

HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

DRAFT

Hatchery Program	South Fork Toutle River Cowlitz Game and Anglers Acclima0tion Pond
Species or Hatchery Stock	Summer Steelhead (<i>Oncorhynchus my kiss</i>) Skamania Stock
Agency/Operator	Washington Department of Fish and Wildlife
Watershed and Region	Cowlitz/Lower Columbia Province
Date Submitted	-
Date Last Updated	January 18, 2005

Section 1: General Program Description

1.1 Name of hatchery or program.

South Fork Toutle River - Cowlitz Game and Anglers Acclimation Pond

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

Summer Steelhead (*Oncorhynchus mykiss*)

ESA Status: Not listed and not a candidate for listing

1.3 Responsible organization and individuals.

Name (and title):	Mark Johnson Cowlitz Complex Manager
Agency or Tribe:	Washington Department of Fish & Wildlife
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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
Cowlitz Game and Anglers	Acclimation Pond Operations

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

Funding Sources
Mitchell Act - Full-time equivalent staff and annual operating cost and applies cumulatively to N.F. Toutle River, and Washougal/Skamania Hatcheries Anadromous Fish Programs, which cannot be broken out specifically by program.
Cowlitz Game and Anglers (In – kind contributions) - The Cowlitz Game and Anglers provides staff for the daily operations.

1.5 Location(s) of hatchery and associated facilities.

Broodstock source	Skamania Hatchery- North Fork Washougal River
Broodstock collection location (stream, Rkm, subbasin)	Skamania Hatchery/N.F. Washougal River/Rkm 2.4/Washougal
Adult holding location (stream, Rkm, subbasin)	Skamania Hatchery/N.F. Washougal River/Rkm 2.4/Washougal
Spawning location (stream, Rkm, subbasin)	Skamania Hatchery/N.F. Washougal River/Rkm 2.4/Washougal
Incubation location (facility name, stream, Rkm, subbasin)	Skamania Hatchery/N.F. Washougal River/Rkm 2.4/Washougal; and Vancouver Hatchery/Off-Stream Near Vancouver, WA/Columbia Lower
Rearing location (facility name, stream, Rkm, subbasin)	Skamania Hatchery/N.F. Washougal River/Rkm 2.4/Washougal; Vancouver Hatchery/Off-Stream Near Vancouver, WA/Columbia Lower; Toutle Hatchery/Green River (Tributary to S.F. Toutle River/Rkm 0.81/Cowlitz Subbasin; and Cowlitz Game & Anglers Acclimation Satellite Pond /S.F. Toutle River/Rkm 16.1/Cowlitz Subbasin

1.6 Type of program.

Isolated Harvest.

1.7 Purpose (Goal) of program.

The goal of the Cowlitz game and Anglers South Fork (S.F.) Toutle River Summer Steelhead Program is to mitigate for activities within the Columbia River basin, which have reduced fish populations. Release of summer steelhead smolts from the Cowlitz Game & Anglers Acclimation Pond into the S.F. Toutle River provides sport harvest under the selective fishery regulations (retention of adipose clipped fish only) within the Toutle and Cowlitz River basins

1.8 Justification for the program.

The Cowlitz Game and Anglers is a 501(c)-3 on-profit organization which began in 1939. It is one of the first and longest running citizen groups that organized to partner with local, state and federal governments to help the natural resources in the state (pers. comm.Edwina Herkle 2004). Landowners, sports fisherman and other interested parties have worked on the fish and wildlife projects for benefit in the Cowlitz, South Fork Toutle and Coweeman Rivers. A WDFW Cooperative Fish and Wildlife Project Memorandum of Understanding Fish Production Agreement is used for monitoring cooperative programs (see also section 3.2).

The South Fork Toutle acclimation site was developed in 1981 by the U.S. Army Corps of Engineers (COE) as a way to mitigate for lost production in the Toutle River system after the 1980 eruption of Mt. St. Helens. COE, the Washington Department of Game (WDG) along with the Cowlitz Game and Anglers partnered to develop a trapping and rearing site at the mouth of Jordan Creek which is a tributary of Brownell Creek. The trapping facility and plans were discontinued but the rearing and release of summer steelhead from this facility has been an on-going program since. A 14' X 40' X 3.5' wooden pond was constructed to last ten years. In 2001, the original pond was dismantled by the Cowlitz Game and Anglers and a newer pond

constructed (pers. comm. Dick Miller, 2004). The present facility is made up of two earthen ponds measuring 24' x 50' x 4.5' each although only one pond is currently being used.

The program will be operated to provide fish for harvest while minimizing adverse affects on listed fish. WDFW protects listed fish and provides harvest opportunity in the Lower Columbia River (LCR) through the LCR Fish Management and Evaluation Plan (FMEP) which has been agreed upon by NOAA (12/29/2003). To protect fish in the S.F. Toutle, salmon cannot be harvested. For steelhead harvest, only hatchery fish can be harvested which are marked to distinguish them from wild steelhead. WDFW selective gear regulations (artificial lures and single barbless hook only) are in place when wild winter steelhead start entering the system (December – March) up to the harvest closure on March 31st. Approximately 17 miles of the South Fork Toutle River above the 4100 Rd. Bridge is closed after November 30th to all angling in order to protect wild steelhead.

To minimize adverse interactions with listed juvenile fish, the project adheres to a number of program guidelines:

- Releases are consistent with WDFW Statewide Steelhead Rearing Guidelines (July 2001) indicating the time, size, and conditional at release of smolts for migration fitness and smoltification occurs within nearly the entire population, which reduces residence time in the streams after release.
- Physiological measures, including allowable population fork length standard deviation (STD) and coefficient of variation (CV) maximums, will be used to indicate when steelhead should be released.
- Fish are acclimated for several weeks at the site before release.
- WDFW fish disease control policies will reduce the incidence of diseases in hatchery fish produced and released, further decreasing the likelihood for disease transfer to wild salmon and steelhead.
- WDFW proposes to continue monitoring, research and reporting of hatchery smolt migration performance behavior, and intra and interspecific interactions with wild fish to assess, and adjust if necessary, hatchery production and release strategies to minimize effects on wild fish (Kalama River steelhead research station).

In order to minimize impact on listed fish by the South Fork Toutle River steelhead program, the following Risk Aversion are included in this HGMP:

Table 1. Summary of risk aversion measures for the S.F. Toutle steelhead program.

Potential Hazard	HGMP Reference	Risk Aversion Measures
Water Withdrawal	4.2	A Department of Ecology (DOE) water right exists for 4 cfs from Brownell Creek. The outfall deposits non-consumptive water directly to the S.F. Toutle River at a point downstream of Brownell Creek.
Intake Screening	4.2	A new intake structure (2000) has been constructed to replace the original non-compliant intake (Army Corp). The intake was engineered for screen and adult passage compliance thru the WDFW HPA authority.
Effluent Discharge	4.2	Total production and fish food usage at this acclimation pond does not meet requirements needed for an NPDES permit.
Broodstock Collection & Adult Passage	7.9	Broodstock are not collected for this program. See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

Disease Transmission	7.9, 10.11	<i>Fish Health Policy in the Columbia Basin.</i> Details hatchery practices and operations designed to stop the introduction and/or spread of any diseases within the Columbia Basin. Also, <i>Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries</i> (Genetic Policy Chapter 5, IHOT 1995).
Competition & Predation	2.2.3, 10.11	Fish are released as smolted yearlings that emigrate from the S.F. Toutle River basin and Columbia river within the year of release.

1.9 List of program "Performance Standards".

See section 1.10.

Benefits		
Performance Standard	Performance Indicator	Monitoring & Evaluation
Assure that hatchery operations support Columbia River fish Mgt. Plan (<i>US v Oregon</i>), production and harvest objectives	Contribute to a meaningful harvest for sport, tribal and commercial fisheries. Achieve a 10-year average of 572 fish harvested.	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 (Skamania Hatchery)	A minimum of 100 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)
Region-wide, groups are marked in a manner consistent with information needs and protocols to estimate impacts to natural and hatchery origin fish	Use mass-mark (adipose-fin clip) for selective fisheries.	Returning fish are sampled throughout their return for length, sex, mark and

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<p>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).</p>	<p>Necropsies of fish to assess health, nutritional status, and culture conditions</p>	<p>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</p> <p>A fish health database will be maintained to identify trends in fish health and disease and implement fish health management plans based on findings.</p>
	<p>Release and/or transfer exams for pathogens and parasites</p>	<p>1 to 6 weeks prior to transfer or release, fish are examined in accordance with the Co-managers Fish Health Policy</p>
	<p>Inspection of adult broodstock for pathogens and parasites</p>	<p>At spawning, lots of 60 adult broodstock are examined for pathogens (Skamania)</p>
	<p>Inspection of off-station fish/eggs prior to transfer to hatchery for pathogens and parasites</p>	<p>Controls of specific fish pathogens through eggs/fish movements are conducted in accordance to Co-managers Fish Health Disease Policy.</p>
<p>Program is successful at producing smolts.</p>	<p>Program adheres to acclimation time, rearing procedures and time of release as specified in FBD.</p>	<p>Cooperator and WDFW monitor growth and release parameters and submits yearly Volunteer Fish production Project Release and Planting Record Form that includes details on success of program. WDFW reviews and recommends changes if needed.</p>
<p>Program minimizes impacts and/or interactions to ESA listed fish. See also Risks below.</p>	<p>Program is consistent with the WDFW FBD.</p>	<p>Cooperator submits yearly WDFW Volunteer Fish production Project Release and Planting Record Form that includes details on fish released, date of releases and location of projects.</p>
<p>Partnership with local government and citizens continues</p>	<p>Cowlitz Game and Anglers coordinates ongoing and future cooperative projects</p>	<p>Volunteer involvement is tracked yearly and total hours committed are recorded.</p>

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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 (5.0–5.5X fish/lb) and released from the hatchery at a time that fosters rapid migration downstream. Mass mark production fish to identify them from naturally produced fish.	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.
Production facilities are operated in compliance with all applicable fish health guidelines, facility operation standards and protocols including HOPPS, 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	<p>MOU Section 4. The Cooperator shall also be responsible for obtaining and complying with any and all necessary permits to conduct the project(s) described in the attached Exhibit(s), which may include but are not limited to: Hydraulic Project Approvals (HPA), State Environmental Protection Act checklist (SEPA), National Pollution Discharge Elimination System (NPDES), Water Rights, local construction, grading, or filling permits, etc, with the exception of federal ESA compliance, which can only be deferred upon WDFW or the Treaty Tribes of Washington.</p> <hr/> <p>MOU Section 4. The Cooperator shall also be responsible for obtaining and complying with any and all necessary permits to conduct the project(s) described in the attached Exhibit(s), which may include but are not limited to: Hydraulic Project Approvals (HPA), State Environmental Protection Act checklist (SEPA), National Pollution Discharge Elimination System (NPDES), Water Rights, local construction, grading, or filling permits, etc, with the exception of federal ESA compliance, which can only be deferred upon WDFW or the Treaty Tribes of Washington.</p>	The Cooperator complies with all permits required and submits MOU to WDFW for each year involved in the project before project is approved.
Water withdrawals and instream water diversion	Hatchery intake structures meet state and federal guidelines where located in fish	Barrier and intake structure compliance assessed and needed

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<p>structures for hatchery facility will not affect spawning behavior of natural populations or impact juveniles.</p>	<p>bearing streams.</p>	<p>fixes are prioritized.</p>
<p>Harvest of hatchery-produced fish minimizes impact to wild populations</p>	<p>Harvest is regulated to meet appropriate biological assessment criteria. Mass mark juvenile hatchery fish prior to release to enable state agencies to implement selective fisheries.</p>	<p>Harvests are monitored by agencies and tribes to provide up to date information.</p>
<p>Water useage and in-stream water diversion structures will not affect spawning behavior of natural populations or impact juveniles.</p>	<p>Cooperator works with WDFW on technical site evaluation and operational support to minimize impacts of water or pond intakes .</p>	<p>The Cooperator submits yearly WDFW Volunteer Fish production Project Release and Planting Record Form that includes details success or operational concerns.</p>

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

See also Skamania Summer Steelhead HGMP for additional 1.10 information.

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

Broodstock are collected at Skamania Hatchery for WDFW Region 5 summer steelhead transfer and outplant programs. Approximately 200 spawning cohorts are used to support Region 5 programs. Smolts for the South Fork Toutle program come from a portion of the 200 spawning cohorts (approximately 20 - 25 pair). See also Skamania Summer Steelhead HGMP.

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
Yearling	25,000	5.5	April 15- May 1	S.F. Toutle	16.1	Toutle River	Lower Columbia

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

Program is for harvest only. From 1986 thru 2002, Smolt to Adult Harvest (sport catch data) averaged 2.07%. Average release was 24,225 smolts and average catch was 512 steelhead (WDFW Historical database). Adults cannot be collected in this system.

Return Year	Sport Harvest		
	Hatchery	Wild	H&W Total
1989/90	434	37	471
1990/91	421	0	421
1991/92	761	4	765
1992/93	320	12	332
1993/94	1,300	8	1,308
1994/95	387	23	410
1995/96	352	3	355
1996/97	1,243	6	1,249
1997/98	358	3	361
1998/99	138	6	144
1999/00	384	4	388
2000/01	577	0	577
2001/02	711	6	717
2002/03	265	4	269
2003/04	Na	Na	Na

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

The first release from the Cowlitz Game and Anglers Acclimation Pond was in 1983.

1.14 Expected duration of program.

The program is on-going.

1.15 Watersheds targeted by program.

Cowlitz/Lower Columbia Province

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

The sole purpose of the release of Skamania stock summer steelhead into the Toutle system is to continue a summer steelhead sport fishery. One group of smolts are acclimated at the Toutle Hatchery and released into the Green River. The other group is acclimated in a pond on the South Toutle River for release there. Both release locations encourage them to remain in the heart of the sport fishery so that they are highly susceptible to harvest. Any adults that escape the fishery may spawn in the system, but there is not a native return of summer steelhead into the Toutle system.

1.16.2 Potential Alternatives to the Current Program

Alternative 1: Eliminate the non-local program and develop a locally adapted stock. There is no local native summer steelhead stock for this program.

Alternative 2: Eliminate the program. This action would significantly reduce potential interaction with the natural population and eliminate impacts on other ESA listed species. This alternative is not considered acceptable; currently this program supports a very popular sport fishery in the Toutle River system and elsewhere. An adequate adult trapping facility is not in place.

Alternative 3: Capture excess adults and remove them from the system.

1.16.3 Potential Reforms and Investments

Reform/Investment 1: If the local stock were to be used for this program, new rearing facilities and heated water systems would be needed to produce 1-year smolts from the entire run time.

Reform/Investment 2: If the local stock were to be used for this program, new trapping facilities would be needed to acquire broodstock and maintain an integrated population.

Reform/Investment 3: If the local stock were to be used for this program, monitoring and evaluation will be needed to insure that the survival of the native population is not impacted and to decrease the risk of impacting other ESA listed species.

Reform/Investment 4: An adult capture facility is needed for adult control. Probably not feasible.

Section 2: Program Effects on ESA-Listed Salmonid Populations

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

No permits currently exist but production for this program is described in the Biological Assessment for “The Operation Of Hatcheries Funded by The National Marine Fisheries Service” (March 99). Concurrent with this HGMP to satisfy Section 7 consultations, WDFW is writing HGMP’s to cover all hatchery programs in the Lower Columbia ESU.

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- Natural and Hatchery (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.

None.

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

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.

Lower Columbia River fall chinook salmon (*Oncorhynchus tshawytscha*) are federally listed as “threatened” under the Endangered Species Act. Coweeman, Cowlitz and Toutle Populations.

Lower Columbia River Steelhead (*Oncorhynchus mykiss*), were listed as threatened under the ESA on March 19, 1998.

Lower Columbia River Coho (*Oncorhynchus kisutch*) is currently a candidate for listing and has been 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. Recovery goals and population targets have been established for Chinook, coho and steelhead populations in the LCR ESU.

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). In the early 1990's, estimated returns to the Toutle system was 164 fish (WDF, 1990). 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. In the late 1990's, WDFW started releasing spring Chinook from the North Toutle Hatchery but discontinued plants in 2001.

Lower Columbia River fall 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: 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). 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. Until 2001 the goal had not been met since 1989 (SaSI 2002, Draft).

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). SaSI (WDF et. al. 1993) listed fall chinook stocks as healthy in 1993; status today is depressed (SaSI 2002, Draft). 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. 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). 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). From 1990 –2001, escapement in the South Fork Toutle system averaged 57 fish although significant increases in fall Chinook escapement for 2002 and 2003 reflect the Lower Columbia River trend for those past 2 years.

Table 2. Fall chinook salmon abundance estimates in the LCMA.

Year	Cowee- man River	Cowlitz River	Green River	SF Toutle River	Kalama River	EF Lewis River	NF Lewis River	Washougal River
1990	241	2,698	123	0	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	0	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	0	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	14,427	Na	140	18,952	1375	17,106	6050
2003	Na	10,329	Na	450	24,782	727	20,171	3044

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). The Toutle River is managed for natural winter steelhead production with current stock status rated as depressed because of chronically low escapements (SaSI 2002, Draft). South Fork Toutle winter steelhead were identified as a stock based on their distinct spawning distribution. Redd counts in index areas in the mainstem South Fork Toutle from the mouth to Goat Creek and in Studebaker, Johnson, Harrington and “Loch” creeks have been conducted. Stock status is rated Depressed in 2002 because of chronically low escapements. An escapement goal of 1,058 fish has been established for this stock while escapement has been low averaging 415 fish from 1994 to the present (SaSI 2002, Draft).

Table 3. Wild winter steelhead abundance estimates in the LCMA.

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	Na	36	419	Na
1991	Na	904	108	72	114	108	1,128	Na
1992	Na	1,290	44	88	142	322	2,322	Na
1993	438	1,242	84	90	118	165	992	Na
1994	362	632	128	78	158	90	853	Na
1995	252	396	174	53	206	175	1,212	Na
1996	44	150	Na	Na	Na	251	853	70
1997	108	388	Na	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	Na
2001	284	334	192	79	216	185	1085	Na
2002	Na	Na	Na	Na	Na	Na	Na	Na
2003	Na	Na	Na	Na	Na	Na	Na	Na

Lower Columbia River Coho (*Oncorhynchus kisutch*) is currently a candidate for listing and 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 part of the ESU, 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, Draft). There are no adequate abundance trend data for South Fork Toutle coho, so their status is unknown (SaSI 2002, Draft). Spawning takes place in the South Fork Toutle River and in tributaries such as Johnson, Studebaker, Disappointment, and Herrington creeks.

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: The following hatchery activities are identified in the ESA Section 7 Consultation “Biological Opinion on Artificial Propagation in the Columbia River Basin” (March 29, 1999). WDFW considers broodstock selection as a direct take with predation, disease transmission and genetic and ecological interactions in the natural environment as indirect takes that cannot be quantified. As broodstock are not taken for this HGMP, no take tables will be submitted for this program.

Broodstock Program:

Broodstock Collection: Broodstock are not collected at this facility. See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

Genetic introgression: The Toutle River system did not have a native summer steelhead run. To

reduce the number of hatchery fish that could interbreed with listed winter steelhead, WDFW uses a wild steelhead management strategy to remove as many hatchery steelhead thru selective harvest as possible. For fish not harvested, studies by WDFW have shown Skamania stock hatchery summer steelhead in the Kalama system were 88% less effective at producing offspring compared to wild Kalama River steelhead (Leider et al., 1990). Results for hatchery winter steelhead in Beaver Creek (Chambers origin) indicate similar differences in reproductive success between hatchery and wild winter run steelhead (Hulett et al., 1998). Aside from small releases of winter steelhead fry after the 1980 Mt. St. Helens eruption, no hatchery winter steelhead have been released in the S.F. Toutle River; total winter steelhead hatchery releases are estimated as 58,079 from 1968-1985. Indirect take from genetic introgression is unknown.

Rearing Program:

Operation of Hatchery Facilities: Facility operation impacts include water withdrawal, effluent, and intake compliance. Effluent at outfall areas is rapidly diluted with main stem flows and operation is within non-permitted guidelines (NPDES guidelines). Indirect take from the S.F. Toutle Acclimation Pond 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 Washougal/Skamania Hatcheries. Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1995) chapter 5 have been instrumental in reducing disease outbreaks. Fish health at the Cowlitz Game and Anglers Pond has been good with minimal loss due in large part to the water quality, temperature regime, and the quality of smolts received. Indirect take from disease are unknown.

Release:

Hatchery Production/Density-Dependent Effects: Up to 25,000 steelhead smolts are released into the S.F. Toutle. WDFW considers a release of 20,000 smolts as being a minimal number needed to provide a level of steelhead harvest (pers. comm. Rawding 2004). Density effects would be an issue if steelhead do not migrate from the system and compete or interact with listed fish. These effects are minimized by release location, rearing program and time of release parameters. With selective fishery regulations, few hatchery steelhead are expected to remain in the system to spawn (Leider et al.1990). Indirect take from production or density dependent effects are unknown.

Competition: Salmon and steelhead feed actively during their downstream migration (Becker 1973; Muir and Emmelt 1988; Sager and Glova 1988). If they do not migrate they could compete with wild fish. The SIWG (1984) concluded that “migrant fish will likely be present for too short a period to compete with resident salmonids. Studies and monitoring programs on many systems throughout Washington indicate that salmon and steelhead smolts released from hatchery programs migrate rapidly downstream with migration rates of approximately 20 river miles per day were observed by steelhead smolts in the Cowlitz River (Harza 1998). Once in the lower Columbia River mainstem of tidal influence, in a study designed to define the migrational characteristics of chinook salmon, coho salmon, and steelhead trout in the Columbia River estuary, Dawley et al (1984), found the average migration rates for subyearling chinook, yearling chinook, and coho salmon and steelhead, were 22, 18, 17, and 35 Rkm daily respectively.

Predation: Hawkins and Tipping (1999) reported that in 1998, nearly half of the hatchery steelhead smolts sampled on the Lewis River, Washington contained Chinook salmon fry and the smolts had consumed a mean of 1.13 fry each. However, Cannamela (1993) and Jonasson et al. (1995) found low rates of predation on upper Columbia River tributaries, with 0.0% to 0.18% of hatchery steelhead smolts containing juvenile Chinook salmon. The variable predation rates cited

above were associated with extremes in Chinook salmon fry abundance; low predation rates had low spawner densities and high predation rates had high spawner densities. Recent research in Puget Sound has correlated low hatchery steelhead predation in systems with low to moderate levels of juvenile Chinook abundance (Response of Chinook Salmon Egg-to-Migrant Survival to Various Hatchery Steelhead Smolt Release Levels in the Skagit River, Washington, Curtis R. Kraemer*, Jack M. Tipping 11/3/04 Draft). In the absence of site-specific empirical information, the identification of risk factors can be a helpful tool for reviewing hatchery programs, while monitoring and research programs such as those on the Kalama River steelhead are developed.

Predation Risk Factors:

Environmental Characteristics: The South Fork Toutle River is a medium sized river system. Runoff is predominantly generated by fall, winter, and spring rainfall, with a portion of spring flows coming from snowmelt in the upper elevations and occasional winter peaks related to rain-on-snow events. During the release period, mean monthly flows are 754 cfs for April and 659 cfs for May (USGS Real Time Data). Below the confluence of the S.F. Toutle with the mainstem (N.F. Toutle), the combined flow is 2,676 cfs in April and 2109 in May. By late summer, glacial and sediment turbidity can result in reduced visibility in the N.F. and below the confluence area.

Dates of Releases: Steelhead are released from mid-April to May 1st. Listed Chinook from the Lower Columbia ESU are believed to be present in many systems over a wide rearing and migration window from March thru August. Listed winter steelhead including emerging fry and migrating yearlings are present in the system. Depending on available temperature units, eggs will hatch in 4-7 weeks with fry emergence approximately 2-3 weeks after hatching (Table 2). It is likely that a significant portion of migration and dispersal of the hatchery program, this occurs before peak emergence of listed winter steelhead.

Table 5. Steelhead Spawn and Emergence Windows.

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

Relative 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 or larger 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. 2001). 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). Although predation on larger chinook juveniles may occur under some conditions, WDFW believes that a careful review of the Pearson and Fritts (1999) study supports the continued use of the “33% of body length criterion” until further data for individual rivers can be collected.

Release Location and Release Type: The Cowlitz Game and Anglers Acclimation Pond is located approximately 9.6 Rkm above the confluence of the South Fork Toutle with the North Fork Toutle. This location is low in the South Fork Toutle system with significant wild stock habitat utilization above this point. Fish have been acclimated and imprinted to the area of Brownell Creek confluence with the S.F. Toutle which is the main area of harvest opportunity when adults return. Although the release is not totally volitional, most fish quickly vacate the pond as soon as screens are removed (pers. comm. Dick Miller 2004).

We have provided in this section a summary of empirical information and theoretical analysis of competition and predation interactions that may be relevant to the S.F. Toutle steelhead program.

Potential S.F. Toutle summer steelhead predation and competition effects on listed salmonids:

Adult chinook presence has been documented upstream an additional 19.2 Rkm from the steelhead release site (LCFRB Basin Plans 2004). Wild steelhead presence is also documented 27.0 Rkm upstream of the present release site. The majority of the hatchery steelhead smolts would emigrate from the system quickly. The potential competition effects would be from residualized individuals (see also *Residualism* below). Steelhead releases pose an unknown risk on listed fish of 70 mm fl and smaller as *O. mykiss* smolts are large enough to consume wild Chinook salmon fry (Pearsons and Fritts, 1999). In Hawkins and Tipping (1999), their research demonstrated that increased steelhead predation rates coincided with the increased abundance of chinook fingerlings produced from egg deposition rates of 778,000 eggs/km. Based on Chinook salmon potential egg deposition and size of the system planted (Response of Chinook Salmon Egg-to-Migrant Survival to Various Hatchery Steelhead Smolt Release Levels in the Skagit River, Washington, Curtis R. Kraemer*, Jack M. Tipping 11/3/04 Draft), and associated research on the Green and Deschutes River (pers. comm. Cameron Sharpe 2004), the S.F. Toutle would have a low Chinook egg density of 13,750 eggs/km (based on an average 66 fish escapement since 2000). By comparison, the relatively large Lewis River egg deposition potential (788,000 eggs/km) was cited as one of the factors on the predation rates in the Lewis River.

Residualism: To maximize smolting characteristics and minimize residual steelhead, WDFW adheres to a combination of acclimation, volitional release strategies, active pond management, size, and release guidelines (Steelhead Guidelines, July 2001). Condition factors including a lean .90-.99 K factor and co-efficient of variation (CVs) of less than 10% are steelhead rearing guidelines. Data from steelhead release programs on the Toutle River system are representative of the Lower Columbia steelhead programs and illustrates that few fish <180 mm fl and >250 mm fl are released. Figure 1 represents length frequency samples of 100 smolts from 25,000 summer steelhead released directly from the N.F. Toutle Hatchery while Figure 2 represents 25,000 summer steelhead released from the Cowlitz Game and Anglers Acclimation Pond located on the S.F. Toutle River

Figure 1. N.F. Toutle Summer Steelhead Plants (Hatchery Site Plants)

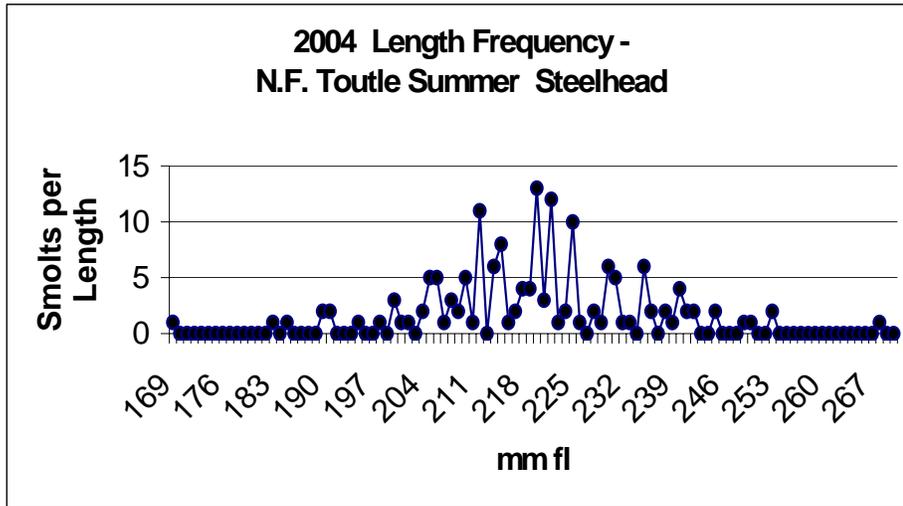
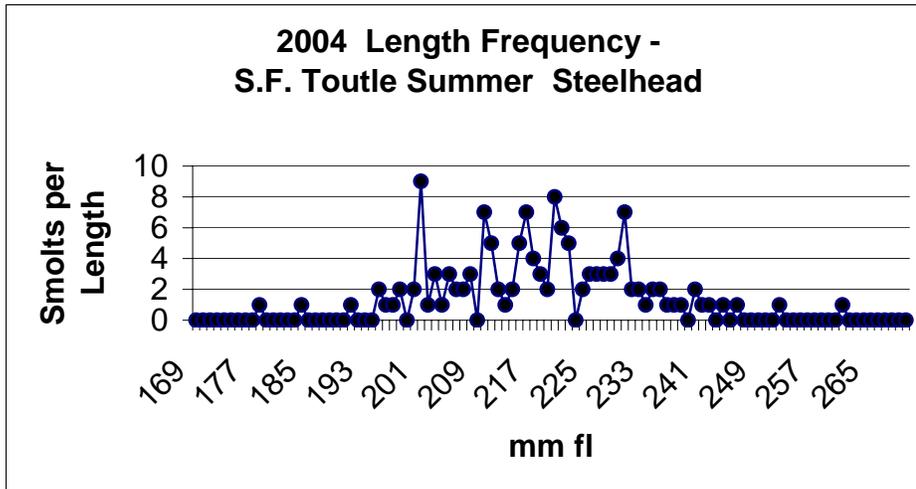


Figure 2. S.F. Toutle Summer Steelhead Plants (Acclimation Site Plants)



Migration Corridor/Ocean: It is unknown to what extent listed fish are available both behaviorally or spatially on the migration corridor. Once reaching the Columbia River, fish appear to travel quickly. Median Travel Time of subyearling chinook, on the mainstem Columbia River, from McNary to Bonneville Dam was estimated to average 8.0 days (29.2 RKm/d) during the years 1997 to 2003 (Memo- Michele DeHart to Bill Tweit (WDFW), 2003). In a study designed to define the migrational characteristics of chinook salmon, coho salmon, and steelhead trout in the Columbia River estuary, Dawley et al (1984), found the average migration rates for subyearling chinook, yearling chinook, and coho salmon and steelhead, were 22, 18, 17, and 35 RKm/d respectively. 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 baseline 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. 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. (There are no direct take table included in this HGMP).

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

Any additionally 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 are observed impacted by this operation, then staff would inform WDFW District Biologist Wolf Dammers who along with the Complex Manager would determine an appropriate plan and consult with NOAA if needed.

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.

The production developed for this program will be integrated with *U.S. v Oregon* and the Columbia River Fish Management Plan (CRFMP) and with hatchery plans documented in WDFW's yearly Future Brood Document (FBD), and Lower Columbia Fisheries Management and Evaluation Plan (2002 FMEP) which has been agreed to by NOAA for listed steelhead, chum, and Chinook in the ESU. The CRFMP defines the roles of harvest and production in the Columbia River basin, including the Snake River. The CRFMP has expired and the parties to *U.S. v Oregon* are in the process of renegotiating the plan.

WDFW 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:

Genetic Manual and Guidelines for Pacific Salmon Hatcheries in Washington. These guidelines define practices that promote maintenance of genetic variability in propagated salmon (Hershberger and Iwamoto 1981). 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 used to maintain genetic variability within the hatchery populations (Seidel 1983). 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* (Genetic Policy Chapter 5, IHOT 1995).

WDFW Steelhead Rearing Guidelines. Details rearing guidelines and rearing parameters statewide (July 31, 2001).

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.

Cooperative Fish and Wildlife Project Memorandum of Understanding (MOU) Fish Production Agreement:

A Cooperative Fish and Wildlife Project Memorandum of Understanding Fish Production Agreement is used to monitor WDFW and Cooperative programs annually with the Cowlitz Game and Anglers.

Among the important operational concerns, the Cooperator is responsible for: a) obtaining permission to work on private property; b) maintaining a list of volunteer workers and their hours of work; and c) submitting completed annual planting slips to the Department within 30 days of release. The Cooperator shall also be responsible for obtaining and complying with any and all necessary permits to conduct the project(s) described in the attached Exhibit(s), which may include but are not limited to: Hydraulic Project Approvals (HPA), State Environmental Protection Act checklist (SEPA), National Pollution Discharge Elimination System (NPDES), Water Rights, local construction, grading, or filling permits, etc, with the exception of federal ESA compliance, which can only be deferred upon WDFW or the Treaty Tribes of Washington.

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.

Releases from the Cowlitz Game and Anglers Acclimation Pond contribute to the South Fork Toutle, mainstem Toutle, and limited Cowlitz and Columbia River mainstem sport fisheries. Program is 100% mass marked (adipose fin-clipped) for the purpose of selective fisheries management. Selective fisheries were initiated for steelhead in the late 1980's in the lower Columbia River tributaries in order to provide maximum sport harvest (retention of adipose clipped fish only). Adults are not trapped at the return site so hatchery return is unknown.

The proposed harvest levels in the Lower Columbia FMEP occur at a level that, (1) ensures natural escapement, (2) avoids a genetic introgression of hatchery fish on wild fish. This regulation requires the release of all wild steelhead although there are no wild summer steelhead in the South Fork Toutle River System. On the Kalama River harvest rates for hatchery fish are believed to range from 40% to 70% and averaged near 50%. The harvest rate of hatchery fish is expected to remain greater than 40% for most stocks while harvest rates have been as high as 70% for hatchery steelhead in the Cowlitz River. Until wild steelhead populations have recovered, wild steelhead release regulations will be in effect with incidental mortality limited to less than 7% on wild stocks.

Brood Year	Harvest # of Adults
1992	761
1993	320
1994	1300
1995	387
1996	352
1997	1243
1998	358
1999	138
2000	384
2001	577
2002	711
2003	265
2004	NA

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, 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 documents 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 where 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 steelhead 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: S.F. Toutle steelhead smolts can be preyed upon release thru the entire migration corridor from the river subbasin to the mainstem Columbia River and estuary. Northern pikeminnows (beginning at RM 4.0) and introduced spiny rays along the Columbia mainstem sloughs can predate on coho 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 (river otters), and returning adults include: harbor seals, sea lions 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 thru 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 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.). Except for yearling stocks (coho and steelhead), these species may serve as prey items during the emigration thru the basin. While not always desired from a production standpoint, hatchery fish provide an additional food source to natural predators that might otherwise consume listed fish and may overwhelm established predators providing a beneficial, protective effect to co-occurring wild fish. Successful or non-successfully spawner adults originating from this program may provide a source of nutrients in oligotrophic 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). Carcasses from returning adult salmonids have been found to elevate stream productivity through several pathways, including: 1) the releases of nutrients from decaying carcasses has been observed to stimulate primary productivity (Wipfli et al. 1998); 2) the decaying carcasses have been found to enrich the food base of aquatic invertebrates (Mathisen et al. 1988); and 3) juvenile salmonids have been observed to feed directly on the carcasses (Bilby et al. 1996). Addition of nutrients has been observed to increase the production of salmonids (Slaney and Ward, 1993). The N.F. Toutle River drainage is thought to be inadequately seeded with anadromous fish carcasses and coho carcasses can be used throughout the basin. Assuming integrated spawning and carcass seeding efforts, approximately 5,000 – 10,000 Type S coho adult carcasses could contribute approximately 25,000 – 50,000

pounds of marine derived nutrients to organisms in the river.

4) Salmonid and non-salmonid fishes or species that could be positively impacted by the program. S.F. Toutle steelhead smolts can be preyed upon release thru 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 prey on steelhead smolts as well as avian predators, including gulls, mergansers, cormorants, belted kingfishers, great blue herons and night herons. Mammals that benefit from migrating smolts (river otters), and returning adults include: harbor seals, sea lions and Orcas.

Section 4. Water Source

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

Brownell Creek water is used to supply up to 1600 gpm for the program. A new screened intake provides water via a PVC pipeline system to the ponds and provides upstream access for fish. Water quality is good and loadings are kept at 3.3 lbs per gpm maximum.

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	A Department of Ecology (DOE) water right exists for 4 cfs from Brownell Creek. The outfall deposits non-consumptive water directly to the S.F. Toutle River at a point downstream of Brownell Creek.
Intake/Screening Compliance	A new intake structure has been constructed to replace the original non-compliant intake (Army Corp). The intake was engineered for screen and adult passage compliance thru the WDFW HPA authority.
Hatchery effluent discharges. (Clean Water Act)	Total production and fish food usage at this acclimation pond is limited to stay within requirements not exceeding need for a NPDES permit.

Section 5. Facilities

5.1 Broodstock collection facilities (or methods).

Broodstock are collected from Skamania Hatchery. See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

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

Not applicable.

5.3 Broodstock holding and spawning facilities.

Broodstock are held at Skamania Hatchery. See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

5.4 Incubation facilities.

Incubation is done at Skamania Hatchery. See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

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
1	Earthen Raceway (2)	5,400 each	50	24	4.5	1,600		.75 lbs/cu.ft.

5.6 Acclimation/release facilities.

Same as above, see section 5.5.

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

Outside of predation impacts, no significant mortalities have occurred.

5.8 Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

The gravity water supply system has been reliable for the program. Volunteer staff from the Cowlitz Game and Anglers provides operational support frequently and communicates any operational or disease concerns to the WDFW Toutle River staff.

Section 6. Broodstock Origin and Identity

6.1 Source.

The Skamania Hatchery Summer Steelhead stock was derived from wild fish taken from the Washougal and Klickitat rivers. For decades the Skamania Hatchery Summer Steelhead broodstock has been obtained directly from adults returning to the hatchery. The Skamania stock is the source of nearly all the hatchery summer steelhead smolts that WDFW releases in the Lower Columbia River region with the exception of Cowlitz and Lewis rivers (BO for CRFD funded facilities, March 1999).

6.2.1 History.

The first fish captured at the Skamania Hatchery for broodstock occurred in 1956. The first returns of wild fish reared at the hatchery returned in 1959. Lavier (1973) described the Washougal River as originally being a summer steelhead stream. Cowlitz and Skamania Hatchery stocks were introduced into the system in the late 1950s and are assumed to have interbred with the wild stock (Salmon and Steelhead Production Plan Washougal River Subbasin, 1990). The Skamania Hatchery has been stocking hatchery steelhead into the river system since the late 1950's.

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

6.2.2 Annual size.

Broodstock needs have been consistent at approximately 600 to 800 adult fish returning to the hatchery. The average hatchery return over the past 9 years has been 1653 fish with the highest year in 1992 (5173 fish) and the lowest year being 1999 with an estimated 600 fish. The sex ratio for Skamania Summer Steelhead is typically 45% males and 55% females. A comprehensive view of adult fish returns is found in the " Preliminary Stock Status For Steelhead in the Lower Columbia River, Washington, November 1997, WDFW". See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

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

Natural origin fish are not integrated within the broodstock program. See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

6.2.4 Genetic or ecological differences.

Skamania Summer Steelhead pool with wild summer steelhead from the Lower Columbia River (Phelps et al., 1994; Leider et al., 1986; and Busby et al., 1996). The difference in spawn timing (3 months earlier for Skamania hatchery fish), poor reproductive success for these fish in the wild (Hulett et al. 1998) and spatial separation at spawning have helped to maintain genetic differences between hatchery and wild fish. Fish are released as age-1+ smolts whereas wild steelhead are predominantly age-2+ smolts. Outmigration timing for both life history types is similar but is slightly earlier for hatchery component (Fuss et al. 1998). See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

6.2.5 Reasons for choosing.

For decades the Skamania Hatchery Summer Steelhead broodstock has been obtained directly from adults returning to the hatchery. There has been a long history of adaptation of the stock to Skamania facility contributing to the success of the summer steelhead program. Skamania stock has been the source of nearly all the hatchery summer steelhead smolts that WDFW releases in the Lower Columbia River region with the exception of Cowlitz and Lewis rivers (BO for CRFD funded facilities, March 1999). See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

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.

Listed fish are not used in broodstock selection and can be identified by adipose fin presence and are handled with care and released in stream reaches as prescribed by Region 5 biologists.

Section 7. Broodstock Collection

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

See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

7.2 Collection or sampling design

See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

7.3 Identity.

All hatchery-origin Skamania summer steelhead are adipose fin clipped and only fin-clipped adults are used for broodstock. Presently, adult broodstock are randomly selected over the entire run entry pattern based on program protocols and guidelines set forth by program/agency geneticists.

7.4 Proposed number to be collected:

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

See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

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

Broodstock needs for Skamania Hatchery Region 5 programs have been approximately 600 to 800 adult fish returning to the hatchery. The average hatchery return over the past 9 years has been 1653 fish with the highest year in 1992 (5173 fish) and the lowest year being 1999 with an estimated 600 fish. The sex ratio for Skamania Summer Steelhead is typically 45% males and 55% females. A comprehensive view of adult fish returns is found in the " Preliminary Stock Status For Steelhead in the Lower Columbia River, Washington, November 1997, WDFW". See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

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

See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

7.6 Fish transportation and holding methods.

See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

7.7 Describe fish health maintenance and sanitation procedures applied.

See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

7.8 Disposition of carcasses.

See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

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.

See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

Section 8. Mating

8.1 Selection method.

See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

8.2 Males.

See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

8.3 Fertilization.

See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

8.4 Cryopreserved gametes.

Cryopreserved gametes are not used.

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

Listed fish are not used in broodstock selection and can be identified by adipose fin presence and are handled with care and released in stream reaches as prescribed by Region 5 biologists.

Section 9. Incubation and Rearing.

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

See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

9.1.2 Cause for, and disposition of surplus egg takes.

See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

9.1.3 Loading densities applied during incubation.

See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

9.1.4 Incubation conditions.

See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

9.1.5 Ponding.

See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP for rearing and ponding up to sub-yearling stage. Fish from Skamania Hatchery are transferred to Cowlitz Game and Anglers acclimation ponds in January of the year at around 7-10 FPP. They are placed, reared and released from the Cowlitz Game & Anglers Acclimation Satellite pond. Dimensions of two earthen acclimation ponds are approximately 50' x 24' x 4.5'.

9.1.6 Fish health maintenance and monitoring.

Cowlitz Game and Anglers staff feeds and monitors progress at the ponds approximately 4-5 times weekly (pers.comm. Dick Miller CG&A). As soon as potential problems are seen, these concerns are immediately communicated to the N.F. Toutle Hatchery Specialist 4 who will contact the area Fish Health Specialist. There has been minimal fish health concerns at this site. In regular monitoring, fish health specialists normally conduct inspections monthly at N.F.Toutle Hatchery and the status of the S.F.Toutle pond is discussed.

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

No listed fish are incubated in this program.

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.

See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

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

Guidance to rear fish are based on using the loading densities recommended by Piper et al. 1982. Approximately 10,800 cu.ft of rearing area is available, although most fish are placed in one pond at this time. Maximum load density is .75-lbs/per cu.ft. Maximum lbs. per gallons per minute (GPM) do not exceed 2.5 lbs. per gpm. Loadings are within IHOT guidelines.

9.2.3 Fish rearing conditions.

Pre-smolts are pumped from the Skamania Hatchery rearing ponds to a tank truck, and are transferred to the ponds in winter. Fish are reared on Brownell Creek water. A screened intake is located approximately ¼ mile upstream of the ponds and feeds water via PVC pipe. IHOT standards are followed for: water quality, predator control measures (netting) to provide the necessary security for the cultured stock, loading and density. Environmental parameters: flow rates, water temperatures, dissolved oxygen and Total Settable Solids (TSS) are monitored on a routine basis thru the rearing period.

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
January /04	180	8.0	-	0.11
February /04	188	7.0	-	0.12
March /04	198	6.0	-	0.14
April/04	203	5.5	-	-
May /04	208	5.0	.930 (K)	-

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

Same as Section 9.2.4.

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).

At the South Fork Toutle Pond, feeding is done with demand feeders.

Rearing Period	Food Type	Application Schedule (#feedings/day)	Feeding Rate Range (%B.W./day)	Lbs. Fed Per gpm of Inflow	Food Conversion During Period
March-July	BioDiet	8	3.0-4.0	0.1	1.2
August-September	Moore Clark Nutra	6	2.0-2.5	-	0.80
October-December	Moore Clark Nutra	Demand	1.0-1.5	-	1.0
January-April	Moore Clark Nutra	Demand	0.5-1.0	0.06	1.1

See Skamania Summer Steelhead (Washougal River) Station Release and Outplants HGMP.

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

Cowlitz Game and Anglers staff feeds and monitors progress at the ponds approximately 4-5 times weekly (pers.comm. Dick Miller CG&A). As soon as potential problems are seen, these concerns are immediately communicated to the N.F. Toutle Hatchery Specialist 4 who will contact the area Fish Health Specialist. There has been minimal fish health concerns at this site. In regular monitoring, fish health specialists normally conduct inspections monthly at N.F. Toutle Hatchery and the status of the S.F. Toutle pond is discussed.

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

Aggressive screen and intake crowding, swarming against sloped pond sides, a lean (.90-1.0) condition factor (K), a silvery physical appearance absent of parr markings and loose scales during feeding events are signs of smolt development. N.F. Toutle hatchery staff conducts smolt to non-smolt checks (visual parr or non parr markings) during length frequency sampling close to the release period to determine the best date to begin release.

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

Some natural food sources are available in the acclimation ponds.

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

Listed fish are not reared.

Section 10. Release

10.1 Proposed fish release levels.

Age Class	Max. No.	Size (fpp)	Release Date	Location			
				Stream	Release Point (RKm)	Major Water-shed	Eco-province
Yearling	25,000	5.5	April 15 May 1	Cowlitz Game & Anglers Acclimation Satellite/S.F. Toutle River	RKm 16.1	Cowlitz	Lower Columbia

Due to environmental conditions, program goals (fish size and release dates) can be reviewed to protect the health of the program.

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

Fish are released from the pond beginning in mid-April. The outlet pipe leads to an off channel pond that drains directly to the S.F. Toutle River.

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

Release Year	Yearling Release		
	No.	Months	Avg Size/(fpp)
1992	31,900	April/May	5.0 –5.5
1993	27,700	April/May	5.0 –5.5
1994	25,600	April/May	5.0 –5.5
1995	24,600	April/May	5.0 –5.5
1996	23,300	April/May	5.0 –5.5
1997	32,900	April/May	5.0 –5.5
1998	30,900	April/May	5.0 –5.5
1999	23,900	April/May	5.0 –5.5
2000	15,000	April/May	5.0 –5.5
2001	11,900	April/May	5.0 –5.5
2002	24,100	April/May	5.0 –5.5
2003	23,900	April/May	5.0 –5.5
2004	24,976	April 18	4.9

10.4 Actual dates of release and description of release protocols.

Steelhead release guidelines and protocols include release from April 15 – May 15, with the release from year to year based on those parameters of size and condition.

10.5 Fish transportation procedures, if applicable.

Fish are transported to the acclimation pond in late winter in a 1000 gallon tanker truck equipped with an oxygen and aeration source.

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

Fish are reared, acclimated, and released as yearling smolts directly from the rearing/acclimation units at the S.F. Toutle Ponds. Rearing and acclimation has taken place on Brownell Creek water for approximately 4-5 months. Adult steelhead have a strong imprinting sense to this water as adult summer steelhead are known to access the ponds thru the outlet pipe if the ponds are pulled and there is water for attraction (pers comm. Miller 2004).

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

Program is 100% adipose fin-clipped.

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

As a transfer, a maximum program number has been agreed upon by Region 5 staff.

10.9 Fish health certification procedures applied pre-release.

Prior to release, the population health and condition is established by the Area Fish Health Specialist. This is commonly done 1-3 weeks pre-release and up to 6 weeks on systems with pathogen free water and little or no history of disease. Prior to this examine, whenever abnormal behavior or mortality is observed, Cowlitz Game and Angler staff contacts the staff at North Toutle Hatchery who would contact the Area Fish Health Specialist. The fish specialist examines affected fish, and recommends the appropriate treatment. Reporting and control of selected fish pathogens are done in accordance with the Co-managers Fish Disease Control Policy and IHOT guidelines.

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

Manager would contact Complex Manager to apprise him/her of situation. Based on authorization/instructions, manager would pull screens and stop logs for direct/forced release of fish to S.F. Toutle River.

10.11 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases.

- Acclimation of fish for several weeks will contribute to the smoltification process, and reduced hatchery salmon residence time in the system and mainstem migration corridors.
- Program release is consistent with WDFW Statewide Steelhead Rearing Guidelines (July 2001) indicating the time, size and conditional release of smolts for migration fitness and smoltification occurs within nearly the entire population, which reduces residence time in the streams after release.
- Physiological measures, including allowable population fork length C.V. maximums, will be used to indicate when steelhead should be allowed to enter the stream to maximize out-migration.
- Rearing and release strategies are designed to limit the amount of ecological interactions occurring between hatchery and naturally produced fish. Volitional release practices are employed to foster the exodus of smolts from rearing ponds over extended time periods to reflect normal migratory behavior patterns, while unsmolted fish remain in rearing ponds continue to feed and develop. Volitional release practices also act to reduce instantaneous densities of hatchery-reared fish in wild fish production areas, reducing potentially adverse density-dependent effects.
- Adherence to WDFW fish disease control policies will reduce the incidence of diseases in hatchery fish produced and released, further decreasing the likelihood for disease transfer to wild salmon and steelhead.
- Returning hatchery fish are under heavy selective harvest and are identified by Ad clip mark. Hatchery stock and wild fish are isolated by timing.
- WDFW proposes to continue monitoring, research and reporting of hatchery smolt migration performance behavior, and intra and interspecific interactions with wild fish to assess, and adjust if necessary, hatchery production and release strategies to minimize effects on wild fish.
- WDFW fish health and operational concerns for Skamania Hatchery programs are communicated to Region 5 staff for risk management or needed treatment. See also section 9.7.

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.

Performance indicators for harvest will be accomplished by continuing mass marking (ad clip). See section 1.10 Monitoring and Evaluation for additional plans and methods to collect data necessary. Ongoing monitoring of chum programs including Duncan Creek, Grays River/Sea Resources chum recovery programs will provide chum emigration data through 2012. Wild stock monitoring on Cedar Creek (Lewis River) is ongoing and will provide research that can be used to minimize hatchery releases on listed fish that can be strategically applied in the Lower Columbia system.

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

Current region 5 Fish program staff is available to continue baseline monitoring and evaluation in the Lower Columbia Management Area (LCMA) for adult steelhead and salmon evaluation including: redd surveys, mark-recapture surveys, trap counts, snorkel surveys Area-Under-the-Curve (AUC) surveys, sampling of carcasses and trapped fish include recovery of coded wide tagged (CWT) fish for hatchery or wild stock evaluation and downstream migrant trapping in many rivers. Long standing steelhead research is on-going in the Kalama River system for interactions of hatchery and wild steelhead. Chum monitoring will be done thru 2012, while ongoing research at Cedar Creek is in part funded by PacifiCorp and likely will be continued due to recent Lewis River system FERC agreements.

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 follow scientific protocols designed to minimize impact.

Section 12. Research

12.1 Objective or purpose.

Ongoing research on the Kalama River will be used to evaluate steelhead programs in and originating from the Skamania/Washougal system. The objectives of this work are to: 1) design and implement a wild broodstock hatchery program, 2) assess the reproductive success of hatchery fish from wild broodstock relative to that of wild fish, 3) measure interbreeding between wild fish and hatchery fish from wild broodstock and its effect on productivity of the naturally spawning population, and 4) assess the efficacy of wild broodstock hatchery programs in achieving natural production and other fishery management objectives including containment of risks to wild stocks. A thorough treatment of goals and objectives of the program as well as justification for and benefits of the work in the Kalama Basin is provided in Sharpe et al. (2000).

12.2 Cooperating and funding agencies.

NA

12.3 Principle investigator or project supervisor and staff.

NA

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

NA

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

NA

12.6 Dates or time periods in which research activity occurs.

NA

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

NA

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

NA

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).

NA

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

NA

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.

NA

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: _____