HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	North Toutle Hatchery Fall Chinook (Integrated)
Species or Hatchery Stock:	Fall Chinook (*Oncorhynchus tshawytscha*) Toutle River Stock
Agency/Operator:	Washington Department of Fish and Wildlife
Watershed and Region:	Cowlitz River System/ Toutle Sub-Basin/ Lower Columbia River
Date Submitted:	
Date Last Updated:	August 19, 2014

Executive Summary

The Washington Department of Fish and Wildlife is submitting a Hatchery and Genetic Management Plan (HGMP) for the North Toutle Hatchery Fall Chinook program to the National Marine Fisheries (NMFS) for consultation under Section 10(a)(1)(A) or 4 (d) of the Endangered Species Act (ESA). NMFS will use the information in this HGMP to evaluate the hatchery impacts on salmon and steelhead listed under the ESA. The primary goal of an HGMP is to devise biologically-based hatchery management strategies that ensure the conservation and recovery of salmon and steelhead populations. This HGMP focuses on the implementation of hatchery reform actions adopted by the Washington Fish and Wildlife Commission Policy on Hatchery and Fishery Reform C-3619.

The purpose of the program is to produce Toutle River fall Chinook for sustainable escapement to the watershed, while providing recreational and commercial fisheries. Program fish will be produced at the North Toutle Hatchery, located on the Green River (WRIA 26.0323), tributary to the North Fork Toutle River (WRIA 26.0314) in the Cowlitz Basin. The program will annually release 1,400,000 sub-yearlings to the Toutle River.

This fall Chinook HGMP is built around the principles and recommendations of the Hatchery Scientific Review Group (HSRG). These principles and recommendations represent the best science available for operating hatchery facilities consistent with the conservation of salmonid species. The program has been operated as a "integrated type" program, as defined by the HSRG, since 2010. An "integrated" program is one in which natural-origin individuals are used in the hatchery broodstocks. Integration is achieved by using up to 30% of the returning adult natural-origin fall Chinook (distinguished by an intact adipose fin) returning to the North Toutle Hatchery trap on the Green River (RKm 0.8) from mid-August through October. All fish released through this hatchery program have been 100% mass-marked (adipose fin-clipped) since brood year 2006; of these, 100,000 sub-yearling fall Chinook are also released coded-wire tagged (CWT).

The Lower Columbia River Chinook are listed as "Threatened" under the ESA. The DPS includes the North Toutle Tule Chinook Program.

Broodstock Collection:
The broodstock is derived from stock returning to the North Toutle/Green Rivers. The proportion of natural-origin fish in the broodstock (pNOB) has averaged 25 over the last three years. The current egg-take goal is 1,625,000 at North Toutle Hatchery; around 380 adult pairs may be collected. Surplus hatchery fish above broodstock will be donated to food banks or used for nutrient enhancement.

Harvest:
Total annual harvest is dependent on management response to annual abundance in *Pacific Salmon Commission* (PSC - U.S./Canada), *Pacific Fishery Management Council* (PFMC - U.S. ocean), and *Columbia River Compact* forums. WDFW has also received authorization for tributary, Columbia River mainstem, and ocean fisheries; the combined harvest rates in the *Fisheries Management and Evaluation Plan* (FMEP), *Columbia River Fish Management Plan* (CRFMP), and ocean fisheries are reviewed annually in the North of Falcon process to ensure the harvest rates are consistent with recovery of the Lower Columbia River Tule Chinook population. The *U.S. v Oregon* Technical Advisory Committee (TAC) has prepared Biological Assessments (BAs) for combined fisheries based on relevant *U.S. v Oregon* management plans and agreements. The current BA concerns Columbia River treaty Indian and non-Indian fisheries, as described in the "2008–2017 *U.S. v Oregon* Management Agreement for upriver Chinook, sockeye, steelhead, coho, and white sturgeon" (2008–2017 MA).

Due to limitations that not all fish can be accounted for as being harvested or as back-to-rack counts, smolt-to-adult survival rates (SAR) are likely underestimated. Based on the average SAR of 0.17% for brood years 2000-2009, and a programmed release goal of 1.4-million sub-yearlings, the estimated production goal would be 2,380 adults.

Monitoring and Evaluation:
Performance indicators for harvest will be accomplished by continuing mass-marking (adipose fin-clip); CWT recoveries help determine stray rate contributions on spawning grounds by watersheds close in proximity to this program's release vicinity.

Operation and Maintenance of Hatchery Facilities:
North Toutle Hatchery has water rights to divert water at a rate of 48 cfs from the Green River The intake structures are in compliance with state and federal guidelines, but do not meet the current criteria. WDFW has requested funding for scoping, design, and construction work of a new intake system. Upstream passage is blocked by the temporary barrier weir during the broodstock collection period. The return water systems operate under a National Pollutant Discharge Elimination System (NPDES) permit.

1 SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1 Name of hatchery or program.

North Toutle Hatchery Fall Chinook

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

Chinook (*Oncorhynchus tshawytscha*)

ESA Status: "Threatened" March 24, 1999 (64FR14308); reaffirmed on June 28, 2005 (70FR37160); reaffirmed August 15, 2011 (76 FR 50448).

1.3 Responsible organization and individuals

Hatchery Operations Staff Lead Contact

Name (and title): Mark Johnson, Hatcheries Operations and Complex Manager
Agency or Tribe: Washington Department of Fish & Wildlife
Address: 165 Osprey Lane, Toledo WA 98591
Telephone: (360) 864-6135
Fax: (360) 864-6122
Email: Mark.Johnson@dfw.wa.gov

Fish Management Staff Lead Contact

Name (and title): Eric Kinne, Region 5 Hatchery Reform Coordinator
Agency or Tribe: Washington Dept. of Fish and Wildlife
Address: 2108 Grand Boulevard, Mail Stop: S-19, Vancouver, WA 98661-4624
Telephone: (360) 906-6747
Fax: (360) 906-6776
Email: Eric.Kinne@dfw.wa.gov

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

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

Funding Sources	Operation Information
Mitchell Act	Full time equivalent staff – 2.76
	Annual operating cost (dollars) - $323,922

The above information for full-time equivalent staff and annual operating cost applies cumulatively to anadromous program facilities and cannot be broken out specifically by program.

1.5 Location(s) of hatchery and associated facilities.

Broodstock Source: Toutle River tule fall Chinook

Table 1.5.1: Location of culturing phases, by facility.

Facility	Culturing Phase	Location
North Toutle Hatchery	Broodstock collection, Adult holding/spawning, Incubation, Rearing, Acclimation	Green River (WRIA 26.0323) at RM 0.81; tributary to North Fork Toutle River (WRIA 26.0314) at R.M. 11.5; tributary to the Toutle River (WRIA 26.0227) at R.M. 17.2; tributary to the Cowlitz River (WRIA 26.0002) at R.M. 20.0; tributary to the Columbia River at R.M. 68.0, Lower Columbia River, Washington.

1.6 Type of program.

Integrated Harvest

1.7 Purpose (Goal) of program.

Mitigation/Augmentation. The goal of this program is to provide maximum sport harvest under the mark-selective fishery regulations (retention of adipose-clipped fish only) while minimizing impacts to wild listed salmonids and steelhead. This is a conservation/harvest program.

The proposed integrated strategy for this program is based on WDFW's assessment of the genetic characteristics of the hatchery and local natural population, the current and anticipated productivity of the habitat used by the populations, the potential for successfully implementing an isolated program, and NMFS' listing determination (August 15, 2011 76 FR 50448). Mitchell Act funding made integration possible, with the onset of mass marking (adipose fin-clip) with the 2006 brood.

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-*Fish Management and Evaluation Plan* (FMEP) (WDFW 2001). All mainstem and tributary salmon fisheries are managed as mark-selective (no wild retention) fisheries to minimize the impact on listed wild fish. The Mitchell Act programs are intended to support Northwest fishing economies – particularly coastal and Native American -- that have relied on Columbia River production both before and after dam construction. Catches of hatchery fish sustain the economies of local communities while keeping incidental mortalities of ESA-Listed fish at approved levels. Value of hatchery production and benefit to local economies will be further increased by implementing fisheries that increase harvest of hatchery produced fish, as expected through implementation of the LCSRP.

To minimize impact on listed fish by the North Toutle Hatchery fall Chinook program and operations, the following risk aversions are included in this HGMP (**Table 1.8.1**).

Table 1.8.1: Summary of risk aversion measures for the North Toutle Fall Chinook program.

Potential Hazard	HGMP Reference	Risk Aversion Measures
Water Withdrawal	4.1	Water rights are formalized through trust water right from the Department of Ecology. Monitoring and measurement of water usage is reported in monthly NPDES reports.
Intake Screening	4.1	The intake screens are in compliance with state and federal guidelines (NMFS 1995, 1996), but do not meet the current *Anadromous Salmonid Passage Facility Design Criteria* (NMFS 2011). WDFW has secured funding in 2012 for scoping and feasibility design of a new river intake system to meet NOAA-NMFS compliance (Mitchell Act Intake and Fish Passage Study Report 2003).
Effluent Discharge	4.1	This facility operates under the "U*pland Fin-Fish Hatching and Rearing*" *National Pollution Discharge Elimination System* (NPDES) administered by the Washington Department of Ecology (DOE) - WAG 13-1010.
Broodstock Collection & Adult Passage	7.9	All fish are mass marked prior to release. Broodstock collection and sorting procedures can quickly identify listed non-target listed fish, and if encountered, released per protocol to minimize impact as determined by WDFW

		Region 5 staff. The hatchery weir and associated intake facilities need repairs to provide compliant passage.
Disease Transmission	7.9, 10.11	The *Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State* (WDFW and WWTIT 1998, updated 2006) and the *Fish Health Policy in the Columbia Basin* details hatchery practices and operations designed to stop the introduction and/or spread of any diseases within the Columbia Basin. Also, *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (Fish Health Policy Chapter 5, IHOT 1995).
Competition & Predation	2.2.3, 10.11	Fish are released at a time, size and the system and life history stage to foster rapid migration to marine waters, and to allow juvenile listed fish to grow to a size that reduces potential for predation. Current risk aversions and future considerations are being reviewed and evaluated for further minimizing impacts to listed fish.

1.9 List of program "Performance Standards".

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

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

1.10.1 "Performance Indicators" addressing benefits.

Table 1.10.1: "Performance Indicators" addressing benefits.

Benefits		
Performance Standard	**Performance Indicator**	**Monitoring & Evaluation**
3.1.2 Program contributes to mitigation requirements. Program provides mitigation for lost fish production due to development within the Columbia River Basin.	Number of fish released by program returning, or caught, as applicable to given mitigation requirements.	Annually estimate survival and contribution for each brood year released. 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.
3.1.3 Program addresses ESA responsibilities.	Program complies with Federal ESA-listed fish take authorizations for harvest and hatchery actions.	Compliance with ESA is managed with sport fishery regulations that minimize impacts to ESA-listed fish and are monitored by WDFW law enforcement officers. The FMEP outlines anticipated encounter rates and expected mortality rates for these fisheries. Creel surveys are being implemented to verify. Natural populations are monitored annually to assess trends and compare with goals. HGMP updated and re-submitted

		to NOAA with significant changes or under permit agreement.
3.2.1: Fish produced for harvest are propagated and released in a manner enabling effective harvest, as described in all applicable fisheries management plans, while adequately minimizing by-catch of non-target species.	Annual number of fish produced by program caught in all fisheries, including estimates of fish released.	Annually mass-mark hatchery releases to differentiate hatchery from natural-origin fish and record estimates of mark rate. The external mark enables mark-selective fisheries, which can reduce directed harvest mortality on natural-origin fish. Harvest is regulated to meet appropriate biological assessment criteria. Agencies monitor harvests to provide up-to-date information. Estimate survival and contribution to fisheries for each brood year released.
3.3.1. Artificial propagation program contributes to an increasing number of spawners returning to natural spawning areas.	Annual number of naturally-produced adults or redds on the spawning grounds or selected natural production index areas.	Annually monitor and report returns to the hatchery and spawning grounds..
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 (fin-clip, CWT, otolith-mark, other, etc., depending on species) production fish to identify them from naturally produced fish.	Annually monitor and report size, number, mass-mark quality (mark rate/tag rate) and date of all hatchery releases. Annually sample returning fish for the mass-mark and CWT in fisheries and at the hatchery; monitor and report numbers of estimated hatchery (marked) and natural (unmarked) fish. Report CWT analysis to RMIS database.
3.4.1 Fish collected for broodstock are taken throughout the return or spawning period in proportions approximating the timing and age distribution of population from which broodstock is taken.	Temporal distribution of broodstock collection at point of collection.	Collect broodstock representatively and systematically throughout the entire return timing of the returns (August through October). Collect annual run timing, age and sex composition and spawning escapement timing data. Adhere to WDFW spawning guidelines (Seidel 1983; HSRG 2009).
3.5.5 Juveniles are released at fully-smolted stage to benefit juvenile to adult survival rates, and reduce the likelihood for residualism and negative	Level of smoltification (size, appearance, behavior, etc.) at release compared to WDFW rearing and release guidelines. Release type (forced, volitional,	Monitor fish condition in the facilities throughout all rearing stages. Annually monitor and record

ecological interactions with natural-origin fish.	or direct).	size, number, and date of release.
3.6.1 The hatchery program uses standard scientific procedures to evaluate various aspects of artificial propagation.	Apply basic monitoring standards in the hatchery: food conversion rates, growth trajectories, mark/tag rate error, weight distribution (CV).	Collect annual run timing, age and sex composition data upon adult return. Annually record growth rates, mark rate and size at release and release dates. See also HGMP section 11 for program monitoring and evaluation.
3.8.3 Non-monetary societal benefits for which the program is designed are achieved.	Program is designed to help achieve the end goal of conserving and stabilizing natural salmon populations.	Long-term monitoring of system population will indicate success of program.

1.10.2 "Performance Indicators" addressing risks.

Table 1.10.2: **"Performance indicators" addressing risks.**

Risks		
Performance Standard	**Performance Indicator**	**Monitoring & Evaluation**
3.1.3 Program addresses ESA responsibilities	Program complies with Federal ESA-listed fish take authorizations for harvest and hatchery actions.	HGMP is updated to reflect any major changes in program and resubmitted to NOAA fisheries. Program risks have been addressed in this HGMP through best available science hatchery management actions. WDFW staff annually reviews Future Brood Document (FBD) for stock, size, number, date and location of releases from all production programs. Monitor and record juvenile hatchery fish size, number, date of release and mass-mark quality; monitor contribution of hatchery adult fish to fisheries and escapement.
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 adequately minimizing by-catch of non-target species.	Annual number of naturally-produced adults and/or redds on the spawning grounds or in selected natural production index areas. Number of marks released and estimated proportion of marks in out-migrant juveniles and returning adults on the spawning ground.	Production fish are mass-marked (adipose fin-clip) to allow for their differentiation from naturally-produced fish Monitor and record juvenile hatchery fish size, number, date of release and mass-mark (fin clips, tags, etc.) quality; monitor contribution of hatchery adult fish to fisheries and escapement. Harvest is regulated to meet appropriate biological assessment criteria. Agencies monitor harvests and

		hatchery escapements to provide up-to-date information.
3.2.2 Release groups are sufficiently marked in a manner consistent with information needs and protocols to enable determination of impacts to natural- and hatchery-origin fish in fisheries.	Percentage of total hatchery releases are identifiable as hatchery-origin fish. Mass-mark (adipose-fin clip, CWT, otolith-mark, etc., depending on species) produced fish to allow for their differentiation from naturally produced fish for selective fisheries.	Annually monitor and report size, number, date of release and mass-mark quality (adipose fin-clip rate) of all hatchery releases. Annually assess harvest of mass-marked hatchery fish based on CRC estimates and creel surveys.
3.3.2 Releases are sufficiently marked to allow statistically significant evaluation of program contribution to natural production and to evaluate effects of the program on the local natural population.	All hatchery production is identifiable in some manner (fin-marks, tags, otolith, etc.) consistent with information needs.	Annually monitor and record size, number, date of release and mass-mark quality (tag rate) of hatchery releases. Examine returning fish encountered for the mass-mark (CWT) at the hatchery and on the spawning ground. Annually record numbers of estimated hatchery (marked) and natural (unmarked).
3.4.1 Fish collected for broodstock are taken throughout the return or spawning period in proportions approximating the timing and age distribution of population from which broodstock is taken.	Temporal and age distribution of broodstock collected, compared to that of naturally-produced population at collection point.	Collect annual run timing, age and sex composition and return timing data.
3.4.3 Life history characteristics of the natural population do not change as a result of the hatchery program.	Life history characteristics are measured in adult and juvenile hatchery fish: return timing, age and sex composition, spawning timing, and size in returning hatchery adults; size, growth rates, and survival to release in juvenile production. Life history patterns of juvenile and adult NOR are stable.	Collect annual run timing, origin, and age and sex composition data. Annually monitor and record juvenile hatchery fish size, growth rates, number released, mass-mark/tag data, survival-to-release rates, and date of release. Examine returning fish for the mass-mark (fin-clips, CWTs) at broodstock collection points and on the spawning grounds. Annually record and report numbers of estimated hatchery (marked) and natural (unmarked).
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.	See HGMP section 11 for M&E information.
3.5.2 Collection of broodstock does not adversely impact the genetic diversity of the naturally-spawning population.	Total number of natural-origin spawners (if any) reaching the collection facility. Timing of collection compared	All on-station hatchery releases are identifiable in some manner (fin-marks, tags, etc.). Collect annual run timing, origin,

	to overall run timing.	and age and sex composition data. CWT data reported to RMIS. Examine returning fish for the mass-mark (fin-clips, CWTs) at broodstock collection points and on the spawning grounds. Annually record and report numbers of estimated hatchery (marked) and natural (unmarked).
3.5.3 Hatchery-origin adults in natural production areas do not negatively affect 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).	Examine returning fish for the mass-mark (fin-clips, CWTs) at broodstock collection points and on the spawning grounds. Annually record and report numbers of estimated hatchery (marked) and natural (unmarked).
3.5.4 Juveniles are released on-station, or after sufficient acclimation to maximize homing ability to intended return locations.	Location of release (on-station, acclimation pond, direct plant). Release type (forced, volitional or direct stream release). Proportion of adult returns to program's intended return location, compared to fisheries and artificial or natural production areas.	Annually record and report release information, including location, method and age class in hatchery data systems (WDFW Hatcheries Headquarters Database).
3.5.5 Juveniles are released at fully-smolted stage.	Level of smoltification at release. Release type (forced, volitional or direct).	Annually monitor and record size, number, date of release and release type.
3.7.1 Hatchery facilities are operated in compliance with all applicable fish health guidelines and facility operation standards and protocols (IHOT, PNFHPC, *Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State*).	Annual reports indicating levels of compliance with applicable standards and criteria. Periodic audits indicating level of compliance with applicable standards and criteria.	Pathologists from WDFW's Fish Health Section monitor program monthly. Exams performed at each life stage may include tests for virus, bacteria, parasites and/or pathological changes, as needed. The program is operated consistent with the *Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State* (WDFW and WWTIT 1998, updated 2006), *Fish Health Policy in the Columbia Basin*, and *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (Fish Health Policy Chapter 5, IHOT 1995).
3.7.2 Effluent from hatchery facility will not detrimentally affect natural populations.	Discharge water quality compared to applicable water quality standards by NPDES permit.	Flow and discharge reported in monthly NPDES report (see HGMP section 4.2).

	WDFW water right permit compliance.	
3.7.3 Water withdrawals and in-stream water diversion structures for artificial production facility operation will not prevent access to natural spawning areas, affect spawning behavior of natural populations, or impact juvenile rearing environment.	Water withdrawals compared to NMFS, USFWS and WDFW applicable passage and screening criteria for juveniles and adults.	Barrier and intake structure compliance assessed and needed fixes are prioritized (see HGMP section 4.2).
3.7.4 Releases do not introduce pathogens not already existing in the local populations, and do not significantly increase the levels of existing pathogens. Follow the *Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State* (WDFW and WWTIT 1998, revised 2006).	Necropsies of fish to assess health, nutritional status, and culture conditions.	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. A fish health database will be maintained to identify trends in fish health and disease and implement fish health management plans based on findings.
	Release and/or transfer exams for pathogens and parasites.	Examine fish 1 to 6 weeks prior to transfer or release, in accordance with the *Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State* (WDFW and WWTIT 1998, updated 2006).
	Inspection of adult broodstock for pathogens and parasites.	At spawning, lots of 60 adult broodstock are examined for pathogens.
	Inspection of off-station fish/eggs prior to transfer to hatchery for pathogens and parasites.	Controls of specific fish pathogens through eggs/fish movements are conducted in accordance to the *Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State* (WDFW and WWTIT 1998, updated 2006).
3.7.6 Adult broodstock collection operation does not significantly alter spatial and temporal distribution of any naturally-produced population.	Spatial and temporal spawning distribution of natural populations above and below broodstock collection site is currently compared to historic distribution.	Trap is checked daily. Non-target listed fish, when encountered, are returned to the river.
3.7.7 Weir/trapping operations do not result in significant stress, injury or mortality in natural populations.	Mortality rates in trap. Pre-spawning mortality rates of captured fish in the hatchery and/or after release.	Traps checked daily. Annually record and report abundances and observations of natural-origin fish at hatchery facilities.
3.7.8 Predation by artificially produced fish on naturally – produced fish does not significantly reduce numbers of natural fish.	Hatchery juveniles are raised to smolt-size and released from the hatchery at a time that fosters rapid migration downstream.	Hatchery smolt release size and time are monitored to quantify/minimize predation effects on naturally-origin salmon and steelhead (Sharpe et

		al. 2008).
3.8.1 Cost of program operation does not exceed the net economic value of fisheries in dollars per fish for all fisheries targeting this population.	Total cost of operation.	Compare annual operational cost of program to calculated fishery contribution value (Wegge 2009).
3.8.2. Juvenile production costs are comparable to or less than other regional programs designed for similar objectives.	Total cost of program operation.	Annually monitor and report feed costs and fish health actions.

1.11 Expected size of program.

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

Around 380 adult pairs, not including jacks, are needed to achieve the established egg-take goal of 1,625,000 (FBD 2014), based on an average fecundity of around 4,900 smolts/female, and a pre-spawning mortality of 14.5%.

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

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

Age Class	Max. No.	Size (fpp)	Release Date	Location	Major Watershed
Sub-yearlings	1,400,000	80.0	June/July	Green River	Cowlitz

Source: Future Brood Document 2014.

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

Table 1.12.1: Total releases and adult fall Chinook returns to North Toutle Hatchery.

Year	Total Release	Hatchery Escapement
2002	1,361,143	6,233
2003	2,593,342	10,215
2004	2,083,000	3,645
2005	2,086,306	5,033
2006	1,667,700	3,567
2007	2,584,941	1,937
2008	2,282,929	1,648
2009	1,468,609	1,988
2010	1,594,584	3,446
2011	1,573,797	4,387
2012	1,575,534	2,603
2013	1,514,769	4,052
Average	**1,865,555**	**4,063**

Source: WDFW Hatcheries Headquarters Database 2014. Returns indicate marked and unmarked returns. Prior to brood year 2006 Chinook were not mass-marked. Beginning in 2011 marked and unmarked returns represent the full age classes of marked returns. See Table 7.4.2.1 for unmarked returns.

See also **Table 3.3.1.1** SAR calculation.

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

The North Toutle Hatchery began operation in 1951. The Toutle River was planted with fall Chinook until the eruption of Mt. Saint Helens in 1980. Rearing ponds were developed near the site of the original hatchery in 1985. The hatchery was renovated and resumed operations in 1991. The production has operated as an "integrated" program since the 2007 brood.

1.14 Expected duration of program.

Program is on-going, with no plans for termination.

1.15 Watersheds targeted by program.

Cowlitz Sub-Basin, 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.

Fish passage at North Toutle Hatchery is managed by the in-stream fish barrier and fish ladder. The WDFW Columbia River Fisheries Development (CRFD) 2003 *Intake and Fish Passage Study Report* indicates the passage at North Toutle is not in compliance with current passage criteria. This trap 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 that can be prevented with a modern sorting and handling system designed to cause the least harm possible to all fish handled.

1.16.2 Potential Alternatives to the Current Program

Alternative 1: *Eliminate the program*: This action would reduce potential interaction with natural populations and eliminate potential impacts on other ESA-listed species. Currently this program supports popular sport fisheries in the lower Columbia River, and is consistent with the mitigation requirements.

Alternative 2: Modify release time or location, and/or reduce the size of the program. The primary ecological risks include competition between natural-origin and hatchery fall Chinook. Data from other Chinook populations suggests that wild fall Chinook salmon migration peaks in February or March, and continues through July. WDFW hatchery fall Chinook salmon are released in July, after the peak of the natural out-migration.

1.16.3 Potential Reforms and Investments

Reform/Investment 1: *Modernize the Toutle Trap*. A semi-automated sorting system would be comprised of the following: Construct a three pond system that allows for fish to enter a pre-sorting pond volitionally. Fish would be sorted from this pond and either returned to stream above the weir, held for broodstock or surplused. All ponds would be equipped with a crowder and a brail type system.

Reform/Investment 2: *Fish passage at North Toutle Hatchery*. The solution to the passage non-compliance is not one that can be solved by operating the fishway or hatchery water intake in a different manner. The solution lies in the construction of significant modification of the existing fishway/barrier or a completely new fishway/weir.

Reform/Investment 3: *A non-compliant status also exists with the gravity intake for the rearing ponds*. Screen slot width, approach velocities, sweep velocities, and floodwater invasion are the

non-compliant issues. The solution to these issues will be a significant construction and possibly a complete rebuild.

Reform/Investment 4: *Water supply system has pipeline problems* and needs to be replaced form the gravity intake to the hatchery rearing ponds, as well as new riser supply piping.

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

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

None currently. This HGMP is submitted to the NOAA Fisheries for ESA consultation and take prohibition exemption under ESA section 4(d) 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.

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).

- 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).

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.

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, as well as fifteen artificial propagation programs. Excluded are Upper Columbia River bright hatchery stocks that spawn in the mainstem Columbia River below Bonneville Dam and in other tributaries upstream from the Sandy River to the Hood and White Salmon rivers (NMFS 2014 79FR20802).

Status: Today only two of 32 historical populations – the North Fork Lewis and Sandy late-fall populations – are considered viable. Most populations (26 out of 32) have a very low probability of persistence over the next 100 years, and some populations are extirpated, or nearly so. Five of the six strata fall significantly short of the Willamette- Lower Columbia Technical Recovery

Team (WLC TRT) criteria for viability. One stratum – Cascade late fall – meets the WLC TRT criteria (Dornbush and Sihler 2013). Dam construction eliminated habitat for a number of populations leading to the extirpation of spring Chinook salmon populations in the Upper Cowlitz, Cispus, Tilton, North Fork Lewis , Big White Salmon rivers, and fall Chinook populations in the Upper Cowlitz and Big White Salmon rivers (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 Big White Salmon River was breached October 26, 2011. Based on the 2010 recovery plan analyses, all of the 14 Tule populations (**Table 2.2.2.1**) 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 (LCFRB 2010).

Table 2.2.2.1: Baseline viability status, viability and abundance objectives, and productivity improvement targets for lower Columbia River Chinook populations.

		Baseline viability					Prod.	Abundance		
Population	Contribution	A&P	S	D	Net	Obj.	target	Historical	Baseline	Target
Coast Fall										
Grays/Chinook	Contributing[2]	VL	H	VL	VL[2]	M+	+500%	800	<50	1,000
Eloch/Skam [C]	Primary	VL	H	L	VL[2]	H	+150%	3,000	<50	1,500
Mill/Aber/Germ	Primary[1]	VL	H	L	VL[2]	H	+155%	2,500	50	900
Youngs Bay (OR)	Stabilizing	--[3]	--[3]	--[3]	L	L	--[3]	--[3]	--[3]	--[3]
Big Creek (OR) [C]	Contributing[1]	--[3]	--[3]	--[3]	VL	L	--[3]	--[3]	--[3]	--[3]
Clatskanie (OR)	Primary	--[3]	--[3]	--[3]	VL	H	--[3]	--[3]	--[3]	--[3]
Scappoose (OR)	Primary[1]	--[3]	--[3]	--[3]	L	H	--[3]	--[3]	--[3]	--[3]
Cascade Fall										
Lower Cowlitz [C]	Contributing	VL	H	M	VL[2]	M+	+50%	24,000	500	3,000
Upper Cowlitz	Stabilizing	VL	VL	M	VL	VL	--	28,000	0	--
Toutle[C]	Primary[1]	VL	H	M	VL[2]	H+	+265%	11,000	<50	4,000
Coweeman [G]	Primary	VL	H	H	VL[2]	H+	+80%	3,500	100	900
Kalama	Contributing[2]	VL	H	M	VL[2]	M	+110%	2,700	<50	500
Lewis [G]	Primary	VL	H	H	VL[2]	H+	+280%	2,600	<50	1,500
Salmon	Stabilizing	VL	H	M	VL	VL	--	n/a	<50	--
Washougal	Primary	VL	H	M	VL[2]	H+	+190%	2,600	<50	1,200
Clackamas (OR) [C]	Contributing	--[3]	--[3]	--[3]	VL	M	--[3]	--[3]	--[3]	--[3]
Sandy (OR)	Contributing[1]	--[3]	--[3]	--[3]	VL	M	--[3]	--[3]	--[3]	--[3]
Cascade L Fall										
Lewis NF [C,G]	Primary	VH	H	H	VH[1]	VH	0%	23,000	7,300	7,300
Sandy (OR) [C,G]	Primary	--[3]	--[3]	--[3]	H	VH	--[3]	--[3]	--[3]	--[3]
Cascade Spring										
Upper Cowlitz [C,G]	Primary	VL	L	M	VL[2]	H+	>500%	22,000	300	1,800
Cispus [C,G]	Primary	VL	L	M	VL[2]	H+	>500%	7,800	150	1,800
Tilton	Stabilizing	VL	VL	VL	VL	VL	0%	5,400	<100	--
Toutle	Contributing	VL	H	L	VL	M	>500%	3,100	100	1,100
Kalama	Contributing[2]	VL	H	L	VL	L	>500%	4,900	100	300
Lewis NF [C]	Primary	VL	L	M	VL	H	>500%	15,700	300	1,500
Sandy (OR) [C,G]	Primary	--[3]	--[3]	--[3]	M	H	--[3]	--[3]	--[3]	--[3]
Gorge Fall										
L. Gorge (WA/OR)	Contributing	VL	M	L	VL[2]	M	>500%	n/a	<50	1,200
U. Gorge (WA/OR) [C]	Contributing[1]	VL	M	L	VL[2]	M	>500%	n/a	<50	1,200
White Salmon [C]	Contributing	VL	L	L	VL	M	>500%	n/a	<50	500
Hood (OR)	Primary[4]	--[3]	--[3]	--[3]	VL	H	--[3]	--[3]	--[3]	--[3]
Gorge Spring										
White Salmon [C]	Contributing	VL	VL	VL	VL	L+	>500%	n/a	<50	500
Hood (OR)	Primary	--[3]	--[3]	--[3]	VL	VH	--[3]	--[3]	--[3]	--[3]

Source: LCFRB 2010.
L = Low; M = Moderate; H = High; VH/E = Very High/Extinct.
[1] Increase relative to interim Plan.
[2] Reduction relative to interim Plan.
[3] Addressed in Oregon Management Unit plan.
[C] Designated as a historical core population by the TRT.

[G] Designated as a historical legacy population by the TRT.

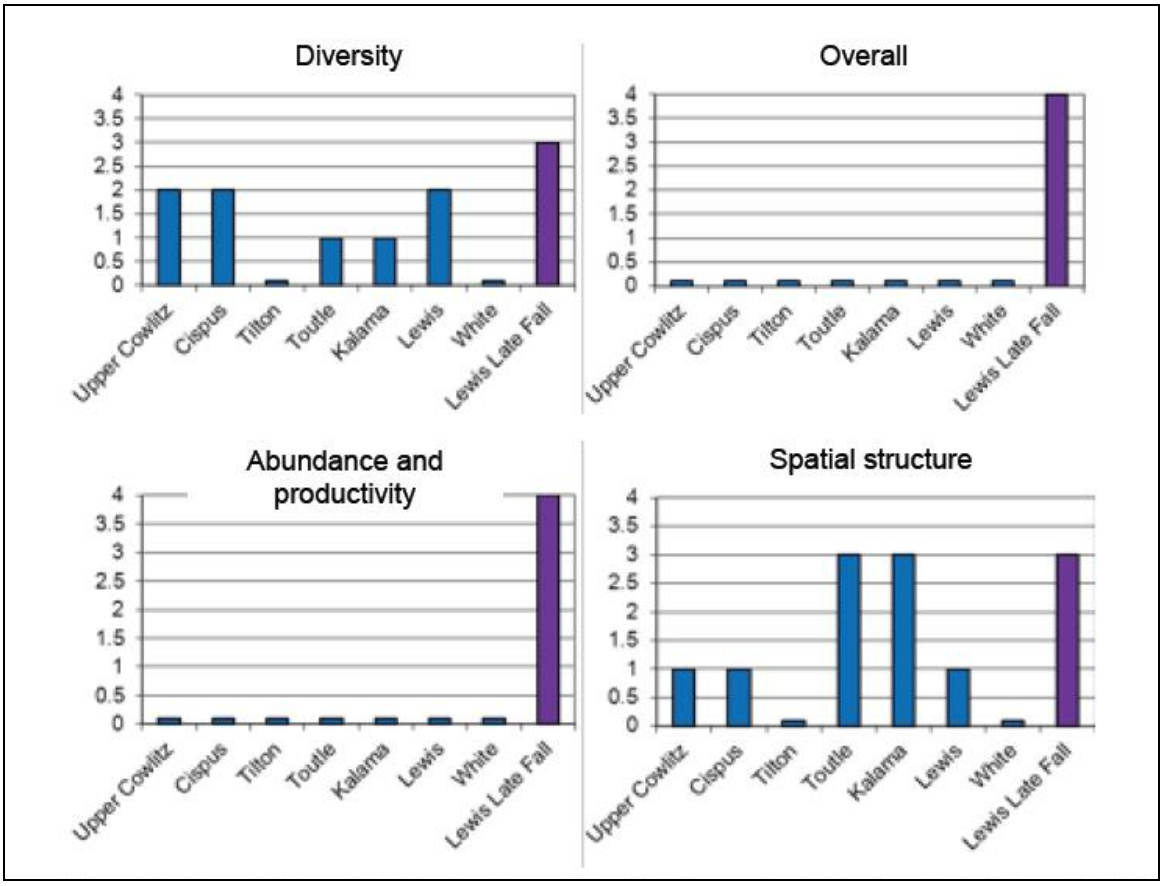

Figure 2.2.2.1: Current status of Washington lower Columbia River spring Chinook and late fall-run (bright) Chinook salmon populations for the VSP parameters and overall population risk. (LCFRB Recovery Plan 2010, chapter 6). A population score of zero indicates a population extirpated or nearly so, a score of 1 is high risk, 2 is moderate risk, 3 is low risk ("viable") and 4 is very low risk (Ford 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), and excludes fish originating from the upper Willamette River Basin above Willamette Falls. The DPS includes seven artificial propagation programs, including the Cowlitz Trout Hatchery Winter-late (Lower Cowlitz), Kalama River Wild (winter- and summer-run) and Lewis River Wild Winter (NMFS 2014 79FR20802).

Status: Today, 16 of the 23 Lower Columbia River steelhead populations have a low or very low probability of persisting over the next 100 years, and six populations have a moderate probability of persistence. Only the summer-run Wind population is considered viable. All four strata in the DPS fall short of the WLC TRT criteria for viability (Dornbush and Sihler 2013). Populations in the upper Lewis and Cowlitz 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 (Ford 2011). Condit Dam on the White Salmon River was breached October 26, 2011. WDFW is currently developing watershed-specific management plans in accordance with the SSMP. As part of this planning process, WDFW is proposing to complete a thorough review of current steelhead stock status using the most up to date estimates of adult abundance, juvenile production and genetic information.

Table 2.2.2.2: Baseline viability status, viability and abundance objectives, and productivity improvement targets for lower Columbia River steelhead populations.

		Baseline viability					Prod.	Abundance		
Population	Contribution	A&P	S	D	Net	Obj.	target	Historical	Baseline	Target
Coast Winter										
Grays/Chinook	Primary	VH	VH	M	M[1]	H	0%[4]	1,600	800	800
Eloch/Skam	Contributing	VH	VH	M	M[1]	M+	0%[4]	1,100	600	600
Mill/Ab/Germ	Primary	H	VH	M	M[1]	H	0%[4]	900	500	500
Youngs Bay (OR)	Primary	--[3]	--[3]	--[3]	VH	VH	--[3]	--[3]	--[3]	--[3]
Big Creek (OR)	Primary	--[3]	--[3]	--[3]	H	VH	--[3]	--[3]	--[3]	--[3]
Clatskanie (OR)	Primary	--[3]	--[3]	--[3]	VH	VH	--[3]	--[3]	--[3]	--[3]
Scappoose (OR)	Primary	--[3]	--[3]	--[3]	VH	VH	--[3]	--[3]	--[3]	--[3]
Cascade Winter										
Lower Cowlitz	Contributing	L	M	M	L	M	+5%	1,400	350	400
Upper Cowlitz [C,G]	Primary	VL	M	M	VL[2]	H[1]	>500%	1,400	<50	500
Cispus [C,G]	Primary	VL	M	M	VL[2]	H[1]	>500%	1,500	<50	500
Tilton	Contributing	VL	M	M	VL	L	>500%	1,700	<50	200
S.F. Toutle	Primary	M	VH	H	M	H+	+35%	3,600	350	600
N.F. Toutle [C]	Primary	VL	H	H	VL[2]	H	+125%		120	600
Coweeman	Primary	L	VH	VH	L[2]	H	+25%	900	350	500
Kalama	Primary	L	VH	H	L[2]	H+	+45%	800	300	600
N.F. Lewis [C]	Contributing	VL	M	M	VL[2]	M	>500%	8,300	150	400
E.F. Lewis	Primary	M	VH	M	M[1]	H	+25%	900	350	500
Salmon	Stabilizing	VL	H	M	VL[2]	VL	0%	na	<50	--
Washougal	Contributing	L	VH	M	L[2]	M	+15%	800	300	350
Clackamas (OR) [C]	Primary	--[3]	--[3]	--[3]	M	H	--[3]	--[3]	--[3]	--[3]
Sandy (OR) [C]	Primary	--[3]	--[3]	--[3]	L	VH	--[3]	--[3]	--[3]	--[3]
Cascade Summer										
Kalama [C]	Primary	H	VH	M	M[1]	H	0%[4]	1,000	500	500
N.F. Lewis	Stabilizing	VL	VL	VL	VL	VL	0%	na	150	--
E.F. Lewis [G]	Primary	VL	VH	M	VL[2]	H	>500%	600	<50	500
Washougal [C,G]	Primary	M	VH	M	M[1]	H	+40%	2,200	400	500
Gorge Winter										
L. Gorge (WA/OR)	Primary	L	VH	M	L[2]	H	+45%	na	200	300
U. Gorge (WA/OR)	Stabilizing	L	M	M	L[2]	L	0%	na	200	--
Hood (OR) [C,G]	Primary	--[3]	--[3]	--[3]	M	H	--[3]	--[3]	--[3]	--[3]
Gorge Summer										
Wind [C]	Primary	VH	VH	H	H[1]	VH	0%[4]	na	1,000	1,000
Hood (OR)	Primary	--[3]	--[3]	--[3]	VL	H	--[3]	--[3]	--[3]	--[3]

Source: LCFRB 2010.

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

[1] Increase relative to interim Plan.

[2] Reduction relative to interim Plan.

[3] Addressed in Oregon Management Unit plan.

[4] Improvement increments are based on abundance and productivity; however, this population will require improvement in spatial structure or diversity to meet recovery objectives.

[C] Designated as a historical core population by the TRT.

[G] Designated as a historical legacy population by the TRT.

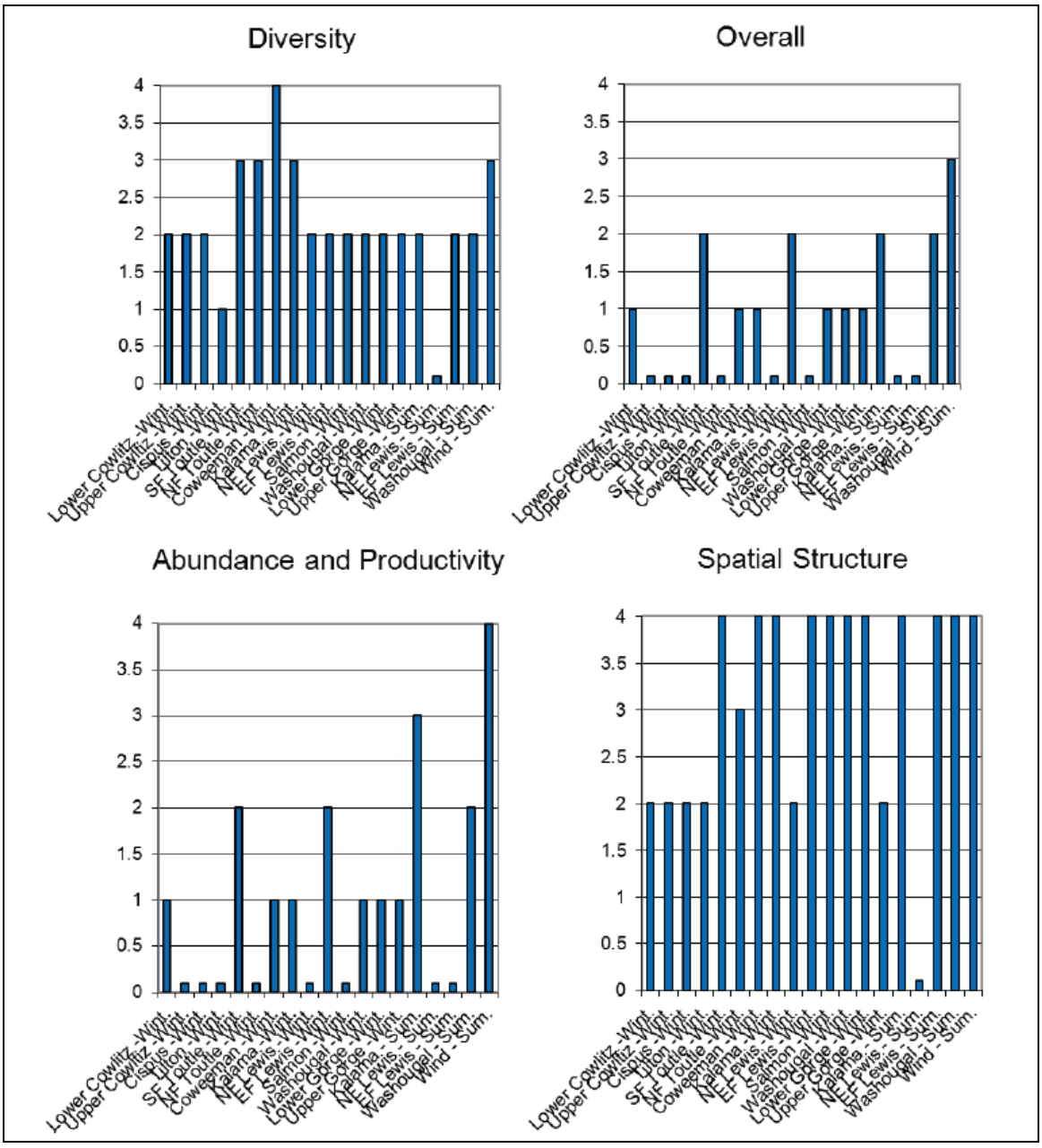

Figure 2.2.2.2: Current status of Washington LCR steelhead populations for the VSP parameters and overall population risk. (LCFRB 2010 Recovery Plan, chapter 6). A population score of zero indicates a population extirpated or nearly so, a score of 1 is high risk, 2 is moderate risk, 3 is low risk ("viable") and 4 is very low risk (Ford 2011).

Lower Columbia River coho *(Oncorhynchus kisutch)*: Originally part of a larger Lower Columbia River/Southwest Washington ESU, Lower Columbia coho were identified as a separate ESU and listed as threatened on June 28, 2005. The ESU includes all naturally spawned populations of coho salmon in the Columbia River and its tributaries in Washington and Oregon, from the mouth of the Columbia up to and including the Big White Salmon and Hood Rivers, The twenty-one artificial propagation programs include: the Grays River, Peterson Coho Project, Cowlitz Type-N Coho Program in the Upper and Lower Cowlitz Rivers, Cowlitz Game and Anglers Coho Program, Friends of the Cowlitz Coho Program, North Fork Toutle River Hatchery, Kalama River Type-N and Type-S Coho Programs, Lewis River Type-N and Type-S

Coho programs, Fish First Wild Coho and Type-N Coho programs, Syverson Project Type-N Coho Program, and Washougal Hatchery Type-N Coho Program (NMFS 2014 79FR20802).

Status: 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, Dornbusch and Sihler 2013). All of these 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. The 2005 BRT evaluation noted that 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 2011). Since this time WDFW has implemented an ESU wide monitoring program for LCR coho which began in 2010. Preliminary results indicate that natural origin population abundance may be higher than previously thought for certain populations (WDFW, unpublished). Results from the first 3 years of monitoring should be available in the near future. Currently, 21 of the 24 Lower Columbia River coho salmon populations are considered to have a very low probability of persisting over the next 100 years, and none is considered viable (Dornbusch and Sihler 2013). All three strata in the ESU fall significantly short of the WLC TRT criteria for viability.

Table 2.2.2.3: Baseline viability status, viability and abundance objectives, and productivity improvement targets for lower Columbia River coho populations.

		Baseline viability					Prod.	Abundance		
Population	Contribution	A&P	S	D	Net	Obj.	target	Historical	Baseline	Target
Coast										
Grays/Chinook [L]	Primary	VL	H	VL	VL[2]	H	+370%	3,800	<50	2,400
Eloch/Skam [L]	Primary	VL	H	VL	VL[2]	H	+170%	6,500	<50	2,400
Mill/Ab/Germ [L]	Contributing	VL	H	L	VL[2]	M	>500%	2,800	<50	1,800
Youngs (OR) [L]	Stabilizing	--[3]	--[3]	--[3]	VL	VL	--[3]	--[3]	--[3]	--[3]
Big Creek (OR) [L]	Stabilizing[2]	--[3]	--[3]	--[3]	VL	VL	--[3]	--[3]	--[3]	--[3]
Clatskanie (OR) [L]	Primary[1]	--[3]	--[3]	--[3]	L	VH	--[3]	--[3]	--[3]	--[3]
Scappoose (OR) [L]	Primary	--[3]	--[3]	--[3]	M	VH	--[3]	--[3]	--[3]	--[3]
Cascade										
Lower Cowlitz [L]	Primary	VL	M	M	VL[2]	H	+100%	18,000	500	3,700
Upper Cowlitz [E, L]	Primary[1]	VL	M	L	VL	H[1]	>500%	18,000	<50	2,000
Cispus [E, L]	Primary[1]	VL	M	L	VL	H[1]	>500%	8,000	<50	2,000
Tilton [E, L]	Stabilizing[2]	VL	M	L	VL	VL[2]	0%	5,600	<50	--
Toutle SF [E, L]	Primary	VL	H	M	VL[2]	H	+180%	27,000	<50	1,900
Toutle NF [E, L]	Primary	VL	M	L	VL[2]	H	+180%		<50	1,900
Coweeman [L]	Primary	VL	H	M	VL[2]	H	+170%	5,000	<50	1,200
Kalama [L]	Contributing	VL	H	L	VL[2]	L	>500%	800	<50	500
NF Lewis [E, L]	Contributing	VL	L	L	VL[2]	L	+50%	40,000	200	500
EF Lewis [E, L]	Primary	VL	H	M	VL[2]	H	>500%	3,000	<50	2,000
Salmon [L]	Stabilizing	VL	M	VL	VL	VL	0%	na	<50	--
Washougal [L]	Contributing	VL	H	L	VL[2]	M+	>500%	3,000	<50	1,500
Clackamas (OR) [E, L]	Primary	--[3]	--[3]	--[3]	M	VH	--[3]	--[3]	--[3]	--[3]
Sandy (OR) [E, L]	Primary	--[3]	--[3]	--[3]	VL	H	--[3]	--[3]	--[3]	--[3]
Gorge										
L Gorge (WA/OR) [L]	Primary	VL	M	VL	VL[2]	H	+400%	na	<50	1,900
U Gorge (WA) [L]	Primary[1]	VL	M	VL	VL[2]	H	+400%	na	<50	1,900
U Gorge/Hood (OR)[E]	Contributing[4]	--[3]	--[3]	--[3]	VL	H	--[3]	--[3]	--[3]	--[3]

Source: LCFRB 2010.
L = Low; M = Moderate; H = High; VH/E = Very High/Extinct.
[1] Increase relative to interim Plan.
[2] Reduction relative to interim Plan.
[3] Addressed in Oregon Management Unit plan.
[4] Improvement increments are based on abundance and productivity; however, this population will require improvement in spatial structure or diversity to meet recovery objectives.
[E] Early run (Type S) coho stock.
[L] Late run (Type N) coho stock.

(Core and Legacy populations not designated by the TRT for coho).

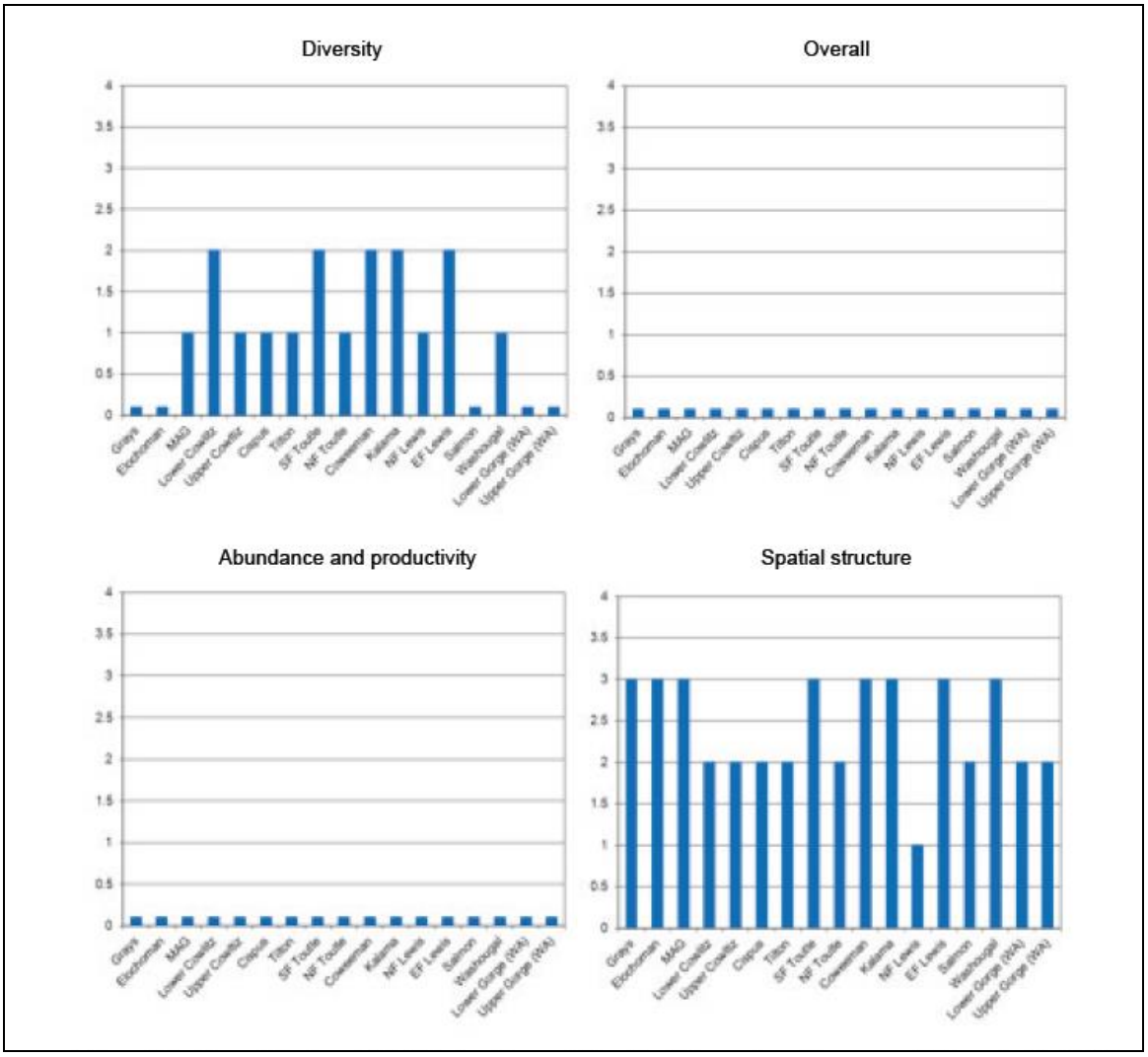

Figure 2.2.2.3: Current status of Washington LCR coho populations for the VSP parameters and overall population risk. (LCFRB 2010 recovery plan, chapter 6). A population score of zero indicates a population extirpated or nearly so, a score of 1 is high risk, 2 is moderate risk, 3 is low risk ("viable") and 4 is very low risk (Ford 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 Grays River and Washougal River/Duncan Creek chum hatchery programs (NMFS 2014 79FR20802).

Status: A report on the population structure of lower Columbia River salmon and steelhead populations was published by the WLC-TRT in 2006 (Myers et al. 2006). The chum population designations in that report are used in this status update and were used for status evaluations in recent recovery plans by ODFW and LCFRB.

The LCFRB completed a revision recovery plan in 2010 that includes Washington populations of Columbia River chum salmon. This plan includes an assessment of the current status of Columbia River chum populations, which relied and built on the viability criteria developed by the WLC-TRT (McElhany et al. 2006) and an earlier evaluation of Oregon WLC populations (McElhany et al. 2007). This evaluation assessed the status of populations with regard to the VSP parameters of A/P, spatial structure, and diversity (McElhany et al. 2000). The result of this analysis is shown in **Figure 2.2.2.4**. The analysis indicates that all of the Washington populations with two exceptions

are in the overall very high risk category (also described as extirpated or nearly so). The Grays River population was considered to be at moderate risk and the Lower Gorge population to be at low risk. The very high risk status assigned to the majority of Washington populations (and all the Oregon populations) reflects the very low abundance observed in these populations (e.g., <10 fish/year) (Ford 2011). Today, 15 of the 17 populations that historically made up this ESU are so depleted that either their baseline probability of persistence is very low or they are extirpated or nearly so; this is the case for all six of the Oregon populations. Currently almost all natural production occurs in just two populations: Grays/Chinook and the Lower Gorge. All three strata in the ESU fall significantly short of the WLC TRT criteria for viability (Dornbush and Sihler 2013).

Table 2.2.2.4: Baseline viability status, viability and abundance objectives, and productivity improvement targets for lower Columbia River chum populations.

		Baseline viability					Prod.	Abundance		
Population	**Contribution**	**A&P**	**S**	**D**	**Net**	**Obj.**	**target**	**Historical**	**Baseline**	**Target**
Coast										
Grays/Chinook [C,G]	Primary	VH	M	H	M[1]	VH	0%[4]	10,000	1,600	1,600
Eloch/Skam [C]	Primary	VL	H	L	VL[2]	H	>500%	16,000	<200	1,300
Mill/Ab/Germ	Primary	VL	H	L	VL	H	>500%	7,000	<100	1,300
Youngs (OR) [C]	Stabilizing[2]	--[3]	--[3]	--[3]	VL	VL	--[3]	--[3]	--[3]	--[3]
Big Creek (OR) [C]	Stabilizing[2]	--[3]	--[3]	--[3]	VL	VL	--[3]	--[3]	--[3]	--[3]
Clatskanie (OR)	Primary[1]	--[3]	--[3]	--[3]	VL	H	--[3]	--[3]	--[3]	--[3]
Scappoose (OR)	Primary[1]	--[3]	--[3]	--[3]	VL	H	--[3]	--[3]	--[3]	--[3]
Cascade										
Cowlitz (Fall) [C]	Contributing	VL	H	L	VL	M	>500%	195,000	<300	900
Cowlitz (Summer) [C]	Contributing	VL	L	L	VL	M	>500%	n/a	n/a	900
Kalama	Contributing	VL	H	L	VL	M	>500%	20,000	<100	900
Lewis [C]	Primary	VL	H	L	VL	H	>500%	125,000	<100	1,300
Salmon	Stabilizing	VL	L	L	VL	VL	0%	n/a	<100	--
Washougal	Primary	VL	H	L	VL[2]	H+	>500%	18,000	<100	1,300
Clackamas (OR) [C]	Contributing	--[3]	--[3]	--[3]	VL	M	--[3]	--[3]	--[3]	--[3]
Sandy (OR)	Primary	--[3]	--[3]	--[3]	VL	H	--[3]	--[3]	--[3]	--[3]
Gorge										
L. Gorge (WA/OR) [C,G]	Primary	VH	H	VH	H[1]	VH	0%[4]	6,000	2,000	2,000
U. Gorge (WA/OR)	Contributing	VL	L	L	VL	M	>500%	11,000	<50	900

Source: LCFRB 2010.

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

[5] Increase relative to interim Plan.

[6] Reduction relative to interim Plan.

[7] Addressed in Oregon Management Unit plan.

[8] Improvement increments are based on abundance and productivity; however, this population will require improvement in spatial structure or diversity to meet recovery objectives.

[C] Designated as a historical core population by the TRT.

[G] Designated as a historical legacy population by the TRT.

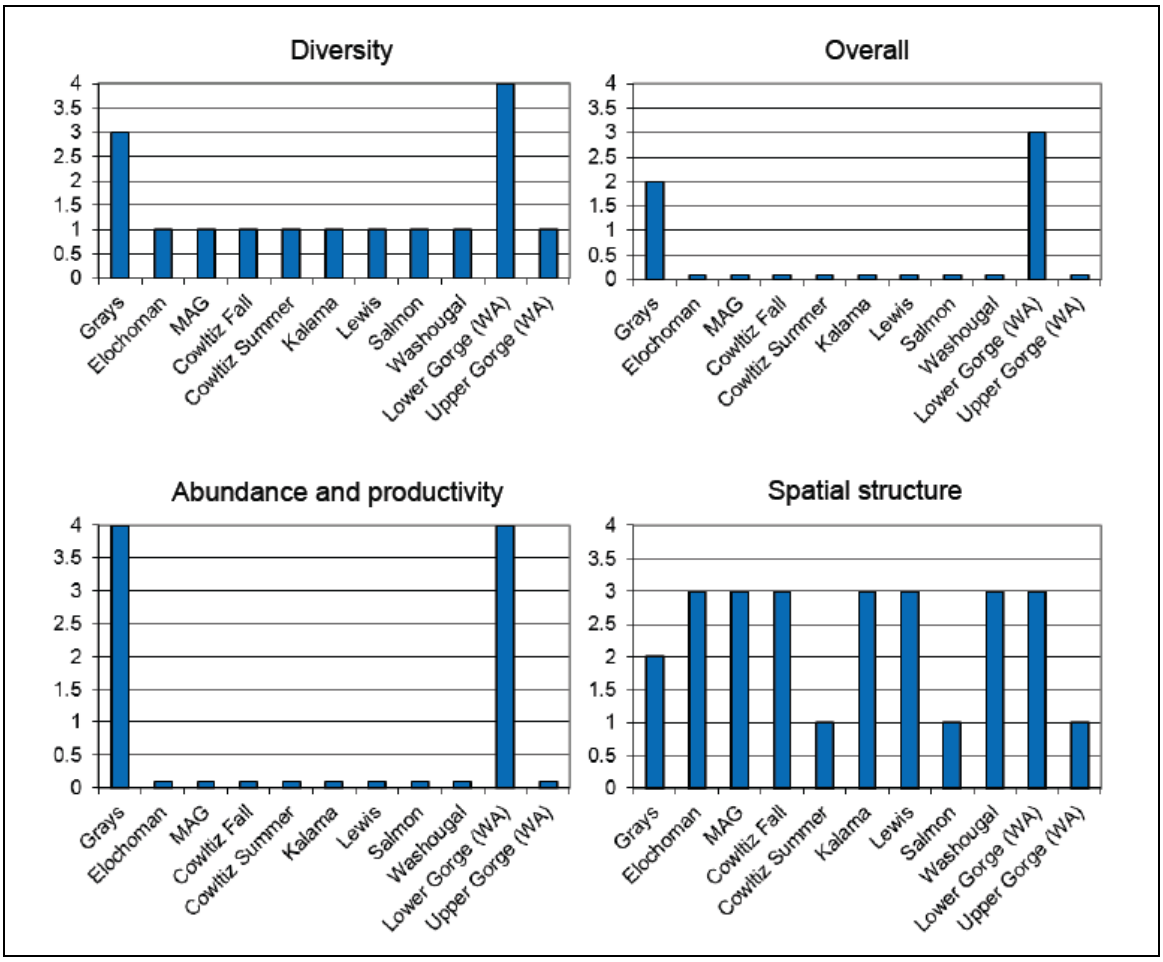

Figure 2.2.2.4: Current status of Washington CR chum populations for the VSP parameters and overall population risk. (LCFRB 2010 Recovery Plan, Chapter 6). A population score of zero indicates a population extirpated or nearly so, a score of 1 is high risk, 2 is moderate risk, 3 is low risk ("viable") and 4 is very low risk (Ford 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.

Juvenile coho production estimates is the one measure of production in the Lower Columbia system. See HGMP section 11.1 for planned M&E.

Table 2.2.2.5: Lower Columbia River Washington tributary coho smolt production estimates, 1997-2009 (WDFW, Region 5).

Year	Cedar Creek	Mill Creek	Abernathy Creek	Germany Creek	Cowlitz Falls 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	90,97	5,077	3,976	-----	38,917
2009	61,140	62,83	3,761	2,576	-----	29,718
2010	-----	-----	-----	-----	-----	49,171
2011	-----	-----	-----	-----	-----	43,831

Source: LCR FMEP Annual Report 2010 and WDFW Data 2012.

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

Table 2.2.2.6: Spring Chinook salmon total spawner abundance estimates in LCR tributaries, 2000-2012.

Year	Cowlitz	Kalama	Lewis
2000	266	34	523
2001	347	578	754
2002	419	898	498
2003	1,953	790	745
2004	1,877	358	529
2005	405	380	122
2006	783	292	857
2007	74	2,150	264
2008	425	364	40
2009	763	34	80
2010	711	0	160
2011	1,359	26	120
2012	1,359	28	200

Source: Joe Hymer, WDFW Annual Database 2012.

Table 2.2.2.7: Fall Chinook salmon total spawner abundance estimates in LCR tributaries, 2000-2011[a].

Year	Elochoman River	Coweeman River[a]	Grays River	Skamokawa Creek	Cowlitz River	Green River (Toutle)	SF Toutle River	Kalama River	EF Lewis River	NF Lewis River	Washougal River
2000	884	424	80	482	2,100	1,580	204	3,877	391	6,504	2,757
2001	230	251	104	3	1,979	1,081	102	3,451	245	4,281	1,704
2002	332	566	390	7	3,038	5,654	216	10,560	441	5,518	2,728
2003	2,204	753	149	529	2,968	2,985	327	9,272	607	11,519	2,678
2004	4,796	1,590	745	2,109	4,621	4,188	618	6,680	918	13,987	10,597
2005	6,820	1,090	387	588	10,329	13,846	140	24,782	727	18,913	3,444
2006	7,581	900	82	372	14,427	7,477	450	18,952	1,375	17,106	6,050
2007	194	140	99	36	2,724	961	30	1,521	308	10,934	2,143
2008	782	95	311	253	1,334	824	45	2,617	236	4,268	3,182
2009	231	147	93	139	2,156	1,302	66	4,356	110	6,112	2,995
2010	1,883	1,330	12	268	2,762	605	NE	3,576	314	8,908	4,529
2011	508	2,148	353	41	1,616	668	NE	10,639	334	14,033	2,961

Source: Ron Roler, WDFW Natural Spawn Progress Reports 2012.

* Estimates of total adult and jack fall Chinook. May include fish put upstream of hatchery weirs.

Table 2.2.2.8: Wild winter steelhead estimates for select SW Washington DPS populations, current WDFW escapement goals and LCSRP abundance targets.

Location	Grays River	Elochoman/ Skamokawa	Mill/Abernathy/ Germany
WDFW Escapement Goal	**1,486**	**853**	**508**
LCSRP Abundance Target	**800**	**600**	**500**
2000	1,064	650	380
2001	1,130	656	458
2002	724	370	354
2003	1,200	668	342
2004	1,132	768	446
2005	396	376	274
2006	718	632	398
2007	724	490	376
2008	764	666	528
2009	568	222	396
2010	422	534	398
2011	318	442	270
3-year average	**436**	**399**	**355**
5-year average	**559**	**471**	**394**
10-year average	**697**	**517**	**378**

Source: WDFW Data 2012.

Table 2.2.2.9: Wild winter steelhead estimates for select SW Washington DPS populations, current WDFW escapement goals and LCSRP abundance targets.

Location	Coweeman	SF Toutle	NF Toutle/ Green	Kalama	EF Lewis	Washougal
WDFW Escapement Goal	**1,064**	**1,058**	**NA**	**1,000**	**1,243**	**520**
LCSRP Abundance Target	**500**	**600**	**600**	**600**	**500**	**350**
2000	530	490	----	921	NA	NA
2001	384	348	----	1,042	377	216
2002	298	640	----	1,495	292	286
2003	460	1,510	----	1,815	532	764
2004	722	1,212	----	2,400	1,298	1,114
2005	370	520	388	1,856	246	320
2006	372	656	892	1,724	458	524
2007	384	548	565	1,050	448	632
2008	722	412	650	776	548	732
2009	602	498	699	1,044	688	418
2010	528	274	508	961	336	232
2011	408	210	416	622	308	204
3-year average	**513**	**327**	**541**	**876**	**444**	**285**
5-year average	**529**	**388**	**568**	**891**	**466**	**444**
10-year average	**487**	**648**	***588**	**1,374**	**515**	**523**

Source: WDFW Data 2012.
* 7-year average for NF Toutle/Green.

Table 2.2.2.10: Wild summer steelhead population estimates for LCR populations from 2001 to 2011, current WDFW escapement goals, and LCSRP abundance targets.

Location	Kalama	EF Lewis	Washougal	Wind
WDFW Escapement Goal	**1,000**	**NA**	**NA**	**1,557**
LCSRP Abundance Target	**500**	**500**	**500**	**1,000**
2001	286	271	184	457
2002	454	440	404	680
2003	817	910	607	1,096
2004	632	425	NA	861
2005	400	673	608	587
2006	387	560	636	632
2007	361	412	681	737
2008	237	365	755	614
2009	308	800	433	580
2010	370	602	787	788
2011	534	1,084*	956*	1468
3-year average	**404**	**829**	**725**	**945**
5-year average	**362**	**653**	**722**	**837**
10-year average	**450**	**627**	**652**	**804**

Source: WDFW Data 2012.
* Preliminary estimates.

Table 2.2.2.11: Population estimates of chum salmon in the Columbia River.

Location	2002	2003	2004	2005	2006	2007	2008	2009	2010[a]	2011[a]
Crazy Johnson Creek	---	---	966	1,471	3,639	759	1,034	981	677	2,374
WF Grays River	---	---	9,015	1,324	1,232	1,909	800	994	1,967	7,002
Mainstem Grays River	---	---	4,872	1,400	1,244	1,164	886	750	3,467	1,848
I-205 area	3,468	2,844	2,102	1,009	862	544	626	1,132	2,105	4,947
Multnomah area	1,267	1,130	665	211	313	115	28	102	427	641
St Cloud area	---	137	104	92	173	9	1	14	99	509
Horsetail area	---	---	106	40	63	17	33	6	45	183
Ives area[b]	4,466	1,942	363	263	387	145	168	141	214	162
Duncan Creek[c]	13	16	2	7	42	9	2	26	48	85
Hardy Creek	343	392	49	73	104	14	3	39	137	173
Hamilton Creek	1,000	500	222	174	246	79	114	115	247	517
Hamilton Spring Channel	794	363	346	84	236	44	109	91	187	324
Grays return[d]	12,041	16,974	15,157	4,327	6,232	3,966	2,807	2,833	6,399	11,518
I-205 to Bonneville return	11,351	7,324	3,959	1,953	2,426	976	1,084	1,666	3,509	7,541
Lower Columbia River Total	23,392	24,298	19,116	6,280	8,658	4,942	3,891	4,499	9,908	19,059

Source: Todd Hillson - WDFW Chum Program 2012.
[a] Data for 2010 and 2011 is preliminary.
[b] Ives area counts are the carcass tagging estimate plus fish removed for broodstock, except for 2007 and 2008, which is area under the curve.
[c] Totals for Duncan Creek do not include broodstock brought in from mainstem spawning areas, adult trap catch or surveys below monitoring weirs only..
[d] Grays return totals include natural spawners and removed for broodstock.

- 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.

The proportion of hatchery-origin spawners (pHOS) should be less than 30% of the naturally spawning population for this integrated program per HSRG guidelines (2009), as it is associated with a Primary natural population. The estimated average pHOS based on CWT expansion data from 2010-2013 is 76%. See **Table 6.2.3.1** for the annually reported values. Hatchery fish have been used in the recent past for seeding of the habitat. Starting in 2014, no hatchery fish will be put above the weir to reduce pHOS levels in the Green River.

See HGMP section 11.1 for planned M&E.

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

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

Broodstock Program:

Broodstock Collection: Hatchery Chinook were not mass-marked prior to brood year 2006 (2011 return year for all age classes), and the level of listed Chinook encountered was unknown. Listed fish identified by the presence of the adipose fin are released and passed upstream although trapping operations cease by mid to late fall, prior to the wild winter steelhead run. See "take" tables at the end of this document.

Genetic introgression: Broodstock for this program was initiated in 1951 from local Toutle River Chinook, although there have been significant transfers made from other Lower Columbia ESU stocks (Spring Creek OR, and Kalama Falls Hatchery). Large numbers of hatchery spawners are released upstream. The 1980 eruption of Mt St Helens devastated much of the historic spawning area in the mainstem and NF Toutle; in the Green River, spawning currently occurs primarily the lower, below the North Toutle Hatchery (~0.6 mi). In principle, the North Toutle Hatchery program is operated to mimic the Green/Toutle River natural fall chinook population. Broodstock is collected with no selection for size, run timing, and spawning time; out-of-basin transfers into the hatchery are under exceptional circumstances, and occur only after consultation with the Regional Fish Program Manager. Indirect take from genetic introgression is unknown.

Rearing Program:

Operation of Hatchery Facilities: Facility operation impacts include water withdrawal, effluent, and intake compliance. Effluent at outfall areas is rapidly diluted with mainstem flows and operation is within permitted NPDES 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 the hatchery programs. *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries*-Chapter 5 (IHOT 1995) have been instrumental in reducing disease outbreaks. Although pathogens occur in the wild and fish might be affected, they are believed to go undetected with predation quickly removing those fish.

In addition, although pathogens may cause post release mortality in fish from hatcheries, there is little evidence that hatchery origin fish routinely infect natural populations of salmon and steelhead in the Pacific Northwest (Enhancement Planning Team 1986 and Steward and Bjornn 1990). Prior to release, the hatchery population health and condition is established by the Area Fish Health Specialist. This is commonly done one to three weeks pre-release, and up to six

weeks on systems with pathogen-free water and little or no history of disease. Indirect take from disease is unknown.

Release:

Hatchery Production/Density-Dependent Effects: Hatcheries can release numbers of fish that can exceed the density of the natural productivity in a limited area for a short period of time and can compete with listed fish. Fish are released as active smolts that will emigrate in order to minimize the effect of the release. Indirect take from density dependent effects is unknown.

Potential North Toutle fall Chinook predation and competition effects on listed salmonids and eulachon: The proposed annual production goal for this program is 1,400,000 sub-yearlings. Hatchery Chinook are released at 80 fpp (88 mm fl). Due to size differences between Chinook smolts and fingerling listed stocks, competition is unlikely with different prey items and habitat preferences. Indirect take from predation is unknown.

Table 2.2.3.1: Peak migration timing and average fork length (mm) of out-migrant juvenile Chinook, coho and steelhead captured in rotary screw traps on Mill, Germany and Abernathy creek, Lower Columbia River, 2008.

Stream	Chinook		Coho		Steelhead	
	Avg Size (mm)	Peak Migration	Avg Size (mm)	Peak Migration	Avg Size (mm)	Peak Migration
Mill Cr	37.0	Mar 10-Apr 13	104.2	Mar 17-23	154.5	Apr 28-May 4
Germany Cr	39.8	Mar 17-23	115.3	May 19-25	177.8	May 12-18
Abernathy Cr	37.9	Mar 31 – Apr 6	112.1	May 19-25	163.8	May 12-18

Source: Kinsel et al 2009.

Both juvenile and adult salmonids have been documented to feed on eulachon (Gustafson et al. 2010). Predation of eulachon by fall Chinook reared in this program may occur, however it is unknown to what degree such predation may occur.

Residualism: To maximize smolting characteristics and minimize residualism, WDFW adheres to a combination of acclimation, volitional release strategies, size, and time guidelines.

- Condition factors, standard deviation and co-efficient of variation (CV) are measured throughout the rearing cycle and at release.
- Feeding rates and regimes throughout the rearing cycle are programmed to satiation feeding to minimize out-of-size fish and programmed to produce smolt size fish at date of release.
- Based on past history, fish have reached a size and condition that indicates a smolted condition at release.
- Releases occur within known time periods of species emigration from acclimated ponds.
- Releases from these ponds are volitional with large proportions of the populations moving out initially with the remainder of the population vacating within days or a few weeks.
- Minimal residualism from WDFW Chinook programs following these guidelines has been indicated from snorkeling studies on the Elochoman River (Fuss et al. 2000) and on Nemah and Forks Creek (Riley et al. 2004). In extensive surveys conducted on the Lewis River, Hawkins and Tipping (1999) found no residualized hatchery Chinook. Indirect take from residualism is unknown.

Monitoring:

Associated monitoring Activities: WDFW has implemented an expanded monitoring program for Chinook, coho, chum and steelhead populations in the Lower Columbia River (LCR) region of Southwest Washington (WDFW's Region 5) and fishery monitoring in the lower mainstem of the Columbia River. The focus of this expanded monitoring is to 1) gather data on Viable Salmonid Population (VSP) parameters – spawner abundance, including proportion of hatchery-origin spawners (pHOS), spatial distribution, diversity, and productivity, 2) to increase the coded wire

tag (CWT) recovery rate from spawning grounds to meet regional standards, and 3) to evaluate the use of PIT tags to develop harvest rates for salmon and steelhead populations. Additionally, key watersheds are monitored for juvenile salmonid out-migrant abundance. Coupled with adult abundance information, these data sets allow for evaluation of freshwater productivity and development of biological reference points, such as seeding capacity. Monitoring protocols and analysis methods utilized are intended to produce unbiased estimates with measurements of precision in an effort to meet NOAA monitoring guidelines (Crawford and Rumsey 2009).

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

Table 2.2.3.2: Disposition of unmarked (no adipose fin-clip) fall Chinook returning to North Toutle Hatchery.

Brood Year	Mortality	Spawned
2011	65	146
2012	18	160
2013	33	237
Average	**39**	**181**

Source: WDFW Hatcheries Headquarters Database 2014.

Note: Fall Chinook production from this facility has been 100% mass-marked (adipose fin-clip) since brood year 2006 (2011 return for all age classes).

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

See "take" tables at the end of this HGMP.

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

No situations are expected to occur where take would exceed ESA limits. 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.

Handling and release of wild coho in broodstock trapping operations is monitored and take observations have been rare. Any additionally mortality from this operation on a yearly basis would be communicated to Fish program staff for additional guidance.

3 SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

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

WDFW has several policies/plans that help inform management decisions regarding the HGMPs currently under review. These policies include:

1. Hatchery and Fishery Reform Policy (Commission Policy C3619)
2. The Conservation and Sustainable Fisheries Plan (draft)
3. The Hatchery Action Implementation Plans (HAIP)
4. Lower Columbia Salmon Recovery Plan (LCSRP)

Descriptions of these policies and excerpts are shown below:

Policies/Plans – Key Excerpts

Hatchery and Fishery Reform Policy: Washington Department of Fish and Wildlife Commission Policy C-3619. WDFW adopted the Hatchery and Fishery Reform Policy C-3619 in 2009. Its purpose is to advance the conservation and recovery of wild salmon and steelhead by promoting and guiding the implementation of hatchery reform. The intent of hatchery reform is to improve hatchery effectiveness, ensure compatibility between hatchery production and salmon recovery plans and rebuilding programs, and support sustainable fisheries. WDFW Policy C-3619 works to promote the conservation and recovery of wild salmon and steelhead and provide fishery-related benefits by establishing clear goals for each state hatchery, conducting scientifically defensible-operations, and using informed decision making to improve management. It is recognized that many state operated hatcheries are subject to provisions under *U.S. v Washington* (1974) and *U.S. v Oregon* and that hatchery reform actions must be done in close coordination with tribal co-managers. Washington Fish and Wildlife Commission Policy: POL-C3619.

Guidelines from the policy include:

1. Use the principles, standards, and recommendations of the Hatchery Scientific Review Group (HSRG) to guide the management of hatcheries operated by the Department.
2. Develop watershed-specific action plans that systematically implement hatchery reform as part of a comprehensive, integrated (All-H) strategy for meeting conservation and harvest goals at the watershed and Evolutionarily Significant Unit (ESU)/Distinct Population Segment (DPS) levels. Action Plans will include development of stock (watershed) specific population designations and application of HSRG broodstock management standards.

Conservation and Sustainable Fisheries Plan (*CSFP*)*:* The CSFP is a draft plan that has been developed to meet WDFW's responsibilities outlined in the Lower Columbia Salmon Recovery Plan (LCSRP) and address the HSRG suggested solutions and achieve HRSG standards for primary, contributing and stabilizing populations. The plan describes the implementation of changes to hatchery and harvest programs and how they assist in recovery and achieve HSRG guidelines. The draft plan also identifies Viable Salmonid Population (VSP) parameters that will be addressed.

Hatchery Action Implementation Plans (*HAIP*)*:* The HAIPs illustrate how WDFW is implementing hatchery programs to incorporate the HSRG guidelines. The plans provide the current programs and explain the future goals.

Lower Columbia Salmon Recovery Plan (*LCSRP*)*:* Some sub-basins will be free of hatchery influence and hatchery programs. In other sub-basins, hatchery programs will serve specific conservation and harvest purposes consistent with goals for naturally-spawning populations. The mosaic of programs is designed to ensure that overall each DPS will be naturally self-sustaining.

Strategies

1. Reconfigure production-based hatchery programs to minimize impacts on natural populations and complement recovery objectives.
2. Adaptively manage hatcheries to respond to future knowledge, enhance natural production, and improve operational efficiencies.

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.

The Mitchell Act programs are intended to support Northwest fishing economies – particularly coastal and Native American -- that have relied on Columbia River production both before and after dam construction. Catches of hatchery fish sustain the economies of local communities while keeping incidental mortalities of ESA-Listed fish at approved levels. Value of hatchery production and benefit to local economies will be further increased by implementing fisheries that increase harvest of hatchery produced fish, as expected through implementation of the LCSRP.

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

Future Brood Document. Hatchery salmon and steelhead production levels are detailed in the annual Future Brood Document, 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 HGMP section 3.1.

3.3 Relationship to harvest objectives.

Total annual harvest is dependent on management response to annual abundance in Pacific Salmon Commission (PSC - U.S./Canada), Pacific Fishery Management Council (PFMC - U.S. ocean), and Columbia River Compact forums. WDFW also has received authorization for tributary, Columbia River mainstem, and ocean fisheries; the combined harvest rates in the *Fisheries Management and Evaluation Plan* (FMEP), *Columbia River Fish Management Plan* (CRFMP), and ocean fisheries are reviewed annually in the North of Falcon process.

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.

The North Toutle Hatchery fall Chinook contribute to coastal ocean fisheries in Alaska, British Columbia and Washington, as well as Toutle tributary sport fisheries. An extremely popular fishery for Tule Chinook exists immediately downstream of the confluence of the Green River with the North Fork (NF) Toutle River.

Table 3.3.1.1: North Toutle River Hatchery Sub-yearling Fall Chinook Fishery Contributions.

Brood Years: 2000-2009[b] Fishery Years:2004-2013		
	Average SAR%[a]	**0.17**
Agency	**Non-WA Fishery**	*% of total Survival*
ADFG	All	*8.61*
CDFO	All	*16.66*
Agency	**OR Fishery**	*% of total Survival*
ODFW	10- Ocean Troll	*1.19*

ODFW	21- Columbia R. Gillnet	*2.03*
ODFW	40- Ocean Sport	*0.80*
ODFW	44- Columbia R. Sport	*1.77*
ODFW	45- Estuarine Sport	*0.56*
Agency	**WA Fishery**	*% of total Survival*
WDFW	10- Ocean Troll	*2.32*
MAKA	15- Treaty Troll	*0.76*
WDFW	15- Treaty Troll	*1.90*
WDFW	41- Ocean Sport- Charter	*0.78*
WDFW	42- Ocean Sport- Private	*1.42*
WDFW	45- Estuarine Sport	*0.21*
WDFW	46- Freshwater Sport[c]	*8.03*
WDFW	50- Hatchery Escapement	*29.97*
WDFW	50- Hatchery Escapement (Strays)[d]	*0.40*
WDFW	54- Spawning Grounds[e]	*22.60*
	Total	*100.0*

[a] Average SAR% = (tags recovered/tags released).

[b] 2009 data preliminary and represents a minimum estimate.

[c] Freshwater Sport based on WDFW Catch Record Card (CRC) data

[d] Includes recoveries at Cowlitz, Kalama Falls and Washougal Hatcheries.

[e] Includes recoveries in WRIA 11, 26 and 27.

Source: RMIS 2014.

3.4 Relationship to habitat protection and recovery strategies.

The following processes have included habitat identification problems, priority fixes and evolved as key components to *The Lower Columbia Salmon Recovery and Fish and Wildlife Sub-basin Plans* (Volume 1; Clark, Cowlitz, Lewis, Skamania and Wahkiakum Counties, December 15, 2004).

Sub-Basin Planning - Regional sub-basin planning processes include the *Cowlitz River Sub-basin Salmon and Steelhead Production Plan*, September 1, 1990 with a more recent Draft Cowlitz River Sub-basin Summary (May 17, 2002) was prepared for the Northwest Power Planning Council. The Sub-basin efforts provided initial building blocks for the LCFRB regional recovery plan. The Lower Columbia fish Recovery Board (LCFRB) has adopted the *Lower Columbia Salmon Recovery and Fish and Wildlife Sub-basin Plans* (Volume 1; Clark, Cowlitz, Lewis, Skamania and Wahkiakum Counties, December 15, 2004) with the understanding that Implementation of the schedule and actions for local jurisdictions depends upon funding and other resources.

Habitat Treatment and Protection - Ecosystem Diagnosis and Treatment (EDT) compares habitat today to that of the basin in a historically unmodified state. EDT has been modeled for productivity in the Cowlitz basin in The Lower Columbia Salmon Recovery and Fish and Wildlife Sub-basin Plans and has been used by Tacoma Power for the FERC re-licensing agreements for the upper basin productivity goals. WDFW is also conducting a Salmon Steelhead Habitat Inventory Assessment Program (SSHIAP), which documents barriers to fish passage. WDFW's habitat program issues hydraulic permits for construction or modifications to streams and wetlands. This provides habitat protection to riparian areas and actual watercourses within the watershed.

Limiting Factors Analysis (LFA) - A WRIA 26 LFA was conducted by the Washington State Conservation Commission (May 2002). WRIA 26 was separated into seven sub-basins; Coweeman, Lower Cowlitz, Toutle, Mayfield/Tilton, Riffe Lake, Cispus, and Upper Cowlitz.

3.5 Ecological interactions.

(1) *Salmonid and non-salmonid fishes or species that could negatively impact the program:* Out-migrant 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); Middle Columbia River steelhead ESU (threatened); and the Columbia River distinct population segment of bull trout (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. In addition the program may have unknown impacts on eulachon populations in the basin.

(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 the North Toutle Hatchery and limited natural production of 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.* Chinook smolts can be preyed upon release thru the entire migration corridor from the river sub-basin to the mainstem Columbia River and estuary. Northern pikeminnows and introduced spiny rays in the Columbia mainstem sloughs can prey on steelhead smolts as well as avian predators, including gulls, mergansers, cormorants, belted kingfishers, great blue herons and night herons. Mammals that benefit from migrating smolts and returning adults include: harbor seals, sea lions, river otters and orcas. Except for yearling coho and steelhead, these species may serve as prey items during the emigration through the basin. Hatchery fish provide an additional food source to natural predators that might otherwise consume listed fish and may overwhelm established predators providing a beneficial, protective effect to co-occurring wild fish. Hatchery releases can also behaviorally encourage mass emigration of multiple species through the watershed, reducing residency. Many watersheds in the Pacific Northwest appear to be nutrient-limited (Gregory et al. 1987; Kline et al. 1997) and salmonid carcasses can be an important source of marine derived nutrients (Levy 1997). Carcasses from returning adult salmonids have been found to elevate stream productivity through several pathways, including:

   a) the releases of nutrients from decaying carcasses has been observed to stimulate primary productivity (Wipfli et al. 1998);
   b) the decaying carcasses have been found to enrich the food base of aquatic invertebrates (Mathisen et al. 1988); and

c) Juvenile salmonids have been observed to feed directly on carcasses (Bilby et al. 1996).

4 SECTION 4. WATER SOURCE

4.1 Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile, and natural limitations to production attributable to the water source.

Table 4.1.1: Water sources for the North Toutle Hatchery.

Water Source	Water Right		Available Water Flow	Avg Water Temp. (F°)[a]	Usage	Limitations[b]
	Record/Cert No.	Permit No.				
Green River (surface)	S2-*08904CWRIS /05609	08245	15 cfs	46 (32-70)	Incubation, rearing, acclimation, adult holding	Temps in lower river can reach in the 70s°F in the summer
Green River (surface) gravity intake	S2-24831 CWRIS	----	20 cfs		Rearing, acclimation	
Green River (surface) pump	S2-23796 CWRIS	----	4 cfs		Adult trapping pond	
Green River (surface)	S2-23797 CWRIS		9 cfs		Fishway	

Source: Phinney 2006, WDOE Water Resources Explorer 2014, WDFW Hatchery Data.

North Toutle Hatchery. A gravity intake on the Green River, located two miles from the confluence with the Toutle River, draws a maximum of 35 cfs while a river pump adjacent to the adult trapping pond entrance supplies another 4 cfs. Water rights were obtained in 1949, 1975, 1976 and 1978.

The adult pond is 100% re-use water, and staff use aerators to boost oxygen levels in the adult pond and create some cover during August to October, if needed.

The raceway rearing ponds attain a maximum of 3,500 gpm total of gravity-fed water. On occasion, water temperatures in excess of 80°F have been observed during the summer months; temperatures in the 70s°F are routinely observed in the lower reaches of the Green River and hatchery rearing ponds (personal comm. Mark Johnson WDFW). The dissolved oxygen level of the incoming water decreases substantially during warm water periods and aerators are employed on the rearing ponds to maintain sufficient levels. Conversely, winter water temperatures may drop to freezing creating anchor and frazzle ice complicating water delivery.

NPDES Permits:
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).

Discharges from the cleaning treatment system are monitored as follows:

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

Table 4.1.2: Record of NPDES permit compliance.

Facility/ Permit #	Reports Submitted Y/N			Last Inspection Date	Violations Last 5 yrs	Corrective Actions Y/N	Meets Compliance Y/N
	Monthly	Qtrly	Annual				
N Toutle WAG13-1010	Y	Y	Y	5/2/2006	0	N	Y

Source: Ann West, WDFW Hatcheries Headquarters Database 2013.

4.2 Indicate risk aversion measures that will be applied to minimize the likelihood for the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge.

The North Toutle Hatchery intake structures were designed and constructed to specifications at the time the facility was built. The intake screens are in compliance with state and federal guidelines (NMFS 1995, 1996), but do not meet the current *Anadromous Salmonid Passage Facility Design* criteria (NMFS 2011). The pump intake sweep velocity, lack of fish bypass feature and 1/8 inch slotted screens are not in compliance (*Mitchell Act Intake and Fish Passage Study Report* 2003). The gravity intake screen slot width, approach and sweep velocities and an open top design into the intake (which allows high water to crest over this structure yearly), are not in compliance. WDFW has requested funding for scoping, design, and construction work of a new intake system. WDFW has completed a feasibility design report (2012) to address the intake compliance issues. These include:

- Upgrading the trash rack and intake screens to meet NMFS criteria, and to make them easier to clean and maintain;
- Raising or designing the walls to prevent overtopping during flood events; and
- Providing a fish bypass and outfall back to the Green River that is minimally attractive to upstream migrants;

5 SECTION 5. FACILITIES

5.1 Broodstock collection facilities (or methods).

Broodstock trapping begins in mid- to late-August. A temporary barrier "rack" is constructed across the Green River, approximately ¼-mile upstream of the confluence with the North Fork Toutle, to direct the fish to a trap located on the east side of the river. This rack is installed by August 20, and operates through late-November/early-December. Located on the right bank, the rack is flanked by the ladder section, which accesses the adult holding ponds. Picket sections (1.5 inch width) within the "rack" successfully blocks adults and all but the smallest jacks. The return is diverted into the holding ponds until the temporary weir is removed.

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

Adults are not transported for this program.

5.3 Broodstock holding and spawning facilities.

Table 5.3.1: Adult holding/spawning facilities available.

Ponds (No.)	Pond Type	Volume (cu.ft)	Length (ft.)	Width (ft.)	Depth (ft.)	Available Flow (gpm)
2	Concrete holding ponds	10,800	60	40	4.5	2,000-3,000

The two concrete holding ponds 60 x 40 x 4.5 (ft.) are supplied with re-use water at 2,000-3,000 gpm. Aerators are used to increase oxygen levels and provide some cover to the adults. Spawning areas are located at the head end of the ponds with kill bins covered.

5.4 Incubation facilities.

Table 5.4.1: Incubation vessels available.

Type	Units (number)	Size	Flow (gpm)	Volume (cu.ft.)	Loading (eggs/unit)
Vertical Stack Tray Units	192 (8 tray stacks)	25" x 20 ¾" x 3.5"	3.5	0.22	7,000
Deep Troughs w/ incubation cells (8 cell/trough)	20	14.9' x 19" x 15"	5-12	29.5	225,000
Shallow Troughs	2	14.9' x 1' x 6.5"	5-9	8.0	20,000

5.5 Rearing facilities.

Table 5.5.1: Rearing facilities available.

Ponds (No.)	Pond Type	Volume (cu.ft)	Length (ft.)	Width (ft.)	Depth (ft.)	Flow (gpm)	Max. Flow Index	Max. Density Index
24	Concrete Raceways	3,628	80	20	2.3	150	1.61	0.20
1	Earthen Pond P-25	18,360	150	36	3.4	*	2.42	0.05
1	Earthen Pond P-26	98,832	426	58	4.0	*	2.42	0.05
1	Earthen Pond P-27	106,929	436	51	4.5	4000	2.42	0.05
1	Earthen Pond P-28	36,693	151	54	4.5	1500	2.42	0.05

* Supplied from P-27.

5.6 Acclimation/release facilities.

See HGMP section 5.5.

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

- The eruption of Mount St. Helens in 1980 completely inundated the facility. Most of the hatchery infra-structure was renovated.
- A flood in February 1996 caused an unscheduled release of 110,000 coho fry.
- An epizootic of columnaris in 1996 resulted in a 60% mortality of the juvenile fingerling coho production.
- Low dissolved oxygen in the adult holding ponds in 2000, resulted in the loss of approximately 700 adult fall Chinook.

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.

A prolonged loss of hatchery water supply would result in catastrophic loss of all rearing units, with incubation and the raceways being most vulnerable. Under a temporary cessation of the surface water supply, water can be re-directed from other supply sources as first pass or re-use to the units. Hatchery is staffed 24/7 and ready to react to system failure and WDFW has emergency procedures and plans in place. All systems are alarmed to alert us of failure.

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. In the event of possible virus outbreak, WDFW facilities follow very strict disinfection procedures and comprehensive lab analysis of all egg-takes for culling, if needed.

6 SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

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

6.1 Source.

Adults returning to North Toutle Hatchery. Natural-origin fish (adipose intact) incorporation into the broodstock will be maximized to allow for integration of this program to meet HSRG standards.

6.2 Supporting information.

6.2.1 History.

Table 6.2.1.1: Broodstock sources for Toutle River fall Chinook program.

Stock (Facility)	Brood Years	
	Pre-Eruption	Post-Eruption
Wind River	1951	----
Spring Creek (WA)	1952-1959	1991
Toutle River	1952-1978	1990-Present
Kalama Falls	1952	1986, 1990, 1992, 1996
Lewis River	1956	----
Willard NFH (Wind)	1959	----
Big Creek (OR)	1966	----
Grays River	----	1987-1988
Elochoman	----	1988, 2000
Washougal	----	1986, 1992, 1995-1996
Cowlitz	----	1990

Source: WDFW Hatchery Headquarters Database 2014.

Fall Chinook were native to the Toutle River. The program was initiated with eggs received from the Wind River during the first year of production in 1951. Toutle stock was used beginning in 1952, and was the primary source after 1967. Stock from Spring Creek (WA) and Big Creek (OR), and other lower Columbia facilities were also used.

A major portion of the spawning area was destroyed by the eruption of Mt. St. Helens in 1980 (WDF et. al. 1993). Before the Mt. Saint Helens eruption, the spawning distribution (1964 through 1979) was 4.8% mainstem, 3.8% South Fork (SF) Toutle River, 49.4 % NF Toutle River, and 42% Green River. Other than the SF Toutle, most of the spawning habitat was destroyed. With the stabilization of the watershed, Chinook are re-establishing themselves in the watershed. Limited spawning ground surveys since 1980 have found that most spawning occurs in areas near the hatchery. It is likely that the majority of natural-spawning fish are of hatchery origin.

Releases of juvenile fall-run Chinook resumed in 1985 from rearing ponds developed at the site of the original hatchery. The current hatchery stock likely consists of fish transferred into the North Fork Toutle Basin following resumption of hatchery activities in 1985. The stock was rebuilt from fish from Cowlitz, Grays River, Big Creek, Kalama, and Washougal hatcheries (**Table 1.8.1**). The North Toutle Hatchery was renovated and began collecting broodstock again in 1990 (LCFRB Plan 2010).

6.2.2 Annual size.

Around 380 adult pairs, not including jacks, are needed to achieve the established egg-take goal of 1,625,000 (FBD 2014), based on an average fecundity of around 4,900 eggs/female, and a pre-spawning mortality of 14.5%.

6.2.3 Past and proposed level of natural fish in broodstock.

Fall Chinook at North Toutle Hatchery have been mass-marked since brood year 2006 (2011 return for all age classes). The production has operated as an integrated program since 2007. Integration levels follow recommended by HSRG. The North Fork Toutle natural fall Chinook population was designated as a Primary population by the LCRFB (2010). HSRG goals for an integrated hatchery program associated with a Primary population are to achieve a PNI > 0.67 and a pHOS < 0.30.

Table 6.2.3.1: Integration rates for North Toutle Hatchery fall Chinook, 2011-2013.

Year	pNOB	pHOS	PNI
2011	0.21	0.79	0.21
2012	0.23	0.76	0.24
2013	0.34	0.58	0.37
Avg	**0.25**	**0.75**	**0.25**

Source: Hatchery Evaluation and Assessment Team Broodstock Tracking tables 2014.
Note: First year of all age classes returning mass marked was 2011.

6.2.4 Genetic or ecological differences.

Straying of Lower River hatchery (LRH) fall Chinook from a number of Oregon and Washington facilities is not unusual, and contributes to natural production. Strays and transfers from lower Columbia River hatcheries has resulted in a widely-distributed, blended hatchery fall Chinook stock. There are no known genotypic, phenotypic, or behavioral differences between either the hatchery stock or natural stock in the sub-basin (Marshall et al, 1995). Fall Chinook propagated through this program represents the indigenous lower Columbia stock.

6.2.5 Reasons for choosing.

Locally-available fall Chinook representing the indigenous lower Columbia stock.

The broodstock chosen has the desired life history traits to meet these harvest goals that provides significant harvest to Washington/Oregon ocean and estuary (e.g., Buoy 10) fisheries, the lower Columbia mainstem/tributaries, and the sub-basin.

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.

- WDFW has established minimum escapement objectives.
- WDFW will promote local adaptation of this fall Chinook population; out-of-basin hatchery transfers of eggs or fish for use as broodstock will only be considered in extreme cases.
- Hatchery program fish have been mass-marked since brood year 2006.
- Natural-origin spawners will be integrated into the broodstock to represent the natural fall Chinook run throughout the season.
- There are no known genotypic, phenotypic, or behavioral differences between either the hatchery stock or natural stock in the sub-basin.
- Holding pond procedures follow IHOT guidelines.

- Other listed fish encountered during the broodstock collection process will be returned directly to the river or passed into the upper watershed, with minimal handling and holding time.
- Any observed mortalities will be reported in the WDFW Hatcheries Headquarters Database.

7 SECTION 7. BROODSTOCK COLLECTION

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

Adults returning to the North Toutle Hatchery.

7.2 Collection or sampling design.

Broodstock are collected throughout the entire run to maintain run timing and other desired life history traits for the population. The Green River is blocked with a temporary picket barrier (installed by August 20) upstream and adjacent to the ladder exiting the trap. Returning Chinook are directed into the fishway/collection pond from August through October; this period is after most of the summer steelhead have moved upstream into the Green River. Capture efficiency is near 100% for fish volunteering to the trap; picket gaps are 1.5-inches wide, which prevent jack Chinook and coho salmon upstream of the weir. Removal of the weir will be determined by management needs.

Fish in the trap are sorted from one holding pond to the other to ensure the female collection goal is met, with a minimum sex ratio of 1 male: 1 female. The Fish Collection Facility (FCF) on the NF Toutle River, directly upstream of the Green River confluence, intercepts fish passing upstream past this point; all Chinook are transported downstream, just below the trap, and returned to the river.

7.3 Identity.

All fall Chinook releases have been 100% mass-marked with an adipose fin-clip (AD) since the 2006 brood (2011 return for all age classes). A portion (~7%) are also released AD+coded-wire tagged (CWT).

7.4 Proposed number to be collected:

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

Around 380 adult pairs, not including jacks, are needed to achieve the established egg-take goal of 1,625,000 (FBD 2014), based on an average fecundity of around 4,900eggs/female, and a pre-spawning mortality of 14.5%.

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

Table 7.4.2.1: Broodstock collection levels.

Brood Year	Hatchery-Origin			Natural-Origin		
	Females	Males	Jacks	Females	Males	Jacks
2002	595	600	7			
2003	475	474	11			
2004	501	517	5			
2005	513	498	1			
2006	607	564	13			
2007	538	522	9			
2008	321	327	4			
2009	341	332	4			

2010	348	337	11			
2011*	276	266	3	69	72	5
2012	219	284	3	48	105	7
2013	250	203	2	95	137	5

Source: WDFW Hatcheries Headquarters Database 2014.

Note*: Hatchery releases have been mass-marked (adipose fin-clip) since the 2006 brood (return year 2011 for all age classes).

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

Prior to 2014 hatchery fish above broodstock needs may have been passed upstream, above the hatchery, at a ratio designed to meet Primary population guidelines, as determined by Fish Management. All fish released above the hatchery were marked with tags and/or opercle punched. This mark allowed staff to determine if these fish fall back into the area between the weir and hatchery, to prevent double counting these fish. This will be discontinued in 2014.

7.6 Fish transportation and holding methods.

Adults are not transported for this program.

7.7 Describe fish health maintenance and sanitation procedures applied.

The adult holding area is separated from all other hatchery operations. 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 end the spawning day.

Elevated water temperatures combined with low water flow stress can lead to mortalities from furunculosis in both the holding ponds and in the river adjacent to the hatchery site. Early-returning adults in the holding ponds are inoculated with Liquamycin, and all adults are treated with Parasite-S every other day at 1 to 6,000 to control fungus.

7.8 Disposition of carcasses.

Spawned carcasses and surplus fish have been returned to the Toutle drainages for system nutrient enhancement.

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.

- Proper trap operation and fish handling techniques are followed.
- Out-of-basin transfers are limited.
- Broodstock are collected throughout the return period.
- Hatchery program fish have been mass-marked since brood year 2006.
- Holding pond procedures follow IHOT guidelines.
- Broodstock collection procedures identify non-target fish encountered; fish not used in the program will be passed into the upper watershed, with minimal handling and holding time.

8 SECTION 8. MATING

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

8.1 Selection method.

Cohorts are utilized from the entire run cycle, with available males and females mated randomly. Spawning is conducted weekly, and occurs over a period of up to six weeks, with the peak in

mid-October. Fish are spawned throughout the entire run to ensure that the run timing for the stock is maintained.

8.2 Males.

A ratio of 1:1 males to females is used. Jack Chinook salmon (2-year old) are incorporated into the broodstock as males at a minimum of 2% of the total spawning population.

8.3 Fertilization.

Agency spawning guidelines are closely followed (Seidel 1983, HSRG 2009). Fertilization occurs at a 1:1 ratio (females/males). Milt is mixed with green eggs with the ovarian fluid. Water hardening procedures with iodophor are followed. Iodophor solution is used as rinse that is applied to hands and spawning implements per spawning. Iodophor foot baths are located at entrance to incubation room. Generally, sixty ovarian fluid and kidney/spleen samples are collected from female spawners to test for the presence of viral pathogens.

8.4 Cryopreserved gametes.

Cryopreserved gametes are not used.

8.5 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.

- 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.

9 SECTION 9. INCUBATION AND REARING -Specify any management *goals* (e.g. "egg to smolt survival") that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.

9.1 Incubation:

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

Table 9.1.1.1: Survival rates (%) from egg-take to ponding.

Brood Year	Egg Take	% Egg Survival	
		Green-to-Eyed	Eyed Egg-to-Ponding
2002	2,944,609	92.5	100.0
2003	2,464,727	86.7	99.3
2004	2,390,000	92.6	99.0
2005	2,261,792	86.6	97.0

2006	2,939,800	94.7	98.8
2007	2,576,399	90.2	98.0
2008	1,692,200	90.6	99.0
2009	1,730,415	93.7	99.0
2010	1,749,406	93.7	99.0
2011	1,734,372	95.7	98.0
2012	1,685,907	95.2	99.0

Source: WDFW hatchery records 2014.

9.1.2 Cause for, and disposition of surplus egg takes.

A WFDW Fish Health Specialist conducts viral sampling on 60-fish lots over the course of the season.

The program broodstock collection goal set forth in the annual brood document usually prevents surpluses. In the event that egg survival is higher than expected, WDFW Regional Managers will be contacted for instructions for disposition of the surplus in accordance with Regional policy and guidelines set forth in management plans/agreements and ESA permits.

9.1.3 Loading densities applied during incubation.

Eggs are placed in deep troughs to the eyed stage, then placed in trays back in the deep troughs for hatching. Removal of dead eggs, accurate enumeration and loadings are adjusted during this time (see HGMP section 5.4 for load criteria). WDFW follows *Integrated Hatchery Operations Team* (IHOT) species-specific incubation recommendations for water quality, flows, temperature, substrate, and incubator capacities.

9.1.4 Incubation conditions.

IHOT species-specific incubation recommendations are followed for water quality, flows, temperature, substrate and incubator capacities. Harmful silt and sediment is cleaned from incubation systems regularly while eggs are monitored to determine fertilization and mortality. Incubation water temperature is monitored by thermograph and recorded and temperature units (TU) are tracked for embryonic development. Dissolved oxygen content is monitored and ranged from 8-12 parts per million (ppm). When using artificial substrate, Vexar® or bio-rings, egg densities within incubation units are reduced by 10%.

9.1.5 Ponding.

Fry are typically ponded from late-January through February, when the yolk slit is closed to approximately 1-mm wide (approximately 1,600 TUs) or KD factor (95% yolk absorption). Fry are transferred by irrigation piping from the incubation room to the appropriate raceway.

9.1.6 Fish health maintenance and monitoring.

Staff conducts daily inspection, visual monitoring and sampling from eye, 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. Disease treatment varies with the pathogen encountered, but is generally antibiotic in nature for bacterial infections and bath or drip treatments with chemotheraputants for external infections

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.

- IHOT and WDFW fish health guidelines followed.
- Multiple units are used in incubators.
- Splash curtains are not used at this facility, but can be installed to 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 (1988-99), or for years dependable data are available.

Table 9.2.1.1: Survival rates (%) from ponding to release.

Brood Year	Fry-to-Sub-yearling
2002	95.2
2003	98.5
2004	93.8
2005	87.7
2006	94.0
2007	100.0
2008	96.7
2009	99.3
2010	97.8
2011	96.8
2012	95.4
2013	NA

Source: WDFW hatchery records 2014.

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

Loading and density levels at WDFW hatcheries conform to standards and guidelines set forth in *Fish Hatchery Management* (Piper et. al. 1982), the *Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State* (WDFW and WWTIT 1998, updated 2006). IHOT standards are followed for water quality, alarm systems, predator control measures to provide the necessary security for the cultured stock, loading and density.

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 40 lbs at 12 gpm (3.33 lbs/gpm). Tank and raceway maximum loading for early rearing is 132 lbs for the tanks at 40 gpm (3.3 lbs/gpm) and 800 lbs per raceway at 300 gpm.(2.66 lbs/gpm). The final loading per raceway is approximately 3,200 lbs. at 300 gpm (10.6 lbs/gpm).

9.2.3 Fish rearing conditions

Table 9.2.3.1: Monthly average surface water temperature (°F) at North Toutle Hatchery.

Month	Average Water Temperature (ºF)
January	39

February	40
March	41
April	44
May	47
June	52
July	62
August	62
September	57
October	48
November	43
December	40

Source: WDFW Hatchery Records 2014.

IHOT standards are followed for water quality, alarm systems, predator control measures (netting), loading and density.

Fish are reared on river water. Temperature, dissolved oxygen (DO) and pond turn-over rate are monitored and recorded daily during fish rearing; water temperatures during the rearing cycle range from 32°F to 80°F. Ponds are vacuum-cleaned regularly, generally weekly, to remove settleable solids, unused feed and feces, to ensure proper cleanliness. Predator netting over the rearing ponds minimize predation. All raceways are pressure-washed between broods; earthen ponds are left to dry.

Fish are mass-marked in June when they are about 120 fpp.

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

Table 9.2.4.1: Monthly fish growth information by length (mm), weight (fpp), condition factor and growth rate, collected during rearing.

Rearing Period	Length (mm)	Weight (fpp)	Growth Rate
March	36.7	1,101	Na
April	52.4	378	0.657
May	70.4	156	0.587
June	87.8	80	0.487
July	87.8	80	Na

Source: WDFW Hatchery Records 2014.

Note: Fish are released in June and July when the average size of fish in a given rearing container reaches 80fpp. Later egg-takes may be released as late as mid-July.

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 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*).

Fish are given variety of diet formulations including starter, crumbles and pellets; the food brand used may vary, depending on cost and vendor contacts. Feeding frequencies varies depending on

the fish size and water temperature, and usually begin at 7-8 feedings/7 days a week, and end at 1-4 feedings/7 days a week. Fall Chinook are typically fed around 2.5% B.W./day, depending upon water temperature and weather conditions. Feed rate is applied in accordance with program goals not to exceed 0.1-0.15 pounds feed per gallon in-flow, depending on fish size. Average season conversion rates generally are no greater than 1.3:1.0.

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

Monitoring. Policy guidance includes: *Fish Health Policy in the Columbia Basin*. Details hatchery practices and operations designed to stop the introduction and/or spread of any diseases within the Columbia Basin. Also, *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (Fish Health Policy, Chapter 5, IHOT 1995). A fish health specialist inspects fish monthly and checks both healthy and presence of 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. Blood is checked for signs of anemia or other pathogens. Additional tests for virus or parasites are done if warranted.

Disease Treatment. As needed, appropriate therapeutic treatment will be prescribed to control and prevent further outbreaks. Outbreaks of gut fungus (*Saprolegnia*), gill amoeba (*Neoparamoeba*), *Columnaris*, *Costia* can occur and are treated with 3% Epson salt, formalin, and Terramycin®. 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 by splashing water. Tank trucks are disinfected between the hauling of adult and juvenile fish. Foot baths containing disinfectant are strategically located on the hatchery grounds to prevent spread of pathogens.

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

ATPase gill activity is not measured. Fish size at release time is critical to the readiness for migration. The migratory state of the release population is determined by fish behavior. Aggressive screen and intake crowding, swarming against sloped pond sides, a leaner (0.80 – 0.90) condition factor (K), a silvery physical appearance and loose scales during feeding events are signs of smolt development. Surface water from the Green River is used for fish rearing, and provides a natural water temperature profile.

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

Not applicable.

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.

See HGMP sections 5.8, 6.3, 7.9 and 9.1.7.

10 SECTION 10. RELEASE

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

10.1 Proposed fish release levels.

Table 10.1.1: Proposed release levels (maximum number).

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Sub-yearlings	1,400,000	80.0	June/July	NF Toutle River (WRIA 26.0314)

Source: WDFW Future Brood Document 2014.
Note: 80 fpp = 88 mm fork length (fl).

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

Stream, river, or watercourse: Green River (WRIA 26.0323)

Release point: RM 0.81
Tributary to NF Toutle River (WRIA 26.0314) at R.M. 11.5

Major watershed: Cowlitz

Basin or Region: Lower Columbia

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

Table 10.3.1: Number of fish released, size, CVs and release date, by age and year.

Release Year	Sub-yearlings			
	Number	Avg Size (fpp)	CV	Date
2002	1,361,143	71.0	11.70	June 25-30
2003	2,593,342	68.0	9.25	June 6-24
2004	2,083,000	60.3	9.69	June 8-July 30
2005	2,086,306	72.2	7.97	July 1-18
2006	1,667,700	73.0	7.10	July 1-12
2007	2,584,941	65.0	8.17	June 21-July 21
2008	2,282,929	72.0	7.79	July 9-31
2009	1,468,609	77.7	8.86	June 17-31, July 1-8
2010	1,594,584	71.3	6.71	June 22-28, July 2-11
2011	1,573,797	70.1	6.91	June 28-July 6, July 11-15
2012	1,575,534	73.8	6.18	June 25-July 1, July 12-15
2013	1,514,769	72.0	8.49	June 17-July 4

Source: WDFW Hatcheries Headquarters Database 2014.
Note: 60 fpp = 97 mm fork length (fl); 72 fpp = 92 mm fl; 80 fpp = 88 mm fl.

10.4 Actual dates of release and description of release protocols.

Volitional releases generally start in mid-June and continue through July 15. Ponds screens are removed first, and then stop-logs are removed over the next few days to slowly lower the pond. Most of the fish vacate the pond after the first week. Most of the stop-logs are removed by the second week. See **Table 10.3.1** for actual release dates.

10.5 Fish transportation procedures, if applicable.

Juvenile fish are not transported; fish are released on-station.

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

Fish are reared and acclimated on river water from during their entire time at North Toutle Hatchery. Sub-yearlings are released directly from the ponds directly into the Green River.

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

Table 10.7.1: Marks applied, by mark-type.

Brood Year	Yearlings	Mark Type
2014	100,000	AD+CWT
	1,300,000	AD-only

Source: FBD 2014.

Fish are 100% mass-marked with either adipose fin-clips + coded-wire tag (AD+CWT) or AD-only, to differentiate them from the natural population.

Snouts collected from the adipose fin-clipped adults are dissected, recovered and read at the WDFW CWT Lab in Olympia. Scale samples are read at WDFW Headquarters Olympia to verify age for run reconstruction.

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

The program guidelines for annual broodstock/egg-take collection are managed to prevent any surpluses, and maintained within the ±5% guideline. In the event of surplus >10%, WDFW Regional Managers will in accordance with regional policy and guidelines set forth in management plans/agreements and ESA permits, and after consultation with NMFS, instruct hatchery staff for disposition of the surplus.

10.9 Fish health certification procedures applied pre-release.

All fish are examined for the presence of "reportable pathogens" as defined in the P*acific Northwest Fish Health Protection Committee* (PNFHPC) disease control guidelines, within three weeks prior to release.

Fish transfers into the sub-basin are inspected and accompanied by notifications as described in IHOT and PNFHPC guidelines.

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. Prior to this examination, whenever abnormal behavior or mortality is observed, staff also contacts the Area Fish Health Specialist. The fish specialist examines affected fish, and recommends the appropriate treatment. Reporting and control of selected fish pathogens are done in accordance with the *Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State* (WDFW and WWTIT 1998, updated 2006) and IHOT guidelines.

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

Hatchery staff will make every attempt to keep the fish alive and healthy throughout the entire rearing-release cycle; all appropriate resource managers from the Complex level to the Federal level will be informed of the actions taken. Based in authorized instructions, screens and stop-logs could be pulled for direct/forced fish release into the Green River.

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.

- The production and release of only smolts through fish culture and volitional release practices fosters rapid seaward migration with minimal delay in the rivers, limiting interactions with naturally produced juveniles.
- Returning hatchery fish are under heavy selective harvest, and may be differentiated from natural-origin fish by the adipose fin-clip or CWT.
- WDFW proposes to continue monitoring, research and reporting of hatchery smolt migration performance behavior, and intra and interspecific interactions with wild fish to access, and adjust if necessary, hatchery production and release strategies to minimize effects on wild fish.
- WDFW fish health and operational concerns for North Toutle Hatchery programs are communicated to WDFW Region 5 staff for any risk management or needed treatment. See also HGMP section 9.7.

11 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). CWT recoveries will help determine stray rate contributions on spawning grounds by watersheds close in proximity to this program's release vicinity. See HGMP section 1.10 Monitoring and Evaluation for additional plans and methods to collect data necessary.

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

Table 11.1.1: Current WDFW Mitchell Act-funded research, monitoring and evaluation projects.

Project	Description
LCR Monitoring	WDFW has implemented an expanded monitoring program for Chinook, coho, chum and steelhead populations in the Lower Columbia River (LCR) region of Southwest Washington (WDFW's Region 5) and fishery monitoring in the lower mainstem of the Columbia River. The focus of this expanded monitoring is to 1) gather data on Viable Salmonid Population (VSP) parameters – spawner abundance, including proportion of hatchery-origin spawners (pHOS), spatial distribution, diversity, and productivity, 2) to increase the coded wire tag (CWT) recovery rate from spawning grounds to meet regional standards, and 3) to evaluate the use of PIT tags to develop harvest rates for salmon and steelhead populations. Additionally, key watersheds are monitored for juvenile salmonid out-migrant abundance. Coupled with adult abundance information, these data sets allow for evaluation of freshwater productivity and development of biological reference points, such as seeding capacity. Monitoring protocols and analysis methods utilized are intended to produce

	unbiased estimates with measurements of precision in an effort to meet NOAA monitoring guidelines (Crawford and Rumsey 2011).

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 HGMP section 1.10 are currently funded (see also HGMP 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.

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 HGMP 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.

12 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.

13 SECTION 13. ATTACHMENTS AND CITATIONS

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Attachment 1: WDFW Virology Sampling 2006-2007 through 2012-2013: North Toutle Hatchery.

Hatchery/ Collection Site	Stock	Species	Date Sampled	Results	Comments	Life Stage	Sample number	Number of fish sampled						ID	Cell Line	Inoc Date
								OF	pools	K/S	pools	fry/visc	pools			
NO TOUTLE	TOUTLE R	FCHIN	10/10/06	**PARAMYXOVIRUS**	2+/12p K/S	AD	1011-1/2	60	12	60	12			F&P	C	
NO TOUTLE	TOUTLE R	SCOHO	11/14/06	NEV		AD	1115-31/32	60	12	60	12					
NO TOUTLE	TOUTLE R	FCHIN	10/15/07	**PARAMYXOVIRUS**	1+/12p K/S	AD	1016-8/9	60	12	60	12			F&P	C	
NO TOUTLE	TOUTLE R	SCOHO	11/06/07	NEV		AD	1107-11/12	60	12	60	12					
NO TOUTLE	TOUTLE R	FCHIN	05/12/08	NEV	RW2, RW3;diag; 10^{0}-10^{-3}	FRY/07	0513-3					10	2			
NO TOUTLE	TOUTLE R	FCHIN	10/20/08	NEV		AD	1021-13/14	60	12	60	12					
NO TOUTLE	TOUTLE R	SMCOHO	10/20/08	NEV		AD	1021-15/16	10	2	20	4					
NO TOUTLE	TOUTLE R	SCOHO	10/23/08	NEV		AD	1024-3/4	30	6	20	4					
NO TOUTLE	TOUTLE R	COHO	10/29/08	NEV		AD	1029-12/13	10	2	20	4					
NO TOUTLE	TOUTLE R	COHO	11/05/08	NEV		AD	1106-1	10	2							
NO TOUTLE	TOUTLE R	FCHIN	10/07/09	NEV		AD	1007-5/6	60	12	60	12					
NO TOUTLE	TOUTLE R	FCHIN	10/07/09	NEV		AD	1007-5/6	60	12	60	12					
NO TOUTLE	TOUTLE R	SCOHO	10/26/09	NEV		AD	1027-3/4	60	12	60	12					
NO TOUTLE	TOUTLE R	SCOHO	10/26/09	NEV		AD	1027-3/4	60	12	60	12					
NO TOUTLE	TOUTLE R	FCHIN	10/13/10	NEV		AD	1014-7/8	60	12	60	12					
NO TOUTLE	TOUTLE R	SCOHO	10/28/10	NEV		AD	1028-3/4	60	12	60	12					
NO TOUTLE	TOUTLE R	FCHIN	10/04/11	NEV		AD	1004-4/5	60	12	60	12					
NO TOUTLE	TOUTLE R	SCOHO	10/25/11	NEV		AD	1026-3/4	60	12	60	12					
NO TOUTLE	TOUTLE R	FCHIN	10/09/12	NEV		AD	1011-6/7	60	12	60	12					12/6/12
NO TOUTLE	TOUTLE R	NCOHO	10/24/12	NEV		AD	1024-6/7	60	12	60	12					4/24/13
NO TOUTLE	TOUTLE R	FCHIN	10/08/13	NEV		AD	1009-12/13	60	12	60	12					10/10/13
NO TOUTLE	TOUTLE R	SCOHO	10/23/13	NEV		AD	1024-1/2	60	12	60	12					10/24/13

Source: WDFW Fish Health Lab data (John Kerwin 2014)

Attachment 2: Fish Health Summaries: North Toutle Hatchery, July 1, 2008 through September 30, 2008 to October 1, 2001 through March 31, 2012..

North Toutle Hatchery Chinook

Juveniles:

2007 brood year fall Chinook

Fish were ponded in mid-March 2008; ponding was delayed due to cold temperatures. Snow melt in the upper basin kept temperatures down and sediment levels up. In June 2008, there was some BGD which were treated successfully with potassium permanganate. Fish remained healthy until release in July 2008.

2008 brood year fall Chinook

Fish were ponded in mid-March; ponding was delayed due to cold temperatures. A small outbreak of *Furunculosis* was noted and treated. In April 2009, fall Chinook fry had some anomalies in development due to winter temperature variation. There was some gut fungus associated with the mortality but not at a level to warrant treatment. Normal drop-out mortality occurred and no further problems were seen. Fish were released healthy in July 2009.

2009 brood year fall Chinook

There was no abnormal loss in egg incubation. Cold temperatures during incubation contributed to a late ponding for these fish. Fish were ponded in early-March. Cool spring weather created optimal conditions for the mass-marking and hauling of these fish, minimized disease outbreaks, and promoted excellent growth.

Fry were infected with *Aeromonas salmonicid*a and were treated successfully with tetracycline medicated feed in March. Fish were released healthy in July 2010.

2010 brood year fall Chinook

Fish were ponded in early-March. Fish were healthy, with a normal amount of loss due to drop-out and 0.5% to otter predation. They were healthy at release the end of May/early-July

2011 brood year fall Chinook

Fish ponded in mid-March with no health issues.

Adults:

2009 fall Chinook

Pre-spawning mortality was low in this stock. No viruses were detected in a sample of 60 fish submitted in five fish pools.

2010 fall Chinook

Sixty spawning adults were tested and no virus was detected.

2011 fall Chinook

Pre-spawning mortality was normal in this stock but higher in males than females. Sixty spawning adults were tested for regulated viral pathogens and no virus was detected.

14 SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

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

Name, Title, and Signature of Applicant:

Certified by_____ Date:_____

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

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

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

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

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

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

"No effect" for the following listed species:

Bull trout (Salvelinus confluentus) – Threatened (Critical Habitat Designated)
Northern Spotted owl (*Strix occidentalis caurina*) –Threatened (Critical Habitat Designated)
Marbled murrelet (*Brachyramphus marmoratus*) –Threatened (Critical Habitat Designated)
Columbian White-Tailed deer (*Odocoileus virginianus leucurus*) – Endangered
Canada Lynx (*Lynx canadensis*) –Threatened
Grizzly bear (*Ursus arctos horribilis*) –Threatened
Gray Wolf (*Canis lupus*) –Threatened
Nelson's checker-mallow (*Sidalcea nelsoniana*) –Threatened
Bradshaw's desert-parsley (*Lomatium bradshawii*) –Endangered
Water howellia (*Howellia aquatilis*) –Threatened
Golden Paintbrush (*Castilleja levisecta*) [historic]

Candidate Species:
Fisher *(Martes pennanti)* – West Coast DPS
Mardon skipper (*Polites mardon*)
Oregon spotted frog (*Rana pretiosa*)
Whitebark pine *(Pinus albicaulis*)
North American wolverine *(Gulo gulo luteus)* – contiguous U.S. DPS
(Brush Prairie) Mazama pocket gopher *(Thomomys mazama* ssp. *oregonus)*

15.3 Analyze effects.

Not applicable.

15.4 Actions taken to minimize potential effects.

Program coho are released fully smolted to foster rapid outmigration from the basin and to minimize predation and residualism risks.

15.5 References

Not applicable.

"Take" Tables

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

Listed species affected: Spring Chinook (*Oncorhynchus tshawytscha*)	**ESU/Population:** Lower Columbia River Spring Chinook	**Activity:** North Toutle Fall Chinook Program
Location of hatchery activity: North Hatchery, Green River (WRIA 26.0323) at RM 0.81 Tributary to the NF Toutle River (WRIA 26.0314) at R.M. 11.5	**Dates of activity:** August - October	**Hatchery program operator:** WDFW

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

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

Instructions:

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

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

Listed species affected: Fall Chinook (*Oncorhynchus tshawytscha*)	**ESU/Population:** Lower Columbia River Fall Chinook	**Activity:** North Toutle Hatchery Fall Chinook Program
Location of hatchery activity: North Hatchery, Green River (WRIA 26.0323) at RM 0.81 Tributary to the NF Toutle River (WRIA 26.0314) at R.M. 11.5	**Dates of activity:** August - October	**Hatchery program operator:** WDFW

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

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

Instructions:

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

Table 3. Estimated listed salmonid take levels of by hatchery activity.

Listed species affected: Steelhead *(Oncorhynchus mykiss)*	**ESU/Population:** Lower Columbia River Steelhead	**Activity:** North Toutle Hatchery Fall Chinook Program
Location of hatchery activity: North Hatchery, Green River (WRIA 26.0323) at RM 0.81 Tributary to the NF Toutle River (WRIA 26.0314) at R.M. 11.5	**Dates of activity:** August - October	**Hatchery program operator:** WDFW

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

* Highest number of unmarked winter-late steelhead trapped and released in the Lewis River.

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.

Table 4. Estimated listed salmonid take levels of by hatchery activity.

Listed species affected: Coho (*Oncorhynchus kisutch*)	**ESU/Population:** Lower Columbia River Coho	**Activity:** North Toutle Hatchery Fall Chinook Program
Location of hatchery activity: North Hatchery, Green River (WRIA 26.0323) at RM 0.81 Tributary to the NF Toutle River (WRIA 26.0314) at R.M. 11.5	**Dates of activity:** August - October	**Hatchery program operator:** WDFW

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

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

Table 5. Estimated listed salmonid take levels of by hatchery activity.

Listed species affected: Chum (*Oncorhynchus keta*)	**ESU/Population:** Columbia River Chum	**Activity:** North Toutle Hatchery Fall Chinook Program
Location of hatchery activity: North Hatchery, Green River (WRIA 26.0323) at RM 0.81 Tributary to the NF Toutle River (WRIA 26.0314) at R.M. 11.5	**Dates of activity:** August - October	**Hatchery program operator:** WDFW

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

*

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