HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	**Lower Umpqua River Basin Fall Chinook Salmon Program**
Species or Hatchery Stock:	**Fall Chinook Salmon Stock-151**
Agency/Operator:	**Oregon Department of Fish and Wildlife**
Watershed and Region:	**Umpqua Watershed, West Region**
Date Submitted: **First Update Submitted:** **Second Update Submitted:**	**February 17, 2006** **August 16, 2016** **August 31, 2017**
Date Last Updated:	**August 30, 2017**

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Lower Umpqua River Basin Fall Chinook Salmon Program.

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

Fall Chinook Salmon *Oncorhynchus tshawytscha* (Stock-151). Fall Chinook Salmon are not an ESA listed population in the Umpqua Basin.

1.3) Responsible organization and individuals.

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Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program:

The Oregon Department of Fish and Wildlife and Gardiner-Reedsport-Winchester Bay (GRWB) Salmon and Trout Enhancement Program (STEP) volunteers cooperate with this program. Roseburg Resources Company owns the land and leases it to GRWB STEP on a renewal, 5-year lease.

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

Approximately 100 volunteers assist in this program contributing an average of about 3,000 hours per year by collecting, spawning, rearing, and releasing fish. The volunteers pay for the cost of utilities, equipment and maintenance at their facilities via membership fees, sponsorships, donations, in-kind labor, and grants. Gardiner-Reedsport-Winchester Bay STEP is a nonprofit organization (IRS#93-1166963).

Table 1-1. Estimated annual costs:

Item	Cost/Value	Source
Labor	$66,000	Volunteers
Operations	$30,000	Memberships, donations
Fish Food	$3,000	ODFW STEP/ R & E Grant
Smolt Rearing	$10,560*	ODFW Rock Creek Hatchery
Technical Assistance	$9,400	ODFW STEP Bio & Travel
Minimum Annual Cost	**$100,210**	

* This is an estimated cost based on 3% of Rock Creek Hatchery's 2003 annual budget. Exact costs will be unknown until 2005 when the smolt program has been implemented.

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

Current Facilities

Spawning, egg incubation, rearing

- *The GRWB facility* is located west of highway 101, south of the town of Gardiner in Douglas County Oregon. It is below Gardiner Reservoir, which serves as its water source, and the outlet is STEP Creek, which drains into the mainstem Umpqua at River Mile (RM) 10. The facility is at portion NWNW, section 26, T21S, R12W. lying south of Gardiner Reservoir and north of Highway 101. The property is part of a 197.71 acre parcel owned by Roseburg Resources Company. GRWB STEP operates under a lease with Roseburg Resources Co. All of the lower Umpqua River fall Chinook Salmon are spawned and incubated at the GRWB facility. All broodstock are held at this facility until spawning.

The watershed code for Gardiner/STEP Creek is: 1600101000 (GRWB Hatchery)

- *Rock Creek Hatchery* is located above the confluence of Rock Creek and the North Umpqua at RM 36. Rock Creek Hatchery is an ODFW operated facility and is used for the fall release smolt program (70,000 smolts release) to raise to eyed egg or fry stage.

Brood Collection and Adult Trap Sites

- *Winchester Creek-trap site*: located at RM 01 of the mainstem Umpqua River, up Winchester Creek approximately 500'. The facility uses a box trap with cyclone fence

weirs on each side to funnel fish to trap.

- *Mill Creek trap-site:* tributary to the mainstem Umpqua at RM 24. This is a modified floating weir trap located at the end of tidal influence. The weirs guide the fish into a box trap.
- *Smith River Falls-trap site:* Smith River is a tributary to the Umpqua River at RM 12, the Smith River Falls fishway and trap is up the Smith at RM 29. A trap is made in the fishway by blocking the inlet with bars and placing a fyke at the lower end of the last step of the fishway. Consequently the fish are held in the last upstream pool of the fishway.
- *West Fork Smith River:* This is a floating weir used by ODFW for a Life-Cycle-Monitoring Station. Adult salmon are diverted to a holding area. Occasionally, this site would be used for broodstock collection. The West Fork branches off from the main Smith River at RM 35.
- *Tangle netting:* may be used to augment brood collection in Mill Creek, the lower Smith, North Fork Smith River, Umpqua, or Winchester Creek.
- *Hook-and-line:* may be used to augment brood collection in the lower Smith or Umpqua.
- *North Fork of the Smith River-trap site:* a box trap similar to the one used in Winchester Creek is used.
- STEP/Gardiner Creek: fish may swim into the lower raceways or a box trap at the GRWB facility.

The watershed code for the mainstem Umpqua is: 1600100000 (capture site)
The watershed code for Mill Creek is: 1600110000 (capture site)
The watershed code for Winchester Creek is: 1600100800 (capture site)
The watershed code for Smith River is: 1600400000 (capture site)
The watershed code for the West Fork Smith River is: 1600406000 (capture site)
The watershed code for the North Fork Smith River is: 1600410000 (capture site)

Acclimation

- *Gardiner-Reedsport-Winchester Bay STEP acclimation site:* located west of Highway 101, south of the town of Gardiner. This is a volunteer operated facility with raceways for broodstock and rearing plus a hatch house for spawning and egg incubation.
- *Winchester Bay-acclimation site:* RM 01 of the Umpqua River at the commercial dock of Salmon Harbor. Fish are acclimated here in netpens attached to the dock. The nets are attached to a floating pontoon frame.

The watershed code for Gardiner/STEP Creek is 1600101000 (GRWB Hatchery)

Release Sites

- Unfed Fry may be released due to emergencies at GRWB facility directly into STEP

Creek.

- Releases of pre-smolts or smolts may occur in the Umpqua Estuary near Unger's Landing.
- Netpens are used at Winchester Bay at the commercial dock of Salmon Harbor for acclimating the fall Chinook Salmon to the Bay. These fish are transported from Gardiner STEP to the Bay and are held in the netpens for 3 to 8 weeks prior to their release. The fish are released on an out-going tide. This facilitates their movement away from the docks and reduces avian predation.
- Fall Chinook Salmon smolts released in STEP Creek are released directly from the hatch house or raceways at the GRWB facility into STEP Creek. The fish move volitionally toward the estuary. This creek is tidal influenced and is a good wetland complex for the fish to stage in prior to their movement to the estuary. STEP Creek is about a quarter-mile in length.

1.6) Type of program.

The lower Umpqua River fall Chinook Salmon program is a Harvest Augmentation Program.

1.7) Purpose (Goal) of program.

The goal of this program is to provide fish for the intense and popular recreational and commercial fall Chinook Salmon fishery in the ocean and Umpqua Estuary. Due to returning behavior of these program fish, this program also provides a significant fishery for bank anglers in Winchester Bay. As a harvest program, the small numbers of program Chinook Salmon that are not harvested are reproductively integrated with naturally produced populations of fall Chinook Salmon. No significant impact to natural Chinook Salmon or other native wild populations is anticipated from these small numbers of fish. Another important goal of this program is to educate and increase students/public awareness about salmon biology, life history and their habitat requirements using classroom incubators.

1.8) Justification for the program.

The lower Umpqua River fall Chinook Salmon program was established in 1988 to improve recreational and commercial harvest opportunities in the estuary and ocean. The program was refined to an acclimation program in 1995. In addition to providing hatchery fish for an intensive recreational and commercial fishery, the returning adults have also generated a large bank fishery at Winchester Bay. The program follows the guidelines established by the Native Fish Conservation Policy. The small numbers of program fish (<2%) escaping harvest are allowed to integrate with natural populations of Chinook Salmon.

Overall, this program has minimal impact on ESA-listed natural Coho Salmon while contributing to a popular fishery and providing economic and volunteer benefits. Fish acclimation and releases occur in the lower estuary that ensure adult returns in the Winchester Bay and contribute to the fishery; and some may move into Winchester Creek where wild fall Chinook Salmon are not present. Based on district estuary seining data, the number of wild Coho Salmon smolts present in the Bay area during the fall Chinook smolts

releases is low. Due to this the spatial and temporal differences in habitat use the adverse interaction effects are minimal between the two species. The data also showed that program Chinook Salmon at release are smaller in size than Coho Salmon smolts, thus competition and niche overlap will be minimized. Additionally, the release of unfed fry is likely to have negligible impacts on other species. Although interactions in the estuary and ocean are not clearly understood, the number of fish released by this program is probably not big enough to have an impact on listed salmon in the open water bodies.

Observed stray rates for returning adults have been low. Most program adults return to Winchester Creek, thus impacts less than 5 miles of the total spawning habitat available to wild Coho Salmon in the Umpqua Basin. Additionally, the GRWB STEP program in cooperation with other community organizations established several education kiosks at local boat ramps to help anglers correctly identify Coho and Chinook Salmon to avoid accidental take of wild Coho Salmon. This has reduced accidental harvest of wild Coho Salmon (Oregon State Police, pers. comm.). Another strong justification is that the program is designed to educate and increase students/public awareness about salmon biology, life history and habitat requirements, which will eventually help in managing the natural resources of the State. Also, the program has a strong local support.

1.9) List of program "Performance Standards" and (1.10) Performance Indicators, addressing benefits (1.10.1) and addressing risks (1.10.2)

BENEFITS **Performance Standards**	**BENEFITS** **Performance Indicators**	**BENEFITS** **Monitoring & Evaluation**
Provide fall Chinook Salmon for recreational harvest.	• Program fish contribute to the ocean and freshwater harvest. • Based on estimated juvenile survival rates, the program produces 1,000-2,500 adult salmon annually. • Anglers pursue program fish.	• All releases are properly documented. • Program fish are externally marked (fin-clipped, AD) to help evaluate survival, distribution, straying, and contribution to the fishery. • Periodically conduct creel or other surveys to estimate angler effort and harvest rates of program fish.
Program fish provide societal benefits.	• Program fish provide a venue for community and volunteer involvement. • Program fish provide enough angler interest to contribute to the local economy. • Program fish contribute to the fishery.	• The number of volunteers interested and involved in the program will be recorded. • The program is designed for educational purposes and the extent of learning will be evaluated through volunteers' active participation and fishery

		contribution. • Periodic evaluations are conducted to determine the contribution of program fish to the ocean and freshwater fishery.
Healthy fall Chinook Salmon smolts are released.	• Release groups will meet ODFW fish health standards. • Release timing and size at release will mimic naturally produced fall chinook.	• Conduct appropriate health checks throughout incubation, rearing, and prior to release. • Document size and age of program fish prior to release. • Periodically monitor the size and age distribution of naturally produced Chinook and Coho Salmon.
The fall Chinook Salmon harvest program will meet the criteria provided by the Native Fish Conservation Policy.	• A Conservation Plan will be developed for the appropriate Species Management Unit (SMU). • Based on the Conservation Plan and the Fish Hatchery Management Policy, a Hatchery Management Plan will be developed.	• Procedures for assessing stock status and risks will be developed in conjunction with the Conservation and Hatchery Management Plan. • Public input will be sought during the development of the plans.
RISKS **Performance Standards**	**RISKS** **Performance Indicators**	**RISKS** **Monitoring & Evaluation**
Life history characteristics of program Chinook Salmon will not diverge significantly from naturally produced fall Chinook.	• Releases of program fish mimic the emigration of naturally produced Chinook Salmon. • Behavioral and morphological characteristics of program fish are similar to naturally produced fall chinook. • Broodstock collection is random and reflects the run timing and age classes represented in the natural population. • Brood collection will meet or exceed the standards	• Appropriate monitoring techniques will be periodically used to monitor juvenile emigration and size. • Develop a program to periodically sample hatchery juveniles and returning adults for phenotypic and genotypic characteristics to measure the similarities/differences and the integration of hatchery and naturally produced fall chinook. • If funding and technology

	established by the Native Fish Conservation Policy.	become available, sample returning natural and hatchery broodstock for environmental factors such as chemical concentrations or toxicology issues. May also sample hatchery juveniles or eggs. Samples (tissue, scale, organ etc.) would be determined by the best science available used for the evaluation.
Releases of program Chinook Salmon smolts have minimum impacts on listed natural Coho Salmon.	• Program fish are released in a small percentage of the overall habitat available for Coho Salmon. • Program fish are released in Jan/Feb (unfed fry), May/June (pre-smolts), or smolts (Sept/Oct.) to reduce temporal and spatial overlap with emigrating Coho Salmon. • Program fish are released at sizes which mimic naturally produced fish and are generally smaller than emigrating Coho salmon. • The different spatial and habitat preferences of Chinook Salmon reduces impacts to Coho Salmon on spawning beds.	• Appropriate monitoring is periodically conducted to monitor run timing and size of emigrating Chinook and Coho Salmon. • Release size and dates are recorded for program fish. • Spawning ground surveys are periodically conducted to monitor fall Chinook Salmon and Coho Salmon spatial and temporal distribution in the basin.
Hatchery operations comply with the Fish Hatchery Management Policy and other state and federal guidelines and permits.	• Hatchery operations conform to applicable fish health, sanitation, and operational guidelines. • Hatchery operations conform to STEP poundage and/or DEQ/NPDES guidelines for water quality. • Facility intakes are appropriately screened or above anadromous salmon distribution.	• Fish health is regularly monitored to avoid the introduction of new pathogens or significant levels of existing pathogens. • Fish health is certified prior to release. • Appropriate reports are filed to document fish mortality and growth. • Sanitation and maintenance activities are conducted

		regularly. • Appropriate protocols will be followed for monitoring water quality standards.
Broodstock collection operations will have a minimal impact on listed natural Coho Salmon.	• Keep traps well maintained and free of irregularities that could harm salmon. • Check traps. • Minimize holding time of natural Coho Salmon. • With a minimum of handling, remove any Coho Salmon from traps and release them above the trap.	• Record the date and number of Chinook and Coho Salmon captured at each trap. Traps will be checked daily. • Record the number of Chinook Salmon used for brood or passed. • Monitor captured fish for signs of stress or injury. • Evaluate and repair traps prior to use each season.

1.11) Expected size of program.

The goal of this program is to produce 1,000-2,500 adult Chinook Salmon for the ocean and freshwater fishery. The number of fish released to achieve this goal will depend on the size and the survival of program juveniles released (see Section 1.11.2).

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

To achieve a release of 170,000 fall Chinook Salmon smolts the program would need 55 pairs of fall Chinook Salmon for brood.

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

Life Stage	Release Location	Annual Release Level
Eyed Eggs	None	
Unfed Fry	STEP Creek	10,000
Fry (pre-smolts)	Winchester Bay Umpqua Estuary STEP Creek	100,000
Fingerling (fall smolts)	STEP Creek Winchester Bay Umpqua Estuary	70,000
Yearling	None	

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

- The GRWB program has marked nearly 100% of its pre-smolts since 1995. Based on CWT data from 1987 to 1999, survival of program fall Chinook Salmon has ranged from 0.01% to 0.76% (Lewis 2003). The average ocean recovery is 30% while freshwater harvest is less than 10% (Lewis 2003). Approximately 87% of the CWT tags have been recovered from ocean harvest, while 13% have been in freshwater. The stock is a north migrating Chinook Salmon with 70% of the ocean harvest occurring in Alaska and British Columbia and 30% occurring in Washington and Oregon waters (Lewis 2003). With the CWT data available, fish released in late June at 20 fish per pound had the highest survival. The Lower Umpqua fall Chinook Salmon program now releases all of its pre-smolts in June, and smolts in September/October. Based on a 0.8% survival, the pre-smolt program is currently producing about 800 adults annually while unfed fry with a survival of 0.5% produces 750 adults. If the smolts have a 3% survival, this will increase program production to about 2,900 fish based on a release of 100,000 pre-smolts and 70,000 smolts.

- Upon analysis of hatchery Chinook Salmon used for spawning, it is likely that survival rates are higher than the current estimate. Four years after the net pen program was established, it was observed that fall Chinook Salmon were migrating up Winchester Creek (near the acclimation site). The GRWB program installed a trap in Winchester Creek in 2000. In 2000, 120 fin-clipped Chinook Salmon were recorded at this trap, in 2002, 104 clipped and 2 wild Chinook Salmon were handled while in 2003 nearly 600 fin-clipped Chinook were handled at this trap. Fish are only recorded while the trap is in operation from September to early October. Many of the remaining program fish migrate up Winchester Creek after brood collection is ended.

- Stray rates of this program fish are low. Data collected at Smith River Falls demonstrate that less than 2% of the Chinook captured are hatchery fish (Harris 1999, Harris 2000). Likewise in Mill Creek, no hatchery-origin Chinook Salmon were collected during brood operations in 2002 and 2003.

- Punch card data from 1985 - 1997 showed that fall Chinook Salmon harvest at Winchester Bay and the Umpqua River ranged from 148 in 1985 to 3,605 in 1997.

- ODFW's web page data of ocean harvest by port from 2003 – 2005 shows that Winchester Bay averaged 10,666 Chinook Salmon harvested. The area also attracted an average of 23,210 angler trips during the same time period. Although not all of the Chinook Salmon harvested are from the Umpqua, the port data demonstrates the popularity of the Winchester Bay fishery since Winchester Bay exceeded all other ports in Chinook Salmon harvest from 2003 – 2005.

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

The Lower Umpqua fall Chinook Salmon program was started in 1989 with releases in the mainstem Umpqua at the head of tide area near Scottsburg (RM26). These smolts were

raised from South Umpqua broodstock (stock-18) at ODFW's Rock Creek Hatchery. Between 25% and 95% of the smolts released were coded wired tagged. Annual releases continued at this site until October of 1996. The GRWB STEP program began its fall Chinook Salmon program in 1992. In 1993 and 1994 the program received stock-18 eggs or fry from Rock Creek Hatchery. In 1995, the Gardiner STEP program received approval from ODFW to release 125,000 - 250,000 pre-smolts in the estuary, with the condition that the hatchery stray rates were within acceptable limits, and that the program started with a release of 125,000 pre-smolts. Approximately 100,000 fall Chinook Salmon eggs/fry from the South Umpqua hatchery program were allocated to the project for up to 4 years until adult returns to the lower Umpqua facilities were established. The first group of Chinook Salmon smolts acclimated in Winchester Bay was released in 1995. Approximately 75 - 100% of the fish released into the Bay since 1995 have been coded-wire-tagged (CWT) and fin-clipped. In 1997 the program collected lower Umpqua stock-151 broodstock from Smith River and Mill Creek and discontinued the use of stock-18 eggs. In 2000, the program started using returning Winchester Creek hatchery fish as part of its broodstock. From brood year 1999 - 2003, the program acclimated and released approximately 108,000 pre-smolts per year. In 2002, the program was reduced to 100,000 pre-smolts to meet OAR 635-009-0135 constraints. The balance of the fish released to meet production or payback goals were released as unfed fry. In 2004 ODFW Rock Creek Hatchery started a joint program with GRWB to release smolts to increase survival and contribute more fish to the fishery. Stock-151 fall Chinook Salmon will be used as brood; and the Rock Creek Hatchery will rear the fish from the eyed or fry stage to smolts. The fish will be acclimated in the Umpqua estuary in September/October prior to release.

1.14) Expected duration of program.

The lower Umpqua River Fall Chinook Salmon program is ongoing and has no planned termination.

1.15) Watersheds targeted by program.

Lower Umpqua River basin, Umpqua estuary and Smith River basin.

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 key issues of the lower Umpqua River fall Chinook Salmon hatchery program in regard to listed natural Coho Salmon are: the overlap in spawning ground use, impacts of hatchery juveniles on Coho Salmon juveniles, and the incidental take of Coho Salmon during broodstock collection activities. Impacts from this program seemed to be minimal. The observed stray rates are less than 3%. Most program fish return to Winchester Creek, thus impact less than 5 miles of Coho Salmon spawning habitat in the Umpqua basin. The primary release site for program fish is the Umpqua estuary. Although potential negative interactions in the estuary and ocean are not clearly understood, the number of fish released by this program is probably not big enough to have any measurable impacts on native wild

species. Program pre-smolts released in June are smaller than Coho Salmon smolts of May in the estuary, 85 – 105 mm and >130 mm respectively (ODFW release and beach seine data). Coho Salmon are believed to spend little time in the estuary, thus few Coho smolts are expected in the estuary during the fall release of program fish. Program fish released into the Smith River basin, Winchester Creek or Mill Creek also emigrate at a smaller size than Coho Salmon and thus will have minimal temporal overlap with Coho smolts outmigration.

Broodstock collection is carefully monitored to minimize negative impacts to listed natural Coho Salmon. Most broodstock are collected prior to the peak run of Coho Salmon. To reduce negative impacts and any incidental take of Coho Salmon, traps are checked daily basis and any Coho captured are released above the trap with minimum handling/stress. At Winchester Creek when hatchery-origin Coho Salmon are captured, the hatchery fish are returned to the fishery for harvest by recycling them below the trap. The West Fork Smith River fishway is used as Life-Cycle-Monitoring station for Coho Salmon in addition to its use as fall Chinook Salmon broodstock collection site.

1.16.2) Potential alternatives to the current program.

The alternatives are drafts only and not necessarily endorsed by the implementing agency.

Alternative 1: Terminate the lower Umpqua river fall Chinook Salmon program.

Pros: This would eliminate any risk to listed natural Coho Salmon due to interactions with the hatchery-produced fall Chinook Salmon. It would also eliminate the incidental take of Coho Salmon during broodstock collection activities.

Cons: The elimination of this program would have a negative impact on a growing, and very popular recreational bank fishery in the Winchester Bay area. It would also have a negative economic impact on local businesses in the area and Douglas County. The elimination of this program would put more harvest pressure on naturally produced Chinook Salmon. Eliminating this program would also be contrary to Oregon Administrative Rules which states that the ODFW should provide opportunities for volunteer involvement. Volunteers and the local community are very active in this program. Volunteers have built and operate the hatch house, raceway, rearing ponds, sheds, netpens, and traps used to operate this program. These volunteers annually contribute over 5,000 hours of labor to the ODFW. If terminated, there would be a reduction in the number of volunteers and community support for the ODFW.

This basic alternative could also be modified to reduce the allocation. The same pros and cons would apply, although the impacts would vary with the degree of reduction. Since this program has minimal impacts on listed natural Coho Salmon, the greatest impacts due to a decrease in allocation would be to the recreational fishery, and to the economy and support of the local community. This program has a less than 2% stray rate per data from Smith River Falls and Mill Creek trap. Most of the hatchery Chinook Salmon smolts released in Winchester Bay are returning to Winchester Creek which according to StreamNet data is not considered part of the 338.4 miles of fall Chinook Salmon habitat available in the lower and main Umpqua River. Aquatic Habitat Surveys documented fish presence (species unknown)

up through mile 5.8 of the 6.5 miles of Winchester Creek surveyed. Thus if any hatchery Chinook spawning overlapped with the listed natural Coho Salmon in Winchester Creek it would impact less than 1% of the total spawning habitat available to Coho Salmon in the Umpqua basin.

Alternative 2: Double the number of fall Chinook Salmon smolts released.

Pros: This would benefit the commercial and recreational fishery and increase the local economic benefit of the program.

Cons: An increase of this scale would result in the need for additional broodstock collection and an increase in brood holding capacity. The hatchery is already limited by available water in the fall. A well or other water source would have to be developed. The site would also have to add 7 more incubation stacks and either adapt the brood holding raceways for rearing ponds or build additional rearing ponds. The program could likely capture enough hatchery-origin Chinook Salmon for broodstock, but may potentially exceed guidelines for collections at sites used to collect naturally produced Chinook Salmon.

Although the carrying capacity for the estuary is unknown, doubling the program could lead to an increase in stray rates. The number of hatchery Chinook Salmon returning to Winchester Creek could cause the program to have to trap and remove excess fish. This would require much more volunteer effort and ODFW coordination. There are currently enough volunteers to conduct the present program. A dramatic increase in the program would require more volunteers, funding and ODFW staff.

1.16.3) Potential Reforms and Investments.

Reform/Investment for Alternative 1: Terminating the volunteer-based fall Chinook Salmon hatchery program would be contrary to the Oregon Plan, Native Fish Conservation Policy and OAR 635-009-0135. It would reduce community support and the number of volunteers assisting the ODFW. It would reduce a growing a very popular bank fishery in the estuary. There would be little cost savings to the ODFW in terminating this program since the facilities are build and maintained by the volunteers. Rock Creek would gain some rearing space if this program were eliminated that could be used for other watershed priorities.

Reform/Investment for Alternative 2: If the current number of fish reared was doubled, the program would have to increase the brood holding, incubation and rearing capacity of the GRWB facility. Exact cost is unknown, but would be substantial. Volunteers would likely incur much of the cost but there would also be an increase in ODFW funding and staff to help coordinate such an increase. An increase in the program would also have to undergo an appropriate review and approval process. An OAR statue presently limits the program. To increase the program, a new ODFW commission approved plan would need to be developed. Future Native Fish Conservation Policy Conservation Plans and Hatchery Management Plans may address this issue, but it will be several years before these plans are developed and implemented.

SECTION 2. PROGRAM EFFECTS ON ESA-LISTED SALMONID POPULATIONS.

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

Rock Creek Hatchery has been operating under an incidental take permit (number 1017) for Umpqua Cutthroat Trout, which were classified as endangered under the Federal Endangered Species Act in 1995. Cutthroat Trout were removed from the federal ESA list in April 2000 and subsequently the Oregon Department of Fish and Wildlife withdrew its application for the incidental take permit.

This program also operates under FERC license 7161 issued to Douglas County for operation of the Galesville Dam project (1984 – 2034). Rock Creek Hatchery also has permit NWP-2002-132/5; NMFS No. 2011/03901 for the operation and annual June cleaning of their intake pipe. This permit allows the excavation of 100 cubic yards of gravel and sand to clear the fish hatchery intake. The project is located at North Umpqua River Mile 35.7 approximately 150 feet upstream of the confluence with Rock Creek. Work is performed from the adjacent shoreline bar with an excavator. As per National Marine Fisheries Service (NMFS) requirements, aggregate is returned to the river system by spreading materials over the adjacent gravel bar. For additional requirements, see permit NWP-2002-132/5.

The HGMP for this lower Umpqua River fall Chinook Salmon program was submitted to NMFS on 2/17/2006 for approval and ESA take authorization. This is an updated version of the previously submitted HGMP and is consistent with the ODFW's Coastal Multi-Species Conservation and Management Plan (CMP) 2014.

Water right permits for the hatchery include: S 5890, S 8896, S 12003 and S 17680 for water from Rock Creek, and S 41447 for North Umpqua water.

The hatchery is operated under the NPDES general permit 300-J to comply with the federal Clean Water Act.

2.2) Provide descriptions, status, and projected take actions and levels for ESA-listed natural populations in the target area.

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

The ESA listed Oregon Coast Coho Salmon ESU may be affected by this hatchery program, particularly the Coho Salmon populations of the Umpqua River Basin. The following are a brief description of the habitat and the affected population(s):

Umpqua Population Stratum
The OCCCP (2007) uses the population delineations identified by the Oregon Coast Workgroup of NOAA's Oregon-Northern California Technical Recovery Team (TRT). The TRT identified a geographic stratum of Coho Salmon populations in the Umpqua that

includes the following populations: Lower Umpqua, Middle Umpqua, North Umpqua and South Umpqua. There are estimated 1,489 miles of spawning habitat available to Coho Salmon inhabiting this population complex.

Coho Salmon Life History

Adult Coho Salmon migrate into fresh water in the fall to spawn. Spawning of wild Coho Salmon usually occurs from mid-November through February. Adult spawning Coho Salmon are typically three years old and 2-year-old jacks (precocious males) often accompany them from the next brood. Spawning occurs primarily in small tributaries located throughout coastal basins. The parents normally exhibit strong homing to their natal stream. The female digs a nest (redd) in the gravel and lays her eggs, which are immediately fertilized by accompanying adult males or jacks. Digging and displacing gravel from the upstream edge of the nest covers the eggs. The adults die soon after spawning. Each female lays about 2,500 eggs. Sex ratios of spawning adults tend to average around 50:50 at most locations (Table 2.2.1). However, Moring and Lantz (1975) observed 77% males in three small Alsea River tributaries over a period of 14 years. They concluded that males tend to move around and visit multiple streams.

The eggs hatch in about 35-50 days, depending upon water temperature. Warm temperature speeds hatching. The alevins remain in the gravel two or three weeks until the yolks are absorbed and emerge as fry to actively feed in the spring. Most juvenile Coho Salmon spend one summer and one winter in fresh water. The following spring, approximately one year after emergence, they undergo smoltification - physiological changes that allow them to survive in seawater. They then migrate to the ocean as smolts about 10-12 cm in length.

Table 2.2.1. Observations of Coho Salmon sex ratios at adult traps.

Population Complex	Percent Males	Percent Females	Location	Run years	Data Source
Nehalem	52%	48%	North Fork trap	1998-1999	Life Cycle Monitoring
Siletz	50%	50%	Mill Cr. Trap	1997-1999	Life Cycle Monitoring
Yaquina	51%	49%	Mill Cr. Trap	1997-1999	Life Cycle Monitoring
Alsea	77%	23%	Drift Cr. tributaries	1959-1972	Moring & Lantz (1975)
	50%	50%	Cascade Cr. Trap	1997-1999	Life Cycle Monitoring
Umpqua	55%	45%	Smith River trap	1999	Life Cycle Monitoring
Coos	63%	37%	S. Coos R., Winchester Cr., & Fall Cr.	1999	Oregon Plan Monitoring

The smolts undergo rapid growth in the ocean, reaching about 40-50 cm by fall. Little is known of the ocean migrations of Coho Salmon from Oregon coastal streams; however, it appears migrations are mostly limited to coastal waters. Initial ocean migration appears to be to the north of their natal stream (Fisher and Pearcy 1985; Hartt and Dell 1986). After the first summer in the ocean, a small proportion of males attain sexual maturity and returns to spawn as jacks. Migration patterns during the fall and winter are unknown. Those fish remaining at sea grow little during winter but feed voraciously during the next spring and summer, growing to about 60-80 cm in length. During this second summer in the ocean, certain percentage of maturing adults are caught in ocean troll and sport fisheries, usually to the south of their natal stream (Lewis 2000). The survivors return to their home streams or neighboring streams where they spawn and die to complete the life cycle.

Habitat Use and Freshwater Distribution

Spawning and rearing of juvenile Coho Salmon generally take place in small, low gradient (generally <3%) tributary streams, although rearing may also take place in lakes where available. Coho Salmon require clean gravel for spawning and cool water temperatures for rearing. Fifty-three to 58°F is preferred, with 68°F being the maximum (Reiser and Bjornn 1979). Fry emerge from February to early June (Moring and Lantz 1975) and occupy backwater pools and the stream margins (Mundie 1969; Lister and Genoe 1970; Nickelson et al. 1992a). In summer, Coho Salmon smolts prefer pools in small streams, whereas during winter, they prefer off-channel alcoves, beaver ponds, and dam pools with complex cover (Nickelson et al. 1992a, 1992b). Complexity, primarily in the form of large and small wood, is an important element of productive Coho Salmon streams (Nickelson et al. 1992b; Rodgers et al. 1993). Little is known about residence time or habitat use of estuaries during seaward migration. It is usually assumed that Coho Salmon spend only a short time in the estuary before entering the ocean. However, recent research is finding that rearing in the upper ends of tidal reaches can be extensive.

The distribution of Coho Salmon within a basin is primarily determined by two factors: marine survival, and the distribution of freshwater habitat of different levels of quality. When marine survival has been very poor, Coho Salmon will be found in only the highest quality habitats. Coast-wide, high quality environments comprise about 22% of available habitat (Nickelson 1998). When marine survival increases, as could occur with a changing climate regime, Coho Salmon will redistribute into freshwater habitats of lower quality. Thus Coho Salmon population dynamics function with a classic "source-sink" relationship among stream reaches.

2.2.2) Status of ESA-listed salmonid population affected by the program

- Describe the status of the listed natural population(s) relative to "critical" and "viable" population thresholds.

According to the OCCCP (2007) the overall Umpqua stratum passed the viability analysis. The North Umpqua as an individual population failed due to the hatchery influence. The North Umpqua program has subsequently been discontinued and Coho Salmon numbers have increased. Gray et al. (2011) noted that to reach current full seeding in the Umpqua basin, 29,400 spawners would be necessary. As illustrated in Figure 2.2.2a, the Umpqua has generally met or surpassed the number of spawners necessary for fully seeding the basin and has averaged 42,656 returning adults during the last 12 years.

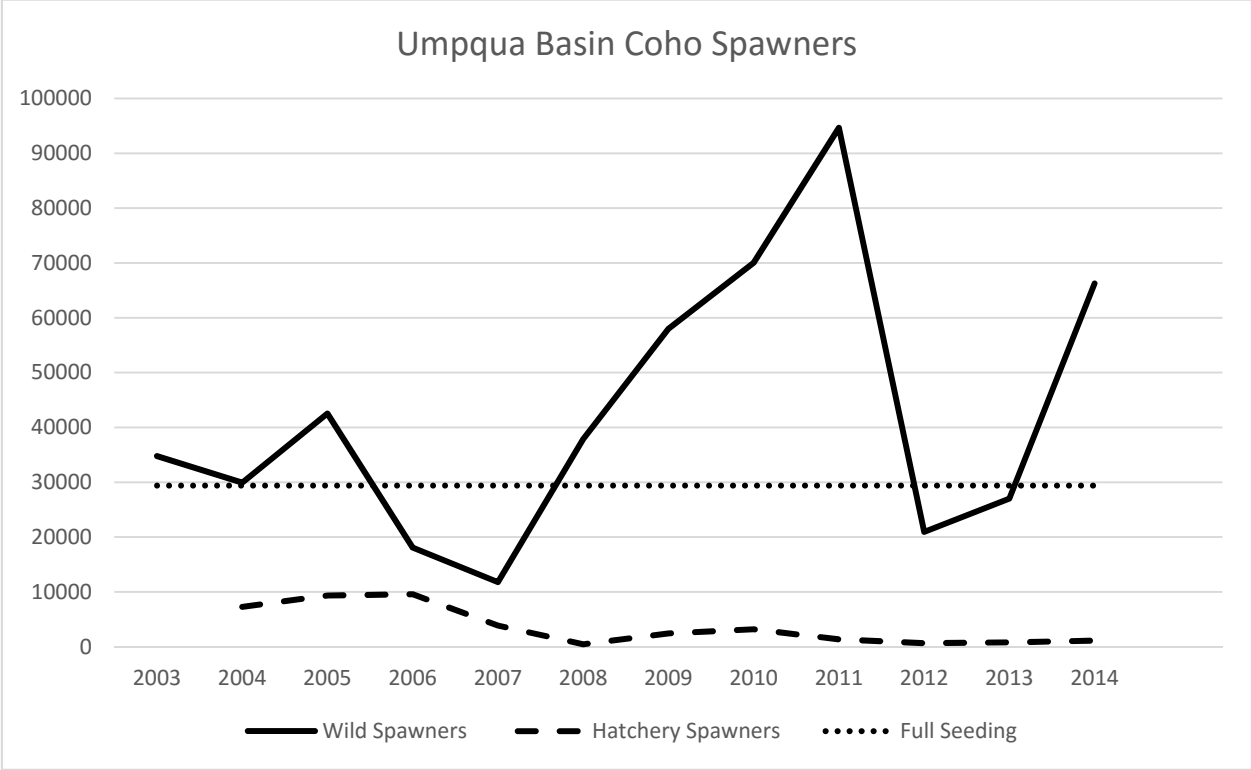

Figure 2.2.2a. The abundance of listed natural Coho Salmon spawners in the Umpqua River Basin (2003-2014) showing a marginal line for full seeding levels.

- Provide the most recent 12 year progeny-to-parent ratios, survival data by life stages or other measures of productivity for listed population. Indicate the source of these data.

Figure 2.2.2b illustrates the number of Coho Salmon recruits per spawner in the South Umpqua basin. This data is available from the Salmon and Steelhead Recovery Tracker link on the ODFW website. The South Umpqua is presently averaging about 2.1 recruits per spawner. Data for the North Umpqua is not presented since the newest data does not include 2008 to the present. Data from 2008 onward reflects the current status of the North Umpqua basin since the hatchery program was discontinued.

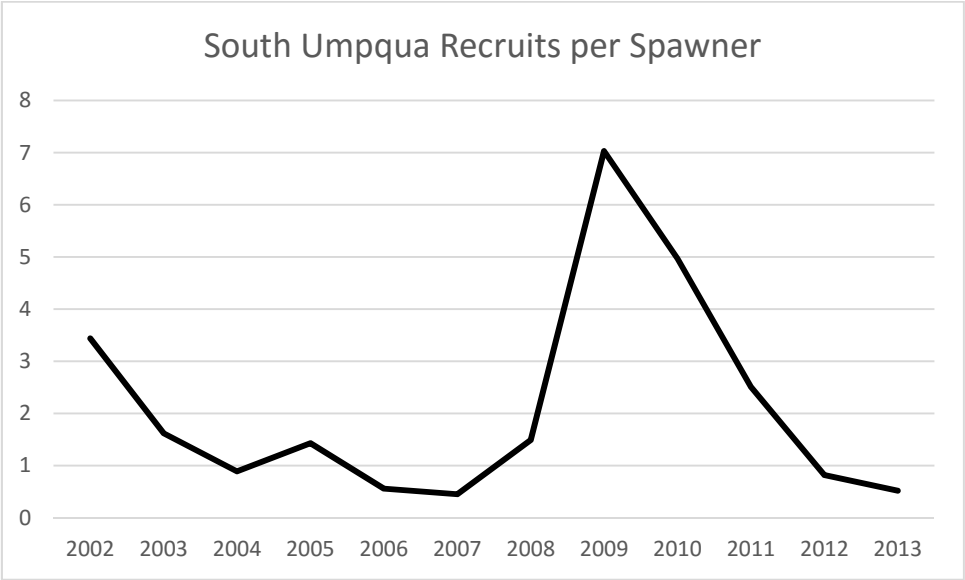

Figure 2.2.2b. Number of recruits per spawner of Coho Salmon for the South River Umpqua basin, 2002-2013.

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

The Umpqua River has generally met or surpassed the number of Coho Salmon spawners necessary for fully seeding the basin and has averaged 42,656 returning adults during the last 12 years (see Figure 2.2.2a).

-Provide the most recent 12 year estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.

The number of spawning adults of Coho Salmon in the South Umpqua has increased in recent years and from 2003 to 2014 averaged 15,295 wild Coho and 662 hatchery Coho Salmon (Figure 2.2.2c). According to OASIS spawning ground data (M. Lewis pers.com and http://odfw.forestry.oregonstate.edu/spawn/reports.htm) hatchery influence has ranged from 0% to 13% of the population and has averaged 4.6% since 2004. This is well within the goals of the NFCP (2003), OCCCP (2007) and HMP (2003) plans. Since the hatchery program for this basin fulfills a specific mitigation goal of releasing 60,000 Coho Salmon smolts, this stray rate should continue to remain low and meet the department's program goals for stray rates. Per NEQ seeding levels noted by Gray et al. (2011), the South Umpqua population has also met or exceeded reaching 75% of the seeding needs of the basin in most years (Figure 2.2.2c). Persistence estimates in 2007 (ODFW Salmon and Steelhead Recovery Tracker) show a high probability of all of the Umpqua's populations persisting into the future. The Lower Umpqua had an average probability of 0.993, Mid Umpqua 0.992, North Umpqua 0.976, and South Umpqua 0.997. Again, these data for the North reflect the time period prior to the hatchery program being discontinued.

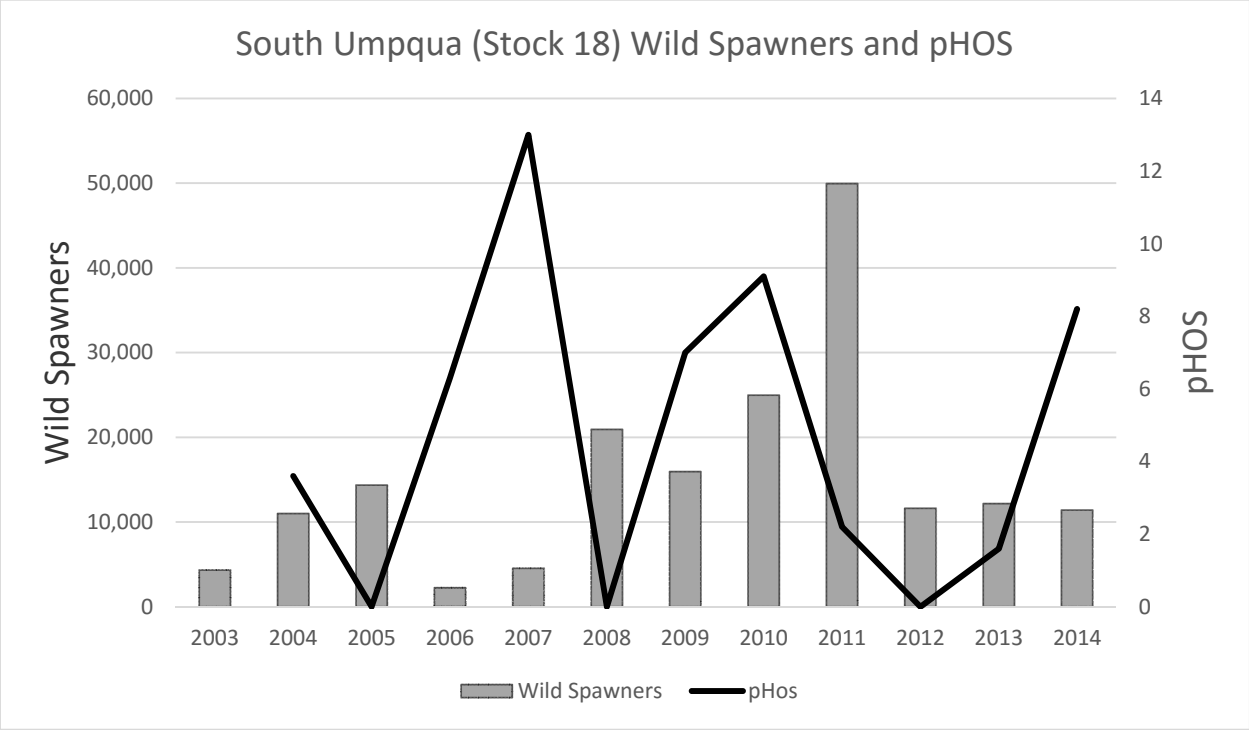

Figure 2.2.2c. The number of wild and hatchery Coho Salmon in the South Umpqua basin compared to NEQ seeding levels.

The lower Umpqua River fall Chinook Salmon percentage of hatchery-origin spawners (pHOS) is tracked primarily through walking spawning ground surveys throughout the lower Umpqua Basin. From the year 2006 – 2015 the average pHOS level is 11.4%. This percentage is likely over estimated due to some outlier years. In recent years a greater effort has been made to accurately identify Chinook Salmon as wild or hatchery-origin. In years as recent as 2011, the majority of carcasses were identified as unknown. This is likely either a data entry error or observer error and these fish may be wild-origin fish. Prior to 2006 all fish were not identified by origin. Since 2012 the stray rate averages only 0.2% (Table 2.2.2a).

Table 2.2.2a. Origin of fall Chinook Salmon in the lower Umpqua River Basin observed in spawning ground surveys, 2006-2015.

Survey Stream	Survey Date	Total unknown	Total hatchery	Total wild	Total fish	Stray rate (%)
Smith	2006	109	8	0	117	100.0
Smith	2008	208	0	0	208	0.0
Smith	2009	210	1	41	252	2.4
Smith	2010	75	0	61	136	0.0
Smith	2011	390	4	85	479	4.5
Smith	2012	40	0	65	105	0.0
Smith	2013	35	0	132	167	0.0
Smith	2014	24	0	66	90	0.0
Smith	2015	94	0	219	313	0.0
Umpqua	2008	36	0	0	36	0.0
Umpqua	2009	190	10	6	206	62.5
Umpqua	2010	58	4	47	109	7.8
Umpqua	2011	516	22	124	662	15.1
Umpqua	2012	11	0	56	67	0.0
Umpqua	2013	3	0	253	256	0.0
Umpqua	2014	6	1	59	66	1.7
Umpqua	2015	2	0	55	57	0.0

Stray rates for the lower Umpqua River fall Chinook Salmon are also monitored at the West Fork Smith River adult fish trap. From 2003 – 2015 of all fall Chinook Salmon handled at the adult fish trap, 7% were of hatchery-origin. In 2015, only 1% of fish handled at West Fork Smith adult fish trap were of hatchery-origin.

Winchester Dam on the North Umpqua River provides some insight into stray rates of Lower Umpqua fall Chinook Salmon. Fish crossing Winchester Dam are examined via video recording for species, size and hatchery marks. For the years 2003-2014 the average stray rate was 11.5%. This includes all hatchery fall Chinook Salmon observed. It should be noted that a second fall Chinook Salmon program, where fish were released into the Calapooya River, ran concurrently with the Lower Umpqua program and utilized the same hatchery marks in many years. It is very likely that the Calapooya program's fish contributed to the majority of the total hatchery count over Winchester Dam. Thus the stray rate of Lower Umpqua fall Chinook Salmon over Winchester Dam is likely much less than 11.5%.

Hatchery strays of Lower Umpqua fall Chinook Salmon can also be examined at the Happy Valley fish trap. Prior to 2015 broodstock for the Calapooya Creek fall Chinook Salmon program were taken from a weir style adult fish trap near river mile 18 on the South Umpqua. A portion of the fall Chinook migrating upstream were trapped and collected. The trap was normally operated for about one month during the peak of the fall Chinook Salmon run. From the years 2008 through 2014, 0.2% of Chinook Salmon handled at this location were identified as hatchery-origin. Similar to the Winchester Dam monitoring information, the majority of these fish are likely from the Calapooya Creek program and not from the Lower Umpqua program. Note: The Calapooya Creek fall Chinook Salmon program has been terminated with the last smolts release in 2015.

Stray rates may have decreased since 2009 due to changes in release location of hatchery juveniles. As recently as 2007 fall Chinook Salmon smolts were released into locations other than Winchester Bay and may have contributed to additional straying. Since 2008 all lower Umpqua fall Chinook smolts have been acclimated and released into Winchester Bay.

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

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

Chinook Brood Collection:

Winchester Creek Trap
This trap was first operated in 2000. It is a box trap with a top lid for removing fish captured. All naturally-produced Coho Salmon are released with a minimum of handling upstream of the trap. Fin-clipped Coho Salmon are returned to the fishery below the trap. No trap mortalities have occurred at this site. The trap is removed in late September or October which is before the wild Coho Salmon run reaches its peak into lower Umpqua tributaries. Consequently, incidental capture of adult Coho Salmon is likely to remain a low percent of the trap catch. The trap is checked once or twice per day depending on daylight low tides which make the trap accessible. Thus Coho Salmon are detained for less than 24 hours.

North Fork of Smith River Trap
This trap has a low potential to capture and harm wild Coho Salmon due to the operation time as only a few brood fish are collected at the site. This trap is a box trap similar to the Winchester Creek trap. When used, the trap is operated in October and checked at least once per day, thus detaining Coho Salmon for 24 hours or less. Any wild Coho Salmon captured are placed above the trap with a minimum of handling.

Mill Creek
The Mill Creek trap is located at the end of tidal influence in Mill Creek which is a tributary

to the Umpqua main-stem at RM 24. This trap may slightly delay Coho Salmon migration until the trap is checked when Coho are allowed to pass upstream. This trap is checked once or twice per day. This trap has only been in operation since 2002. No Coho Salmon mortalities have occurred during the trap's operation. Coho captured in the trap are placed above the trap with a minimum of handling. This trap is operated from late October until high water makes operating the trap unsafe and unfeasible, normally around the end of November. Adult Chinook Salmon trapping is normally accomplished prior to the peak Coho Salmon run.

Tangle Netting

Tangle netting for broodstock would only be done if other, more passive trap methods were unsuccessful in obtaining enough brood. Coho Salmon take levels for the Umpqua Watershed would be checked prior to initiating tangle netting to ensure take levels were not being approached. Tangle nets would be used in areas likely to have greater concentrations of Chinook, not Coho Salmon. A block and push net would be used. Several people in drysuits and snorkel gear would be with each net to immediately free any listed salmon captured. This method was used for the program in Mill Creek in 1997. The number of Coho Salmon captured was not recorded, but no mortalities were observed. This method was also used in 2002, when 16 Chinook Salmon were collected, 10 were passed, and no Coho Salmon were captured or mortalities occurred.

Hook-and-Line

Hook-and-line methods for broodstock collection would also only be used if other, more passive collection methods were unsuccessful in obtaining enough brood. Coho Salmon take levels would be checked prior to initiation to ensure that take levels were not being approached. Hook-and-line collection would be conducted in areas likely to have higher concentrations of fall Chinook Salmon. Incidental take would be similar to the current allowable in-river Chinook harvest. Coho Salmon would be released with a minimum of handling. This method has not been used for brood collection to date.

Smith River Falls Fishway

A V notch and weir trap is installed in the upper pool of the Smith River falls fishway each year from September to April as part of a monitoring project to estimate the population numbers of fall Chinook, Coho, and winter steelhead in the Smith River. All fish are captured and released, except for brood stock collected for the fall Chinook Salmon program. In 1999 and 2000 we collected 31 and 19 Chinook Salmon from the falls, respectively. This represented less than 25% of the fall Chinook Salmon run during 1999 and 2000. Early returning Coho Salmon spawners are present at the falls during October and are captured in the fishway when Chinook Salmon brood are taken. Under normal flow conditions, Chinook arrive and pass the falls earlier than Coho. In 1999 and 2000, significant rain did not occur until after October and both species began passing the falls during the same period. The Chinook run usually begins earlier in late September compared to Coho run in mid to late October. Approximately 49% of the Coho Salmon run passed the falls during the Chinook Salmon broodstock collection period in 1999 and 2000. We expect this to be a maximum level of incidental take. No direct mortality from trapping operations was documented for coho or chinook during either year. The trap is normally checked every 24 hours. However, during periods when fish migration rates are high, the trap is checked

more frequently. During low run periods, the trap may be closed for no more than 48 hours.

West Fork Smith River Fishway
This site is being used by the ODFW as a Life-Cycle Monitoring Station. It includes a floating weir and an adult holding area. This site is maintained by ODFW staff out of the Charleston office. They would notify the Roseburg office if Chinook Salmon were available.

STEP Creek Trap
The opportunity to collect Chinook Salmon brood stock returning to STEP Creek may exist. In past years there have not been enough flows through the Highway 101 bridge culvert to attract fish. In 2000, a new culvert was constructed to improve fish passage at low flows. However, fall rains have been late during the last several years and were insufficient to attract fish during the normal spawning migration period for Chinook Salmon. If fish can pass the culvert, options will be explored for capturing some brood as swim-ins on site. The culvert could be fitted with a V-notch to prevent Chinook Salmon from leaving STEP Creek during outgoing tides. Adult hatchery-origin Coho Salmon have been collected at the facility in prior years as a result of smolt releases in STEP Creek. This program has been discontinued and Coho are not expected to return after 2000. Any hatchery- or wild-origin Coho Salmon strays incidentally captured at the site will be immediately released back into Winchester Bay.

Smolt Release in Winchester Bay/Umpqua Estuary Netpens
These estuary releases will have minimal impacts to listed natural Coho Salmon juveniles due to the timing and size of the Chinook Salmon smolts releases. Estuary seining data from February through September shows that Coho are present in the Umpqua estuary primarily during only April and May. Chinook smolts releases in estuary are in mid-May at STEP Creek, June for pre-smolts in Winchester Bay, and September/October for smolts. Chinook released in STEP Creek will be 60 to 100 mm, compared to the average size of 130 mm for wild Coho. Chinook smolts released in Winchester Bay in June range from 80 mm to 115 mm. Coho smolts have not been documented in the Umpqua estuary during June and July seining operations. If any Coho smolts do remain in the estuary during the early summer they would mostly likely be larger than the program Chinook Salmon smolts. The hatchery Chinook are similar in size to wild Chinook present in the release areas. A July 1999 estuary seining project conducted shortly after a release of pre-smolts indicated all of the hatchery fish were within the normal range (98 to 113 mm) of wild Chinook. Hatchery pre-smolts composed 33% of the Chinook captured. In September, hatchery Chinook averaged 138 mm compared to wild Chinook that averaged 141 mm (ODFW Estuary Seine data). Chinook and Coho Salmon have naturally coexisted in the estuary and there is no indication that the hatchery Chinook smolts released are either larger in size than wild Chinook or are in significantly higher densities within current Coho Salmon habitat.

Chinook Salmon Population Monitoring
These activities occur within the "take area" thus are described in this section. The NMFS evaluated ODFW's research program submitted November 17, 2000 (and amended on February 13, 2001) for consideration under the ESA research limit #7 of the July 2000 4(d) Rule (July 10, 2000; 65 FR 424222). NMFS determined that take prohibitions under section

9 of the ESA will not apply to research activities specified in this program provided that the research activities are conducted in accordance with the program as submitted and in accordance with the conditions and requirements enclosed with the March 5, 2000 letter to ODFW.

These activities include the following: Spawning fish surveys, downstream migrant traps, juvenile surveys, estuary seining, adult collection for mark and recapture research studies.

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

Table 2.2.3-1. Wild Coho Salmon Handled, Counted and Released at Lower Umpqua Chinook Broodstock Traps.

Year	Winchester Creek	Smith River Falls	North Fork Smith	Mill Creek
1992	Not Used	NA	Not Used	Not Used
1993	Not Used	Not Used	Not Used	Not Used
1994	Not Used	Not Used	Not Used	Not Used
1995	Not Used	Not Used	Not Used	Not Used
1996	Not Used	Not Used	Not Used	NA
1997	Not Used	NA	Not Used	NA--no mort.
1998	Not Used	NA	Not Used	Not Used
1999	Not Used	460*, 0 mort.	0	Not Used
2000	10, 0 mort	951*, 0 mort	4, 0 mort	Not Used
2001	48, 0 mort	2,493	0	Not Used
2002	13	6,762	0	20
2003	13	Not Used for brood	Not Used	0
2004	2	1,911	Not Used	0
	N/A	N/A	N/A	N/A
2006	N/A	N/A	N/A	N/A
2007	N/A	N/A	N/A	N/A
2008	20	Not Used	Not Used	23
2009	13	Not Used	Not Used	0
2010	0	Not Used	Not Used	0
2011	4	Not Used	Not Used	0
2012	2	Not Used	Not Used	27
2013	N/A	Not Used	Not Used	N/A
2014	0	Not Used	Not Used	Not Used

*A total of 930 Coho were documented at the Smith River Falls Fishway during the 1999-2000 run. Of these only 460 were captured during the same time that fall Chinook were being captured at the falls. In 2000 at total of 1,956 coho passed the falls, 951 passed during broodstock collection. With large numbers of coho at the site since 2001, the trap is opened on some days to allow free passage of all fish. When crowding exists in the trap, only a portion of the Coho Salmon are handled for marking.

NA indicates that the trap was used but no data is available on Coho Salmon captures.

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

See below Table 2.2.3-2 for the estimated take levels of listed Coho Salmon that occur mostly due to monitoring activities and are covered in the 4(d) Research & Monitoring Activities Report submitted in 2000

Table 2.2.3-2. Estimated listed salmonid take levels of by hatchery and other programs' monitoring activities.

Listed species affected: Coho Salmon **ESU/Population: Oregon Coast Coho Salmon ESU** **Activity: Lower Umpqua Fall Chinook Salmon Program**				
Location of hatchery activity: Gardiner **Dates of activity: Sept-July** **Hatchery program operator: Hatchery plus other programs' monitoring activities in the Lower Umpqua River Basin**				
Type of Take	**Annual Take of Listed Fish By Life Stage *(Number of Fish)***			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)	0	0	4,000	500
Collect for transport	0	0	0	0
Capture, handle, and release a)	0	2,000	4,000	
Capture, handle, tag/mark/tissue sample, & release	0	0	0	
Removal (e.g. broodstock)	0	0	0	0
Intentional lethal take	0	0	0	
Unintentional lethal take b)	0	0	11	
Other Take (specify)	0	1	1	

a. Smith River Fishway is a Life Monitoring Station. Brood collection at this site is secondary to monitoring Coho. Coho are marked for population estimates or passed. Over 6,000 Coho have been handled at Smith River Fishway in recent years. Several thousand Coho have also been allowed free passage when the trap was opened on certain days or only a portion of the Coho in the trap were handled and the rest were passed. Coho at other brood collection sites are observed and released by opening the back panel of the trap, or handled and released upstream from the trap.
b. Unintentional mortality of listed fish for adults as a result of 1% handling mortality at brood collection sites.

Note: Take associated with the monitoring activities within the "take area" (Section 2.2.3, Table 2.2.3-2) are covered in the 4(d) Research & Monitoring Activities Report submitted in 2000. Although the data provides useful information for the Lower Umpqua Fall Chinook Program, the monitoring activities are not part of the hatchery operations.

Instructions:

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

- **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.**

Significant delays in Coho Salmon migration due to trapping will be avoided by checking all traps on a daily basis, therefore reducing delays to 24 hours or less. If Coho take levels are being approached, or if the number of Coho exceeds the number of Chinook in brood collection traps for 10 days, and crowding is occurring, brood collection at the site will be suspended. Smith River Falls is an exception to this since it is primarily operated as a Coho monitoring station under a research program. When severe crowding occurs, only a portion of the Coho Salmon is tagged and the trap is opened to let some fish pass freely. To avoid delaying Coho while also collecting Chinook brood at the site, a cage was placed inside the trap. Chinook Salmon found while processing Coho are placed into the cage for later transport. Tangle netting will be halted at any given location if the number of Coho exceeds the number of Chinook captured. All Coho Salmon will be passed from the various sites with a minimum of handling. The peak Coho Salmon run occurs after the completion of bulk of the Chinook Salmon broodstock collection. Any significant mortality incidents at capture facilities will be evaluated on individual basis and addressed according to IHOT and fish handling protocols and procedures identified under best practices management.

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.

Until May 2000, the Umpqua River fall Chinook Salmon program operated under a section 10 incidental take permit application the hatchery programs in the Umpqua Basin for take of Umpqua River Cutthroat Trout. ODFW requested that this permit be withdrawn as a result of the delisting of the Umpqua Cutthroat Trout in May 2000. This program is currently operating under the guidelines of the Native Fish Conservation Policy and the Fish Hatchery Management Policy, which were adopted by the ODFW in 2003.

This fall Chook Salmon program is also consistent with the ODFW's Coastal Multi-Species Conservation and Management Plan (CMP) 2014.

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

1) Section 10 incidental permit number 1017 (withdrawn May 2000)
2) FERC permit number 7161
3) US Army COE permit number 2000-00552
4) ESA Section 7 consultation, biological opinion in cooperation with Roseburg and Coos BLM districts, Umpqua National Forest, Interagency fish population monitoring program, approved NMFS April 10, 1997
5) US Army Corps of Engineers- General Authorization permit number for improving fish habitat in Western Oregon
6) NPDES permit for Rock Creek hatchery operations and DEQ Memorandum of Agreement regarding fish carcass distribution in Oregon streams.
7) ODFW STEP Project Proposals, GRWB, approved 2002.
8) Landowner lease with Roseburg Resources Company.
9) GRWB Nonprofit status, IRS#93-1166963.
10) ODFW Native Fish Conservation Policy, 2003.
11) ODFW Fish Hatchery Management Policy, 2003.
12) ODFW Fish Health Management Policy, 2004.
13) STEP Regulatory Statue (496) and Oregon Administrative Rules (635) guidelines
14) STEP Program Water Rights ORS 537.142
15) Oregon Plan for Salmon and Watersheds.

This program will be operated consistent with all permits and agreements.

3.3) Relationship to harvest objectives.

Harvest objectives for OCN Coho Salmon have been approved by NMFS under the section 7 consultation for the PFMC salmon management plan. The Lower Umpqua fall Chinook Salmon program operates within the ODFW's Coastal Chinook Salmon Plan (1991). Harvest of marked or unmarked fall Chinook Salmon is legal in the Umpqua Estuary/River. However, GRWB has a goal of at least matching the marking done by the ODFW Stock Assessment Program (25,000 fish). Of the Chinook Salmon smolts released in the estuary the program has consistently attempted to mark 100% of the pre-smolts released in the bay/estuary since 1996. This will enhance monitoring of harvest, escapement, and straying. The marked fish also identify the fish for harvest, thus minimizing the time needed by anglers to discern the difference between an unmarked Chinook and a wild Coho Salmon. The program has directly benefited a recreational bank angling fishery that has developed in recent years. As program fish return to Winchester Creek they swim near the shore and provide angling opportunity to people fishing from the banks. Although the program won't meet production goals until 2005, the program will continue contributing to the ocean and freshwater harvest.

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.

Harvest rates for program fish are estimated at 30% in the ocean fishery and 10% in the freshwater fishery. Generally, insufficient data are available for harvest of program fish in the ocean and the freshwater harvest of program fish in the lower main-stem Umpqua River. The program did not stabilize until brood year 1994 when the primary emphasis of the program was to acclimate and release pre-smolts in Winchester Bay. Table 3.3.1 shows the maximum estimated harvest of the pre-smolts released by the program based on a 0.8% CWT survival estimate and a 40% harvest. Additional data has been collected for ocean fisheries (creel surveys), freshwater fisheries (punch card data) and CWT, but the data has not yet been analyzed or published. The fact that nearly 600 fin-clipped Chinook Salmon were handled at the Winchester Creek trap in 2003 indicates that current survival rates are likely underestimated. There has also not been a creel survey designed yet for the growing bank fishery occurring in the Winchester Bay area. Data from brood year 2000 - 2003 are projections of harvest since these adults are still returning.

With the addition of the smolt program in brood year 2004, the program’s projected harvest would be 320 fish from a release of 100,000 pre-smolts, plus 840 fish from a release of 70,000 smolts if they had an average survival of 3%.

Table 3.3.1. Estimated hatchery-origin fin-marked fall Chinook Salmon harvest, 1994-2011.

Brood Year	Harvest
1994	283
1995	158
1996	234
1997	177
1998	124
1999	273
2000	561
2001	478
2002	310
2003	326
2004	1196
2005	721
2006	1336
2007	209
2008	255
2009	1277
2010	128
2011	181

3.4) Relationship to habitat protection and recovery strategies.

Naturally-produced Coho Salmon in the Umpqua basin have declined over the past decades for a number of reasons including poor ocean conditions which negatively affect smolts survival, predation, lack of screening at irrigation diversions and pumps, degradation of suitable habitats (spawning gravel and large woody debris), unfavorable natural conditions and improper fish passage at culverts.

Overall habitat conditions appear to be improving in the Umpqua Basin as well as the ocean, which are benefiting survival of Coho Salmon. Local interest in habitat issues has also grown recently. For example, local watershed councils, in conjunction with federal and state agencies, are implementing numerous freshwater habitat improvement projects throughout the basin, including fencing riparian habitats, placing large woody debris in the streams, and improving fish passage. A study is currently being conducted by the Smith River Watershed Council to look at water quality. Estuary mapping is also being conducted via partnerships with other agencies. The Department of Fish and Wildlife has an active screening program which has screened 45 irrigation pumps in the Umpqua Basin. The ODFW has also conducted several in-stream habitat projects in the Smith River Basin which benefit Coho Salmon and other salmonids. Ocean conditions have also improved since 2000 which has improved smolt survival and increased adult growth and return.

3.5) Ecological interactions.

(a) Species that could negatively impact program.

The size of program fish at release is smaller than Coho that will still remain in the estuary. As a result the Coho will dominate over the released fall Chinook pre-smolts which may

negatively impact the program fish. The predatory fish that could negatively impact out-migrating Chinook smolts include one native fish (coastal Cutthroat Trout) and introduced non-native Striped Bass. However, negative impacts due to predation by Cutthroat Trout and Coho on Chinook Salmon fry and smolts are unknown. Chinook may be relatively more susceptible to Striped Bass predation than other juvenile salmonids due to their smaller size and lesser experience in predator avoidance. Predation by aquatic mammals like otters, seals, sea lions etc. could negatively impact the program. Also, birds like blue herons, Caspian terns, cormorants, and gulls etc. may impact the program.

b) *Species that could be negatively impacted by program.*

Competition for food and space by Chinook may negatively impact the listed Coho Salmon fry/smolts in the estuary, but because of relatively smaller size of Chinook the juvenile Coho and steelhead will dominate over released fish and impact on listed fish would be minimal. Release timing and locations are also designed to minimize competition and predation on wild juvenile fish. While predation may be concentrated to some degree at release locations, this effect would increase the risk to hatchery juveniles, but not necessarily to naturally-produced juveniles coming from elsewhere in the basin. Most of the program fish are released into estuarine rearing habitats that do not knowingly overlap (or compete) with significant numbers of wild coho in the estuarine environment. The program fish are spatially segregated from primary rearing habitats, and occur in the estuary after Coho smolts emigration.

c) *Species that could positively impact program.*

Any hatchery or wild fish that dies or recycled for nutrient enrichment of the basin may positively impact the program.

d) *Species that could be positively impacted by the program.*

The freshwater and marine species that depend directly or indirectly on salmonids for their food and nutrient supply could be positively impacted by the program. These include larger salmonids, other fish species, aquatic mammals, birds etc. Thus the hatchery production has the potential for playing a significant role in the predator-prey relationships and community ecology during the low natural productivity.

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.

GRWB STEP

Water source for the GRWB STEP facility is Gardiner Reservoir. This is a gravity fed system that operates the hatch house from late October through March, the rearing ponds from March to June, and the brood holding raceways September through November. Flow can be controlled at the intake by adjusting the lake level by the use of dam boards and valves to specific facilities. Water temperatures at Gardiner can exceed 65° F degrees during the summer. Consequently the Lower Umpqua program has all of the fish released from the site or transported to the netpens by mid-June. The reservoir has a high amount of sediment on the bottom. To minimize sediment intake, the intake pipes to the hatch house are suspended above the bottom of the lake. Intake to the hatch house is also routed through a series of filter-cloth filters. During a lengthy summer/fall drought, water flow to the raceways used for holding broodstock could be limited. Additional aeration pumps and gravity sprinklers were installed in the brood holding raceways in 2002 and 2003. In 2004, GRWB added a re-circulating pump so water flow through the raceway can be maintained at 100 - 200 gpm. The program is also considering for a well and pump system for adding cooler water to the raceways.

Rock Creek Hatchery

The water right for Rock Creek Hatchery is 30 CFS from Rock Creek during the months of October through June and 25 CFS from the North Umpqua during June through October. Rock Creek water temperatures are too high for fish health in the summer, which necessitates the need for the cooler North Umpqua water supply.

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.

GRWB STEP

Coho Salmon populations are not present above the GRWB STEP intake since the reservoir has been dammed in 1944 and had no fish passage. There is no historical record of any wild Coho Salmon population in STEP Creek. The intake is still screened with a woven wire mesh screen at the dam and two filter cloths at the hatch house intake. Untreated discharge water from the facility enters STEP Creek. Treated incubation water is discharged on upland soil to allow natural soil percolation. Present levels of fish rearing are well below the poundage requiring for the NPDES permit and discharge monitoring. Volunteers however are implementing measures to monitor water temperature and DO. Organic effluents from cleaning rearing ponds are discharged at a designated upland site away from the stream.

Rock Creek Hatchery

The Rock Creek intake is equipped with NMFS specification mesh screening: 0.0689 inch stainless steel wedge wire and the Umpqua intake with 5/64 inch perforated aluminum

panels. Sixty percent of the waste discharged from the facility raceways is abated in a large 100’ x 80’ pollution abatement pond before discharge to Rock Creek. The facility is operated under the NPDES general permit 300J; and effluents are monitored and reported quarterly to DEQ.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

Broodstock adults are collected at 4 locations:

(1) Winchester Creek: a box trap is used to collect brood. The box is made of aluminum tubing with a V notch entrance. Cyclone fencing is used to form weirs from the side of the trap for funneling the fish to the trap entrance. The roof of the trap is hinged to allow removal of the fish. Non-target fish are passed with a minimum of handling. The rear panel of the trap can be removed to allow upstream passage of fish with no handling. Program fish are removed from the trap and carried to the transport tank via a net or a rubber inner tube "boot" partially filled with water. The trap size can be increased by adding additional panels. In recent years the program has operated the trap at a length of 22 feet to reduce potential crowding.

(2) The same type of box trap and transport system is used on the North Fork of the Smith River. The trap site has varied. Since no standard site has been found for operating this trap, it has not been used for the last couple of years.

(3) The same type of box trap is used on Mill Creek. Fish are funneled into the Mill Creek trap via a floating weir in addition to cyclone fencing. The trap is located near the end of tidal influence. Starting in 2004, the trap may be operated at a length of 33 feet.

(4) Tangle netting uses a block and push net. The monofilament net has a 4 - 6 inch mesh size to avoid capturing salmon by the gill plate. Personnel and volunteers attend each net. Personnel with snorkel gear untangle the fish to reduce the capture time and potential for descaling or other injury. As soon as a salmon hits the net, the fish is restrained and removed from the net. Chinook used for brood are placed in a hand net or inner tube for and placed in the transportation tank. Non-target fish and coho are cut free and are placed to the open sides or above the nets. Locations for using the nets may vary depending on the availability of returning Chinook and their movement. Nets are fixed in pools and calm areas, which are relatively free from obstructions. Tangle netting for this program could occur in Mill Creek, Camp Creek, Winchester Creek, the lower Smith River, or lower Umpqua.

(5) Smith River Falls Fishway has multiple steps contained within a concrete tunnel for aiding fish passage over the Smith River Falls. The last step is approximately 40' x 10'. The trap is operated by blocking the intake end with a screen while placing a fyke in the entrance of the lower end. A crowder is used to reduce the area available for the fish to swim and allow netting. Once the fish are processed they are placed over the crowder, the intake screen is removed and the fish volitionally exit the trap. Brood fish are placed in cage set in the fishway to avoid any delay in removing coho from the trap. Later, the chinook are lifted out of the tunnel and carried to the transport tank via a boot or net.

(6) If Chinook Salmon start passing the culvert at new highway 101, a box trap could be

placed above the culvert for brood collection. The program could also install a finger weir on the lower end of the GRWB raceway to capture broodstock on site.

(7) Hook-and-Line techniques use a rod and reel to capture Chinook Salmon. Fish are not "played out" and are reeled to a cloth hand net for removing the hook. Coho Salmon are released immediately with minimum stress. Site selection depends on the stock being sought and areas of higher concentrations of Chinook Salmon.

(8) West Fork Smith River Fishway is operated by the ODFW. The Charleston staff operating this facility would contact the Roseburg staff if fall Chinook Salmon were available. The fish would be transported a portable tank to the GRWB broodstock raceway.

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

- Transportation trucks: There are 3 trucks used for fish transportation; one 3,000 gallon stainless steel tractor-trailer with liquid oxygen and agitators; one 2,300 gallon stainless steel tanker with liquid oxygen and one 1,000 gallon steel-tanker with refrigeration and oxygen supply facilities**.**
- Two insulated portable tanks with diffused oxygen and spray aeration. One tank holds 250 gallons of water and the other holds 220 gallons.
- Five Push-in aluminum tanks with spray aeration. Each tank holds 200 gallons of water.
- Two Push-in aluminum tanks with spray aeration and diffused oxygen. Each tanks holds 350 gallons of water.

5.3) Broodstock holding and spawning facilities.

The GRWB STEP facility is the only place used for spawning for the Lower Umpqua fall Chinook Salmon. Brood fish are held on site in the upper 80' x 16' x 4' raceway. The lower raceway consists of two parallel raceways of 34’ x 4’10” and 34’ x 2’6” then a single raceway of 50’ x 4’9”. Below this a 15’6” x 4’9” section of raceway can be used as a swim in trap. Tank 3 which is 59' 4" x 6' wide can be run at 4' deep and used to hold brood. The water supply for all raceways is from Gardiner Reservoir, plus some tidal influence from STEP Creek. The raceways have multiple sections that can be gated and used for sorting fish. Oxygen to the raceways can be increased by using an electric circular or fresh flow pumps to spray the water from a spray-nozzle. Gravity flow water can also be sprinkled through mesh-covered trays to increase aeration. A re-circulation pump was added to the upper raceway in 2004 so flows can be maintained at 100 - 200 gpm even during drought years. The program is considering the addition of a well to add cooler water to the raceways while holding brood prior to the start of the fall rainy season.

5.4) Incubation facilities.

Rock Creek Hatchery
At Rock Creek hatchery incubation takes place in 20 vertical stack incubators. The water is filtered to 20 micron mesh from Rock Creek and passed through UV sterilization. The

water supply is the same as the rest of the hatchery. Discharge water from incubation is returned back to Rock Creek except for during times of treatment. Treated incubation water is diverted to the abatement pond before dismissal into Rock Creek. Eggs may be incubated at the hatchery from the eyed-stage.

GRWB STEP Facility

At Gardiner STEP facility, incubation takes place in 13 vertical stack incubators with 8 trays per stack. Water is gravity fed from Gardiner Reservoir and controlled to flow at 6 to 8 gallons per minute through the trays. Discharge water from incubation is run into the raceways and then into Gardiner/STEP creek except during times of treatment. During treatment, water from the hatch house is diverted to a sandy area to be filtered by natural percolation through the soil.

5.5) Rearing facilities.

GRWB STEP

There are 6 rearing facilities for the Lower Umpqua fall Chinook Salmon program at the Gardiner STEP site. Four sites are above the ground concrete tanks, which are 20' x 6' and run at a water depth of 4' to 4'9". Water for these tanks (4, 5, 6, and 7) come from Gardiner Reservoir and is discharged into STEP Creek. The water enters each tank via a 4-inch pipe, which is raised approximately 3 feet above the tank. Holes have been drilled the length of the pipe to create a sprinkler system. The water is further oxygenated by dropping through a series of three mesh-covered trays (baffles) before entering the tank. The holding capacity of each tank is 480 pounds of fish when the water is 4' deep. Each tank operates at about 60 gallons per minute. Dissolved oxygen in the tank is maintained above 6.5 ppm. Extra aeration can be added via an electric pump and a spray nozzle. All four tanks are covered by a roof to provide shade and predator protection. Predator nets are hung from the edge of the roof. A sunscreen is placed on the east end of the area, which receives the most sunlight.

The fifth rearing site (tank 3) is an above the ground concrete tank which is 59' 4" x 6' and runs at a water depth of 4'. The water is from Gardiner Reservoir, and like the other tanks enters the pond via a raised pipe which sprinkles through mesh-covered trays. The holding capacity is 1,416 pounds of fish. Discharge is into the brood raceway, and then enters STEP Creek. This tank is operated at a dissolved oxygen level of over 6.5 ppm. The tank is roofed to provide shade and predator control. The sixth rearing site is a fiberglass, 60 gallon round tank. Water from Gardiner Reservoir enters the tank via a center sprinkle pipe. This tank sits next to tank 3 and is under the same roof and discharge system.

Rock Creek Hatchery

There are at Rock Creek 20 rearing containers in all: 2- 30'x 80' concrete; 6- 20'x 80' concrete; 6-145'x 20' concrete; 1- 20'x 80' concrete w/ center wall; 6– 16' Canadian troughs; all single pass containers. Flows are adjustable in all containers. All containers carry a maximum 5' depth except the Canadian troughs which are 2' deep.

5.6) Acclimation/release facilities.

(1) Winchester Bay: Fish are acclimated in six 20' x 20' x 8' netpens with 3/8 inch mesh suspended by PVC pontoons. The holding capacity for each netpen is 2,400 pounds of fish. The program currently has 4 netpens and is seeking funding for 2 additional netpens. All netpens presently used are fitted with submerged feeders to encourage natural feeding behavior in program fish. At Winchester Bay, the program has access to running water and to a floating dock to wash the netpens.

(2) Fish may be released into STEP Creek directly from tanks 3, 4, 5, 6, or 7. STEP/Gardiner Creek is less than 0.5 miles long and drains directly into the Umpqua estuary complex near the confluence of the Umpqua and Smith River.

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

Prior to brood year 1999, GRWB STEP had years with relatively high mortality of broodstock. Trapping techniques were being refined, the fish were more stressed, and the Chinook were placed in the narrow lower raceway. To minimize mortality the program installed a new large upper raceway in 1999. From 1999 - 2002 mortality was less than 6% and the brood did not developed any fungal infection. In 2003, the program accidentally overstocked the holding raceway. Water temperatures were above 65º F, the DO dropped below 7 ppm and the water flow was inadequate to maintain the number of fish placed in the raceway. This caused a significant mortality of brood fish. To correct this problem the program reviewed holding capacity with STEP members, and installed a re-circulating pump, 2 fresh flow aerators, and more baffles to increase water flow and oxygen levels. The program also installed a flow measuring board so gpm could be more accurately measured. Tank-3 and the lower, old raceway can still be used for holding brood if more capacity is needed. A flood in 1996 did cause some broodstock to escape. With the new raceway and the fencing around it, the facility should be able to better withstand flood conditions.

In brood year 1999 Gardiner STEP suffered significant mortality of eggs due to suffocation caused by sediment in the water during a heavy December rainfall. The program then lost a significant number of smolts due to a large bullfrog carcass blocking an intake pipe, causing the water flow to stop. Although the intakes had been screened previously, the program improved the screening by decreasing the mesh size of the dam screen to ¼ inch and adding filter cloth screens to the hatch house intake. In a separate incident in 1999, a pipe to tank-3 broke, causing significant mortality. All pipes were checked and re-glued.

Water temperatures at GRWB can exceed 65º F during the summer, consequently the program releases all of its fish or moves them to acclimation sites by mid-June. In 2000, tank-7 contracted red-mouth disease. The disease was controlled by medicated feed and no significant loss of pre-smolts occurred. In 2002, 2003, and 2004 vibriosis occurred in the netpens. Samples were sent to ODFW pathology and an early release was approved by pathology. The program lost 1,000 to 4,000 pre-smolts.

5.7) 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.

GRWB STEP Facility

The Lower Umpqua fall Chinook Salmon is not an ESA-listed population. However, to minimize the loss of any program fish, the GRWB STEP facility added a re-circulation pump and aeration systems to improve brood holding conditions in its raceways. The program also gages water flow daily and started taking frequent DO readings, especially during periods of warm water temperatures or when numerous brood fish are being held on site. No take of a listed or wild species would be anticipated even if the water from the hatchery would be halted since STEP Creek is tidal influenced and would maintain its flow. Presently, a gasoline pump and an electric pump are located on site, and could be used to provide water through a spray nozzle to aerate water in case of an emergency. All raceways were fenced to prevent the escapement of brood fish during extreme flood conditions. Hatchery methods of operations are guided by IHOT literature, the Hatchery Fish Management Policy and as prescribed by ODFW fish health pathologists at Oregon State University. All propagation equipment is disinfected with chlorine or iodophor as it is received or dismissed from station premises to prevent disease transferal. Outbreaks of disease are acted on immediately with guidance from certified ODFW pathologists. ODFW pathology tests required for broodstock are conducted as needed and regular health inspections of ponded fish are completed to control the spread of diseases. Chinook Salmon smolts acclimated at Winchester Bay are inoculated with Vibrogen several weeks prior to release. Starting in 2005, the program may also do a duel Vibrogen inoculation and/or try medicated feed to avoid a vibriosis outbreak. The vibriosis outbreaks have occurred after Coho Salmon juveniles have emigrated out of the estuary area. Care is taken to avoid overcrowding the fish in the various tanks and netpens and to release them by mid-June when water temperatures can exceed 65ºF.

Rock Creek Hatchery

Rock Creek Hatchery is equipped with state of the art 245 kw emergency generator which has the capacity to run the North Umpqua pump station and hatchery facility concurrently. The facility is staffed 24 hours, 365 days a year. All rearing and incubation containers are secured with low level water alarms connected to 5 personnel residences via Motorola radio and facility grounds audio siren in case of water emergencies. The hatch house is equipped with an intruder security system connected to same radio and siren. Both intakes are equipped with NMFS criteria screening. All fish are routinely examined on a monthly and as-needed basis by an assigned ODFW fish pathologist. Brood fish are checked for viral pathogens at the spawning stage.

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

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

6.1) Source.

Oregon coastal fall Chinook Salmon are not federal ESA listed population. From 1989 until 1996, the Lower Umpqua fall Chinook Salmon program primarily used South Umpqua (stock-18) broodstock, which were captured in Cow Creek or the lower South Umpqua at Happy Valley. Gardiner STEP did periodically capture local brood, and in 1997 the program shifted to all local brood (stock-151).

The annual broodstock collection goal is 55 pairs of fish. These fish are collected at Winchester Creek, Smith River Falls Fishway, North Fork of Smith River, Mill Creek, plus potentially STEP Creek, lower Smith and the lower Umpqua. Fish captured at Winchester Creek are primarily returning hatchery-fish. Wild Chinook Salmon are captured at the other collection sites. To reduce impacts to the naturally produced Chinook Salmon population, the number of fish collected for brood follows the guidelines established by the Native Fish Conservation Policy and is generally less than 25% of the local Chinook Salmon population. Counts are made at the trapping locations or surveys are conducted above the trap site to ensure the standards are met. Returning hatchery-origin Chinook Salmon have little interaction with wild Coho Salmon on the spawning grounds based on current stray rate observations in the lower Umpqua River and Smith River.

6.2) Supporting information.

6.2.1) History.

The Umpqua basin has five Chinook Salmon populations, including a small spring run on the South Umpqua, a healthy fall run on the South, a healthy spring run on the North, a small fall run on the North, and a fall run in the lower Umpqua and Smith River. Historically Chinook Salmon entered the Umpqua year-round and were very abundant (1995 Biennial Report). Harvest records during the 1920s indicate the fall run was most common. The Chinook Salmon populations declined to very low levels in the late 1940s and became extremely during the 1960s (Nicholas and Hankin 1989). Chinook no longer enter the Umpqua year-round indicating some loss of various population segments. Helicopter and trap counts have indicated an increase in the South Umpqua population since the 1980s. Adult populations in the Smith River have been more closely monitored since 1999 (see table below). Chinook Salmon hatchery programs were initiated in the Umpqua during the 1950s to rebuild populations. Some adult Chinook Salmon from the Columbia basin were transferred to the Umpqua during the early phases. All current programs use locally founded broodstock. Although all broodstock for fall Chinook Salmon program originated from the South Umpqua basin (stock-18) the Lower Umpqua fall Chinook Salmon program now collects brood locally to use lower Umpqua/Smith River stock-151 fish.

Prior to 1999, the Gardiner facility had difficulty retaining jacks. With the new raceway

more jacks can be held and used in spawning. Matrix spawning has been used since brood year 1998 to reduce any inadvertent selection for traits. Fish are collected from September through November to represent the natural return timing of the run. Brood fish are checked weekly for spawning ripeness from the end of October through November to ensure the program represents natural spawning times.

6.2.2) Annual size.

This program has a goal to collect 55 pairs of brood annually. Table 6.2.2 represents the Chinook Salmon actually collected and passed. Some fish also pass through the traps with no handling.

Table 6.2.2. Adult fish captured and passed upstream (199-2012) and only 55 pairs are used for broodstock.

Year	Smith Falls Brood	North Fork Brood	Winchester Ck. Brood*	Mill Creek
1999	9M, 1J, 21F passed 92	13M, 8F passed 86	Not Used	Not Used
2000	9M, 1J, 9F passed 134	3M, 4F passed 89	49M, 58F 16 below, opened by Oct. 1	Not Used
2001	30F, 1M passed 374	0	58M, 16F Opened by Oct. 1	Not Used
2002	17F passed 126	0	105M, 3F Opened by Oct. 1	16F count: 186/mi
2003	Not used	Not used	173 adults 405 passed, also opened	51 count: 241/mi
2004	7M 3F passed 57	Not used	15M, 5J, 39F passed 88, plus left trap open	18M, 16F operated 3 days
2005				
2006				
2007				
2008	0	8M, 2F, Passed 6	3M, 6F, 9J, Passed 4	7M, 13F, 6J, Passed 8
2009	0	0M, 2F, 2J	52M, 50F, 17J	5M, 16F, 0J, Passed 42
2010	0	0	19M, 17F, 3J	34M, 46F, 16J
2011	0	0	2M, 2F, 1J Passed 2	18M, 20F, 3J, Passed 74
2012	0	0	56M, 7F, 32J, Passed 9	0M, 18F, Passed 56

*Note over 90% of the Chinook returning to Winchester Creek are hatchery fish.

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

Prior to 1997, naturally produced South Umpqua (stock-18) fish were used for this program. From 1997 until 2000 the progeny were produced from lower Umpqua brood (stock-151) and were over 90% natural Chinook Salmon. In 2000, the program began capturing returning hatchery fish at Winchester Creek. In ore to maintain the genetic composition/diversity of the broodstock, naturally-produced fall Chinook Salmon will be incorporated into broodstock for this Lower Umpqua fall Chinook Salmon program per ODFW's Native Fish Conservation Policy guidelines for naturally-produced fish stock status. Currently, the proposed number or proportion of natural fish incorporation into broodstock is at least 10%.

6.2.4) Genetic or ecological differences.

Until 2000, 100% of the Chinook Salmon used for this program were naturally produced. The program now uses at least 10% naturally produced Chinook in its broodstock. Hatchery brood are collected during September and October in the lower estuary area, while naturally produced brood are collected from October – November higher upstream.

6.2.5) Reasons for choosing.

The brood was selected to represent the local population. No deliberate selection of any specific traits or characteristics is made for brood collected within the local breeding population. Collections of hatchery fish at Winchester Creek are staggered between mid-September and October to better represent the run and obtain a relatively equal sex ratio. This trap is not run throughout the entire duration of the Chinook Salmon run, due to the number of Coho Salmon which start entering the trap in late October. The later portions of the Chinook Salmon run, and naturally produced Chinook are collected at other traps such as Mill Creek and the Smith River Falls. Trap operations at Mill Creek or the North Fork Smith River become difficult and unsafe during high flows in late November. Consequently the tail end of the upstream migration is likely under-represented in the broodstock.

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.

No adverse genetic or ecological impacts to ESA-listed natural Coho Salmon are expected while selecting brood. Most of the broodstock are collected prior to the peak run of Coho Salmon. Where broodstock collection coincides with Coho migration, risk aversion measures will be applied. Traps will be kept in good repair and checked daily. Coho Salmon will be passed with minimum handling stress. Take levels will be reviewed prior to implementing collection methods such as tangle nets or hook-and-line.

SECTION 7. BROODSTOCK COLLECTION

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

A maximum of 55 pairs of adult fall Chinook Salmon are collected for broodstock. All fish captured for broodstock represent the age class distribution naturally occurring in the run (jacks, 3-year old, 4-year old etc.).

7.2) Collection or sampling design.

(1) **Winchester Creek**: The trap is operated from early September through mid-October or until nearly 50 to 70% of the brood goal is met. Most fish captured are hatchery fish, with a few natural Chinook Salmon. Since male Chinook Salmon tend to arrive at the trap first, the program staggers collections to maintain a 50/50 sex ratio from the trap site.

(2) **North Fork of Smith River/Mill Creek**: These traps are operated from early October to November. The program normally collects one out of every four fish which enter the trap. This helps ensure that over 75% of the run passes upstream. The program may also pass fish for several days, or do an upstream survey, and then collect an appropriate number of fish to "even" the 3:1 ratio. These are not permanent traps so fish swim past the weirs during high flows and also migrate above the traps before and after the traps are operated.

(3) **Smith River Falls Fishway:** This trap is operated from mid-October through April. The primary purpose of operation of this facility is to document Coho Salmon and steelhead runs. Broodstock collection is secondary. ODFW personnel operating the trap do document each Chinook Salmon, thus keep a tally of fish passed/collected to ensure that broodstock collection does not exceed 25% of the native run. Spawning ground surveys are also conducted above and below the trap to further document escapement numbers.

(4) **STEP Creek:** Fish will be collected at the Gardiner STEP site if water flows are adequate for fish passage. The on-site collection will target only hatchery fish.

(5) **Tangle netting/Hook-and-Line:** These methods will only be used if more passive trapping methods have been unsuccessful. They may be random, or might target one sex if sex ratios are uneven. No other selection criteria would be used.

7.3) Identity.

The lower Umpqua River fall Chinook Salmon program previously had a goal of fin-marking (ADLV) 100% of the program fish. Since 1996, 70 - 100% of the estuary/bay pre-smolts have been tagged and fin-clipped. This mark is unique to the GRWB program and is therefore identifiable as GRWB program fish and not stock-18 fall Chinook Salmon (AD only). With the discontinuation of the stock-18 Chinook program, clipping will now be AD only.

7.4) Proposed number to be collected.

This program would collect a maximum of 55 males and 55 females of the lower Umpqua River stock-151 fall Chinook Salmon.

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

About 55 pairs of adult Chinooks Salmon with 1:1 sex ratio would be collected.

7.4.2) Broodstock collection levels for the last twelve years, or for most recent years available:

Brood Year	Adult Females	Adult Males	Jacks	Eggs	Juveniles released
1988					
1989					(60,000)
1990	No release				
1991					(91,713)
1992	3	4		13,783	13,413 (103,539)
1993*				11,571*	4,000*
1994*					98,553* (51,920)
1995*					80,789* (84,739)
1996*	7 (5)	8 (4)		18,155 77,900*	87,105*
1997	50 (31)	23 (14)	2	139,471	97,920
1998	29 (25)	14 (13)	0	87,400	47,688
1999	33 (29)	19 (18)	1	105,915	87,796
2000	71 (66)	61 (57)	1	267,065	223,600
2001	46 (42)	59 (34)	11	177,842	149,373
2002	37 (33)	105 (34)**	0	141,061	116,113
2003	109 (43)	115 (34)	0	176,470	135,142
2004	80 (70)	48 (44)	5	295,593	247,408
2005	83 (53)	36 (30)	2	231,875	134,334
2006	62 (53)	34 (31)	2	212,951	193,580
2007	18 (5)	3 (3)	4	19,997	17,467
2008	15 (10)	14 (10)	8	38,923	21,288
2009	63 (53)	53 (50)	19	220,978	183,050
2010	33 (23)	28 (19)	3	96,684	40,026
2011					56,499
2012	25 (23)	57 (24)	32		

- * Indicates stock-18 eggs or fry transferred from Rock Creek Hatchery to Gardiner STEP
- ( ) Indicates smolts from Rock Creek Hatchery released at the head of tide area below Scottsburg
- ( ) From 1996 - 2012 indicates number actually used for brood.
- ** Excess males were released in 2002.

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

Excess hatchery-fish at Winchester Creek have been released below the trap to re-enter the fishery, which is less than a quarter mile away. Excess Winchester Creek fish collected and taken to the GRWB facility have been released at Winchester Bay. No excess has been taken from other trap sites.

7.6) Fish transportation and holding methods.

Adults from Winchester Creek are in a portable tank for less than 30 minutes before reaching GRWB STEP. Transport time from Smith River Falls, West Fork or the North Fork of the Smith is approximately one hour. Transport time from Mill Creek is about 30 minutes. Adult Chinook Salmon are transported in a portable tank (220, 250, or 350-gallon capacity) with a loading rate of one pound of fish per gallon of water. Oxygen level is maintained at least 6.5 ppm. No anesthetic is used although Poly-Aqua may be used to reduce handling stress. Water is pumped from the trap site so tank temperature matches the local water temperature.

7.7) Describe fish health maintenance and sanitation procedures applied.

Disease outbreaks are monitored and antibiotic injections are an option if warranted and prescribed by ODFW fish pathology. Fish are monitored for signs of fungus and may be treated with hydrogen peroxide if warranted. Hydrogen peroxide would be administered at the rates recommended by pathologists. Spawned adults are sampled and tested for viral and bacterial infection by ODFW's centralized pathology unit. Tanks are disinfected with chlorine. All equipment is disinfected with chlorine or Iodophor.

7.8) Disposition of carcasses.

Carcasses are placed into the North Fork of the Smith River for nutrient recycling into the stream according to DEQ permit specifications.

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.

The lower Umpqua River fall Chinook Salmon is not an ESA-listed population. It is therefore unlikely that the brood stock collection will have any genetic effects on wild Coho population. However, to minimize any ecological effects, any wild Coho Salmon captured during Chinook Salmon brood collection will be released unharmed with minimum stress. To minimize the risk of genetic effects within hatchery-origin Chinook population, wild Chinook Salmon will be incorporated into brood stock each year adhering to the Native Fish Conservation Policy and Fish Hatchery Management Policy. The health risks will be minimized by monitoring and maintenance guidelines of collection and holding facilities. Most of the broodstock will be collected prior to the peak run of Coho Salmon.

SECTION 8. MATING

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

8.1) Selection method.

Brood stocks are randomly selected to represent the run as much as possible; and no biased or deliberate selection of any specific traits or characteristics is made while selecting brood within the population. This unbiased method for selecting brood will minimize the risk of any genetic effects. Professional monitoring and maintenance guidelines will minimize the health risks. Fish are tested weekly from October-November and ripe fish are randomly used for spawning. This ensures egg representation from the entire spawning period. Matrix sets for spawning usually include some wild males and females, which are randomly used within the 5 x 5 matrix. The matrix system helps reduce any inadvertent selection.

8.2) Males.

Males are used one time only. Male to female ratio is 1:1. Jacks are incorporated at random proportional to population.

8.3) Fertilization.

Eggs are fertilized on a matrix basis based on the number of females ripe. An even sex matrix of 5 males x 5 females is used when possible. The only selection process used is to have some wild male or female fish in each matrix set. This reduces the likelihood of all hatchery-by-hatchery cross.

Ovarian and tissue samples are randomly taken from 65 fish to detect the presence of any viral pathogens. All eggs taken from infected fish are destroyed and buried. Fish are examined by an ODFW fish pathologist to monitor overall health condition. Fertilized eggs are water hardened in 100 ppm iodine for 30 minutes.

8.4) Cryopreserved gametes.

N/A

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.

This program is on fall Chinook Salmon, and therefore, it is unlikely that the mating scheme for fall Chinook will have any adverse genetic or ecological effects on the listed natural Coho Salmon. Natural fall Chinook have co-existed with Coho Salmon in the basin. As long as the program fish continue to mimic the wild fish, there should be no impact to Coho Salmon from the present mating scheme.

SECTION 9. INCUBATION AND REARING -

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

9.1) Incubation:

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

Brood Year	Egg Take	Egg Survival	Fry Survival	Juvenile Survival	Juveniles/smolts released	Smolt goal
1992		97%			13,413	50,000
1993		35%			4,000	50,000
1994		Received fry	99.6%		88,563 net pen 9,990 STEP 98,553 total	125,000
1995		Received fry	77%		49,240 net pen 31,549 STEP 80,789 total	125,000
1996		Local eggs and eyed eggs from Rock Creek	91%		72,978 net pen 14,127 STEP 87,105 total	125,000
1997	139,471	81%	87%		55,459 net pen 42,461 payback 97,920 total	125,000
1998	87,400	80%	65%		38,632 net pen 9,056 fry Smith 47,688 total	125,000
1999	105,915	86%	97%		85,207 net pen 2,589 payback 87,796 total	125,000
2000	267,056	85%	99%		134,000 net pen 41,200 Unger's 48,400 fry Smith 223,600 total	250,000
2001	177,482	90%	98.6%	98.4%	124,748 net pen 24,625 Smith 149,373 total	250,000
2002	141,061	86%	98%	95.6%	96,726 net pen 16,400 fry Win. B 2,987 fry Smith 116,113 total	100,000 *
2003	176,470	79% includes fry loss		97.0%	102,517 net pen 33,319 fry Win Ck 135,142 total	100,000*
2004	295,593	91.5%	95.1%	99.8%	106,398 net pen pre-smolts 27,543 fry STEP Ck 71,363 fall smolts	100,000 pre-smolts 70,000 smolts

Brood Year	Egg Take	Egg Survival	Fry Survival	Juvenile Survival	Juveniles/smolts released	Smolt goal
2005	231,875	86.1%	97.8%		38,544 STEP fingerlings 48,769 net pen pre-smolts 47,050 fall smolts	100,000 pre-smolts 70,000 smolts
2006	212,951	93.5%	96.0%		110,217 net pen pre-smolts 81,973 fall smolts	100,000 pre-smolts 70,000 smolts
2007	19,997	87.9%	99.2%		17,483 fall smolts	100,000 pre-smolts 70,000 smolts
2008	38,923	59.2%	90.5%		21,288 fall smolts	100,000 pre-smolts 70,000 smolts
2009	220,978	85.2%	96.6%		104,570 pre-smolts 78,480 fall smolts	100,000 pre-smolts 70,000 smolts
2010	96,684	49.9%			40,026 net pen pre-smolts	100,000 pre-smolts 70,000 smolts
2011					56,499 net pen pre-smolts	100,000 pre-smolts 70,000 smolts
2012						100,000 pre-smolts 70,000 smolts

*Note: In 2002 goals were adjusted to match OAR 635. Program also has an approved unfed fry proposal, and in brood year 2004 will release STEP pre-smolts and acclimate ODFW smolts with a starting goal of 100,000 pre-smolts and 70,000 fall smolts. All net pen fish in this table are pre-smolts. Payback and fish denoted as fry were released as unfed fry.

For 1993, 1994, 1995, and 1996 egg losses were recorded by the South Umpqua fall Chinook Salmon program since fry/eyed eggs were transferred to Gardiner from Rock Creek Hatchery.

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

Eggs taken from infected females are disposed of and buried to prevent transmission of diseases. The program's egg take has not exceeded 10% of the current goals. If an excess of healthy eggs would occur, the fish would be released as unfed fry into Winchester Creek or STEP Creek. Either site would impact less than 2 miles of Coho Salmon habitat and 0 miles of naturally produced Chinook Salmon habitat.

9.1.3) Loading densities applied during incubation.

Gardiner STEP Facility
Trays are Marisource replica to Heath
Green egg size @ 507 eggs per cup.
Tray density for green @ 8 cup per tray.
Tray density for hatch @ 4,000 to 5,000 fry per tray.
Water flow @ 5-6 gallons per minute/tray for egg and fry incubation.

Rock Creek Hatchery
Trays are Marisource replica to Heath
Green egg size @ 65 eggs/ounce.
Tray density for green @ 200 ounces per tray.
Eyed eggs transferred to STEP, trayed at 5,000 per basket.
Water flow in incubator & hatchbox @ 5-8 gallons per minute.

9.1.4) Incubation conditions.

GRWB STEP: Incubation temperatures are monitored and recorded daily. Incoming silts are controlled via two filter cloth screens at the hatch house intake. All tray screens are cleaned once per week and after each large rain event. Filter cloth-screens are regularly checked and cleaned. Eggs are treated with 600 - 650ppm hydrogen peroxide for 15 minutes per day to control fungal infection until hatching. Eggs are not picked until after shocking.

Rock Creek Hatchery: Incubation temperatures are monitored and recorded at 8 am and 4 p.m. daily. Hatch house water is filtered through 20 micron mesh and passes through UV sterilization. Dissolved oxygen is monitored. When required, water temperatures are controlled to speed up or slow down development to unify embryonic and larval growth. Formalin may be used for fungus control during incubation at 1,250 ppm formalin for 15 minute drip 4 times weekly until hatching.

9.1.5) Ponding.

Forced ponding @ 99% button-up fry. Fry length= 40 to 45mm. Weight at ponding = 900 fish per pound. No feeding occurs until 24- 48 hours after ponding. Ponding normally occurs from the end of February to mid-March.

9.1.6) Fish health maintenance and monitoring.

Green eggs are water hardened in iodophor for 30 minutes. Pathology samples of tissues and ovarian fluid are collected from 65 adults to detect viral infections. Fungal infections of incubating eggs are controlled with hydrogen peroxide at GRWB and formalin at Rock Creek hatchery. Dead and non-viable eggs are handpicked at GRWB STEP after shocking and then once per week until hatching occurs. Rock Creek Hatchery has a machine to pick dead eggs. No yolk-sac malformations have been recorded. Trays and tanks are annually scrubbed with an iodine or chlorine solution, hosed with a power-washer, and rinsed.

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.**

As indicated before, the fall Chinook Salmon are not an ESA-listed population. Therefore the incubation process of this program fish will have no adverse genetic or ecological effects to listed natural Coho Salmon population. However, risk aversion measures are taken at both facilities to prevent the transmission of diseases to the receiving streams.

Rock Creek Hatchery
At Rock Creek Hatchery, fall Chinook Salmon eggs are incubated on filtered and UV

sterilized water and treated with formalin to minimize potential disease risks to the program fish and transfer of pathogens to receiving stream. Incubation effluent water is discharged into 100' X 180' abatement pond to meet DEQ requirements for dilution to reduce impacts from water discharge. Discharged effluents are monitored and reported quarterly to DEQ as per NPDES general permit 300J. This helps to ensure that discharged water meets EPA standards to reduce any potential impacts on listed species and other stream biota.

GRWB STEP Facility

Fall Chinook Salmon eggs at GRWB are treated with hydrogen peroxide to minimize potential risk of diseases in program fish and their transmission to listed species in the basin. Any water used for egg/fish treatment is sand percolated before discharge.

9.2) Rearing:

9.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1988-99), or for years dependable data are available.

See Tables 9.1.1 and 7.4.2 above.

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

At GRWB facility, densities stated are for temperatures below 60ºF. Flow and fish density = 8 lbs fish/gal/min. Rearing space density is 1 pound of fish per cubic foot. At Rock Creek hatchery, the densities are for temperatures below 58ºF, and the density and loading criteria are same as in GRWB facility.

9.2.3) Fish rearing conditions.

GRWB Facility: Water source and holding facilities are described in sections 4.1, 5.3, and 5.5 respectively. During rearing, water temperatures are monitored daily. Fish are visually checked daily for overall health parameters e.g. fish behavior, depth in water column, symptoms of diseases, mortality etc. Dissolved oxygen is monitored during times of crisis, critical high water temperature, and high fish density or low water flow situations. Rearing containers are cleaned weekly as needed. Cleaning includes using a pool vacuum to remove organic material from the bottoms of pools. Discharge of cleaning operations is passed to a specified site onto the ground. Containers are protected from predators with a mesh cover. Fish are fed via submerged feeders to simulate natural feeding behavior and conditions.

Rock Creek Hatchery: Water source and holding facilities are described in sections 4.1, 5.3, and 5.5 respectively. During rearing, water temperatures are monitored 3 times daily. Fish are visually checked daily for overall health conditions e.g. fish behavior, depth in water column, signs of diseases, mortality etc. Dissolved oxygen is monitored during times of crisis, critical high water temperature, high fish density or low water flow situations. Rearing containers are flushed or cleaned 1-2 times weekly as needed. Cleaning includes using a brush to remove organic material from the bottoms of the raceways. Discharge water from cleaning operations pass into the settling pond for additional treatment to abate pollution. Containers are protected from predators with a mesh cover. Rearing fish are fed

via hand broadcasting of the food.

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

Table 9.2.4a. Summary of Excel Growth Program for spring released fall Chinook Salmon smolts.

Date	Water Temp.	Feed/Mo Lbs	# fish per pound	% Body weight	Number of Fish	K Factor	Feed Conversion	% AGR*
March 10, 2013	47F	122	900-427	3.23	100,000	0.00045	1.0	100
April 2013	51F	344	426-176	2.90	100,000	0.00045	1.0	100
May 2013	55F	793	175-74	2.71	100,000	0.00045	1.0	100
June 10, 2013	57F	416	73-57	2.63	100,000	0.00045	1.0	100
Total Food		1,675 lbs						

This Excel program calibrates the amount of food fed daily to the fish based on species, number of fish, length of rearing, K factor, the food conversion rate and %AGR. A 100% AGR value is equal to all of the food a fish will eat. Values below 100% represent a food schedule that is restricting food to slow growth rates, while values over 100% are accelerating growth.

Table 9.2.4b. Summary of Excel Growth Program for fall released fall Chinook Salmon smolts.

Date	Water Temp.	Feed/Mo	# fish per pound	% Body weight	Number of Fish	K Factor	Feed Conversion	% AGR*
March	47F	85	900-440	3.23	70,000	0.00045	1.0	100
April	51F	241	439-177	2.91	70,000	0.00045	1.0	100
May	55F	556	176-74	2.71	70,000	0.00045	1.0	100
June	57F	1106	73-34	2.63	70,000	0.00045	1.0	100
July	63F	1630	34-19	1.57	70,000	0.00045	1.0	100
August	61F	2270	18-12	1.55	70,000	0.00045	1.0	100
September	54F	3795	11-8	1.20	70,000	0.00045	1.0	100
October	52F	1063	8-7	1.06	70,000	0.00045	1.0	100

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

See Section 9.2.4. Energy reserve data are not estimated or available.

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

See Section 9.2.4.

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

Fish health and behavior are monitored daily. Dead eggs and fish are removed daily and buried. If recommended by pathology, mortality samples are collected for disease diagnosis. Scheduled pathology examinations are conducted at random as needed and as prophylactic. Parasitic and bacterial infections are treated as needed under prescription of Department pathologists. Viral infections are monitored by Pathology department. Disinfecting procedures are followed during cleaning tanks, trays, and equipment. Unusual or unusually high mortalities are reported to the STEP Biologist for investigation and consultation with Rock Creek Hatchery and ODFW Pathologists.

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

Applied smolt development indices are age of fish, size, color, behavior etc. No gill ATPase enzyme activity studies are conducted.

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

At GRWB fry in ponds 4,5,6,7 are fed via a mechanical feeder, reducing the exposure of the young fish to humans as seen during hand broadcasting. In the netpens, the fish are fed via submerged feeders so they develop natural feeding behavior and stay in the water column to forage instead of rising to the surface and make them vulnerable to avian predators.

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.

The fish under this propagation program is not an ESA-listed population. However, risk aversion measures are taken to minimize any adverse effects on listed natural Coho Salmon and were described in Sections 5.8, 6.3, 7.9, 8.5 and 9.1.7. Releases are conducted in a manner to reduce temporal and spatial overlap with wild Coho smolts out-migration. Program pre-smolts are released at smaller sizes compared to Coho smolts, and when most Coho smolts have already migrated to the ocean. During the fall, only adult Coho Salmon are present in the estuary when the smolts are released. Unfed fry releases impact less than 3% of the total habitat available for Coho Salmon in the Umpqua. The propagation program will follow guidelines established by the Native Fish Conservation Policy and Fish Hatchery Management Policy and Fish Health Management Policy.

SECTION 10 RELEASE

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

10.1) Proposed fish release levels.

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs	None			
Unfed Fry	10,000	900/lb	Jan-FEB	STEP Creek
Fry (pre-smolt)	100,000	20 - 60/lb	May/June	Primary site is Winchester Bay netpens, may also release Umpqua Estuary
Fingerling (fall smolt)	70,000	5 - 20/lb	Sept/Oct	STEP Creek, Winchester Bay, Umpqua Estuary
Yearling	None			

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

Stream	Watershed Code	Release Point	Watershed	Basin
STEP Creek	1600101000	Read Sec. 1.5	Umpqua River	Umpqua
Umpqua Estuary	1600100000	Sec. 1.5	Umpqua River	Umpqua
Winchester Bay	1600100000	Sec. 1.5	Umpqua River	Umpqua

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

Release Year	Eggs/ Unfed Fry	Avg Size	Fry	Avg Size	Pre-smolt Fingerling	Avg Size	Smolt	Avg Size	Release Dates
1990			60,000	984					n/a
1991					91,713	39.8			n/a
1992					103,539	45.4			n/a
1993					89,075	47.4			n/a
1994					55,920	46.1			n/a
1995					183,292	67.5			n/a
1996							80,789	5.7-22.2	n/a
1997							87,105	7.7	n/a
1998	42,461	900			55,459	n/a			n/a
1999	9,056	900					38,632	39.0	Jul 3
2000	2,589	900					85,207	17.0	Jul 22
2001			48,400	358			175,200	26.1	Apr 17 - Jun 29
2002					24,625	72.0	124,748	32.0	May 20 - Jun 19
2003	16,400 2,987	1600* 900	13,587	103	83,139	69.3			Jun 5
2004	33,319	900			102,517	40.6			Jun3
2005	27,543	900	42,104	148	106,398	46.0	71,363	7.6	May 26 - Oct 19
2006			38,544	158			95,790	8.3	Apr 20 - Oct 18
2007	1,393	900			110,217	46.7	81,970	9.6	Jun 6 - Oct 17
2008							17,467	8.2	Oct 22
2009							21,288	8.4	Oct 14
2010					104,570	40.6	78,480	9.1	Jun 7 - Oct 21
2011							40,026	37.5	Jun 8
2012					56,499	39.8			Jun 12
2013					49,750	40.0			Jun 5
2014									
2015					96,048	40.0	59,840	19.5	May 27 - Sep 1
Average	**16,969**	**900**	**35,659**	**179**	**87,517**	**44.5**	**75,565**	**14.2**	

*Experimental program to test rearing of unfed fish in Winchester Bay netpens.

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

See Table 10.3 above for actual release dates. Pre-smolts released into STEP Creek are released directly from the rearing tanks into the creek. Pre-smolts released from the Winchester Bay netpens are released in June at about 40/lb. Fish are acclimated to

Winchester Bay by being held in the netpens a minimum of three weeks. When possible, releases are done during an afternoon outgoing tide to minimize the time that the newly released fish are vulnerable to avian predators. Smolts (fall release) are also held in netpens for three weeks prior to release. They are released during an afternoon slack or outgoing tide. This fish are acclimated at RM11 at the docks behind the Discovery Center.

10.5) Fish transportation procedures, if applicable.

Smolts arriving from Rock Creek will be transported in one of the larger tanker trucks described in section 5.2. They are piped to the netpens from the liberation truck. Flowing water will facilitate movement. Hauling time from Rock Creek to Reedsport will be approximately 2 - 3 hours.

Pre-smolts to Winchester Bay are transported using the same transport tanks and loading at similar density. Transportation time is approximately 30 minutes. The pre-smolts are piped from the tank to the netpens. Pipes will have flowing water to facilitate movement.

10.6) Acclimation procedures.

Fish released into STEP Creek are reared and released into STEP/Gardiner Creek water and are therefore automatically acclimated to the site. Program fish are acclimation at Winchester Bay/Umpqua Estuary by holding them in netpens for a minimum of three weeks. The fish are fed via submerged feeders to develop natural feeding behavior. Fish are inoculated with Vibrogen at least 3 weeks prior to release and moving to salt water.

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

All the program fish (pre-smolts and smolts) are to be marked with adipose fin-clip. Potentially smolts or pre-smolts may be implanted with coded wire tags for further study of survival and adult distribution.

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

If a surplus is noted, the program would work with ODFW hatchery and district staff to determine the disposition of the excess fish. A surplus would be noted during the egg stage and appropriate measures will be taken accordingly.

10.9) Fish health certification procedures applied pre-release.

Fish are regularly examined for parasites, viral and bacterial infection by ODFW personnel and the volunteers. If any health problems are observed, samples are collected and Rock Creek Hatchery and ODFW pathology staff are contacted for consultation.

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

GRWB STEP Facility: The nearest volunteers will initiate the pre-established contingency plan by contacting STEP Biologist and district biologist. The contingency plan entails releasing or transferring broodstock to another site and releasing juveniles in order of closest to release date. Remaining fish would be kept on life support via gas or electric pumps and spray aeration until transportation is available or the water supply is stabilized.

Rock Creek Hatchery: The hatchery staff will contact District biologist to initiate pre-established contingency plan. Rock Creek has a back-up generator that should maintain life support systems until the water supply is stabilized. If necessary, the program would attempt to transfer the fall Chinook to the lower Umpqua for an early release or placement into netpens.

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.

Releases are restricted to stream main-stem areas in less than 3% of the Coho spawning habitat to reduce spatial overlap. Fish released in the estuary are also released at a size smaller than Coho juveniles and released during the summer/fall when local seining surveys have not documented juvenile Coho Salmon. Thus the temporal and spatial overlap and ecological interactions between program fish and listed natural Coho juveniles in the estuary will be minimal.

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.

A description of monitoring and evaluation for each "Performance Indicator" is provided in the Table of Benefits and Risks in 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.

As with all state programs, budgets are approved by the Legislature for a two-year period. No commitment of funds can be made past the approved budget period. Funds for various projects associated with this HGMP come from a variety of sources including license dollars, state general funds, federal sport fish restoration funds as well as a variety of other federal funds (BLM, USFS, etc.). Funds are committed for portions of the HGMP monitoring but can change with relatively short notice.

Levels of volunteer assistance can also vary depending on local interest, personalities, ODFW support, and community support. Presently the volunteers within the GRWB STEP program are very dedicated and have a positive working relationship with the ODFW.

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.

ODFW staff has not identified any potential genetic or ecological risks from the monitoring program. NMFS has evaluated the fishery research program under consideration of the ESA research limit of the July 2000 4(d) Rule (July 10, 2000; 65 FR 424222). ODFW concurs with this determination and will conduct research activities in accordance with the conditions and requirements of the approved program.

SECTION 12. RESEARCH

12.1) Objective or purpose.

- The ODFW does random and standard spawning ground surveys, and occasionally monitors the Smith River fishway at Smith River Falls. ODFW also has a life cycle monitoring station in the West Fork Smith River. Smolt traps may also be used by the ODFW and are described in the Coho HGMP that was sent to NOAA in March 2003.

- The ODFW conducted CWT tagging on 25,000 or more fish per year at GRWB through 2006. All pre-smolts and smolts are marked with an adipose fin-clip. If funding is available, fish may be tagged with a coded wire tag (CWT). The program hopes to use CWTs to help evaluate the survival, distribution, contribution to fishery, stray rates and differences between pre-smolts vs. smolts released by this program.

- If funding and facilities become available at the site, otolith marking program of pre-smolts will be undertaken to evaluate their survival and return rates.

- If funding and facilities become available, testing for genetic similarities/differences between hatchery and naturally produced fall Chinook Salmon will be conducted.

- If funding and facilities become available, returning natural or hatchery broodstock would be sampled for environmental factors such as chemical concentrations or toxicology issues. May also sample juveniles or eggs. Samples (tissue, scale, organ etc.) would be determined by the best science available used for the evaluation.

12.2) **Cooperating and funding agencies**.

- Oregon Department of Fish & Wildlife
- Gardiner-Reedsport-Winchester Bay STEP
- Umpqua Fishery Enhancement Derby
- Douglas County
- Port of Umpqua
- Salmon Harbor
- Other grants as applied for---STAC, R & E, OWEB, Oregon Wildlife Heritage Foundation, Cow Creek Band of the Umpqua Tribe of Indians, etc.

12.3) Principal investigator or project supervisor and staff.

Greg Huchko, District Fish Biologist, ODFW
Umpqua Watershed Fish Staff, ODFW

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

N/A

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

- Spawning ground surveys are conducted on foot or by raft. Live fish are counted, while dead fish are counted and measured. Scale samples may also be collected and if the fish were potentially otolith marked the head would be collected for later otolith analysis.

- For CWT marking, the program fish have to be reared to at least 200/lb. ODFW tagging trailers use seasonal fin-clippers to tag and mark the fish. A CWT is inserted into the head of the fish and the adipose fin is clipped. MS222 is used on the fish to facilitate marking. Three weeks after marking, at least 500 fish are tested for size, mark accuracy and CWT retention for each mark code. This is usually done on program fish just prior to release.

- To mark otoliths, the program fish would either have to have their incubation water warmed and chilled at regular intervals, or be dipped in an oxytetracycline solution. Otolith marks are permanent internal marks of the "ear bones" of the fish.

- To conduct genetic/toxicology testing, naturally produced and program juveniles or adults would be necessary. Naturally produced juveniles could be captured in smolt traps and program juveniles could be tested prior to release. Natural and program adults could be captured via the methods and locations used to capture brood. Program fish would have to be identifiable. Fish would have to be netted, identified, measured, and a tissue sample would be required. Samples would be labeled and preserved for laboratory analysis.

12.6) Dates or time period in which research activity occurs.

- Spawning ground surveys take place from October to January.
- CWT takes place at the hatchery during the spring or summer.
- Otolith marking takes place at the hatchery during the spring.
- Genetic/toxicology testing would be done during the spring for juveniles and fall for adults.

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

Handling techniques for the capture methods (traps, net, hook-and-line) have already been described. If adult marking is necessary, or measurements are desired, or genetic sampling is conducted, the fish would be individually netted and placed in a measuring tray for processing. If necessary, they could be placed in an aerated recovery box prior to or after handling. Listed fish would be freed upon capture. On spawning grounds, only dead fish are handled. Juvenile smolt traps are described in the coho HGMP. Juveniles are removed from the trap, placed in a bucket, and then individually processed. If necessary, MS222 is used to slow the fish down for handling. Program fish marked at the hatchery undergo normal facility rearing.

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

External marking of fall Chinook Salmon (floy tag, maxillary, tissue punch) or tissue sampling of adults at traps would have less than 5% mortality. If tangle nets are used, some de-scaling and line abrasions may occur. Mortality may occur, but is estimated at less than10% of the fish handled. Mortality during tangle net use for research in 2002 and 2003 was 4.7% and 5.7% respectively (C. Sheely pers. comm). If hook-and-line is used, some injuries may occur in the mouth. Hook-and-line methods used for a steelhead radio telemetry study noted less than10% hooking mortality of marked fish. No mortality is expected while otolith-marking program fish. Take of wild Coho Salmon during research projects would be even less than fall Chinook Salmon since handling would be reduced or avoided. In some cases, tissue from spawned out brood fish could be used, thereby causing no additional mortality.

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

See the Table 2.2.3-2 (Section 2).

12.10) Alternative methods to achieve project objectives.

- There is no alternative to spawning ground surveys unless a monitoring station (like Winchester Dam) could be set up to record the passage of every fish. If external marking of adults were necessary for mark-recapture population estimates, there would be no alternative that would satisfy this condition.

- There is no alternative to a visible external mark other than fin clipping once the fish are 200/lb or larger. Fish at this size cannot be marked with floy tags. They can be otolith marked, CWT'ed, or PIT tagged—but there would be no external mark to distinguish a hatchery fish from a wild fish.

- There is no alternative to genetic or environmental sampling. Currently the program relies on morphological and behavioral characteristics to note similarities/differences between natural and program chinook. Environmental testing has not been available to date.

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

Winter Steelhead---no mortality
Summer Steelhead--no mortality
Spring Chinook--no mortality
Cutthroat Trout--no mortality

12.11) 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.

Time of trapping activities will be conducted prior to the large numbers of Coho Salmon adult arrival or presence. Trapping time and techniques will be adjusted or discontinued when Coho exceed the number of Chinook Salmon captured for 10 days.

SECTION 13. ATTACHMENTS AND CITATIONS

References:

Fisher, J. P., and W. G. Pearcy. 1985. Studies of juvenile salmonids off the Oregon and Washington coast, 1985. Oregon State University Sea Grant College Program, ORESU-T-85-004, Corvallis.

Hartt, A. C., and M. B. Dell. 1986. Early oceanic migrations and growth of juvenile Pacific salmon and steelhead trout. International North Pacific Fisheries Commission Bulletin 46:1-105.

Lewis, M.A. 2003. Stock assessment of anadromous salmonids, 2002. Oregon Department of Fish and Wildlife, Oregon Plan for Salmon and Watersheds, Annual Progress Report number OPSW-ODFW-2000-4, Portland.

Lister, D. B., and H. S. Genoe. 1970. Stream habitat utilization by cohabiting underyearlings of chinook (*Oncorhynchus tshawytscha*) and coho (*O. kisutch*) salmon in the Big Qualicum River, British Columbia. Journal of the Fisheries Research Board of Canada 27:1215-1224.

Moring, J. R., and R. L. Lantz. 1975. The Alsea watershed study: Effects of logging on the aquatic resources of three headwater streams of the Alsea River, Oregon. Part I - Biological studies. Oregon Department of Fish and Wildlife, Fishery Research Report Number 9, Corvallis.

Mundie, J. H. 1969. Ecological implications of the diet of juvenile coho in streams. Pages 135-152. *In* T. G. Northcote [ed.] Symposium on salmon and trout in streams. H. R. MacMillan Lectures in Fisheries. University of British Columbia, Vancouver, B.C.

Nicholas, J.W., and D.G. Hankin. 1989. Chinook salmon populations in Oregon coastal river basins: description of life histories and assessment of recent trends in run strengths. Oregon Department of Fish and Wildlife, Corvallis.

Nickelson, T.E. 1998. A habitat-based assessment of coho salmon production potential and spawner escapement needs for Oregon coastal streams. Oregon Department of Fish and Wildlife, Fish Information Report 98-4. Portland.

Nickelson, T.E. 2000. Population assessment: Oregon coast coho salmon ESU. Oregon Department of Fish and Wildlife, Northwest Region Research and Monitoring Program, Corvallis.

Nickelson, T. E., J. D. Rodgers, S. L. Johnson, and M. F. Solazzi. 1992a. Seasonal changes in habitat use by juvenile coho salmon (*Oncorhynchus kisutch*) in Oregon coastal streams. Canadian Journal of Fisheries and Aquatic Sciences 49:783-789.

Nickelson, T. E., M. F. Solazzi, S. L. Johnson, and J. D. Rodgers. 1992b. Effectiveness of selected stream improvement techniques to create suitable summer and winter rearing habitat for juvenile coho salmon (*Oncorhynchus kisutch*) in Oregon coastal streams. Canadian Journal of Fisheries and Aquatic Sciences 49:790-794.

Reiser, D. W., and T. C. Bjornn. 1979. Habitat requirements of anadromous salmonids. Ch. 1. *In* W. R. Meehan [tech. ed.] Influence of forest and rangeland management on anadromous fish habitat in the western United States and Canada. Pacific Northwest Forest and Range Experiment Station, USDA. Forest Service, Portland.

Rodgers, J. D., S. L. Johnson, T. E. Nickelson, and M. F. Solazzi. 1993. The seasonal use of natural and constructed habitat by juvenile coho salmon (*Oncorhynchus kisutch*) and preliminary results from two habitat improvement projects on smolt production in Oregon coastal streams. *In* Proceedings of the coho workshop, May 26-28, 1992 at Nanaimo, B.C.

Solazzi, M.F., S.L. Johnson, B. Miller, and T. Dalton. 2000. Salmonid Life-Cycle Monitoring Project 1998 and 1999. Monitoring Program Report Number OPSW-ODFW-2000-2, Oregon Department of Fish and Wildlife, Portland.

SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

"I hereby certify that the foregoing information 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 and Title of Applicant: Timothy Walters, Umpqua Watershed District Manager, West Region, ODFW

Signature: _____Date:_____

Certified by: Scott Patterson, Fish Propagation Program Manager, ODFW

Signature: _____ Date: _____