HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

DRAFT

Hatchery Program	North Toutle Hatchery Fall Chinook
Species or Hatchery Stock	Chinook Salmon *(Oncorhynchus tshawytscha)*
Agency/Operator	Washington Department of Fish and Wildlife
Watershed and Region	Cowlitz/Lower Columbia Province
Date Submitted	nya
Date Last Updated	August 13, 2004

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 Salmon *(Oncorhynchus tshawytscha)*

ESA Status: Threatened

1.3 Responsible organization and individuals.

Name (and title):	Mark Johnson
	Cowlitz Complex Manager
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Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program.

Co-operators	Role
National Marine Fisheries Service	Manager of Mitchell Act Funds

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

Funding Sources
Mitchell Act

Operational Information	Number
Full time equivalent staff	4.3
Annual operating cost (dollars)	$354,190

The above information for full-time equivalent staff and annual operating cost applies cumulatively to N.F. Toutle River Anadromous Fish Programs and cannot be broken out specifically by program.

1.5 Location(s) of hatchery and associated facilities.

Broodstock source	North Toutle River Hatchery- Fall Chinook
Broodstock collection location (stream, RKm, subbasin)	North Toutle River Hatchery/Green River/RKm 0.8/Toutle-Cowlitz
Adult holding location (stream, RKm, subbasin)	North Toutle River Hatchery/Green River/RKm 0.8/Toutle-Cowlitz
Spawning location (stream, RKm, subbasin)	North Toutle River Hatchery/Green River/RKm 0.8/Toutle-Cowlitz
Incubation location (facility name, stream, RKm, subbasin)	North Toutle River Hatchery/Green River/RKm 0.8/Toutle-Cowlitz
Rearing location (facility name, stream, RKm, subbasin)	North Toutle River Hatchery/Green River/RKm 0.8/Toutle-Cowlitz

1.6 Type of program.

Integrated Harvest - The proposed integrated strategy for this program is based on WDFW's assessment of the genetic characteristics of the hatchery and local natural populations, the current and anticipated productivity of the habitat used by the populations, the potential for successfully implementing as isolated program, and NOAA's proposed listing determination (69 FR 33102; 6/14/2004). Modification of the proposed strategy may occur based upon NOAA's final listing determination and as additional information are collect and analyzed.

Integration will be possible with the onset of mass marking (adipose fin clip). WDFW has asked for federal funds to implement mass marking of federally funded Mitchell Act fall chinook. The FFY 05 request is for funds to purchase mass marking trailers. The FFY 06 request will be for operating funds. Upon successful receipt of this funding, marking of brood year 2005 fall chinook would begin in the spring of 2006.

1.7 Purpose (Goal) of program.

- Plant 2,500,000 smolts at 80.0 ffp into the N.F. Toutle River.
- Produce chinook salmon to mitigate for activities within the Columbia River Basin that have decreased salmonid populations and for the loss of chinook salmon that would have been produced naturally in the Toutle River system.
- With mass marking, incorporate a level of natural stock into the existing hatchery population to support overall ESU recovery goals.
- Operate hatcheries consistent with the recovery of fall chinook salmon in the N.F. Toutle River. The major hatchery issues are: 1) to maintain the genetic diversity of fall chinook in the N.F. Toutle River, and ensure the reproductive success of wild fall chinook meets or exceeds recovery goals, 2) minimize the ecological interactions of hatchery fall chinook on naturally produced salmon and steelhead, and minimize the mortality of naturally produced juvenile and adult salmon and steelhead due to facility operations.

1.8 Justification for the program.

- Legal justification includes: Columbia River Fisheries Development Program, Columbia River Fish Management Plan and *U.S.vs.Oregon* court agreements.
- WDFW protects listed fish and provides harvest opportunity on the N.F. Toutle River fall chinook programs through the Fish Management and Evaluation Plan (FMEP). The objectives of the WDFW's FMEP are based on the WDFW Wild Salmonid Policy. In that policy, it states that harvest rates will be managed so that 1) spawner abundance levels allow for abundant utilization of available habitat, 2) ensure the number and distribution of locally adapted spawning populations will not decrease, 3) genetic diversity within populations is maintained or increased, 4) natural ecosystem processes are maintained or restored, and 5) sustainable surplus production above levels needed for abundant utilization of habitat, local adaptation, genetic diversity, and ecosystem processes will be managed to support fishing opportunities (WDFW 1997).
- In addition, fisheries will be managed to insure adult size, timing, distribution of the migration and spawning populations, and age at maturity are the same between fished and unfished populations. By following this policy, fisheries' impacts to listed populations in the Lower Columbia River (LCR) Evolutionary Significant Unit (ESU) will be managed to promote the recovery of these species. The Congressional motivation for Mitchell Act passage was recognition that the salmon fishery of the Columbia River was in a serious and progressive decline due to habitat destruction and alteration from dam construction and operation, deforestation and other forest practices, pollution, water diversions, and over fishing. Legal justification includes: Mitchell Act, Pacific Northwest Electric Power Planning and Conservation Act, and *U.S. vs. Oregon* court agreements.

In order to minimize impact on listed fish by WDFW facilities operation and the N.F. Toutle fall Chinook program, the following Risk Aversions are included in this HGMP:

Table 1. Summary of risk aversion measures for the N.F.Toutle programs.

Potential Hazard	HGMP Reference	Risk Aversion Measures
Water Withdrawal	4.2	Water rights are formalized thru trust water right #S2-24832 from the Department of Ecology. Monitoring and measurement of water usage is reported in monthly NPDES reports. See also section 4.2.
Intake Screening	4.2	WDFW has requested funding for future scoping, design, and construction work of a new river intake system to meet NOAA compliance (Mitchell Act Intake and Screening Assessment 2002). See also section 4.2.
Effluent Discharge	4.2	This facility operates under the "Upland Fin-Fish Hatching and Rearing" National Pollution Discharge Elimination System (NPDES) administered by the Washington Department of Ecology (DOE) - WAG 13-1010. See also section 4.2.
Broodstock Collection & Adult Passage	7.9	The hatchery weir and associated intake facilities need repairs to provide compliant passage. See also section 4.2. Unlike hatchery steelhead, coho, and spring chinook, hatchery fall chinook from the Toutle Hatchery are not mass marked, and we cannot distinguish hatchery and wild chinook salmon in this basin. The weir is constructed and operated with a removable panel. The removable panel design can allow relief of listed fish "bottlenecks" below the weir in years of large returns. The frequency and duration of panel removal will be determined at the pre-season meeting and adjusted in-season based on broodstock collection needs, actual run timing, high water events, etc.
Disease Transmission	7.9, 10.11	*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* (Genetic Policy Chapter 5, IHOT 1995). See also section 9.7.
Competition & Predation	2.2.3, 10.11	Current risk aversions and future considerations are being reviewed and evaluated for further minimizing impacts to listed fish. See also those sections.

1.9 List of program "Performance Standards".

See HGMP Section 1.10.

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

1.10.1 Benefits:

Benefits		
Performance Standard	**Performance Indicator**	**Monitoring & Evaluation**
Assure that hatchery operations support Columbia River fish Mgt. Plan *(US v Oregon)*, production and harvest objectives.	Contribute to a meaningful harvest for sport, tribal and commercial fisheries. Achieve a 10-year average of 0.14 % smolt-to-adult survival (range 0.09-0.29%) that includes harvest plus escapement (3,500 fish at current production levels).	Survival and contribution to fisheries will be estimated for each brood year released. Work with co-managers to manage adult fish returning in excess of broodstock need.
Maintain outreach to enhance public understanding, participation and support of Washington Department of Fish & Wildlife (WDFW) hatchery programs.	Provide information about agency programs to internal and external audiences. For example, local schools and special interest groups tour the facility to better understand hatchery operations. Off station efforts may include festivals, classroom participation, stream adoptions and fairs.	Evaluate use and/or exposure of program materials and exhibits as they help support goals of the information and education program. Record on-station organized education and outreach events.
Program contributes to fulfilling tribal trust responsibility mandates and treaty rights.	Follow pertinent laws, agreements, policies and executive and judicial orders on consultation and coordination with Native American tribal governments.	Participate in annual coordination meetings between the co-managers to identify and report on issues of interest, coordinate management, and review programs (FBD process).
Implement measures for broodstock management to maintain integrity and genetic diversity: Maintain effective population size Limit out of basin transfers of fish or eggs for use as broodstock. Maximize available natural origin broodstock (NOB) with mass marking.	A minimum of 500 adults are collected throughout the spawning run in proportion to timing, age and sex composition of return	Annual run timing, age and sex composition and return timing data are collected. Adhere to WDFW spawning guidelines. (WDFW 1983). Adhere to WDFW Stock Transfer guidelines. (WDFW 1991).
Region-wide, groups are marked in a manner consistent with information needs and protocols to estimate impacts to natural and hatchery origin fish	Use Ad+CWT (90,000/4.5%) for evaluation purposes	Returning fish are sampled throughout their return for length, sex, and mark.
Maximize survival at all life stages using disease control and disease prevention techniques. Prevent introduction, spread or amplification of fish pathogens. Follow Co-managers Fish Health Disease Policy (1998).	Necropsies of fish to assess health, nutritional status, and culture conditions	WDFW Fish Health Section inspect adult broodstock yearly for pathogens and parasites and monitor juvenile fish on a monthly basis to assess health and detect potential disease problems. As necessary, WDFW's Fish Health Section recommends remedial or preventative measures to prevent or treat disease, with administration of therapeutic and prophylactic treatments as deemed necessary A fish health database will be maintained to identify trends in fish health and disease and implement fish health management plans based on findings.
	Release and/or transfer exams for pathogens and parasites.	1 to 6 weeks prior to transfer or release, fish are examined in accordance with the Co-managers Fish Health Policy
	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 Co-managers Fish Health Disease Policy.

1.10.1 Risks:

Risks		
Performance Standard	**Performance Indicator**	**Monitoring & Evaluation**
Minimize impacts and/or interactions to ESA listed fish	Hatchery operations comply with all state and federal regulations. Hatchery juveniles are raised to smolt-size (80-fish/lb) and released from the hatchery at a time that fosters rapid migration downstream. Index CWT for evaluation.	As identified in the HGMP: Monitor size, number, date of release and mass mark quality. Additional WDFW projects: straying, instream evaluations of juvenile and adult behaviors, NOR/HOR ratio on the spawning grounds, fish health documented.
Artificial production facilities are operated in compliance with all applicable fish health guidelines, facility operation standards and protocols including IHOT, Co-managers Fish Health Policy and drug usage mandates from the Federal Food and Drug Administration	Hatchery goal is to prevent the introduction, amplification or spread of fish pathogens that might negatively affect the health of both hatchery and naturally reproducing stocks and to produce healthy smolts that will contribute to the goals of this facility.	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.
Ensure hatchery operations comply with state and federal water quality and quantity standards through proper environmental monitoring	NPDES permit compliance WDFW water right permit compliance	Flow and discharge reported in monthly NPDES reports.
Water withdrawals and instream water diversion structures for hatchery facility will not affect spawning behavior of natural populations or impact juveniles.	Hatchery intake structures meet state and federal guidelines where located in fish bearing streams.	Barrier and intake structure compliance assessed and needed fixes are prioritized.
Hatchery operations comply with ESA responsibilities.	WDFW completes an HGMP and is issued a federal and state permit when applicable.	Identified in HGMP and Biological Opinion for hatchery operations.
Harvest of hatchery-produced fish minimizes impact to wild populations.	Harvest is regulated to meet appropriate biological assessment criteria. If possible, mass mark juvenile hatchery fish prior to release to enable state agencies to implement selective fisheries .	Harvests are monitored by agencies and tribes to provide up to date information..

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

WDFW has established an egg take goal of 2.75 million eggs in the Future Brood Document (FBD 2004). To meet this goal a total of 673 females and 673 males need to be collected annually, based on an average fecundity of 4,900 eggs/female and a pre-spawning mortality of 14.5%. These numbers may need to be adjusted based on the success of efforts to reduce pre-spawning mortality. A pre-season meeting between WDFW Fish Programs staff will occur in June/July to review past hatchery operations, natural escapement, and to develop a plan for weir and hatchery operations during each upcoming fall season. However, since run size predictions are not always accurate and run timing varies annually, programs must maintain flexibility to meet our goals of ensuring natural and hatchery numerical escapement objectives as well as selection for run timing, spawning time, and size.

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

Age Class	Max. No.	Size (ffp)	Release Date	Location			
				Stream	Release Point (RKm)	Major Water-shed	Eco-province
Fingerling	2,500,000 FBD	80.0	June	Green River	0.8 RKm	N. F. Toutle	Columbia Estuary

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

Brood Year	SAR (%)	Return Year	Hatchery Escapement	Total Catch
1995	0.1010%	1995	786	426
1996	0.0969%	1996	3,434	310
1997	0.2980%	1997	1,196	856
1998	0.0916%	1998	1,051	208
mean	0.1469%	mean	1,617	450

Data Sources - Regional Mark Information System (RMIS)/Pacific States Fishery Commission/WDFW.

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

The first year of operation for this hatchery was 1951. The Toutle River was planted with fall chinook until the 1980 eruption of Mt. Saint Helens. Post eruption plants started again in 1990.

1.14 Expected duration of program.

The program is on-going with no planned termination.

1.15 Watersheds targeted by program.

The watersheds targeted by the program are the Columbia River below the confluence with the Cowlitz River (WRIA 36.0001), the Cowlitz River (WRIA 26.0002), the Toutle River and it's north fork (WRIA 26.0227) and the Green River (WRIA 26.0323).

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 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. Hatchery fall chinook are not mass marked and the proportion of hatchery and wild fish in the broodstock is unknown. Recent estimates indicate 80% of the natural spawners are hatchery origin fall chinook.

1.16.2 Potential Alternatives to the Current Program:

Alternative 1: Use mass marking to separate and assess the wild component of the population.

Alternative 2: Modify release time or location, and/or reduce the size of the program. The primary ecological risks include competition, predation, and disease transfer between hatchery

fall chinook and juvenile steelhead, cutthroat, coho, chum, and fall chinook. We are most concerned with competition between wild and hatchery fall chinook salmon. 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 release in July is toward the tail end of the wild 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: An initial holding pond would collect and hold the fish until sorting is initiated by opening a gate, which allows adults to be attracted through a false weir and onto a fabricated, sloped, sorting chute. The chute contains paddles and side chutes. The side chutes lead to different adult ponds, and also provide returns to the river above and below the in stream barrier. An observer located in a control tower above the main chute identifies the fish as it enters the chute and then activities in of the paddles to direct the fish to the desired location. Staff does not physically handle the fish during this sorting process .

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: Fall chinook should be mass marked so that wild fish integration into the hatchery program and the proportion of hatchery spawners in the river can be accurately measured. Coded-wire-tagging and recovery programs must be sufficiently funded to meet the current management and science needs. Measures of spawning escapement including the proportion of hatchery and wild spawners must be accurate and precise and population estimates should include confidence intervals.

Limited information is available on the wild juvenile migration pattern of tule fall chinook salmon in the Lower Columbia ESU. Monitoring of hatchery and wild chinook migration should be considered in the Toutle and other basins in the Lower Columbia River ESU to address issue .

The hatchery program is a part of a strategy to meet conservation and/or harvest goals for the target stock. The tables below indicate what the short- and long-term goals are for the stock in terms of stock status (biological significance and viability), habitat and harvest. The letters in the table indicate High, Medium, or Low levels for the respective attributes. Changes in these levels from current status indicate expected outcomes for the hatchery program and other strategies (including habitat protection and restoration).

	Biological Significance	Viability	Habitat
Current Status	L	M	L
Short-term Goal	M	M	L
Long-term Goal	M	H	H

Section 2: Program Effects on ESA-Listed Salmonid Populations

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

This program is described in "Biological Assessment For The Operation Of Hatcheries Funded by The National Marine Fisheries Service (March 99)", Statewide Section 6 consultation with USFWS for interactions with Bull Trout, and concurrent with this HGMP to satisfy Section 7 consultations: WDFW is writing HGMP's to cover all stock/programs produced at Cowlitz Complex; N.F. Toutle fall chinook, N and S type coho, summer and winter run steelhead.

2.2.1 Descriptions, status and projected take actions and levels for ESA-listed natural populations in the target area.

The following ESA listed natural salmonid populations occur in the subbasin where the program fish are released:

ESA listed stock	Viability	Habitat
Spring Chinook	M	L
Cowlitz Fall Chinook	L	L
Coweeman Fall Chinook-Natural	H	M
Toutle Fall Chinook	M	L
Late Winter Steelhead	H	L
Coho- (Proposed)	Na	Na
H, M and L refer to high, medium and low ratings, low implying critical and high healthy.		

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

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

Lower Columbia River fall chinook salmon are listed as "threatened" under the ESA on May 24, 1999.

Identify the ESA-listed population(s) that may be incidentally affected by the program.
Lower Columbia River spring chinook salmon listed as "threatened" under the ESA on May 24, 1999.

Lower Columbia River Steelhead listed as threatened under the ESA on March 19, 1998.

Lower Columbia River Coho is currently a candidate for listing (proposed as threatened on June 14, 2004.)

2.2.2 Status of 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. Critical and Viable population thresholds have not been established by the Lower Columbia River/Willamette River Technical Review Team (TRT).

Lower Columbia River spring chinook salmon *(Oncorhynchus tshawytscha*) within the Evolutionary Significant Unit (ESU) are federally listed as "threatened" under the Endangered Species Act effective May 24, 1999.

Status: Toutle River spring chinook are not recognized by WDFW as a separate stock (WDF et. al. 1993). In the early 1950s, annual spawning escapement was estimated to be 400 fish in the upper Toutle River (WDF, 1951). The Toutle Hatchery produced spring chinook from 1967 until 1980, when it was destroyed by the Mt. St. Helens mudflows (WDW 1990). Most Toutle spring chinook were reared in Deer Springs Pond, which was destroyed in the winter of 1981-82 when a temporary flood-control dam was breached. Evaluation of the fish plants was not conducted, and returning adults were not captured at the hatchery.

**Lower Columbia River fall chinook salmon *(Oncorhynchus tshawytsch*a) within the Evolutionary Significant Unit (ESU) are federally listed as "threatened" under the Endangered Species Act effective May 24, 1999.

Status: Cowlitz Fall chinook are indigenous and historically were abundant in the Cowlitz Basin (WDW 1990). In 1951, the fall chinook escapement to the Cowlitz River and tributaries was estimated at 31,000, with the following distributions: 10,900 to the mainstem Cowlitz and its minor tributaries, 8,100 to the Cispus, 500 to the Tilton, 6,500 to the Toutle, and 5,000 to the Coweeman (WDF 1951). Historically, fall chinook spawning occurred throughout the area available to anadromous fishes, from the first favorable gravel riffle to the headwaters (WDF 1951). They migrated to and spawned within all the major tributaries to the Cowlitz, several of the smaller tributaries, as well as the main river. In 1948, the WDF and WDG estimated that the upper Cowlitz River produced 63,612 adult fall chinook annually. Escapement above the Mayfield Dam site was believed to be "no less than 14,000 fish". In 1951, WDF estimated that the annual escapement of fall chinook to the Cowlitz River totaled 31,000. The distribution was thought to be 10,900 to the mainstem Cowlitz and "minor tributaries," 500 in the Tilton River, and 8,100 to the Cispus (WDF 1951). Stock status is rated Depressed in 2002 because of chronically low escapements. Natural spawning abundance is more a reflection of the size of returns to the Cowlitz Salmon Hatchery and stray rates than of natural production. The natural spawning escapement goal is 3,000 adults. Prior to 2001 the goal had not been met since 1989 (SaSI 2002).

Status: Historically, Coweeman River fall chinook spawned from Mulholland Creek (RM 18.4) downstream approximately 6 miles to the Jeep Club Bridge (WDF et. al. 1993). The estimated annual escapement of fall chinook in 1951 was 5,000, although splash dams probably impacted production (WDW 1990). The Coweeman River has received fall chinook plants from at least 1951 until 1979 (WDW 1990). The Coweeman River fall chinook are a mixed stock of composite production. Fall chinook have been planted in the Coweeman River since 1951. SaSI (WDF et. al. 1993) listed fall chinook stocks as healthy in 1993; however, the status today is unknown. Natural spawning escapements from 1967-1991 averaged 182 with a low of 38 in 1981 and a high of 1,108 in 1988 (WDF et. al. 1993). Coweeman River fall chinook are presently managed as a lower Columbia River hatchery stock (WDW 1990). Although derived from a mixed stock composition this population appears to be representative of the indigenous fall chinook populations in the Cowlitz watershed as only one coded wire tagged hatchery stray has ever been recovered in spawning surveys (Hymer, personal comm., 2001).

Status: Toutle Fall Chinook About 20 miles of spawning and rearing area are available above the hatchery trap on the Green River (excluding tributaries). (WDF 1973). Natural spawners (hatchery and natural origin) from 1964 through 1979 averaged 42 percent (equal to 4,517 fish) of the Toutle subbasin spawners, which were estimated at 10,756 fish (Kreitman 1981 as cited in WDW 1990). The spawning grounds were destroyed by the 1980 eruption of Mt. St. Helens. The Toutle River Hatchery, located 0.5 miles up the Green River, began collecting brood stock again in 1990. Surplus hatchery fish were released upstream of the hatchery to spawn naturally. Brood

stock has been from a mixture of sources since the 1980 eruption (WDW 1990). The estimated annual escapement of fall chinook in the Toutle and its tributaries in the early 1950s was 6,500. An estimated 80 percent of the total Toutle fall chinook run spawned in the lower five miles of the mainstem Toutle (WDF 1951). Annual surveys show the greatest abundance of adult fall chinook on the North Fork Toutle River to be in a five-mile stretch from the Toutle River Hatchery (1/2 mile up the Green River) to Kid Valley Park on the North Fork Toutle. An average spawning escapement of 2,700 fall chinook was observed from 1968 to 1972, with a sharp increase beginning in 1971. Fall chinook were observed as far upstream as Spirit Lake (WDF 1973). An average of 10,756 adults returned each year to the Toutle River basin from 1964 through 1979 (pre-eruption). Of these, natural spawners of both hatchery and natural origin in the Toutle subbasin averaged 6,573 fish from 1964 through 1979 with the following distribution: 4.8 percent from the mainstem, 3.8 percent South Fork Toutle, 49.4 percent North Fork Toutle, and 42 percent Green River (Kreitman 1981 as cited in WDW 1990). Spawning areas in the mainstem Toutle, North Fork, and Green rivers were destroyed by the 1980 eruption of Mt. St. Helens (WDW 1990). DeVore (1987) assumed that 12.8 percent of the Toutle River fall chinook spawned naturally and estimated that an average of 1,528 naturally-spawning fall chinook entered the Toutle subbasin.

Table 2. Fall chinook salmon abundance estimates in the LCMA (2004 FMEP)

Year	Cowee-man River	Cowlitz River	Green River	Toutle River	Kalama River	EF Lewis River	NF Lewis River	Washougal River
1990	241	2,698	123		20,54	342	17,506	2,062
1991	174	2,567	123	33	5,085	230	9,066	3,494
1992	424	2,489	150		3,593	202	6,307	2,164
1993	327	2,218	281	3	1,941	156	7,025	3,836
1994	525	2,512	516	0	2,020	395	9,939	3,625
1995	774	2,231	375	30	3,044	200	9,718	2,969
1996	2,148	1,602	667	351	10,630	167	14,166	2,821
1997	1,328	2,710	560		3,539	307	8,670	4,529
1998	144	2,108	1,287	66	4,318	104	5,929	2,971
1999	93	997	678	42	2,617	217	3,184	3,105
2000	126	2,700	852	27	1,420	323	9,820	2,088
2001	646	5,013	4,951	132	3,714	530	15,000	3,901
2002	Na	Na	Na	Na	Na	Na	Na	Na
2003	Na	Na	Na	Na	Na	Na	Na	Na

Lower Columbia River Steelhead *(Oncorhynchus mykiss*), were listed as threatened under the ESA on March 19, 1998. In Washington, the LCR steelhead ESU includes winter and summer steelhead in tributaries to the Columbia River between the Cowlitz River and Wind River. The mainstem North Fork Toutle River has been planted with hatchery steelhead since 1953 (WDF et. al. 1993). No historical production estimates are given for this stock. Currently, winter steelhead spawning occurs in Hoffstadt, Outlet, Alder, and Deer creeks (WDF et. al. 1993). Current winter steelhead stocks are considered depressed based on chronically low returns. Spawning escapements were estimated from 1989 through 1992 with a low of 18 in 1989 and a high of 322 in 1992. The stock will likely remain depressed until spawning and rearing habitat in the mainstem improves from the 1980 eruption of Mt. St. Helens (WDF et. al. 1993). There has been no escapement goal set. The mean escapement from 1991 to 1996 for the mainstem North Fork winter steelhead was 185 fish. It is estimated that from 1991 to 1996, none of the run was from

hatchery fish (LCSCI 1998). The Toutle River is managed for natural winter steelhead production (WDW 1990).

Table 3. Wild winter steelhead abundance estimates in the LCMA (FMEP 2004).

Brood Year	Index Redd Surveys					Pop. Est. Trap Counts		Index Trap/redd
	Coweeman	SF Toutle	Green	EF Lewis	Washougal	NF Toutle	Kalama	Cedar Creek
1990	522	752	86	102		36	419	
1991		904	108	72	114	108	1,128	
1992		1,290	44	88	142	322	2,322	
1993	438	1,242	84	90	118	165	992	
1994	362	632	128	78	158	90	853	
1995	252	396	174	53	206	175	1,212	
1996	44	150				251	853	70
1997	108	388		192	92	183	537	78
1998	314	374	118	250	195	149	438	38
1999	126	562	72	276	294	129	562	52
2000	290	490	124	207	939	238	941	
2001	284	334	192	79	216	185	1085	
2002	Na	Na	Na	Na	Na	Na	Na	Na
2003	Na	Na	Na	Na	Na	Na	Na	Na

Lower Columbia River Coho (***Oncorhynchus*** *kisutch*), are currently a candidate for listing but has been proposed as threatened on June 14, 2004.

Status: NMFS concludes that the LCR coho ESU includes all naturally spawned populations of coho salmon in the Columbia River and its tributaries from the mouth of the Columbia up to and including the Big White Salmon and Hood Rivers. Twenty-one artificial propagation programs are considered to be part of the ESU as NMFS has determined that these artificially propagated stocks are genetically no more than moderately divergent from the natural populations (NMFS, 2004b). The naturally spawning Toutle coho are a composite of hatchery and natural origin fish. They currently spawn in all accessible tributaries. Stock status is unknown, but shows signs of a long-term negative trend (SaSI-2002). The run-size of naturally spawning segment for 1972-1979 was estimated to be 1,662 fish, based on average rack returns of 14,406 fish (WDW 1990). Adult coho are trapped and hauled above the sediment-retention dam on the North Fork Toutle (WDW 1990). Hatchery fingerlings were seeded in the watershed beginning in 1983 and this continued as least until the writing of the SaSI report in 1993. A number of tributaries in the Toutle River have good production potential; among these are Stankey and Outlet creeks (WDF et. al. 1993). The Cowlitz River Subbasin Summary: DRAFT May 17, 2002- 16 spawning grounds in the lower Green River that were destroyed by the 1980 eruption of Mt. St. Helens (WDF et. al. 1993).

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

Describe hatchery Activities: Hatchery activities are identified in the ESA Section 7 Consultation "Biological Opinion on Artificial Propagation in the Columbia River Basin" (March 29, 1999). The following are identified as general hatchery actions that have direct mortality (via predation, broodstock collection and disease transmission) and indirectly through genetic and ecological interactions in the natural environment.

Broodstock Program:

Broodstock Collection: The hatchery weir has historically been installed in mid-August and is currently operated for collection of fall chinook and Type S coho. Removal of the weir will be determined by coho broodstock/management needs. The hatchery weir will be operated to minimize hatchery selection for size, run timing, and spawning time. Adults are collected each year from the run reaching the North Toutle Hatchery weir trap (Green River RKm 0.8) during August, September and October. Broodstock are randomly collected throughout the entire run to ensure that run timing and other attributes for the population are maintained. A rack across the Green River is installed by August 20 and directs chinook adults into the fish way/collection pond. In 2002, trapping of fall chinook commenced on August 29th. 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. On the N.F.Toutle directly upstream of the Green River confluence, the Fish Collection Facility intercepts fish passing upstream past this point in the Toutle River and chinook are transported downstream below the Green River confluence area. WDFW Region 5 fish program staff plans upcoming adult handling in a preseason meeting with hatchery staff and there is staff communication to handle unforeseen or weather related events that can impact runs and procedures. Until mass marking, hatchery Chinook cannot be identified from listed chinook. Wild steelhead are encountered during broodstock operations. See Take Tables for direct take.

Genetic introgression: The level of integration is unknown until mass marking occurs. The primary goal of WDFW is to operate fisheries and hatcheries consistent with the recovery of fall chinook salmon in the Green and Toutle Rivers. Final escapement objectives have not been established by the NMFS through a recovery plan. From a genetic perspective, the State of Washington Wild Salmonid Policy (WSP) indicates the interim minimum fall chinook escapement goal should be 500 fish. WDFW will develop escapement objectives for the area above the hatchery based on the available habitat, by 2004. There is approximately ¼ mile of spawning area below the hatchery weir (between the weir and the confluence with the NF Toutle). An additional 10 – 20% of the run may spawn in this area. In principle, the North Toutle Salmon Hatchery will be operated to mimic the Green/Toutle River natural fall chinook population. By agreeing to these principles, WDFW has acknowledged that there will be no selection for size, run timing, and spawning time in fall chinook retained for broodstock and that out of basin transfers into the hatchery will not occur except in extreme situations and 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, hatchery effluent, and intake compliance with impact on listed fish unknown but monitoring and maintenance are conducted along with staff observations. Intakes and screen do not meet compliance with ESA and WDFW standards. WDFW has assessed and forwarded needed improvements for future funding (Mitchell Act Hatcheries Intake and Passage Study -April 2003). Main stem flows rapidly diluted effluent and operation is within permitted discharge guidelines. (See HGMP Sections 4.1 and 4.2). Indirect take from this operation is unknown.

Disease: Outbreaks in the hatchery may cause significant adult, egg, or juvenile mortality. Over the years, rearing densities, disease prevention and fish health monitoring have greatly improved the health of the programs at North Toutle Hatchery. Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1994) Chapter 5 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 but there is little evidence that hatchery origin fish routinely infect natural populations of salmon and steelhead in the Pacific Northwest (Enhancement Planning Team 1986; Stewart and Bjornn 1990). Prior to release, the health and condition of the chinook population is established by the Area Fish Health Specialist. This is commonly done 1-3 weeks pre-release.
Indirect take from disease effects 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. Toutle River fall chinook releases have been above 2,000,000 since 1991. Due to the eruption of Mt. Saint Helens, little remained of the overall chinook capacity outside the Green River system so this density does not necessarily affect wild chinook. Chinook are released late June at approximately 80 FPP, but due to environmental conditions, fish size can range from 70-90 FPP. This time frame is late in the natural migration window of wild Chinook and has allowed dispersal of on station coho and steelhead releases occurring in April and May before chinook are released. Indirect take from density dependent effects is unknown.

Competition: Salmon and steelhead feed actively during their downstream migration (Becker 1973; Muir and Emmelt 1988; Sager and Glova 1988) and if they do not migrate they can compete with wild fish. WDFW is unaware of any studies that have empirically estimated the competition risks to listed species posed by the program described in this HGMP. Studies conducted in other areas indicate that this program is likely to pose a minimal risk of competition:

1) As discussed above, coho salmon and steelhead released from hatchery programs as smolts typically migrate rapidly downstream. The SIWG (1984) concluded that "migrant fish will likely be present for too short a period to compete with resident salmonids." On station release in large systems may travel even more rapidly – migration rates of approximately 20 river miles per day were observed by steelhead smolts in the Cowlitz River (Harza 1998).
2) NMFS (2002) noted that "..where interspecific populations have evolved sympatrically, chinook salmon and steelhead have evolved slight differences in habitat use patterns that minimize their interactions with coho salmon (Nilsson 1967; Lister and Genoe 1970; Taylor 1991). Along with the habitat differences exhibited by coho and steelhead, they also show differences in foraging behavior. Peterson (1966) and Johnston (1967) reported that juvenile coho are surface oriented and feed primarily on drifting and flying insects, while steelhead are bottom oriented and feed largely on benthic invertebrates."
3) Flagg et al. (2000) concluded, "By definition, hatchery and wild salmonids will not compete unless they require the same limiting resource". Thus, the modern enhancement strategy of releasing salmon and steelhead trout as smolts markedly reduces the potential for hatchery and wild fish to compete for resources in the freshwater rearing environment. Miller (1953), Hochachka (1961), and Reimers (1963), among others, have noted that this potential for competition is further reduced by the fact that many hatchery salmonids have developed different habitat and dietary behavior than wild salmonids." Flagg et al (2000) also stated "It is unclear whether or not hatchery and wild chinook salmon utilize similar or different resources in the estuarine environment."
4) Fresh (1997) noted that "Few studies have clearly established the role of competition and predation in anadromous population declines, especially in marine habitats. A major reason for the uncertainty in the available data is the complexity and dynamic nature of

competition and predation; a small change in one variable (e.g., prey size) significantly changes outcomes of competition and predation. In addition, large data gaps exist in our understanding of these interactions. For instance, evaluating the impact of introduced fishes is impossible because we do not know which nonnative fishes occur in many salmon-producing watersheds. Most available information is circumstantial. While such information can identify where inter- or intra specific relationships may occur, it does not test mechanisms explaining why observed relations exist. Thus, competition and predation are usually one of several plausible hypotheses explaining observed results."

5) Studies from Fuss (2000) on the Elochoman River and Riley (2004) on two Willapa Bay tributaries (Nemah and Forks Creek), indicate that hatchery reared coho and Chinook can effectively leave the watershed within days after release.

Predation: Chinook fingerlings from this program could prey upon listed species of salmonids, but the magnitude of predation will depend upon the characteristic of the listed population of salmonids, the habitat in which the population occurs and the characteristics of the hatchery program (e.g.. release time, location, number released and size upon release). The site specific nature of predation and the limited number of empirical studies that have been conducted, make it difficult to predict the predation effects of this specific hatchery release. WDFW is unaware of any studies that have empirically estimated the predation risks to listed fish by this program.

Predation Risk Factors:

Environmental Characteristics: These characteristics can influence the level of predation (see SIWG 1984 for a review) with risk greatest in small systems during periods of low flow and high clarity. The Green River is a small to medium clear water system, but once the Green River merges with the N.F. Toutle approximately 0.5 miles downstream, fish merge into a larger system with significant glacial and sediment turbidity during much of the year. At the confluence of the North and South Forks, (approximately 12 RKm) downstream, the Toutle system is a large river of 1500 – 2200 cfs during April/May (USGS Real Time data).

Dates of Releases: The release date can influence the likelihood that listed species are encountered. There is limited studies on migration timing of naturally produced chinook but listed chinook from the Lower Columbia ESU are believed to emigrate over a wide window from March thru August (LCFRB Technical Reports 2004). A release period beginning after May 15st has been implemented to allow listed chinook time for growth to minimize predation opportunity.

Relative Body Size: Studies and opinions on size of predator/prey relationships vary greatly and although there is evidence that salmonids can prey upon fish up to 50% of their body length, most prey consumed is probably much smaller. Keeley and Grant (2001) suggest that the mean prey size for 100-200 mm fl salmonids is between 13-15% of predator body size. Salmonid predators were thought to be able to prey on fish up to approximately 1/3 of their length (USFWS 1994), although coho salmon have been observed to consume juvenile chinook salmon of up to 46% of their total length in aquarium environments (Pearsons et al. 1998). Artic char are well known as piscivorous predators, but recent studies suggest the maximum prey size is approximately 47% of their length (Finstad et al. 2002). The "33% of body length" criterion for evaluating the potential risk of predation in the natural environment has been used by NOAA Fisheries and the USFWS in a number of biological assessments and opinions (c.f., USFWS 1994; NMFS 2002). WDFW believes that a careful review of the Pearson and Fritts (1999) study supports the continued use of the "33% of body length criterion" for listed species

until further data for the North Toutle system can be collected.

Release Location and Release Type: The likelihood of predation may also be affected by the location and the type of release. Other factors being equal, the risk of predation may increase with the length of time fish co-mingle. In the freshwater environment, this is likely to be affected by distribution of the listed species in the watershed, the location of the release and the speed at which fish released from the program migrate. Releases are not made until to June to give listed chinook additional time to grow in order to minimize predation.

We have provided a summary of empirical information and a theoretical analysis of competition and predation interactions that may be relevant to the North Toutle fall chinook program.

Potential N.F. Toutle fall chinook predation and competition effects on listed salmonids: The proposed annual production goal for this program is 2,500,000 fish released in June (June 10-25 typically). This time frame of volitional release could encounter late emigrating or rearing listed chinook in the Toutle subbasin and Columbia mainstem. Due to similar sizes between chinook smolts and fingerling phases of listed stocks, competition could have an impact if hatchery chinook do not emigrate quickly. At 80 FPP (80 mm fl), potential predation would be on listed fish less than 27 mm fl and smaller. Indirect take due to predation is unknown.

- Fork length (fl) of naturally produced chinook from the Lewis River system during the month of June indicate fish 48-55 mm fl (Columbia River Progress Report 2003-16). The Lewis River system fall chinook stock timing is the latest for the Columbia tributary stocks, and would be considered a "worst case scenario"(smaller size), when compared to other Columbia River Systems.
- Average chinook fork lengths by week from 26 sampling sites on the Kalama River by week indicate fish 44 mm fl on April 25, 46 mm fl on May 3, 56 mm fl on May 11, 62 mm fl by May 16, and ranges of 70 – 80 mm fl for the month of June and 77—89 mm fl for the month July (Pettit WDFW 1990).
- Fork lengths from Cedar Creek (tributary to the N.F. Lewis River) indicate that average chinook lengths reach approximately 50 mm fl between the weeks of April 12 and April 19, 2004, with fish 55-60 mm fl by April 26 and May 3, 2004 and fish approaching 70 mm fl by mid-May (Rawding 2004, Pers. Comm.).
- Average chinook fork lengths from 26 sampling sites on the Kalama River by week indicate fish 44 mm fl (April 25), 46 mm fl (May 3), 56 mm fl (May 11) and 62 mm fl (May 16). Other lengths through August are available (Pettet WDFW 1990).
- Fork lengths from Cedar Creek (tributary to the N.F. Lewis River) indicate that average chinook lengths reach approximately 50 mm fl between the weeks of April 12 and April 19, 2004, and are growing rapidly with fish 55-60 mm fl by April 26 and May 3, 2004.

Actively migrating smolts may interact with listed steelhead as spawning time for wild winter steelhead stocks in the ESU occurs from March to May with April 20th the peak week of spawning and depending on available temperature units, eggs will hatch in 4-7 weeks with fry emergence approximately 2-3 weeks after hatching which indicates listed fish would be present beginning in late May to mid June (LCSI Draft 1998). There are no wild summer steelhead in the Toutle system. Indirect take from predation or competition is unknown.

Table 4. Steelhead Spawn and Emergence Windows.

Race	Spawn	Peak	Incubation to	Swim-up	Swim-	Source

	Time	**Spawn Window**	**Hatch**	**Window**	**up @ 50% Date**	
Winter	March – May	April 15 - 25th	May 13 – June 15	May 27- July 7	June 17	LCSI Draft 1998
Summer	February – April	March 20- 30th.	April 14 – May 18	April 28 – June 2	May 15	Kalama Research Report

*Listed Coho (Proposed):*Length data for wild coho in the Toutle basin is unknown. Depending on water temperatures, during the month of April, lower Columbia River hatchery coho fry can range from 42 – 40 mm fl in early April, and 50mm fl by May 1 (LCR Hatchery data 2001). Indirect take from predation or competition is unknown.

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 through out the rearing cycle and at release.
- Feeding rates and regimes through out the rearing cycle are programmed to satiation feeding to minimize out of size fish and programmed for smolt phase as release or plant times approach.
- 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 with in a couple of days.
- Minimal residualism from WDFW chinook programs following these guidelines has been indicated from snorkeling studies on the Elochoman River (Fuss 2000) and on Nemah and Forks Ck. (Riley 2004). Indirect take from residualism is unknown.

Migration Corridor/Ocean: It is unknown to what extent listed fish are available both behaviorally or spatially on the migration corridor. Once in the main stem, Witty et al. (1995) has concluded that predation by hatchery production on wild salmonids does not significantly impact naturally produced fish survival in the Columbia River migration corridor. Evidence in estuarine and nearshore environments indicate that diets are often dominated by invertebrates with Durkin (1982) reporting that diet of coho smolts (128-138 mm fl) in the Columbia River estuary was composed almost entirely of invertebrates without evidence of salmonids as prey (HSRG - Hatchery Reform 2004). There appear to be no studies demonstrating that large numbers of Columbia system smolts emigrating to the ocean affect the survival rates of juveniles in the ocean in part because of the dynamics of fish rearing conditions in the ocean. Indirect take in the migration corridor or ocean is unknown.

Monitoring:

Associated Monitoring Activities - The following monitoring activities are conducted in the Lower Columbia Management Area (LCMA) for adult steelhead and salmon: redd surveys are conducted for winter steelhead in the SF Toutle, Coweeman, EF Lewis and Washougal rivers. Redd surveys are also conducted in the Cowlitz River for fall and spring chinook. Mark-recapture surveys provide data for summer steelhead populations in the Wind and Kalama rivers. Mark-recapture carcass surveys are conducted to estimate populations of chinook salmon in Grays, Elochoman, Coweeman, SF Toutle, Green, Kalama, NF Lewis, EF Lewis, rivers and

Skamokawa, Mill, Abernathy, and Germany creeks and for all chum salmon populations. Snorkel surveys are conducted for summer steelhead in the EF Lewis, Washougal rivers. Adult trap Counts are conducted on the Cowlitz, NF Toutle, Kalama, and Wind rivers and on Cedar Creek a tributary of the NF Lewis River. Area-Under-the-Curve (AUC) surveys are conducted to collect population data for chum salmon in Grays River and Hardy and Hamilton Creeks. All sampling of carcasses and trapped fish include recovery of coded wide tagged (CWT) fish for hatchery or wild stock evaluation. Downstream migrant trapping occurs on the Cowlitz, Kalama, NF Lewis, and Wind rivers, Cedar Creek, and will expand to other basins as part of a salmonid life cycle monitoring program to estimate freshwater production and wild smolt to adult survival rates. Any take associated with monitoring activities is unknown but all follow scientific protocols designed to minimize impact.

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

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

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

Any additional mortality from this operation on a yearly basis would be communicated to Fish program staff for additional guidance. For other listed species, if significant numbers of wild salmonids impacted by this operation, then staff would inform WDFW District Biologist , Fish Health Specialist, or Area Habitat Biologist, who along with the Complex Manager would determine an appropriate plan and consult with NOAA for adaptive management review and protocol.

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

Take of chinook has been unknown. Listed steelhead and listed coho (proposed) have been sorted and released upstream. No pond mortalities have been reported by staff.

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.

For ESU-wide hatchery plans, the production of coho salmon from N.F. Toutle Hatchery is consistent with:

- 1999 Biological Opinion on Artificial Propagation in the Columbia River Basin
- 1999 Review of Artificial Production of Anadromous and Resident Fish in the Columbia River Basin
- Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1994)
- The *U.S. v. Oregon* Columbia River Fish Management Plan
- NWPPC Fish and Wildlife Program

For statewide hatchery plan and policies, hatchery programs in the Columbia system adhere to a number of guidelines, policies and permit requirements in order to operate. These constraints are designed to limit adverse effects on cultured fish, wild fish and the environment that might result from hatchery practices. Following is a list of guidelines, policies and permit requirements that govern WDFW Columbia hatchery operations with which the production of coho salmon from Toutle Hatchery is consistent with the following WDFW Policies*:*

Genetic Manual and Guidelines for Pacific Salmon Hatcheries in Washington. These guidelines define practices that promote maintenance of genetic variability in propagated salmon.. Also, *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (Genetic Policy Chapter 5, IHOT 1995).

Spawning Guidelines for Washington Department of Fisheries Hatcheries. Assembled to complement the above genetics manual, these guidelines define spawning criteria to be use to maintain genetic variability within the hatchery populations.. Also, *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (Genetic Policy Chapter 7, IHOT 1995).

Stock Transfer Guidelines. This document provides guidance in determining allowable stocks for release for each hatchery. It is designed to foster development of locally-adapted broodstock and to minimize changes in stock characteristics brought on by transfer of non-local salmonids (WDF 1991).

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 Policy Chapter 5, IHOT 1995).

National Pollutant Discharge Elimination System Permit Requirements This permit sets forth allowable discharge criteria for hatchery effluent and defines acceptable practices for hatchery operations to ensure that the quality of receiving waters and ecosystems associated with those waters are not impaired.

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

The program described in this HGMP is consistent with the following agreements and plans:

- The Columbia River Fish Management Plan
- U.S. vs. Oregon court decision
- Production Advisory Committee (PAC)
- Technical Advisory Committee (TAC)
- Integrated Hatchery Operations Team (IHOT) Operation Plan 1995 Volume III.
- Pacific Northwest Fish Health Protection Committee (PNFHPC)
- In-River Agreements: State, Federal, and Tribal representatives
- Northwest Power Planning Council Sub Basin Plans
- Washington Department of Fish and Wildlife Wild Salmonid Policy

3.3 Relationship to harvest objectives.

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

Annual harvest is dependent on management response to annual abundance in Pacific Salmon Commission (PSC)(US/Canada), Pacific Fisheries Management Council (PFMC), (US ocean), and Columbia River Compact forums.

U.S. v. Oregon/Columbia River Compact

U.S. v. Oregon/Columbia River Compact fisheries Technical Advisory Committee impact assessments are evaluated through Section 7/10 consultation process. Commercial fishery seasons on the portion of the mainstem Columbia River where the states of Oregon and Washington share a common boundary are regulated by a joint Oregon and Washington regulatory body (the Columbia River Compact). The ODFW and WDFW directors or their delegates comprise the Compact and act consistent with delegated authority by the respective state commissions. Columbia River seasons are also regulated by the U. S. v. Oregon process which dictates sharing of Columbia River fish runs between treaty Indian and non-Indian fisheries. The Compact receives input from the tribes, states, the federal government, and the fishing industry through a series of meetings held throughout the year. These meetings assist the Compact in developing harvest allocations and decisions related to monitoring harvest quotas. Meetings are held in late January of each year to establish the harvest guidelines for the spring and summer fisheries and in late July to establish guidelines for fall fisheries.

Coded-wire tag (CWT) data analysis of the 1989-94 brood North Toutle Hatchery fall chinook indicates a total Toutle River fall chinook harvest rate of 41%. (LCFRB TRT). The majority of the North Toutle Hatchery fall chinook stock harvest occurred in Toutle tributary sport (31%), British Columbia (30%), Columbia River (13%), Alaska (14%), and Washington ocean (10%) fisheries. An extremely popular fishery for tule chinook exists immediately downstream of the confluence of the Green River with the N.F. Toutle. 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 to ensure the harvest rates are consistent with recovery of the Lower Columbia river tule chinook population.

Lower Columbia chinook ESU consists of spring, fall tule, and fall bright fish runs. These runs are impacted differently by fisheries outside the LCMA and outside WDFW management. Fall

run lower Columbia chinook are more heavily impacted by ocean fisheries. The ocean exploitation rate for tule fall chinook averaged 53% from 1977 to 1990 and was reduced to 25% between 1991 and 1994 due to low abundance. The combined mainstem and tributary fishery impacts for tule chinook are less than 1/2 of the ocean fishery and have been reduced from 11% to 5% (NMFS 2000b).

Brood Year	SAR (%)	Return Year	Hatchery Escapement	Total Catch
1995	0.1010%	1995	786	426
1996	0.0969%	1996	3,434	310
1997	0.2980%	1997	1,196	856
1998	0.0916%	1998	1,051	208
mean	0.1469%	mean	1,617	450

3.4 Relationship to habitat protection and recovery strategies.

Subbasin Planning and the Lower Columbia Fish Recovery Board (LCFRB)
The current Toutle River HGMP processes are designed to deal with existing hatchery programs and potential reforms to those programs. A regional sub-basin planning process (Draft Cowlitz Basin/Toutle Subbasin Summary May 17, 2002) is a broad-scale initiative that will provide building blocks of recovery plans by the Lower Columbia Fish Recovery Board (LCFRB) for listed fish and may well use HGMP alternative ideas on how to utilize hatchery programs to achieve objectives and harvest goals. In order to assess, identify and implement restoration, protection and recovery strategies, WDFW Region 5 staff is involved in fish and wildlife planning and technical assistance in concert through the LCFRB including the role of fish release programs originating from Region 5 hatcheries.

Habitat Treatment and Protection
WDFW is presently conducting or has conducted habitat inventories within the N.F. Toutle subbasin. Ecosystem Diagnosis and Treatment (EDT) compares habitat today to that of the basin in a historically unmodified state. It creates a model to predict fish population outcomes based on habitat modifications. WDFW is also conducting a Salmon Steelhead Habitat Inventory Assessment Program (SSHIAP) which document barriers to fish passage. The Washington Department of Fish and Wildlife also administers the Washington State Hydraulic Code (RCW 75). This law requires that anyone wishing to use, divert, obstruct, or change the natural flow or bed of any waters of the state to first secure a Hydraulic Project Approval (HPA) from WDFW, so that potential harm to fish and fish habitat can be avoided or corrected.

Limiting Factors Analysis
A WRIA 26 (Cowlitz Watershed) habitat limiting factors (LFA) has been completed by the Washington State Conservation Commission (Wade G., March 2001) with the input of WDFW Region 5 staff. The Toutle River can never reach pre-eruption levels until there is recovery of the North Toutle River above the Sediment Retention Structure. Unless there are changes, this does not appear likely to happen in the next twenty years. The 1980 eruption of Mount St. Helens severely impacted salmonid populations and their habitat. Yet, most stream systems are naturally recovering from the disturbance. The North Fork Toutle is one exception were recovery has lagged behind. TAG members attributed the slow recovery to the Sediment Retention Structure (SRS) that has altered natural recovery processes.

3.5 Ecological interactions.

Below are discussions on both negative and positive impacts relative to the North Toutle fall chinook program and are taken from the Puget Sound listed and non-listed HGMP template (WDFW and NOAA 2003).

(1) Salmonid and non-salmonid fishes or species that could negatively impact the program: North Toutle fall chinook smolts can be preyed upon through the entire migration corridor , from the river subbasin to the mainstem Columbia River and estuary. Northern pikeminnows and introduced spiny rays along the Columbia mainstem sloughs can predate on chinook smolts as well as avian predators, including gulls, mergansers, cormorants, belted kingfishers, great blue herons and night herons. 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. See also Section 2.2.3 Predation and Competition.

(3) Salmonid and non-salmonid fishes or other species that could positively impact the program. Multiple programs including spring chinook, fall chinook, Type S and N coho and steelhead programs are released in the Cowlitz/Toutle River systems and 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. . A host of freshwater and marine species that depend on salmonids as a nutrient and food base may be positively impacted by program fish. The hatchery program may be filling an ecological niche in the freshwater and marine ecosystem. A large number of species are known to utilize juvenile and adult salmon as a nutrient and food base (Groot and Margolis 1991; and McNeil and Himsworth 1980). Chinook smolts can be preyed upon through the entire migration corridor from the river subbasin to the mainstem Columbia River, estuary and in the immediate ocean system by piscivorous salmon species. Northern pikeminnows and introduced spiny rays in the Columbia mainstem sloughs can predate on 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. Successful or non-successfully spawner adults originating from this program may provide a source of nutrients in oligotrohic coastal river systems and stimulate stream productivity. Many watersheds in the Pacific Northwest appear to be nutrient-limited (Gregory et al. 1987; Kline et al. 1997) and salmonid carcasses can be an important

source of marine derived nutrients (Levy 1997). Addition of nutrients has been observed to increase the production of salmonids (Slaney and Ward 1993; Slaney et al. 2003; Ward et al. 2003). The N.F.Toutle River drainage is thought to be inadequately seeded with anadromous fish carcasses and chinook carcasses can be used throughout the basin. Assuming integrated spawning and carcass seeding efforts, approximately 1,000 – 5,000 fall chinook adult carcasses could contribute approximately 10,000 – 50,000 pounds of marine derived nutrients to organisms in the river. However, *Saprolegniasis* occurrences in young hatchery fish have been observed in greater frequency on Mitchell Act stations that have nutrient enhancement projects and in some cases, circumstantial evidence suggests more outbreaks of gill and tail fungus are the result of nutrient enhancement efforts. Staff is continuing to monitor observations or occurrences of this possibility.

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.

A gravity intake on the Green River draws a maximum of 11,400 gpm (25.4 cfs) in July while a river pump adjacent to the adult trapping pond entrance supplies another 2,000 –3,000 gpm. The adult pond is 100% reuse water, and staff uses two aerators in order to boost oxygen levels in the adult pond and create some cover during the August to October time period if needed. The raceway rearing ponds attain a maximum of 3,500 gpm total of gravity fed water. Water temperatures in excess of 80 F have been observed during the summer months and temperatures in the 70's F are routinely observed in the lower reaches of the Green River and hatchery rearing ponds (pers. 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.

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.

Potential Hazard	Risk Aversion Measure
Hatchery water withdrawal	Water rights total 26,031gpm from October to June (Montgomery Watson 1997) and are formalized thru trust water right #S2-24832 from the Department of Ecology. Monitoring and measurement of water usage is reported in monthly NPDES reports (see below).
Intake/Screening Compliance	Intake structures were designed and constructed to specifications at the time the N.F. Toutle facility was constructed. For the pump intake, sweep velocity, lack of fish bypass feature and 1/8 inch slotted screens are not in compliance (The Mitchell Act Intake and Screening Assessment 2002). For the gravity intake, screen slot width, approach and sweep velocities and an open top design into the intake allows high water to crest over this structure yearly are not in compliance. From the assessment, WDFW has been requesting funding for future scoping, design, and construction work of a new intake system.
Hatchery effluent discharges. (Clean Water Act)	This faculty operates under the "Upland Fin-Fish Hatching and Rearing" National Pollution Discharge Elimination System (NPDES) general permit which conducts effluent monitoring and reporting and operates within the limitations established in its permit administered by the Washington Department of Ecology (DOE). WAG 13-1010. Monthly and annual reports on water quality sampling, use of chemicals at this facility, compliance records are available from DOE. Discharges from the cleaning treatment system are monitored as follows: *Total Suspended Solids (TSS)*C1 to 2 times per month on composite effluent, maximum effluent and influent samples. *Settleable Solids (SS)*C1 to 2 times per week on effluent and influent samples. *In-hatchery Water Temperature* - daily maximum and minimum readings.

Section 5. Facilities

5.1 Broodstock collection facilities (or methods).

Broodstock trapping begins in late August (August 29, 2002). 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 20th of the year and remains until early November. 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 coho jacks. The chinook return is diverted into the holding ponds until the temporary weir is removed. A removable gate within the rack was employed in 2003. This allowed the volitional passage of adults in excess of need to be visually counted upstream without handling.

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

NA

5.3 Broodstock holding and spawning facilities.

The two concrete holding ponds 60 x 40 x 4.5 (ft.) are supplied with 1500-2000 gpm (reuse). Aerators are used to increase oxygen levels and provide some cover to the adults. Adults are seined, sorted, killed and spawned directly from the adult holding ponds. Spawning areas are located at the head end of the ponds with kill bins covered. Fish not ready to spawn are returned to the pond for further maturation.

5.4 Incubation facilities.

Incubator Type	Units (number)	Flow (gpm)	Volume (cu.ft.)	Loading-Eyeing (eggs/unit)	Loading-Hatching (eggs/unit)
Deep Troughs Units with Incubation cells (8 cells/deep trough)	6	12	nya	65000	nya
Deep Troughs Units with Cells/Incubation Trays (	15	12	nya	nya	65000

5.5 Rearing facilities.

Ponds (No.)	Pond Type	Volume (cu.ft)	Length (ft.)	Width (ft.)	Depth (ft.)	Flow (gpm)	Max. Flow Index	Max. Density Index
10	Concrete Raceways	3638	80	20	2.3	250-400	1.31	0.11
1	Earthen Pond	143242	nya	nya	nya	4000	2.25	0.063

5.6 Acclimation/release facilities.

Same, see HGMP Section 5.5 above.

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

1) Eruption of Mount St. Helens totally destroyed the facility. Required construction and rebuilding for most of the hatchery infra-structure.
2) In February 1996, a flood caused an unscheduled release of 110,000 coho fry.
3) During a high water event in 2002, an incubation tray stopper bung was dislodged dewatering a number of succeeding trays resulting in a mortality of 29,500 fry (2002).
4) Outlet screens on large juvenile rearing ponds (converted adult ponds) had bottom seals that allowed fish leakage. Alternative fixes have now prevented leakage.
5) Low dissolved oxygen in the adult holding ponds resulted in the loss of approximately 700 adult fall Chinook in 2000.
6) A epizootic of *Columnaris* in 1996 resulted in a 60% mortality of the juvenile fingerling coho production.

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.

- All pumps, broodstock holding, incubation and rearing receptacles have water loss alarms.
- Staff is available 24/7 to respond to pump failure, water loss, and flooding events.
- Aeration pumps are used to maximize the water conditions in the adult collection pond during periods of low water quality, which benefits fish held until sorting can be accomplished.
- Fish health protocols through broodstock collection, incubation and rearing phases are followed and monitored monthly.
- Broodstock collection is checked daily for program and non-target listed fish.

Section 6. Broodstock Origin and Identity

6.1 Source.

With the eruption of Mt. St. Helens in 1980, the hatchery was destroyed. However, in 1985, juvenile releases of fall-run chinook salmon were resumed from rearing ponds associated with the original hatchery. It is most likely that the current hatchery stock consists of fish transferred into the North Fork Toutle Basin following resumption of hatchery activities in 1985. Since 1985, introduced fish were obtained from the Cowlitz, Grays River, Big Creek, Kalama, and Washougal hatcheries. For the past three years the hatchery has been able to recruit escapement within the Toutle system to meet the broodstock collection goal of 1,346 adults (673 males and 673 females).

6.2.1 History.

Fall chinook were native to the Toutle River. The Toutle River has received plants of non-local fall Chinook from 1951 – 1980 and received eggs from Wind River during the first year of production in 1951. After 1967, Toutle stock was primarily used, although Spring creek and Big Creek (1967), Kalama (1979) and Washougal and Kalama (1987) were also used. Before the Mt. Saint Helens eruption, spawn distribution for 1964 through 1979 was 4.8% mainstem, 3.8% South Fork Toutle, 49.4 % N.F.Toutle and 42% Green River. Other than the S.F. Toutle, most spawning habitat was destroyed after the event. Limited spawning ground surveys since 1980 have found most spawning in areas near the hatchery.

Current total escapement estimates are based on annual peak live plus dead spawner counts from the North Toutle Hatchery weir (on the Green River) to the mouth of the Green River, a distance of 0.6 miles. Stock status is rated healthy based on adult abundance (SaSI 2002). With the stabilization of the watershed since the eruption of Mt. St. Helens, chinook are re-establishing themselves in the watershed. During the post-eruption years, no surveys were conducted. It is likely that the majority of natural spawning fish are of hatchery origin. In the past three years (2001 – 2003), escapement numbers have increased significantly from 4,951 to 7,477 to 13,846.

Broodstock Source	Origin	Year(s) Used	
		Begin	End
Kalama Fall Chinook	H	1987	1991
Washougal River Fall Chinook	H	1987	1990
Grays River Fall Chinook	H	1988	1988
Cowlitz River Fall Chinook	H	1991	1991
Toutle River Fall Chinook	H	U	Present

6.2.2 Annual size.

WDFW has established an egg take goal of 2.75 million eggs in the Future Brood Document (FBD). To meet this goal a total of 673 females and 673 males need to be collected annually, based on an average fecundity of 4,900 eggs/female and a pre-spawning mortality of 14.5%. At the pre-season meeting Fish and Hatchery Program staff will develop the weekly and cumulative broodstock collection goals, and evaluate run size forecasts. Fish and Hatchery Programs must maintain flexibility to meet our goals of ensuring natural and hatchery numerical

escapement objectives as well as selection for run timing, spawning time, and size.

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

Unknown. When mass marking (start 2005 brood, depending on budget) is initiated, integrated levels will be determined by the TRT. The first mass marked adult returns would be expected in 2008.

6.2.4 Genetic or ecological differences.

For the last 5 years all adults used for tule broodstock have been collected from the N.F. Toutle River. Straying of lower river hatchery (LRH) fall chinook from a number of Oregon and Washington hatcheries is not unusual, and contributes to natural production. The overall result of straying and transfers of fall chinook at lower Columbia River hatcheries is the development of a widely distributed, blended hatchery stock. There are no known genotypic, phenotypic, or behavioral differences between either the hatchery stock or natural stock in the subbasin. (Busack and Shaklee Genetic Diversity Units and Major Ancestral Lineages of Salmonid Fishes in Washington November 1995). Fall chinook propagated through the program represent the indigenous lower Columbia stock. During years where insufficient numbers of adults return, eggs may be obtained from other lower Columbia River hatchery facilities with tule fall chinook if available.

6.2.5 Reasons for choosing.

This stock has a run entry pattern and timing that provides harvest opportunities for fisheries in the subbasin, the lower Columbia mainstem/tributaries, and Washington/Oregon Coast . The broodstock chosen has the desired life history traits to meet these harvest goals (e.g. run-timing) that provides significant harvest to the ocean fisheries and lower Columbia River fisheries (e.g. Buoy 10). Fall chinook propagated through the program represent the indigenous lower Columbia stock.

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 interim minimum escapement objectives.
- Every effort shall be made to promote local adaptation of this fall chinook population and out of basin hatchery transfers of eggs or fish for use as broodstock will only be considered in extreme cases.
- Mating cohorts are randomly selected.
- There are no known genotypic, phenotypic, or behavioral differences between either the hatchery stock or natural stock in the subbasin.
- Holding pond procedures follow IHOT guidelines.
- Other listed fish will be released immediately, if encountered during the broodstock collection process.

Section 7. Broodstock Collection

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

Adults for broodstock.

7.2 Collection or sampling design

A rack across the Green River is installed by August 20 directs chinook adults into the fishway/collection pond during August, September and October. In 2002, trapping of fall chinook commenced on August 29th. This period is after most of the summer steelhead have moved upstream of this point into the Green River. Pickett gaps are 1.5 inches wide which prevents jack chinook and coho salmon upstream of the area. Removal of the weir will be determined by chinook broodstock/management needs. Broodstock are randomly collected throughout the entire run to ensure that run timing and other attributes for the population are maintained. 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. On the N.F.Toutle directly upstream of the Green River confluence, the Fish Collection Facility (FCF) intercepts fish passing upstream past this point in the Toutle River with chinook are transported downstream below the Green River confluence area.

7.3 Identity.

Fall chinook are identified by run-timing. There is currently no way to distinguish the target population of hatchery origin fish from naturally spawning fish with the exception of the portion of returns that are identified by the absence of their adipose fin (indicating presence of a coded-wire tag). This portion is approximately 3.6% of the total production annually. But as there is still the potential for spring chinook genes incorporated, no adipose clipped chinook shall be collected for broodstock prior to October first (2002-2004) to prevent spring chinook from being incorporated into fall chinook broodstock (all hatchery spring chinook in the lower Columbia are now mass marked). After October 1st (2002-2004) adipose clipped fish can be incorporated randomly into broodstock. All fish handled at the hatchery (including mortalities) will be examined for tags and marks (including fin clips and opercle punches). All adipose clipped chinook are sacrificed for CWT recovery and any biological samples are collect at the direction of WDFW Region 5 staff.

7.4 Proposed number to be collected:

7.4.1 Program goal (assuming 1:1 sex ratio for adults): To meet this goal a total of 673 females and 673 males need to be collected annually, based on an average fecundity of 4,900 eggs/female and a pre-spawning mortality of 14.5%.

7.4.2 Broodstock collection levels for the last twelve years (e.g. 1990-2001), or for most recent years available.

Year	Adults			Eggs	Juveniles
	Females	Males	Jacks		
Planned	673	673	14	nya	nya
1990	114	105	2	nya	nya
1991	186	147	6	nya	nya
1992	45	46	3	nya	nya
1993	95	94	3	nya	nya
1994	371	245	13	nya	nya
1995	99	97	3	nya	nya
1996	536	543	6	nya	nya
1997	513	421	4	nya	nya
1998	467	448	11	nya	nya
1999	395	415	4	nya	nya
2000	145	168	11	nya	nya
2001	667	620	12	nya	nya
2002	585	600	7		

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

If available, non-CWT fish are be enumerated (by sex) and passed above the hatchery weekly, as additional spawning area is present above the hatchery. In 2002, 3,552 adults (2,156 males and 1,396 females) were released upstream. All fish released above the hatchery are right opercle punched (ROP). This mark will allow staff to determine if these fish fall back into the area between the weir and hatchery (to prevent double counting these fish).

7.6 Fish transportation and holding methods.

Transportation not needed, but a 1100 gallon tanker truck can be used form Mossyrock Hatchery if needed.

Ponds (No.)	Pond Type	Volume (cu.ft)	Length (ft.)	Width (ft.)	Depth (ft.)	Available Flow (gpm)
2	Concrete Ponds	10800	60	40	4.5	1500-2500

7.7 Describe fish health maintenance and sanitation procedures applied.

Integrated Hatchery Operations Team (IHOT), Pacific Northwest Fish Health Protection committee (PNFHPC), WDFW's Fish Health Manual November 1966, updated March 30, 1998 or tribal guidelines are followed. Fish health specialists make monthly visits and consult with staff. The adult holding area is separated from all other hatchery operations. All equipment and personnel use disinfection (chlorine) procedures upon entering or exiting the area. Disinfection procedures that prevent pathogen transmission between stocks of fish are implemented during spawning. Spawning implements are rinsed with an iodophor solution, and spawning area and implements are disinfected with iodophor solution at the days end of spawning. Elevated water temperatures combined with low water flow stress can lead to mortalities (Furunculosis) both within the holding ponds and in the river adjacent to the hatchery site. Holding pond adults are inoculated with florphenocal, erythromycin and liquamycin.

7.8 Disposition of carcasses.

Spawned carcasses and pond mortalities through the season are returned to the Toutle drainages for nutrient enhancement by Hal Mahnke and the Lower Columbia Fly Fishers. In 2002 the number of adults used for nutrient enhancement was 2,553 fish. Carcasses collected on the weir are examined for marks and enumerated.

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.

- Every effort shall be made to promote local adaptation of this fall chinook population and out of basin hatchery transfers of eggs or fish for use as broodstock will only be considered in extreme cases.
- Unlike hatchery steelhead, coho, and spring chinook, hatchery fall chinook from the N.F. Toutle Salmon Hatchery are not mass marked, and we cannot distinguish hatchery and wild chinook salmon in this basin but up to 400 fish spawn naturally in this system. Mass marking for chinook programs could begin in 2005, with expected adult returns beginning in 2008.
- At least 500 adults are collected.
- Limit out of basin transfers of eggs or fish for use as broodstock, except in rare circumstances.
- There are no known genotypic, phenotypic, or behavioral differences between either the hatchery stock or natural stock in the subbasin.
- Holding pond procedures follow IHOT guidelines.

- Non-target listed fish will be released immediately, if encountered, during the broodstock collection process.

The weir is constructed and operated with a removable panel. The removable panel design will allow relief of fish "bottlenecks" below the weir in years of large returns. The frequency and duration of panel removal will be determined at the pre-season meeting and adjusted in-season based on broodstock collection needs, actual run timing, high water events, etc. During periods of panel removal, a hatchery worker must be present for the duration of the opening to estimate the number of fish moving through the weir. These estimates will be recorded and provided to WDFW Region 5 staff.

Section 8. Mating

8.1 Selection method.

Cohorts are utilized from the entire run cycle with males and females available on a given day mated randomly. Spawning is conducted weekly, and occurs over a period of up to six weeks with the peak in mid October. The spawning protocol mandates the use of a spawning population of at least 500 adults. Fish are spawned throughout the entire run to help ensure that the run timing for the stock is maintained. A portion of each day's egg take is used for on-site hatchery production to help ensure that the return timing of the seasonal run is represented..

8.2 Males.

The spawning protocol is described in the as follows; The intent is to use a spawning population of at least 500 adults (IHOT 1995 Volume III). When spawning fewer than 1 million eggs in a day, the male-to-female ratio will be 1:1 for all stocks. When spawning more than one million eggs in a day, the ratio will not be less than 1 male to 3 females (WDFW Spawning Guidelines, 1983). If available, jacks are used at a rate of 2 %

8.3 Fertilization.

Ovarian fluid is not drained prior to fertilization. Fish health procedures used for disease prevention include water hardening of eggs in an iodophor at spawning and biological sampling of spawners. Generally, sixty ovarian fluid and kidney/spleen samples are collected from female spawners to test for the presence of viral pathogens. For daily egg takes, eggs from five females are spawned into a bucket and the sperm from five males are then combined with the eggs. Pooled egg lots are loaded into incubation units at the specified egg loading rates.

8.4 Cryopreserved gametes.

NA

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.

The current broodstock collection protocol will ensure that available genetic material represented reflects current broodstock history. When marking allows identification of wild stock, then acceptable wild stock integration levels can be followed.

Section 9. Incubation and Rearing.

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

Year	Egg Take	Green-Eyed Survival (%)	Eyed-Ponding Survival (%)	Egg Survival Perfor-mance Std.	Fry-fingerling Survival (%)	Rearing Survival Perfor-mance Std.	Fingerling-Smolt Survival (%)
1990	474240	nya	nya	nya	nya	nya	nya
1991	712000	nya	nya	nya	nya	nya	nya
1992	184000	nya	nya	nya	nya	nya	nya
1993	368200	nya	nya	nya	nya	nya	nya
1994	1567000	nya	nya	nya	nya	nya	nya
1995	482700	nya	94.6	nya	nya	nya	nya
1996	2965000	95.1	nya	nya	nya	nya	95.0
1997	2905382	91.6	98.1	nya	nya	nya	96.4
1998	2327568	95.4	98.0	nya	nya	nya	99.0
1999	1899040	95.3	98.4	nya	nya	nya	99.5
2000	779494	92.2	98.0	nya	nya	nya	99.0
2001	2908300	95.0	98.0	nya	nya	nya	90.7
2002	2909000						92.0.

Eggs may be imported from Kalama, Grays River, and other lower Columbia facilities, if program should experience a significant short-fall in broodstock.

9.1.2 Cause for, and disposition of surplus egg takes.

Egg take goal is 2,900,000. BKD and viral sampling lots (60 fish lots) are conducted over the course of the season. Lots are removed for unacceptable levels of BKD and with any protocols involved due to viral sampling. Surplus eggs may be used to backfill production shortages at other lower Columbia facilities. Otherwise, the program broodstock collection goal set forth in the annual brood document usually prevents surpluses.

9.1.3 Loading densities applied during incubation.

Eggs are placed in deep troughs to the eye stage then moved to stack incubators for hatching. Removal of dead eggs, accurate enumeration and loadings are adjusted during this time. See section 5.4 for load and hatching criteria. Integrated Hatchery Operations Team (IHOT) species-specific incubation recommendations are followed for water quality, flows, temperature, substrate and incubator capacities.

9.1.4 Incubation conditions.

Integrated Hatchery Operations Team (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 have been at acceptable levels of saturation with a minimum criteria of 8 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 ponded when: a visual inspection of the amount of yolk sac remaining with the yolk slit closed to approximately 1 millimeter (approximately 1600 TU's) or based on (95% yolk absorption) KD factor. At this time fry are transferred to the appropriate starting raceway (See HGMP Section 5.5 for raceway specifications) this usually occurs during the last week of January and continues through February.

9.1.6 Fish health maintenance and monitoring.

Staff conducts daily inspection, visual monitoring and sampling from eyed egg, fry, fingerling and sub-yearling stages. As soon as potential problems are seen, these concerns are immediately communicated to the WDFW Fish Health Specialist. In regular monitoring, fish health specialists conduct inspections monthly. Potential problems are managed promptly to limit mortality and reduce possible disease transmission.

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 can isolate incubators.
- Temperature, dissolved oxygen, and flow are monitored.
- Dead eggs are discarded in a manner that prevents transmission.

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 (1990-2001), or for years dependable data are available.

Year	Egg Take	Green-Eyed Survival (%)	Eyed-Ponding Survival (%)	Egg Survival Perfor-mance Std.	Fry-fingerling Survival (%)	Rearing Survival Perfor-mance Std.	Fingerling-Smolt Survival (%)
1995	482700	nya	94.6	nya	nya	nya	nya
1996	2965000	95.1	nya	nya	nya	nya	95.0
1997	2905382	91.6	98.1	nya	nya	nya	96.4
1998	2327568	95.4	98.0	nya	nya	nya	99.0
1999	1899040	95.3	98.4	nya	nya	nya	99.5
2000	779494	92.2	98.0	nya	nya	nya	99.0
2001	2908300	95.0	98.0	nya	nya	nya	90.7
2002	2909000	nya	nya				92.0

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

General guidelines for density and loading targets are recommended by Piper et al. 1982. Individual hatchery programs will take water quality, flow profiles, and past performance into consideration for this program through the rearing period and the units they are reared in. In all facilities within Toutle Complex, densities are kept at or below 3.3 lbs /gpm and 0.5 lbs /cu ft. before the last loading reduction in the fall of the year. Trough maximum loading is 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 3200 lbs. at 300 gpm (10.6 lbs/gpm).

9.2.3 Fish rearing conditions.

Fish are started in raceways then moved to pond 27 for final rearing and release in late June and July. Temperature, dissolved oxygen and pond turn over rate are monitored. IHOT standards are followed for: water quality (within the limits of the surface water available), alarm systems, predator control measures (netting) to provide the necessary security for the cultured stock, loading and density. Settleable solids, unused feed and feces are removed regularly to ensure proper cleanliness of rearing containers. Rearing units are cleaned at least one time per week, using a vacuum system. Due to a limited number of ponds, various sizes of fish are put into the single earthen pond; thus weight samples vary. Fish were released from June 20 through July 30.

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

Rearing Period	Length (mm)	Weight (fpp)	Condition Factor	Growth Rate	Hepatosomatic Index	Body Moisture Content
March	35.6	1054	nya	nya	nya	nya
April	50.0	376	nya	0.643	nya	nya
May	67.6	151	nya	0.598	nya	nya
June	91.2	61	nya	0.596	nya	nya
July**	89.7	65	nya	nya	nya	nya

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

Rearing Period	Length (mm)	Weight (fpp)	Condition Factor	Growth Rate	Hepatosomatic Index	Body Moisture Content
March	35.6	1054	nya	nya	nya	nya
April	50.0	376	nya	0.643	nya	nya
May	67.6	151	nya	0.598	nya	nya
June	91.2	61	nya	0.596	nya	nya
July	89.7	65	nya	nya	nya	nya

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

Rearing Period	Food Type	Application Schedule (#feedings/day)	Feeding Rate Range (%B.W./day)	Lbs. Fed Per gpm of Inflow	Food Conversion During Period
Ponding to 3/31/01	Moore Clark Nutra #0 to Moore Clark Nutra #2	8-7	3.0-2.2	0.02	0.86-1.0
4/01/01 to 7/30/01	Moore Clark Nutra #0 to Moore Clark Fry 2.5	5-1	3.0-1.4	0.06	0.64-1.0

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

Fish Health 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* (Genetic Policy Chapter 5, IHOT 1995). A fish health specialist inspects fish programs at Elochoman Hatchery monthly and checks both healthy and if present symptomatic fish. Based on pathological or visual observations by the crew, age of fish and the history of the facility, the pathologist determines the appropriate tests. External signs such as lesions, discolorations, and fungal growths will lead to internal examinations of skin, gills and organs. Kidney and spleen are checked for bacterial kidney disease (BKD). Blood is checked for signs of anemia or other pathogens. Additional tests for virus or parasites are done if warranted.
Disease Treatment	As needed, appropriate therapeutic treatment will be prescribed to control and prevent further outbreaks. 3% Epson salt, formalin, terramycin are used for gut fungus, gill amoeba, costia, and columnaris. 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.

The migratory state of the release population is noticed by fish behavior. Aggressive screen and intake crowding, swarming against sloped pond sides, leaner condition factors, a more silvery physical appearance and loose scales during feeding events are signs of smolt development. ATPase activity is not measured. Multiple smolt events can also be triggered by environmental cues including daylight increase, a spike in the water temperature and spring freshets. ATPase activity is not measured.

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

NA

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.

- At least 500 adults are available in the population.
- Every effort shall be made to promote local adaptation of this fall chinook population and out of basin hatchery transfers of eggs or fish for use as broodstock will only be considered in extreme cases.
- Run will be collected through out the run time from adults arriving at the hatchery rack.
- Protocols for population size, fish health disinfection and genetic guidelines followed.
- Eggs water hardened in iodophor (1:600).
- Multiple incubation and rearing units are used.
- Staff is available 24/7 to respond to emergencies.
- IHOT guidelines are followed for rearing, release and fish health parameters.

Section 10. Release

10.1 Proposed fish release levels.

2,500,000 subyearlings at 80 fpp are released into the Green River located 0.8 RKm above the confluence with the N.F. Toutle.

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

Same as above.

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

	Fingerling Release		
Release Year	No.	Date (MM/DD)	Avg Size (fpp)
1991	2694700	June 17	66.0
1992	2410200	May 21-June 11	51.0
1993	3444300	June 14-18	58.0
1994	2044500	June 11-18	56.0
1995	2498200	June 24-30	89.0
1996	2573400	June 21-July 1	83.0
1997	2631598	June-July	67.0
1998	2566600	June 30-July 1	57.0
1999	2613678	July 3-15	67.0
2000	1726175	June 24-July 15	68.0
2001	695443	June 20-July 30	64.0
2002	2772286	June 26-July 15	69.0

10.4 Actual dates of release and description of release protocols.

Fish are released from ponds 25 and 28. Release dates can range from June 1 until July 15. This time frame lies within one of the windows of the normal out migration period of naturally produced tule fall chinook.

10.5 Fish transportation procedures, if applicable.

None.

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

Fish are released as fingerling smolts directly from the rearing/acclimation units at the Toutle Hatchery. All incubation, hatching and rearing occurred on Green River water.

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

90,000 fish (3.65%) of the program is adipose/CWT marked as an index group for management purposes. The agency goal is a 100% adipose clip of all hatchery-produced fall chinook to be able to distinguish the target population of hatchery origin fish from naturally spawning fish.

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

Egg takes are planned according to data/information of historical egg takes at the Elochoman Hatchery. Thus, egg take and production are maintained within the plus/minus 5% guideline. For unforeseen events, the Hatchery Manager would contact the Complex Manager who would contact the appropriate WDFW Regional Manager to apprise him/her of the situation. Regional Manager would consult with appropriate regional co-managers/NOAA to get recommendation for fish disposition. The Hatchery Complex Manager would instruct hatchery to implement recommendation.

10.9 Fish health certification procedures applied pre-release.

Whenever abnormal behavior or mortality is observed, staff conducts the Area Fish Health Specialist. The fish health specialist examines affected fish, and recommends the appropriate treatment. Reporting and control of selected fish pathogens are done in accordance with the Co-managers Fish Disease Control Policy. All fish are examined for general condition and health as well as presence of "reportable pathogens" as defined in the PNFHPC disease control guidelines, within 1 to 3 weeks prior to release.

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

Emergency procedures and disposition of fish would adhere to the protocols and procedures set by parties involved in preseason meetings. If the program is threatened by ecological or mechanical events, the Complex manager would contact and inform WDFW Regional management of the situation. Based on a determination of a partial or complete emergency release of program fish. If an on-station emergency release was authorized, personnel would pull screens and sumps and fish would be forced released into the Green River. No release of fish will occur without a review by WDFW Fish Management and a risk assessment. WDFW Regional manager would consult with appropriate regional co-managers/NMFS to get recommendation for fish disposition.

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 rearing or delay in the river, limiting interactions with naturally produced steelhead juveniles.
- WDFW uses acclimation and release of smolts in lower river reaches where possible, this in an area below known wild fish spawning and rearing habitat in the upper Green River.
- Every effort shall be made to promote local adaptation of this fall chinook population and out of basin hatchery transfers of eggs or fish for use as broodstock will only be considered in extreme cases.

- WDFW releases fish in late June which gives listed fish time to grow to a size that has minimal predation and competition impacts.
- 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 Elochoman Hatchery programs are communicated to WDFW Region 5 staff for risk management or needed treatment. See also section 9.7.

Section 11. Monitoring and Evaluation of Performance Indicators

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

Refer to Section 1.10 for a discussion of how each “Performance Indicator” will be monitored and evaluated. In addition, another important aspect of hatchery management is the monitoring and evaluation of the genetic profile of hatchery-origin and of natural-origin stock(s). This is an ongoing monitoring need to evaluate changes in the genetic structure of both hatchery and natural populations and the amount and extent of gene flow between them. Achieving the monitoring and evaluation objectives requires handling fish and taking tissue samples for genetic analysis. Statistical considerations have led geneticists to identify a sample size goal of approximately 100 broodstock fish for such genetic monitoring.

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

To evaluate hatchery programs comprehensive monitoring and evaluation programs are needed. These programs at a minimum must measure adult hatchery and wild escapement, and fishery contributions from hatchery and wild salmonids for every stock. Reproductive success should be measured for representative wild and hatchery stocks. Ecological interactions (predation, competition, and disease) need to be measured for representative stocks as well. With the loss of Mitchell Act funding, staffing and logistical support may be lost to continue the monitoring and evaluation of this and other programs on the Columbia River.

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. Most trap mortalities are the result of extreme environmental conditions that flood traps, or equipment failure. WDFW will take precautions to make sure the equipment is properly functioning during the season. If environmental conditions are forecast that will cause high mortality then traps will be removed or opened up to allow unobstructed passage without mortality. Any take associated with monitoring activities is unknown but all activities follow scientific protocols designed to minimize impact.

Section 12. Research

12.1 Objective or purpose.

Applicable lower Columbia River fall chinook research work is being conducted at Kalama Falls.
1) Measure fecundity of fall chinook salmon at Kalama Falls Hatchery each year to determine temporal changes.
2) Compare these data to calculated fecundities obtained from hatchery records
3) Compare these data to data obtained at other Columbia Basin hatcheries.

12.2 Cooperating and funding agencies.

NOAA and WDFW

12.3 Principle investigator or project supervisor and staff.
Jim Byrne, Fish Biologist, 600 Capitol Way N, Olympia, WA 98501-1091

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

12.5 Techniques: include capture methods, drugs, samples collected, tags applied.
Individual females are measured to determine length and the age of the fish is determined by removing the snout if it contains a coded-wire tag or by removing and aging of scales if not tagged. The measured fecundity of the female is determined by passing the eggs through an electronic fish counter with accuracy of better than 95%. Fecundity by age is determined and the average measured fecundity of the brood is compared among broods and age classes.

12.6 Dates or time periods in which research activity occurs.
September through December.

12.7 Care and maintenance of live fish or eggs, holding duration, transport methods.
Each lot of eggs is carefully passed through the fish counter before standard shocking and picking activities by the hatchery crew. Total number o f eggs are counted and the lot of eggs is replaced in the incubator for subsequent incubation and care by the hatchery crew.

12.8 Expected type and effects of take and potential for injury or mortality.
A total of 20-30 hatchery females are used in the study.

12.9 Level of take of listed fish: number of range or fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached "take table" (Table 1).
20-30 adults

12.10 Alternative methods to achieve project objects.
Two alternatives exist. The first is to use estimated fecundities obtained by dividing total egg collection by total females spawned (however this study is being done to check the accuracy of this method) and the second method is to hand count the eggs.

12.11 List species similar or related to the threatened species; provide number and causes of mortality related to this research project.
Coho and steelhead. No associated mortality to other species is expected due to this activity.

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.

None. No associated adverse ecological effects or injury/mortality to listed species is expected from this activity.

Section 13. Attachments and Citations

13.1 Attachments and Citations

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Section 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

14.1 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:_____

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

Spring Chinook

ESU/Population	Lower Columbia River Spring Chinook
Activity	North Fork Toutle Hatchery Fall Chinook Program
Location of hatchery activity	North Toutle River Hatchery
Dates of activity	
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)	nya	nya	nya	nya
Collect for transport (b)	nya	nya	nya	nya
Capture, handle, and release (c)	nya	nya	0	nya
Capture, handle, tag/mark/tissue sample, and release (d)	nya	nya	nya	nya
Removal (e.g., broodstock (e)	nya	nya	0	nya
Intentional lethal take (f)	nya	nya	0	nya
Unintentional lethal take (g)	nya	nya	nya	nya
Other take (specify) (h)	nya	nya	nya	nya

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.

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

Fall Chinook

ESU/Population	Lower Columbia River Fall Chinook
Activity	North Fork Toutle Hatchery Fall Chinook Program
Location of hatchery activity	North Toutle River Hatchery
Dates of activity	
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)	nya	nya	nya	nya
Collect for transport (b)	nya	nya	nya	nya
Capture, handle, and release (c)	nya	nya	0	nya
Capture, handle, tag/mark/tissue sample, and release (d)	nya	nya	nya	nya
Removal (e.g., broodstock (e)	nya	nya	1346 *	nya
Intentional lethal take (f)	nya	nya	1346	nya
Unintentional lethal take (g)	312,500	281,250	nya	nya
Other take (specify) (h)	nya	nya	nya	nya

* With mass marking, an accurate level of take will possible.

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.

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

Winter Steelhead

ESU/Population	Lower Columbia River Steelhead
Activity	North Fork Toutle Hatchery Fall Chinook Program
Location of hatchery activity	North Toutle River Hatchery
Dates of activity	
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)	nya	nya	nya	nya
Collect for transport (b)	nya	nya	nya	nya
Capture, handle, and release (c)	nya	nya	0	nya
Capture, handle, tag/mark/tissue sample, and release (d)	nya	nya	nya	nya
Removal (e.g., broodstock (e)	nya	nya	nya	nya
Intentional lethal take (f)	nya	nya	nya	nya
Unintentional lethal take (g)	nya	nya	nya	nya
Other take (specify) (h)	nya	nya	nya	nya

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

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

Coho

ESU/Population	Lower Columbia River Coho
Activity	North Fork Toutle Hatchery Fall Chinook Program
Location of hatchery activity	North Toutle River Hatchery
Dates of activity	
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)	nya	nya	nya	nya
Collect for transport (b)	nya	nya	nya	nya
Capture, handle, and release (c)	nya	nya	0-50*	nya
Capture, handle, tag/mark/tissue sample, and release (d)	nya	nya	nya	nya
Removal (e.g., broodstock (e)	nya	nya	nya	nya
Intentional lethal take (f)	nya	nya	nya	nya
Unintentional lethal take (g)	nya	nya	nya	nya
Other take (specify) (h)	nya	nya	nya	nya

*- some Type S coho are captured while trapping fall chinook. Some may be kept as brood stock, many are released upstream. See N.F. Toutle Type S coho HGMP for a more accurate description.

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