

# HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

**DRAFT**

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Hatchery Program	Mayfield Lake Rainbow Trout
Species or Hatchery Stock	Rainbow Trout ( <i>Oncorhynchus mykiss</i> )
Agency/Operator	Washington Department of Fish and Wildlife
Watershed and Region	Cowlitz Subbasin/Lower Columbia Province
Date Submitted	
Date Last Updated	April 7, 2005

## Section 1: General Program Description

### 1.1 Name of hatchery or program.

Mayfield Lake Rainbow Trout

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

Rainbow Trout (*Onchorhynchus 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:	1182 Spencer Road, Winlock, WA 98596
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### Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program.

Co-operators	Role
Tacoma Public Utilities	Funding Source for Mitigation production (50,000 lbs)
Friends of the Cowlitz	Cooperative Group that operates Net Pens in Lake Mayfield.

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

Funding Sources	
Tacoma Public Utilities	
Operational Information	Number
Full time equivalent staff	2.0
Annual operating cost (dollars)	\$118,000.00*

\*Trout production as negotiated in the previous Settlement Agreement is approximately 40% of the available Mossyrock Trout budget. The remainder budgets for production for additional programs are from Wildlife (State) and Dingall - Johnson (Federal Match) funding.

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

Broodstock source	Goldendale Hatchery/Goldendale, WA/ Klickitat Co.
Broodstock collection location (stream, Rkm, subbasin)	Goldendale Hatchery/Goldendale, WA/ Klickitat Co.
Adult holding location (stream, Rkm, subbasin)	Goldendale Hatchery/Goldendale, WA/ Klickitat Co.
Spawning location (stream, Rkm, subbasin)	Goldendale Hatchery/Goldendale, WA/ Klickitat Co.
Incubation location (facility name, stream, Rkm, subbasin)	Mossyrock Hatchery/Mayfield Reservoir/ Cowlitz
Rearing location (facility name, stream, Rkm, subbasin)	Mossyrock Hatchery/Mayfield Reservoir/ Cowlitz

### 1.6 Type of program.

Isolated Harvest

### 1.7 Purpose (Goal) of program.

Mayfield Lake is planted with legal rainbow trout to provide harvest and recreation to east Lewis County residents.

### 1.8 Justification for the program.

Plants were made to Mayfield Lake as part of the a negotiated agreement between WDFW and Tacoma Power in 1986 to provide trout for resident fisheries in areas above Mossyrock Dam. Resident trout programs provide substantial recreational fishing opportunities that can be measured by numbers of angler trips that translate into important local economic benefits. For fishery evaluations, creel census studies on Mayfield Lake were not available but plants to Lake Scanewa as part of Lewis PUD mitigation (FERC 2833) indicate an estimated 25,616 hours were expended to fish for approximately 25,000 planted rainbow trout in that reservoir (Tipping and Serl 2000). Also, in the reservoir directly upstream of Mayfield Lake (Riffe Lake), based on the most recent creel survey an estimated 120,360 angler hours was expended for a twelve month period during 1999-2000 which compared to an average of 167,000 angler hours from three previous assessments from the late 1970's (Tipping and Buckley 1979) and 1980's (Tipping 1998). Prior to 1980, trout plants of up to 400,000 catchable trout were made in the system mostly in larger tributaries of the Upper Cowlitz and the Cispus Rivers. By the early 1980's, the program was reduced to 200,000 fish to reduce impacts on wild trout and reduce wastage. WDFW then decided to prioritize plants to each major community (Packwood, Randle, Mossyrock and Morton. In 1986, a new wildlife agreement was signed with Tacoma Power which provided for 50,000 pounds of catchable trout annually. For a number of years, coho salmon plants into Mayfield Lake and Riffe Reservoir and counted as part of the mitigation plants. By the mid 1990's, trout plants were being made directly into Mayfield Lake with current releases being made by the Friends of the Cowlitz Mayfield Lake Net Pens.

Rainbow trout plants are made from the Friends of the Cowlitz (FOC) Net Pens in Mayfield Lake located adjacent to the Mossyrock Hatchery on Mayfield Lake. The net pens provide the space needed for rearing a large portion of the trout production funded by Tacoma Power due to space and water limitations at Mossyrock Hatchery. A smaller amount of 3,750 are directly planted

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from Mossyrock Hatchery to the Ike Kinswa State Park boat launch site that also counts toward the poundage agreement of 50,000 lbs if needed. Although Mayfield Lake is open year around, trout plants released directly into the lake from Mossyrock Hatchery or from the FOC net pens start in March when traditional lake fishing pressure increases and continue throughout the summer. Along with 10,000 rainbow trout planted in Swofford Pond, a brown trout plant of 4,000 is made into Swofford Pond and counted as part of the trout production. Swofford Pond has a retention structure that usually does not allow fish to access Mayfield Lake.

In the final Cowlitz Project Settlement Agreement (SA), the Cowlitz River Fisheries Technical Committee (FTC) concluded that continued trout production is not consistent with the primary goal of the Settlement Agreement; defined as achieving ecosystem integrity and the recovery of wild, indigenous salmonid runs, including ESA-listed and unlisted stocks, to harvestable levels. Hook and release mortality on steelhead smolts, angler by-catch, predation, genetic impacts that would lower native disease resistant to *Ceratomyxa Shasta* a disease endemic to the Cowlitz River, and that planting of resident trout susceptible to this same pathogen would increase bed loads in the release stream "*Impacts of Resident Trout Fisheries on Anadromous Fish Populations*" (TPU 2004) prepared for the Cowlitz FTC. Sources of impacts cited in the document include several WDFW studies. In the recent SA through 2004, Tacoma Power provided funding for 50,000 pounds of trout production and after 2004, future trout production was to be based upon a review by the FTC of the success or failure of the program and any impacts to listed stocks (Section b, Article 5). Future production of the resident trout program was eliminated from the final FHMP (August 2004). Negotiations between WDFW and Tacoma Power resulted in funding through the 2005 releases but future funding and the trout program are currently under negotiation.

Plants occur from March through August with trout released directly from the Friends of the Cowlitz (FOC) Net Pen Complex located adjacent to Mossyrock Hatchery. Staggered plants can be made from one or two net pens (approximately 6,000 - 6,500 fish per pen) prior to weekends and provide readily available fish throughout the season as a catch-able size product. The additional plants from Mossyrock Trout Hatchery are trucked to Ike Kinswa State Park area at the confluence of the Tilton River with Mayfield Lake. In the past fish releases have been variable from trout one pound each to smaller fish at 5.0 ffp. Current target size at release has been 2.0 – 2.8 ffp throughout the staggered release schedule. Larger fish such as one pounders (0.8 – 1.0 ffp) are eliminated to reduce predation potential on listed fish and eliminating smaller fish (5.0 ffp) acenutate the size disparity between catch-able trout at 25 cm and migrant steelhead smolts which average 16.8 to 19.9 cm (Serl and Morrill, Draft 2004). General characteristics of the rainbow trout used (Goldendale Hatchery broodstock) have been described as: few fish survive the following year after being grown to a legal size and exhibit little success at spawning (pers. comm. B. Crawford 2005).

As a migration corridor for smolts produced in several tributaries, approximately 4,000 steelhead smolts are collected yearly at Mayfield Dam. There are minimum size restrictions for lake fishing to prevent angler by-catch and juvenile steelhead harvest rates in reservoir fisheries are expected to be low as reservoirs are believed to provide little rearing habitat for juvenile steelhead (TPU 2004). In the past fish releases have been variable from trout one pound each to smaller fish at 5.0 ffp. Current target size at release has been 2.5 ffp throughout the staggered release schedule. Larger fish such as one pounders are eliminated to reduce predation potential on listed fish and eliminating smaller fish (5.0 ffp) acenutate the size disparity between catch-able trout at 25 cm and migrant steelhead smolts averaging 16.8 to 19.9 cm (Serl and Morrill, Draft 2004). NOAA has set an incidental ceiling of 5% incidental mortality in a given year, that if exceeded, then additional measures would be considered. To reduce impacts of trout fisheries in anadromous reservoirs where listed fish use as migration corridors, future Mayfield Lake plants

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could be consistent with management on Lake Scanewa where Lewis PUD has consulted with NOAA fisheries and altered their resident fish mitigation requirements to accommodate impacts to anadromous juveniles identified by the creel study (Tipping and Serl 2000). The following are currently being discussed or are in effect with creel census monitoring planned for 2005 (pers. comm.. M. Kohn, Lewis PUD 2005).

1. Reduction in numbers planted to 25,000 rainbow annually.
2. Initiate stocking between June 16-30 annually
3. Continue the management practice of Lake Scanewa closure until June 1
4. Encouraged management practice to increase bag limits after Labor Day to minimize holdover trout
5. Plant only a single size of RBT at approximately 2 fpp
6. Externally mark resident RBT plants
7. Monitor fishery

### **1.9 List of program "Performance Standards".**

See section 1.10 below.

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

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### 1.10.1 Benefits

Benefits		
Performance Standard	Performance Indicator	Monitoring & Evaluation
Assure that hatchery operations support WDFW mandate to provide freshwater angling opportunities	Production of up to 63,750 catchable sized rainbow trout for stocking in Mayfield Lake. Provide potentially 100,000 - 120,000 hours of fishing opportunity with a catch rate of 0.42 fish/hour. An additional 10,000 rainbow and 4,000 brown trout are planted in Swofford Pond.	Creel census and evaluation funding is being requested by WDFW to determine success of the program and to determine impact to wild fish in the stream.
Maintain outreach to enhance public understanding, participation and support of Washington Department of Fish & Wildlife (WDFW) hatchery programs	Provide information about agency programs to internal and external audiences. For example, local schools and special interest groups tour the facility to better understand hatchery operations. Off station efforts may include festivals, classroom participation, stream adoptions and fairs.	Evaluate use and/or exposure of program materials and exhibits as they help support goals of the information and education program.  Record on-station organized education and outreach events.
Implement measures for broodstock management to maintain characteristics needed for the trout program goals	Broodstock protocols are followed for maximum fertilization and economic benefit of rearing a broodstock source.	Broodstock selection of 3 and 4 year crosses are followed per hatchery broodstock operation plans.
Catch-able trout can be distinguished from wild smolts.	Plant fish at a size desirable to anglers and significantly larger than listed salmonids smolts.	Size and release records are recorded on all plants made.
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 and monitor juvenile fish on a monthly basis to assess health and detect potential disease problems. As necessary, WDFW's Fish Health Section recommends remedial or preventative measures to prevent or treat disease, with administration of therapeutic and prophylactic treatments as deemed necessary  A fish health database will be maintained to identify trends in fish health and disease and implement fish health management plans based on findings.
	Release and/or transfer exams	1 to 6 weeks prior to transfer or release, fish are examined in accordance with the Co-managers Fish Health Policy

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	Inspection of adult broodstock	At spawning, lots of 60 adult broodstock are examined for pathogens
	Inspection of off-station fish/eggs prior to transfer to hatchery	Control of specific fish pathogens through eggs/fish movements are conducted in accordance to Co-managers Fish Health Disease Policy.
	Inspection of adult broodstock	At spawning, lots of 60 adult broodstock are examined for pathogens
	Inspection of off-station fish/eggs prior to transfer to hatchery	Control of specific fish pathogens through eggs/fish movements are conducted in accordance to Co-managers Fish Health Disease Policy.

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### 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.	As identified in the HGMP: Monitor size, number, and date of release.
Catch-able trout can be distinguished from wild trout.	Explore possibility of marking (fin-clip) catch-ables in anadromous waters	Based on future evaluations, WDFW would be requesting funding if fin-clipping would be needed.
Predation	Predation risk	
Hatchery facilities are operated in compliance with all applicable fish health guidelines, facility operation standards and protocols including HOPPS, Co-managers Fish Health Policy and drug usage mandates from the Federal Food and Drug Administration	Hatchery goal is to prevent the introduction, amplification or spread of fish pathogens that might negatively affect the health of both hatchery and naturally reproducing stocks and to produce healthy smolts that will contribute to the goals of this facility.	Pathologists from WDFW's Fish Health Section monitor program monthly. Exams performed at each life stage may include tests for virus, bacteria, parasites and/or pathological changes, as needed
Ensure hatchery operations comply with state and federal water quality and quantity standards through proper environmental monitoring	NPDES permit compliance  WDFW water right permit compliance	Flow and discharge reported in monthly NPDES reports.
Water withdrawals and in-stream water diversion structures for hatchery facility will not affect spawning behavior of natural populations or impact juveniles.	Hatchery intake structures meet state and federal guidelines where located in fish bearing streams.	Barrier and intake structure compliance assessed and needed fixes are prioritized.
Hatchery operations comply with ESA responsibilities	WDFW completes an HGMP and is issued a federal and state permit when applicable.	Identified in HGMP and Biological Opinion for hatchery operations.

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

Fish planted in the Cowlitz basin are a portion of 330,000 eyed eggs shipped from Goldendale Hatchery. At Goldendale Hatchery, fecundity has varied from 4,800 eggs per 3 year old broodstock to 6,800 per 4 year old broodstock and 330,000 eyed eggs would require approximately 120-150 pairs of broodstock at Goldendale Hatchery depending on the ratio of 3 and 4 year fish used.

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### 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
*Catch-able rainbow	3,750	2.0 – 3.0	April – August	Ike Kinswa State Park / Mayfield Lake	-	Cowlitz	Lower Columbia
**Catch-able rainbow	60,000	2.0 – 3.0	Mar – August	Mayfield Lake	-	Cowlitz	Lower Columbia
***Catch-able rainbow	10,000	2.0 – 3.0	April – June	Swofford Lake	-	Cowlitz	Lower Columbia
***Catch-able brown trout	4,000	4.0	April	Swofford Lake	-	Cowlitz	Lower Columbia

\* Direct plants are made from Mossyrock Trout Hatchery

\*\*Fish are released from the Friends of the Cowlitz (FOC) Mayfield Lake Net Pens

\*\*\*Plants counted as part of the resident program made to Swofford Pond (landlocked arm of Riffe Lake).

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

Rainbow plants to Mayfield Lake do not have a sport fishery catch rate (per hour) goal. In Lake Scanewa, the Lewis PUD mitigation license (FERC 2833) indicates a rainbow trout sport fishery catch rate of 0.50 fish per hour catch. Creel census work has been done in Riffe Lake which has indicated 0.30 – 0.35 fish per hour catcher rates for shore anglers and 0.21 – 0.39 fish per hour catch rates for boat anglers. As Mayfield Lake is a multi-species lake, additional fishing opportunities besides trout harvest is present for spiny rays etc so multiple species fishing could take place concurrently with trout fishing.

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

The program started in 1986 including a combination of anadromous fish and resident trout released into Project reservoirs, Swofford Pond, Tilton River and upper Cowlitz River basins (primarily Skate Creek).

### 1.14 Expected duration of program.

With the new FERC license (July 2003), a new FHMP (2004) eliminated the resident trout program. Although the program has been funded through 2005 plants, WDFW and TPU are discussing the future of the program.

### 1.15 Watersheds targeted by program.

Cowlitz Subbasin/Lower Columbia Province

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### 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

**Issue 1: Goals above Mayfield Dam and Impact on Natural Stock Recovery:** WDFW's goal is to manage for multiple uses in the upper watershed and anadromous reservoirs including resident fish harvest and to establish a balance of harvest opportunity versus natural stock recovery. In the Cowlitz Fisheries and Hatchery Management Plan (FHMP – Final August 2004), trout plants were proposed for discontinuation based on the several points including: The elimination of resident fish stocking programs in the key spawning areas of listed species was identified in the 1999 Hatchery Biological Opinion (NMFS 1999) as a reasonable and prudent measure to reduce impacts to listed stocks. The recommendation cited the impact catch-able trout fisheries have on steelhead populations was summarized by Filbert (2002), as part of the re-licensing proceedings for the North Fork Clackamas River Hydroelectric Project. Also weighed was the “*Impacts of Resident Trout Fisheries on Anadromous Fish Populations*”(TPU 2004) prepared for the Cowlitz FTC.

**Issue 2: Program Success:** Catch success have been in part based on past creel census studies and angler success and benefits to the local economy have not been evaluated recently. TPU has agreed to fund production through 2005 but negotiations with WDFW are on-going for the future of the program. Future trout production should be based upon a review by the Fisheries Technical Committee (FTC) of the success or failure of the program.

#### 1.16.2) Potential Alternatives to the Current Program

##### **DRAFT ALTERNATIVE 1: Eliminate the resident trout program.**

Descriptions and Implications: In 2003, Tacoma Power eliminated funding for trout production as was called for by the FHMP in order to eliminate any impact on upper river recovery efforts. Subsequent discussions were made to contract a private fish company (Trout Lodge) to stock the waters to fulfill the mitigation for 2004. Funding was reinstated for 2005 for trout production at Mossyrock Hatchery with future years presently being discussed by the parties involved.

##### PROS AND CONS:

Pros – This would reduce impact on listed fish from catch-able trout harvest including hook and release mortality and angler by-catch on listed fish over 8 inches and eliminate concerns about predation, competition or genetic impacts. Not all impact would be eliminated if a fishery on resident trout were managed as in other anadromous streams such as a 12 inch minimum size and daily limit of two fish.

Cons - This would eliminate or sharply reduce a longstanding angling harvest opportunity for citizens in east Lewis County. Catch-able rainbow trout remain a desirable target for many generations of freshwater angling families and significant local economic benefits would be affected. Stream angling can give anglers who cannot afford or have the capabilities to manage boats and trailers anymore, easy access to fishing opportunities. WDFW has a mandate to provide angling opportunity for increasing public demand and will manage to do so while protecting and restoring co-occurring native fish and wildlife species.

##### **DRAFT ALTERNATIVE 2: Continue to provide a catch-able trout opportunity in Mayfield Lake and other lakes.**

Descriptions and Implications: In 2003, Tacoma eliminated funding for trout production as was called for by the FHMP to eliminate impact on upper river recovery efforts. Subsequent

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discussions were made to contract a private fish company (Trout Lodge) to stock the waters to fulfill the mitigation for 2004. Funding was reinstated for 2005 for trout production at Mossyrock Hatchery with future years presently being discussed by the parties involved.

### PROS AND CONS:

Pros – This would continue a longstanding angling harvest opportunity for citizens in east Lewis County. Catch-able rainbow trout remain a desirable target for many generations of freshwater angler families and significant local economic benefits would be affected.

Cons - This would impact listed fish from catch-able trout harvest including hook and release mortality and angler by-catch on fish over 8 inches with some level of predation, competition or genetic impacts.

### **DRAFT ALTERNATIVE 3: Review the success or failure of the program**

Descriptions and Implications: Current releases have been based on past creel census studies. The degree of angler success and benefits to the local economy have not been evaluated recently although some reservoir studies have been conducted in Mayfield, Riffe and Scanewa Reservoirs in the past few years. WDFW's goal is to manage for multiple uses in the upper watershed and reservoirs including resident fish species and to establish a balance of harvest opportunity versus natural stock recovery and before eliminating resident trout production would like decisions based on evaluations as mentioned in the SA.

### PROS AND CONS:

Pros – After 2004, future trout production was to be based upon a review by the FTC of the success or failure of the program and any impacts to listed stocks (Section b, Article 5). WDFW agrees with the 1999 Hatchery Biological Opinion (NMFS 1999) that as a condition of stocking resident trout, the agency shall implement a monitoring and evaluation program to evaluate the potential impacts and to demonstrate whether the program jeopardizes the survival or recovery of listed fish. Concerns by the U.S. Fish and Wildlife Service (USFWS) for catch-able rainbow trout plants in Lake Scanewa which is the upper most Cowlitz system reservoir, have been discussed with NOAA Fisheries to develop an approach that will continue to monitor the program and address listed fish concerns in the Lake Scanewa trout program (Lewis PUD FERC 2833). Evaluation will allow WDFW to better manage impacts or determine the success or failure of the program to achieve goals including preserving a viable catch-able trout opportunity.

Cons - Without evaluation, the success or failure of resident trout programs to achieve all goals for the Cowlitz system above Lake Mayfield will not be determined. As Lake Scanewa is a critical migration corridor as Mayfield Lake, continued trout plants to Mayfield could be consistent with the Lake Scanewa modifications.

### **1.16.3) Potential Reforms and Investments**

**Reform/Investment 1:** WDFW is seeking funding to monitor and evaluate both impacts of trout plants in stream and in lakes included in the anadromous zone which makes up critical habitat for upriver recovery of ESA listed fish.

**Reform/Investment 2:** Due to the loss of Yellowjacket Pond on the Cispus River there are few places left to stock these fish. Similar type ponds that allow harvest in accessible areas would need to be explored or developed to provide some type of harvest opportunities.

**Reform/Investment 3:** For additional plant sites in Mayfield Lake if deemed more appropriate, net pen production similar to the FOC net pens could be used.

## Section 2: Program Effects on ESA-Listed Salmonid Populations

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

None. On March 23, 2004, NOAA Fisheries (Consultation No. 2001/02045) issued a Biological Opinion for ESA Section 7 Cowlitz River Hydroelectric Project but did not cover trout production.

### 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 above Mayfield Lake where the program fish are released:

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

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

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

None

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

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

**Lower Columbia River spring chinook salmon** listed as “threatened” under the ESA on May 24, 1999.

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

**Lower Columbia River Coho** including hatchery and wild populations within the Lower Columbia River/Southwest Washington Evolutionary Significant Unit (ESU) were proposed as threatened under the federal Endangered Species Act in 2004 (NOAA 69 FR 33101; 6/14/2004).

### 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.**

The Settlement Agreement states that it is the responsibility of NOAA-Fisheries and USFWS to set the adult abundance values used to determine the sustainability of spring Chinook and late winter steelhead in the upper Cowlitz River and for all anadromous fish species in the Tilton River. These abundance values are used as one of the two criteria for determining when upstream adult fish passage facilities would be constructed at the Project. Minimum abundance (500 adults for all indigenous salmonids) targets for the Tilton River and upper Cowlitz River populations have been proposed by Tacoma Power in Section 3.5.1 of the Cowlitz River FHMP. These are not necessarily levels that constitutes recovery, but a minimum population size that prevents unacceptable rate of risk for extinction in the near future. It should be emphasized that these proposed abundance targets are based on the interpretation of currently available data and determining the need for adult passage facilities and should be modified as more rigorous analysis of new data is completed (Cowlitz River FHMP).

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**Lower Columbia River Coho:** Above Mayfield Dam, objectives and strategies for the recovery of endemic stocks is covered under Section 5 in the final FHMP which is beyond the scope of the HGMP process. Coho adult re-introduction strategies are used in both Upper Cowlitz with 75% of the adults taken above Lake Scanewa and in the Middle Cowlitz with approximately 25% transported to the Tilton River (**Table 2**). Presently, all smolt production collected at Mayfield Dam are blank wire tagged (BWT) and all identified returning adults with BWT are placed in the Tilton River (**Table 3**).

**Lower Columbia River fall chinook salmon (*Oncorhynchus tshawytscha*):** Fall Chinook adults have been transferred to the Tilton River (**Table 2**). Smolt counts of naturally produced fall Chinook at Mayfield Dam are monitored (**Table 3**).

**Lower Columbia River Steelhead (*Oncorhynchus mykiss*):** Both hatchery and wild adults are taken to the Tilton River (**Table 2**). Both early and late stock fish have been transferred although currently, only early winter wild fish will be hauled. Approximately 4,000 naturally produced smolts yearly are counted at Mayfield Dam and marked with a BWT (**Table 3**). All adults returning with BWT will be used in the Tilton River.

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**Table 2.** Annual numbers of adult fall Chinook (FCK), coho salmon, winter steelhead (WSH), late Winter Steelhead (LWS), and sea-run cutthroat trout adults transported into the Tilton River system from Cowlitz Salmon Hatchery (CSH) by origin, species, and sex.

Year	Hatchery					Wild					
	Species	Females	Males	Jacks	Non sexed	Total Hatchery	Females	Males	Jacks	Non sexed	Total Wild
1997	FCK	3	24	84		111					0*
	Coho	867	2766	2056		5689					
	WSH	293	289		286	868	8	11			19
	SRCT									79	79
1998	FCK	2	98	141		241					
	Coho	903	1106	1944		3953	535	647	460		1642
	WSH	92	158	83		333					
1999	FCK		1	72		73					0*
	Coho	2469	3058	2471		7998	573	673	29		1275
	WSH				339	339		104			104
	SRCT							62			62
2000	FCK		1	636		637					0*
	Coho	4933	6138	4006		15077	159	252	85		496
	WSH	324	323		7	654	72	47			119
	LWSH						2	6			8
	SRCT										
2001	FCK	397	1079	1065		2541					0*
	Coho	12569	14770	1808		29147	660	1063	156		1879
	WSH	214	320	8		542	88	84			172
	LWSH						1				1
	SRCT									92	92
2002	FCK	167	405	16		588					0*
	Coho*	6165	7989	1673		15827	525	661	69		1255
	WSH	477	601	3	451	1532	152	153	1	300	606
	LWSH									12	12
	SRCT									7	7
2003**	FCK					4285					0*
	Coho					6806					617
	WSH					243					84
	LWSH					377					74
	SRCT										617
2004**	FCK					1,550					0*
	Coho					12,030					381
	WSH					0					319
	LWSH					503					26
	SRCT					0					69

\* 0 Fall Chinook origin cannot be determined without mass marking.

\*\* Totals for each sex unavailable.

Source – Cowlitz Hatchery annual reports and D. Harmon (2002-2003).

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**Table 3** Mayfield Dam downstream fish passage. Migrants captured with estimated FGE (fish guidance efficiency) and turbine survival applied to estimate passage survival (PS) and total passage.  $PS\% = (FGE \times \text{bypass survival}) + ((1 - FGE) \times \text{turbine survival})$ . Fish Guidance Efficiency (FGE) at the collection site: 66.4% for coho, 81.4% for Chinook and 73.6% for Steelhead.

Year	Coho Salmon				Chinook Salmon				Steelhead			
	Captured	Est. Total Run	PS %	Est. Total Passage	Captured	Est. Total Run	PS %	Est. Total Passage	Captured	Est. Total Run	PS %	Est. Total Passage
1995	374	563	95.3	537	317	389	96.5	376	2560	3478	95.9	3335
1996	1773	2670	95.3	2545	64	79	96.5	76	3318	4508	95.9	4323
1997	895	1348	95.3	1285	4456	5474	96.5	5283	329	447	95.9	429
1998	16747	25221	95.3	24039	2153	2645	96.5	2553	6476	8799	95.9	8437
1999	8006	12057	95.3	11492	86	106	96.5	102	2893	3931	95.9	3769
2000	23535	35444	95.3	33783	62	76	96.5	74	3528	4793	95.9	4596
2001	82215	123818	95.3	118013	618	759	96.5	733	7447	10118	95.9	9702
2002	11675	17583	95.3	16759	19282	23688	96.5	22862	2050	2785	95.9	2671
2003	38892	58572	95.3	55826	10825	13299	96.5	12835	4790	6508	95.9	6241
Mean	20457	28732	95.3	27385	4207	1361	96.5	1314	3710	5154	95.9	4942
*Assumes 90% turbine survival, 98% bypass survival, no spillway passage												

Source. NOAA Fisheries consultation No. 2001/02045- Biological Opinion for ESA Section 7 Consultation for the Cowlitz River Hydroelectric Project (FERC No.2016).

### 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.

The hatchery activity described in this section pertains only to the catch-able trout planting program into Mayfield Lake. Rainbow and brown trout plants made in Swofford Pond are counted as part of the mitigation but they do not have access to Lake Mayfield. Indirect take from predation, harvest or disease are not known, therefore take numbers or estimated levels of take cannot be determined at this time.

### HARVEST AND FISHING MORTALITY

Although significant impacts from harvest from stream plants have been cited, steelhead harvest rates from the Lake Scanewa fishery were expected to have lower impacts on listed steelhead smolts as reservoirs provide little rearing habitat for juvenile steelhead “*Impacts of Resident Trout Fisheries on Anadromous Fish Populations*” (TPU 2004) prepared for the Cowlitz FTC. Lewis PUD mitigates for rainbow trout in Lake Scanewa and is currently evaluating potential impact to listed fish (pers. comm. M.Kohn, Lewis PUD 2005). To reduce impacts of trout fisheries in anadromous reservoirs where listed fish use as migration corridors, future Mayfield Lake plants could be consistent with management on Lake Scanewa where Lewis PUD has consulted with NOAA fisheries and altered

## Mayfield Lake Rainbow Trout Plants

their resident fish mitigation requirements to accommodate impacts to anadromous juveniles identified by the creel study (Tipping and Serl 2000).

### HYBRIDIZATION

In addition to the negative interactions identified by Tipping and Serl (2000), resident fish stocking may also impact native fish populations through interbreeding (Williams et al. 1997) which may alter their fitness and lower their resistance to diseases such as *Ceratomyxa shasta*. This would be dependent on whether fish seek tributaries for spawning or whether they survive to spawn and have not been evaluated. In statewide rainbow hatchery strains that were in large part derived from Meader Trout Farm strains in the 1930s and 40s (Idaho), carryover potential, the ability to compete in the wild (survival) and spawning success of catch-able rainbows were considered to be very low (pers. comm. Crawford IAC 2005).

### COMPETITION

As mentioned previously, few fish are expected to survive the year and carryover potential of catch-able trout is considered to be low. Evaluations have not been done to confirm this and should be included in future evaluations. In Skate Creek, a creel census study from early June to early September indicated 68.1% of the fish were harvested (Danielson and Tipping 1980). The percentage of trout surviving to as “holdovers”, only 58 fish out of 25,000 rainbows (0.232 %) were harvested as holdovers (defined as fish > 36 cm) in Lake Scanewa with some of the fish potentially being broodstock plants escaping from a kids fishing day seined off area (Tipping and Serl 2000).

### PREDATION

As trout are planted at 25 cm fl, most listed fry, fingerling and yearling smolts (up to 100 mm fl) whether 1, 2 or 3 year freshwater smolts could be potential prey for catch-able trout. In 2001, on Skate Creek, 111 angler and 17 electrofishing caught trout were examined for stomach contents with 0% incidence of salmonids prey items while no anadromous fish were observed in the catch. Analysis on rainbow trout in Lake Scanewa, indicated that 1.1% of the smaller trout (length <30 cm) consumed salmonids with 13.6% of larger fish (length >30 cm) consuming salmonids. The study consisted of 351 “small trout” and 22 “large trout”. A large trout (length 46 cm) accounted for two of the three predated salmonids among the two large trout with salmon as prey. Only 5.89% of the total fish sampled though were of the larger size with the remainder (94 % +) made up of smaller trout (Tipping and Serl 2000). As in the previous competition section, some of the “holdovers” could have been large broodstock fish escaping a special kids derby. Lake Scanewa behind Cowlitz Falls Dam is currently producing the most significant number of wild salmonids in the upper system and additional creel census work to further evaluate trout impacts in Lake Scanewa has been funded by Lewis PUD for 2005 (pers. comm.. M. Kohn 2005).

### DISEASE

Non-endemic strain of rainbow released in the Cowlitz system are believed have little resistance to *Ceratomyxa Shasta*, and the planting of trout could increase *C. shasta* in the stream have been cited by the FTC (TPU 2004). Rainbow planted from Mossyrock Hatchery (via eggs from Goldendale) have been reared on spring water and transmission of *C. shasta* is not transmitted through eggs nor fish to fish (WDFW Fish Health). A relationship between increased water temperatures and low velocity high volume environments such as exhibited by the reservoir environments on the Cowlitz system could favor conditions required by the naturally occurring *C. shasta*. Fish reared for 3-4 months in the FOC net pens in Mayfield Lake have been infected by *C. shasta* with some loss reported by fish health staff. Environmental conditions in Skate Creek could be less conducive to *C. shasta* but impact of trout plants is unknown. See also HGMP section 9.2.7.

## 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.

Trout production in the area above Mossyrock Dam was negotiated between WDFW and TPU and additionally, in accordance to a “Supplemental Agreement Regarding Game Fish and Wildlife Mitigation Relative to the Cowlitz River Project” allowed for coho plants to be counted towards resident production.

Plants to Riffe Lake were discontinued in 1999 due to the annual recruitment of natural coho smolts dropping down from upper Cowlitz River production above Lake Scanewa which creates the landlocked “silver” fishery. From 2001-2003, both channel catfish and tiger musky production in Swofford Pond were counted as credit for part of the resident fish mitigation. Stream plants of rainbow were made to the Clear Fork of the Upper Cowlitz until 1994 and the now defunct off channel ponds on Yellow Jacket Creek (tributary to Cispus River) in 1996. Current catch-able size production includes rainbow trout plants to the Tilton River (tributary to Lake Mayfield), Skate Creek (tributary to the upper Cowlitz), to the Mayfield Lake Net Pens operated by the Friends of the Cowlitz (FOC), direct plants into Lake Mayfield by Mossyrock Hatchery and rainbow and brown trout planted into Swofford Pond.

With the proposed elimination or a resident program by the new FHMP, discussions between WDFW and TPU will be ongoing. To minimize impacts on listed fish in Mayfield Lake, future trout mitigation plants could be managed with NOAA concurrence as is being done for trout plants in Lake Scanewa by Lewis PUD (FERC 2833).

### 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 expired mitigation agreement (2001) for Cowlitz Salmon and Trout Hatcheries was for anadromous species (salmon steelhead and sea-run cutthroat) production in the lower river (FERC PROJECT # 2016 dated Aug. 9, 1967). That license expired on December 31, 2001 with the new thirty-five year license issued March 13, 2003, and became effective on July 18, 2003. The license is for a term of 35 years and expires July 18, 2038. Originally, resident trout production was not part of the settlement but negotiated in the late 1980’s. The final FHMP for the new Settlement Agreement (August 2004), has recommended ending the resident trout plants.

### 3.3 Relationship to harvest objectives.

The WDFW has a mandate to balance increasing the public demand for more angling opportunity for these species with the increasing need to protect and restore co-occurring native fish and wildlife species. As large impoundments, fishing opportunities in three of the Cowlitz System reservoirs created by the Project (FERC 2016) and Lewis PUD (FERC 2833) have provided multi species opportunities for county residents. As Mayfield Lake is part of the anadromous zone for wild productivity from several tributaries including the Tilton River, several WDFW policy documents attempt to balance harvest opportunity with the recovery of natural listed and non-listed stocks:

Resident Trout Stream Stocking Policy (POL-5231) – Section 3- “Fishing stocking will not cause significant impacts to other fish or wildlife species”. The policy does not necessarily prevent stocking of trout into streams where listed fish are present or in streams critical for

## Mayfield Lake Rainbow Trout Plants

recovery of listed species. The new Settlement Agreement indicates that subsequent to 2004, future trout production (especially stream plants) was to be based upon a review by the FTC of the success or failure of the program and any impacts to listed stocks (Section b, Article 5). WDFW is in agreement with a review based on evaluation as needed.

Wild Salmonid Policy (WSP) - Introductions of fish populations (non-indigenous) are to be managed to avoid significant adverse impacts on wild populations. WDFW agrees with the new SA priority of the recovery of historical salmonids in the upper Cowlitz. WDFW is in agreement with a review based on evaluation as needed.

Cowlitz River Fish Management Framework – General Management Focus “Interaction between stocked (trout) and native trout will be reduced in upriver tributaries and focus will be on providing trout fishing opportunities in impoundments”. WDFW concurs and that trout plants have been reduced from earlier levels to reduce interaction potential and that if needed based on future evaluations, that impoundments provide freshwater opportunities in lieu of stream plants.

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

Citizens from 14 counties have utilized the fishery opportunities in Lake Scanewa (Tipping and Serl 2000). Lewis County and Pierce residents make up a majority of the anglers. In 1997, a Skate Creek creel census estimated 68.1% of the approximately 55,000 trout planted were harvested. Recent creel surveys have not been conducted on the current level of 15,000 trout planted in Skate Creek. In 2000, 40.4% of 25,000 trout planted were estimated to be harvested in Lake Scanewa (Tipping and Serl 2000).

### **3.4 Relationship to habitat protection and recovery strategies.**

The re-licensing impact associated with TPU and Lewis PUD continued operation of hydroelectric facilities including the dams creating Mayfield Lake, Riffe Lake and Lake Scanewa are major factors that affected natural production of resident and anadromous fish species. Project impacts are to fish and wildlife but the following pertains to fish only and include:

- (1) impacts to resident and anadromous fishes in the reservoirs, downstream, and upstream caused by project-related barriers, false attraction, entrainment in intakes, and other impediments to fish migration;
- (2) impacts to resident and anadromous fishes in the reservoirs, downstream, and upstream caused by project-related mitigation hatchery fish interactions with remaining wild fish;
- (3) impacts to resident and anadromous fishes in reservoirs from fluctuations in reservoir level;
- (4) impacts to resident and anadromous fishes downstream of the dams caused by project-related flow-dependent habitat changes;
- (5) impacts to resident and anadromous fishes downstream of the dams caused by project-related flow fluctuations;
- (6) impacts to resident and anadromous fishes in the reservoir and downstream caused by project-related channel changes stemming from alteration of natural sediment transport;
- (7) changes in dynamics of fish-predator interactions resulting from change in fish escape options;
- (8) changes in water quality (e.g., temperature, dissolved gases, suspended sediment, pollutants) which can impact fish (and wildlife);
- (9) interruption of the transport of large wood and nutrients from upstream to downstream reaches and nutrient transport upstream in the form of adult anadromous fish;
- (10) inundation of anadromous fish spawning, incubation, and rearing habitat by Mayfield, Mossyrock and Cowlitz Falls dams, resulting in loss of anadromous fish production from the inundated reaches.

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Several FERC Settlement Agreement articles are addressing passage way problems in the system including: 1 (Downstream Fish Passage for Riffe Lake and Cowlitz Falls), 2 (Downstream passage for Mayfield Lake) and 3 (Upstream Fish Passage for the barrier Dam, Mossyrock and Mayfield) deal with future proposals and improvement needed for restoring processes upstream and down. Additionally a fish habitat fund of up to 3.0 million dollars for identified projects has been created (Article 11).

### ***Additional Processes:***

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

### **Sub-Basin Planning**

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

### **Habitat Treatment and Protection**

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

### **Limiting Factors Analysis (LFA)**

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

## Mayfield Lake Rainbow Trout Plants

### 3.5 Ecological interactions.

Salmonid and non-salmonid fishes or other species that could:

(1) *Salmonid and non-salmonid fishes or species that could negatively impact the program:*

There are high numbers of predators in Mayfield and Riffe Lake Reservoirs, such as northern pikeminnow as well as exotic predators, such as tiger muskies, brown trout, large and smallmouth bass, bluegill, crappie, and yellow perch introduced for angling. These predators present some risk but size of catch-able trout would be beyond the realm of all but the largest predators. River otters and mink are mammals with the potential to feed on trout in smaller environments but as free swimming fish in the reservoir, little opportunity would exist outside of congregating at the FOC net pen site upon releases. Raptors including ospreys utilize fish exclusively in their diets.

(2) *Salmonid and non-salmonid fishes or species that could be negatively impacted by the program:* Co-occurring indigenous salmon, steelhead, anadromous and resident trout populations and non-salmonid species including sculpins, minnows such as dace and could be negatively impacted by program fish due to competition or predation. Of primary concern are listed steelhead and proposed for listing coho smolts migrating through the reservoir or from listed species including chinook dropping down from the upper Cowlitz re-introduction program in Lake Scanewa.

3) *Salmonid and non-salmonid fishes or other species that could positively impact the program.*

Reintroduced salmonids that naturally spawn in the target stream and surrounding production areas may positively impact program fish. Decaying carcasses may contribute nutrients that increase productivity of the overall system.

4) *Salmonid and non-salmonid fishes or species that could be positively impacted by the program.* Mayfield Lake is large impoundment with significant angling opportunities. The catch-able trout program is targeted specifically by local citizens utilizing the lake and reduces harvest on priority salmonids utilizing the system including steelhead and cutthroat including anadromous and resident strains. Although there are multi species for harvest including spiny rays and tiger musky, salmonids are desirable species for harvest.

## 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.

Goldendale Hatchery – The hatchery is fed from a spring source located approximately 500 feet Northeast of the hatchery. 4,500 gpm (10 Ccfs) is gravity fed through a pipeline and is a constant 50° F. A headbox at the north end of the raceway and brood stock ponds delivers water to 8 ponds total. The water is hard with some iron; chemical compositions that benefit the trout program.

Mossyrock Hatchery - Four springs (1-4), are located approximately ¾ mile north of the hatchery grounds. Up to 2,500 gpm (5.6 cfs) are gravity fed through an eighteen inch line to the head box of the raceway ponds. Water is a constant 50°F. Due to flow fluctuations ranging from 800 – 2,500 gpm depending on season, 1 hp aerators are used in raceway ponds from spring on until the catchable plants begin and can reduce loadings in the ponds and provide the fish protection from sunburn. WDFW staff also can make release decisions based environmental conditions such as low flows from dry conditions if they are a risk to the health of the program.

Friends of the Cowlitz (FOC) Net Pens – The eight pen complex is situated adjacent to the Mossyrock Hatchery grounds. Pens are tethered to the shore and connected by a walkway ramp. Ambient water temperatures of Mayfield Lake range from 48° F - 58 ° F at the surface from early spring to summer. Pen loadings are kept below .5lbs/cf3 and pens are released to avoid maximum densities when they reach upper limits. FOC and WDFW staff also can make release decisions based environmental conditions if they are a risk to the health of the program.

### 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	<p><b>Goldendale Hatchery:</b> Water rights total are for 100% of the available spring water at Goldendale (up to 4,500 gpm) and are formalized thru trust water right S4-*04576 from the Department of Ecology. Monitoring and measurement of water usage is reported in monthly NPDES reports (see below).</p> <p><b>Mossyrock Hatchery:</b> Water rights total are for 100% of the available spring water at Mossyrock (up to 2,500 gpm) and are formalized thru trust water right S2-*05156 from the Department of Ecology. Monitoring and measurement of water usage is reported in monthly NPDES reports (see below).</p> <p><b>Friends of the Cowlitz (FOC) Mayfield Lake Net Pens</b> The FOC has been rearing fish cooperatively in Lake Mayfield since the late 1990's. Both salmon and trout have been released from these pens with resident trout currently the only species propagated. Permits to operate are granted by TPU. For WDFW, a Cooperative Fish and Wildlife Project Memorandum of Understanding Fish Production Agreement is used to monitor volunteer cooperative programs. Among the important operational concerns, the Cooperator is responsible for: a) obtaining permission to work on private property; b) maintaining a list of</p>

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	<p>volunteer workers and their hours of work; and c) submitting completed annual planting slips to the Department within 30 days of release. The Cooperator is also responsible for obtaining and complying with any and all necessary permits to conduct the project(s) described in the attached Exhibit(s), which may include but are not limited to: Hydraulic Project Approvals (HPA), State Environmental Protection Act checklist (SEPA), National Pollution Discharge Elimination System (NPDES), Water Rights, local construction, grading, or filling permits, etc, with the exception of federal ESA compliance, which can only be deferred upon WDFW or the Treaty Tribes of Washington.</p>
<p>Intake/Screening Compliance</p>	<p><b>Goldendale Hatchery:</b> Spring source is non-fish bearing. Appropriate screen sizes are used depending on the size of the trout in the raceways to prevent loss or physical damage.</p> <p><b>Mossyrock Hatchery:</b> Spring source is non-fish bearing. Appropriate screen sizes are used depending on the size of the trout in the raceways to prevent loss or physical damage.</p> <p><b>Friends of the Cowlitz (FOC) Mayfield Lake Net Pens:</b> Net pen mesh size is meant to keep trout from escaping before programmed release time. 5/8 and 3/4 inch stretch mesh sizes are used to keep program trout confined and prevent deter other species from entering the pens.</p>
<p>Hatchery effluent discharges. (Clean Water Act)</p>	<p><b>Goldendale and Mossyrock</b> Hatcheries operates under the “Upland Fin-Fish Hatching and Rearing” National Pollution Discharge Elimination System (NPDES) general permit which conducts effluent monitoring and reporting and operates within the limitations established in its permit administered by the Washington Department of Ecology (DOE) WAG 13-5001 (Goldendale) and WAG 13-1013 (Mossyrock). Monthly and annual reports on water quality sampling, use of chemicals at this facility, compliance records are available from DOE. Adherence with the NPDES permit will likely lead to no adverse effects on water quality from the program on any listed fish.</p> <p>Discharges from the cleaning treatment system are monitored as follows: <i>Total Suspended Solids (TSS)</i>C1 to 2 times per month on composite effluent, maximum effluent and influent samples. <i>Settleable Solids (SS)</i>C1 to 2 times per week on effluent and influent samples. <i>In-hatchery Water Temperatures</i> are monitored daily for maximum and minimum readings.</p> <p><b>Friends of the Cowlitz (FOC) Mayfield Lake Net Pens:</b> Feeding or total pounds produced within the net pen complex are kept under 5,000 pounds of fish food fed monthly and 20,000 pound total on site production. This accomplished by managing for size at release and a staggered release schedule through out the release period. This is within the “Upland Fin-Fish Hatching and Rearing” National Pollution Discharge Elimination System (NPDES) general permit requirement not needing an NPDES permit.</p>

## Section 5. Facilities

### 5.1 Broodstock collection facilities (or methods).

Broodstock are reared at Goldendale Hatchery. There are a total of twelve ponds that rear trout to catchable size on station. Two ponds are used to segregate 3 and 4 year aged broodstock for egg take. Younger aged fish are located in ponds 1-10. Of the younger aged fish, approximately 3,000 fish are kept on hand instead of planting in the spring. By year 3, approximately 2,400 fish are available for spawning and are kept in pond eleven. By age 4, approximately 700 females are separated in pond twelve. Broodstock ponds are 12' x 75' x 4'.

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

Broodstock do not have to be transported within station, but excess broodstock or unused fish can be transported via Cowlitz Complex 1,500 gallon tanker for lake plants. Oxygen and 5% salt solution is used on the transfer.

### 5.3 Broodstock holding and spawning facilities.

The spawning is done in the broodstock holding ponds. Sections are partitioned off for sorting ripe and unripe fish. A spawning table is set up in the pond.

### 5.4 Incubation facilities.

Goldendale Hatchery - Incubation is in shallow troughs with approximately 42 shallow baskets used for the egg take. 40,000 eggs are eyed per basket with baskets reduced to 8,000 eggs per tray prior to hatching.

Mossyrock Hatchery – Shallow troughs 15' x 1' and 6 inches deep are used. A total of 96 shallows are present in the incubation room with 24 used for the mitigation program.

### 5.5 Rearing facilities.

Goldendale Hatchery – Twelve outside raceways are 10' x 75' x 4'. Ponds 1-10 hold growing fish while 11 & 12 are reserved for broodstock fish.

Mossyrock Hatchery – Twelve outside raceways are 10' x 90' x 1.5'. All rear the various trout programs.

Mayfield Lake Friends of the Cowlitz (FOC) Net Pens – Fish are stocked at approximately 6,000 fish in six net pens (dimensions - 20' x 20' x 10') and at 12,000 in two net pens (dimensions - 30' x 30' x 10').

### 5.6 Acclimation/release facilities.

Same as above. Trout are trucked out for plants in regions 3 and 5.

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

Due to the good water supply and gravity feed system located within the hatchery grounds, there have been no disasters. Some avian predation has occurred and an efficient predator bird netting system is currently being installed.

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**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.**

Not applicable to listed fish. For the efficiency and safe operation of the legal trout program, fish health, rearing and facility permitting guidelines are followed. Facilities are spring fed and all trout are transported out of station. FOC net pen operations follow both permitted and non-permitted (NPDES) guidelines needed to operate with-in Lake Mayfield.

## Section 6. Broodstock Origin and Identity

### 6.1 Source.

Source is from the on-station broodstock trout program at Goldendale Hatchery.

### 6.2.1 History.

Broodstock are cultured at Goldendale Hatchery. Most sources used in combination to form the present strain are a derivative of rainbow from California. Rainbow from Yakima and Meader strain were combined around 1950 to form the present rainbow stock at Goldendale Hatchery that has continued to this day (Crawford 1979).

**Meader Stock** - This stock was first used when the Goldendale Hatchery first opened. The W. S. Meader Trout Farm was located at Papoose Springs near Pocatello, Idaho. The source of their eggs could not be directly determined through correspondence, etc., however the circumstantial evidence strongly suggests that they were originally obtained from the U. S. Fish Commission's hatchery at Springville, Utah some time between 1910 and 1930. Springville obtained eggs from the McCloud River, Shasta County, California.

**Cape Cod strain** - The Cape Cod Trout Company of Wareham, Massachusetts used fish from the McCloud River near Mt. Shasta, California. Goldendale used these fish for a time in the early 1940's but Cape Cod transfers were phased out by 1948.

**Yakima Strain** - The Yakima Hatchery began in 1938 from a mixture of Meader and McNott stock.

**Mt. Whitney Strain** - In June 1962, Mt. Whitney strain rainbow trout from the Mt. Whitney Hatchery at Independence, California were shipped to Goldendale Hatchery. According to Mr. Leonard E. Nixon, California Department of Fish and Game (letter in files), it is a mixture of Sacramento River rainbow and Klamath River steelhead with a possible contribution by Lahonton cutthroat from a spawning station at June Lake, Mono County, California. Because the 52° F spring water temperature at Goldendale tended to cause early maturation of the spawners, the stock was transferred to the Puyallup Hatchery in 1964 and discontinued at Goldendale Hatchery.

### 6.2.2 Annual size.

The Goldendale Hatchery total egg take goal is 6,850,000. Approximately 700 4 year fish, 2,400 3 year fish, and 3,000 2 year fish make up the broodstock program.

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

Trout broodstock have come from the hatchery program since inception.

### 6.2.4 Genetic or ecological differences.

Not applicable, see HGMP section 6.2.1.

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### **6.2.5 Reasons for choosing.**

The Goldendale rainbow has been selected for early eggs, large size, high fecundity, and overall color and vigor. Spawn is presently taken from October to February with the majority of eggs available in November and December. The resultant strain of fish have consistently shown good survival in the hatchery and in the waters planted. Spawn is presently taken from October to February with the majority of eggs available in November and December. Females are presently spawned as 3, and 4 year olds and produce approximately 4,800 to 6,800 ggs per female. Males are spawned as three year olds and are held separately.

### **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.**

Not applicable as no listed natural fish are used.

## Section 7. Broodstock Collection

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

Goldendale Hatchery rears the life stages needed to create their broodstock program.

### 7.2 Collection or sampling design

Adults are reared depending on age class and segregated in the broodstock raceways. Collection for broodstock is in 6 fish pools (4 year fish) and 10 fish pools (3 year fish) from the broodstock raceways.

### 7.3 Identity.

Broodstock on hand.

### 7.4 Proposed number to be collected:

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

Approximately 700 4 year fish, 2,400 3 year fish, and 3,000 2 year fish make up the broodstock program. Approximately 1200 – 1300 females and equal number of males are used for the annual egg. Approximately 350,000 green eggs are proportioned for the Mossyrock trout program.

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

Approximately 700 4 year fish, 2,400 3 year fish, and 3,000 2 year fish make up the broodstock program. After spawning, 4 year females fish are broodstock planted to lakes with a like amount of 3 year females carried over to the next year. 2 year fish are carried to the broodstock numbers needed for males and females.

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

Fish not needed for broodstock or older than 4 years are transported to lakes for recreational opportunities.

### 7.6 Fish transportation and holding methods.

Broodstock do not have to be transported within station, but excess broodstock or unused fish can be transported via Cowlitz Complex 1,500 gallon tanker for lake plants. Oxygen and 5% salt solution is used on the transfer.

### 7.7 Describe fish health maintenance and sanitation procedures applied.

60 fish representing the spawning population are sampled for ovarian fluid and kidney /spleen samples. Samples are tested for viral hemorrhagic septicemia (VHS), infectious pancreatic necrosis virus (IPN) and infectious hematopoietic necrosis (IHN). There has been no history of these viruses at Goldendale Hatchery, but sampling is done to ensure pathogen history in case need arises for transfers of fish out of fish health management zones. This has not been done in recent history and transmission of disease does not occur in egg transfers.

### 7.8 Disposition of carcasses.

Carcasses are disposed of at the local landfill.

## Mayfield Lake Rainbow Trout Plants

**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.**

Not applicable for listed fish. For the genetic health of the program, broodstock are selected randomly, mated 1:1, pooled with 3 and 4 year fish, and use only 3 year males for milt.

## Section 8. Mating

### 8.1 Selection method.

Adults are randomly selected from the pond.

### 8.2 Males.

3 year males are used with 4 year old females and collected in 6 fish pools. 3 year males are crossed with 3 year females and collected in 10 fish pools.

### 8.3 Fertilization.

Milt is pooled before mixing in a receptacle.

### 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.

Not applicable to listed fish, but for the genetic health of the program, the pooling and fertilization protocols have produced desirable size, growth, and health characteristics for the broodstock program.

## Section 9. Incubation and Rearing.

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

The current egg take goal is 6,850,000. In the future, the amount of eggs taken will vary depending on program production goals. Data is not available, but overall survival rates from green egg to ponding have consistently 94%-95% (pers, comm. B. Ault, L. Peterson 2005).

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

Program adheres to program goal egg take unless an unexpected loss of eggs occurred or other trout broodstock facilities would require eggs (e.i. Spokane Hatchery).

### 9.1.3 Loading densities applied during incubation.

Green eggs are loaded at 42,000 eggs per shallow tray basket. From eyed egg to hatching, eggs are reduced to 8,000 eggs per basket.

### 9.1.4 Incubation conditions.

Incubation conditions at Goldendale and Mossyrock Hatcheries are similar as both are spring fed. Eggs in shallow baskets are treated with salt and hydrogen peroxide drip daily. During eye stage, water flow is 7 gpm. During hatching and swim-up, the flow is increased to 13 gpm. Temperatures are constant within the incubation building and in the outside ponds.

### 9.1.5 Ponding.

After swimup in the shallow troughs, fish are divided into 100k lots per raceway. Fish are transferred to cement incubation raceways in the incubation room when they reach 250 ffp. After reaching 100 ffp, they are transferred to the outside raceways.

### 9.1.6 Fish health maintenance and monitoring.

Fish health and condition is monitored daily by staff. Regular fish health specialist visits check for general fish health symptoms. General fish health history has been very good due to the water supply and loading criteria for the station.

### 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.

Not applicable for listed fish. For the broodstock program, incubation conditions are optimum within the incubation building and incubation receptacles.

### 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.

Data is not available, but overall survival rates from green egg to ponding have consistently been 94%-95% (pers, comm. B. Ault, L. Peterson 2005). Loss from ponding to growout stages are:

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

At Goldendale and Mossyrock, maximum loading densities for legal grow out and or broodstock holding range from 12 –18 lbs/gpm. These loading vary depending on stage and when trout are removed for plants.

## Mayfield Lake Rainbow Trout Plants

### 9.2.3 Fish rearing conditions.

**Goldendale Hatchery** – Twelve rearing raceways (dimensions - 10' x 90' x 3.5') are used. Fish are fed on 3-7 day schedules depending on age class. Fish are transported to lakes for plants. Temperature, D.O., and loadings are monitored. Ponds are vacuumed and settled in a 1/8 acre pollution abatement pond.

**Mossyrock Hatchery** – Twelve rearing raceways (dimensions – 10' x 90' x 1.5') are used. Aerators are used to add oxygen and re-use water to the raceways when needed and provide protection from sunburn problems. Ponds are covered with bird netting. Fish are transported to lakes and streams for plants. Ponds are vacuumed and settled in a 1/8 acre pollution abatement pond.

**Mayfield Lake Friends of the Cowlitz (FOC) Net Pens** – Fish are held in a total of eight net pens located a short distance north of the Mossyrock Hatchery. The FOC complex is anchored in Mayfield Lake and connected with a 20' wooden walkway from the shoreline located within the hatchery grounds. Fish are stocked at approximately 6,000 fish in six net pens (dimensions - 20' x 20' x 10') and at 12,000 in two net pens (dimensions - 30' x 30' x 10'). Net pen mesh size is 5/8 – 3/4 inch stretch and are covered with individual bird netting covers. Water temperatures are those of ambient Mayfield Lake during the spring and early summer which can range from 48° F - 58 ° F at the surface. Fish are fed on a 3 –5 day weekly schedule with fish released directly from the net pen site from April through June.

## Mayfield Lake Rainbow Trout Plants

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

Rearing Period	Number Fish <sup>^</sup>	Length (mm)	Weight (fpp)	Growth Rate
Dec	348,000	NA	4,244	NA
Jan – 1 <sup>st</sup> YR	301,175	35	1,630	NA
Feb – 1 <sup>st</sup> YR	299,747	51	430	NA
Mar – 1 <sup>st</sup> YR	297,587	59	200	NA
Apr – 1 <sup>st</sup> YR	296,570	76	92	0.44
May – 1 <sup>st</sup> YR	289,529	86	62	0.32
Jun – 1 <sup>st</sup> YR	287,265	106	33	0.47
Jul – 1 <sup>st</sup> YR	286,354	126	20	0.39
Aug – 1 <sup>st</sup> YR	286,057	139	15	0.25
Sep – 1 <sup>st</sup> YR	198,162	159	10	0.31
Oct – 1 <sup>st</sup> YR	190,162	171	8	0.20
Nov – 1 <sup>st</sup> YR	130,657	179	7	0.14
Dec – 1 <sup>st</sup> YR	115,457	188	6	0.12
Jan – 2 <sup>nd</sup> YR	107,949	200	5	0.13
Feb – 2 <sup>nd</sup> YR	107,770	216	4	0.20
Mar – 2 <sup>nd</sup> YR	54,508	216	4	0.19
Apr – 2 <sup>nd</sup> YR	37,174	237	3	0.02
May – 2 <sup>nd</sup> YR	30,157	237	3	0.15
Jun – 2 <sup>nd</sup> YR	13,425	272	2	0.12
Jul*	NA	299	1.5	0.15
Aug*	NA	343	1.0	
Sep*	0	369	0.8	

<sup>^</sup>Numbers represent the start of the trout program including other mitigation plants besides the Mayfield Lake. After August, numbers remaining are the result of size grading and/or plants.

\*Projected growth if fish were programmed to be released at that size (currently not done as in the past). Fish are managed for a size at release of 2.0 – 2.5 ffp.

Note: Length frequency data are approximations adapted from coho length frequency table (Piper et al. 1982).

Note: Data for trout at the FOC net pens are similar from the time fish are transferred to certain release dates.

**Mayfield Lake Rainbow Trout Plants**

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

See HGMP section 9.2.4 above.

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

Rearing Period	Food Type	Application Schedule (#feedings/day)	Feeding Rate Range (%B.W./day)
1400-200	Bio Diet Starter #1, #2 and #3	6	3.0-2.5
200 - 95	Silver Cup/S and BD # 2	4-1	2.5-1.75
95 – 35	Silver Cup/S # 2	1	1.75
35 – 1.0	Silver Cup/S # 3	1	1.50

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

Fish Health Monitoring	Policy guidance includes: <i>Fish Health Policy in the Columbia Basin</i> and <i>Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries</i> (Genetic Policy Chapter 5, IHOT 1995). A fish health specialist stationed at Cowlitz Complex inspects Mossyrock trout programs including Mayfield Lake Net Pens and checks both healthy and if present symptomatic fish. External signs such as lesions, discolorations, and fungal growths will lead to internal examinations of skin, gills and organs. Blood is checked for signs of anemia or other pathogens. Additional tests for virus or parasites are done if warranted.
Disease Treatment	In the standard ponds, fish can be treated with Florinicol at 15MG/KG for 10 – 14 days if needed for <i>Flavobacteriosis</i> (Bacterial Cold Water Disease). Skin parasites <i>Ichthyoboda</i> (costia) can be treated with hydrogen peroxide drips. Fish health and or treatment reports are kept on file.
Sanitation	Mortality is collected from the ponds and net pens and will be disposed of at a landfill. 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.**

Not applicable to legal trout plants.

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

None for raceway rearing. Some natural conditions of ambient lake temperatures and lake ecosystem conditions exist in the FOC net pen complex.

## Mayfield Lake Rainbow Trout Plants

### **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.**

Not applicable as listed fish are not under propagation. Until direct plant into lakes or streams, the trout program at Goldendale and Mossyrock Hatcheries follow fish health and rearing guideline, and facility permitting to maximize trout growth in order to achieve goals.

## Mayfield Lake Rainbow Trout Plants

### Section 10. Release

#### 10.1 Proposed fish release levels.

Friends of the Cowlitz Net Pens can release approximately 60,000 rainbow trout at 2.5 ffp. Additional plants to Mayfield Lake of up to 3,750 fish can also be made directly from Mossyrock Hatchery to adjust fulfilling the 50,000 lbs resident fish production. This includes fish planted to Swofford Pond and stream plants to the Tilton River and Skate Creek.

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

Age Class	Max. No.	Size (ffp)	Release Date	Location			
				Stream	Release Point (Rkm)	Major Water-shed	Eco-province
*Catch-able rainbow	3,750	2.0 – 3.0	April – August	Ike Kinswa State Park / Mayfield Lake	-	Cowlitz	Lower Columbia
**Catch-able rainbow	60,000	2.0 – 3.0	April – August	Mayfield Lake	-	Cowlitz	Lower Columbia
***Catch-able rainbow	10,000	2.0 – 3.0	April – June	Swofford Lake	-	Cowlitz	Lower Columbia
***Catch-able brown trout	4,000	4.0	April	Swofford Lake	-	Cowlitz	Lower Columbia

\* Direct plants are made from Mossyrock Trout Hatchery

\*\*Fish are released from the Friends of the Cowlitz (FOC) Mayfield Lake Net Pens

\*\*\*Plants counted as part of the resident program made to Swofford Pond (landlocked arm of Riffe Lake).

## Mayfield Lake Rainbow Trout Plants

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

Release Year	Catch-able Rainbow Trout			
	Mayfield Lake	Friends of the Cowlitz Net Pens	Date*	Avg Size (fpp)
	No.	No.		
1994			Mar – Sept	
1995	14,938		Mar – Sept	3.1 - 4.2
1996	36,785		Mar – Sept	0.8 - 6.5
1997	38,572		Mar – Sept	0.9 – 5.0
1998	47,357		Mar – Sept	0.8 – 5.0
1999	31,194	2,748	Mar – Sept	1.2 – 4.5
2000	5,132	20,581	Mar – Sept	0.5 – 3.3
2001		104,932	Mar – Sept	0.8 – 3.2
2002		55,152	Mar – Sept	2.0 – 2.6
2003	30,786	51,232	Mar – Sept	2.0 – 2.2/9.6
2004		47,970	Mar – May	2.0 – 2.2

\*Plants are trucked from Mossyrock Hatchery to Ike Kinswa State Park area. Numerous plants are staggered through out the season at two week intervals.

^Trout Lodge was contracted for plants in 2004.

Source – WDFW Plants Database

Note – Additional Rainbow trout fry plants (20 – 100 ffp) have been made from trout graded out of the Mossyrock Hatchery raceways.

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

See HGMP Section 10.3 above.

### 10.5 Fish transportation procedures, if applicable.

Several small tankers with air stones (one 750 gallon, one 1,000 gallon and several 250 gallon tanks) are utilized for moving fish around the facilities or for transporting fry and fingerlings to upper watershed.

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

Rainbow trout from the FOC net pens have been reared in the net pens for 2-3 months prior to release. Direct plants made from Mossyrock to Mayfield Lake or Swofford Pond are transferred and dumped without acclimation.

## Mayfield Lake Rainbow Trout Plants

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

None. Legal trout plants though have noticeable physical characteristics that can allow anglers to distinguish them from other salmonids including: fins can be rounded off from being reared in concrete ponds, fish exhibit similar size and girth to one another, are generally colored as opposed to migrating salmonids smolts that would be quite silvery.

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

The 50,000 production agreement is a portion of the program on-station at Mossyrock Hatchery. Fish above this level but using mitigation trout monies from TPU could be planted in the same reservoirs.

### **10.9 Fish health certification procedures applied pre-release.**

Prior to release, population health and condition is established by the Cowlitz Complex Fish Health Specialist. This is commonly done 1-3 weeks pre-release. Prior to this examine, whenever abnormal behavior or mortality is observed, staff also conducts the Cowlitz Facility 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. See also HGMP Section 9.2.7.

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

In event of system failure, there is an extensive alarm system capable of identifying problems in critical areas of the hatchery. Water system is gravity fed so water is available or could be pumped from Mayfield Lake if needed. FOC net pens could be released directly from the pens if needed to in an emergency.

### **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 catch-able rainbow strain from Goldendale stock has been used for decades and displays several stock characteristics that provides immediate harvest and reduces long term competition or interactions with listed fish including high growth rates in the hatchery environment and reduced holdover ability as opposed to sub-yearling or jumbo fry plants as fall plants. As fish are reared throughout the life cycle in concentrated numbers in raceways or in the FOC net pens, upon release fish can remain “schooled together” for a time rather than dispersing throughout the system. Legal trout plants have noticeable physical characteristics that can allow anglers to distinguish them from natural salmonids smolts. At 2.0 – 3.0 ffp are significantly larger than wild smolts and fins can be eroded from being reared in concrete ponds. Upon release, fish are of similar size and girth to one another and can be rainbow hue colored as opposed to smolts that would be silvery in appearance. Where in the past, fish release size was variable (0.8 – 5.0 ffp), fish size at release has been programmed at 2.5 ffp to reduce predation potential on listed salmonids and provide a catch-able trout of similar size at approximately 1/3 lb each and 10 inches in length significantly larger than listed smolts in the area. Plants are staggered to create a fishery throughout the summer months with the first plant talking place after data has shown most steelhead smolts have vacated.

## Section 11. Monitoring and Evaluation of Performance Indicators

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

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

1. Production of catch-able trout – Annual plants records recorded by WDFW hatchery data base. Ongoing program is managed continuously for this indicator.
2. Plant fish at programmed size desirable to anglers and significantly larger than listed smolts - Growth monitored and programmed for this indicator. Plants target size recorded by WDFW hatchery data base.
3. Provide Information about hatchery programs – Hatchery provides outreach to local schools and groups and is recorded by visit by on-station staff.
4. Hatchery operations comply with all state and federal regulations – Water use-age, intake compliance, and effluent discharge are monitored and reported per NPDES and other reporting guidelines.
5. Broodstock program at Goldendale Hatchery produces traits desirable to the program - Protocols including mating pools and fertilization at Goldendale Hatchery are followed to preserve trout characteristics desirable for trout programs. Feeding and pond management are monitored daily by on-station staff.
6. Necropsies of fish performed to assess health, nutritional status and culture conditions – Fish health procedures are performed by WDFW fish health.
7. Estimate hours of angling opportunity – Based on past creel census studies with funding requested for this indicator and others indicators.
8. Estimate catch rate fish/hour- Based on past creel census studies with funding requested for this indicator and others indicators.
9. Distinguish catch-able trout – Explore the marking of trout (fin clipping) based on future consultation and findings with other trout programs in the watershed (Lake Scanewa studies 2005).

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

Current trout production is mitigated by TPU although future funding is being discussed. Indicators 1- 6 are inherent in WDFW hatchery operations if the program exists. Indicators 7-9 are dependent on future funding of the resident trout program and on needed evaluation funding for impacts that trout fishing can have on listed fish in tributary stream and reservoirs.

#### 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.

If funding for evaluation is provided, protocols to protect listed fish in any population or status would applied by region staff.

## Section 12. Research

**12.1 Objective or purpose.**

None planned.

**12.2 Cooperating and funding agencies.**

**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

Crawford, B.A. 1979. The origin and history of the trout brood stocks of the Washington Department of Game. Washington State Game Dep., Fishery Research Report, 76 p. (Available from Washington Dept. of Fish and Wildlife, 600 Capitol Way N., Olympia, WA 98501-1091.)

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Serl, J., and Morrill, C. 2004. Draft: 2004 Annual Report for the Cowlitz Falls Project. Washington Department of Fish and Wildlife. Olympia.

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Tipping, J.M., and Serl, J. 2000. Lake Scanewa Creel Census for 2000. Washington Department of Fish and Wildlife FPT 00-32. Olympia.

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Tacoma Power (TPU). 2004. Impacts of Resident Trout Fisheries on Anadromous Fish Populations. Tacoma Power. June 2004

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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: \_\_\_\_\_