# HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

**DRAFT**

| | |
|---|---|
| Hatchery Program | North Toutle Hatchery Summer Steelhead |
| Species or Hatchery Stock | Summer Steelhead *(Onchorhynchus mykiss)* Skamania Hatchery Stock |
| Agency/Operator | Washington Department of Fish and Wildlife |
| Watershed and Region | Cowlitz/Lower Columbia Province |
| Date Submitted | nya |
| Date Last Updated | August 16, 2004 |

# Section 1: General Program Description

### 1.1 Name of hatchery or program.

N.F. Toutle River Summer Steelhead (Transfer from Skamania Hatchery)

### 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 |
| Address: | 600 Capitol Way N. Olympia, WA 98501-1091 |
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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 | 8.3 |
| Annual operating cost (dollars) | $817,771 |

The above information includes full-time equivalent staff and annual operating cost and applies cumulatively to N.F. Toutle River, and Washougal/Skamania Hatchies Anadromous Fish Programs which cannot be broken out specifically by program. Costs associated with this program are a portion of that total.

## 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 |

## 1.6 Type of program.

**Isolated Harvest**

## 1.7 Purpose (Goal) of program.

- Rear and release 25,000 smolts into the N.F.Toutle River system.
- The goal is to mitigate for activities within the Columbia River basin, which has reduced salmonid populations.
- The purpose is to provide maximum sport harvest recreational summer steelhead selective fisheries within the Toutle/Cowlitz River basins under the selective fishery regulations (retention of adipose-clipped fish only).

For programs designed for selective steelhead harvest, WDFW tries to minimize natural escapement of hatchery fish to protect the genetic diversity of wild stocks and minimize impact on listed fish. The most commonly used approach for steelhead management is to maximize the difference between hatchery and wild stocks, so that if hatchery fish spawn, they are not likely to interbreed with wild spawners. Strategies used by WDFW to limit genetic and ecological risks include: 1) limit the number of hatchery spawners by providing intense selective fisheries, and maintaining high trapping efficiency at the hatcheries or adult traps that remove hatchery fish prior to spawning; 2) advance the spawning timing of Chambers Creek and Skamania type steelhead stocks, so these fish spawn 3 months earlier than wild stocks, minimizing interbreeding between these two groups; 3) keep hatchery steelhead spawners in the lower river away from prime wild steelhead spawning areas through lower river releases and acclimation; 4) since the reproductive success of Chambers Creek stock is 11% of wild winter steelhead and Skamania stock is 18% of wild summer steelhead, the few fish that do survive to spawn will produce few offspring; 5) use hatchery management practices, acclimation, timing, and lower river releases to limit steelhead residualism and the competition and predation that can occur when steelhead smolts residualize; and 6) follow the Integrated Hatchery Operations Team (IHOT 1995) guidelines to limit disease risks from hatchery steelhead.

## 1.8 Justification for the program.

- The program is authorized under the Columbia River Fisheries Development Program, Columbia River Fish Management Plan and U.S. vs. Oregon.
- To provide selective fisheries WDFW protects listed fish and provides harvest opportunity through the Fish Management and Evaluation Plan (FMEP 2002). The objectives of the WDFW's FMEP are based on the WDFW Wild Salmonid Policy (1997). In that policy, it states that harvest rates will be managed so that 1) spawner abundance levels abundantly utilize available habitat, 2) ensure that 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. In addition, fisheries will be managed to ensure 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 steelhead, chinook salmon, and chum salmon in the Lower Columbia River (LCR) Evolutionary Significant Unit (ESU) will be managed to promote the recovery of these species and not at rates that jeopardize their survival or recovery.

To minimize impacts on listed fish by WDFW facilities operation and the North Toutle summer steelhead program, the following Risk Aversions are included in this HGMP:

**Table 1**. Summary of risk aversion measures for the North Toutle steelhead program.

| 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 useage 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.<br>See also section 4.2. |
| Broodstock Collection & Adult Passage | 7.9 | Broodstock are not collected for this program nor are listed fish activily collected. The hatchery weir and associated intake facilities need repairs to provide compliant passage. See also section 4.2. |
| 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). |
| Competition & Predation | 2.2.3, 10.11 | Current risk aversions and future considerations are being reviewed and evaluated for minimizing impacts to listed fish. See those sections. |

## 1.9 List of program "Performance Standards".

See section 1.10.

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

### 1.10.1 Benefits:

Portions of this table are not pertinent to this rearing and release plant. See Washougal/Skamania HGMP also.

| 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 catch of 422 fish. | 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.<br><br>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. | A minimum of 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.<br>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 with additional groups Ad+CWT and CWT only for evaluation purposes | Returning fish are sampled throughout their return for length, sex, mark and |
| 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 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<br><br>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 | Control 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 (5.0–5.5 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 (except CWT only groups) | 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<br><br>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. | Visual observations recorded.<br>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. 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).

Broodstock for this program are not collected at this facility. See 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 FBD | 5.0-5.5 | April – May | Green River/N.F .Toutle | 0.8 | Toutle/Cowlitz | Cowlitz |

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

Fish are released for harvest only and no escapement is intended for this program. Smolt-to-adult survival rates are not available. This includes fish harvested in the Green River and N.F.Toutle Rivers. Average release was 24,652 smolts and average catch was 422 steelhead (WDFW Historical database).

Harvest of steelhead (Includes Green River and N.F. Toutle catches)

| Brood Year | Sport Harvest | Smolt Release |
|---|---|---|
| 1992 | 1188 | 28,500 |
| 1993 | 261 | 28,600 |
| 1994 | 168 | 25,800 |
| 1995 | 438 | 12,200 |
| 1996 | 87 | 28,400 |
| 1997 | 102 | 36,000 |
| 1998 | 361 | 26,200 |
| 1999 | 566 | 35,200 |
| 2000 | 535 | 14,700 |
| 2001 | 518 | 11,900 |
| 2002 | Na | 24,100 |
| 2003 | Na | 24,225 |
| Average | 422 | 24,652 |

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

Steelhead have been planted in this system since 1970. The current program at North Toutle Hatchery began in 1996.

## 1.14 Expected duration of program.

The program is on-going with no planned termination.

## 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 North Toutle is to continue a summer steelhead sport fishery. One group of smolts is 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 the fish 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 in the Toutle system.

### 1.16.2 Potential Alternatives to the Current Program

Alternative 1: Eliminate the non-local program and use the native stock for this program. This would require using the native winter steelhead from the system. This would eliminate a popular summer steelhead fishery in the Toutle River system. Adult trapping, incubation, and rearing facilities are currently inadequate at Toutle Hatchery.

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 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.

Program is described in: "Biological Assessment For The Operation Of Hatcheries Funded by The National Marine Fisheries Service (March 99)". During 2004, WDFW is writing HGMP's to cover all stock/programs produced at Toutle River Hatchery; fall chinook, N and S type coho, summer and winter 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 sub-basin 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*)** has been proposed for listing 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 (*Onhorhynchus 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. The current estimated return is 164 fish. The Toutle Hatchery produced spring chinook from 1967 until 1980, when it was destroyed by the Mt. St. Helens mudflows. Most Toutle spring chinook were reared in Deer Springs Pond, which was destroyed in winter 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. The primary management objective for the Toutle River is to produce 500 fish for the sport harvest. This would represent an estimated subbasin return of 1,697 fish and a total production of 2,976 fish.

**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:** Cowlitz fall chinook are indigenous and historically abundant in the Cowlitz Basin. 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. Historically, fall chinook spawning occurred throughout the area that was available to anadromous fish, from the first favorable gravel riffle to the headwaters. 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 River. Stock status was 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, WDFW web site, 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. The Coweeman River has received fall chinook plants from at least 1951 until 1979. The Coweeman River fall chinook are a mixed stock of composite production. SaSSI (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 fish 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. Although derived from a mixed stock composition, this population may 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, pers. 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). Natural spawners (hatchery and natural origin) from 1964 through 1979 averaged 42 percent (equal to 4,517 fish) of the Toutle sub-basin spawners, which were estimated at 10,756 fish (Kreitman 1981). 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. Broodstock has been from a mixture of sources since the 1980 eruption. The estimated annual escapement of fall chinook in the Toutle and its tributaries in the early 1950s was 6,500 fish. An estimated 80 percent of the Toutle fall chinook run spawned in the lower 5 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. 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 sub-basin 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). Spawning areas in the mainstem Toutle, North Fork, and Green rivers were destroyed by the 1980 eruption of Mt. St. Helens. 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 sub-basin.

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

| Year | Cowee-man River | Cowltiz 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 *(Onchorhynchus 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.

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

| Brood Year | Index Redd Surveys | | | | | Pop. Est. Trap Counts | | IndexTrap/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 kitsutch*)** has been proposed for listing 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.

**Lower Columbia River Coho (*Oncorhynchus kisutch*)** is 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.

### 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 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*: Broodstock for the summer steelhead is collected at Skamania Hatchery. Not take is associated with this protion.

*Genetic introgression:* The Toutle system did not have a native summer steelhead run. To reduce the number of hatchery fish that could interbreed with listed steelhead during the winter, WDFW uses a wild steelhead management strategy removing hatchery marked steelhead through selective harvest. When hatchery fish spawn, their reproductive success in the wild is low and few offspring are produced (Chilcote et al. 1986 and Leider et al. 1990). 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 impacts on listed fish unknown but monitoring and maintenance are conducted along with staff observations. Intakes and screens 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). Effluent is rapidly diluted with main stem flows 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 Washougal/Skamania Hatcheries. Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1994) chapter 5 have been instrumental in reducing disease outbreaks. Fish health at the Cowlitz Game and Anglers Pond has been good with minmal loss due in large part to the water quality, temperature regime and quality of smolts. Indirect take from disease are 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. 25,000 steelhead smolts are released into the N.F. Toutle via the Green River as active smolts. Fish emigrate quickly at a time period similar to the Toutle River wild juvenile winter steelhead emigration which occurs from April to May, with this peak migration occurring in early May. 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 releases 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."

*Predation*: Steelhead released from this program may prey upon listed species of salmonids, but the magnitude of predation will depend upon the characteristic of the listed population, the habitat in which the population occurs and the characteristics of the hatchery program (e.g.. release time, location, number released and size at 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.

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 are developed and implemented such as those on the Kalama River.

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 Toutle and South Tourtle Forks, (approximately 12.0 RKm) downstream, the main 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 through August. Staff has been implementing release dates to May 1st in order to give listed Chinook additional growth.

Relative Body Size: Relative Body Size: Studies and opinions on size of predator/prey relationships vary greatly and although there is evidence that salmonids can prey on 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). 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 this system can be collected.

Release Location and Release Type: The likelihood of predation may also be affected by the location and type of release. Other factors being equal, the risk of predation may increase with the length of time that involves co-mingling. 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. Fish have been reared and released from a large acclimation pond at Toutle Hatchery. During the initial release, end screens are released and one or two stoplogs are removed. Staff reports that a majority of the population vacates the pond after the first day and by the 2nd day, the release is complete. Steelhead smolts released onstation may travel even more rapidly – migration rates of approximately 20 river miles per day have been observed in the Cowlitz River (Harza 1998).

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 N.F.Toutle summer steelhead program.

**Potential North Toutle Hatchery summer steelhead predation and competition effects on listed salmonids:**

The proposed annual production goal for this program is up to 25,000 fish at an average size of 5.0 fpp (approximately 210 mm fl). Fish are released volitionally from mid-April to May 1st. Steelhead released as actively migrating smolts would not likely compete for food or habitat with fingerling stocks of chinook or steelhead (Section 7). At 5.0 fpp, steelhead pose an unknown risk on listed fish of 70 mm fl and smaller. The magnitude of predation will depend upon the characteristic of the listed population of salmonids and the habitat in which the population occurs.

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 which can be a reduced visibility benefit to listed fish. 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) which can help disperse hatchery releases.

Relative Body Size: Steelhead releases average 5.0 fpp (210 mm fl). Below are some data available for chinook fry and fingerling lengths from area Lower Columbia streams. The current release poses a risk to fish less than 70 mm although as mentioned

previously, the magnitude of predation will depend upon the characteristic of the listed population of salmonids and the habitat in which the population occurs. Indirect take due to predation is unknown.

- Lengths from the Lewis River system during the month of June indicate fish are 48-55 mm fl (Columbia River Progress Report 2003-16).
- Average fork length, by week from 26 sampling sites on the Kalama River, indicate fish are 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 (Dan Rawding, WDFW, pers. comm. 2004).

Listed 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 4). Based on the migration and dispersal of the hatchery program, it is likely that this occurs before peak emergence of listed winter steelhead. Release of the program lower in the river is expected to be below much of the listed fish habitat and home the adult retrun to the lower river for additional harvest opportunity.

**Table 4.** 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 - 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 River Research Report 2003 |

Wild steelhead smolts migrate from freshwater to saltwater from March through June (Loch et al. 1986). Wild steelhead smolts on the Lewis River system averaged 135-154 mm fl in 1997 and 1998 respectively (Hawkins 2002) and would likely not be prey items. Potential competition would be minimized due to the migratory state of hatchery and wild stocks at this time. Steward and Bjornn (1990) concluded that hatchery fish kept in the hatchery for extended periods before release as smolts (e.g. yearling salmonids) also may have different food and habitat preferences than wild fish, and that hatchery fish will be unlikely to out-compete wild fish and are at a competitive disadvantage in free flowing systems.

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

Indirect take from competition and predation is unknown.

*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 (WDFW Steelhead Rearing Guidelines 2001). Condition factors including a lean .90-.99 K factor and co-efficient of variation (CVs) of less than 10% are steelhead rearing guidelines. For lengths, recent research (Rhine et al. 1997, Bigelow 1997) indicates steelhead smaller than 180 mm are more prone to residualize, while smolting and survival are optimized on fish greater than 190 mm fl (WDFW Steelhead Rearing Guidelines 2001). As a case in point, data from steelhead release programs on the Toutle River system are representative of the Lower Columbia steelhead programs at release that illustrates that few fish are less than 180 mm fl and/or greater than 250 mm fl on release. Figure 1 represents length frequency samples of 100 smolts from 20,000 summer steelhead released directly from the N.F.Toutle Hatchery while Figure 2 represents 20,000 summer steelhead released from the Cowlitz Game and Anglers Acclimation Pond located on the S.F. Toutle River. In both cases, few fish are outside these general guidelines for optimum steelhead size at release.

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

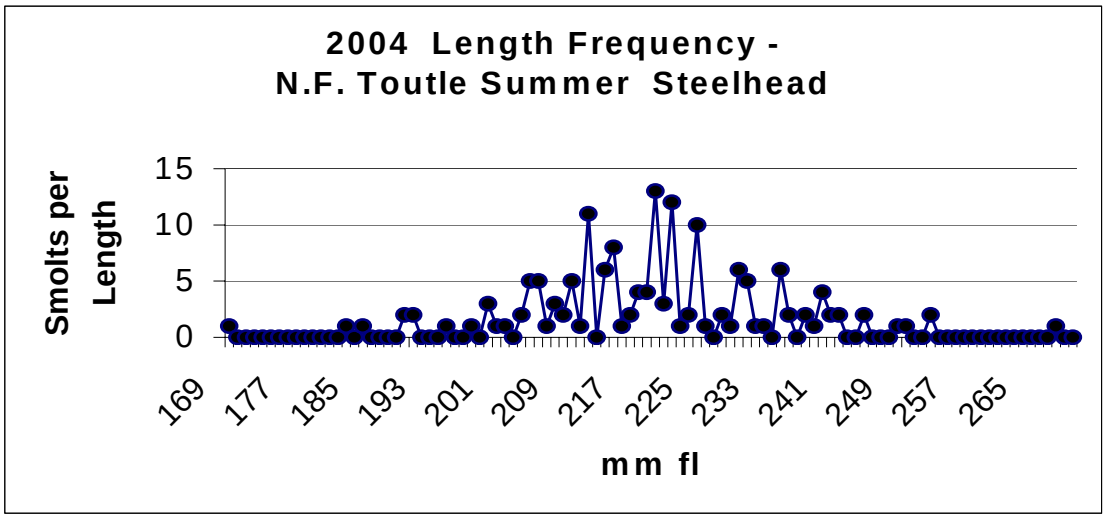
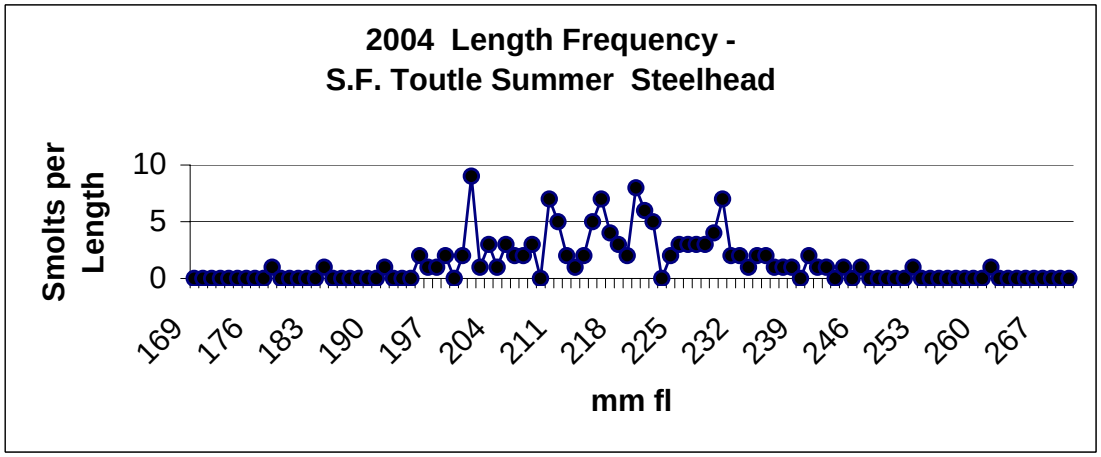



Figure 2. S.F. Toutle Summer Steelhead Plants (Acclimation Site Plants)




*Migration Corridor/Ocean*: Once in the mainstem, Witty et al. (1995) concluded that predation by hatchery production on wild salmonids does not significantly impact naturally produced fish survival in the Columbia River migration corridor. She also stated there are no studies demonstrating that numbers of Columbia system smolts emigrating to the ocean can be associated with a change in the survival rates of juveniles in the ocean in part because of the dynamics of

fish rearing conditions in the ocean.

**Monitoring**:

*Associated monitoring and evaluation and research programs:* 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 wire-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.**

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

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

No data available.

# 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 Managememt 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 re-negotiating the plan. According to the schedule a new plan is supposed to be finalized by spring 2004.

WDFW hatchery programs in the Columbia system adhere to a number of guidelines, policies and pemit 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 propagrated salmon (Hershberger and Iwamoto 1981). Also, *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (Genetic Policy Chapte 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 (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 detemining 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.

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.

Summer steelhead from North Toutle contribute to Green River and North Fork Toutle in river mainstem sport fisheries. The 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 to provide maximum sport harvest (retention of adipose clipped fish only). Most steelhead have passed upstream by the time the temporary weir has been installed for chinook and coho collection so the hatchery return is unknown.

This selective fishery regulation requires the release of all wild steelhead although there are no wild summer steelhead in the Green/North 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.

Harvest of steelhead (Includes Green River and N.F. Toutle catches)

| Brood Year | Harvest # of Adults |
|---|---|
| 1992 | 1188 |
| 1993 | 261 |
| 1994 | 168 |
| 1995 | 438 |
| 1996 | 87 |
| 1997 | 102 |
| 1998 | 361 |
| 1999 | 566 |
| 2000 | 535 |
| 2001 | 518 |
| 2002 | Na |
| 2003 | Na |

## 3.4 Relationship to habitat protection and recovery strategies.

*Sub-basin 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 limitng factors analysis (LFA) report has been completed by the Washington State Conservation Commission with input from 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 20 years. The 1980 eruption of Mount St. Helens severely impacted salmonid populations and habitat. Yet, most stream systems are naturally recovering from the disturbance. The North Fork Toutle is one exception where recovery has lagged. 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 programs 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:* N.F. Toutle steelhead smolts can be preyed upon through the entire migration corridor from the river sub-basin to the mainstem Columbia River and estuary. Northern pikeminnows (beginning at RM 4.0) and introduced spiny rays, as well as avian predators, including gulls, mergansers, cormorants, belted kingfishers, great blue herons and night herons along the Columbia mainstem sloughs, can prey on steelhead smolts Mammals that can take a heavy toll on migrating smolts and returning adults include: harbor seals, sea lions, river otters and Orcas.

*(2) Salmonid and non-salmonid fishes or species that could be negatively impacted by the program:* Co-occurring natural salmon and steelhead populations in local tributary areas and the Columbia River mainstem corridor areas could be negatively impacted by program fish. Of primary concern are the ESA listed endangered and threatened salmonids: Snake River fall-run Chinook salmon ESU (threatened); Snake River spring/summer-run Chinook salmon ESU (threatened); Lower Columbia River Chinook salmon ESU (threatened); Upper Columbia River

spring-run Chinook salmon ESU (endangered); Columbia River chum salmon ESU (threatened); Snake River sockeye salmon ESU (endangered); Upper Columbia River steelhead ESU (endangered); Snake River Basin steelhead ESU (threatened); Lower Columbia River steelhead ESU (threatened); Middle Columbia River steelhead ESU (threatened); and the Columbia River distinct population segment of bull trout (threatened). Listed fish can be impacted through a complex web of short and long term processes and over multiple time periods which makes evaluation of this 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.).

*4) Salmonid and non-salmonid fishes or species that could be positively impacted by the program.* N.F.Toutle steelhead smolts can be preyed upon through the entire migration corridor from the river sub-basin to the mainstem Columbia River, estuary and in the immediate ocean system by picsivorous salmon species. Northern pikeminnows and introduced spiny rays, as well as avian predators, including gulls, mergansers, cormorants, belted kingfishers, great blue herons and night herons in the Columbia mainstem sloughs, can prey on steelhead smolts Mammals that benefit from migrating smolts and returning adults include: harbor seals, sea lions, river otters and Orcas. Except for yearling stocks (coho and steelhead), these species may serve as prey items during the emigration through the basin. Hatchery fish provide an additional food source to natural predators that might otherwise consume listed fish and may overwhelm established predators providing a beneficial, protective effect to co-occurring wild fish. Spawning 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). 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 carcasses (Bilby et al. 1996). Addition of nutrients has been observed to increase the production of salmonids (Slaney and Ward 1993; Slaney et al. 2003; Ward et al. 2003). The N.F.Toutle River drainage is thought to be in-adequately seeded with anadromous fish carcasses and steelhead carcasses can be used throughout the basin. Assuming integrated spawning and carcass seeding efforts, approximately 1,000 steelhead adult carcasses could contribute approximately 7,000 pounds of marine derived nutrients to organisms in the river. *Saprolegniasis* occurrences in young hatchery fish though have been observed in greater frequency on Mitchell Act stations. In some cases, circumstantial evidience suggests more outbreaks of gill and tail funguus are the result of nutrient enhancement efforts. Fish health 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% re-use water, and staff uses two aerators in order to boost oxygen levels in the adult pond and create some cover during August to October, if needed. The raceway rearing ponds attain a maximum of 3,500 gpm total of gravity fed water. 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 and are formalized through trust water right #S2-24832 from the Department of Ecology. Monitoring and measurement of water useage 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 facilty operates under the "Upland Fin-Fish Hatching and Rearing" National Pollution Discharge Elimination System (NPDES) genral 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.<br><br>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 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).

Sub-yearling smolts are trucked from Skamania to North Toutle in a 1000 gallon capacity tanker equipped with oxygen and aeration.

### 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 Pond | 95722 | nya | nya | nya | 4200 | 2.10 | 0.09 |

### 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.

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 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.
7) Erruption of Mount St. Helens totally destroyed the facility. Required construction and rebuilding for most of the hatchery infra-structure.

## 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.

Listed fish are not reared.

| Potential Hazard | Risk Aversion Measure |
|---|---|
| Equipment failure/Water loss | Staff is available 24/7 to respond to these hazards. 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. |
| Disease Transmission | Fish Health guidelines on release are followed on rearing and release (IHOT 1999). |

# 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 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.

Skamania Hatchery summer steelhead were developed in the late 1950's from the Washougal and Klickitat rivers (Crawford 1979). The Skamania Hatchery has been stocking hatchery steelhead into the Toutle 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 Skamania Hatchery. The average hatchery return over the past 9 years has been 1,653 fish with the highest year in 1992 (5,173 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.

NORs 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 genetically with wild summer steelhead from the Lower Columbia River (Phelps et. al. 1994, Leider et al. 1996 and Busby et al. 1997). 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. 1999). 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. 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.

- Only hatchery stock is used.
- Timing is separated from natural steelhead.
- Holding pond procedures follow IHOT guidelines.
- Other listed fish, if identified, 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).

Broodstock are not collected at this station. 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. Only adipose fin-clipped adults are used for broodstock. Presently, adult broodstock are randomly selected over the entire run entry pattern based on program protocols and guidelines set forth by program/agency geneticists.

## 7.4 Proposed number to be collected:

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

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 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 1,653 fish with the highest year in 1992 (5,173 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. Fish from Skamania Hatchery are transferred to N.F. Toutle Hatchery in January of the year. Fish are transferred, reared and released from pond 25 which is a ¼ acre gravel pond located upstream towards the upper river intake.

### 9.1.6 Fish health maintenance and monitoring.

Staff conducts daily inspection and samples fish at all growth stages. As soon as problems are seen, these concerns are immediately communicated to the WDFW fish health specialist. Fish health specialists conduct inspections monthly. Potential problems are managed promptly to limit mortality and reduce possible disease transmission. Records on inspections are kept at the hatchery.

### 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).

The fish are reared using the loading densities recommended by Piper (1982). In all facilities within the 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 at the hatchery are reared on Green River water. Environmental parameters: flow rates, water temperatures, dissolved oxygen and Total Settable Solids (TSS) are monitored on a routine basis through the rearing period. IHOT standards are followed for: water quality, alarm systems, predator control measures (netting) to provide the necessary security for the cultured stock. Settleable solids, unused feed and feces are removed regularly to ensure proper cleanliness of rearing containers. All ponds are broom cleaned as needed and pressure washed between

broods. Temperature and dissolved oxygen are monitored and recorded daily during fish rearing.

### 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.

| | | | | | | |
|---|---|---|---|---|---|---|
| January | 180 | 8.0 | nya | 0.11 | nya | nya |
| February | 188 | 7.0 | nya | 0.12 | nya | nya |
| March | 198 | 6.0 | nya | 0.14 | nya | nya |
| April | 203 | 5.5 | | | | |
| May | 208 | 5.5 | | | | |

### 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*).

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 | nya | 0.80 |
| October-December | Moore Clark Nutra | Demand | 1.0-1.5 | nya | 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.

| | |
|---|---|
| Fish Health Monitoring | A fish health specialist inspects fish monthly and checks both healthy and if present symptomatic fish. Based on pathological or visual signs by the crew, age of fish and the history of the facility, the pathologist determines the appropriate tests. External signs such as lesions, discolorations, and fungal growths will lead to internal examinations of skin, gills and organs. Kidney and spleen are checked for bacterial kidney disease (BKD). Blood is checked for signs of anemia or other pathogens. Additional tests for virus or parasites are done if warranted. |
| Disease Treatment | At Skamaina Hatchery, bacterial cold water disease (Flavobacteriosis) can occur mid-summer with Florfenicol used. IHN can occur from mid-summer to fall. Loss o fish to IHN in 2002 was 6% of the summer steelhead population. After transfer to N.F.Toutle Hatchery, rearing and disease problems have not been a problem. In 2002, loss was 122 fish out of a population of 24,347 (.05%) from January to April release. 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.

Gill ATPase levels are not measured. But staff observes fish behaviors such as 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 as 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.

Not applicable.

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

Listed fish are not reared.

# Section 10. Release

## 10.1 Proposed fish release levels.

| Age Class | Max. No. | Size (ffp) | Release Date | Location | | | |
|---|---|---|---|---|---|---|---|
| | | | | Stream | Release Point (RKm) | Major Water-shed | Eco-province |
| Yearling | 25,000 | 5.0 | April 15 - May 15 | Green River (Tributary to N.F. Toutle River) | 0.81 | 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).

January - Fish are released from pond 25 to the Green River approximately RKm .81 above the confluence of the Green River with the N.F.Toutle River.

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

| | Yearling Release | | |
|---|---|---|---|
| Release Year | No. | Months | Avg Size/(fpp) |
| 1992 | 28,500 | April/May | 5.0 –5.5 |
| 1993 | 28,600 | April/May | 5.0 –5.5 |
| 1994 | 25,800 | April/May | 5.0 –5.5 |
| 1995 | 12,200 | April/May | 5.0 –5.5 |
| 1996 | 28,400 | April/May | 5.0 –5.5 |
| 1997 | 36,000 | April/May | 5.0 –5.5 |
| 1998 | 26,200 | April/May | 5.0 –5.5 |
| 1999 | 35,200 | April/May | 5.0 –5.5 |
| 2000 | 14,700 | 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 | 24,225 | April/May | 5.0 –5.5 |

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

Steelhead release guidelines and protocols include release from April 15 – May 15, fork length (180 –240 mm fl), and condition factor .90 - .99 (K) (WDFW Steelhead Rearing Guidelines 2001). Steelhead are volitionally released from pond 23 when they meet these parameters. In 2004, the starting release date was May 4. Outlet screens are removed allowing fish to volitionally migrate immediately. In 2004, the volitional release occurred quickly with the total pond vacated within 48 hours (pers. comm. Peterson).

### 10.5 Fish transportation procedures, if applicable.

Fish do not need transport.

### 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 (pond # 25) at the N.F. Toutle Hatchery. Rearing and acclimation has taken place on Green River water for approximately 4-5 months.

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

Program is 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. 25,000 fish is the current plant.

### 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 examination, whenever abnormal behavior or mortality is observed, staff also contacts the Area Fish Health Specialist. The fish specialist examines affected fish, and recommends the appropriate treatment. Reporting and control of selected fish pathogens are done in accordance with the Co-managers Fish Disease Control Policy and IHOT guidelines.

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

Staff would contact Complex Manager to aprise him/her of situation. Based on authorization/instructions, manager would pull screens and stoplogs for direct/forced release of fish to Green River.

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

- The production and release of smolts through fish culture and volitional release practices fosters rapid seaward migration, limiting freshwater interactions with naturally produced chinook and steelhead juveniles.
- WDFW uses acclimation and release of smolts in lower river reaches where possible. Smolt releases from this facility occur below known wild fish spawning and rearing habitat in the upper Green River.
- Fish are mass marked for heavy harvest selection.
- North 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 when 100% of the sample has smolted.
- Steelhead releases will start after May when operationally feasible to allow listed Chinook time for additional growth to minimize potential predation but is still prior to when listed steelhead have emerged from late May – June.
- 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 North.Toutle 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.

Continue to calculate annual fisheries contribution rates based on coded-wire-tag recoveries in regional commercial and sport fisheries. Continue use of mass marked (ad clip) and coded-wire-tagged groups as effective management and research tools. Ongoing research by the Kalama Research Station may provide applicable methods for management of this steelhead program. Also see HGMP Section 1.10.

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

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. Current Region 5 Fish Program staff are available to complete monitoring and evaluation of baseline Lower Columbia system needs while research is on-going for coho interaction in the Lewis River and steelhead in the Kalama 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 equipment failure or extreme environmental conditions that flood traps. 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.**

See Kalama River wild summer and winter steelhead HGMPs.

**12.3 Principle investigator or project supervisor and staff.**

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

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

**12.6 Dates or time periods in which research activity occurs.**

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

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

**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).**

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

**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.**

# 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:_____