

HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:

Skamania Summer Steelhead
On-Station Release and Outplants

**Species or
Hatchery Stock:**

Skamania Hatchery (Washougal River)
Summer Steelhead *Oncorhynchus mykiss*

Agency/Operator:

Washington Department of Fish and Wildlife

Watershed and Region:

Washougal River/Lower Columbia River

Date Submitted:

Date Last Updated:

August 21, 2012

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Skamania Hatchery Summer Steelhead

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

Skamania Hatchery (Washougal River) summer steelhead (*Oncorhynchus mykiss*) – 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:

NOAA-National Marine Fisheries Service (NMFS) – Manager of Mitchell Act Funds

Clark County Public Utilities

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

Funding Sources

Mitchell Act

Operational Information

Full time equivalent staff – 4.0

Annual operating cost (dollars) - \$463,581

The above information for full-time equivalent staff and annual operating cost applies cumulatively to Washougal/Skamania Hatchery Anadromous Fish Programs and cannot be broken out specifically by program.

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

Broodstock Source: Skamania Hatchery- North Fork Washougal River

Broodstock Collection; Adult Holding; Spawning Locations:

Skamania Hatchery: WF Washougal River (WRIA 28.0232) at Rkm 2.4; tributary to the Washougal River (WRIA 28.0160) at R.M.14.4; tributary to the Columbia River via Camas Slough (WRIA 28.0154) at R.M. 118.1, Lower Columbia River, Washington.

Incubation Location:

Vancouver Trout Hatchery: 12208 SE Evergreen Hwy Vancouver, WA 98683. Located on Love Creek (WRIA 28.0148 – LLID1225448455962), tributary to the Columbia River at R.M. 115.5, Lower Columbia River, Washington.

Rearing; Release Location:

Skamania Hatchery: WF Washougal River (WRIA 28.0232) at Rkm 2.4; tributary to the Washougal River (WRIA 28.0160) at R.M.14.4

1.6) Type of program.

Segregated Harvest

1.7) Purpose (Goal) of program.

Mitigation/Augmentation. The goal of this program is to provide maximum sport harvest under the selective fishery regulations (retention of adipose-clipped fish only) while eliminating a directed harvest on wild winter steelhead Also serves as mitigation for development (including hydro-power) and habitat degradation

Program also provides fish for releases in the E.F. Lewis River, and Kalama River (Fallert Hatchery), SF Toutle River (Cowlitz Game and Anglers), NF Toutle River and Klickitat River (YKFP) - see respective program HGMPs. Program previously provided fish for releases in the White Salmon River – discontinued because of the removal of Condit Dam beginning October 2011. In 2012, WDFW proposed moving this program to Drano Lake.

1.8) Justification for the program.

The program is funded through the Mitchell Act via NOAA-NMFS for the purpose of mitigation for lost fish production due to development within the Columbia River Basin.

WDFW protects listed fish and provides harvest opportunity on hatchery fish through the Lower Columbia River-approved Fish Management and Evaluation Plan (FMEP) (WDFW 2001). All mainstem and tributary fisheries are managed as mark-selective (no wild retention) fisheries to minimize the impact on listed wild fish.

In order to minimize impact on listed fish by WDFW facilities operation, the following Risk Aversions are included in this HGMP:

Summary of risk aversion measures for the Skamania Hatchery summer steelhead program.

Potential Hazard	HGMP Reference	Risk Aversion Measures
Water Withdrawal	4.2	Water rights are formalized through trust water right #S2-23896 from the Department of Ecology. Monitoring and measurement of water usage is reported in monthly NPDES reports.
Intake Screening	4.2	WDFW has secured funding to begin work in 2012 on a new river intake system, to meet NOAA-NMFS compliance (Mitchell Act Intake and Fish Passage Study Report 2003)
Effluent Discharge	4.2	This facility operates under the “Upland Fin-Fish Hatching and Rearing” National Pollution Discharge Elimination System (NPDES) administered by the Washington Department of Ecology (DOE) - WAG 13-1008.
Broodstock Collection & Adult Passage	7.9	Listed fish are not collected. The hatchery weir and associated intake facilities need repairs to provide compliant passage. Pacific Coast Salmon Recovery Funds (PCSRF) were secured to install a velocity weir/barrier across the river at the entrance to the Skamania Hatchery fish ladder (planned for Summer 2013).
Disease Transmission	7.9, 10.11	<i>Fish Health Policy in the Columbia Basin.</i> Details hatchery practices and operations designed to stop the introduction and/or spread of any diseases within the Columbia Basin. Also, <i>Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries</i> (Genetic Policy Chapter 5, IHOT 1995).

Competition & Predation	See also 2.2.3, 10.11	Current risk aversions and future considerations are being reviewed and evaluated for further minimizing impacts to listed fish.
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1.9) List of program “Performance Standards”.

See HGMP Section 1.10. Standards are referenced from Northwest Power Conservation Council (NPCC) Artificial Production Review (APR) (NPCC 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
3.1.2- Program contributes to mitigation requirements	This program provides mitigation for lost fish production due to development within the Columbia River Basin 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 Section 10 permit	HGMP updated and re-submitted to NOAA-NMFS with significant changes or under permit agreement.
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	Externally-marked hatchery fish enable mark-selective fisheries, which can reduce directed harvest mortality on wild fish	Harvests and hatchery returns 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 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.	Annual estimates of mass-mark rate of all hatchery releases.
3.4.1 Implement measures for broodstock management to maintain integrity and genetic diversity	A minimum of 400 adults are collected throughout the spawning run in proportion to timing, age and sex composition of return	Annual run timing, age and sex composition and return timing data are collected. Adhere to WDFW spawning guidelines. (Seidel 1983)
3.8.3 Non-monetary societal benefits for which the program is designed are achieved.	Recreational fishery angler days, length of season, number of licenses purchased	Annual harvest of hatchery fish based on CRC estimates and creel surveys.

1.10.2) “Performance Indicators” addressing risks.

Risks		
Performance Standard	Performance Indicator	Monitoring & Evaluation
3.1.3 Program addresses ESA	This HGMP has been submitted	HGMP is updated to reflect any

responsibilities	for program authorization under auspices of the ESA	major changes in program and resubmitted to NOAA-NMFS Monitor size, number, date of release and mass-mark quality..
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.
3.2.2 Release groups are marked in a manner consistent with information needs and protocols to estimate impacts to natural and hatchery origin fish	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.	Annual harvest of mass-marked hatchery fish based on Catch Record Card (CRC) estimates and creel surveys.
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	Trap is checked daily. Only marked hatchery fish are used for broodstock purposes. Natural fish, when encountered, are returned to the river upstream of the hatchery weir
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. See section 11.1 for proposed monitoring.
3.5.3 Artificially-produced 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)	pHOS is <0.05. Steelhead are currently not monitored by spawning ground surveys in the LCR. The facility has received PCSRF money to provide 100% capture efficiency at the trap, and pass only natural-origin fish upstream. WDFW has plans to possibly utilize genetic samples to get at gene-flow estimates from recent hatchery operations
3.5.4. Juveniles are released on-station or after sufficient acclimation to maximize homing ability to intended return locations	Fish are released in lower river locations after acclimation per WDFW Steelhead Rearing Guidelines (Tipping 2001)	Annual information regarding release type (on-station, acclimation pond, direct plant) and type of release are recorded in hatchery data systems (WDFW <i>FishBooks</i>).
3.5.5 Juveniles are released at fully-smolted stage.	Level of smoltification at release. Release type (forced, volitional or direct)	Fish are released at 5.5 fpp per WDFW Steelhead rearing guidelines (Tipping 2001)

<p>3.7.1 Artificial production facilities are operated in compliance with all applicable fish health guidelines, facility operation standards and protocols including IHOT, Co-managers Fish Health Policy and drug usage mandates from the Federal Food and Drug Administration</p>	<p>Annual reports indicating levels of compliance with applicable standards and criteria.</p> <p>Periodic audits indicating level of compliance with applicable standards and criteria.</p>	<p>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</p>
<p>3.7.2 Ensure hatchery operations comply with state and federal water quality and quantity standards through proper environmental monitoring</p>	<p>Discharge water quality compared to applicable water quality standards by NPDES permit.</p> <p>WDFW water right permit compliance</p>	<p>Flow and discharge reported in monthly NPDES reports.</p>
<p>3.7.3 Water withdrawals and in-stream water diversion structures for hatchery facility will not affect spawning behavior of natural populations or impact juveniles.</p>	<p>Water withdrawals compared to NOAA-NMFS, USFWS and WDFW applicable passage and screening criteria for juveniles and adults</p>	<p>Barrier and intake structure compliance assessed and needed fixes are prioritized.</p>
<p>3.7.4 Prevent introduction, spread or amplification of fish pathogens. Follow Co-managers Fish Health Disease Policy (WDFW and WWTIT 1998, revised 2006).</p>	<p>Certification of fish health during rearing and immediately prior to release, including pathogens presence and virulence.</p> <ul style="list-style-type: none"> • Release and/or transfer exams for pathogens and parasites • Inspection of adult broodstock for pathogens and parasites • Inspection of off-station fish/eggs prior to transfer to hatchery for pathogens and parasites 	<p>WDFW Fish Health Section inspect adult broodstock yearly for pathogens and monitor juvenile fish on a monthly basis to assess health and detect potential disease problems.</p> <p>A fish health database will be maintained to identify trends in fish health and disease and implement fish health management plans based on findings.</p>
		<p>1 to 6 weeks prior to transfer or release, fish are examined in accordance with the Co-managers Fish Health Policy</p>
		<p>At spawning, lots of 60 adult broodstock are examined for pathogens</p>
		<p>Controls of specific fish pathogens through eggs/fish movements are conducted in accordance to Co-managers Fish Health Disease Policy (WDFW and WWTIT 1998, updated 2006).</p>
<p>3.7.6 Adult broodstock collection operation does not significantly alter spatial and temporal distribution of any naturally-produced population</p>	<p>Spatial and temporal spawning distribution of natural populations above and below weir/trap currently compared to historic distribution.</p>	<p>Trap is checked daily. When wild steelhead are mixed in with hatchery fish, they are returned to the river upstream of the hatchery weir</p>

3.7.8 Predation by hatchery fish does not significantly reduce numbers of natural fish	Hatchery juveniles are raised to smolt-size (5.5 fish/lb) and released from the hatchery at a time that fosters rapid migration downstream.	Recent WDFW research has shown that the predation risk from hatchery steelhead smolt releases are minimal on smaller prey fish.
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1.11) Expected size of program.

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

A total of 200 males and 200 females are needed to reach production goals and on-station broodstock needs. Egg take goal is 450,000 (FBD). Production goals support on-station program and transfers and outplants to acclimation facilities and direct plants to Region 5 streams totaling up to around 250,000 fish (see also EF Lewis, SF Toutle, NF Toutle, Kalama/Fallert hatchery, Drano Lake - Little White Salmon River and Klickitat/YKFP summer steelhead HGMPs). Additional eggs are taken to cover potential loss.

1.11.2) Proposed annual fish release levels (maximum number) by life stage and location. (Use standardized life stage definitions by species presented in Attachment 2).

The program’s on-station goal is to release up to 60,000 smolts into the West Fork Washougal River.

Age Class	Annual Release Level	Size (ffp)	Release Date	Location			
				Stream	Release Point (Rkm)	Major Water-shed	Eco-province
Yearling	60,000	5.5	April 15-May	WF Washougal	2.4 & 3.2	Washougal	Lower Columbia

Additional Skamania summer steelhead outplants from this HGMP are made to the N.F. and S.F. Toutle, Kalama, E.F. Lewis and Klickitat (YKFP) rivers; see respective summer steelhead HGMPs. In 2012, it was proposed to use the 24,000 smolts previously destined for White Salmon River releases (before the removal of Condit Dam in 2011) as plants into Drano Lake at the mouth of the Little White Salmon River (WRIA 29.0131) at RM 162 on the Columbia River (see Section 1.16).

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

Smolt-to-adult survival rates are not available for steelhead except for the wild steelhead programs on the Kalama system.

Sport harvest, escapement and estimated survival to adult return rates (%SAR)^a, Washougal River (Skamania) summer steelhead, based on WDFW Catch Record Card (CRC) data for brood years 2000-2007, release years 2001-2009, fishery years 2002-2011.

Return Year	Total Released	Sport Harvest	Hatchery Escapement	SAR %
2003	55,040	647	-----	-----
2004	60,957	614	24	-----
2005	61,206	372	1,254	2.66%
2006	66,061	434	832	1.92%
2007	71,514	541	1,582	2.97%

2008	91,491	444	2,129	2.81%
2009	62,056	733	3,263	6.44%
2010	64,619	1,441	3,027	6.91%
Average	66,618	653	1,730	3.95%

^a SAR is calculated by dividing (Sport Harvest + Hatchery Escapement)/Total Released

Note: Harvest based on Washougal River catch only, does not include mainstem Columbia No hatchery escapement data available for 2003. The number of unsampled fish in escapement is unknown, thus SAR% is likely under-represented.

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

The first year of operation for this hatchery was 1957.

1.14) Expected duration of program.

On-going program with no plans for termination

1.15) Watersheds targeted by program.

Washougal River (WRIA 28.0159), Lower Columbia River

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

1.16.1 Brief Overview of Key Issues

Efforts to propagate summer returning steelhead date back to 1915. In 1956, the Skamania Hatchery was built on the WF Washougal River to produce summer steelhead. Adults were collected both at the hatchery site and at the barrier dam at the Washougal salmon hatchery after its construction and in the late 1950s, additional summer steelhead from the Klickitat River were transferred to the Skamania Hatchery for spawning. By 1963, Washougal native steelhead and Klickitat native steelhead were mixed and spawned together to produce the present Skamania summer steelhead.

The Skamania Hatchery summer steelhead program produces smolts for planting in many regional streams. Skamania summer steelhead stock are released into the Washougal River to continue a summer steelhead sport fishery while eliminating a directed harvest on wild summer steelhead and to maintain a broodstock for this program. Smolts are released from the hatchery into the West Fork Washougal River to encourage migration back to the facility, which is at the upper end of the sport fishery so that they are highly susceptible to harvest. Any adults that escape the fishery may spawn in the system, but a series of falls on the upper mainstem provides a measure of separation between hatchery steelhead and the main spawning area of the wild summer steelhead.

For future out-plants to the Klickitat River, the Yakima/Klickitat Fisheries Project (YKFP) Transition Plan calls for phasing out Skamania Hatchery stock and shifting to supplementation of naturally spawning Klickitat stock. Implementation of this new effort would be conducted at the Klickitat Hatchery (see Klickitat River Summer Steelhead HGMP).

In addition, WDFW has proposed to use the 24,000 smolts, previously programmed for White Salmon, for direct plants into Drano Lake at the mouth of the Little White Salmon River (WRIA 29.0131) at RM 162 (WDFW previously released smolts into Drano Lake until 2003). The White Salmon releases were discontinued with the removal of Condit Dam in 2011. The breaching resulted in the release of the huge amount of sediment that filled in the lower river. Prior to breaching, the lower river area had offered very important cold water refugia, especially for steelhead, but also for salmon. The White Salmon River historically represented a tremendous steelhead fishery, and had been very important economically to both Skamania and Klickitat counties. Regional managers held public meetings to develop steelhead management plans for the

Wind River downstream. This plan could include continuing sport fishing opportunities for hatchery winter steelhead, where available. WDFW will also be conducting sport creel surveys on the river in summer 2012 determine the demand (and continued existence) of the popular fishery. Releases of the former White Salmon winter steelhead program are planned beginning spring 2012.

In 2008, WDFW began implementation of changes to many of its segregated LCR steelhead programs as the result of development of the Conservation and Sustainable Fisheries (C&SF) plan. Through this plan, WDFW used AHA modeling, combined with the best available estimates of key model assumptions, to adjust segregated program sizes to meet HSRG standards (see Attachment #3). Through this effort, WDFW realized that some assumptions of the AHA model (e.g. harvest rates) needed to be validated and actual gene flow/introgression (or pHOS) needed to be monitored. WDFW has since been reviewing existing monitoring programs for the purpose of identifying improvements that would allow for the validation of key assumptions in the AHA model. WDFW initiated implementation of new monitoring efforts and changes to existing monitoring effort in 2008 for the purpose of collecting data/samples that would address the aforementioned modeling assumption validation needs. Subsequent to implementation improvements to the monitoring program, WDFW began development of a study design to estimate actual gene flow/introgression. The following list provides examples of activities being conducted as part of the improved monitoring program:

- **Summer steelhead monitoring (existing)** – provides information on hatchery/wild proportions during tagging/snorkeling as part of a mark-recapture population abundance estimation methodology.
- **Winter steelhead monitoring (existing)** – redd based surveys to estimate abundance of wild winter steelhead populations in LCR tributaries.
- **Fish In Fish Out (FIFO) monitoring (existing)** – provides information on adult and juvenile production for life cycle monitoring – i.e productivity.
- **Cowlitz Introgression study (new)** – evaluated introgression rates of Chambers (winter) and Skamania (summer) hatchery stocks into Lower Cowlitz wild winter steelhead population.
- **Creel Surveys/ Hooking Mortality Study(new)** – implemented on the Wind (hooking mortality), Washougal and SF Toule (creel surveys) to evaluate harvest, harvest rates (SF Toule), wild steelhead interception rates and post release mortality rates during fisheries. Long-term vision is a comprehensive program with a rotating design that moves between key watersheds.
- **Genetic sample collection (new and existing)** – genetic samples are collected from adult wild steelhead populations and naturally produced steelhead smolts during summer steelhead monitoring, at winter steelhead trapping locations, during FIFO monitoring (smolts) and potentially during creel surveys. These samples and future sample collections may be valuable in assessing gene flow/introgression (Section 11).

In February of 2008, WDFW formally adopted a Statewide Steelhead Management Plan (SSMP) that guides statewide policies, strategies and actions pertaining to steelhead in Washington State. This plan calls for the development of regional watershed plans that further guide steelhead management at the local level. WDFW is currently developing regional watershed plans for all LCR steelhead populations. This process includes the development of stakeholder workgroups that provide input into the planning process. During this process, all current hatchery steelhead programs are being reviewed and evaluated for possible program improvements. Program improvements could include, but are not limited to, changes in smolt release numbers, changes in broodstock composition (e.g. converting to indigenous stock) and changes in fishery regulations to better protect adults and/or juveniles. Additionally, the SSMP calls for the development of a

network of wild steelhead gene banks throughout the state and these gene banks will be implemented through the regional watershed steelhead management plan development process.

WDFW has, and is continuing, to consider the alternatives listed in section 1.16.2. Modeling completed during the development of the C&SF plan indicates this program is currently meeting HSRG standards. WDFW will evaluate the value of implementing alternatives to the existing programs based on information from the LCR regional watershed planning process, data collected as part of the improved monitoring program and results from the study design (currently in development) to estimate gene flow/introgression (Section 11).

1.16.2 Potential Alternatives to the Current Program

Alternative 1: Eliminate the program. This action would reduce potential interaction with the natural population and eliminate impacts on other ESA-listed species. Currently this program supports a very popular late-fall/early-winter sport fishery.

Alternative 2: Use local hatchery (integrated or segregated) stocks. This action would require the program to develop a local hatchery broodstock. WDFW would complete a population risk assessment prior to converting a brood stock from the current segregated brood stock source to an local hatchery brood stock source. Data used in this risk assessment could include stray rates, temporal separation, removal rates of returning adult wild fish (including harvest related removals), handle rates of wild fish in sport fisheries, impacts from Columbia River fisheries, AHA modeling results and results of genetic analyses. This may include construction of additional infrastructure in the basin.

Alternative 3: Use local indigenous (integrated or segregated) stocks. This action would require the program to develop a local indigenous broodstock. WDFW would complete a population risk assessment prior to converting a brood stock from the current segregated brood stock source to an local indigenous brood stock source. Data used in this risk assessment could include stray rates, temporal separation, removal rates of returning adult wild fish (including harvest related removals), handle rates of wild fish in sport fisheries, impacts from Columbia River fisheries, AHA modeling results and results of genetic analyses. This may include construction of additional infrastructure in the basin and increase handle of ESA listed stocks.

Alternative 4: Adjust current segregated program size and release strategies appropriately in response to the results of recently implemented monitoring programs. Program changes would not be solely based on gene flow/introgression rates but would also incorporate data used to evaluate Alternatives 2 and 3.

Ideally any changes to existing programs would occur via the development of watershed steelhead management plans as part of the implementation of WDFW's SSMP. This would provide a vehicle to provide for public involvement and ensure the process is consistent with SEPA.

1.16.3 Potential Reforms and Investments

Reform/Investment 1: Current screening and passage is not currently compliant with current NOAA-NMFS standards for ESA fish. When conditions dictated, the Washougal/Skamania Hatchery was unable to capture all of the returning adult steelhead. Capital Bond funds have been secured to begin work on the Skamania Hatchery intake in 2012. To control upstream passage of hatchery fish, a Pacific Coast Salmon Recovery Funds (PCSRF) were secured to install a velocity weir/barrier across the river at the entrance to the Skamania Hatchery fish ladder (planned for Summer 2013).

Reform/Investment 2: This trap and handle facility has several issues related to unsafe handling of adult listed fish. A complete investigation and comprehensive re-design is needed to accommodate a facility that can be installed and removed without putting machinery in the stream, as well as a trap facility that will sort, return to the stream, and/or load fish with a water to

water transfer method to cause no harm to hatchery or wild stocks. Adult sorting and handling, in general, is very hard on adult fish and routinely causes mortality. This can be prevented with a modern semi-automated sorting and handling system. This sorting system would be comprised of the adult holding pond that collects and holds the fish. Daily sorting is initiated by opening a gate, which allows adults to be attracted through a false weir and onto a fabricated, sloped, sorting chute. The chute contains paddles and side chutes. The side chutes lead to different adult ponds, and also provide returns to the river above and below the in-stream barrier. An observer that is located in a control tower above the main chute identifies the fish as it enters the chute and then activates the paddles to direct the fish to the desired location. Staff does not physically handle the fish during this sorting process.

Reform/Investment 3: Modify the Washougal River Diversion Dam fishway (mainstem Washougal, at approximately RM 20) to use as a trap. The previous fish ladder was destroyed in a flood, and needs to be replaced. In addition, WDFW wants to design a removable trap box designed for the top of the fish ladder for sorting wild summer steelhead for monitoring (See Section 11), and possibly removing hatchery fish from the upper system. Extensive modifications will need to be made and funds will be needed to operate the trap.

Reform/Investment 4: If the local stock were to be used for this program, investments into the rearing and holding systems will need to happen. The rearing system would require smaller rearing vessels as well as some heated water to accelerate growth to make one year smolts from stock across the entire run time.

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-NMFS for ESA consultation and take prohibition exemption under ESA section 4(d), 7, or 10.

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 – this is a segregated program.

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

Lower Columbia River steelhead (*Oncorhynchus mykiss*). Listed as a threatened species on March 19, 1998 (63FR13347); threatened status reaffirmed on January 5, 2006 (70FR37160); reaffirmed threatened by five-year status review, completed August 15, 2011 (76 FR 50448).

Lower Columbia River Chinook (*Oncorhynchus tshawytscha*). Listed as “threatened” on March 24, 1999 (64FR14308); threatened status reaffirmed on June 28, 2005 (70FR37160); reaffirmed threatened by five-year status review, completed August 15, 2011 (76 FR 50448).

Lower Columbia River coho (*Oncorhynchus kisutch*). Identified as a candidate species on June 25, 1995 (60FR38011). Listed as threatened on June 28, 2005 (70FR37160); reaffirmed threatened by five-year status review, completed August 15, 2011 (76 FR 50448).

Columbia River chum salmon (*Oncorhynchus keta*). Listed as threatened on March 25, 1999 (64FR14507); threatened status reaffirmed on June 28, 2005 (70FR37160); reaffirmed threatened by five-year status review, completed August 15, 2011 (76 FR 50448).

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 (see definitions in “Attachment 1”).

Current extinction risk rate status of historical demographically-independent Lower Columbia River salmon and steelhead populations

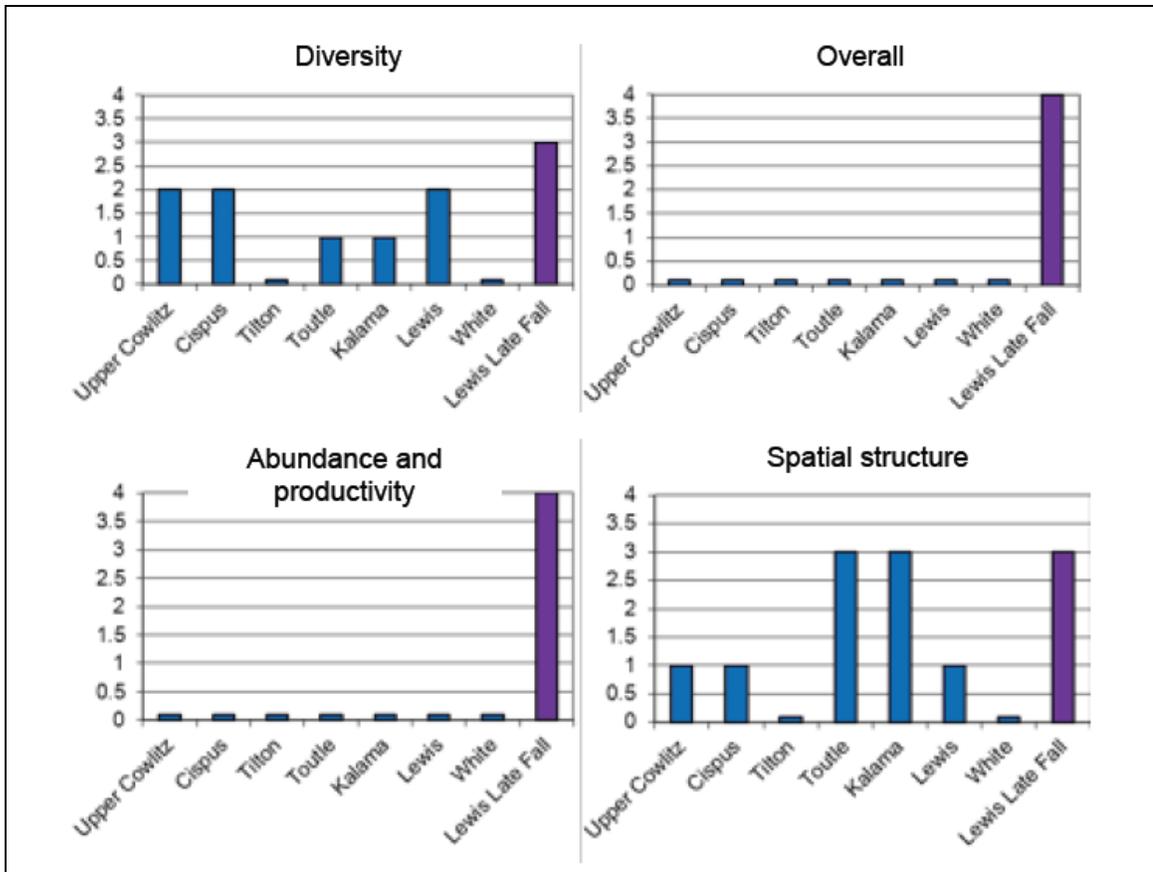
River	Chinook		Steelhead		Chum	Coho
	Spring	Fall	Summer	Winter		
Grays River		VH/E		M	M	VH/E
Elochoman River		VH/E		M	VH/E	VH/E
Mill Creek		VH/E		M	VH/E	VH/E
Lower Cowlitz		VH/E		H	VH/E	VH/E
NF Toutle River	VH/E	VH/E		VH/E		VH/E
SF Toutle River		VH/E		M		VH/E
Cispus River	VH/E	VH/E		VH/E		VH/E
Tilton River	VH/E			VH/E		VH/E
Upper Cowlitz River	VH/E			VH/E		VH/E
Coweeman River				VH/E	H	VH/E
Kalama River	VH/E	VH/E	M	H	VH/E	VH/E
NF Lewis River	VH/E	VH/E	VH/E	VH/E	VH/E	VH/E
EF Lewis River			VH/E	M		VH/E
Salmon Creek		VH/E		VH/E	VH/E	VH/E
Washougal River		VH/E	M	H	VH/E	VH/E
Wind River		VH/E	L	H	L	VH/E
White Salmon River	VH/E	VH/E		H	VH/E	VH/E

L = Low; M = Moderate; H = High; VH/E = Very High/Extinct.

Source: LCFRB 2010

Lower Columbia River Chinook: In Washington, the LCR Chinook ESU includes all naturally spawned Chinook populations from the mouth of the Columbia to a transitional point between Washington and Oregon east of the Hood River and the White Salmon River. Spring Chinook were present historically in the Cowlitz, Kalama, Hood, White Salmon and Lewis rivers.

Status: Of the 32 historical populations in the ESU, 28 are considered extirpated or at very high risk (Ford 2010). Dam construction eliminated habitat for a number of populations leading to their extirpation of spring Chinook salmon populations: Upper Cowlitz River, Cispus River, Tilton River, North Fork Lewis, Big White Salmon, and Upper Cowlitz fall Chinook and Big White Salmon fall Chinook (SHIEER, NMFS 2004). Projects to allow access have been initiated in the Cowlitz and Lewis systems but these are not close to producing self-sustaining populations; Condit Dam, on the White Salmon River, was breached October 26, 2011. Based on the recovery plan analyses, all of the tule populations are considered very high risk except one that is considered at high risk. The modeling conducted in association with tule harvest management suggests that three of the populations (Coweeman, Lewis and Washougal) are at a somewhat lower risk. The Lewis River late-fall population is considered low or very low risk (Ford et al. 2010).



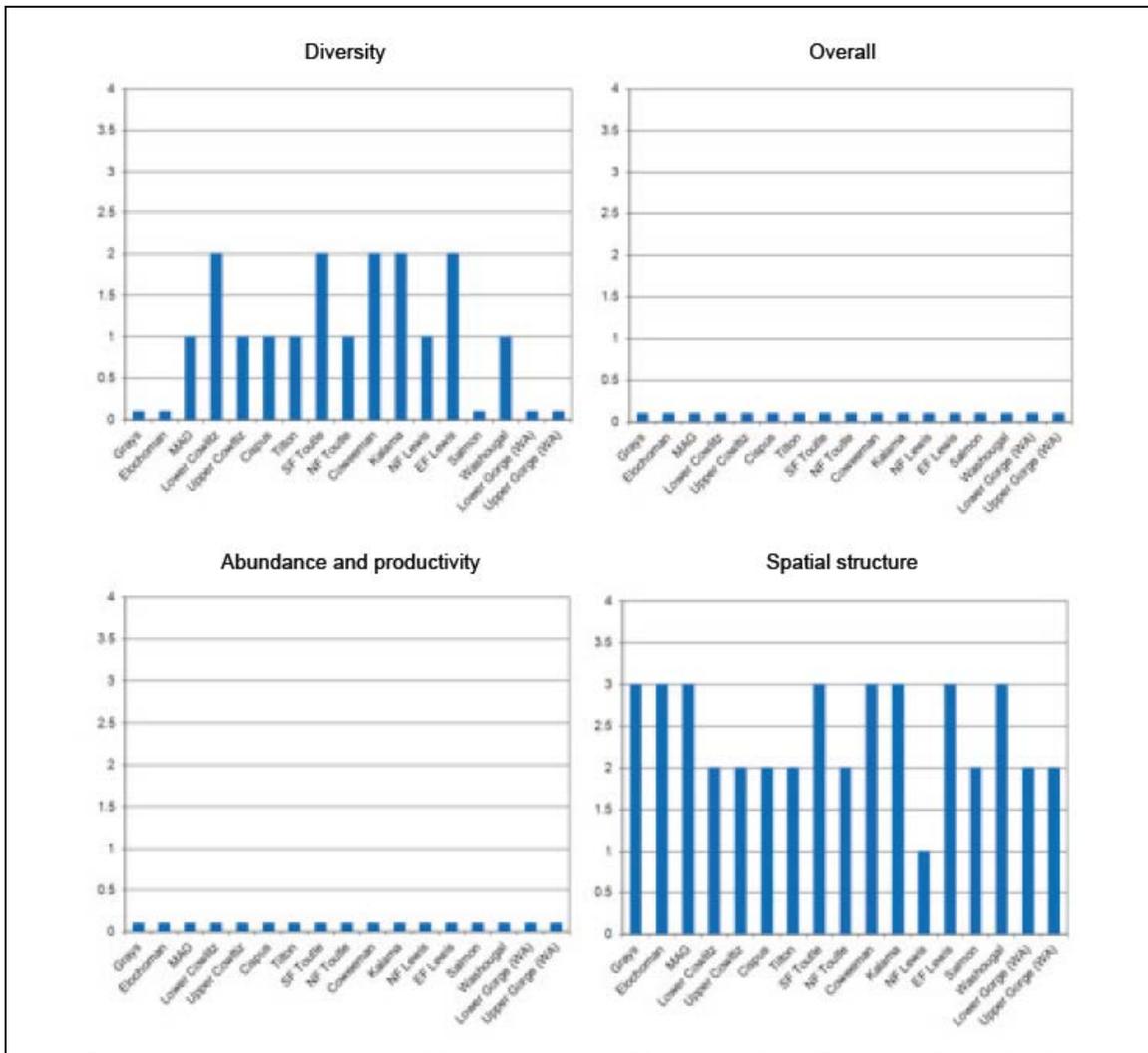
Current status of Washington lower Columbia River spring Chinook and late fall-run (bright) Chinook salmon populations for the VSP parameters and overall population risk. (LCFRB Recovery Plan 2010, chapter 6). A population score of zero indicates a population extirpated or nearly so, a score of 1 is high risk, 2 is moderate risk, 3 is low risk (“viable”) and 4 is very low risk (Ford et al. 2011).

Lower Columbia River Steelhead (*Oncorhynchus mykiss*): The DPS includes all naturally spawned anadromous *O. mykiss* (steelhead) populations below natural and manmade impassable barriers in streams and tributaries to the Columbia River between the Cowlitz and Wind Rivers, Washington (inclusive), and the Willamette and Hood Rivers, Oregon (inclusive), as well as ten artificial propagation programs: the Cowlitz Trout Hatchery (in the Cispus, Upper Cowlitz, Lower Cowlitz, and Tilton Rivers), Kalama River Wild (winter- and summer-run) and Lewis River Wild Winter.

Status: Of the 26 historical populations in the ESU, 17 are considered at high or very high risk. Populations in the upper Lewis, Cowlitz and White Salmon watersheds remain cut-off from access to essential spawning habitat by hydroelectric dams. Projects to allow access have been initiated in the Cowlitz and Lewis systems but these have not yet produced self-sustaining populations. The populations generally remain at relatively low abundance with relatively low productivity (Ford et al. 2010).

Washougal Hatchery Type-N Coho Program, Lewis River Type-N Coho Program, Lewis River Type-S Coho Program, Fish First Wild Coho Program, Fish First Type-N Coho Program,

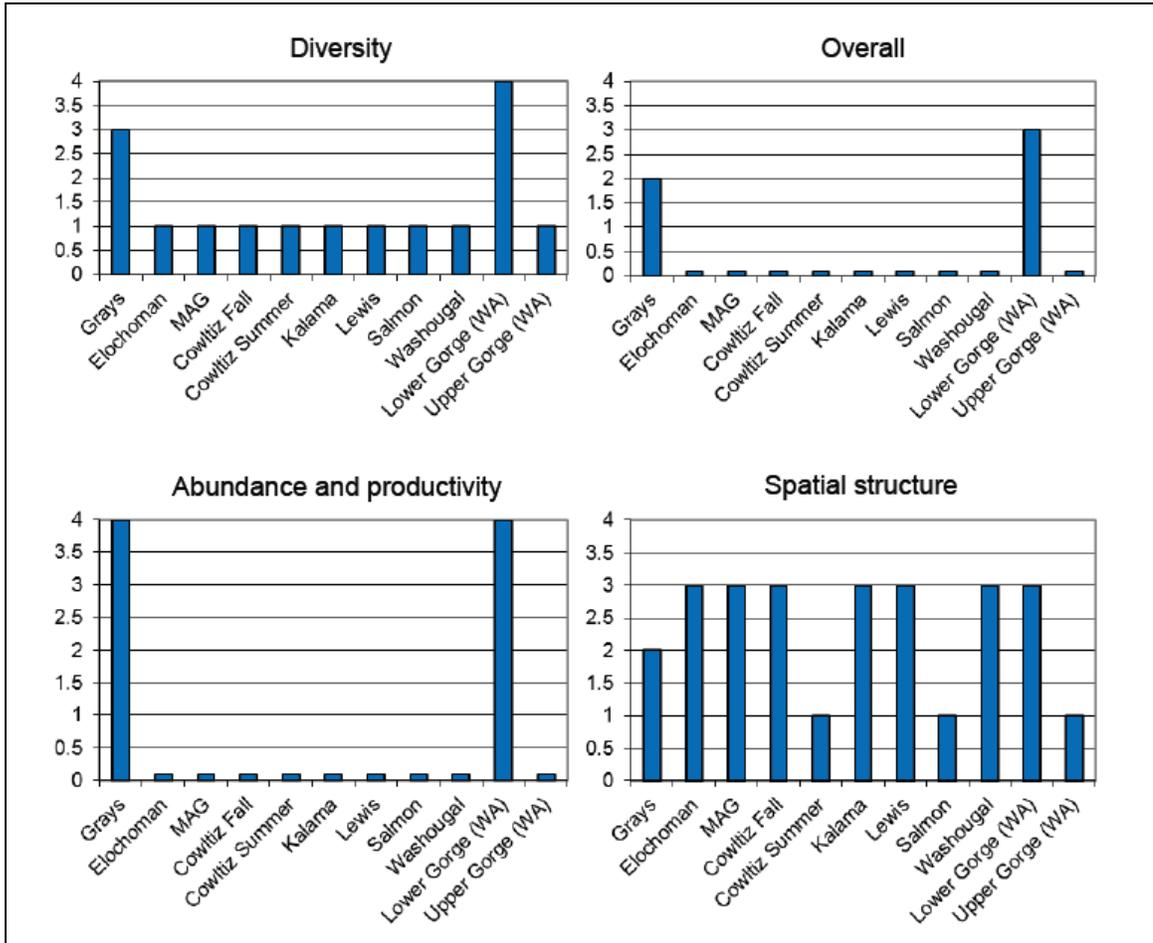
Status: Three status evaluations of LCR coho status, all based on WLC-TRT criteria, have been conducted since the last BRT status update in 2005 (McElhany et al. 2007, Beamesderfer et al. 2010, LCFRB 2010). All three evaluations concluded that the ESU is currently at very high risk of extinction. All of the Washington side populations are considered at very high risk, although uncertainty is high because of a lack of adult spawner surveys. As was noted in the 2005 BRT evaluation, smolt traps indicate some natural production in Washington populations, though given the high fraction of hatchery origin spawners suspected to occur in these populations it is not clear that any are self-sustaining (Ford et al. 2010).



Current status of Washington LCR coho populations for the VSP parameters and overall population risk. (LCFRB 2010 recovery plan, chapter 6). A population score of zero indicates a population extirpated or nearly so, a score of 1 is high risk, 2 is moderate risk, 3 is low risk (“viable”) and 4 is very low risk (Ford et al. 2011).

Columbia River chum salmon (*Oncorhynchus keta*). ESU includes all naturally spawned populations of chum salmon in the Columbia River and its tributaries in Washington and Oregon, as well as artificial propagation programs at Big Creek, Grays River, Lewis River, and Washougal River/Duncan Creek chum hatchery programs.

Status: Of the 27 historical populations in the ESU, 24 are considered at very high risk. The remaining three (Sandy, Clackamas and Scapposse) are considered at high to moderate risk. All of the Washington side populations are considered at very high risk, although uncertainty is high because of a lack of adult spawner surveys. As was noted in the 2005 BRT evaluation, smolt traps indicate some natural production in Washington populations, though given the high fraction of hatchery origin spawners suspected to occur in these populations it is not clear that any are self-sustaining (Ford et al. 2010).



Current status of Washington CR chum populations for the VSP parameters and overall population risk. (LCFRB 2010 Recovery Plan, Chapter 6). A population score of zero indicates a population extirpated or nearly so, a score of 1 is high risk, 2 is moderate risk, 3 is low risk (“viable”) and 4 is very low risk (Ford et al. 2011).

- 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. Indicate the source of these data.

Not available for most species. See Section 11.1 for planned M&E. Juvenile coho production estimates are the one measure of production in the Lower Columbia system.

Lower Columbia River Washington tributary coho smolt production estimates, 1997 – 2009 (WDFW, Region 5).

Year	Cedar Creek	Mill Creek	Abernathy Creek	Germany Creek	Cowlitz Fall Dam	Mayfield Dam
1997	-----	-----	-----	-----	3,700	700
1998	38,400	-----	-----	-----	110,000	16,700
1999	28,000	-----	-----	-----	15,100	9,700
2000	20,300	-----	-----	-----	106,900	23,500
2001	24,200	6,300	6,500	8,200	334,700	82,200
2002	35,000	8,200	5,400	4,300	166,800	11,900
2003	36,700	10,500	9,600	6,200	403,600	38,900
2004	37,000	5,700	6,400	5,100	396,200	36,100
2005	58,300	11,400	9,000	4,900	766,100	40,900
2006	46,000	6,700	4,400	2,300	370,000	33,600
2007	29,300	7,000	3,300	2,300	277,400	34,200
2008	36,340	9097	5077	3976	-----	-----
2009	61,140	6283	3761	2576	-----	-----

Source: LCR FMEP Annual Report 2010.

- Provide the most recent 12 year annual spawning abundance estimates, or any other abundance information. Indicate the source of these data.

Spring Chinook salmon total spawner abundance estimates in LCR tributaries, 1997-2009 (update by Joe Hymer, WDFW)

Year	Cowlitz	Kalama	Lewis	Wind
1997	455	45	417	227
1998	356	46	213	60
1999	285	224	270	99
2000	266	34	523	224
2001	347	578	754	428
2002	419	898	498	566
2003	1,953	790	745	746
2004	1,877	358	529	286
2005	405	380	122	279
2006	783	292	857	207
2007	74	2,150	264	108
2008	425	364	40	75
2009	763	34	80	33

Source: LCR FMEP Annual Report 2010.

Fall Chinook salmon total spawner abundance estimates in LCR tributaries, 1997-2009 (update by Joe Hymer, WDFW)

Year	Elochoman River	Coweman River ^a	Grays River	Skamokawa Creek	Cowlitz River	Green River (Toult)	SF Toult River	Kalama River	EF Lewis River	NF Lewis River	Washougal River
1998	220	144	93	139	2	93	66	4,318	52	5,935	2,971
1999	707	93	303	251	1	303	42	2,617	109	3,184	3,105
2000	121	126	89	25	2	89	27	1,420	323	9,820	2,088
2001	2,354	646	251	536	5	251	132	3,714	530	15,000	3,901
2002	7,581	900	82	372	14	82	450	18,952	1,375	17,106	6,050
2003	6,820	1,090	387	588	10	387	140	24,782	727	20,171	3,444
2004	4,796	1,590	745	2,109	4	745	618	6,680	918	15,907	10,597
2005	2,204	753	149	529	2	149	327	9,272	607	11,023	2,678
2006	332	566	390	7	3	390	216	10,560	441	12,299	2,728
2007	230	251	104	3	1	104	102	3,451	245	3,761	1,704
2008	884	424	80	482	2	80	204	3,877	391	5,700	2,757
2009	1,538	783	173	3	2	173	135	7,704	637	7,952	3,029

Source: LCR FMEP Annual Report 2010.

* Preliminary estimate

Total summer steelhead spawner abundance estimates in the Lower Columbia River (updated by Bryce Glaser, WDFW)

Brood Year	Trap Count	Snorkel Surveys		
	Kalama	EF Lewis	Washougal	Wind
1999	220	139	135	n/a
2000	140	229	140	193
2001	329	271	184	416
2002	454	440	404	669
2003	817	910	607	1,067
2004	632	425	NA	816
2005	400	673	608	542
2006	387	560	636	648
2007	361	412	681	689
2008	237	365	755	637
2009	268*	800	433	622
2010	n/a	n/a	n/a	n/a

Source: LCR FMEP Annual Report 2010.

* Preliminary estimate

Total winter steelhead spawner abundance estimates in the Lower Columbia River, 1997-2010 (updates by Bryce Glaser and Josua Holowatz, WDFW).

Brood Year	Index Redd Surveys					Trap Counts		Index Count
	Coweeman	SF Toutle	Green	EF Lewis	Washougal	NF Toutle	Kalama	Cedar Cr*
1997	108	388	-----	238	92	183	456	78
1998	486	374	-----	376	195	149	425	12
1999	198	562	-----	442	294	133	490	51
2000	530	490	-----			238	829	68
2001	384	348	-----	377	216	185	938	43
2002	298	640	-----	292	286	328	1,377	85
2003	460	1,510	-----	532	764	410	1,719	67
2004	722	1,212	-----	1,298	1,114	249	2,156	45
2005	370	520	222	246	320	166	1,784	35
2006	372	656	592	458	524	300	1,560	23
2007	384	548	410	448	632	155	910	35
2008	722	412	554	548	732	96	668	16
2009	602	498	610	688	418	89	940	24
2010	528	274	n/a	320	232	-----	n/a	-----

Source: LCR FMEP Annual Report 2010.

* Cedar Creek trap Index Count does not represent an estimate of total abundance

Total coho harvest (age 3 adults) in LCMA tributaries, 2001-2008 (Joe Hymer, WDFW).

River System	Tributary Sport Catch (age 3 adults) by Year						
	2002	2003	2004	2005	2006	2007	2008
Grays	35	15	72	73	368	477	929
Elochoman	639	933	122	201	240	465	180
Skamakowa Creek	0	0	0	0	0	0	0
Germany Creek.	0	0	0	0	0	0	0
Mill Creek	0	0	0	0	0	0	0
Kalama	1,465	1,323	534	536	715	793	2,662
EF Lewis	0	0	0	0	0	0	0
NF Lewis	2,091	5,538	3,419	2,961	3,462	5,792	8,51
Lower Cowlitz	9,453	4,410	3,008	2,584	4,949	9,694	12,454
Coweeman	0	0	0	0	0	0	0
Toutle	2,594	1,457	880	543	110	528	2506
Washougal	172	319	103	10	158	30	81
Abernathy	0	0	0	0	0	0	0
Green	860	632	705	142	58	542	1,399
Deep	10	5	0	42	0	227	12
Total	17,319	14,632	8,843	7,092	10,060	18,548	28,474

Source: LCR FMEP Annual Report 2010.

Peak spawning ground counts for fall chum salmon in index reaches in the Lower Columbia River, 1997-2009 (M Groesbeck WDFW; Streamnet 2003; John Weinheimer 2010).

Return Year	Grays River ^a				Hamilton Creek ^b			Hardy Creek ^b
	Mainstem	WF Grays	Crazy Johnson Creek	Total	Spawning Channels		Total	
					Hamilton	Spring		
1997	79	55	485	619	182	114	296	173
1998	154	214	145	513	346	237	583	778
1999	222	100	927	1,249	221	165	386	192
2000	1,124	833	249	2,206	255	143	398	24
2001	448	1,630	1,260	3,338	925	486	1,411	835
2002	3,081	5,678	2,954	11,713	1,000	794	1,794	343
2003	5,377	6,162	5,139	16,678	223	628	851	582
2004	4,493	12,372	857	17,722	571	219	790	40
2005	1,172	2,081	1,294	4,547	191	157	348	98
2006	668	1,519	3,368	5,555	188	338	526	188
2007	1,455	2,399	740	4,594	148	100	248	26
2008	228	536	823	1,587	114	112	226	9
2009	36	634	920	1,590	30	113	143	46

Source: LCR FMEP Annual Report 2010.

^a Peak Counts.

^b Estimated escapement numbers

- 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.

Not available. See Section 11.1 for planned M&E. Summer steelhead in the Washougal system have been identified as a Primary population; thus pHOS for Washougal summer steelhead should be <5% (LCFRB 2010).

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 (see "Attachment 1" for definition 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.

Broodstock Program:

Broodstock Collection: No take of natural stocks are associated with this operation

Genetic Introgression. The expected gene flow rate can be much lower than the "stray" rate. In a well run segregated program, the level of gene flow should be quite low for three reasons: 1) the numbers of hatchery-origin fish that have escaped harvest should be low compared to the number of natural-origin fish present; 2) the reproductive success of the hatchery-origin fish can be expected to be low (Leider et al. 1990; Kostow et al. 2003; McLean et al. 2003; McLean et al. 2004); and 3) spawning overlap may be low (Scott and Gill 2008).

Summer steelhead begin entering the Washougal system from June and continue through October; with hatchery broodstock entering the Skamania holding ponds in October and November and spawned close to that time frame. Wild stock interbreeding with Skamania Hatchery brood stock is thought to be low because of differences in spawn timing (LCFRB 2010). Several studies corroborate findings from the earlier work that translocated domesticated hatchery stocks had poor reproductive success relative to wild fish (Hulett et al. 2004). Crew can quickly distinguish wild steelhead (intact adipose fin) and pass the fish back to the river (see “Take” tables at the end of this HGMP). Indirect take from genetic introgression is unknown.

WDFW initiated implementation of new monitoring efforts and changes to existing monitoring effort in 2008 for the purpose of collecting data/samples that would address the AHA modeling assumption validation needs (see HGMP section 1.16.1). Subsequent to implementation improvements to the monitoring program, WDFW began development of a study design to estimate actual gene flow/introgression. Genetic samples are collected from adult wild steelhead populations and naturally-produced steelhead smolts during summer steelhead monitoring, at winter steelhead trapping locations, during FIFO monitoring (smolts) and potentially during creel surveys. These samples and future sample collections may be valuable in assessing gene flow/introgression (see HGMP section 11).

Rearing Program:

Operation of Hatchery Facilities: Washougal/Skamania Hatcheries withdraw water from the watershed. This can further reduce low flows in late summer and early fall from the sections between the intake location and where the non-consumptive water rejoins the river. At Skamania, this is approximately a distance of 1600 ft and on the Washougal River this is a distance of approximately 2000 ft. Water intakes have engineered design criteria to minimize impingement of naturally-produced fish on intake screens and the Mitchell Act Hatcheries Intake and Passage Study (April 2003) has assessed which structures are ESA compliant and forwarded needed improvements for funding. Effluent at outfall areas is rapidly diluted with main stem flows and operation is within permitted guidelines. (See HGMP Sections 4.1 and 4.2). Indirect take from this operation is unknown.

Disease: Over the years, rearing densities, disease prevention and fish health monitoring have greatly improved the health of hatchery programs. Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1995) Chapter 5 have been instrumental in reducing disease outbreaks. It is possible that hatchery fish which have been infected by transmissible pathogens or effluent from hatcheries with sick fish could infect wild fish and hatchery effluent is not tested for pathogens, so we do not know if pathogens are released into the environment. But, releases do not introduce pathogens not already existing in the local populations and disease transmission from hatchery to wild fish is unlikely due to the spatial separation between wild and hatchery fish (Tynan 1999). Indirect take from disease effects is unknown.

Release:

Hatchery Production/Density-Dependent Effects: The Skamania steelhead hatchery program maximizes smolting condition through behavior, acclimation and releases at lower sites, timing, feed management and condition factor so releases will migrate quickly, thus reducing affects of density limiting factors such as residualism, competition and predation. As adults, selective fishery regulations are meant to remove as many adults as possible.

Potential Washougal summer steelhead predation and competition effects on listed salmonids: The proposed annual production goal for the on-station program is 60,000 fish with 50% released in the main Washougal and 50% released from the W.F. Washougal. Steelhead releases are at 5.5 fpp (210 mm fl) and can be released starting April 15 although recently, staff has implemented a May 1 release date. Washougal steelhead releases could encounter listed Chinook, coho, steelhead, chum and eulachon in the Washougal River sub-basin and Columbia mainstem. Due to size differences between steelhead smolts and fingerlings, competition is probably low with

regards to food and spatial preference between species and size. At 5.5 fpp (210 mm fl), potential predation on listed Chinook would be on fish of 62-64 mm fl and smaller.

Residualism: WDFW steelhead programs are reared and released in a smolted condition. To achieve this, the following rearing parameters are followed:

- To maximize smolting characteristics and minimize residual steelhead, WDFW adheres to a combination of acclimation, volitional release strategies, active pond management, size, and release guidelines (Tipping 2001).
- Condition factors, including a lean 0.90 to 0.99 K factor, and co-efficient of variation (CVs) of less than 10% are steelhead rearing parameters.
- Steelhead release programs practice active pond management to remove fish less than 180 mm fl and greater than 250 mm fl on release (Tipping 2001).

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

Encounters with wild fish are minimal (see “Take” tables at the end of this HGMP).

- 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).

In other HGMPs provided to NOAA-NMFS (Puget Sound, Upper Columbia), indirect takes from hatchery releases such as predation and competition is highly uncertain and dependant on a multitude of factors (i.e. data for population parameters - abundance, productivity and intra species competition) and although HGMPs discuss our current understanding of these effects, it is not feasible to determine indirect take (genetic introgression, density effects, disease, competition, predation) due to these activities. (See Take Tables at the end of this document for identified levels).

- 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.

For other listed species, if significant numbers of wild salmonids are observed impacted by this operation, then staff would inform the WDFW District Biologist, Fish Health Specialist or Area Habitat Biologist who, along with the Hatchery Complex Manager, would determine an appropriate plan and consult with NOAA-NMFS for adaptive management review and protocols.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

This is a segregated/harvest program, and is not used to supplement natural-origin fish. WDFW's primary objective is to augment harvest while trying to minimize the abundance of hatchery-origin fish on the natural spawning grounds. The LCFRB (2010) identifies the presence of hatchery-origin fish on the natural spawning grounds as a factor in the reduced productivity of the natural populations in Lower Columbia River ESUs.

- 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 (draft) Conservation and Sustainable Fisheries Plan (C&SFP). This program is identified within the WDFW draft Conservation and Sustainable Fisheries Plan. This document addresses

priorities of the *LCFRB Recovery Plan (2010)* and *Fishery Management and Evaluation Plan (FMEP)*, the legal requirements of the 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.

Mitchell Act. This program receives Mitchell Act Funding. Initially passed in 1938, the Mitchell Act is intended to help rebuild and conserve the fish runs, and mitigate the impacts to fish from water diversions, dams on the mainstem of the Columbia River, pollution and logging. The Mitchell Act specifically directs establishment of salmon hatcheries, conduct of engineering and biological surveys and experiments, and installing fish protective devices. It also authorizes agreements with State fishery agencies and construction of facilities on State-owned lands. NMFS has administered the program as of 1970. There are 15 Mitchell Act hatcheries in Washington State; the majority of which are below Bonneville Dam.

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

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 the upcoming brood stock collection and fish rearing season (July 1 – June 30).

See also section 3.1 above.

The portion of the outplants that occur at Klickitat is agreed to under *U.S. v. OR* (see Klickitat YKFP Steelhead HGMP).

3.3) Relationship to harvest objectives.

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.

Sport harvest and escapement, Washougal River (Skamania) summer steelhead, based on WDFW Catch Record Card (CRC) data for brood years 2000-2007, release years 2002-2009, fishery years 2003-2011.

Return Year	Total Released ^a	Sport Harvest	Hatchery Escapement
2003	55,040	647	-----
2004	60,957	614	24
2005	61,206	372	1,254
2006	66,061	434	832
2007	71,514	541	1,582
2008	91,491	444	2,129
2009	62,056	733	3,263
2010	64,619	1,441	3,027
Average	66,618	653	1,730

^a Total Release = number released two years prior which generated the return.

Note: Harvest based on Washougal River catch only, does not include mainstem Columbia No hatchery escapement data available for 2003.

Program is 100% mass marked (adipose fin-clipped only) for the purpose of selective fisheries management. Selective fisheries were initiated for steelhead in 1986 in the Lower Columbia River tributaries. This regulation requires the release of all wild steelhead. No directed fisheries target **wild** Washougal summer steelhead; incidental mortality can occur during the Columbia River fall commercial and summer sport fisheries.

3.4) Relationship to habitat protection and recovery strategies.

None available for this system.

3.5) Ecological interactions. [Please review Addendum A before completing this section. If it is necessary to complete Addendum A, then limit this section to NMFS jurisdictional species. Otherwise complete this section as is.]

- (1) *Salmonid and non-salmonid fishes or species that could negatively impact the program:* Outmigrant hatchery fish can be preyed upon through the entire migration corridor from the river sub-basin to the mainstem Columbia River and estuary. Northern pikeminnows and introduced spiny rays, as well as avian predators, including gulls, mergansers, cormorants, belted kingfishers, great blue herons and night herons in the Columbia mainstem sloughs, can prey on steelhead smolts. Mammals that can take a heavy toll on migrating smolts and returning adults include: harbor seals, sea lions, river otters and orcas
- (2) *Salmonid and non-salmonid fishes or species that could be negatively impacted by the program:* Co-occurring natural salmon and steelhead populations in local tributary areas and the Columbia River mainstem corridor areas could be negatively impacted by program fish. Of primary concern are the ESA listed endangered and threatened salmonids: Snake River fall-run Chinook salmon ESU (threatened); Snake River spring/summer-run Chinook salmon ESU (threatened); Lower Columbia River Chinook salmon ESU (threatened); Upper Columbia River spring-run Chinook salmon ESU (endangered); Columbia River chum salmon ESU (threatened); Snake River sockeye salmon ESU (endangered); Upper Columbia River steelhead ESU (endangered); Snake River Basin steelhead ESU (threatened); Lower Columbia River steelhead ESU (threatened); and the Middle Columbia River steelhead ESU (threatened). Listed fish can be impacted through a complex web of short and long term processes and over multiple time periods which makes evaluation of this a net effect difficult. WDFW is unaware of studies directly evaluating adverse ecological effects to listed salmon.
- (3) *Salmonid and non-salmonid fishes or other species that could positively impact the program.* Multiple programs including fall Chinook, coho and steelhead programs are released from Skamania Hatchery and limited natural production of fall (Tule) Chinook, coho, chum and steelhead occurs in this system along with non-salmonid fishes (sculpins, lampreys and sucker etc.).
- (4) *Salmonid and non-salmonid fishes or species that could be positively impacted by the program.* Nutrients provided by decaying carcasses might benefit fish and aquatic invertebrates in freshwater (Wipfli et al. 1998; Mathisen et al. 1988; Bilby et al. 1996). The program could also positively impact freshwater and marine species that prey on juvenile fish. These species include:
 - Northern pikeminnow
 - Chinook salmon, steelhead, coastal cutthroat trout
 - Pacific staghorn sculpin
 - Eulachon
 - Numerous marine pelagic fish species
 - Avian predators, including: gulls, mergansers, cormorants, belted kingfishers, great blue herons and night herons
 - Mammals including: harbor seals, sea lions, river otters and orcas.

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.

Vancouver Trout Hatchery. Columbia Springs, West Biddle Lake and two wells are the primary water sources for this facility. Columbia Springs is a pathogen-free water supply for all incubation needs as well as round rearing vessels and one $\frac{1}{8}$ -acre rearing pond. West Biddle Lake supplies water to four raceways used for rearing until fish are transferred. Only one well has suitable water for rearing fish and can supply up to 200 gpm to the $\frac{1}{8}$ -acre pond as well as the four raceways. Water rights total 5,892 gpm from all sources combined. In recent years, however, the overall amount of water from Columbia Springs and West Biddle Lake has diminished considerably due to residential development and the water table decreasing. Overall water quality is good and pathogen free. Actual water used averages 1,900 gpm from the used sources.

Skamania Hatchery. Water rights total 11,670 gpm from West Fork Washougal River and Vogel Creek. The river provides the most water used. Actual water use averages 9,800 gpm and ranges from 6,650 to 11,460 gpm. Vogel Creek water is used for incubation and early rearing while Washougal River water is used thereafter until spring release.

Adults are held on re-use water flowing from rearing units during times when rearing units are being used and fresh flow when rearing units are empty.

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.

Vancouver Trout Hatchery. No impact to listed natural fish.

This facility operates under the “Upland Fin-Fish Hatching and Rearing” National Pollution Discharge Elimination System (NPDES) general permit which conducts effluent monitoring and reporting and operates within the limitations established in its permit administered by the Washington Department of Ecology (DOE), WAG 13-1032. Monthly and annual reports on water quality sampling, use of chemicals at this facility, compliance records are available from DOE.

Skamania Hatchery. Water for raceways are diverted from the W.F. Washougal River while incubation and the hatchery building is supplied from Vogel Creek and are formalized through trust water right #S2-*12684 from the Department of Ecology. Monitoring and measurement of water usage is reported in monthly NPDES reports.

Intake structures were designed and constructed to specifications at the time the Skamania facility was constructed. WDFW has determined that the Vogel Creek intake must retain the ability to block anadromous fish for potential disease vectors. The Mitchell Act Intake and Fish Passage Study Report 2003 identified design and alternatives needed to get existing structures in compliance including the intake on the W.F. Washougal. Intake traveling screen gaps, and screen mesh (1/4 inch) and approach velocities (0.4 fps) are problems. WDFW has received funding for future scoping, design, and construction work of a new intake system. It is scheduled to be completed in 2012-2013.

This facility operates under the “Upland Fin-Fish Hatching and Rearing” National Pollution Discharge Elimination System (NPDES) general permit which conducts effluent monitoring and reporting and operates within the limitations established in its permit administered by the Washington Department of Ecology (DOE), WAG 13-1026. 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.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

A fish ladder approximately 80' long leads from the West Fork Washougal River to a 20' x 20' trap area where returning fish are routed to one of the three holding ponds for holding and sorting. All flow for these ponds and the fish ladder is re-use water from the raceways when in use and fresh flow when raceways are empty. The Skamania facility **did** not have a barrier at the entrance to the fish ladder, which allowed a portion of the hatchery fish to pass upstream during the winter and spring migration periods. PCSRF monies were secured to install a velocity weir/barrier across the river at the entrance to the Skamania Hatchery fish ladder (planned for summer 2013).

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

The Skamania Hatchery has one fish transport truck, a 1991 International 1,800 gallon tanker truck. The truck has the capacity for hauling and off-loading brood fish. We have plans to develop an overhead crane loading system using a water-to-water container for loading fish for re-cycle to the fishery downstream.

5.3) Broodstock holding and spawning facilities.

Ponds (No.)	Pond Type	Volume (cu.ft)	Length (ft.)	Width (ft.)	Depth (ft.)	Available Flow (gpm)
3	Concrete Raceway	7,695	135	12	4.75	2,500

The three 7,695 cu.ft concrete raceways used for holding ponds have a cover building over the center portion for sorting and spawning adult fish. These ponds are very effective at holding steelhead with annual mortality at less than 1%. All flow for these ponds and the fish ladder is re-use water from the raceways when in use and fresh flow when raceways are empty. Integrated Hatchery Operations Team (IHOT) adult holding guidelines followed for adult holding, density, water quality and predator control measures to provide the necessary security for the broodstock.

5.4) Incubation facilities.

Incubator Type	Units (number)	Flow (gpm)	Volume (cu.ft.)	Loading-Eyeing (eggs/unit)	Loading-Hatching (eggs/unit)
Skamania Hatchery- Shallow Troughs (5 cells/trough)	64 Shallow Troughs	7	9	150000	20000
Vancouver Hatchery- Shallow Troughs (5 cells/trough)	48 Shallow Troughs	7	9		20000

A portion of the incubation building can be isolated by containment curtains.

5.5) Rearing facilities.

Ponds (No.)	Pond Type	Volume (cu.ft)	Length (ft.)	Width (ft.)	Depth (ft.)	Flow (gpm)	Max. Flow Index	Max. Density Index
64	Shallow Troughs (Post emergence Rearing)	9	15	1.0	0.6	7	1.6	0.25
6	Fiberglass Intermediate	90	15	3.0	2.0	35	1.6	0.25
10	Concrete Intermediate Raceways	280	35	4.0	2.0	60	1.6	0.25
32	Concrete Raceways	2,200	80	10	2.75	325	1.6	0.25

5.6) Acclimation/release facilities.

Fish released at Skamania are acclimated throughout the incubation and rearing time at the hatchery.

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

Operational - Winter ice, snow, slush ice and high water events can interrupt flow. Staff are available 24/7 to handle these problems. Bird predation is also a problem and has predator netting in place over the raceways.

Disease – Virus problems have led to quarantine and removal of batches of eggs or fish from the system. Fish or eggs are sent to a local landfill or rendering plant for disposal.

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.

Potential Hazard	Risk Aversion Measure
Water Loss	The facility is sited so as to minimize the risk of catastrophic fish loss from flooding and set up with low water alarm probes in strategic locations to prevent loss due to loss of water. Alarm systems are monitored 24/7 with staff available on station 24 hours daily to respond to problems.
Disease Transmission	IHOT fish health guidelines are followed. WDFW fish health specialists conduct inspections monthly and problems are managed promptly to limit mortality and reduce possible disease transmission. As for the threat of a virus outbreak, we have very strict disinfection procedures and comprehensive lab analysis of all egg takes for culling, if needed.

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

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

6.1) Source.

The Skamania Hatchery summer steelhead stock was derived from wild fish taken from the Washougal and Klickitat rivers. For decades the Skamania Hatchery summer steelhead broodstock has been obtained directly from adults returning to the hatchery.

6.2) Supporting information.

6.2.1) History.

Efforts to propagate summer-returning steelhead date back to 1915. In 1956, with money from Columbia River Basin fishery enhancement funds administered by the National Marine Fisheries Service, the Skamania Hatchery was built on the WF Washougal River for the purpose of culturing of summer steelhead. Adults were collected both at the hatchery site and at the barrier dam at the Washougal salmon hatchery after its construction. The first returns of hatchery-reared fish returned in 1959. Due to low numbers of returning adults in the late 1950s, additional summer steelhead were trapped in the Klickitat River and transferred to the Skamania Hatchery for spawning. Initially, Klickitat stock progeny were fin-clipped for identification and segregation, however, by 1963, Washougal native steelhead and Klickitat native steelhead were mixed and spawned together to produce the present Skamania summer steelhead. As was the case with winter steelhead, the earliest-maturing adults have been selected in order to produce one-year smolts. Skamania summer steelhead have been used as the parent stock for runs created at various rearing ponds and hatcheries throughout the state (Crawford 1979).

Broodstock Source	Origin	Year(s) Used	
		Begin	End
Washougal River Summer Steelhead	N	1956	U
Klickitat River Summer Steelhead	N	U	U
Skamania Hatchery Summer Steelhead	H	1959	Present

6.2.2) Annual size.

A total of 200 pairs of marked hatchery males and females are needed to reach total production goals for both on-station and off-station broodstock needs. Egg take goal is 450,000 (FBD). Production goals supports transfers and outplants to acclimation facilities and direct plants to Region 5 streams totaling around 250,000 fish (see also EF Lewis, SF Toutle, NF Toutle, Kalama and Drano Lake summer steelhead HGMPs). Additional eggs taken are to cover potential loss.

Juvenile summer steelhead transferred from Skamania Hatchery

Facility (Off-station Releases)	System	Number	Size (fpp)	Reason
Fallert Creek Hatchery	Kalama	30,000	10.0	Acclimation
North Toutle Hatchery	Toutle	25,500	8.0	Acclimation
South Fork Toutle Hatchery	Toutle	20,000	8.0	Acclimation
E.F. Lewis River	Lewis	15,000	5.5	Direct Release
Drano Lake (Little White Salmon)	LWS	24,000	5.5	Direct Release
Klickitat River ^a	Klickitat	90,000	5.5	Direct Release
In-system Releases	System	Number	Size (fpp)	Reason
Washougal River	Washougal	60,000	5.5	Direct Release

^a This release is covered in the Klickitat/YKFP HGMP

6.2.3) Past and proposed level of natural fish in broodstock.

Only returning hatchery-origin broodstock have been used for propagation purposes since 1986, and are identified by their missing adipose fin. Natural fish are not incorporated within the broodstock.

6.2.4) Genetic or ecological differences.

The expected gene flow rate can be much lower than the “stray” rate. In a well run segregated program, the level of gene flow should be quite low for three reasons: 1) the numbers of hatchery-origin fish that have escaped harvest should be low compared to the number of natural-origin fish present; 2) the reproductive success of the hatchery-origin fish can be expected to be low (Leider et al. 1990; Kostow et al. 2003; McLean et al. 2003; McLean et al. 2004); and 3) spawning overlap may be low (Scott and Gill 2008).

Hatchery production accounts for most adult summer steelhead returning to the Washougal River. Hatchery steelhead return timing is earlier than their wild counterparts, and the wild steelhead smolt emigration appears to be timed slightly later than the hatchery releases. Wild stock interbreeding with Skamania Hatchery brood stock is thought to be low because of differences in spawn timing (LCFRB 2010). Several studies corroborate findings from the earlier work that translocated domesticated hatchery stocks had poor reproductive success relative to wild fish (Hulett et al. 2004).

6.2.5) Reasons for choosing.

Broodstock for the Skamania Hatchery’s summer steelhead program originated from wild fish taken from the Washougal and Klickitat rivers. Current broodstock collection comes from adults returning to the hatchery. Because spawn timing of wild fish and naturally spawning hatchery fish is different, little interaction between adult wild and hatchery summer steelhead is thought to occur. The Skamania summer steelhead stock is the source of nearly all hatchery summer steelhead smolt releases on the Washington side of the lower Columbia River, except for the Cowlitz and Lewis rivers (LCFRB 2010).

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.

Natural fish are not used in broodstock selection and can be identified by adipose fin presence and are handled with care and released in stream reaches as prescribed by Region 5 biologists; listed fish, if identified, will be released immediately if encountered during the broodstock collection process. See also Section 6.2.5.

SECTION 7. BROODSTOCK COLLECTION

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

Only marked hatchery-origin fish returning to Skamania Hatchery are used.

7.2) Collection or sampling design.

Because hatchery fish have been fin-marked at Skamania for over ten years, the broodstock selection is comprised of hatchery fish. The intent of the adult collection procedures at Skamania Hatchery is to collect enough adults to maintain the hatchery production program. Hatchery fish enter the sub-basin from April through September with a peak in June/July. Adults captured are spawned at the hatchery while some portion of the run may pass the fishway and escape to the upper portion of the West Fork Washougal River where a considerable sport harvest occurs. Wild fish (with adipose fin) that become trapped are transported up-stream or directly released for up-stream passage. The Skamania Hatchery has no weir for trapping. Attributes critical to long-term fitness of the stock are retained since adult broodstock are randomly selected over the entire run entry pattern based on program protocols and guidelines set forth by program/agency geneticists.

7.3) Identity.

All hatchery-origin Skamania summer steelhead are adipose fin clipped. Only adipose fin-clipped adults are used for broodstock. Presently, adult broodstock are randomly selected over the entire

run entry pattern based on program protocols and guidelines set forth by program/agency geneticists.

7.4) Proposed number to be collected:

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

A total of 200 males and 200 females are needed to meet total program needs, including off-station plants (60%).

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

Egg losses have ranged from 7.0% to 17.0 % in past years. This does not include potential IHN positive eggs that need to be destroyed. Extra eggs can be taken to cover potential IHN positive eggs. In some years, shortages are made up with IHN negative eggs from Merwin Hatchery. Broodstock are collected to cover program goals for plants made in the Washougal River plus the out-plants that originate from this facility.

Year	Adults			Eggs
	Females	Males	Jacks	
2000	150	150	0	600,000
2001	158	158	0	632,000
2002	301	305	0	1,204,000
2003	224	229	0	896,000
2004	202	202	0	808,000
2005	192	192	0	768,000
2006	159	159	0	628,000
2007	101	123	0	404,000
2008	102	119	0	387,600
2009	137	188	0	493,200
2010	121	242	0	435,600
2011	111	140	0	399,600
2012	107	107	0	385,200
Average	159	178	0	580,653

Provided by the Hatchery Data Unit; 2000-2009 data April 2010; 2010-2012 data from Skamania Hatchery and WDFW *Fishbooks* (January 2012).

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

All hatchery steelhead in surplus of broodstock needs are recycled to the lower Washougal River (sport harvest) or donated to local food banks.

7.6) Fish transportation and holding methods.

Ponds (No.)	Pond Type	Volume (cu.ft)	Length (ft.)	Width (ft.)	Depth (ft.)	Available Flow (gpm)
3	Concrete Raceway	7,695	135	12	4.75	2,500

Broodstock is collected and held in a manner that results in less than 10% pre-spawning mortality. The first adult summer steelhead begin arriving at Skamania Hatchery in May and are held until the end of November, before spawning begins. Pre-spawning mortality is typically 1 to 2%. The only surface water source used for adult holding is the West Fork Washougal River. Adult holding water is re-use water flowing from raceways when raceways are in use and fresh flow when raceways are empty.

7.7) Describe fish health maintenance and sanitation procedures applied.

The adult holding area is separated from all other hatchery operations. All equipment and personnel use disinfection (chlorine or iodophor) procedures upon entering or exiting the area. The adults hold extremely well and the use of chemicals for fungus control is not needed.

7.8) Disposition of carcasses.

Carcasses fit for human consumption are donated to local food banks or Tribes. Fish unfit for consumption and all mortality carcasses are taken to a local rendering plant.

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.

No listed natural fish are used for broodstock collection. See also Sections 6.2.4 and 6.3. Listed fish will be released immediately if encountered during the broodstock selection process.

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 for this program arrives from May through September. Spawning occurs (95%) in November and December. Males and females available on a given day are mated randomly. Fish are spawned through this period to help ensure that the run timing for the isolated stock is maintained.

8.2) Males.

Spawning protocol as described in the IHOT 1995 Volume III. The intent is to utilize a spawning population of at least 200 marked hatchery adults and spawn fish at a 1:1 male-to-female ratio. However, difficulty in obtaining sperm may sometimes result in using two males per female. The availability of jacks in the population is usually very insignificant, but when available, jacks can be used up to 2.0% of the total male population. Males can be lived spawned.

8.3) Fertilization.

Disinfection procedures that prevent pathogen transmission between stocks of fish are implemented during spawning. Spawning implements are rinsed with an iodophor solution, and spawning area and implements are disinfected with iodophor solution at the days end of spawning. An overall ratio of 1:1 (females/males) is applied. Ovarian fluid is not drained prior to fertilization. Water hardening procedures with iodophor are followed. All implements are rinsed/washed with iodophor solution at the end of the days spawning activities.

8.4) Cryopreserved gametes.

Not Applicable.

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.

- No listed natural fish are used in the mating scheme.
- Mating cohorts are randomly selected.
- Protocols for population size, fish health disinfection and genetic guidelines followed.
- Spawn all collected mature broodstock if possible without regard to age, size, color or other physical characteristics. If not spawning all collected mature adults over the season, apply the same rationale to individual spawn days.
- Randomize mating and avoid selectivity beyond ripeness on a given spawn day.
- Use one male to one female as much as possible in order to ensure an equal genetic contribution.
- Do not mix milt from multiple males and add to eggs (pooling prior to mixing) in order to eliminate disproportionate genetic male contributions.
- Do not re-use males except as part of specific spawning protocols. A given male should be used as the first mate for only one female total

SECTION 9. INCUBATION AND REARING -

Specify any management goals (e.g. “egg to smolt survival”) that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.

9.1) Incubation:

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

The egg-take goal of 450,000 covers all in-basin and off-station releases. Due to IHN possibilities excess eggs are taken to safeguard against potential viral and incubation/rearing losses as viral problems can be significant. Past results have shown a high instance of IHN in the parental sampling. This required the culling of between 14 to 37% of the annual egg take. This action is taken at the eyed-egg stage once results are obtained from virology sampling. Backup steelhead eyed-eggs from Merwin Hatchery are used to replace program shortages if and when needed.

Egg take also includes fish previously needed for release in the Big White Salmon River (24,000 smolts); these releases were discontinued with the removal of Condit Dam in 2011. In 2012, WDFW chose to release these fish in Drano Lake, at the mouth of the Little White Salmon River (WRIA 29.0131), a tributary to the Columbia River at R.M. 162, to maintain a popular local-area sport fishery.

All Skamania summer steelhead eggs are incubated from egg take to eyed stage at Skamania Hatchery and then 290,000 are transferred after shocking and picking to Vancouver Hatchery for hatching and rearing to approximately 100 fpp (with the remaining 160,000 eggs are reared on-station).

Survival rates from egg-take to ponding, Skamania Hatchery summer steelhead, 1999-2011

Year	Egg Take	Green-Eyed Survival (%)	Eyed-Ponding Survival (%)
1999	617,900	83.7	98.0
2000	600,000	90.0	97.0
2001	632,000	90.5	98.0

2002	1,204,000	90.4	n/a
2003	896,000	92.3	n/a
2004	808,000	85.3	n/a
2005	768,000	84.9	n/a
2006	628,000	86.7	n/a
2007	404,000	87.2	89.2
2008	376,164	91.0	95.0
2009	493,200	89.0	91.9
2010	435,600	89.5	91.1
2011	397,600	91.6	89.6
Average	597,520	88.6	93.7

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

BKD and viral sampling lots (60 fish lots) are conducted over the course of the season. Lots of eggs are removed with unacceptable levels of BKD. Due to IHN possibilities excess eggs are taken to safeguard against potential incubation/rearing losses. Eggs with high to mid-level titers are selective culled and destroyed. (See also section 9.1.1)

9.1.3) Loading densities applied during incubation.

Summer steelhead eggs range in size from 3,000 eggs/lb to 3,500 eggs/lb. Standard loading of eyed eggs per shallow trough basket is 18,000. Trough flow is varied from 5 to 10 gallons per minute (gpm) depending on the stage of the egg or fry.

9.1.4) Incubation conditions.

All Skamania summer steelhead eggs are incubated from egg take through eyed stage at Skamania Hatchery. After shocking and picking, a portion of the eyed-eggs are transferred and incubated at Vancouver Hatchery through hatching, and reared until approximately 100 fpp (see section 9.1.1). Standard low-level alarms are present in the hatchery and water temperatures are recorded using a thermograph. Silt management is usually not necessary and influent and effluent gas concentrations, including dissolved oxygen, are within optimal parameters for salmonid egg and juvenile survival.

At Vancouver Hatchery, eggs are incubated in shallow troughs with water from Columbia Springs; flow to the incubation room at Skamania Hatchery is from Vogel Creek.

Silt in the water sources is a common occurrence during rain events and is handled by standard daily trough cleaning techniques while eggs are monitored to determine fertilization and mortality. The water temperature is monitored continuously with a thermograph and recorded while temperature units (TU) are tracked for embryonic development. Although water is saturated with oxygen at 12 ppm, dissolved oxygen content is monitored and has been at acceptable levels (minimum criteria of 8 parts per million (ppm)). Disinfection procedures are implemented during incubation that prevents pathogen transmission between stocks of fish on site.

9.1.5) Ponding.

Vancouver Hatchery. Initial feeding and early rearing occurs in the incubation troughs. Ponding/feeding begins on a volitional basis when the fry are 100% at the swim-up stage. At this point very little, if any, yolk sack will be present. Fry are ponded when the yolk slit is approximately 1-mm wide (approximately 1600 TUs) or based on (95% yolk absorption) KD factor. Fry are introduced feed in the shallow troughs (See HGMP Section 5.5 for trough

specifications) during February and March, depending on the time lapse between egg-takes. Fish are fed in indoor troughs until April, when they will be ponded into outdoor raceways.

9.1.6) Fish health maintenance and monitoring.

Staff conducts daily inspection, visual monitoring and sampling from eyed egg, fry, fingerling and sub-yearling stages. As soon as potential problems are seen, these concerns are immediately communicated to the WDFW fish health specialist. In addition, fish health specialists conduct inspections monthly. Potential problems are managed promptly to limit mortality and reduce possible disease transmission. Formalin (37% formaldehyde) is dispensed into water for control of ectoparasites on juvenile fish and for fungus control on eggs. Egg mortality ranges from 6 to 16 % and all eggs are processed through an automated egg picking machine and to some degree by hand.

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.

- All eggs incubated are from hatchery-origin marked adults only.
- IHOT and WDFW fish health guidelines followed.
- Multiple units are used in incubators.
- Splash curtains can isolate incubators.
- Temperature, dissolved oxygen, and flow are monitored.
- Dead eggs are discarded in a manner that prevents disease transmission.

9.2) Rearing:

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

Survival rates from ponding to release, Skamania Hatchery summer steelhead, 1999-2011.

Year	Fry-fingerling Survival (%)	Rearing Survival Performance Std.	Fingerling-Smolt Survival (%)
1999	94.0	90	98.3
2000	99.0	90	94.9
2001	98.6	90	84.0
2002	n/a	90	n/a
2003	n/a	90	n/a
2004	n/a	90	n/a
2005	n/a	90	n/a
2006	n/a	90	n/a
2007	n/a	90	99.6
2008	93.1	90	99.6
2009	91.2	90	99.4
2010	91.1	90	98.1
2011	n/a	90	n/a

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

The fish are reared using the loading densities recommended by Piper et al. (1982). In all facilities within the Lewis/Washougal Complex, densities are kept at or below 3.3 lbs /gpm and 0.5 lbs /cu ft. before the last loading reduction in the fall of the year. Trough maximum loading is 33 lbs at 10 gpm (3.33 lbs/gpm). Fiberglass intermediate and raceway maximum loading for early rearing is 132 lbs for the tanks at 40 gpm (3.3 lbs/gpm) and 1000 lbs per raceway at 300 gpm.(3.33 lbs/gpm). The final loading per raceway is approximately 3200 lbs. at 300 gpm (10.6 lbs/gpm).

9.2.3) Fish rearing conditions

Environmental parameters: flow rates, water temperatures, dissolved oxygen and Total Settable Solids (TSS) are monitored on a routine basis thru the rearing period. All ponds are broom cleaned once per month, or as necessary, and pressure-washed between broods. The raceways are covered to protect the fish from birds with predator netting. Hand feeding is done during the summer and early fall months, and demand feeders are used on all raceways throughout the fall and winter months until planting begins.

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.

Rearing Period	Length (mm)	Weight (fpp)	Growth Rate
April	36	1000	0.54
May	46	400	0.60
June	64	175	0.56
July	80	90	0.48
August	101	45	0.50
September	139	17	0.63
October	153	13	0.23
November	167	10	0.23
December	173	9.0	0.10
January	180	8.0	0.11
February	188	7.0	0.12
March	198	6.0	0.14

Note: Rearing of fish;

- (1) 1/2 of winter steelhead production is reared at Skamania Hatchery from ponded fry to smolt stage.
- (2) 1/2 of winter steelhead production is reared at the Vancouver Hatchery to approximately 90 fpp, and transferred to the Skamania Hatchery for final rearing.

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

See HGMP Section 9.2.4. No energy reserve data is available.

9.2.6) Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (average program performance).

Rearing Period	Food Type	Application Schedule (#feedings/day)	Feeding Rate Range (%B.W./day)	Lbs. Fed Per gpm of Inflow	Food Conversion During Period
Feb-July	Ewos Micro, Pacific and Transfer	5 to 10	1.5-3.0		.60
August-September	Ewos Transfer	1 to 5	1.5-3.0		.70
October-December	Ewos Transfer	Demand	1.5-3.0		.70

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

Monitoring	A fish health specialist inspects fish monthly at Skamania and Vancouver hatcheries and checks both healthy and, if present, symptomatic fish. Based on pathological or visual signs by the crew, age of fish and the history of the facility, the pathologist determines the appropriate tests. External signs such as lesions, discolorations, and fungal growths will lead to internal examinations of skin, gills and organs. Kidney and spleen are checked for bacterial kidney disease (BKD). Blood is checked for signs of anemia or other pathogens. Additional tests for virus or parasites are done if warranted.
Disease Treatment	Bacterial cold water disease (<i>Flavobacteriosis</i>) can occur mid-summer; Florfenicol is used to treat the disease. IHN can occur from mid-summer to fall. Loss of fish to IHN in 2002 was 6% of the summer steelhead population. Significant losses to IHN have occurred. Mortality is collected and disposed of at a landfill. Fish health and or treatment reports are kept on file.
Sanitation	All eggs brought to the facility are surface-disinfected with iodophor (as per disease policy). All equipment (nets, tanks, boots, etc.) is disinfected with iodophor between different fish/egg lots. Different fish/egg lots are physically isolated from each other by separate ponds or incubation units. The intent of these activities is to prevent the horizontal spread of pathogens Tank trucks are disinfected between the hauling of adult and juvenile fish. Footbaths and equipment tubs containing disinfectant are strategically located on the hatchery grounds to prevent spread of pathogens.

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

Besides time, size and past history, aggressive screen and inflow crowding, swarming against pond sides, a silvery physical appearance and loose scales during feeding events are signs of smolt development. From past history, hatchery specialists will reduce feed regimes in early spring as fish show signs of smolting. Also at this time feed conversions fall and fish appear leaner with condition factors falling well below 1.0 (K) to .90 (K).

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

None

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.

No listed natural fish are under propagation.

SECTION 10. RELEASE

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

10.1) Proposed fish release levels.

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Yearling	60,000	5.5	April 15- May 15	NF & Mainstem Washougal, (RKm 2.4 & 3.2)

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

Stream, river, or watercourse: WF Washougal River (28.0232) Washougal River (28.0159)

Release point: RKm. 2.4 RKm. 12.9

Major watershed: Salmon-Washougal

Basin or Region: Lower Columbia River

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

Release year	Yearling	Date Released	Avg size (fpp)
2000	81,935	May 2-5	5.5
2001	55,040	May 6	5.4
2002	60,957	April 23-May 9	4.8
2003	61,206	May 2-9	4.6
2004	66,061	April 28-May 6	5.6
2005	71,514	May 2-10	5.1
2006	91,491	April 20-May 5	5.6
2007	62,056	April 20-May 9	5.7
2008	64,619	May 12	6.3
2009	71,807	May 6-7	6.1
2010	61,190	May 3	5.9
2011	63,163	April 15	5.6

Direct releases of Skamania Hatchery summer steelhead also occur at E.F. Lewis River (see EF Lewis Summer Steelhead HGMP) and the Klickitat River (see Klickitat/YKFP Summer Steelhead HGMP). Fish released on the Kalama River are transferred in late fall/early winter and are acclimated at Kalama No. 2 (Fallert Creek Hatchery) (see Kalama Summer Steelhead HGMP). Fish are transferred to the Green River (North Toutle Hatchery) and S.F. Toutle River sites for final acclimation before release in those systems (see North Toutle and SF Toutle summer steelhead HGMPs).

Direct plants were also made into Drano Lake, until 2003. In 2012, WDFW proposed using fish that were previously direct-released in the White Salmon River (program discontinued after the Condit Dam removal in 2011) (see Section 1.16) for direct plants in Drano Lake, at the mouth of the Little White Salmon River (29.0131).

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

For broodstock and river plants, 60,000 smolts at 5.5 fpp are released starting in April. 50% is released (on-station Rkm 2.4) in the N.F. Washougal and the other 50% is trucked and released into the main Washougal River at Rkm 12.9. See Section 10.3 for actual dates of release.

10.5) Fish transportation procedures, if applicable.

Equipment Type	Capacity (gallons)	Supp. Oxygen (y/n)	Temp. Control (y/n)	Norm. Transit Time (minutes)	Chemical(s) Used	Dosage (ppm)
Tanker Truck	1800	Y	N	20	Sodium Chloride (Salt)	5000 ppm (~0.5%)

Fish are loaded with 6-inch fish pumps and oxygen is supplied through diffuser stones in the tanks. Densities are always less than one pound per gallon. Time of transport can vary from two hours to twenty minutes (avg. time is one hour). Primary truck is has an insulated tank. No issues with elevated temperatures during hauling.

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

Smolts are pumped from ponds, and transported for direct releases into the N.F. Washougal River (adjacent to Skamania Hatchery) and the Washougal River at two sites downriver.

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

Fish are 100% adipose fin-clipped-only, so that they can be distinguished from the natural population, when they reach 100 fpp. This can occur generally from July through end of September, during fry stage (a year before release – see table in section 9.2.4), depending on growth rates and water temperature.

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

As a transfer, a maximum program number has been agreed upon by Region 5 staff. Fish above the program level will not be transferred unless communication with Fish Program staff (in consultation with NOAA-NMFS) has occurred

10.9) Fish health certification procedures applied pre-release.

Prior to release, the population health and condition is established by the Area Fish Health Specialist. This is commonly done 1-3 weeks pre-release and up to 6 weeks on systems with pathogen free water and little or no history of disease. Whenever abnormal behavior or mortality is observed prior to normal examination schedule, staff will contact the Area Fish Health Specialist. The Fish Health Specialist examines affected fish, and recommends the appropriate treatment. Reporting and control of selected fish pathogens are done in accordance with the Co-managers Fish Disease Control Policy (WDFW and WWTIT 1998, updated 2006) and IHOT guidelines.

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

If the program is threatened by ecological or mechanical events, the Complex Manager would contact and inform regional management of the situation and determination and directive per Section 7 guidelines and policy. Based on a determination of a partial or complete emergency release of program fish, personnel would pull screens and sumps to allow a force release of fish. No release of fish will occur without a review by WDFW Fish Management and a risk assessment.

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.

- Smolt releases from this facility occur below known wild fish spawning and rearing habitat in the upper Washougal tributaries.
- WDFW will be reviewing the Washougal programs to implement a May 1 release date.
- Returning hatchery fish are under heavy selective harvest and are identified by adipose-fin clip mark.
- Hatchery stock and wild fish are thought to be isolated by timing.
- Surplus adults are killed and donated to the food bank or buried on-site (depending on condition), thus removing them from the system; or are opercle-punched and recycled to the lower river for additional harvest opportunity (see Section 7.5).
- WDFW fish health and operational concerns for Skamania Hatchery programs are communicated to Region 5 staff for risk management or needed treatment. See also section 9.2.7.

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

11.1) Monitoring and evaluation of “Performance Indicators” presented in Section 1.10.

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

Performance indicators for harvest will be accomplished by continuing mass marking (ad clip). See section 1.10 Monitoring and Evaluation for additional plans and methods to collect data necessary.

Modify the Washougal River Diversion Dam fishway (Washougal Hatchery, mainstem Washougal, at approximately RM 20) to use as a trap (see Section 1.16.3). The plans to repair the fishway over the diversion dam (planned to begin in 2012) include the possibility of designing a removable trap for the top of the fish ladder. The trap would operate to sort summer steelhead during approximately May-October. The purpose would be to tag a portion of the wild summer steelhead population for possibly mark re-sight surveys in the watershed, and to remove hatchery-origin steelhead. While the hatchery summer steelhead return occurs primarily from May-July, both natural- and hatchery-origin fish return through late-fall. Current questions include:

- 1) Will the intake be a complete barrier at all flows, only at low flows, or not at all. Thus, will fish have to use the ladder throughout the year, only at low flows, or only volitionally all season?
- 2) Will the trap operations occur throughout the year, seasonally, or only sporadically (i.e. every other day) to get a sub-sample of fish for tagging?

If the intake is a barrier at all or most flows and the fish have to use the ladder, the trap could also be used to remove hatchery-origin winter steelhead and monitor wild winter steelhead as well. Contingent on staff availability, this would occur from early-November through April, thus enabling year-round removal of hatchery-origin steelhead (and salmon) from the upper Washougal.

The fish trap would be modular in design, allowing the possibility for portions to be inserted and removed; if the trap operates only for summer steelhead, trap would be installed in the summer and removed before winter flows. The pieces would be sized to allow for easy installation by a pair of workers without the use of a boom truck. The pump station has an existing ladder down to the top of the dam; the trap would be in the same pool as the ladder to allow for easy access.

Panels of horizontal pickets will be located over the top of the trap to prevent fish from jumping out. The floor of the trap could be raised to reduce water depth in the trap to make it easier for working fish.

Additional research, monitoring and evaluation in the Lower Columbia. WDFW is currently conducting the following Mitchell Act-funded research, monitoring and evaluation projects:

Project	Description	FY 2012 Budget
Kalama Summer Steelhead Relative Reproductive Success (RRS)	This project will maintain the adult and juvenile steelhead monitoring program for Kalama River summer and winter steelhead that was associated with the Kalama RRS study. This is the longest-term FIFO dataset for steelhead in the LCR.	\$ 96,000.00
Fish Collection Weirs on the Grays, Coweeman, Washougal and Elochoman Rivers	This project will install, operate and remove fish collection weirs on the lower Grays Coweeman, Washougal and Elochoman rivers. Operation of these weirs will allow WDFW to control the number of hatchery fall Chinook reaching natural spawning locations, thereby benefiting natural production in these basins. Additionally, this project will fund spawning ground survey activities to monitor the effectiveness of these weirs and allow for the calculation of important hatchery performance metrics, such as pHOS. Deliverables include estimates of pHOS, and trapping efficiency, plus a draft Section 10 report for the weir on the Grays River.	\$300,000.00
Monitoring of Primary Populations of Winter Steelhead	This project will implement spawning ground surveys in Washington tributaries to the lower Columbia River that support primary populations of winter steelhead. Streams surveyed include the Grays, Skamokawa, Elochoman, South Fork Toutle, Green, Coweeman, Kalama, East Fork Lewis and Washougal. Surveys will provide data regarding abundance and spatial distribution, which are two key VSP parameters. Deliverables include abundance estimates and mapping of redd location using GPS technology. Data can be used to track annual trends in abundance and spatial distribution.	\$ 79,368.00
Monitoring of Key Summer Steelhead Populations	This project will monitor summer steelhead populations in the East Fork Lewis and Washougal rivers. Both populations are classified as primary for recovery purposes. Data collected will allow for the estimation of key VSP parameters for these two populations (abundance, diversity). Data provided by this project will allow WDFW to evaluate the impact of summer steelhead hatchery programs in the Washougal and Lewis river basins on these primary populations. Deliverables will include estimates of pHOS and key VSP parameters.	\$ 15,000.00
Monitoring of Gene Flow from Hatchery Steelhead Populations to Wild Steelhead Populations	During the first six months of FY 2013 (September 2012 through March 2013), WDFW Molecular Genetics Laboratory (MGL) will review existing microsatellite and single nucleotide polymorphism (SNP) data to determine the degree to which collections of Chambers Creek-origin (early-winter steelhead) and Skamania-origin (summer steelhead) segregated	TBD

	<p>hatchery populations can be differentiated from natural-origin steelhead populations in the lower Columbia River tributaries. These data will constitute our baseline from which we will determine the current level of introgression. If there are no data for particular watersheds or if the existing data are insufficient, but there are samples currently available for these areas, with available funds from Region 5, the MGL will augment the existing baseline with new data and analyses. The schedule for these supplementary analyses will depend on the availability of funds and the MGL production schedule; however, we anticipate that WDFW will establish a working baseline for measuring introgression within lower Columbia steelhead populations within six to 12 months.</p> <p>WDFW will monitor changes to the composition of natural populations as a result of introgressive hybridization (if it exists) with the segregated hatchery populations by sampling natural populations periodically (every 2-5 years). Each sample will be genetically analyzed and statistically compared with its baseline and previous samples to ascertain absolute changes from the baseline, and trends if changes exist.</p>	
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Notes on Gene Flow Monitoring. For the purposes of monitoring WDFW Hatcheries programs, this HGMP defines, the genetic interaction between hatchery- and natural-origin individuals as “introgressive hybridization.” Introgression is the degree to which hatchery- and natural-origin genomes are mixed, and WDFW will attempt to measure it at both the individual and population levels. Introgression is the product of gene flow; that is, gene flow is the process that gives rise to the state of introgression. Since the genetic status of individuals and populations will be measured at specific time-intervals (see HGMP section 11.1.1), we will be examining the product of gene flow (i.e., introgression), not the process of gene flow itself.

There are two components to monitor the potential genetic effects of segregated hatchery programs on natural populations: (1) a baseline from which we can statistically identify introgression, and (2) a sampling program from which we check for changes in the status (i.e., degree of introgression, if present) of the natural population. Implicit in this procedure are that the hatchery- and natural-origin populations are genetically differentiated enough so that introgression can be identified statistically, and there exist a robust statistical framework to identify introgression.

Our ability to definitively document introgressive hybridization between segregated hatchery- and natural-origin populations is compromised by the absence of pure hatchery and natural populations. By definition, pure populations would serve as the baseline to which all subsequent samples would be compared. Without definitive baseline populations and with the current set of molecular markers (e.g., microsatellites and SNPs), we must use statistical methods that estimate the degree to which individuals are admixed between hatchery and natural ancestry, and then establish thresholds beyond which we identify an individual as a hatchery-natural hybrid. Two commonly used statistical methods for measuring admixture are employed in the programs STRUCTURE and NewHybrids. The WDFW-MGL (K. Warheit) is currently evaluating these methods and their limits for differentiating between introgression and recent common ancestry in a collection of winter steelhead populations from the Skagit River basin. We will apply the results from this analysis to measuring hatchery introgression in lower Columbia steelhead populations.

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

Except for a risk involving genetic introgression, all other aspects of the M&E outlined in Section 1.10 are currently funded (see also section 11.1.1).

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.

Capital requests are in place for screen replacements that will comply with current standards. Vogel Creek has up-stream control devices in place that prevent adult fish passage to prevent IHN shedding into incubation waters and causing IHN epizootics.

Monitoring, evaluation and research follow scientific protocols with adaptive management process if needed. WDFW will take risk aversion measures to eliminate or reduce ecological effects, injury, or mortality as a result of monitoring activities See section 1.10 Monitoring and Evaluation for additional plans and methods to collect data necessary, In addition, we will adaptively manage all aspects of the program to continue to minimize associated risks using the more recent available scientific research.

SECTION 12. RESEARCH

12.1) Objective or purpose.

No research is directly associated with the program

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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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: _____

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

Listed species affected: Fall Chinook (<i>Oncorhynchus tshawytscha</i>)	ESU/Population: Lower Columbia River Fall Chinook	Activity: Skamania Summer Steelhead (Hatchery) Program		
Location of hatchery activity: Skamania Hatchery	Dates of activity: July – December	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)				

* Chinook are taken for the fall Chinook broodstock program directly. See Washougal Fall Chinook HGMP.

- 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 1b. Estimated listed salmonid take levels of by hatchery activity.

Listed species affected: Chum (<i>Oncorhynchus keta</i>)	ESU/Population: Lower Columbia River Chum	Activity: Skamania Summer Steelhead (Hatchery) Program		
Location of hatchery activity: Skamania Hatchery	Dates of activity: July – December	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)			0	
Other Take (specify) h)				

0* Chum are not seen at this upper location.

- 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 1c. Estimated listed salmonid take levels of by hatchery activity.

Listed species affected: Steelhead	ESU/Population: Lower Columbia River Summer Steelhead	Activity: Skamania Summer Steelhead (Hatchery) Program		
Location of hatchery activity: Skamania Hatchery	Dates of activity: July – December	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)				

0* Up to 10 listed steelhead annually can be sorted and released from the holding pond. No observed mortality has been reported by staff.

- 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 1d. Estimated listed salmonid take levels of by hatchery activity.

Listed species affected: Steelhead	ESU/Population: Lower Columbia River Winter Steelhead	Activity: Skamania Summer Steelhead (Hatchery) Program		
Location of hatchery activity: Skamania Hatchery	Dates of activity: July – December	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)				

0* Up to 15 listed steelhead annually can be sorted and released from the holding pond. No observed mortality has been reported by staff.

- 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 1e. Estimated listed salmonid take levels of by hatchery activity.

Listed species affected: Coho (<i>Oncorhynchus kisutch</i>)	ESU/Population: Lower Columbia River Winter Steelhead	Activity: Skamania Summer Steelhead (Hatchery) Program		
Location of hatchery activity: Skamania Hatchery	Dates of activity: July – December	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)				

0* Wild coho are seen occasionally and released back to stream. No observed mortality has been reported.

- 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.

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 Fingerling	>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 Fingerling	>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	>=0.45
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 Fingerling	>20 to 150	3 to <23
X	Cutthroat Fry	>150	<3
X	Trout Legals	<=10	>=0.45
X	Trout Fry	>10	<0.45

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.

Attachment 3 - Statewide Hatchery Reform--Broodstock Management Tracking Table: Region 5 Steelhead

Note: pHOS estimates in table are from the HSRG review completed in 2008; AHA modeling were completed as part of the Lower Columbia River Conservation and Sustainable Fisheries Plan (C&SF Plan)

Skamania (Washougal) Summer Steelhead HGMP 55

Natural Population (SaSI)	SaSI Stock #	Population Designation	Hatchery Program	Program Type- Integrated or Segregated	Program Goal (Conservation or Harvest)	HSRG Broodstock management standards met?	pHOS est.	pHOS goal maximum	Hatchery Mtg Plan status- (HAIP, HGMP or other)	Agreed-to Program Changes- (broodstock management)	Program size (2012)	Changes Implemented	Implementation Target Date	Projected pHOS	Projected to meet HSRG Broodstock Management Standards?	Potential or additional Changes	Additional Monitoring
Grays River Winter Steelhead	6658	Primary	Grays River Winter Steelhead	Segregated	Harvest	Yes	0.01	0.05	C&SFP in final draft	No change in program	40K	No Change	N/A	<0.05	Yes	Program is being evaluated through development of Steelhead Watershed Management Plans. May be a candidate for elimination to create a gene bank in coastal stratum. Program may change with completion of Columbia River EIS	
Skamokawa Creek/ Elochoman Winter Steelhead	6668	Contributing	Beaver Creek Summer Steelhead	Segregated	Harvest	Yes	0.06	0.10	C&SFP in final draft	No change in program	30K			<0.05	Yes	Program is being evaluated through development of Steelhead Watershed Management Plans. Program may change with completion of Columbia River EIS	
Skamokawa Creek/ Elochoman Winter Steelhead	6668	Contributing	Beaver Creek Winter Steelhead	Segregated	Harvest	Yes	0.06	0.10	C&SFP in final draft	Program moved from Elochoman Hatchery to Beaver Creek Hatchery	90K	Rearing and release location change	2008	<0.05	Yes	Program is being evaluated through development of Steelhead Watershed Management Plans. Program may change with completion of Columbia River EIS	
Cowlitz Winter Steelhead	6700	Contributing	Cowlitz Late-Winter Steelhead	Segregated	Harvest	No	0.51	0.10	Cowlitz FHMP in draft	New int program balanced with conservation	Upper -118K; Tilton -51K; Lower - 478K	Credit Driven through FHMP	2013	<0.05	Yes	Program is being evaluated through FHMP in progress. Convert segregated program to a properly integrated program with the lower Cowlitz winter steelhead stock. Program may change with completion of Columbia River EIS	
Cowlitz Winter Steelhead	6700	Contributing	Cowlitz Hatchery Summer Steelhead	Segregated	Harvest	No	0.17	0.10	Cowlitz FHMP in draft	New program balanced with conservation	650K	Credit Driven through FHMP	2013	<0.05	Yes	Program is being evaluated through development of Steelhead Watershed Management Plans. Install lower Cowlitz tributary weirs to control Summer SHD straying. Program may change with completion of Columbia River EIS	Cowlitz Introgression Study
Cowlitz Winter Steelhead	6700	Contributing	Cowlitz Hatchery Early-Winter Steelhead	Segregated	Harvest	No	0.18	0.10	Cowlitz FHMP in draft	Discontinue Program	N/A	Discontinue Program in 2012	2012	N/A	Yes	Program is being evaluated through FHMP in progress. Discontinue this program	
Coweeman Winter Steelhead	6707	Primary	Coweeman Winter Steelhead, Coop	Segregated	Harvest	Yes	0.02	0.05	C&SFP in final draft	Program reduced from recent historical size	12K	Reduced program size from 20K to 12K	2008	<0.05	Yes	Program is being evaluated through development of Steelhead Watershed Management Plans. Recommendation will likely be to continue at 10 or 12K level. Program may change with completion of Columbia River EIS	
Green (Toutle) Winter Steelhead	6717	Primary	NF Toutle Hatchery Summer Steelhead	Segregated	Harvest	Yes	0.05	0.05	C&SFP in final draft.	Adult weir installed to control pHOS	25K	Adult weir installed to control pHOS	2010	>.05	Yes	Program is being evaluated through development of Steelhead Watershed Management Plans. Recommendation is to eliminate this program and create a steelhead gene bank. Program may change with completion of Columbia River EIS	

Natural Population (SaSI)	SaSI Stock #	Population Designation	Hatchery Program	Program Type- Integrated or Segregated	Program Goal (Conservation or Harvest)	HSRG Broodstock management standards met?	pHOS est.	pHOS goal maximum	Hatchery Mtg Plan status- (HAIP, HGMP or other)	Agreed-to Program Changes- (broodstock management)	Program size (2012)	Changes Implemented	Implementation Target Date	Projected pHOS	Projected to meet HSRG Broodstock Management Standards?	Potential or additional Changes	Additional Monitoring
SF Toutle Winter Steelhead	6721	Primary	SF Toutle Summer Steelhead, Coop	Segregated	Harvest	No	0.10	0.05	C&SFP in final draft.	Program reduced from recent historical size	20K	Reduced program size from 25K to 15K (2008-12); increase to 20K in 2013	2008	N/A	Yes	Program is being evaluated through development of Steelhead Watershed Management Plans. Recommendation will likely be to continue at 20K while harvest rates are assessed through creel survey. Program may change with completion of Columbia River EIS	Creel Survey to evaluate harvest rates and interception rates of wild winter steelhead during fishery.
Kalama Summer Summer Steelhead	6735	Primary	Fallert Creek Hatchery Summer Steelhead	Segregated	Harvest	Yes	0.04	0.05	C&SFP in final draft	No change in program	30K	N/A	N/A	>.05	Yes	Program is being evaluated through development of Steelhead Watershed Management Plans. Recommendation will likely be to eliminate this program and compensate with integrated wildbroodstock. Program may change with completion of Columbia River EIS	Estimates of hatchery proportions during trap operation and snorkeling for mark/recapture estimates.
Kalama River Winter Steelhead	6742	Primary	Kalama Falls Hatchery Winter Steelhead	Segregated	Harvest	No	0.08	0.05	C&SFP in final draft	Program re-evaluated based on pHOS estimate	45K	Program re-evaluated based on pHOS estimate	2014	<0.05	Yes	Program is being evaluated through development of Steelhead Watershed Management Plans. Program may change with completion of Columbia River EIS	
Lewis Winter Steelhead	6749	Contributing	Merwin Hatchery Winter Steelhead	Segregated	Harvest	No	0.20		C&SFP in final draft. HGMP submitted to NOAA through the PacCorp Re-license-H&SP	No change in program	100K			>.05	Yes	Program is being evaluated through development of Steelhead Watershed Management Plans. Program may change with completion of Columbia River EIS	
Lewis Summer Steelhead	6756	Stabilizing	Merwin Hatchery Summer Steelhead	Segregated	Harvest	Yes	0.12	Current	C&SFP in final draft. HGMP submitted to NOAA through the PacCorp Re-license-H&SP	Program reduced from recent historical size	235K	Reduction of 50K release at Echo net Pens	2008	>.05	Yes	Program is being evaluated through development of Steelhead Watershed Management Plans. Program may change with completion of Columbia River EIS	
EF Lewis Summer Steelhead	6763	Primary	Skamania Hatchery Summer Steelhead- Outplant (EF Lewis)	Segregated	Harvest	No	#DIV/0!	0.05	C&SFP in final draft	Program reduced from recent historical size	15K	Reduced program size from 30K to 15K	2008	N/A	Yes	Program is being evaluated through development of Steelhead Watershed Management Plans. Program may change with completion of Columbia River EIS	Estimates of hatchery proportions during tagging and snorkeling for mark/recapture estimates.
EF Lewis Winter Steelhead	6770	Primary	Skamania Hatchery Winter Steelhead- Outplant (EF Lewis)	Segregated	Harvest	No	0.14	0.05	C&SFP in final draft	Program reduced from recent historical size	60K	Reduced program size from 90K to 60K	2008	N/A	Yes	Program is being evaluated through development of Steelhead Watershed Management Plans. Program may change with completion of Columbia River EIS	
Salmon Creek Winter Steelhead	6777	Stabilizing	Klinline Pond Winter Steelhead	Segregated	Harvest	Yes	0.30	Current	C&SFP is in final draft	No change in program	20K			>.05	Yes	Program is being evaluated through development of Steelhead Watershed Management Plans. Program may change with completion of Columbia River EIS	

Natural Population (SaSI)	SaSI Stock #	Population Designation	Hatchery Program	Program Type- Integrated or Segregated	Program Goal (Conservation or Harvest)	HSRG Broodstock management standards met?	pHOS est.	pHOS goal maximum	Hatchery Mtg Plan status- (HAIP, HGMP or other)	Agreed-to Program Changes- (broodstock management)	Program size (2012)	Changes Implemented	Implementation Target Date	Projected pHOS	Projected to meet HSRG Broodstock Management Standards?	Potential or additional Changes	Additional Monitoring
Washougal Summer Steelhead	6784	Primary	Skamania Hatchery Summer Steelhead	Segregated	Harvest	Yes	0.02	0.05	C&SFP in final draft.	No change in program	60K			>.05	Yes	Program is being evaluated through development of Steelhead Watershed Management Plans. Program may change with completion of Columbia River EIS	Estimates of hatchery proportions during tagging and snorkeling for mark/recapture estimates.
Washougal Winter Steelhead	6791	Contributing	Skamania Winter Steelhead	Segregated	Harvest	Yes	0.01	0.10	C&SFP in final draft.	No change in program	60K			>.05	Yes	Program is being evaluated through development of Steelhead Watershed Management Plans. Program may change with completion of Columbia River EIS	Creel Survey to evaluate total harvest and interception rates of wild winter steelhead during fishery. Plus evaluate effectiveness and impacts of selective gear season.
Klickitat Summer Steelhead	6833	Primary	Skamania Hatchery Summer Steelhead- Outplant	Segregated	Harvest	No	0.09	0.05	YKFP Plan	Transition to Local Broodstock	90K	None	N/A	N/A	No	YKFP calls for changing to a local broodstock for this program. Program may change with completion of Columbia River EIS	