

HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:

Tumwater Falls Fall Chinook Hatchery
Program (Segregated)

**Species or
Hatchery Stock:**

Deschutes River Fall Chinook
(*Oncorhynchus tshawytscha*)

Agency/Operator:

Washington Department of Fish & Wildlife

Watershed and Region:

Deschutes River / Puget Sound

Date Submitted:

Date Last Updated:

January 16, 2013

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Tumwater Falls (South Puget Sound) fall Chinook Program

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

Deschutes River fall Chinook (*Oncorhynchus tshawytscha*) - not listed

1.3) Responsible organization and individuals

Hatchery Operations Staff Lead Contact

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

Not applicable

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

Funding Sources	Operational Information (for FY 2011)
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General Fund – State

Full time equivalent staff – 1.98

DJ – Federal

Annual operating cost (dollars) - \$144,372

The above information for annual operating cost applies cumulatively and cannot be broken out specifically by program.

The Squaxin Island Tribe has provided some temporary, interim funding assistance for this project.

1.5) Location(s) of hatchery and associated facilities.

Broodstock Collection:

Broodstock Collection; Acclimation; and Release Locations:

Tumwater Falls Hatchery: Located on Deschutes River (WRIA 13.0028) at RM. 0.2. Deschutes River drains (through Capitol Lake) into Puget Sound Budd Inlet.

Incubation Locations:

Minter Creek Hatchery: Located on Minter Creek (15.0048) at RM 0.5. Minter Creek drains into Puget Sound Carr Inlet

Wallace River Hatchery: Located on Wallace River (WRIA 07.0940) at RM 4.0, tributary to the Skykomish River (WRIA 07.0963)

Rearing Locations:

Wallace River Hatchery

Coulter Creek Rearing Ponds: Located at RM 0.2 on Coulter Creek (15.0002). Coulter Creek drains into Puget Sound Case Inlet.

1.6) Type of program.

Segregated harvest.

1.7) Purpose (Goal) of program.

Harvest Augmentation. The goal of this program is to provide adult fish for sustainable fisheries (Magnuson/Stevens Act) and *US v Washington* 1974 (tribal harvest opportunity) in deep South Puget Sound, including Budd Inlet.

1.8) Justification for the program.

The purpose of the program is to produce fall Chinook for sustainable fisheries (Magnuson/Stevens Act), for harvest in Puget Sound recreational fisheries and to fulfill Treaty Indian fishing right entitlements *US v Washington (1974)*. Releases are mass-marked (see HGMP section 10.7).

To minimize impacts on listed fish by WDFW facilities operation and the Tumwater Falls sub-yearling Chinook program, the following Risk Aversions are included in this HGMP:

Table 1.8.1: Summary of risk aversion measures for the Tumwater Falls fall Chinook program.

Potential Hazard	HGMP Reference	Risk Aversion Measures
Water Withdrawal	4.1, 4.2	With expansion of the facility being proposed & developed, a new water right permit (# S2-30064) is being applied for. Monitoring and measurement of water usage is reported in monthly NPDES reports.
Intake Screening	4.2	The intake screens on Tumwater Falls are in compliance with state and federal guidelines (NMFS 1995, 1996), but do not meet the current Anadromous Salmonid Passage Facility Design criteria (NMFS 2011).
Effluent Discharge	4.2	Pounds of fish reared at the release site do not exceed the requirements of an NPDES permit.
Broodstock Collection & Adult Passage	2.2.3,5.1, 7.9	The fish ladder at Tumwater Falls facility diverts returning adult Chinook into the hatchery adult pond where they are sorted for spawning or passage upstream.
Disease Transmission	9.2.7	Co-Managers Fish Disease Policy. 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 (smolts) to foster rapid migration to marine waters.

1.9) List of program “Performance Standards”.

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

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

1.10.1: “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 <i>US v WA</i> .	Contributes to co-manager harvest.	Participate in annual coordination between co-managers to identify and report on issues of interest, coordinate management, and review programs (FBD process, North of Falcon, HAIPs).
3.1.2- Program contributes to mitigation requirements.	This program provides mitigation for lost fish production due to development within Puget Sound and contributes to a meaningful harvest in sport and commercial fisheries.	Survival and contribution to fisheries will be estimated for each brood year released.
3.1.3 Program addresses ESA responsibilities.	Program is allowed to continue harvest under ESA permits.	HGMP updated and re-submitted to NOAA with significant changes or under permit agreement.
3.2.1. Harvest of hatchery-produced fish minimizes impact to wild populations.	Harvest is regulated to meet appropriate biological assessment criteria. Mass mark juvenile hatchery fish prior to release to enable state agencies to implement selective fisheries.	Harvests are monitored by agencies to provide up to date information.
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.	Percentage of total hatchery releases is identifiable as hatchery-origin fish. Mass-mark (adipose-fin clip, CWT, otolith-mark, other, etc., depending on species) production fish to identify them from naturally produced fish.	Historically, Chinook salmon could not ascend Tumwater Falls, and no self-sustaining Chinook salmon population existed in the Deschutes River Basin (SSHAG 2003). Annual estimates of mass-mark rate (adipose fin-clip) of all hatchery releases. Chinook releases were CWT'd until 2009; last group was a yearling release (see HGMP section 3.3.1).
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.	Hatchery adults are collected throughout the spawning run in proportion to timing, age and sex composition of return. Adhere to WDFW spawning guidelines. (Seidel 1983).	Annual run timing, age and sex composition and return timing data are collected.
3.5.5 Juveniles are released at fully-smolted stage.	Higher survival benefit and reduced residualism; smoltification (size fpp/mass CV and condition factor) and behavior monitored in the hatchery.	Condition of fish monitored in the hatchery throughout rearing stages. Annual information regarding date, size at release, release type (on-station) and type of release

		are recorded in hatchery data systems (WDFW <i>FishBooks</i>).
3.5.6 The number of adults returning to the hatchery that exceeds broodstock needs is declining.	Program is properly sized to meet harvest objectives; program fish are fully utilized in target fisheries.	Harvests and hatchery returns are monitored throughout the run.
3.6.1 The hatchery program uses standard scientific procedures to evaluate various aspects of artificial propagation.	Adhere to HSRG (2004) and WDFW spawning guidelines (Seidel 1983). 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.
3.8.2 Juvenile production costs are comparable to or less than other regional programs designed for similar objectives.	Artificial production was chosen as the preferred alternative for attaining hatchery production objective.	Annual operational cost of program compared to calculated fishery contribution value (Wegge 2009). WDFW reports annual operating costs.
3.8.3 Non-monetary societal benefits for which the program is designed are achieved.	Contributes to the cultural benefit that fishing provides. Recreational fishery angler days, length of season, number of licenses purchased. Public outreach via schools. Fish available for tribal ceremonial use.	Current releases from Tumwater Falls are ad-clip only. Annual harvest of hatchery fish based on CWT recovery estimates and creel surveys. The last CWT release occurred in 2009.

1.10.2: “Performance Indicators” addressing risks.

Risks		
Performance Standard	Performance Indicator	Monitoring & Evaluation
3.2.1 Fish produced for harvest are produced and released in a manner enabling effective harvest, as described in all applicable fisheries management plans, while avoiding overharvest of non-target species.	Harvest is regulated to meet appropriate biological assessment criteria. Mass-mark juvenile hatchery fish prior to release to enable state agencies to implement selective fisheries.	Harvests and escapements are monitored by agencies to provide up-to-date information.
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.	Percentage of total hatchery releases are identifiable as hatchery-origin fish. Mass-mark (adipose-fin clip, CWT, otolith-mark, other, etc., depending on species) production fish to identify them from naturally produced fish for selective fisheries.	Current releases from Tumwater Falls Hatchery are ad-clip only. Annual harvest of mass-marked hatchery fish based on creel surveys. The last CWT release occurred in 2009.
3.3.2 Releases are sufficiently marked to allow statistically significant evaluation of program contribution to natural	Hatchery production is identifiable in some manner (fin-marks, tags, otolith, etc.) consistent with information	Historically, Chinook salmon could not ascend Tumwater Falls, and no self-sustaining Chinook salmon population

production and to evaluate effects of the program on the local natural population.	needs.	<p>existed in the Deschutes River Basin (SSHAG 2003).</p> <p>Annual estimates of mass-mark (ad-clip only) rate of all hatchery releases.</p> <p>Returning fish encountered are examined for the fin-mark upon hatchery return and on the spawning ground. Numbers of estimated hatchery (marked) are recorded annually.</p>
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.	Collection of broodstock is done randomly throughout the entire return period.	<p>Annual run timing, age and sex composition and return timing data are collected.</p> <p>Adhere to WDFW spawning guidelines. (Seidel 1983).</p>
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.	Historically, Chinook salmon could not ascend Tumwater Falls, and no self-sustaining Chinook salmon population existed in the Deschutes River Basin (SSHAG 2003).
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.	<p>Historically, Chinook salmon could not ascend Tumwater Falls, and no self-sustaining Chinook salmon population existed in the Deschutes River Basin (SSHAG 2003).</p> <p>Not applicable.</p>
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.	<p>Historically, Chinook salmon could not ascend Tumwater Falls, and no self-sustaining Chinook salmon population existed in the Deschutes River Basin (SSHAG 2003).</p> <p>Annual run timing, age and sex composition and return timing data are collected.</p>
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).	<p>Historically, Chinook salmon could not ascend Tumwater Falls, and no self-sustaining Chinook salmon population existed in the Deschutes River Basin (SSHAG 2003).</p> <p>Not applicable.</p>

3.5.4 Juveniles are released on-station, or after sufficient acclimation to maximize homing ability to intended return locations.	Location and type of release.	Annual release information, including location (on-station), method (acclimation), type (forced) and class (sub-yearlings) are recorded in hatchery data systems.
3.5.5 Juveniles are released at fully-smolted stage.	Level of smoltification at release. Fish are released at 50-80 fpp (sub-yearlings).	Condition of fish monitored in the hatchery throughout rearing stages. Annually monitor size number, date of release.
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.	Numbers of adults returning to the hatchery, broodstock collected, and surplus returns are recorded annually.
3.6.1 The hatchery program uses standard scientific procedures to evaluate various aspects of artificial propagation.	Adhere to HSRG (2004) and WDFW spawning guidelines (Seidel 1983). 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.
3.7.1 Hatchery facilities are operated in compliance with all applicable fish health guidelines and facility operation standards and protocols (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.
3.7.2 Effluent from hatchery facility will not detrimentally affect natural populations.	Discharge water quality compared to applicable water quality standards by NPDES permit. WDFW water right permit compliance.	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.
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.	Controls of specific fish pathogens through eggs/fish movements are conducted in accordance to Co-managers Fish Health Disease Policy. Disposition of carcasses are recorded in the WDFW Hatchery Adult Data.
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.	Historically, Chinook salmon could not ascend Tumwater Falls, and no self-sustaining Chinook salmon population existed in the Deschutes River Basin (SSHAG 2003).
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 released from the hatchery at a time that fosters rapid migration downstream.	Not applicable. Historically, Chinook salmon could not ascend Tumwater Falls, and no self-sustaining Chinook salmon population existed in the Deschutes River Basin (SSHAG 2003).
3.8.1 Cost of program operation does not exceed the net economic value of fisheries in dollars per fish for all fisheries targeting this population.	Total cost of operation.	Annual operational cost of program compared to calculated fishery contribution value (Wegge 2009).
3.8.3 Non-monetary societal benefits for which the program is designed are achieved.	Contributes to the cultural benefit that fishing provides. Recreational fishery angler days, length of season, number of licenses purchased. Fish available for tribal ceremonial use.	Agencies and tribes to provide up-to-date information needed to monitor harvests.

1.11) Expected size of program.

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

Approximately 2,400 adults collected annually.

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

Table 1.11.2.1 Proposed annual fish release levels (maximum number) by life stage and location.

Life Stage	Release Location	Annual Release Level
Sub-yearling	Deschutes River	3,800,000

WDFW, Future Brood Document 2012.

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 was 0.19% for brood years 2000-2004 for sub-yearlings (RMIS 2012). Based on the smolt-to-adult survival and the programmed release goal of 3,800,000-sub-yearling Chinook, the estimated adult production (goal) level would be 7,100 (see also HGMP section 3.3.1).

Table 1.12.1: Tumwater Falls Hatchery fall Chinook escapement 2000-2011.

Year	Escapement
2000	5,948
2001	5,671
2002	8,704
2003	7,845
2004	13,101
2005	9,607
2006	17,788
2007	14,474
2008	10,994
2009	10,155
2010	5,599
2011	5,163
Average	9,587

Source: WDFW Hatchery Database 2008, *FishBooks* 2012.

Table 1.12.2: Adult (jacks not included) fall Chinook passed above hatchery traps on the Deschutes River and Percival Creek (WDFW Hatchery Records).

Year	Deschutes River	Percival Creek ^a
1998	1,442	155
1999	223	1,190
2000	2,838	71
2001	1,504	56
2002	2,523	404
2003	3,080	Trapping Discontinued
2004	779 (779 Adipose present+21 jacks)	
2005	482 (482 Adipose present+ 46 jacks)	
2006	3,939 (3,875 Adipose-fin clipped+ 126 jacks)	
2007	1,801 (1,773 Adipose-fin clipped + 28 jacks)	
2008	1,401 (1,380 Adipose-fin clipped + 21 jacks)	

2009	2,023	(1,664 Adipose-fin clipped, 82 jacks; 277 unknowns (12 jacks)
2010	318	(304 Adipose-fin clipped adults + 17 jacks)
2011	571	(115 Adipose-fin clipped adults + 456 jacks)

Source: WDFW Hatchery Database 2008, *FishBooks* 2012.

^a Percival Cove counts include some estimates made after the pickets were removed from the trap.

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

Program propagation began in 1946. The Washington Department of Fisheries built the fishway around the falls in 1954, and constructed the adult holding ponds in the early 1960s (WDF 1954).

1.14) Expected duration of program.

Ongoing.

1.15) Watersheds targeted by program.

Deschutes River (WRIA 13.0028) and Percival Creek (WRIA13.0029).

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

Alternative #1: To reduce the sub-yearling program would require the review and approval of the co-managers (WDFW and Squaxin Tribe). The Puget Sound Salmon Management Plan (PSSMP 1985), a federal court order, describes the co-management responsibilities of WDFW and the tribes with regard to fishery management and artificial production. The PSSMP explicitly states that "no change may be made to the Equilibrium Brood Document (program production goals) without prior agreement of the affected parties."

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 is 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.

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.

None directly.

- 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 (70 FR 37160); reaffirmed Threatened by five-year status review, completed August 15, 2011 (76 FR 50448). 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, as well as twenty-six artificial propagation programs (Ford 2011). The Technical Recovery Team (TRT) did not find any evidence that an independent population of Chinook salmon historically existed in the Deschutes River or other nearby South Sound independent tributaries (Ruckelshaus et al. 2006).

Puget Sound steelhead (*Oncorhynchus mykiss*): Listed as *Threatened* under the ESA on May 11, 2007 (72 FR 26722); reaffirmed Threatened by five-year status review, completed August 15, 2011 (76 FR 50448). 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). 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, Elwha natural, White 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 2011).

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.

Tumwater Falls (Deschutes River) fall Chinook in Puget Sound Chinook ESU. The PSTRT (2003) determined that a viable Chinook population did not historically occur in the Deschutes River. While the program may have incorporated natural-origin fish for use as broodstock over the years, naturally-produced Deschutes River Chinook are not considered a viable population segment in the Puget Sound ESU nor is the hatchery population included in NOAA Fisheries Hatchery Listing Policy (70 FR 37160, June 28, 2005; NMFS SHIEER 2004).

SSHAG (2003) designated this stock as Category 2b. It was founded from fish that are considered part of the ESU, but is released outside of its native watershed. Historically, Chinook salmon could not ascend Tumwater Falls, and no self-sustaining Chinook salmon population existed in the Deschutes River Basin.

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).

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 intrinsic potential (IP) estimate by the PSSTRT (2011), the capacity for winter steelhead in this DIP is approximately 8,312 adults. Historically, there was no anadromous migration of Puget Sound steelhead above Tumwater Falls on the Deschutes River (Hard et al. 2007). Essentially no steelhead are encountered in adult surveys or juvenile out-migrant traps within the South Sound DIP (S. Steltzner, Squaxin Island Tribe, pers. comm.).

Puget Sound Steelhead: Updated Risk Summary. The status of the listed Puget Sound steelhead DPS has not changed substantially since the 2007 listing. Most populations within the DPS are

showing continued downward trends in estimated abundance, a few sharply so (Ford 2011). For all but a few putative demographically independent populations of steelhead in Puget Sound, estimates of mean population growth rates obtained from observed spawner or redd counts are declining (typically 3 to 10% annually) and extinction risk within 100 years for most populations in the DPS is estimated to be moderate to high, especially for *draft* populations in the *putative* South Sound and Olympic MPGs. Collectively, these analyses indicate 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 2.2.1).

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

- 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.

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).

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 (see HGMP section 2.2.2).

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 wild winter or summer stocks (being later 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.

Juvenile (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. Fuss (2003) indicated that most of the natural-origin Chinook out-migrants were larger than the hatchery-origin fish beginning in mid-May. In April and early May, hatchery fish were a slightly 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 Tumwater Falls, predation by hatchery smolts is not expected to be a significant problem.

Again, the Deschutes River has not been identified by the PSTRT (Ruckelshaus et al. 2006) as a watershed where an indigenous Chinook salmon population was historically present or whether such a population exists today. The program may have incorporated natural-origin fish for use as broodstock over the years although Deschutes River naturally produced Chinook are not considered a viable population segment in the Puget Sound ESU nor is the hatchery population included in NOAA Fisheries Hatchery Listing Policy (NMFS 2005).

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

Not applicable.

- 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).

See "Take" table at end of HGMP.

- 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.

Not applicable.

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, defining artificial production; objectives *Comprehensive Management Plan for Puget Sound Chinook* (WDFW 2004); and the Hatchery Action Implementation Plan (HAIP) for the watershed (see HGMP section 3.4).

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) and the *Hood Canal Salmon Management Plan* (HCSMP) (PNPTC et al. 1986), 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.

See also HGMP section 3.1.

3.3) Relationship to harvest objectives.

Tribal and non-tribal commercial and recreational fisheries directed at fall Chinook and other species produced through WDFW hatchery releases will be managed to minimize incidental effects to listed Chinook salmon and summer chum salmon. Compliance with the fisheries management strategy defined in the Summer Chum Salmon Conservation Initiative (SCSCI) will lead to fisheries on WDFW hatchery-origin stocks that are not likely to adversely affect listed Chinook or listed summer chum.

Each year, state, federal and tribal fishery managers plan the Northwest's recreational and commercial salmon fisheries. The pre-season planning process, known as the North of Falcon (NoF) process involves a series of public meetings between federal, state, tribal and industry representatives and other concerned citizens. NoF coincides with meetings of the Pacific Fishery Management Council, which sets the ocean salmon seasons at these meetings.

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: Tumwater Falls Hatchery Fall Chinook Fishery Contributions.

Brood Years: 2000-2004 (Sub-yearling) and 2004 (Yearling) Fishery Years: 2004-2008 (Sub-yearling) and 2008 (Yearling)			
Average SAR%*		0.19	0.29
Agency	Non-WA Fishery	% of total Survival	
		Sub-yearlings	Yearlings
ADFG	All	1.0	---
CDFO	All	24.0	---
NMFS	All	0.2	---
ODFW	All	0.5	---
Agency	WA Fishery	Sub-yearlings	Yearlings
WDFW	10- Ocean Troll	3.1	---
WDFW	15- Treaty Troll	6.0	---
WDFW	23- PS Net	10.5	9.1
WDFW	41- Ocean Sport- Charter	0.2	---
WDFW	42- Ocean Sport- Private	2.6	1.5
WDFW	45- PS Sport	30.5	78.8
WDFW	46- Freshwater Sport**	4.1	---
WDFW	50- Hatchery Escapement	17.2	9.5
WDFW	54- Spawning ground	---	1.1
Total		100.0	100.0

Source: RMIS 2012.

* Average SAR% = (tags recovered/tags released).

** Freshwater Sport based on WDFW Catch Record Card (CRC) data.

3.4) Relationship to habitat protection and recovery strategies.

The Tumwater Falls Hatchery program is part of WDFW-managed plans under the Co-Manager's Non-Chinook Resource Management Plan (RMP) for Puget Sound region non-Chinook salmon hatchery programs.

Hatchery Action Implementation Plans (HAIPs): Are watershed-level documents developed by the western Washington Treaty Tribes (Tribes) and WDFW, which consolidate descriptions of hatchery programs from each watershed into a single document. This document addresses co-manager priorities, legal requirements of the Puget Sound Salmon Management Plan (PSSMP) and Endangered Species Act (ESA), and recommendations of the Hatchery Scientific Review Group (HSRG). It describes the adaptation of general principles for hatchery management to the unique genetic and ecological setting of each watershed. The HAIPs also describe how hatchery programs will operate in conjunction with harvest management, habitat restoration, and habitat protection to achieve near- and long-term goals for natural and hatchery production of salmon in each watershed, as well as listing funded and unfunded capital and operating/monitoring needs for all state and tribal hatchery programs and facilities. Each HAIP will also outline the monitoring and evaluation needs and describe the co-manager's adaptive management approach.

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 Deschutes River watershed is the Thurston County Conservation District. Land use in the Deschutes is 54% forested, 39% non-forested vegetation, 16% agricultural and 5% urban. (See also http://www.rco.wa.gov/salmon_recovery/lead_entities.shtml).

RFEGs: Several citizen based groups in conjunction with local governments work on habitat actions to benefit both listed and non-listed stock in the system including the South Puget Sound Salmon Enhancement Group (RFEG).

Shared Strategy Plan: An ESU-wide recovery planning effort was undertaken by Shared Salmon Strategy for Puget Sound, a collaborative group dedicated to restoring salmon throughout Puget Sound (online at <http://www.sharedsalmonstrategy.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:

- Orcas
- 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 the Chinook 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 the emigrating Chinook. 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 Whale
- Northern pikeminnow
- Cutthroat trout
- Steelhead
- Coho salmon
- Pacific staghorn sculpin
- Numerous marine pelagic fish species

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 source available at Tumwater Falls Hatchery.

Facility	Water Source	Available Water Flow (gpm)	Temp. (°F)	Usage	Limitations
Tumwater Falls	Deschutes R. (surface)	3,000	48-60	Broodstock collection, rearing, acclimation	No limitation
Coulter Creek	Coulter Creek (surface)	187	41-54	Main supply	

	Unnamed stream (surface)	14		Broodstock collection, rearing,	
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Tumwater Falls Hatchery: Water from Deschutes River is the only source available at the hatchery. Water is used only during broodstocking in the fall and acclimation and releases in the spring.

Water rights at Tumwater Falls Hatchery are regulated through permit # S2-30064.

Coulter Creek rearing pond: Water rights are regulated through permit # S2-24938C and S2-25354-C.

Minter Creek Hatchery: See Minter Creek Chinook HGMPs.

Wallace River Hatchery: See Wallace River Chinook HGMPs.

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.

Tumwater Falls Hatchery: The facility meets guidelines not requiring the “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).

Minter Creek Hatchery: See Minter Creek Chinook HGMPs.

Wallace River Hatchery: See Wallace River Chinook HGMPs.

Coulter Creek rearing pond: Coulter Creek Rearing Ponds 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) (see 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 Coulter Creek Rearing Pond.

Facility/ Permit #	Reports Submitted Y/N			Last Inspection Date	Violations Last 5 yrs (see Table 4.2.2)	Corrective Actions Y/N	Meets Compliance Y/N
	Monthly	Qtrly	Annual				
Coulter Cr Pd WAG13-1012	Y	Y	Y	5/16/2005	0	N	Y

Source: Ann West, WDFW Hatchery Data Unit.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

Three ladders along the Deschutes River allow upstream fish passage. During the broodstocking season, part of the uppermost ladder, located at the hatchery, is blocked and migrating fish enter the two hatchery holding ponds. Non-targeted species are enumerated and passed upstream. Once

the broodstock collection has ended the upper ladder is opened and all fish are allowed unrestricted passage upstream.

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

Two tanker trucks (1,300 and 2,000-gallons), equipped with aerators and oxygen tanks are used for juvenile transportation. Adults are not transported.

5.3) Broodstock holding and spawning facilities.

Table 5.3.1: Broodstock holding and spawning facilities at Tumwater Falls Hatchery.

Facility	Pond Type	Number	Dimensions
Tumwater Falls	Concrete raceways	2	20' x 100' x 5'

Two 20' x 100' x 5' concrete ponds are the only ponds available at the hatchery. They are used for broodstocking in the fall and acclimation and release in the spring. Ponds are supplied with river water.

5.4) Incubation facilities.

There are no incubation facilities at Tumwater Falls Hatchery. Incubation of fish for this program takes place at Minter Creek and Wallace River hatcheries.

Table 5.4.1: Incubation facilities at Minter Creek and Wallace River hatcheries for Deschutes River fall Chinook.

Facility	Type	Number	Size
Minter Creek	Vertical Trays	762	24" x 25"
Wallace River	Vertical Trays	184	24" x 25"

5.5) Rearing facilities.

Tumwater Falls Hatchery has no rearing capability. Fish rearing for this program takes place at Coulter Creek Ponds, Minter Creek (initial rearing only) and Wallace River hatcheries. Sub-yearlings are transported back to Tumwater Falls Hatchery for acclimation and release only.

Table 5.5.1: Ponds utilized for rearing Deschutes River fall Chinook.

Facility	Pond Type	Number	Dimensions
Wallace River	Standard ponds	2	20' x 80' x 20"
Coulter Creek	Asphalt ponds	2	1/3 acre

5.6) Acclimation/release facilities.

The two 20' x 100' x 5' concrete ponds are the only ponds available. They are used for broodstocking in the fall and acclimation and release in the spring. Ponds are supplied with river water. Fish are released directly from the ponds into the river.

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

No operational difficulties have led to significant fish loss.

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.

The facility is equipped with low water alarms and a back-up generator in case of power loss.

Listed fish should not be affected by this facility operation. Deschutes River Chinook 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).

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.

Adult fall Chinook returning to the Deschutes River.

6.2) Supporting information.

6.2.1) History.

The hatchery program was founded in 1946 when 414,000 sub-yearling Green River hatchery-lineage broodstock were transferred from WDFW hatcheries in Puget Sound (WDF 1954). Soos Creek Hatchery-origin sub-yearlings were the first hatchery fish transferred into the lower river, with 16 different hatchery populations or admixtures of populations used to sustain juvenile fish production (Crawford 1999). The first fall Chinook egg takes in the watershed resulting from adult returns occurred in 1949 and 1950 (WDF 1949; 1950) (70 FR 37160. June 28, 2005; NMFS SHIEER 2004). Use of out-of-basin stock was discontinued in 1992, and the program has been fully self-sustaining since. From 2000 to 2003, broodstock was also collected at Percival Cove. Collection at that site was discontinued.

6.2.2) Annual size.

Approximately 2,400 adults collected annually.

6.2.4) Genetic or ecological differences.

The program is geographically, ecologically and genetically disconnected from the Green River natural and Green River hatchery-lineage populations that were originally used to found the Tumwater Falls hatchery population. The transplanted, isolated hatchery population propagated through this program is likely to be substantially diverged from natural Chinook salmon populations in the region. The South Sound Inlet Region, where the program operates, does not have a native self-sustaining natural Chinook salmon population that would serve as an appropriate reference population for the hatchery program (Ruckelshaus et al. 2006). No genetic samples have been collected from the Tumwater Falls Hatchery fall Chinook population to allow for its comparison with other Puget Sound Chinook salmon populations (70 FR 37160. June 28, 2005; NMFS SHIEER 2004).

6.2.5) Reasons for choosing.

The program was designed to provide Chinook salmon for fisheries harvest. To suit this purpose, fish were transplanted to create a population in place where natural fall Chinook population was not historically present. Green River hatchery-lineage populations were used since they reproduced well and were available for transfers at the time.

Currently, program uses locally-adapted hatchery stock established in and returning to the Deschutes River.

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.

This program does not affect listed fish as a result of broodstock selection practices. Deschutes River Chinook 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).

SECTION 7. BROODSTOCK COLLECTION

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

Adults

7.2) Collection or sampling design.

During the broodstocking season, the part of fish passage ladder located at the hatchery is blocked to prevent upstream passage; fish are diverted into two hatchery holding ponds instead. The ladder is blocked from the last week of August through the first week of December. The Chinook run ends in late-October, but collection continues through the end of coho run.

7.3) Identity.

Fish released through this hatchery program has been consistently mass-marked (adipose fin-clipped) since the 1999 releases (1998 brood). A portion of the 60,000 to 200,000 fish released in 2001-2009 (brood years 2000-2007) were also coded-wire tagged.

7.4) Proposed number to be collected:

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

Approximately 2,400 adults collected annually.

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

Table 7.4.2.1: Composition, by sex and age, of broodstock spawned at Tumwater Falls Hatchery for fall Chinook program.

Year	Adults		Jacks
	Females	Males	
2000	1,051	1,068	3
2001	1,136	1,194	4
2002	1,036	1,034	14
2003	1,044	1,084	8
2004	1,265	1,285	12
2005	1,393	1,412	18
2006	1,157	1,231	13
2007	1,484	1,498	19
2008	1,421	1,430	9
2009	1,268	1,245	29
2010	1,416	1,485	24
2011	1,315	1,260	90
Average	1,249	1,269	20

Source: WDFW Hatchery Database, 2009, FishBooks 2012.

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

Up to 1,500 fish are passed annually upstream for recreational opportunity. The remaining surplus fish are disposed of to a contracted fish buyer.

7.6) Fish transportation and holding methods.

Adult fish are not transported.

Broodstock is held in two 20' x 100' x 5' concrete ponds supplied with river water.

7.7) Describe fish health maintenance and sanitation procedures applied.

Standard fish health protocols, as defined in the Co-manager Fish Health Policy (WDFW and WWTIT 1998, updated 2006) are adhered to.

7.8) Disposition of carcasses.

Fish carcasses are disposed of to a contracted fish 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.

This program does not affect listed fish as a result of broodstock collection practices. Deschutes River Chinook 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).

SECTION 8. MATING

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

8.1) Selection method.

Broodstock is selected randomly from ripe fish across the entire maturation time frame. Spawning takes place three times a week.

8.2) Males.

All males collected, including jacks, are considered for spawning and chosen when ripe.

8.3) Fertilization.

Eggs from each female are collected in separate container and mixed with milt from one male (pairwise spawning). Eggs mixed with milt are allowed 30-60 seconds for fertilization and then eggs from five females are combined into one bucket.

Fertilization takes place at Minter Creek Hatchery. Collected gametes are transported from Tumwater Falls Hatchery to Minter Creek Hatchery in coolers for about one hour.

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.

This program does not affect listed fish as a result of mating scheme. Deschutes River Chinook 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).

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.

Incubation and rearing of fall Chinook Deschutes River program takes place at Minter Creek, Wallace River hatcheries and Coulter Creek rearing ponds (Table 9.1).

Table 9.1: Facilities utilized in the culture of Deschutes River fall Chinook.

Facility	Stage	Shipped to	Number	Size (fpp)	Month
Tumwater Falls	Broodstock collection	Minter Creek	4,575,000	Green eggs	September, October
Minter	Incubation	Wallace River	1,100,000	Eyed eggs	December
		Coulter Cr Ponds	3,000,000	1,000	January
Wallace	Rearing	Tumwater	1,000,000	125	May
Coulter Cr Ponds	Rearing	Tumwater	2,800,000	120	March-May
Tumwater Falls	Release	Deschutes River	3,800,000	90	March, June

Source: Future Brood Document 2012.

9.1) Incubation:

Current egg-take goal for Tumwater Falls fall Chinook program is 4,575,000 (FBD, 2012).

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

Table 9.1.1.1: Survival rates from egg take to ponding, Deschutes River fall Chinook, 2000-2011.

Brood Year	Egg Take	Survival Rates (%)		
		Green-to-Eye Up	Eye-Up-to-Ponding	
			Minter	Wallace
2000	4,863,000	90.2	98.0	96.4
2001	5,109,000	89.9	98.0	96.9
2002	4,914,500	89.4	98.0	95.0
2003	4,875,525	87.6	98.0	97.3
2004	4,815,200	88.4	98.0	97.9
2005	4,968,700	89.6	98.0	96.9
2006	4,423,945	85.4	98.0	97.5
2007	4,759,798	87.8	98.0	94.8
2008	4,802,194	87.6	98.0	94.9
2009	4,573,284	88.4	98.0	99.7
2010	4,582,665	92.8	98.0	97.9
2011	6,074,200	86.8	98.0	99.9
Average	4,860,376	88.8	98.00	97.0

Source: Hatchery Records 2012.

9.1.2) Cause for, and disposition of surplus egg takes.

No eggs in excess of program needs are collected for the Tumwater Falls Hatchery fall Chinook program. Current management approach does not allow for taking of eggs in surplus of program goal. If hatchery losses exceed the expected levels, then program goals for release are not met.

If the Chambers Creek fall Chinook program does not collect enough eggs collected at the Chambers Creek trap, the shortage is supplemented with eggs collected at Tumwater Falls Hatchery (see Table 9.1.2.1). The request for eggs is made in-season based on broodstocking needs.

Table 9.1.2.1: Eggs collected at Tumwater Falls Hatchery and shipped to Lakewood Hatchery for the Chambers Creek fall Chinook program (also see Chambers Creek Fall Chinook HGMP).

Brood Year	Eggs shipped
2000	0
2001	0
2002	400,000
2003	267,000
2004	1,154,000
2005	875,100
2006	708,600
2007	1,798,692
2008	1,808,304
2009	1,701,754
2010	1,525,342
2011	1,478,200
Average	976,416

Source: Hatchery Records 2012.

9.1.3) Loading densities applied during incubation.

Minter Creek Hatchery: Fertilized eggs are placed in vertical trays at 6,000 per tray.

Wallace River Hatchery: Eyed eggs are placed in vertical trays at 6,000 per tray.

9.1.4) Incubation conditions.

Minter Creek Hatchery: All eggs are incubated in trays on well water, flowing at 4 gpm. Vexar™ layers are placed in trays as a substrate substitute.

Once eyed, 1,100,000 eggs are shipped to Wallace River Hatchery. Eggs are wrapped in moist burlap, placed in coolers and transported for about 2.5 hours.

Wallace River Hatchery: Eyed eggs are incubated in trays on May Creek water at a flow of 4 gpm. Temperature of in-flowing water is monitored and recorded daily. Dissolved oxygen is checked when needed. Vexar™ layers are placed in trays as a substrate substitute.

Use of surface water causes siltation issues. Excess silt is removed by “rodding” trays and brushing the tray screens. The problem requires constant attention during flood events.

9.1.5) Ponding.

Minter Creek Hatchery: When fish are 95%+ buttoned up, (late December, early January), they are transported to Coulter Creek and ponded into two asphalt ponds.

Wallace River Hatcher: When fish are 95%+ buttoned up (February), they are moved from trays into 10' x 100' x 36" raceways and reared on May Creek/Wallace River mixed water.

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 a 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, the 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.

No listed fish are incubated through this program. Deschutes River Chinook 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).

9.2) Rearing:

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

Table 9.2.1.1: Fry to sub-yearling and yearling survival of Deschutes River fall Chinook 2000-2011.

Brood Year	Survival Rates (%)			
	Ponding –to-Transfer		Transfer to Sub-yearling Release	Sub-yearling-to-Yearling
	Wallace River	Coulter Creek		
2000	96.51	96.78	97.50	99.25
2001	96.17	85.20	97.50	99.36
2002	95.78	97.70	97.50	99.48
2003	97.06	99.26	97.50	99.27
2004	96.42	99.76	97.50	99.48
2005	94.42	97.71	97.50	99.61
2006	99.81	98.49	97.50	99.41
2007	97.29	98.92	97.50	99.03
2008	96.63	94.87	97.50	98.97
2009	95.88	97.95	97.50	99.40
2010	94.66	97.05	97.50	Discontinued
2011	90.64	96.80	97.50	
Average	95.94	96.71	97.50	99.23

Source: Hatchery Records 2012.

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 Fish Health 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/ft³.

9.2.3) Fish rearing conditions

Wallace River Hatchery: Fish are reared in 10' x 100' x 36"raceways on May Creek/Wallace River mix water.

Fish are marked when they reach 150 fpp, and are transferred to Tumwater Falls Hatchery, usually in two to three groups, in starting in April and continuing through May.

Coulter Creek Rearing Ponds: Fish are reared in two 1/3-acre asphalt ponds. Fish are marked when they reach 180 fpp (March), and are transferred to Tumwater Falls Hatchery, usually in eight groups, starting in March and continuing through May.

Tumwater Falls. Fish transferred to Tumwater Falls are acclimated in concrete raceway for one to two weeks prior to release.

Table 9.2.3.1: Average surface water temperature (°F), by month, at Deschutes River, and Minter, May and Coulter creeks.

Month	Average Water Temperatures (°F)			
	Deschutes River	Minter Creek	May Creek	Coulter Creek
January	41	42	42	41
February	43	42	44	42
March	44	43	45	42
April	49	47	46	46
May	52	48	48	47
June	56	52	51	52
July	60	55	57	55
August	65	53	59	55
September	60	53	55	54
October	53	49	52	49
November	48	44	45	44
December	43	43	43	43

Source: Hatchery Records 2012.

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, juvenile fall Chinook reared for Tumwater Falls Hatchery program.

Month	Average Size (fpp)		
	Tumwater	Wallace	Coulter Cr
January	----	----	910
February	No fish on station	900	603
March	195	500	306
April	170	250	166
May	120	125	110
June	90	Transfers completed	

Source: Hatchery Records 2012.

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

Not applicable.

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).

Chinook are fed a variety of diet formulations including starter, crumbles and pellets of Bio-Oregon brand. Feeding frequencies varies depending on the fish size and water temperature and usually begin at eight feedings/7 days a week, and end at 1-3 feeding/5 days a week.

Feed rates vary from 1.5% to 3.0% B.W./day. An overall season food conversion rate is approximately 0.8:1.

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 by the FHS. Procedures are consistent with the Co-Manager's Fish Health Policy (WDFW and WWTIT 1998, updated 2006).

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

ATPase activity is not measured. Due to the space constraints, fish are released regardless of the migratory stage.

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.

Listed fish are not under propagation through this program. Naturally-produced Deschutes River Chinook 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).

SECTION 10. RELEASE

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

10.1) Proposed fish release levels.

Table 10.1.1. Proposed fish release levels.

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Sub-yearling	3,800,000	90	April-June	Deschutes River

Source: WDFW, Future Brood Document 2012.

Note: 70-120 fpp ~ 83-70 mm fork length.

The target release size is 90 fpp. To accommodate the limited rearing capacity at Tumwater Falls Hatchery, however, fish are transferred from Wallace River and Coulter Creek facilities in groups over a period of two months and released between April 1 and June 14 (see also HGMP section 9.2.3). The size of fish between transferred groups varies; therefore the size of fish at release ranges from 75-140 fpp.

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

Stream, river, or watercourse: Deschutes River (WRIA 13.0028)
Release point: RM 0.2
Major watershed: Deschutes River
Basin or Region: Puget Sound

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

Table 10.3.1: Fall Chinook releases into Deschutes River.

Release Year	Sub-yearling	Avg. size (fpp)	CV	Date(s)	Yearling	Avg. size (fpp)	CV	Date(s)
2000	3,424,627	91	6.1	4/17-6/19	No yearling releases			
2001	3,199,200	91	6.4	4/11-6/22				

2002	3,563,000	93	6.9	4/15-6/14				
2003	3,932,589	88	5.5	4/21-6/8				
2004	2,794,036	86	5.9	4/23-6/11	80,790	8	9.8	4/2
2005	3,272,365	110	6.0	4/11-5/30	89,900	12	11.0	4/21
2006	3,495,000	101	9.4	4/19-6/7	80,280	9	11.9	3/31
2007	2,498,450	94	13.9	5/7-6/1	79,000	8	9.3	4/9
2008	4,070,150	100	5.3	4/21-6/2	74,905	13	10.5	3/21
2009	4,111,366	112	5.6	4/6-5/29	90,000	11	NA	3/20
2010	3,540,925	89	5.1	4/5-5/28	Discontinued			
2011	4,279,198	100	4.9	4/11-6/6				
Average	3,515,076	96	6.8		82,479	10	10.5	

Source: WDFW Hatchery Plants database, 2011, FishBooks 2012.

Table 10.3.2: Fall Chinook releases into Percival Cove.

Release Year	Sub-yearling	Avg. size (fpp)	CV	Date(s)	Yearling	Avg. size (fpp)	CV	Date(s)
2000	499,500	92	6.1	5/1	188,980	9	NA	5/25
2001	613,800	75	6.4	5/7, 11	180,000	9	8.6	4/94
2002	591,000	71	6.0	5/23	228,800	12	NA	4/4
2003	-----	-----	NA	-----	154,000	16	NA	1/31
2004	743,700	90	NA	5/3-4	110,000	8	9.4	4/13
2005	282,360	119	NA	4/25	99,200	11	11.9	4/11
2006	498,000	110	7.9	5/16	97,850	10	8.9	4/13
2007	780,000	113	6.0	5/21	48,550	9	9.3	4/26
2008	Discontinued.							
Average	572,623	96	6.9		138,423	11	9.6	

Source: WDFW Hatchery Plants database, 2011, FishBooks 2011.

10.4) Actual dates of release and description of release protocols.

After one to two weeks of acclimation (see HGMP section 10.6), fish are force-released to make room for the next group of arriving fish (see Tables 10.3.1 and 10.3.2 for release dates).

10.5) Fish transportation procedures, if applicable.

Fish are transferred from Wallace River Hatchery and Coulter Creek ponds to Tumwater Falls Hatchery are transported in 1,300 or 2,000 gallon tanker trucks equipped with aerators and oxygen tanks. The transportation time take from one to 2.5 hours. Fish loading densities do not exceed 1,200 lbs.

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

Fish are transferred from Wallace River Hatchery and Coulter Creek ponds to Tumwater Falls Hatchery in groups that accommodate the facility's limited rearing space. Fish are placed in two ponds at 500,000 to 350,000 fish per pond. They are acclimated on river water from one to two weeks, and released directly into Deschutes River. After one group is released, another one is brought in. This process takes place between April 1 and June 14.

If the facility receives more fish than it can accommodate at one time, excess fish are released directly into Deschutes River just above the hatchery. Prior to 2009, excess fish were released directly into Capitol Lake.

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

Table 10.7.1: Marks applied to release groups at Tumwater Fall Hatchery.

Brood Year	Sub-yearlings	Marking
2012	3,800,000	AD Only

WDFW, Future Brood Document 2012.

All fish released through this hatchery program have been consistently 100% mass-marked (adipose fin-clipped), since the 1999 releases (1998 brood). A portion of 60,000-200,000 fish, released from 2001-2009 (brood years 2000-2007), were also marked with coded-wire tags.

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

Egg take is carefully managed to minimize the likelihood of collecting surplus eggs or raising surplus fry. Actual releases should not exceed 10% of the program release goal and has never been a problem at this hatchery. Should it occur, regional staff and NOAA Fisheries will be informed and consulted on any required actions.

10.9) Fish health certification procedures applied pre-release.

Fish health is monitored and the fish health status of the population is certified by a WDFW Fish Health Specialist four days prior to release.

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

During severe drought or flooding conditions, fish may be released early to prevent on-station fish loss, or released directly into the river after transportation.

Hatcheries Standby Procedures (revised in 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.

Naturally-produced Deschutes River Chinook 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). There are no listed fish to be affected by hatchery releases into the Deschutes River.

Potential ecological risks to natural Chinook salmon populations in Puget Sound marine areas posed by juvenile fall Chinook releases by the Tumwater Falls Hatchery program may be partially addressed through adjustments in fish release size and timing practices.

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 monitoring program is designed to determine 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 otolith marks, adipose clips, coded wire tags, blank 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 come together in riverine, estuarine and marine habitats and assessment of the status of the target population. WDFW shall monitor annual salmon escapement to hatchery release sites within the watershed and in natural spawning areas to estimate the number and proportions of tagged, untagged and marked fish escaping each year. WDFW will also monitor straying of hatchery salmon to other Puget Sound watersheds through mark recovery programs conducted during routine spawning ground surveys and sampling at other Puget Sound hatcheries.

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

These fish are mass-marked (adipose-fin clip only) to allow for selective fisheries (harvest opportunity) in mixed stock areas to minimize impacts on weak or protected stocks as well as identifying the hatchery fall Chinook production and the NOR/HOR spawning ground ratios. Additionally, WDFW applied around 200,000 coded-wire tags to the 2000 and 2002-2004 brood year sub-yearling fall Chinook and around 70,000 coded-wire tags to the 2004, 2006 and 2007 brood year yearling fall Chinook productions at Tumwater Falls Hatchery to allow for evaluation of fishery contribution, survival rates and of possible straying to other Puget Sound watersheds.

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 Resource Management Plan for Puget Sound Chinook Salmon Hatcheries (WDFW and PSTT 2002).

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.

SSHAG (2003) designated this stock as Category 2b. It was founded from fish that are considered part of the ESU, but is released outside of its native watershed. Historically, Chinook salmon could not ascend Tumwater Falls, and no self-sustaining Chinook salmon population existed in the Deschutes River Basin.

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

SECTION 13. ATTACHMENTS AND CITATIONS

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DRAFT

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: _____

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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.

Bull Trout (*Salvelinus confluentus*): Bull trout were listed as a threatened species in the Coastal-Puget Sound Distinct Population Segment on November 1, 1999 (64 FR 58910). There are no bull trout in the Deschutes River and Critical Habitat has not been designated in the watershed or adjacent marine nearshore areas (75 FR 63898).

Listed or candidate species:

"No effect" for the following species:

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

Candidate Species

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

15.3) Analyze effects.

Hatchery activities, including in-river broodstock collection, hatchery trap, and water intake structures are not expected to pose a risk to system bull trout populations. Any bull trout encounters through the hatchery activities are recorded and reported.

15.4) Actions taken to minimize potential effects.

Trap is checked at least daily. Any bull trout encountered at the trap would be immediately returned to the stream, after any required measurements or samples have been taken. Bull trout

are not expected to be encountered in other hatchery programs during broodstock collection activities that would directly impact or create potential effects on bull trout in this system based on the current understanding of the status of these fish.

15.5 References

USFWS (U.S. Fish and Wildlife Service). 2004. Draft recovery plan for the Coastal-Puget Sound distinct population segment of bull trout (*Salvelinus confluentus*). Volume I (of II): Puget Sound management unit. Portland, Oregon. 389 + xvii pp.

USFWS (U.S. Fish and Wildlife Service). 2008. Bull trout (*Salvelinus confluentus*) 5-year review: Summary and evaluation. Portland, Oregon. U.S. Fish and Wildlife Service. 55 pp.

WDFW (Washington State Department of Fish and Wildlife). 2004. Washington State salmonid stock inventory bull trout/ Dolly Varden. Washington State Department of Fish and Wildlife. Olympia, Washington.

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

Listed species affected: Chinook (<i>Oncorhynchus tshawytscha</i>)	ESU/Population: Puget Sound Chinook	Activity: Tumwater Falls Chinook Sub-yearling Program		
Location of hatchery activity: Tumwater Fall Hatchery, RM. 0.2 miles on Deschutes River (WRIA 13.0028).	Dates of activity: August- October	Hatchery program operator: WDFW		
Type of Take	Annual Take of Listed Fish By Life Stage (<i>Number of Fish</i>)			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)	-	-	-	-
Collect for transport b)	-	-	-	-
Capture, handle, and release c)	-	-	0	-
Capture, handle, tag/mark/tissue sample, and release d)	-	-	-	-
Removal (e.g. broodstock) e)	-	-	-	-
Intentional lethal take f)	-	-	-	-
Unintentional lethal take g)	-	-	-	-
Other Take (specify) h)	-	-	-	-

- 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.

Table 2. Estimated listed salmonid take levels of by hatchery activity.

Listed species affected: Steelhead (<i>Oncorhynchus mykiss</i>)	ESU/Population: Puget Sound Steelhead	Activity: Tumwater Falls Chinook Sub-yearling Program		
Location of hatchery activity: Tumwater Fall Hatchery, RM. 0.2 miles on Deschutes River (WRIA 13.0028).	Dates of activity: August- October	Hatchery program operator: WDFW		
Type of Take	Annual Take of Listed Fish By Life Stage (<i>Number of Fish</i>)			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)	-	-	-	-
Collect for transport b)	-	-	-	-
Capture, handle, and release c)	-	-	0	-
Capture, handle, tag/mark/tissue sample, and release d)	-	-	-	-
Removal (e.g. broodstock) e)	-	-	-	-
Intentional lethal take f)	-	-	-	-
Unintentional lethal take g)	-	-	-	-
Other Take (specify) h)	-	-	-	-

- 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.

Attachment 1. Definition of terms referenced in the HGMP template.

Augmentation - The use of artificial production to increase harvestable numbers of fish in areas where the natural freshwater production capacity is limited, but the capacity of other salmonid habitat areas will support increased production. Also referred to as “fishery enhancement”.

Critical population threshold - An abundance level for an independent Pacific salmonid population below which: compensatory processes are likely to reduce it below replacement; short-term effects of inbreeding depression or loss of rare alleles cannot be avoided; and productivity variation due to demographic stochasticity becomes a substantial source of risk.

Direct take - The intentional take of a listed species. Direct takes may be authorized under the ESA for the purpose of propagation to enhance the species or research.

Evolutionarily Significant Unit (ESU) - NMFS definition of a distinct population segment (the smallest biological unit that will be considered to be a species under the Endangered Species Act). A population will be/is considered to be an ESU if 1) it is substantially reproductively isolated from other conspecific population units, and 2) it represents an important component in the evolutionary legacy of the species.

Harvest project - Projects designed for the production of fish that are primarily intended to be caught in fisheries.

Hatchery fish - A fish that has spent some part of its life-cycle in an artificial environment and whose parents were spawned in an artificial environment.

Hatchery population - A population that depends on spawning, incubation, hatching or rearing in a hatchery or other artificial propagation facility.

Hazard - Hazards are undesirable events that a hatchery program is attempting to avoid.

Incidental take - The unintentional take of a listed species as a result of the conduct of an otherwise lawful activity.

Integrated harvest program - Project in which artificially propagated fish produced primarily for harvest are intended to spawn in the wild and are fully reproductively integrated with a particular natural population.

Integrated recovery program - An artificial propagation project primarily designed to aid in the recovery, conservation or reintroduction of particular natural population(s), and fish produced are intended to spawn in the wild or be genetically integrated with the targeted natural population(s). Sometimes referred to as “supplementation”.

Isolated harvest program - Project in which artificially propagated fish produced primarily for harvest are not intended to spawn in the wild or be genetically integrated with any specific natural population.

Isolated recovery program - An artificial propagation project primarily designed to aid in the recovery, conservation or reintroduction of particular natural population(s), but the fish produced are not intended to spawn in the wild or be genetically integrated with any specific natural population.

Mitigation - The use of artificial propagation to produce fish to replace or compensate for loss of fish or fish production capacity resulting from the permanent blockage or alteration of habitat by human activities.

Natural fish - A fish that has spent essentially all of its life-cycle in the wild and whose parents spawned in the wild. Synonymous with *natural origin recruit (NOR)*.

Natural origin recruit (NOR) - See *natural fish* .

Natural population - A population that is sustained by natural spawning and rearing in the natural habitat.

Population - A group of historically interbreeding salmonids of the same species of hatchery, natural, or unknown parentage that have developed a unique gene pool, that breed in approximately the same place and time, and whose progeny tend to return and breed in approximately the same place and time. They often, but not always, can be separated from another population by genotypic or demographic characteristics. This term is synonymous with stock.

Preservation (Conservation) - The use of artificial propagation to conserve genetic resources of a fish population at extremely low population abundance, and potential for extinction, using methods such as captive propagation and cryopreservation.

Research - The study of critical uncertainties regarding the application and effectiveness of artificial propagation for augmentation, mitigation, conservation, and restoration purposes, and identification of how to effectively use artificial propagation to address those purposes.

Restoration - The use of artificial propagation to hasten rebuilding or reintroduction of a fish population to harvestable levels in areas where there is low, or no natural production, but potential for increase or reintroduction exists because sufficient habitat for sustainable natural production exists or is being restored.

Stock - (see "Population").

Take - To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.

Viable population threshold - An abundance level above which an independent Pacific salmonid population has a negligible risk of extinction due to threats from demographic variation (random or directional), local environmental variation, and genetic diversity changes (random or directional) over a 100-year time frame.

Attachment 2. Age class designations by fish size and species for salmonids released from hatchery facilities.

(generally from Washington Department of Fish and Wildlife, November, 1999).

SPECIES/AGE CLASS		Number of fish/pound	<u>SIZE/CRITERIA</u> Grams/fish
X	Chinook Yearling	≤20	≥23
X	Chinook (Zero) Yearling	>20 to 150	3 to <23
X	Chinook Fry	>150 to 900	0.5 to <3
X	Chinook Unfed Fry	>900	<0.5
X	Coho Yearling 1/	<20	≥23
X	Coho Sub-yearling	>20 to 200	2.3 to <23
X	Coho Fry	>200 to 900	0.5 to <2.3
X	Coho Unfed Fry	>900	<0.5
X	Chum Fry	≤1000	≥0.45
X	Chum Unfed Fry	>1000	<0.45
X	Sockeye Yearling 2/	≤20	≥23
X	Sockeye Sub-yearling	>20 to 8000	0.6 to <23
X	Sockeye Fall Releases	>150	>2.9
X	Sockeye Fry	>800 to 1500	0.3 to <0.6
X	Sockeye Unfed Fry	>1500	<0.3
X	Pink Fry	≤1000	≥0.45
X	Pink Unfed Fry	>1000	<0.45
X	Steelhead Smolt	≤10	≥45
X	Steelhead Yearling	≤20	≥23
X	Steelhead Fry	>20 to 150	3 to <23
X	Steelhead Unfed Fry	>150	<3
X	Cutthroat Yearling	≤20	≥23
X	Cutthroat Sub-yearling	>20 to 150	3 to <23
X	Cutthroat Fry	>150	<3
X	Trout Legals	≤2.5	≥180
X	Trout Fry	>2.5	<180

1/ Coho yearlings defined as meeting size criteria and 1 year old at release, and released prior to June 1st.

2/ Sockeye yearlings defined as meeting size criteria and 1 year old.