HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Minter Creek Hatchery (Source: Washington State Coastal Atlas, WDOE 2006) and Hupp Springs Ponds (Source: Google 2014)

Hatchery Program:	Minter Creek/Hupp Springs Spring Chinook Hatchery Program (Segregated)
Species or Hatchery Stock:	Minter Creek Hatchery White River Spring Chinook *(Oncorhynchus tshawytscha)*
Agency/Operator:	Washington Department of Fish and Wildlife
Watershed and Region:	Minter Creek/South Puget Sound
Date Submitted:	July 29, 2016
Date Last Updated:	June 14, 2016

This page intentionally left blank

Executive Summary

ESA Permit Status:
In 2004, the Washington Department of Fish and Wildlife (WDFW) and the Puget Sound Treaty Tribes (PSTT) submitted a Hatchery Genetic Management Plan (HGMP) for the White River Spring Chinook (WRSC) program at Minter Creek and Hupp Springs hatcheries, under Limit 6 of the 4(d) rule. In a letter from NOAA Fisheries dated August 4, 2004, the Co-managers were informed that NOAA Fisheries anticipated completing a draft Environmental Impact Statement (EIS) by the summer of 2005. NOAA noted that "A final EIS may then be completed by winter 2005-2006, after which time NOAA Fisheries will release ESA 4(d) Rule determinations for the hatchery plans." The letter concluded by stating that "Your work on these hatchery plans is important, and will substantially contribute to on-going salmon recovery efforts within the region." The WDFW provided updated HGMPs to NOAA Fisheries in August 2005.

In May 2016, the Co-managers agreed that the Minter Creek/Hupp Springs WRSC program would be terminated and remaining production would be removed to the WDFW's Puyallup Hatchery. Eggs taken in subsequent years at the Minter Creek facilities will be included as part of the Co-manager-agreed incubation and early rearing of 800,000 sub-yearlings to be provided to the Puyallup Tribe for transfer to their acclimation ponds in the upper White River watershed. No further releases of White River Spring Chinook will take place at Minter Creek or Hupp Springs.

The Co-managers are now re-submitting an HGMP for the Minter Creek/Hupp Springs WRSC sub-yearling program to further update the description of the program and incorporate new information and analyses.

The Puget Sound Chinook ESU is listed as "Threatened" under the ESA, and includes the Hupp Springs Hatchery Program. In the Central and South Sound region, the Technical Recovery Team (TRT) has identified six demographically-independent Chinook populations (DIPs), which includes White River spring Chinook. No native natural-origin Chinook populations exist in Minter Creek (Ruckelshaus et al. 2006).

White River Spring Chinook Program at Minter Creek/Hupp Springs:
The conservation recovery program for WRSC was initiated in 1974; with a change in the funding source in 2012. The purpose of this program has been to serve as a combined gene bank for the *WRSC Recovery Program*. The goal of the WRSC Recovery Plan (1996) is to restore spring Chinook to the White River/Puyallup watershed. This will be achieved when the sustainable escapement goal of 1,000 unmarked spawners per year is met in three out of four consecutive years, with the normal level of incidental sport, commercial and tribal harvest; see also White River Hatchery HGMP (Muckleshoot Tribe). The production will be operated as a "segregated type" program, as defined by the HSRG. A "segregated" program is one in which only identified hatchery-origin individuals are used in the broodstock, and is achieved by using only returning coded-wire tagged (CWT'd) Minter Creek-origin WRSC in the broodstock. Through the 2010 brood, all spring Chinook releases were usually CWT-only (no adipose fin-clips, although differential ventral fin-clips were used in some brood years). As of 2012 (2011 brood), a change in funding source necessitated modifying the program such that all fish (400,000 sub-yearlings) were released marked with both an adipose fin-clip and coded-wire tag (AD+CWT). Releases were CWT-only beginning with brood year 2014 progeny. CWTs are read prior to spawning to ensure that only target WRSC stock is used, and to prevent the inclusion of strays into the gene pool.

The Hatchery Scientific Review Group (2003) recommended that the Co-managers discontinue Hupp Springs releases into the White River, to allow the White River population to locally adapt, and that the WRSC program be maintained exclusively at in-basin facilities. This recommendation was not to be construed as implying that recovery goals for this stock have been fully achieved. Continued hatchery supplementation and habitat improvement are still essential for long-term recovery. The gene banking and conservation role of the Hupp Springs program has been successful in dealing with demographic risks to this stock. The assumption underlying the HSRG's recommendation to halt Hupp Springs releases is that

the benefits of allowing the population in the White River to drive the local adaptation of the stock outweigh current demographic risks to the population.

In May 2016, the Co-managers agreed that the Minter Creek/Hupp Springs WRSC program would be terminated and remaining production would be removed to the WDFW Puyallup Hatchery. Eggs taken in subsequent years at the Minter Creek facilities will be included as part of the Co-manager-agreed incubation and early rearing of 800,000 sub-yearlings to be provided to the Puyallup Tribe for transfer to their acclimation ponds in the upper White River watershed. No further releases of will take place at Minter Creek or Hupp Springs hatcheries.

Risk control measures are in place to address other potential hazards including ecological interactions with ESA-listed species, disease transmission, and facility effects.

Monitoring, Evaluation, and Adaptive Management:
Fish are coded-wire tagged to allow identification at the hatchery rack, and determine contribution to fisheries and hatchery return rate. Funding and resources are currently committed to monitor and evaluate this program as detailed in the *Draft Resource Management Plan for Puget Sound Chinook Salmon Hatcheries* (WDFW and PSTT, March 31, 2004).

1 SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1 Name of hatchery or program.

Minter Creek/Hupp Springs Hatchery Spring Chinook

1.2 Species and population (or stock) under propagation, and ESA status.

The founding spring Chinook *(Oncorhynchus tshawytscha)* stock was derived from the White River (Puyallup Basin). This stock is listed as "*Threatened*" in its native basin, as is the Hupp Springs hatchery stock of White River spring Chinook (WRSC). Reaffirmed threatened by five-year status review, completed August 15, 2011 (76FR50448).

1.3 Responsible organization and individuals

Hatchery Operations Staff Lead Contact

Name (and title): James Jenkins, Region 6 Hatchery Reform and Operations Manager
Agency or Tribe: Washington Department of Fish and Wildlife
Address: 114 Deschutes Way SW, Tumwater, WA 98501
Telephone: (360) 664-0383
Fax: (360) 664-0790
Email: James.Jenkins@dfw.wa.gov

Fish Management Staff Lead Contact

Name (and title): James Losee, District 11 Biologist
Agency or Tribe: Washington Department of Fish and Wildlife
Address: 600 Capitol Way North, Olympia, WA 98501-1091
Telephone: (360) 280-1762
Email: James.Losee@dfw.wa.gov

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

The South Sound Spring Chinook Technical Committee consists of members from WDFW, U.S. Forest Service (USFS), and the Muckleshoot (MIT), Puyallup, Nisqually and Squaxin Island tribes. The *White River Spring Chinook* (*WRSC*) *Recovery Plan* is a cooperative program involving WDFW (Minter Creek and Puyallup hatcheries) and the Tribes (White River Hatchery and White River acclimation ponds).

1.4 Funding source, staffing level, and annual hatchery program operational costs.

Facility	Funding Sources	Operational Information (FY 2013)
Hupp Springs	Puget Sound Recreational Fish Enhancement fund (PSRFE)	Full time equivalent staff (FTEs) = 0.13 Annual operating cost (dollars) $25,000*
Minter Creek Hatchery	PSRFE Fund Aquatic Lands Enhancement Account (ALEA) General Fund – State DJ-Federal Local	FTEs = 5.00 Annual operating cost (dollars) - $572,178

* Coho program only; Chinook programs discontinued at Hupp Springs.

Note: The above information for annual operating cost applies cumulatively to on-station programs at this facility, and cannot be broken out specifically by program.

1.5 Location(s) of hatchery and associated facilities.

Broodstock Source: White River spring Chinook returning to Minter Creek Hatchery.

Table 1.5.1: Location of culturing phases, by facility.

Facility	Culturing Phase	Location
Minter Creek Hatchery	Broodstock collection, Adult holding/ spawning, Incubation, Rearing	Located on Minter Creek (WRIA 15.0048) at RM 0.5; a tributary to Carr Inlet, which enters Henderson Bay (Inlet) on Puget Sound, Washington.
Hupp Springs Rearing Ponds	Rearing, Acclimation	Located at RM 3 on Minter Creek.
Puyallup Hatchery[a]	Rearing, Acclimation	Located at RM 0.8 on Clarks Creek (WRIA 10.0027), a left bank tributary of the lower Puyallup River (WRIA 10.0021) at RM 5.8, which enters Puget Sound at Commencement Bay.

[a] Puyallup Hatchery receives 800,000 green WRSC eggs for rearing and transfer to the Puyallup Tribe for subsequent release from their acclimation ponds in the upper White River. Eggs or fry in excess of program needs may be provided to MIT's WRSC program (see MIT's White River Hatchery Spring Chinook HGMP).

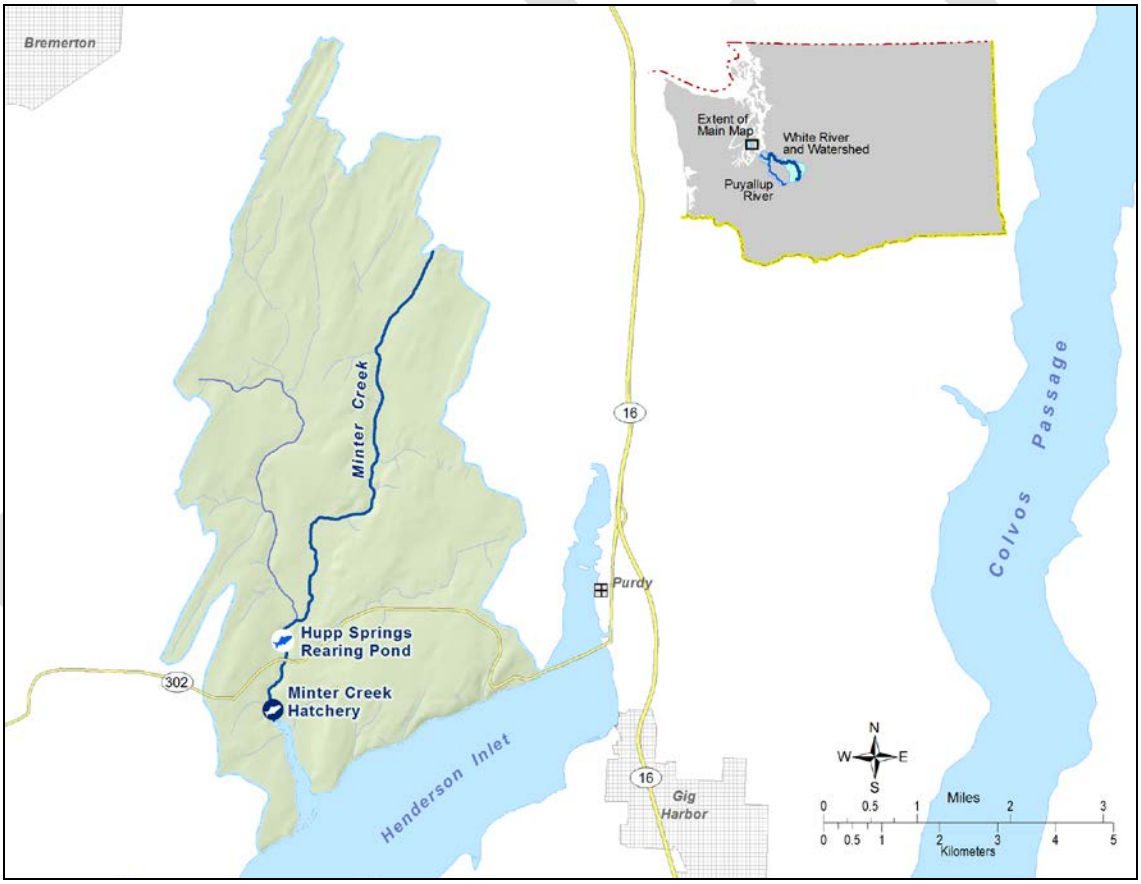

Figure 1.5.1: Map of Minter Creek Hatchery and Hupp Springs rearing ponds. Source: WDFW GIS Unit.

Fry and/or eggs will be shipped to the Puyallup Hatchery for rearing and subsequent transfer to the Puyallup Tribe's White River Acclimation Ponds for release into White River/Puyallup Basin tributaries. Eggs may be provided to the White River Hatchery (Muckleshoot Tribe), as described in HGMP section 1.11. The distribution of any progeny in excess of program needs will be determined annually through the South Sound Spring Chinook Technical Committee.

1.6 Type of program.

Isolated (Segregated) Recovery as a genetic bank for White River/Puyallup Basin spring Chinook recovery.

1.7 Purpose (Goal) of program.

Recovery

1.8 Justification for the program.

This program is part of the Isolated Recovery portion of the *White River Recovery Plan for Spring Chinook* (1996) to enhance the survival of the listed stock by maintaining a source of genetically-protected eggs through the egg bank program conducted at Minter Creek Hatchery and Hupp Springs rearing pond. The goal is to restore White River spring Chinook (WRSC) to the White River/Puyallup Basin watershed. This goal will be achieved when the sustainable escapement goal of 1,000 unmarked spawners per year is met in three out of four consecutive years with the normal level of incidental sport, commercial and tribal harvest; see also White River Hatchery HGMP (Muckleshoot Tribe).

No native natural-origin spring Chinook population exists in Minter Creek that could be impacted by the hatchery program. Interactions with listed salmon populations in Puget Sound are reduced by relying on localized broodstock, by fully imprinting juveniles through rearing at the release site (to minimize straying), and by releasing fish at acclimation ponds, to minimize marine area ecological interactions as programmed in the Future Brood Document.

To minimize impacts on listed fish by WDFW facilities operation and the Minter Creek Hatchery WRSC program, the following Risk Aversions are included in this HGMP:

Table 1.8.1: Summary of risk aversion measures for the White River Spring Chinook program.

Potential Hazard	HGMP Reference	Risk Aversion Measures
Water Withdrawal	4.1	Water rights are formalized through trust water right. Monitoring and measurement of water usage is reported in monthly NPDES reports for Minter Creek only; no NPDES permit is required at Hupp Springs.
Intake Screening	4.2	Intake screens at Minter Creek do not currently meet NMFS screening guidelines. The intake poses no threat to local South Sound tributary Chinook as no natural production of Chinook occurs above the hatchery rack at Minter Creek (no Chinook are passed upstream). Intake screens are scheduled to be replaced.
Effluent Discharge	4.1, 4.2	Minter Creek operates under the "Upland Fin-Fish Hatching and Rearing" National Pollution Discharge Elimination System administered by the Washington Department of Ecology (WDOE). No NPDES permit is required at Hupp Springs.
Broodstock Collection & Adult Passage	2.2.3, 7.9, 8.2	White River spring Chinook (WRSC) produced from this program will be coded-wire tagged to allow positive identification and genetic segregation as adults from fall Chinook returning to Minter Creek Hatchery. Only coded-wire tagged Minter Creek-origin WRSC are used as broodstock. These tags are read prior to spawning to ensure that only White River spring Chinook stock is used in the broodstock and to prevent the inclusion of strays into the gene pool. No listed fish are passed upstream into Minter Creek..

Disease Transmission	9.2.7, 9.2.10	The *Salmonid Disease Control Policy of the Fisheries Co-managers of Washington State* (WDFW and WWTIT 1998, updated 2006) details hatchery practices and operations designed to stop the introduction and/or spread of any diseases.
Competition & Predation	2.2.3, 10.11	Fish are released at a time, size, and life-history stage to foster rapid migration to marine waters.

1.9 List of program "Performance Standards".

See HGMP section 1.10 below. Standards and indicators are referenced from Northwest Power Planning Council (NPPC) Artificial Production Review (NPPC 2001).

1.10 List of program "Performance Indicators", designated by "benefits" and "risks."

1.10.1 "Performance Indicators" addressing benefits.

Table 1.10.1.1: "Performance Indicators" addressing benefits.

Benefits		
Performance Standard	**Performance Indicator**	**Monitoring & Evaluation**
3.1.1 Program contributes to fulfilling tribal trust responsibility mandate and treaty rights, as described in applicable agreements: assure that hatchery operations support *WRSC Recovery Plan* (1996) and *Puget Sound Salmon Management Plan* (*US v Washington*), the Shared Strategy for Salmon Recovery, production and harvest objectives.	Tribal acknowledgement regarding fulfillment of treaty rights/ agreements/ plans.	Participate in annual coordination between co-managers to identify and report on issues of interest, coordinate management, and review programs.
3.1.2 Program contributes to mitigation requirements.	Achieve annual escapement goal of 1,000 spawners (White River) in three of four consecutive years with normal level of incidental sport, tribal and commercial harvest.	Survival and contribution to spawning population will be estimated for each brood year released.
3.1.3 Program addresses ESA responsibilities.	Program complies with Federal ESA-listed fish take authorizations for harvest and hatchery actions.	HGMP updated and re-submitted to NOAA with significant changes or under permit agreement.
3.3.1 Artificial propagation program contributes to an increasing number of spawners returning to natural spawning areas.	Annual numbers of spawners/redd counts on the spawning ground/natural production areas.	Returning fish are sampled in fisheries, at the hatcheries, and on the spawning ground for CWT recovery. Numbers of estimated hatchery (marked) and natural (unmarked) are recorded annually. Program goal met when 1,000 unmarked spawners per year are observed in three out of four consecutive years with the normal level of incidental sport, commercial and tribal harvest.
3.3.2 Releases are sufficiently marked to allow statistically significant evaluation of program	Percentage of total hatchery releases mass-marked (fin-clip, CWT, otolith-mark, other, etc.,	Annually monitor and record size, number, date of release and mass-mark quality (adipose fin-

contribution to natural production, and to evaluate effects of the program on the local natural population.	depending on species) in out-migrant juveniles to allow for their differentiation from naturally-produced fish.	clip rate) of all hatchery releases. Annually sample returning fish for CWT recovery in fisheries, at the hatchery and on the spawning grounds; record numbers of estimated hatchery (marked) and natural (unmarked) fish.
3.4.1 Fish collected for broodstock are taken throughout the return or spawning period in proportions approximating the timing and age distribution of population from which broodstock is taken.	Broodstock collection is conducted representatively and systematically throughout the entire return period.	Collect annual run timing, age and sex composition and spawning escapement timing data. Adhere to WDFW spawning guidelines (Seidel 1983; HSRG 2004).
3.5.5 Juveniles are released at fully-smolted stage to benefit juvenile to adult survival rates, and reduce the likelihood for residualism and negative ecological interactions with natural-origin fish.	Smoltification (size fpp/mass CV and condition factor) and behavior monitored in the hatchery (Chinook sub-yearling = 50-80 fpp).	Condition of fish monitored in the hatchery throughout rearing stages. Annually monitor size number, date of release.
3.6.1 The hatchery program uses standard scientific procedures to evaluate various aspects of artificial propagation.	Apply minimal monitoring standards in the hatchery: food conversion rates, growth trajectories, mark/tag rate error, weight distribution (CV). Implement measures for broodstock management to maintain integrity and genetic diversity. Maintain effective population size.	Adhere to HSRG (2004) and WDFW spawning guidelines (Seidel 1983). Adults are collected throughout the spawning run in proportion to timing, age and sex composition of return. Collect annual run timing, age and sex composition data upon adult return. Gamete exchange between Minter Creek spring Chinook and the WRSC Recovery Program at White River Hatchery may be used to help maintain genetic integrity for the broodstock (see HGMP section 8.2). Annually record growth rates, mark rate, size at release and release dates.
3.6.2 The artificial propagation program is monitored and evaluated on an appropriate schedule to address progress towards achieving the objective and evaluate beneficial and adverse effects on natural populations.	Monitoring and evaluation framework included detailed timeline. Annual and final reports.	Collect and report annual returns to hatchery, age and sex composition and return timing data. Annually monitor and report harvests and returns to the hatcheries and spawning grounds throughout the entire run. Recovery Program goal is met when 1,000 unmarked spawners per year are observed in three out of four consecutive years with the normal level of incidental sport, commercial and tribal harvest.

3.8.3 Non-monetary societal benefits for which the program is designed are achieved.	Contributes to the cultural benefit that fishing provides. Fish available for tribal ceremonial use.	Annual harvest of hatchery fish based on CWT recovery analysis and creel surveys.

1.10.2 "Performance Indicators" addressing risks.

Table 1.10.2.1: "Performance indicators" addressing risks.

Risks		
Performance Standard	**Performance Indicator**	**Monitoring & Evaluation**
3.1.3 Program addresses ESA responsibilities.	Program complies with Federal ESA-listed fish take authorizations for harvest and hatchery actions.	HGMP is updated to reflect any major changes in program and resubmitted to NOAA fisheries. Program risks have been addressed in this HGMP through best available science hatchery management actions. Monitor juvenile hatchery fish size, number, date of release and mass-mark quality; monitor contribution of hatchery adult fish to fisheries and hatchery escapement.
3.2.2 Release groups are sufficiently marked in a manner consistent with information needs and protocols to enable determination of impacts to natural- and hatchery-origin fish in fisheries.	Number of marks released and estimated proportion of marks in out-migrant juveniles and returning adults on the spawning ground. Production fish are marked (CWT, otolith-mark, etc., depending on species) to allow for their differentiation from naturally produced fish.	Annually monitor and record size, number, date of release and mark quality (CWT rate) of all hatchery releases. Annual harvest of marked hatchery fish based on CWT recovery estimates (RMIS) and creel surveys.
3.3.1 Hatchery program contributes to an increasing number of spawners returning to natural spawning areas.	Total number of spawners, categorized by origin, are monitored (pHOS, spawner-recruit ratios).	No historic natural-origin spring Chinook population in the Minter Creek system (Ruckelshaus et al. 2006). Eggs or fry provided to Tribal acclimation facilities as part of the WRSC Recovery Program through 2020.
3.3.2 Releases are sufficiently marked to allow statistically significant evaluation of program contribution to natural production and to evaluate effects of the program on the local natural population.	All hatchery production is identifiable in some manner (fin-marks, tags, otolith, etc.) consistent with information needs.	Annually monitor and record size, number, date of release and mark quality (CWT) of all Minter/Hupp hatchery program releases. Examine returning fish encountered for the CWT in fisheries, at the hatcheries, and on the spawning ground. Annually record and report numbers of estimated hatchery (marked) and natural (unmarked).
3.4.1 Fish collected for broodstock are taken throughout the return or	Collection of broodstock is done randomly throughout the entire return period.	Collect annual run timing, age and sex composition and return timing data.

spawning period in proportions approximating the timing and age distribution of population from which broodstock is taken.		Adhere to HSRG (2004) and WDFW spawning guidelines (Seidel 1983).
3.4.2 Broodstock collection does not significantly reduce potential juvenile production in natural rearing areas.	Number of spawners of natural-origin removed for broodstock.	No native natural-origin spring Chinook population exists in Minter Creek that could be impacted by the hatchery program (Ruckelshaus et al. 2006).
3.4.3 Life history characteristics of the natural population do not change as a result of this hatchery program.	Life history patterns of juvenile and adult NOR are stable.	Unknown. Plan in progress to annually monitor for production levels – age and size data collected.
3.5.1 Patterns of genetic variation within and among natural populations do not change significantly as a result of artificial production.	Within and between populations, genetic structure is not affected by artificial production.	Currently not monitored
3.5.2 Collection of broodstock does not adversely impact the genetic diversity of the naturally-spawning population.	Collection of broodstock is done randomly throughout the entire return period.	No natural-origin spring Chinook population exists on Minter Creek (Ruckelshaus et al. 2006). Annual run timing, age and sex composition and return timing data are collected.
3.5.3 Hatchery-origin adults in natural production areas do not exceed appropriate proportion of the total natural spawning population.	The ratio of observed and/or estimated total numbers of artificially-produced fish on natural spawning grounds, to total number of naturally-produced fish (pHOS).	Not applicable - no natural-origin spring Chinook population exists on Minter Creek (Ruckelshaus et al. 2006).
3.5.4 Juveniles are released on-station, or after sufficient acclimation to maximize homing ability to intended return locations.	Release location of juveniles; length of acclimation period; release type (forced, volitional, or direct). Proportion of adult returns to program's intended return location, compared to fisheries and artificial or natural production areas.	Annual release information, including location, method, type and age class are recorded in WDFW Hatcheries Headquarters Database. Annually CWT a portion of the releases to enable evaluation of fisheries contribution, survival rates, possible straying to other watersheds, and identification to release site. Annually report CWT release data to RMIS.
3.5.5 Juveniles are released at fully-smolted stage.	Level of smoltification at release (50-80 fpp for sub-yearling Chinook). Release type (forced, volitional or direct).	Condition of fish monitored in the hatchery throughout rearing stages. Annually monitor size, number, date of release and release type.
3.5.6 The number of adults returning to the hatchery that exceeds broodstock needs is declining.	Program is sized appropriately for harvest goals. Numbers of surplus hatchery returns are calculated annually.	Annually record numbers of adults returning to the hatchery, broodstock collected, and surplus returns.
3.6.1 The artificial production program uses standard scientific procedures to evaluate various aspects of artificial propagation.	Apply minimal monitoring standards in the hatchery: food conversion rates, growth trajectories, mark/tag rate error, weight distribution (CV).	Annual run timing, age and sex composition data are collected upon adult return. Growth rates, mark rate and size at

		release and release dates are recorded annually. Adhere to HSRG (2004) and WDFW spawning guidelines (Seidel 1983).
3.7.1 Hatchery facilities are operated in compliance with all applicable fish health guidelines and facility operation standards and protocols (IHOT, PNFHPC, WDFW Fish Health Policy, INAD, MDFWP).	Annual reports indicating levels of compliance with applicable standards and criteria. Periodic audits indicating level of compliance with applicable standards and criteria.	Pathologists from WDFW's Fish Health Section monitor program monthly. Exams performed at each life stage may include tests for virus, bacteria, parasites and/or pathological changes, as needed. The program is operated consistent with the *Co-Managers of Washington Salmonid Disease Control Policy* (WDFW and WWTIT 1998, updated 2006).
3.7.2 Effluent from hatchery facility will not detrimentally affect natural populations.	Discharge water quality compared to applicable water quality standards and guidelines by NPDES, and the *Co-Managers of Washington Salmonid Disease Control Policy* (WDFW and WWTIT 1998, updated 2006).	Flow and discharge reported in monthly NPDES reports.
3.7.3 Water withdrawals and in-stream water diversion structures for artificial production facility operation will not prevent access to natural spawning areas, affect spawning behavior of natural populations, or impact juvenile rearing environment.	Water withdrawals compared to NMFS, USFWS and WDFW applicable passage and screening criteria for juveniles and adults.	Barrier and intake structure compliance assessed and needed fixes are prioritized.
3.7.4 Releases do not introduce pathogens not already existing in the local populations, and do not significantly increase the levels of existing pathogens.	Certification of fish health during rearing and immediately prior to release, including pathogens presence and virulence.	WDFW Fish Health Section inspects adult broodstock yearly for pathogens and monitor juvenile fish on a monthly basis to assess health and detect potential disease problems. As necessary, WDFW's Fish Health Section recommends remedial or preventative measures to prevent or treat disease, with administration of therapeutic and prophylactic treatments as deemed necessary. A fish health database will be maintained to identify trends in fish health and disease and implement fish health management plans based on findings.
	Release and/or transfer exams for pathogens and parasites.	Examine fish 1 to 6 weeks prior to transfer or release, in accordance with the *Co-managers' Salmonid disease control policy* (WDFW and WWTIT 1998, updated 2006).

	Inspection of adult broodstock for pathogens and parasites.	At spawning, lots of 60 adult broodstock are examined for pathogens.
	Inspection of off-station fish/eggs prior to transfer to hatchery for pathogens and parasites.	Controls of specific fish pathogens through eggs/fish movements are conducted in accordance to the *Co-managers' Salmonid disease control policy* (WDFW and WWTIT 1998, updated 2006) (WDFW and WWTIT 1998, updated 2006).
3.7.5 Any distribution of carcasses or other products for nutrient enhancement is accomplished in compliance with appropriate disease control regulations and guidelines, including state, tribal and federal carcass distribution guidelines.	All applicable fish disease policies are followed.	Conduct controls of specific fish pathogens through eggs/fish movements in accordance with the *Co-managers' Salmonid disease control policy* (WDFW and WWTIT 1998, updated 2006) (WDFW and WWTIT 1998, updated 2006). Record disposition of carcasses in the WDFW Hatcheries Headquarters Database.
3.7.6 Adult broodstock collection operation does not significantly alter spatial and temporal distribution of any naturally-produced population.	Spatial and temporal spawning distribution of natural populations above and below weir/trap currently compared to historic distribution.	No native natural-origin spring Chinook population exists in Minter Creek that could be impacted by the hatchery program (Ruckelshaus et al. 2006).
3.7.7 Weir/trap operations do not result in significant stress, injury or mortality in natural populations.	All observations of natural-origin fish at hatchery facilities are recorded and reported annually	Trap checked daily. Natural- and hatchery-origin fish recorded annually.
3.7.8 Predation by artificially produced fish on naturally – produced fish does not significantly reduce numbers of natural fish.	Hatchery juveniles are raised to smolt-size and transferred from the hatchery for release at acclimation ponds at a time that fosters rapid migration downstream.	Not available.

1.11 Expected size of program.

1.11.1 Proposed annual broodstock collection level (maximum number of adult fish).

All returning spring Chinook will be spawned. In May 2016, the Co-managers agreed that the Minter Creek/Hupp Springs White River Spring Chinook (WRSC) program would be terminated and remaining production would be removed to the WDFW Puyallup Hatchery on Clarks Creek. Eggs taken in subsequent years at the Minter Creek facilities will be included as part of the Co-manager-agreed incubation and early rearing of 800,000 sub-yearlings to be provided to the Puyallup Tribe for transfer to their acclimation ponds in the upper White River watershed. No further releases of White River spring Chinook will take place at Minter Creek or Hupp Springs. Eggs or fry in excess of program goals will also be made available for transfer to acclimation ponds in the upper White River watershed as determined by the South Sound Spring Chinook Technical Committee. Initial rearing for fry destined for the acclimation ponds will be completed at the Puyallup Hatchery.

1.11.2 Proposed annual fish release levels (maximum number) by life stage and location.

All remaining eggs taken by WDFW at Minter/Hupp, and all remaining eggs taken by MIT's White River Hatchery, up to the level of 800,000 fry agreed by the Co-managers, will be hatched and reared at the WDFW Puyallup Hatchery on Clarks Creek. These fish will be provided to the Puyallup Indian Tribe for marking (vent-clip only) and transported to the White River Acclimation Ponds. Transfers from the Minter Creek facilities will continue until adult returns to Minter Creek cease in 2020..

1.12 Current program performance, including estimated smolt-to-adult survival rates, adult production levels, and escapement levels. Indicate the source of these data.

The average smolt-to-adult survival rate (SAR) for brood years 2000-2009 was 0.32% (sub-yearling) (RMIS 2014). SAR for yearling releases, which were discontinued with the 2011 brood, was 0.04%.

Although RMIS analyses indicate harvest rates near 20% (**Table 3.3.1.1**), it is likely that Canadian harvest has been under-reported. It is expected that the change in the mass-marking program in 2012-13 (see HGMP section 10.7) will provide more accurate information on harvest in pre-terminal fisheries.

Table 1.12.1: White River Spring Chinook escapement levels (including jacks) back to Minter Creek Hatchery 2003-2014.

Year	Escapement
2003	551
2004	789
2005	488
2006	1,320
2007	2,295
2008	1,164
2009	672
2010	365
2011	715
2012	331
2013	682
2014	383
2015	239
Average	**815**

Source: WDFW Hatcheries Headquarters Database 2016.

1.13 Date program started (years in operation), or is expected to start.

The WRSC program at Minter Creek was initiated as a conservation program in 1974. Due to a change in funding source, the program continued with a segregated harvest component during 2012-2013, while providing support to the WRSC Recovery Program. Beginning with return year 2016, WDFW will continue to collect adult spring Chinook at Minter Creek and spawn them through the 2020 return.

1.14 Expected duration of program.

Through the 2020 return year.

1.15 Watersheds targeted by program.

Minter Creek (WRIA 15.0048)/Puget Sound.

The White River (WRIA 10.0031) will receive transfers of fry to the Puyallup Indian Tribe's acclimation ponds as available (HGMP section 1.11.2), following initial rearing at the WDFW Puyallup Hatchery on Clarks Creek. Gametes may be transferred between the Minter/Hupp facilities and the Muckleshoot Tribe's WRSC program to maintain genetic integrity, depending upon need and availability, as determined by the South Sound Spring Chinook Technical Committee.

1.16 Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.

1.16.1 Brief Overview of Key Issues:

As per the *Puget Sound Salmon Management Plan* (PSSMP 1985), any alternative actions to be taken to attain program goals need to be agreed to by affected parties. The PSSMP explicitly states that "no change may be made to the Equilibrium Brood Document (production goals) without prior agreement of the affected parties." Any changes to production goals will be reviewed by WDFW and the Puyallup and Muckleshoot Tribes.

Spring Chinook in Minter Creek are collected at the trap at Minter Creek Hatchery. The eggs are incubated at Minter Creek Hatchery, and then transferred to the WDFW Puyallup Hatchery for early-rearing. In previous years, broodstock were spawned at Hupp Springs or Minter Creek facilities, incubated at Minter Creek, and reared and released at Hupp Springs, with a portion shipped to the Puyallup Tribe's White River acclimation ponds. The program was modified in 2012, and egg-take for the core program was decreased from 800,000 to 550,000 to reflect then-current program and funding sources.

In May 2016, the Co-managers agreed that the Minter Creek/Hupp Springs White River Spring Chinook program would be terminated and remaining production would be removed to the WDFW Puyallup Hatchery. Eggs taken in subsequent years at the Minter Creek facilities will be included as part of the Co-manager-agreed incubation and early-rearing of 800,000 sub-yearlings to be provided to the Puyallup Tribe for transfer to their acclimation ponds in the upper White River watershed. No further releases of White River Spring Chinook will take place at Minter Creek or Hupp Springs facilities.

1.16.2 Potential Alternatives to the Current Program:

Alternative 1: Modify the release time: split program into sub-yearling and yearling components, released from Minter Creek Hatchery. Poor survival of yearling releases in recent years resulted in the termination of the yearling portion of the program. All sub-yearlings from this program will be released from the Puyallup Tribe's upper White River acclimation ponds through brood year 2020.

Alternative 2: Continue the program as a gene bank for the White River Spring Chinook Recovery process. This action is contrary to Co-manager intent and HSRG recommendations (2003), that WDFW "discontinue Hupp Springs releases into the White River, to allow the White River population to locally adapt. The White River spring chinook program should be maintained exclusively at in-basin facilities. This recommendation should not be construed as implying that recovery goals for this stock have been fully-achieved. Continued hatchery supplementation and habitat improvement are still essential for long-term recovery."

Alternative 3: Increase production at Minter Creek/Hupp Springs to include a conservation component. This action would help maintain the original intent of the conservation program to maintain White River-origin spring Chinook at the Minter Creek/Hupp Springs facilities. In November 2014, the Co-managers agreed to an additional 200,000 sub-yearlings, released CWT-only (no adipose fin-clip) to preserve this portion of the spring Chinook return against local mark-selective fisheries. To accomplish this, the spring Chinook egg-take was increased to 800,000, and the fall Chinook sub-yearling program release goals were reduced by 500,000, beginning in brood year 2015.

1.16.3 Potential Reforms and Investments:

N/A

2 SECTION 2. PROGRAM EFFECTS ON NMFS ESA-LISTED SALMONID POPULATIONS. (USFWS ESA-Listed Salmonid Species and Non-Salmonid Species are addressed in Addendum A)

2.1 List all ESA permits or authorizations in hand for the hatchery program.

None currently. This HGMP was submitted to the NOAA Fisheries for ESA consultation and determination regarding compliance of the plan with ESA section 4(d) rule criteria for joint state/tribal hatchery resource management plans affecting listed Chinook salmon and steelhead in 2004. It is now currently being resubmitted for approval.

2.2 Provide descriptions, status, and projected take actions and levels for NMFS ESA-listed natural populations in the target area.

2.2.1 Description of NMFS ESA-listed salmonid population(s) affected by the program.

- Identify the NMFS ESA-listed population(s) that will be directly affected by the program.

Minter Creek Chinook are not considered a viable population segment in the Puget Sound ESU.

"**Hupp Springs" spring Chinook** – the hatchery population is included in the listed Puget Sound Chinook ESU (70 FR 37160).

- Identify the NMFS ESA-listed population(s) that may be incidentally affected by the program.

Puget Sound Chinook (*Oncorhynchus tshawytscha*): Listed as *Threatened* on March 24, 1999 (64FR14308); *Threatened* status reaffirmed on June 28, 2005 (70FR37160); reaffirmed *Threatened* by five-year status review, completed August 15, 2011 (76FR50448). The Puget Sound Chinook salmon ESU is composed of 31 historically quasi-independent populations, of which 22 are believed to be extant currently. The ESU includes all naturally-spawned populations of Chinook salmon from rivers and streams flowing into Puget Sound including the Strait of Juan De Fuca from the Elwha River, eastward, including rivers and streams flowing into Hood Canal, South Sound, North Sound and the Strait of Georgia in Washington (Ford 2011), as well as twenty-seven artificial propagation programs, including White River Hatchery, White Acclimation Pond, and Hupp Springs spring chinook hatchery stocks (NMFS Draft 2013 78FR38270). The Technical Recovery Team (TRT) did not find any evidence that an independent population of Chinook salmon existed in Minter Creek or other nearby South Sound tributaries (Ruckelshaus et al. 2006).

Puget Sound steelhead *(Oncorhynchus mykiss*): Listed as *Threatened* under the ESA on May 11, 2007 (72FR26722); reaffirmed *Threatened* by five-year status review, completed August 15, 2011 (76FR50448). The DPS includes all naturally spawned anadromous winter-run and summer-run *O. mykiss* (steelhead) populations, below natural migration barriers in the river basins of the Strait of Juan de Fuca, Puget Sound, and Hood Canal, Washington (Ford 2011). Also includes steelhead from six artificial propagation programs: Green River Natural; White River Winter Steelhead Supplementation; Hood Canal Steelhead Supplementation Off-station Projects in the Dewatto, Skokomish, and Duckabush Rivers; and the Lower Elwha Fish Hatchery Wild Steelhead Recovery (NMFS 2013 78FR38270). This DPS is bounded to the west by the Elwha River (inclusive) and to the north by the Nooksack River and Dakota Creek (inclusive), and also includes the Green River natural and Hood Canal winter-run steelhead hatchery stocks. In the

South Puget Sound region, the TRT has preliminarily delineated one demographically independent population (DIP) of winter steelhead; (South Puget Sound), no summer run populations were identified in the region (PSSTRT 2013).

2.2.2 Status of NMFS ESA-listed salmonid population(s) affected by the program.

- Describe the status of the listed natural population(s) relative to "critical" and "viable" population thresholds.

Minter Creek fall Chinook in the Puget Sound Chinook ESU. Chinook in Minter Creek are not considered a viable population segment in the Puget Sound ESU nor is the hatchery population included in NOAA Fisheries Hatchery Listing Policy (June 28, 2005).

White River spring Chinook (WRSC) in the Puget Sound Chinook ESU. NMFS (1999) considered this stock to be part of the ESU and essential for recovery. The hatchery population was listed with natural-origin spring Chinook salmon that are part of the White River population (70 FR 37160 June 28, 2005; NMFS SHIEER 2004). Minter Creek Hatchery spring Chinook stock is the continuation of the original Hupp Springs program, for broodstock maintenance.

White River spring Chinook are designated Category 2a, as the hatchery stocks were founded using native WRSC for a restoration program. As a measure to maintain the integrity of the donor stock, the Hupp Springs and White River hatchery programs only used returning marked hatchery-origin adults, in order to ensure that other Chinook stocks are not inadvertently incorporated. The hatchery population is currently listed under the ESA with its founding Hupp Springs hatchery population. This program provides a substantial benefit to VSP parameters for the WRSC salmon population, a unique population that is important for recovery of the Puget Sound Chinook salmon ESU to a viable level (Good et al 2005).

The Hupp Springs (Minter Creek) program. The hatchery has provided a genetic reserve for the White River population. Specific measures are applied to maintain the genetic integrity and diversity of the propagated population. Only known (coded-wire tagged) hatchery-origin WRSC are used as broodstock in order to prevent inadvertent incorporation of stray Chinook from other populations. Most of the spring Chinook juveniles produced by the program are released on-station, outside of the natural range for the reference population (SHIEER 2004). WDFW considers the WRSC to be a primary population, relative to HSRG guidelines (2004).

Table 2.2.2.1: White River Chinook (Central/South Puget Sound), minimum viability spawning abundance and abundance at equilibrium or replacement, and spawning A/P at MSY for a recovered state as determined by EDT analyses of properly functioning conditions and expressed as a Beverton-Holt function. The TRT minimum viability abundance was the equilibrium abundance or 17,000, whichever was less.

Region and population	TRT minimum viability abundance	Under properly functioning conditions (PFC)			NMFS Escapement Thresholds	
		Equilibrium abundance	Spawners at MSY	Productivity at MSY	Critical[a]	Rebuilding[b]
White River	14,200	14,200	3,200	3.2	[c]200	[d]1,100
ESU	**261,300**	**307,500**	**70,948**	**3.2**	**3,875**	**2,785**

Source: Ford 2011; NMFS 2011b.

[a] Critical natural-origin escapement thresholds under current habitat and environmental conditions (McElhaney et al. 2000; NMFS 2000).

[b] Rebuilding natural-origin escapement thresholds under current habitat and environmental conditions (McElhaney et al. 2000; NMFS 2000).

[c] Based on generic VSP guidance (McElhaney et al. 2000; NMFS 2000).

[d] Based on alternative habitat assessment.

Puget Sound Chinook salmon Updated Risk Summary. All Puget Sound Chinook populations are below the TRT planning range for recovery escapement levels. Most populations are also consistently below the spawner recruit levels identified by the TRT as consistent with recovery. Across the ESU, most populations have declined in abundance somewhat since the last status

review in 2005, and trends since 1995 are mostly flat. Several of the risk factors identified by Good et al. (2005) are also still present, including high fractions of hatchery fish in many populations and widespread loss and degradation of habitat. Many of the habitat and hatchery actions identified in the Puget Sound Chinook recovery plan are expected to take years or decades to be implemented and to produce significant improvements in natural population attributes, and these trends are consistent with these expectations. Overall, the new information on abundance, productivity, spatial structure and diversity since the 2005 review does not indicate a change in the biological risk category since the time of the last BRT status review (Ford 2011).

White River winter-run steelhead in the Puget Sound steelhead DPS. Steelhead counts in the White River have declined steadily since the 1980s. The estimated probability that this steelhead population would decline to 10% of its current estimated abundance (i.e., to 26 fish) is high—about 90% within 50 years. With an estimated mean population growth rate of −0.062 ($\lambda = 0.940$) and process variance of 0.002, NOAA was highly confident ($P < 0.05$) that a 90% decline in this population will not occur within the next 25 years (but will occur within 60 years), and that a 99% decline will not occur within the next 50−55 years (but will occur within 100 years). However, beyond the next 20 years NOAA was highly uncertain about the precise level of risk. Based on a preliminary estimate by the Puget Sound Steelhead Technical Recovery Team (PSSTRT 2013), the Intrinsic Potential (IP) was considerably higher than current population size, at 17,490 to 34,981 fish.

South Puget Sound winter-run steelhead in the Puget Sound steelhead DPS. The status of winter-run steelhead in the South Puget Sound is currently unknown. Based on a preliminary IP estimate by the PSSTRT (2013), the IP-based estimate range for capacity was 9,854 - 19,709 steelhead.

Puget Sound Steelhead: Updated Risk Summary. The number of winter steelhead spawners has increased for many populations in Puget Sound since 2009. The number of spawners for 16 Puget Sound winter steelhead populations, relative to the average number of spawners for each population in the four year period up to the listing in 2007, increased from an average of 51% in 2009 to 141% in 2013.

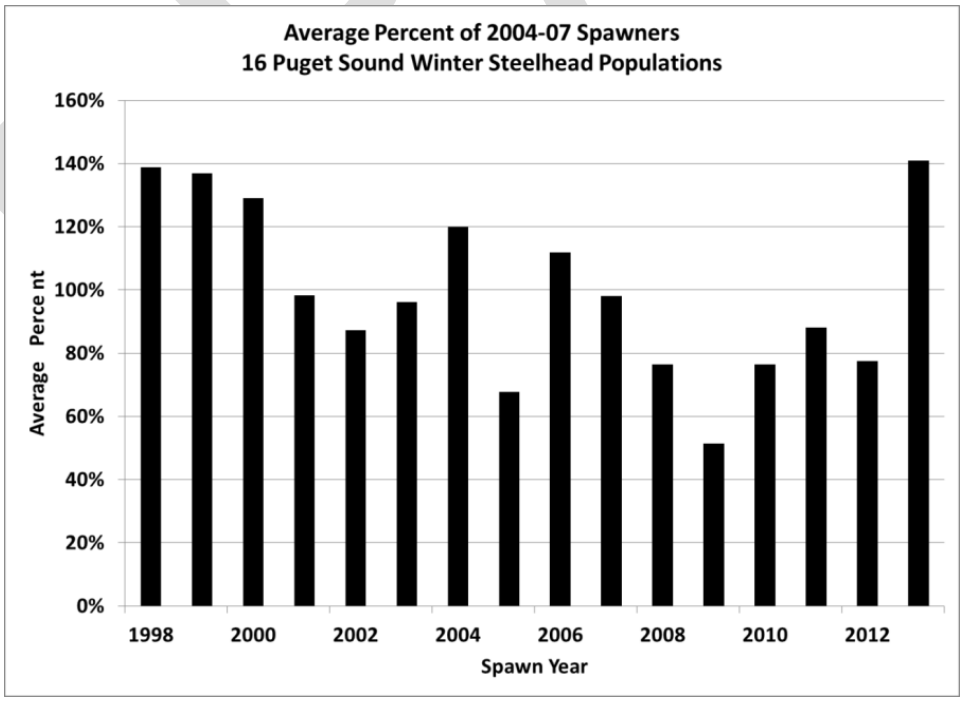

Figure 2.2.2.1: Average percent of 2004-2007 spawners for 16 Puget Sound winter steelhead populations.

These recent, short-term increases in spawners are a positive development, but do not negate the long-term risks facing Puget Sound steelhead DPS. Using spawner data collected through 2008 or 2009, Ford (2011) concluded that the status of the listed Puget Sound steelhead DPS has not changed substantially since the 2007 listing, and that steelhead in the Puget Sound DPS remain at risk of extinction throughout all or a significant portion of their range in the foreseeable future but are not currently in danger of imminent extinction.

- Provide the most recent 12 year (e.g. 1988-present) progeny-to-parent ratios, survival data by life-stage or other measures of productivity for the listed population.

South Puget Sound Chinook (*Oncorhynchus tshawytscha*): Listed Chinook populations are not known to occur in the South Puget Sound (see HGMP section 2.2.2).

Table 2.2.2.2: Puget Sound Chinook population average productivity for five-year intervals measured as recruits per spawner (R/S) and spawners per spawner (S/S). Trend over the intervals is also given.

Brood Year	1982-1986		1987-1991		1992-1996		1997-2001		2002-2006		Trend	
Populations	R/S	S/S	R/S	S/S	R/S	S/S	R/S	S/S	R/S	S/S	R/S	S/S
White	*30.62*	*17.18*	*4.12*	*1.94*	*1.52*	*1.08*	*5.15*	*2.5*	*1.5*	*1.28*	*-5.72*	*-3.12*
ESU	*9.57*	*2.19*	*5.05*	*0.96*	*3.01*	*1.24*	*2.70*	*1.19*	*1.67*	*0.67*	*-1.81*	*-0.28*

Source: Ford 2011

Table 2.2.2.3: Short- and long-term population trend and growth rate estimates for the Puget Sound White River spring Chinook ESU population.

Regions and Populations	Years	Trend Natural Spawners w/CI	Hatchery Fish Success = 0 Lambda w/CI	p>1	Hatchery Fish Success = 1 Lambda w/CI	p>1
White River Spring Run	1995-2009	1.102 (1.034 - 1.175)	1.128 (0.583 - 2.185)	0.87	1.07 (0.499 - 2.295)	0.77
	1965-2009	1.035 (1.003 - 1.068)	1.02 (0.859 - 1.21)	0.60	0.989 (0.841 - 1.161)	0.44

Source: Ford 2011

South Puget Sound winter-run steelhead (*Oncorhynchus mykiss*): Productivity data for South Puget Sound winter-run steelhead is not available.

Table 2.2.2.4: Steelhead Population Exp. Trend ln(nat. spawners) (95% CI).

Population	1985-2009	1995-2009
Puyallup River winter-run	0.919 (0.899 - 0.938)	0.902 (0.850 - 0.957)
South sound tributaries winter run	Not calculated	Not calculated

Source: Ford 2011.

- Provide the most recent 12 year (e.g. 1988-1999) annual spawning abundance estimates, or any other abundance information. Indicate the source of these data.

Table 2.2.2.5. White River spring Chinook trucked above Mud Mountain Dam (White River).

Year	NORs	Acclimation Pond	HORs	Total
2004	1,224	251	19	1,494
2005	1,002	568	108	1,679
2006	1,002	710	165	1,877
2007	1,015	2,732	1,004	4,751
2008	967	638	554	2,159
2009	303	277	284	864
2010	306	362	126	794
2011	588	983	369	1,939
2012	1,107	1,119	204	2,431
2013	910	2,734	873	4,517
2014	245	637	105	987
2015	420	736	472	1,628

Source: T. Livingood Schott, WDFW Area Biologist, 2016.

South Puget Sound Chinook (*Oncorhynchus tshawytscha*): Listed Chinook populations are not known to occur in independent streams of the South Puget Sound (see HGMP section 2.2.2).

South Puget Sound winter-run steelhead (*Oncorhynchus mykiss*): Limited spawning surveys have been conducted by WDFW staff in recent years. These surveys have not documented the presence of adult steelhead or redds in any of the streams monitored.

- Provide the most recent 12 year (e.g. 1988-1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.

South Puget Sound Chinook (*Oncorhynchus tshawytscha*): Listed Chinook populations are not known to occur in the South Puget Sound independent tributaries (see HGMP section 2.2.2).

Table 2.2.2.6: Puget Sound Chinook average natural (natural origin and hatchery) and natural origin only spawners and percent hatchery contributions for five year intervals. Spawning abundance averages are geometric means and hatchery contribution averages are arithmetic.

Return Years	1990-1994			1995-1999			2000-2004			2005-2009		
Populations	**Nat**	**%**	**NOR**	**Nat**	**%**	**NOR**	**Nat**	**%**	**NOR**	**Nat**	**%**	**NOR**
White	322	25%	230	487	17%	392	1,353	12%	1,184	1,869	30%	1,306
ESU	23,938	75%	17,905	27,392	63%	17,245	43,192	72%	31,294	34,486	69%	23,938

Source: Ford 2011

South Puget Sound winter-run steelhead (*Oncorhynchus mykiss*): Hatchery steelhead are not currently released in South Puget Sound, and the level of hatchery winter run steelhead spawners straying from outside the basin is unknown. Due to timing differences between early Chambers stock steelhead and a majority of the existing natural-origin winter or summer stocks (February – June), interaction on the spawning grounds is unclear.

2.2.3 Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of NMFS listed fish in the target area, and provide estimated annual levels of take.

- Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.

Sub-yearling Chinook are released as zero-age smolts to mimic the size of any naturally-produced out-migrants minimizing potential predation and at a time to minimize competition (Steward and Bjornn 1990) with emigrating natural-origin listed fish. At release, hatchery fish were a little larger, but not large enough to prey upon natural-origin out-migrants. The USFWS (1994) has suggested that juvenile salmonids can consume fish which are one-third or less of their own body length. Given this rule of thumb and approximate sizes of hatchery and wild fish at the time Chinook are released from Minter Creek, predation by hatchery smolts is not expected to be a significant problem.

There is no natural origin Chinook population in the watershed where the hatchery is located (Ruckelshaus et al. 2006). The hatchery program does not block or hinder juvenile or adult salmon migration of any natural Chinook salmon populations. Water intake screening for the hatchery is in compliance with NMFS screening criteria.

For Minter Creek spring Chinook fry provided to the WRSC Recovery Program, take will be associated with hatchery recovery operations – collection, holding and spawning of adults, and mortality incurred during incubation and rearing. Under normal operation parameters, adverse risks associated with the above activities should be/have been minimal. Actual average take levels are listed in **Table 2.2.3.1**. NMFS will be notified if take levels exceed these minimum levels in any of the categories.

The risk of predation by hatchery-origin sub-yearling White River spring Chinook on naturally-produced White River spring Chinook is considered low. These fish do not interact in the freshwater environment, as they occur in different watersheds. Impacts of hatchery-origin White River spring Chinook on local, South Sound tributary stocks are also considered low as these fish out-migrate at approximately the same size.

- Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish.

See **Table 2.2.3.1**.

- Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (*to the extent feasible*) by the type of take resulting from the hatchery program (*e.g. capture, handling, tagging, injury, or lethal take*).

All returning spring Chinook at Minter Creek are trapped for broodstock.

Table 2.2.3.1: Average take levels from the hatchery program:

Mortality Type	Average
Pre-spawning	*14%
Egg-to-fry	9%
Fry-to-release	7%

* Range = 5 to 28%; all surviving adults are spawned.

See "Take" table at end of document.

- Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.

Since a portion of the Minter Creek spring Chinook production may be provided for release in the Puyallup Tribe's White River acclimation ponds (as a component of the WRSC Recovery Program), all spawning, incubation, rearing and disease guidelines are followed to prevent any take levels from exceeding average levels. NOAA Fisheries will be notified if levels are expected to exceed the take in any specific category of the WRSC program.

3 SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1 Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (*e*.g. the NPPC *Annual Production Review* Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.

WDFW hatchery programs in Puget Sound operate under and adhere to: *U.S. v Washington* (1974), which provides the legal framework for coordinating these programs and the *Comprehensive Management Plan for Puget Sound Chinook* (2004) (see HGMP section 3.4).

Draft Resource Management Plan: Puget Sound Chinook Salmon Hatcheries, a component within the *Comprehensive Chinook Salmon Management Plan*. This plan describes the operating procedures for Chinook salmon hatcheries in Puget Sound, their role in achieving the co-managers' resource management goals, and their consistency with the protection given to Puget Sound Chinook salmon by the Endangered Species Act (ESA). The plan describes both Tribal and WDFW hatcheries, as are tightly linked: they often operate in the same watersheds, exchange eggs, and share rearing space to maximize the effectiveness of the programs (WDFW and PSTT 2004). Available at: http://wdfw.wa.gov/publications/01053/wdfw01053.pdf.

Washington Department of Fish and Wildlife Commission Policy C-3619. WDFW adopted the Hatchery and Fishery Reform Policy C-3619 in 2009. Its purpose is to advance the conservation and recovery of wild salmon and steelhead by promoting and guiding the implementation of hatchery reform. The intent of hatchery reform is to improve hatchery effectiveness, ensure compatibility between hatchery production and salmon recovery plans and rebuilding programs, and support sustainable fisheries. WDFW Policy C-3619 works to promote the conservation and recovery of wild salmon and steelhead and provide fishery-related benefits by establishing clear goals for each state hatchery, conducting scientifically defensible-operations, and using informed decision making to improve management. It is recognized that many state operated hatcheries are subject to provisions under *U.S. v Washington* (1974) and *U.S. v Oregon* (1969) and that hatchery reform actions must be done in close coordination with tribal co-managers. http://wdfw.wa.gov/commission/policies/c3619.pdf.

Hatchery Reform - Principles and Recommendations of the Hatchery Scientific Review Group. WDFW programs have incorporated the suggestions this report provided in a detailed description of the HSRG's scientific framework, tools and resources developed for evaluating hatchery programs, the processes used to apply these tools, and the resulting principles, system-wide recommendations, and program-specific recommendations to reform (HSRG 2004). See also HGMP section 6.2.3.

3.2 List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.

This hatchery program, and all other WDFW anadromous salmon hatchery programs within the Puget Sound Chinook ESU, operates under *U.S. v Washington* (1974) and the *Puget Sound Salmon Management Plan* (PSSMP 1985), which provides the legal framework for coordinating these programs, defining artificial production objectives, and maintaining treaty-fishing.

Hatchery salmon and steelhead production levels are detailed in the annual *Future Brood Document*. The Future Brood Document (FBD) is a pre-season planning document for fish hatchery production in Washington State for upcoming brood stock collection and fish rearing seasons (July 1 – June 30). The FBD is coordinated between WDFW, the Northwest Indian Fisheries Commission (NWIFC) representing Puget Sound and coastal treaty tribes, eastern Washington treaty tribes, and Federal fish hatcheries.

White River Spring Chinook Recovery Plan (July 1996). The *WRSC Recovery Plan* dictates production parameters for Minter Creek spring Chinook eggs and/or fry provided to the WRSC Recovery Program (WDFW and South Sound Tribes MOU 1987). The distribution of progeny in excess of Minter Creek program needs will be determined annually through the South Sound Spring Chinook Technical Committee formed under the Memorandum of Understanding (MOU). The goal of the recovery plan is to restore White River spring chinook to the White River watershed. This goal will be achieved when the sustainable escapement goal of 1,000 unmarked spawners per year is met in three out of four consecutive years with the normal level of incidental sport, commercial and tribal harvest.

The purpose of the Isolated Recovery portion of the program had been to serve as a genetic bank as part of the *White River Spring Chinook Recovery Plan* (1996). The program enhanced the survival of the listed stock by maintaining a source of genetically-protected eggs through the egg bank program conducted at Minter Creek and Hupp Springs hatcheries.

In May 2016, the Co-managers agreed that the Minter Creek/Hupp Springs White River Spring Chinook program would be terminated and remaining production would be removed to the WDFW Puyallup Hatchery at Clarks Creek. Eggs taken in subsequent years at the Minter Creek facilities will be included as part of the Co-manager-agreed incubation and early rearing of 800,000 sub-yearlings to be provided to the Puyallup Tribe for transfer to their acclimation ponds in the upper White River watershed. No further releases of White River Spring Chinook will take place at Minter Creek or Hupp Springs.

Strategies for the use and distribution of progeny (eggs and/or fry) in excess of primary hatchery production goals will be determined annually through the South Sound Spring Chinook Technical Committee, responsible for developing the WRSC Recovery Program.

See also HGMP section 3.1.

3.3 Relationship to harvest objectives.

WDFW general harvest goals are to provide fishing opportunities consistent with the mandate of the agency for restoration and recovery of wild indigenous salmonid runs, the Pacific Salmon Treaty, the *Puget Sound Salmon Management Plan*, the Pacific Fishery Management Council (PFMC) a North of Falcon (NoF) annual fisheries management planning process, *U.S. v Washington* (1974), and other state, federal, and international legal obligations.

Historically, WDFW and the affected Treaty Tribes have jointly-limited Treaty and non-Treaty Chinook fisheries in Carr Inlet to minimize harvest impacts on White River spring Chinook as they return to Minter Creek, at the expense of precluded Minter Creek fall Chinook harvest.

3.3.1 Describe fisheries benefitting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1988-99), if available.

Table 3.3.1.1: Hupp Springs Hatchery Spring Chinook Fishery Contributions.

Brood Years: 2000-2009
Fishery Years:2004-2013

	Average SAR% [a]	**0.32**	**0.04**
Agency	***Non-WA Fishery***	***% of total Survival***	
		Sub-yearlings	***Yearlings***
CDFO	All	*7.22*	*0.57*
ODFW	All	*0.10*	---
NMFS	All	*0.47*	---
Agency	***WA Fishery***	***Sub-yearlings***	***Yearlings***
WDFW	10- Ocean Troll	*0.51*	---
MAKA	15- Treaty Troll	*0.57*	---
WDFW	15- Treaty Troll	*2.13*	*1.47*
WDFW	22- Coastal Gillnet	*0.06*	---
MAKA	23- PS Net	*0.07*	---
WDFW	23- PS Net	*1.67*	*1.79*
WDFW	41- Ocean Sport- Charter	*0.14*	*0.68*
WDFW	42- Ocean Sport- Private	*0.43*	---
WDFW	45- PS Sport – May to September	*1.92*	*6.34*
WDFW	45-PS Sport – Winter Blackmouth (Oct – Apr)	*4.84*	*9.87*
NIFC	50- Hatchery Escapement[b]	*0.02*	---
TULA	50- Hatchery Escapement[c]	*0.01*	---
WDFW	50- Hatchery Escapement	*79.61*	*79.28*
WDFW	50- Hatchery Escapement (Strays)[d]	*0.06*	---
SUQ	54- Spawning grounds (Strays)[e]	*0.01*	---
WDFW	54- Spawning ground s (Strays)[f]	*0.12*	---
WDFW	62- Test Fishery Seine	*0.04*	---
	Total	***100.0***	***100.0***

Source: RMIS 2014.

[a] Average SAR% = (tags recovered/tags released).
[b] Strays recovered at White River and Gorst Creek Hatchery.
[c] Strays recovered at Bernie Kai Kai Gobin Hatchery.
[d] Strays recovered at Issaquah, Tumwater Falls and Wells Hatcheries.
[e] Strays recovered on the spawning grounds in WRIA 15.
[f] Strays recovered on the spawning grounds in WRIA 15.

3.4 Relationship to habitat protection and recovery strategies.

Draft Puget Sound Chinook Salmon Resource Management Plan - hatchery component of the *Comprehensive Chinook Salmon Management Plan* for the region (WDFW and PSTT 2004). The RMP is the over-arching scientific framework for joint state/tribal implementation of Chinook salmon hatchery programs in the Puget Sound region.

Salmon Recovery Funding Board (SRFB). Created by the Legislature in 1999, the SRFB is composed of five citizens appointed by the Governor and five state agency directors, the Board provides grant funds to protect or restore salmon habitat and assist related activities. It works closely with local watershed groups known as lead entities (see below). The Board supports salmon recovery by funding habitat protection and restoration projects, and related programs and activities that produce sustainable and measurable benefits for fish and their habitat.

Lead Entities - The Lead Entity for the East Kitsap Peninsula and Minter Creek is Kitsap County. (See also http://www.rco.wa.gov/salmon_recovery/lead_entities.shtml). The Pierce County Lead Entity developed the salmon habitat restoration strategy for the Puyallup and White Rivers.

Puget Sound Partnership Action Plan: An ESU-wide recovery planning effort is being undertaken by the Puget Sound Partnership, a collaborative group dedicated to restoring salmon and steelhead throughout Puget Sound (online at http://www.pugetsoundpartnership.org).

3.5 Ecological interactions.

(1) *Salmonid and non-salmonid fishes or other species that could negatively impact the program.* Negative impacts by fishes and other species on the Chinook program could occur directly through predation on program fish, or indirectly through food resource competition, genetic effects, or other ecological interactions. In particular, fishes and other species could negatively impact Chinook survival rates through predation on newly released, emigrating juvenile fish in freshwater, estuarine and marine areas. Certain avian and mammalian species may also prey on juvenile Chinook while the fish are rearing at the hatchery site, if these species are not excluded from the rearing areas. Species that could potentially negatively impact juvenile Chinook through predation include the following:

- Avian predators, including mergansers, cormorants, belted kingfishers, great blue herons, and night herons
- Mammalian predators, including mink, river otters, harbor seals, and sea lions
- Cutthroat trout

Rearing and migrating juvenile and adult Chinook originating through the program may also serve as prey for large, mammalian predators in nearshore marine areas, the estuary and in freshwater areas downstream of the hatchery in the watershed to the detriment of population abundance and the program's success in augmenting harvest. Species that may negatively impact program fish through predation may include:

- Southern Resident Killer Whales
- Sea lions
- Harbor seals
- River otters

(2) *Salmonid and non-salmonid fishes or other species that could be negatively impacted by the program).*

- Puget Sound Chinook
- Puget Sound steelhead

(3) *Salmonid and non-salmonid fishes or other species that could positively impact the program.* Fish species that could positively impact the program may include other salmonid species and trout present in the watershed through natural and hatchery production. Juvenile fish of these species may serve as prey items for salmonids during their downstream migration in freshwater and into the marine area. Decaying carcasses of spawned adult fish may contribute nutrients that increase productivity in the watershed, providing food resources for emigrating salmonids. Salmonid adults that return to the basin and any seeding efforts using adult salmon carcasses may provide a source of nutrients and stimulate stream productivity. Many watersheds in the Pacific Northwest appear to be nutrient-limited (Gregory et al. 1987; Kline et al. 1997) and salmonid carcasses can be an important source of marine derived nutrients (Levy 1997). Carcasses from returning adult salmon have been found to elevate stream productivity through several pathways, including: 1) the releases of nutrients from decaying carcasses has been observed to stimulate primary productivity (Wipfli et al. 1998); 2) the decaying carcasses have been found to enrich the food base of aquatic invertebrates (Mathisen et al. 1988); and 3) juvenile salmonids have been observed to feed directly on the carcasses (Bilby et al. 1996). Addition of nutrients has been observed to increase the production of salmonids (Slaney and Ward 1993; Slaney et al. 2003; Ward et al. 2003).

(4) *Salmonid and non-salmonid fishes or other species that could be positively impacted by the program.* The Chinook program could positively impact freshwater and marine fish species that prey on juvenile and adult fish. Nutrients provided by decaying Chinook carcasses may also benefit fish in freshwater. These species include:

- Southern Resident Killer Whales
- Northern pikeminnow
- Cutthroat trout
- Steelhead
- Coho salmon
- Pacific staghorn sculpin
- Numerous piscivorous avian and marine pelagic fish species

4 SECTION 4. 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.

Table 4.1.1: Water sources available for the Minter/Hupp White River Spring Chinook program.

Facility	Water Source	Water Right		Available Water Flow	Water Temp. (F°)	Usage	Limitations
		Record/Cert. No.	Permit No.				
Minter Cr, Hatchery	Unnamed stream	S2-*07907C WRIS/ 03508	06155	0.5 cfs	38-48	Broodstock collection, incubation, rearing, acclimation	Low summer water flows (Jul/ Aug). Clogged intake screens during winter floods (Dec/ Jan) limit available water flow.
	Minter Creek (surface)	S2-*20960C WRIS/ 10484	15364	6.0 cfs			
	Wells (2)	G2-28656	-----	650 gpm	49-50	Incubation	Iron-rich water causes soft-shell disease.
	Well	G2-28657	-----	150 gpm			
Hupp Springs	Hupp Spring	S2-25031C WRIS	----	5 cfs	46-48	Rearing, Acclimation	None
	Minter Creek (surface)	S2-26917C WRIS	----	1.8 cfs		Used to supplement rearing Apr - Jun.	Low summer water flows (Jul/ Aug).
Puyallup Hatchery	Maplewood Spring	S2-*06915C WRIS/ 03442	06915	15 cfs	47-48	Incubation, rearing	None

Source: Phinney 2006, WDOE Water Resources Explorer 2014, WDFW hatchery data.

Minter Creek Hatchery. Both surface and well water are both used for fish production. Three wells provide pathogen-free, ambient water used exclusively for incubation, especially for eggs shipped to other facilities. The high mineral content (iron) in the well water causes soft-shell disease; salt is added to decrease the problem, but egg mortality could be as high as 25%. The well water is also passed through a de-nitro tower to improve dissolved oxygen content.

Water quality from Minter Creek varies greatly, depending on weather and the time of the year. Heavy debris during winter high flow events can clog the water intake screens, which limits flow into the facility. Silt deposits require occasional “rodding”.

Fish are reared on reuse water, which can present an increased risk of fish disease and elevated mortality in the spring when the rearing densities are high.

Water rights for the purpose of fish propagation at Minter Creek Hatchery are formalized through the Washington Department of Ecology (WDOE) (**Table 4.1.1**), and were obtained in 1947 and 1968 (surface water), and 1992 (well water).

Hupp Springs rearing ponds: Fish are reared on pathogen-free spring water, supplied from an artesian spring (Hupp Springs) located ¼-mile upstream from the facility. An intake at the lower end of the spring collects the water, which is transported via a pipeline to the rearing ponds. Water at the Hupp Springs ponds are 100% gravity-fed and supplies between 1500 - 1700 gallons per minute (gpm), with an average temperature of 46-48°F. Acclimation water is supplemented by surface water pumped from Minter Creek at a rate of 350 gpm.

Water rights at Hupp Springs are formalized through WDOE (**Table 4.1.1**), and were obtained in 1978 and 1986 for the purpose of fish propagation.

Puyallup Hatchery: Fish are reared on pathogen-free water from Maplewood Springs, a tributary to Clarks Creek. An intake at the lower end of the spring collects the water, which is transported 1000 ft. via a 24-inch diameter pipeline. Water is gravity-fed and supplies up to 6300 gpm (15 cfs) of water, although actual water use is 2300-4100 gpm, with an average temperature of 47-48°F. Average use of water has declined in recent years of operation due to increasing municipal water withdrawals and development in the watershed.

The water right at Puyallup Hatchery is formalized through WDOE (**Table 4.1.1**), and was obtained in 1946 for the purpose of fish propagation.

NPDES Permits:
Minter Creek and Puyallup hatcheries operate under the "*Upland Fin-Fish Hatching and Rearing" National Pollution Discharge Elimination System* (NPDES) general permit which conducts effluent monitoring and reporting and operates within the limitations established in its permit administered by the Washington Department of Ecology (DOE), WAG 13-3002 (**Table 4.2.1**). Monthly and annual reports on water quality sampling, use of chemicals at this facility, compliance records are available from DOE.

Discharges from the cleaning treatment system are monitored as follows:

- *Total Suspended Solids (TSS)* 1 to 2 times per month on composite effluent, maximum effluent and influent samples.
- *Settleable Solids (SS)* 1 to 2 times per week on effluent and influent samples.
- *In-hatchery Water Temperature* - daily maximum and minimum readings.

Table 4.2.1: Record of NPDES permit compliance at Minter Creek and Puyallup hatcheries.

Facility/ Permit #	Reports Submitted Y/N			Last Inspection Date	Violations Last 5 yrs (see Table 4.2.3)	Corrective Actions (Y/N)	Meets Compliance Y/N
	Monthly	Qtrly	Annual				
Minter Cr WAG13-1024	Y	Y	Y	5/16/2005	0	N	Y
Puyallup WA0039748	Y	Y	Y	9/13/2012	4	N	Y

Source: Ann West, WDFW Hatcheries Headquarters Database 2014.

Table 4.2.3. List of NPDES violations at Puyallup Hatchery, over the last five years (2009-2014).

Facility	Monitoring Month	Parameter	Sample Type	Result/ Violation	Permit Limit	Comment	Action
Puyallup Hatchery	January 2009	TSS	Avg. Net Composite	13.2 mg/L	5.0 mg/L	Due to flooding.	None
		TSS	Max Net Composite	23.40 mg/L	15.0 mg/L		
	November 2011	Effluent Concentration Outfall 1	123.1 lbs./ day	26.7 lbs/day	Environmental or possible lab error.	Effluent Concentration Outfall 1	
		Effluent Concentration Outfall 2	44.14 lbs./ day	26.7 lbs/day	Environmental or possible lab error.	Effluent Concentration Outfall 2	
	June 2014	BOD(5)	Effluent Concentration Outfall 2	997.46 lbs/day	213.2 lbs. /day	Environmental or possible lab error.	

Source: Ann West, WDFW Hatcheries Headquarters Database 2014.
Note: These violations did not result in non-compliance with NPDES permit.

The Hupp Springs rearing ponds meet guidelines which do not require "*Upland Fin-Fish Hatching and Rearing" National Pollution Discharge Elimination System* (NPDES) general permit (>20,000 lbs. total on site production and > 5,000 lbs. of fish feed per month).

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.

Minter Creek Hatchery has two intake structures: a gravity intake with 1.0" x 0.094" screens, and a pump intake with 4.0" x 0.156" wedge-wire screens. The surface water intakes are currently in compliance with state and federal guidelines (NMFS 1995, 1996), but do not meet current *Anadromous Salmonid Passage Facility Design* criteria (NMFS 2011a). No wild listed species exist above the intakes, and listed fish are not passed upstream.

Hupp Springs Rearing Ponds: The Hupp Springs facility has two intake structures: an intake at the lower end of the spring, and a pump intake in Minter Creek. The surface water intakes are currently in compliance with state and federal guidelines (NMFS 1995, 1996), but do not meet current *Anadromous Salmonid Passage Facility Design* criteria (NMFS 2011a).

Puyallup Hatchery: Adult and juvenile salmonids do not have access to areas above the water intake and will not be impacted by hatchery water withdrawals or screening issues.

The effect of effluent discharge on listed fish has not been examined in this watershed.

5 SECTION 5. FACILITIES

5.1 Broodstock collection facilities (or methods).

Fish collected at Minter Creek Hatchery are trapped using a barrier dam which directs returning adults into a concrete step ladder. A sorter located at the end of the ladder allows for species separation into any one of four 20'x120'x4' holding ponds. Fish may also be directed upstream (e.g., coho salmon and cutthroat) and downstream when necessary (e.g. ponds too crowded).

5.2 Fish transportation equipment (description of pen, tank truck, or container used).

A 300-gallon steel tanker truck equipped with aerators and oxygen tanks is available for transportation at the facility. A larger tank can be borrowed from another facility, as needed.

5.3 Broodstock holding and spawning facilities.

Minter Creek has four 20'x140'x4' concrete raceways used as broodstock holding ponds. They are filled with creek water, covered with bird netting, and equipped with water sprinklers. Spawning takes place in the shaded area on the western side of the ponds.

5.4 Incubation facilities.

Beginning with adult returns in 2016, all adults will be spawned and incubated at the Minter Creek facilities, and eyed-eggs transferred to the WDFW Puyallup Hatchery.

Table 5.5.1: Incubation facilities available at Minter Creek Hatchery.

Type	Number			Size
	Rooms	Stacks	Trays (Total)	
Vertical Heath incubators	8	20	2,560	24"x25"
Troughs	n/a	n/a	4	3'x17'x3'

Minter Creek Hatchery. The facility has vertical Heath-style stack incubators in eight rooms, with 320 trays per room. This allows the facility to keep eggs separate by species and/or facility-origin. Eggs destined for transfer, or which are transferred from other facilities, are incubated on pathogen-free well water. Eggs for on-station release are incubated on surface water; however, water mixed from both sources is also available and used when needed.

Table 5.5.2: Incubation facilities available at Puyallup Hatchery.

Type	Number	Size	Water Flow (gpm)
Vertical Heath incubators	10 stacks of 16 trays	24"x25"	3-5
Concrete troughs	15	15' x 1' x 0.5'	5-10

Puyallup Hatchery. Eyed-eggs will be reared at Puyallup Hatchery in the vertical incubator stacks; no other species are incubated in the stacks. Free flow through the incubators is 5 gpm, but reducers can bring the flow down to 3 gpm.

5.5 Rearing facilities.

Table 5.5.1: Pond facilities available at Puyallup Hatchery.

Facility	Pond Type	Number	Dimensions
Puyallup Hatchery	Round ponds	16	40’ diameter
	Standard raceways	10	10’ x 100’ x 4’
	C-series	6	6’ x 20’x 4’
	Large rearing pond	1	40’ x 120’ x 4’

Beginning with adult returns in 2016, all ponding will take place at Puyallup Hatchery.

Puyallup Hatchery. Unfed fry are transferred to the C-series ponds at the Puyallup Hatchery in late-December/January, and are reared on spring water at a flow of 200 gpm.

5.6 Acclimation/release facilities.

Hupp Springs. Sub-yearlings were released from Hupp Springs from 2013 through 2016, previous releases occurred at Minter Creek Hatchery. Juvenile Chinook are acclimated from April until release in June on a mix of spring water and surface water pumped from Minter Creek a rate of 350 gpm. Sub-yearlings are force-released directly from the rearing ponds into Minter Creek.

Puyallup Hatchery. After mass-marking, fish provided to the WRSC Recovery Program are shipped to Puyallup Tribe’s White River Acclimation Ponds for release (see MIT’s White River Hatchery Spring Chinook HGMP).

5.7 Describe operational difficulties or disasters that led to significant fish mortality.

None.

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.

Fish rearing is conducted in compliance with the *Salmonid Disease Control Policy of the Fisheries Co-managers of Washington State* (WDFW and WWTIT 1998, updated 2006). Adherence to artificial propagation, sanitation and disease control practices defined in the policy should reduce the risk of fish disease pathogen transfers.

Hupp Springs. The facility is equipped with an alarm system run by a primary power source of 110V, with a 12V battery auxiliary. The raceways have low-flow alarms and the gravel-bottom pond has a float alarm. Fencing equipped with an intrusion sensor surrounds the standard ponds. All alarms are connected to Minter Creek Hatchery, which is staffed seven days a week, 24 hours a day.

Minter Creek Hatchery. A member of the hatchery crew is on stand-by at all times to monitor hatchery operations and respond to any unexpected events. The facility is equipped with low-water alarms and a back-up generator in case of power loss.

Puyallup Hatchery: Standby personnel are on duty 24 hours a day to respond to emergencies. A backup generator is available to provide water to ponds supplied with pumps.

6 SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

Describe the origin and identity of broodstock used in the program, its ESA-listing status, annual collection goals, and relationship to wild fish of the same species/population.

6.1 Source.

The original brood source was collected from native adult spring Chinook returning to the Puyallup and White rivers from the late-1970s through early-1980s. The current broodstock is maintained from adult spring Chinook salmon returning to Minter Creek Hatchery (there is no natural spring Chinook population in Minter Creek). The exchange of gametes with the spring Chinook recovery programs at the White River and Puyallup facilities provides an opportunity to maintain genetic integrity for these programs. See HGMP section 8.2.

As of return year 2016, WDFW continue to collect and spawn adult spring Chinook at Minter Creek through the 2020 return.

6.2 Supporting information.

6.2.1 History.

This WDFW program began in 1974, as an effort to restore the White River spring Chinook (WRSC) population in its native basin. Initially, the then Washington Department of Fisheries (WDF) and NMFS maintained two complementary programs: an anadromous broodstock program at Hupp Springs rearing ponds, and a captive brood program at the NMFS Manchester net pens.

From 1974 to 1976, adults were captured at the adult trap at Buckley (on the White River), then transferred to and spawned at either Garrison Springs or Voights Creek Hatcheries. Juveniles from these broods were returned to the White River as sub-yearlings or smolts. In 1977, WRSC brood were released into Minter Creek as an effort to maintain the population through off-site restoration. Until 1990, all subsequent releases were limited to Minter Creek, from Hupp Springs ponds.

Prior to 1986, at least some broodstock for these programs came from adults that returned to the Buckley trap. Minter Creek Hatchery and NMFS' captive brood program at Manchester provided all broodstock from adult returns beginning in 1986. The captive brood operation at the Manchester Net Pens complex (1977-1986 broods) was replaced by a program managed cooperatively by WDFW and the Squaxin Island Tribe at the South Sound Net Pen complex (SSNP), near Olympia, Washington. In 1989, the Muckleshoot Tribe completed construction on their new White River Hatchery facility, located directly opposite the Buckley adult trap. This facility doubled the size of the core program: starting with the 1989 brood (1992 return), adult returns to this White River Hatchery have provided a third source of eggs for the program. The captive brood program was terminated in 1994, when 500 unmarked adults could be passed upstream of the Buckley trap.

The *Recovery Plan for White River Spring Chinook Salmon* (WDFW et al. 1996) provides that the annual goal for the "Hupp Springs program" is 320,000 smolts. "As the number of adult spawners returning to the White River increases, the Hupp Springs program will also be reduced and eventually phased out."

Due to a change in funding source in 2012-2013, WDFW continued the Minter Creek spring Chinook program as a combined gene bank for the WRSC Recovery program and as a segregated harvest program. In May 2016, the Co-managers agreed that the Minter Creek/Hupp Springs White River Spring Chinook (WRSC) program would be terminated and remaining production would be removed to the WDFW Puyallup Hatchery on Clarks Creek.

6.2.2 Annual size.

All returning spring Chinook will be spawned. Around 600 adults may be collected annually to achieve the core program production goals. In May 2016, the Co-managers agreed that the Minter Creek/Hupp Springs White River Spring Chinook (WRSC) program would be terminated and remaining production would be removed to the WDFW Puyallup Hatchery on Clarks Creek. Eggs taken in subsequent years at the Minter Creek facilities will be included as part of the Co-manager-agreed incubation and early-rearing of 800,000 sub-yearlings to be provided to the Puyallup Tribe for transfer to their acclimation ponds in the upper White River watershed. WDFW continue to collect and spawn adult spring Chinook at Minter Creek through the 2020 return. Additional adult returns will be spawned and progeny made available to the recovery program at White River Hatchery to attain WRSC recovery goals, as determined annually through the South Sound Spring Chinook Technical Committee.

6.2.3 Past and proposed level of natural fish in broodstock.

This program began as a conservation project: initially all adults collected for broodstock were of natural-origin. Later broodstocks consisted of the progeny of hatchery-origin fish. In 2012, the program was changed from solely conservation to a harvest program, with excess production potentially available for use in the WRSC Recovery Program.

The Minter Creek spring Chinook production is currently managed as a segregated program. The exchange of gametes between the Minter/Hupp program and the WRSC Recovery Program, to maintain genetic integrity and diversity within both programs, may occur as determined annually through the South Sound Spring Chinook Technical Committee. As of the 2016 adult return, WDFW continue to collect and spawn adult spring Chinook at Minter Creek through the 2020 return.

6.2.4 Genetic or ecological differences.

White River spring Chinook are genetically distinct from all other Chinook in lower Puget Sound, and are the last remaining spring Chinook stock in southern Puget Sound.

6.2.5 Reasons for choosing.

The decline of the indigenous White River spring Chinook population prompted decision to start the restoration project to save the existing population (see HGMP section 6.2.1). Maintenance of the spring Chinook stock at Minter Creek will provide general harvest benefits, and serve as a genetic bank for the WRSC Recovery Program.

The Hatchery Scientific Review Group (2003) recommended that the Co-managers discontinue Hupp Springs releases into the White River, to allow the White River population to locally adapt, and that the WRSC program be maintained exclusively at in-basin facilities. In May 2016, the Co-managers agreed that the Minter Creek/Hupp Springs WRSC program would be terminated and remaining production would be removed to the WDFW Puyallup Salmon Hatchery.

6.3 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.

There was no existing natural-origin spring Chinook population in the Minter Creek that could be affected as a result of broodstock selection practices (Ruckelshaus et al. 2006). All spring Chinook released from Minter Creek Hatchery are 100% coded-wire tagged (CWT). All adult spring Chinook returning to Minter Creek Hatchery are electronically sampled for CWTs, and are read prior to spawning to ensure only White River spring Chinook stock is used for the program.

7 SECTION 7. BROODSTOCK COLLECTION

7.1 Life-history stage to be collected (adults, eggs, or juveniles).

Adults

7.2 Collection or sampling design.

From 2012-2014 (brood years 2011-2013), spring Chinook sub-yearlings released from this program were adipose fin-clipped and coded-wire tagged (AD+CWT) to allow positive identification and genetic segregation from adult fall Chinook returning to Minter Creek Hatchery. In November 2014, the Co-managers proposed including an additional release of 200,000 sub-yearlings released CWT-only. In 2015 and 2016, the sub-yearling production was released CWT-only.

Returning adults are trapped at Minter Creek Hatchery beginning the second week of May through October. A barrier dam directs adults into a concrete step ladder. A sorter located at the end of the ladder allows for species separation into any one of four 20'x120'x4' holding ponds. As of the 2016 adult return, WDFW continue to collect and spawn adult spring Chinook at Minter Creek through the 2020 return.

Coho, chum and pink salmon, and steelhead and cutthroat may also be directed upstream and downstream when necessary (e.g. ponds too crowded).

7.3 Identity.

Marked and tagged spring Chinook adults returning to Minter Creek Hatchery.

With the exception of small experimental releases, all hatchery-origin White River stock spring Chinook released from Minter Creek Hatchery or Hupp Springs rearing ponds have been consistently coded-wire tagged (CWT) since 1999 (WDFW Hatcheries Headquarters Database). This allows fish to be identified by origin (hatchery), brood year, and release site.

Fish produced from this harvest program had been released adipose fin-clipped and coded-wire tagged (AD+CWT) for brood years 2011-2013. As of brood year 2013, the conservation component is released CWT-only. Beginning with brood year 2016, all eggs will be transferred to

the WDFW Puyallup Hatchery for initial rearing, and subsequently transferred to the Puyallup Tribe for transport to acclimation ponds in the upper White River.

7.4 Proposed number to be collected:

7.4.1 Program goal (assuming 1:1 sex ratio for adults):

As of May 2016, all White River stock spring Chinook adults returning to the rack at Minter Creek Hatchery will be will be spawned through the 2020 return. Total spawners have averaged around 460 adults in over the past 12 brood years, and with an average of 281 adults over the last five years (**Table 7.4.2.1**). Up to 600 spawners were needed to meet core program goals.

7.4.2 Broodstock collection levels for the last twelve years (e.g. 1988-99), or for most recent years available:

Through brood year 2011, broodstock levels required an egg-take of 800,000. In brood year 2012, the program continued as a dual-purpose program supporting recovery and segregated harvest, with the egg take goal reduced to 550,000 to provide for a release of 400,000 sub-yearling smolts. As of brood year 2015, the Co-managers increased program to include a conservation component, with an egg-take goal restored to 800,000.

Table 7.4.2.1: Sex composition of White River spring Chinook broodstock spawned at Minter Creek Hatchery, 2004 - 2015.

Year	Adults		
	Females	Males	Jacks
2004	228	207	4
2005	162	165	3
2006	179	218	4
2007	723	763	3
2008	520	420	17
2009	192	197	11
2010	122	107	7
2011	219	202	18
2012	72	75	6
2013	263	262	1
2014	78	80	1
2015	85	69	11
Average	**236**	**220**	**7**

Source: WDFW Hatcheries Headquarters Database 2016.
Note: Male gamete exchanges occurred between Minter Creek/Hupp Springs and the Muckleshoot Tribal Hatchery in brood years 2002-2011 (see HGMP section 8.2).

7.5 Disposition of hatchery-origin fish collected in surplus of broodstock needs.

All adult returns to Minter Creek are intended for spawning. Any surplus fish not used are buried (see also HGMP section 7.8). Due to treatment at the hatchery (see HGMP section 7.7), these fish cannot be used for human consumption or nutrient enhancement.

7.6 Fish transportation and holding methods.

Adults are not transported.

7.7 Describe fish health maintenance and sanitation procedures applied.

WDFW hatcheries adhere to standard fish health protocols, as defined in the *Co-manager Fish Health Policy* (WDFW and WWTIT 1998, updated 2006).

All adult spring Chinook are treated three times a week with formalin, at a rate not exceeding 25 parts per million (ppm) at the pond outfall, as a precaution against fungus infection.

7.8 Disposition of carcasses.

All adult returns to Minter Creek are intended for spawning. Due to treatment at the hatchery (see HGMP section 7.7), carcasses from this program cannot be used for human consumption or nutrient enhancement, and are picked up and disposed of by the contracted buyer.

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.

There was no existing natural-origin spring Chinook population in Minter Creek (Ruckelshaus et al. 2006).

White River spring Chinook (WRSC) produced for the recovery program are marked CWT-only. Only coded-wire tagged Minter Creek-origin WRSC are used as broodstock: tags are read prior to spawning to ensure that only WRSC are is used, and to prevent the inclusion of strays into the gene pool. Broodstock is selected randomly from all hatchery-origin returning WRSC adults throughout the spawning run.

No listed fish are passed upstream. The exchange of gametes with the Muckleshoot Tribe's WRSC Recovery Program at White River Hatchery remains an option to provide an opportunity to maintain genetic integrity for the broodstock. See HGMP section 8.2.

WDFW follows Hatchery Scientific Review Group recommendations (HSRG 2004) and WDFW spawning guidelines (WDFW 1983).

8 SECTION 8. MATING

Describe fish mating procedures that will be used, including those applied to meet performance indicators identified previously.

8.1 Selection method.

Fish for broodstock are selected randomly as they ripen, across the entire maturation time frame. In most years, all returning fish were spawned.

8.2 Males.

All males collected, including jacks, are considered for spawning and are chosen randomly on any spawning day. Jacks are used at rate of 5%-10% of spawned males. From 2002-2011, gametes from up to 40 males per year have been exchanged between White River spring Chinook collected at the Hupp Springs rearing ponds and the Muckleshoot Indian Tribe's White River Hatchery to increase genetic diversity in both the White River and Minter Creek Hatchery populations. This gamete exchange may continue as part of the WRSC conservation program, as determined annually through the South Sound Spring Chinook Technical Committee.

Males captured in the Buckley trap were transferred to Minter Creek and White River hatcheries for spawning (**Table 8.2.1**). All transferred males were CWT'd. Snouts were read at the receiving hatchery; no NORs were detected.

Table 8.2.1: Spring Chinook males and jacks captured at the Buckley trap, and transferred to Minter Creek and White River hatcheries, 2002-2011.

Year	Minter Creek		White River	
	Males	Jacks	Males	Jacks
2002	16	3	-----	-----
2003	16	0	-----	-----
2004	20	0	-----	-----
2005	20	0	21	0
2006	20	0	24	0
2007	38	2	20	1
2008	38	2	20	3
2009	-----	-----	23	0
2010	30	0	20	0
2011	-----	-----	13	0

Source: MIT Enhancement and WDFW hatchery data, 2014.

8.3 Fertilization.

Eggs from each female are collected separately and mixed with milt from one male (pair-wise spawning), and are allowed 60 seconds for fertilization. Fertilized eggs from two females are combined into two-gallon buckets and taken to the incubation room, where they are moved to the vertical trays and water hardened for one hour in an iodophor solution of 100 ppm.

8.4 Cryopreserved gametes.

Cryopreserved gametes are not used.

8.5 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.

WDFW follows Hatchery Scientific Review Group recommendations (HSRG 2004) and WDFW spawning guidelines (WDFW 1983).

Broodstock is chosen randomly from spawning adults in the available gene pool. Every attempt is made to ensure that the egg-take is representative of the entire run. Proper spawning protocols are implemented to maximize the representation of each individual adult into the entire brood, and minimize directed artificial selection of traits that could negatively affect this listed population.

Gametes have been exchanged between Hupp Springs and the WRSC Recovery Program facilities to increase genetic diversity in both the White River and Minter Creek hatchery populations. Continuation of this gamete exchange is determined annually through the South Sound Spring Chinook Technical Committee (see HGMP section 8.2).

9 SECTION 9. INCUBATION AND REARING -

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 Incubation:

All spring Chinook returning to Minter Creek Hatchery will be spawned through return year 2020. Incubation takes place at Minter Creek Hatchery.

9.1.1 Number of eggs taken and survival rates to eye-up and/or ponding.

Table 9.1.1.1: Egg-to-ponding survival rates of White River spring Chinook at Minter Creek Hatchery, brood years 2003-2015.

Brood Year	Eggs Collected	Survival Rates (%)		
		Green-to-Eye up	Eye up-to-Ponding	
			Minter Creek	Puyallup
2004	787,500	94.1	98.0	NA
2005	505,510	95.1	98.0	
2006	525,000	93.0	98.0	
2007	2,151,000	89.7	98.0	
2008	1,897,800	93.8	98.0	
2009	703,991	94.0	97.7	
2010	378,201	94.6	98.0	
2011	686,002	94.1	97.8	
2012	231,900	94.3	98.0	
2013	933,079	93.4	98.0	99.0
2014	295,334	91.0	95.0	99.0
2015	296,270	91.5	97.0	99.0
Average	**782,632**	**93.2**	**97.6**	**99.0**

Source: WDFW Hatcheries Headquarters Database, Hatchery Records, 2016.
Note: Survival rates not available for years prior to 2003.

Puyallup Hatchery. Eyed-eggs are shipped to Puyallup Hatchery for final incubation. There are no survival data currently available.

Table 9.1.1.2: White River spring Chinook eggs shipped from the Muckleshoot Tribe and Minter Creek Hatchery to the Puyallup Hatchery for incubation for the WRSC Recovery Program.

Brood Year	Number Received		
	Muckleshoot Tribe	Minter Creek Hatchery	Total
2013	429,000	467,776	896,776
2014[a]	254,600	0	254,600
2015[a]	448,660	0	448,660

Source: WDFW Hatcheries Headquarters Database, 2016.
[a] Puyallup Hatchery did not receive any eggs from Minter Creek due to low adult Chinook returns.

9.1.2 Cause for, and disposition of surplus egg takes.

After the egg transfer for the 800,000 fry core program at the WDFW Puyallup Hatchery is achieved, any surplus eggs or fry may be disposed of as prioritized by the Technical Committee.

Spring Chinook females are tested for BKD and ELIZA samples are collected at the time of spawning. Because results are not available at the time of spawning, all collected eggs are placed in incubators. When test results are available, eggs from females with high ELIZA value are discarded. This loss is accounted for in the egg-take goal for the program.

9.1.3 Loading densities applied during incubation.

Minter Creek Hatchery. Eggs are placed in vertical Heath-style incubators, at two females per tray, at around 6,200 eggs per tray (4.13 lb. per tray). Once eyed, eggs are reloaded at 6,000 eggs per tray.

Puyallup Hatchery. Eyed-eggs in surplus of core program needs are shipped to Puyallup Hatchery for final incubation; transport time between facilities is around 50 minutes. Eyed-eggs are placed in the vertical incubators at around 6,000 eggs per tray. Flow through the incubators is 3-5 gpm.

9.1.4 Incubation conditions.

On-station program. All eggs are incubated in trays at Minter Creek Hatchery, on well water flowing at 4 gpm. Siltation has never been a problem. Float alarms are used to safeguard against decreases in water levels within all of the incubation rooms. Water temperature is monitored electronically.

Puyallup Hatchery. After shipping (October/November), eyed-eggs are incubated in trays in the vertical incubators, on spring water flowing at 3-5 gpm. There are no siltation problems.

If troughs are used, eggs would be placed in baskets at 20,000 eggs per basket, and six baskets per trough. Flow through the troughs, depending on egg stage, is 5-10 gpm

9.1.5 Ponding.

On-station program: Not applicable. Beginning with adult returns in 2016, all adults will be spawned and incubated at the Minter Creek facilities and eggs transferred to the WDFW Puyallup Hatchery.

WRSC Recovery Program: Spring chinook fry destined for release at the acclimation ponds in the upper White River watershed will be ponded at Puyallup Hatchery. Flow through the ponds is approximately 200 gpm. When 95%+ buttoned up, unfed fry are ponded into the 6'x20'x 4' C-series ponds; ponding begins in late-December, and continues through late-January.

9.1.6 Fish health maintenance and monitoring.

All fertilized eggs are water hardened in an iodophor solution. Fungus in the incubators is controlled by formalin drip, (15-minute injection per day at a target dose of 1,667-ppm formalin) throughout incubation to just prior to hatching. Once eyed, eggs are shocked and dead eggs removed. Fry loss is picked at the time of ponding and then daily.

9.1.7 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.

Spring Chinook eggs are incubated in a separate, isolated, incubation room to minimize the risk of inter-stock disease transmission. Eggs are also incubated on pathogen-free well water. Dead eggs are removed to prevent potential disease transmission.

All water systems are connected to 24-hr/day low water alarms and an emergency backup generator.

9.2 Rearing:

9.2.1 Provide survival rate data (average program performance) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1988-99), or for years dependable data are available.

Table 9.2.1.1: Survival rates to sub-yearling and yearling release, White River spring Chinook at Minter Creek/Hupp Springs.

Brood Year	Survival Rates (%)	
	Fry-to-Sub-yearling	Sub-yearling-to-Yearling[a]
2004	98.9	98.2
2005	98.4	96.8
2006	98.0	97.0
2007	98.1	87.3
2008	97.9	81.3
2009	98.2	96.4
2010	98.5	98.3
2011	92.7	Program discontinued
2012	99.5	
2013	99.9	
2014	94.5	
2015	99.7	
2016	Program discontinued	
Average	**97.8**	**93.6**

Source: WDFW Hatchery Records 2014.

[a] Yearling releases were discontinued with the 2011 brood.

Table 9.2.1.2: Survival rates from ponding to transfer, White River spring Chinook at Puyallup Hatchery.

Brood Year	Survival Rates (%)
2014	85.2
2015	96.2

Source: WDFW Hatchery Records 2016.

9.2.2 Density and loading criteria (goals and actual levels).

Loading and density levels at WDFW hatcheries conform to standards and guidelines set forth in Fish Hatchery Management (Piper et. al. 1982) and *Co-Managers of Washington Salmonid Disease Control Policy* (WDFW and WWTIT 1998, updated 2006). Fish rearing densities are maintained at maximum less than 3 lbs of fish /gpm at release and under 0.35 lbs /cu.ft.

Actual levels reached are 4.5 lbs/gpm and a density index of less than 0.2.

9.2.3 Fish rearing conditions

Puyallup Hatchery: All WRSC fry are reared in 6'x20'x4' C-series ponds on spring water; average water temperature is 47-48°F. Fry are marked in March (170 fpp), and shipped out to White River acclimation ponds about two weeks later (150 fpp). Transport time is about 1.5 hours.

9.2.4 Indicate biweekly or monthly fish growth information (average program performance), including length, weight, and condition factor data collected during rearing, if available.

Table 9.2.4.1: Average size (fpp), by month, spring Chinook sub-yearlings reared at Puyallup Hatchery.

Month	Average Size (fpp)
December	800
January	600
February	400
March	300
April	150

Source: WDFW Hatchery Records 2016.

9.2.5 Indicate monthly fish growth rate and energy reserve data (average program performance), if available.

See **Table 9.2.4.1** for growth information. No energy reserve data available.

9.2.6 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).

Spring Chinook are fed a variety of diet formulations including starters, crumbles and pellets; feed brand may vary, depending on cost and vendor contacts. Feeding frequencies varies depending on the fish size and water temperature. Feed rates vary from 1.5% to 2.25% B.W./day, with an overall season food conversion rate is approximately 0.65:1.

Table 9.2.6.1: White River spring Chinook feeding frequencies,WDFW Puyallup Hatchery.

Fish Size (fpp)	Feeding Frequency
1200	6 to 8/ 7 days a week
600	4 to 6 / 7days a week
400	3 to 4 / 7days a week
100	1 / 5 days a week

Source: WDFW Hatchery Records 2016.

9.2.7 Fish health monitoring, disease treatment, and sanitation procedures.

Fish health is monitored on a daily basis by hatchery staff and at least monthly by a state Fish Health Specialist. Hatchery personnel carry out treatments prescribed. Procedures are consistent with the *Co-Managers of Washington Salmonid Disease Control Policy* (WDFW and WWTIT 1998, updated 2006). See also HGMP section 10.9 for WDFW Standard Fish Health Procedures.

9.2.8 Smolt development indices (e.g. gill ATPase activity), if applicable.

The migratory state of the release population is determined by fish behavior. Aggressive screen and intake crowding, leaner condition factors, a more silvery physical appearance and loose scales during feeding events are signs of smolt development. ATPase activity is not measured.

9.2.9 Indicate the use of "natural" rearing methods as applied in the program.

No "NATURES" type rearing methods are applied through the program.

9.2.10 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation.

All reasonable and prudent measures are employed to minimize rearing and incubation losses. These include the use of quality well water for incubation, use of high quality feeds for rearing,

rearing densities and loadings that conform to best management practices and frequent fish health inspections.

10 SECTION 10. RELEASE

Describe fish release levels, and release practices applied through the hatchery program.

10.1 Proposed fish release levels.

The program release goal was changed with brood year 2009, from a release of 250,000 sub-yearlings and 85,000 yearlings, to 260,000 sub-yearlings and 75,000 yearlings. Sub-yearlings were released from Minter Creek Hatchery and yearlings were released from Hupp Springs rearing ponds. Program release goals were again revised in 2012: after brood year 2010 (released in 2012), with 400,000 sub-yearlings released from Hupp Springs rearing ponds; the yearling program was eliminated after brood year 2011.

In May 2016, the Co-managers agreed that the Minter Creek/Hupp Springs White River Spring Chinook program would be terminated and remaining production would be removed to the WDFW Puyallup Hatchery. Eggs taken in subsequent years at the Minter Creek facilities will be included as part of the Co-manager-agreed incubation and early rearing of 800,000 sub-yearlings to be provided to the Puyallup Tribe for transfer to their acclimation ponds in the upper White River watershed. No further releases of White River Spring Chinook will take place at Minter Creek or Hupp Springs.

10.2 Specific location(s) of proposed release(s).

See White River Hatchery HGMP (Muckleshoot Tribe).

10.3 Actual numbers and sizes of fish released by age class through the program.

Table 10.3.1: Actual numbers, size, and CVs of White River spring Chinook released as sub-yearlings and yearlings at Minter Creek Hatchery and Hupp Springs Rearing Ponds, 2003-2014.

Release Year	Sub-yearlings (Minter Creek)			Yearlings (Hupp Springs)		
	Number	Avg. size (fpp)	CV	Number	Avg. size (fpp)	CV
2005	235,028	49.5	7.5	91,560	8.6	8.9
2006	275,805	53.0	5.4	94,150	8.3	8.4
2007	286,345	54.3	9.8	89,023	7.6	9.3
2008	673,974	46.3	5.7	88,125	6.9	9.3
2009	278,385	57.3	4.5	91,140	6.0	7.2
2010	251,956	66.0	6.3	84,301	6.6	10.0
2011	239,652	49.3	7.4	80,395	7.9	12.2
2012	328,427	50.0	6.3	81,449	7.6	12.6
2013*	205,739	69.5	5.6	**Yearling Releases Discontinued**		
2014	391,843	79.0	3.3			
2015	244,978	78.0	4.0			
2016	257,632	80.0	6.6			
2017	**Sub-yearling Releases Discontinued**					
Average	**305,814**	**61.0**	**6.0**	**87,518**	**7.4**	9.7

Source: WDFW Hatcheries Headquarters Database 2014.

Note: 50 fpp = 103 mm fork length (fl); 65 fpp= 94 mm fl; 80 fpp = 88 mm fl.
6 fpp = 210 mm fl; 8 fpp = 190 mm fl.

* As of 2013 releases (brood year 2012) sub-yearlings were released from Hupp Springs Rearing Ponds.

See also White River Hatchery HGMP (Muckleshoot Tribe).

10.4 Actual dates of release and description of release protocols.

Table 10.4.1: Release dates of White River juvenile spring Chinook sub-yearlings and yearlings, Minter Creek Hatchery and Hupp Springs Rearing Ponds, 2000-2013.

Release Year	Sub-Yearlings	Yearlings
2005	June 3	March 28 - April 8
2006	June 8, June 21	March 23-30
2007	June 7, June 29	March 28-30
2008	May 2, Jun 12-13	March 19 - April 2
2009	May 8, June 2	April 1-22
2010	June 4, June 14-16	March 31 April 9
2011	June 7, June 14	April 1-8
2012	May 13	April 1
2013	May 1, May 13	Discontinued
2014	May 5	
2015	May 5	
2016	May 23	

Source: WDFW Hatcheries Headquarters Database 2014.

Fish were volitionally released from the Hupp Springs facilities during high tides, to prevent them from becoming entrapped within tide pools that form at low tides. Fish at Minter Creek Hatchery were force-released (pumped out of the ponds); however, they can also be released through the pipe system leading to the river.

10.5 Fish transportation procedures, if applicable.

Minter Creek Hatchery has a 300-gallon steel tanker truck equipped with aerators and oxygen tanks available for transportation. Sub-yearlings are released on-station; however, unfed fry were transported from Minter Creek Hatchery to Hupp Springs rearing ponds in late-December/ January.

10.6 Acclimation procedures (methods applied and length of time).

Juvenile Spring Chinook are provided to the Puyallup Tribe for transfer to their acclimation ponds in the upper White River watershed.

10.7 Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.

Table 10.7.1: Number released, by age and mark type.

Brood Year	Sub-Yearlings	Yearlings[a]	Marking
2010	260,000	75,000	CWT-only
2011	328,000	n/a	AD+CWT
2012	205,739	n/a	AD+CWT
2013	391,843	n/a	AD+CWT
2014	244,978	n/a	CWT-only
2015	257,632	n/a	CWT-only

Source: WDFW Hatcheries Headquarters Database 2016.
[a] Yearling program discontinued with the 2011 brood.

Through the 2010 brood, all White River spring Chinook were released CWT-only (no adipose fin-clips). As a conservation program, the intention to mark fish CWT-only prevented them from being harvested in mark-selective fisheries, and allowed differentiation from fall Chinook returning to Minter Creek Hatchery. Beginning with the change in funding in 2012, the program

was modified such that all fish (up to 400,000 sub-yearlings) were released marked with both an adipose fin-clip and coded-wire tag (AD+CWT) for releases in 2012 and 2013. Subsequent releases into Minter Creek were marked CWT-only.

10.8 Disposition plans for fish identified at the time of release as surplus to programmed or approved levels.

Surplus from the Minter Creek spring Chinook program may be transferred to the Muckleshoot Tribal hatchery facilities for rearing and release into the White River. If a surplus of eggs or fry is available, they may be transferred per determination by the South Sound Spring Chinook Technical Committee. Generally, this would be to Puyallup Hatchery, a facility with pathogen-free water, so the fish can subsequently be transferred to acclimation ponds in the White River watershed.

10.9 Fish health certification procedures applied pre-release.

Standard Fish Health Procedures performed at the facility:

- *All fish health monitoring is conducted by a qualified WDFW Fish Health Specialist.*
- *Juvenile fish examinations are conducted at least monthly and more often if necessary*. A representative sample (at the discretion of the Fish Health Specialist) of healthy and moribund fish from each lot is examined.
- *Abnormal levels of fish loss are investigated if they occur.*
- *Fish health status is determined prior to release or transfer to another facility*. The exam may occur during the regular monthly monitoring visit, i.e. within one month of release or transfer.
- *Appropriate actions, including drug or chemical treatments are recommended as necessary*. If a bacterial pathogen requires treatment with antibiotics a drug sensitivity profile is be generated when possible.
- *Findings and results of fish health monitoring are recorded on a standard fish health reporting form and maintained in a fish health database.*
- *Fish culture practices are reviewed as necessary with facility personnel*. Where pertinent; nutrition, water flow and chemistry, loading and density indices, handling, disinfecting procedures and treatments are discussed.

10.10 Emergency release procedures in response to flooding or water system failure.

Emergency release procedures include removal of screens to allow fish migration. During a flood or drought event, fish may be released earlier than scheduled to prevent possible fish loss.

Hatcheries Standby Procedures (revised March 2012), a guideline developed by WDFW, includes information regarding proper actions to follow by hatchery employees in case of an emergency.

10.11 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.

There was no existing natural-origin spring Chinook population in Minter Creek that could be directly affected as a result of fish releases from this program (Ruckelshaus et al. 2006) and spring Chinook can be released at sizes that will maximize their survival.

In addition, coefficient of variation (CV) for length at release of 10.0% or less is desirable in order to increase the likelihood that most of the fish are ready to migrate (Fuss and Ashbrook 1995). The average CV for release years 2002-2013 was 6.4% for sub-yearlings and 9.3% for yearlings.

11 SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

11.1 Monitoring and evaluation of "Performance Indicators" presented in Section 1.10.

Elements of the annual Monitoring and Evaluation plan for this program are identified in HGMP section 1.10. The purpose of a monitoring program is to identify and evaluate the benefits and risks that may derive from the hatchery program. The monitoring program is designed to answer questions of whether the hatchery is providing the benefits intended, while also minimizing or eliminating the risks inherent in the program. A key tool in any monitoring program is having a mechanism to identify each hatchery production group.

Each production group is identified with distinct adipose fin-clips and/or coded-wire tags, or other identification methods as they become available, to allow for evaluation of each particular rearing and/or release strategy. This will allow for selective harvest on hatchery stocks when appropriate, monitoring of interactions of hatchery and wild fish wherever they co-mingle in riverine, estuarine and marine habitats and assessment of the status of the target population. WDFW shall monitor the Chinook salmon escapement into the target and non-target Chinook populations to estimate the number of tagged, un-tagged and marked fish escaping into the river each year and the stray rates of hatchery Chinook into the rivers.

11.1.1 Describe plans and methods proposed to collect data necessary to respond to each "Performance Indicator" identified for the program.

Continue to coded-wire tag fish to allow identification at the hatchery rack and determine contribution to fisheries and hatchery return rate, and adipose fin-clip all releases to allow for selective fishery harvest.

11.1.2 Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.

Funding and resources are currently committed to monitor and evaluate this program as detailed in the *Puget Sound Chinook Salmon Hatcheries Resource Management Plan* (WDFW and PSTT, March 31, 2004).

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.

Monitoring and evaluation will be undertaken in a manner that does not result in an unauthorized take of listed Chinook.

12 SECTION 12. RESEARCH

12.1 Objective or purpose.

Not applicable

12.2 Cooperating and funding agencies.

Not applicable

12.3 Principle investigator or project supervisor and staff.

Not applicable

12.4 Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2.

Not applicable

12.5 Techniques: include capture methods, drugs, samples collected, tags applied.

Not applicable

12.6 Dates or time period in which research activity occurs.

Not applicable

12.7 Care and maintenance of live fish or eggs, holding duration, transport methods.

Not applicable

12.8 Expected type and effects of take and potential for injury or mortality.

Not applicable

12.9 Level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached "take table" (Table 1).

Not applicable

12.10 Alternative methods to achieve project objectives.

Not applicable

12.11 List species similar or related to the threatened species; provide number and causes of mortality related to this research project.

Not applicable

12.12 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities.

Not applicable

13 SECTION 13. ATTACHMENTS AND CITATIONS

Bilby R.E., B.R. Fransen, and P.A. Bisson. 1996. Incorporation of nitrogen and carbon from spawning coho salmon into the trophic system of small streams: evidence from stable isotopes. Canadian Journal of Fisheries and Aquatic Sciences 53:164–173.

Ford M.J. (ed.). 2011. Status review update for Pacific salmon and steelhead listed under the Endangered Species Act: Pacific Northwest. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-113, 281 p.

Fuss, H. and C. Ashbrook. 1995. Hatchery operation plan and performance summaries (HOPPS). Washington Department of Fish and Wildlife. Olympia, Washington.

Good, T.P., R.S. Waples, and P. Adams, (editors). 2005. Updated status of federally listed ESUs of West Coast salmon and steelhead. U.S. Department Commerce. NOAA Tech. Memo. NMFS-NWFSC-66.

Gregory, S.V., G.A. Lamberti, D.C. Erman, K.V. Koski, M.L. Murphy, and J.R. Sedell. 1987. Influence of forest practices on aquatic production. *In* Salo, EO and Cundy TW. (editors), Streamside management: forestry and fishery interactions. Institute of Forest Resources, University of Washington. Seattle, Washington.

HSRG (Hatchery Science Review Group). 2002. Hatchery reform recommendations for the Eastern Strait of Juan de Fuca, South Puget Sound, Stillaguamish and Snohomish rivers. Long Live the Kings. Seattle, Washington. Available from: http://www.lltk.org/hrp-archive/pdf/hsrg/HSRG_Recommendations_February_2002.pdf.

HSRG (Hatchery Science Review Group). 2003. Hatchery reform recommendations for the Skagit River basin, Nooksack and Samish rivers, Central Puget Sound. Long Live the Kings. Seattle, Washington. Available from: http://www.lltk.org/hrp-archive/pdf/hsrg/HSRG_Recommendations_March_2003.pdf.

HSRG (Hatchery Scientific Review Group). 2004. Hatchery reform; principles and recommendations of the Hatchery Scientific Review Group. Long Live the Kings. Seattle, Washington. Available from: http://hatcheryreform.us/hrp_downloads/reports/hsrg_princ_recs_report_full_apr04.pdf

Kline, T.C. Jr., J.J. Goring, Q.A. Mathisen, and P.H. Poe. 1997. Recycling of elements transported upstream by runs of Pacific salmon: I _ ^{15}N and _ ^{13}C evidence in Sashin Creek, southeastern Alaska. Canadian Journal of Fisheries and Aquatic Sciences 47(1): 136-144.

Levy, S. 1997. Pacific salmon bring it all back home: Even in death these fish fuel life in their natal streams. Bio Science 47(10): 657-660.

Mathisen, O.A., P.L. Parker, J.J. Goering, T.C. Kline, P.H. Poe and R.S. Scalan. 1988. Recycling of marine elements transported into freshwater systems by anadromous salmon. International Association of Theoretical and Applied Limnology 23: 2249-2258.

McElhaney, P., M. H. Ruckelshaus, M. J. Ford, and T. C. Wainwright. 2000. Viable salmonid populations and the recovery of evolutionarily significant units. U.S. Dept. of Commerce, NOAA Tech. Memo., NMFS-NWFSC-42, 156 pp.NMFS (National Marine Fisheries Service). 1995. Juvenile fish screen criteria for pump intakes. Available from: http://www.nwr.noaa.gov/1hydrop/nmfscrit1.htm.

NMFS (National Marine Fisheries Service). 1996. Juvenile fish screen criteria for pump intakes. Available from: http://www.nwr.noaa.gov/1hydrop/pumpcrit1.htm.

NMFS (National Marine Fisheries Service). 1999. Endangered and threatened species: Threatened status for three Chinook salmon Evolutionarily Significant Units in Washington and Oregon, and Endangered status for one Chinook salmon ESU in Washington; final rule. Partial 6-month extension on final listing determinations for four Evolutionarily Significant Units of West Coast Chinook salmon; proposed rule. Federal Register 64:14308-14328.

NMFS (National Marine Fisheries Service). 2000. A risk assessment procedure for evaluating harvest mortality of Pacific salmonids. National Marine Fisheries Service, Sustainable Fisheries Division, Northwest Region. May 30. 33pp.

NMFS (National Marine Fisheries Service). 2007. Endangered and threatened species: final listing determination for Puget Sound steelhead. Federal Register 72FR26722.

NMFS (National Marine Fisheries Service). 2011a. Anadromous Salmonid Passage Facility Design. NMFS, Northwest Region, Portland, Oregon.

NMFS (National Marine Fisheries Service). 2011b. Evaluation of and recommended determination on a Resource Management Plan (RMP), pursuant to the salmon and steelhead 4(d) rule: Comprehensive management plan for Puget Sound Chinook: harvest management component. U.S. Department of Commerce, NOAA. FINWRl2010/06051.

NMFS (National Marine Fisheries Service). 2013. Endangered and Threatened wildlife; proposed rule to revise the code of Federal Regulations for species under the jurisdiction of the National Marine Fisheries Service. Federal Register 78FR38270.

NPPC (Northwest Power Planning Council). 2001. Performance standards and indicators for the use of artificial production for anadromous and resident fish populations in the Pacific Northwest. Portland, Oregon. 19 pp.

Phinney, D. 2006. Compendium of Water Rights documents for Hatcheries and Wildlife areas. Washington Department of Fish and Wildlife Habitat Program. Olympia, Washington.

Piper, R., I.B. McElwain, L.E. Orme, J.P. McCraren, L.G. Fowler, J.R. Leonard, A.J. Trandahl, and V. Adriance. 1982. Fish Hatchery Management. United States Dept of Interior, Fish and Wildlife Service. Washington, D.C.

PSTRT (Puget Sound Technical Recovery Team). 2003. (Draft) Independent populations of Chinook salmon in Puget Sound - Puget Sound TRT public review draft (May 18, 2004 version). Northwest Fisheries Science Center. National Marine Fisheries Service. 92p.

Puget Sound Steelhead Technical Recovery Team (PSSTRT). 2013. Identifying historical populations of steelhead within the Puget Sound Distinct Population Segment. Final Review Draft. 149 pp.

Puget Sound Salmon Management Plan. 1985. United States vs. Washington (1606 F.Supp. 1405).

RMIS (Regional Mark Information System). 2012. Retrieved December 31, 2014. Available from: http://www.rmpc.org/.

Ruckelshaus, M.H., K.P. Currens, W.H. Graeber, R.R. Fuerstenberg, K. Rawson, N.J. Sands, and J.B. Scott. 2006. Independent populations of Chinook salmon in Puget Sound. United States Department of Commerce, NOAA. Technical Memo. NMFS-NWFSC-78, Seattle, Washington. 125 pp.

SSHAG (Salmon and Steelhead Hatchery Assessment Group). 2003. Hatchery broodstock summaries and assessments for chum, coho, and Chinook salmon and steelhead stocks within evolutionarily significant units listed under the Endangered Species Act. NOAA Fisheries, Northwest Fisheries

Science Center, Seattle, Washington and Southwest Fisheries Science Center, La Jolla, California. 326pp.

Salo, E.O. and W.H. Bayliff. 1958. Artificial and natural production of silver salmon, *Oncorhynchus kisutch*, at Minter Creek, Washington. Washington Department of Fisheries. Research. Bulletin Number 4. Seattle, Washington. 76 pp.

Seidel, P. 1983. Spawning guidelines for Washington Department of Fish and Wildlife hatcheries. Washington Department of Fish and Wildlife. Olympia, Washington.

Shared Strategy for Puget Sound. 2005. Puget Sound salmon recovery plan. Volumes I and II. Plan adopted by the National Marine Fisheries Service January 19, 2007. Submitted by the Shared Strategy Development Committee. Shared Strategy for Puget Sound. Seattle, Washington.

Slaney, P.A. and B.R. Ward. 1993. Experimental fertilization of nutrient deficient streams in British Columbia. *In* Schooner, G. and S. Asselin, (editors). Le developpmente du saumon Atlantique au Quebec: connaitre les regles du jeu pour reussir. Colloque international e la Federation quebecoise pour le saumon atlantique, p. 128-141. Quebec, decembre 1992. Collection *Salmo salar* n°1.

Slaney, P.A., B.R. Ward and J.C. Wightman. 2003. Experimental nutrient addition to the Keogh River and application to the Salmon River in coastal British Columbia. *In* Stockner J.G. (editor). Nutrients in salmonid ecosystems: sustaining production and biodiversity. American Fisheries Society, Symposium 34(1): 111-126.

Stevens, D.L., and A.R. Olsen. 2004. Spatially balanced sampling of natural resources. Journal of the American Statistical Association 99(465): 262-278.

Steward, C. and T.C. Bjornn. 1990. Supplementation of salmon and steelhead stocks with hatchery fish; a synthesis of published literature. Idaho Cooperative Fish and Wildlife Research Unit. University of Idaho. Tech. Rpt. 90-1. Moscow, Idaho.

U.S. District Court of Western Washington. 1976. *United States v Washington*, 384 F, Supp. 312.

USFWS (U.S. Fish and Wildlife Service). 1994. Biological assessment for operation of U.S. Fish and Wildlife Service operated or funded hatcheries in the Columbia River Basin in 1995-1998. Submitted to National Marine Fisheries Service under cover letter, dated August 2, 1994, from William F. Shake, Acting USFWS Regional Director, to Brian Brown, NMFS.

United States v Washington, No. 9213 Phase 1 (sub no. 85-2) Order Adopting Puget Sound Management Plan, 1985.

Ward, B.R., D.J.F. McCubbing and P.A. Slaney. 2003. Evaluation of the addition of inorganic nutrients and stream habitat structures in the Keogh River watershed for steelhead trout and coho salmon. *In* Stockner J.G. (editor). Nutrients in salmonid ecosystems: sustaining production and biodiversity. American Fisheries Society, Symposium 34(1): 127-147.

WDFW (Washington Department of Fish and Wildlife) and WWTIT (Western Washington Treaty Indian Tribes). 1998 (Updated 2006). Salmonid disease control policy of the fisheries Co-Managers of Washington State. Washington Department of Fish and Wildlife and Western Washington Treaty Indian Tribes, Olympia Washington.

WDFW (Washington Department of Fish and Wildlife), Puyallup Indian Tribe and Muckleshoot Indian Tribe. 1996. Recovery Plan for White River Spring Chinook. 81 pp.

WDFW (Washington Department of Fish and Wildlife) and PSTT (Puget Sound Treaty Tribes). 2004. Puget Sound Chinook salmon hatcheries: a component of the Comprehensive Chinook salmon management plan, Olympia, Washington. 148 pp.

WDFW (Washington Department of Fish and Wildlife). 2014. 2014 Future brood document. Washington Department of Fish and Wildlife. Olympia, Washington. Available from: http://wdfw.wa.gov/publications/01566/.

WDFW (Washington Department of Fish and Wildlife). 2013. Hatcheries Headquarters Database. Washington Department of Fish and Wildlife, Olympia, Washington.

WDFW (Washington Department of Fish and Wildlife). 2012. Salmonid stock inventory (SaSI). Fish Program, Science Division. Washington Department of Fish and Wildlife. Olympia, Washington. Available from: http://wdfw.wa.gov/conservation/fisheries/sasi/

WDOE (Washington Department of Ecology). 2014. Water Resources Explorer. Retrieved September 17, 2014, from: https://fortress.wa.gov/ecy/waterresources/map/WaterResourcesExplorer.aspx.

Wegge, T. 2009. Methods for estimating region economic impacts of Washington hatchery programs: technical memorandum. TCW Economics. Sacramento, California. 10 pp.

Wipfli, M.S., J. Hudson, and J. Caouette. 1998. Influence of salmon carcasses on stream productivity: Response of biofilm and benthic macroinvertebrates in southeastern Alaska, U.S.A. Canadian Journal of Fisheries and Aquatic Sciences. 55(6): 1503-1511.

14 SECTION 14. 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:

Certified by_____ Date:_____

15 ADDENDUM A. PROGRAM EFFECTS ON OTHER (AQUATIC OR TERRESTRIAL) ESA-LISTED POPULATIONS. (Anadromous salmonid effects are addressed in Section 2)

15.1 List all ESA permits or authorizations for USFWS ESA-listed, proposed, and candidate salmonid and non-salmonid species associated with the hatchery program.

The WDFW and the USFWS have a Cooperative Agreement pursuant to section 6(c) of the Endangered Species Act that covers the majority of the WDFW actions, including hatchery operations.

> *"The department is authorized by the USFWS for certain activities that may result in the take of bull trout, including salmon/steelhead hatchery broodstocking, hatchery monitoring and evaluation activities and conservation activities such as adult traps, juvenile monitoring, spawning ground surveys..."*

15.2 Describe USFWS ESA-listed, proposed, and candidate salmonid and non-salmonid species and habitat that may be affected by hatchery program.

Several listed and candidate species are found in Pierce County; however the hatchery operations and facilities for this program do not fall within the critical habitat for any of these species. As such there are no effects anticipated for these species.

Bull Trout (*Salvelinus confluentus*) are not present in the Minter Creek watershed. Interactions between program fish in the marine environment are expected to be minor.

Listed or candidate species:
"No effect" for the following species:

Canada Lynx (*Lynx canadensis*) –Threatened [critical habitat designated]
Gray Wolf (*Canis lupus*) –Threatened
Grizzly bear (*Ursus arctos horribilis*) –Threatened
Northern Spotted owl (*Strix occidentalis caurina*) –Threatened [critical habitat designated]
Marbled murrelet (*Brachyramphus marmoratus*) –Threatened [critical habitat designated]
Water howellia (*Howellia aquatilis*) –Threatened
Marsh Sandwort (*Arenaria paludicola*) [historic]
Golden Paintbrush (*Castilleja levisecta*) [historic]

Candidate Species
Fisher *(Martes pennanti)* – West Coast DPS
Mardon skipper (*Polites mardon*)
(Roy Prairie and Tacoma) Mazama pocket gopher (*Thomomys mazama* ssp. *glacialis* and *tacomensis* [historic])
North American wolverine *(Gulo gulo luteus)* – contiguous U.S. DPS
Oregon spotted frog (*Rana pretiosa*)
Streaked horned lark (*Eremophila alpestris strigata*)
Taylor's checkerspot (*Euphydryas editha taylori*)
Yellow-billed cuckoo (*Coccyzus americanus*)
Whitebark pine *(Pinus albicaulis*)

15.3 Analyze effects.

Not applicable

15.4 Actions taken to minimize potential effects.

Not applicable

15.5 References

Not applicable

"Take" Tables

Table 1. Estimated listed salmonid take levels of by hatchery activity.

Listed species affected: Spring Chinook (*Oncorhynchus tshawytscha*)	**ESU/Population:** Puget Sound Chinook: White River Spring	**Activity:** Minter Creek White River Spring Chinook Program
Location of hatchery activity: Minter Creek Hatchery, mouth of Minter Creek (15.0048) Hupp Springs, RM 3 of Minter Creek (15.0048)	**Dates of activity:** Sub-yearlings: May- June	**Hatchery program operator:** WDFW

Type of Take	**Annual Take of Listed Fish By Life Stage *(Number of Fish)***			
	Egg/Fry	**Juvenile/Smolt**	**Adult**	**Carcass**
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)			0-5	
Capture, handle, tag/mark/tissue sample, and released d)				
Removal (e.g. broodstock) e)			*	
Intentional lethal take f)			*	
Unintentional lethal take g)			0	
Other Take (specify) h)				

* All returning adults will be spawned.

a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at weirs.
b. Take associated with weir or trapping operations where listed fish are captured and transported for release.
c. Take associated with weir or 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.
f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.
g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.
h. Other takes not identified above as a category.

Instructions:

1. *An entry for a fish to be taken should be in the take category that describes the greatest impact.*
2. *Each take to be entered in the table should be in one take category only (there should not be more than one entry for the same sampling event).*
3. *If an individual fish is to be taken more than once on separate occasions, each take must be entered in the take table.*