HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	**Calapooya Creek Fall Chinook Program (STEP)**
Species or Hatchery Stock:	**Fall Chinook (South Umpqua Stock 18)**
Agency/Operator:	**Oregon Department of Fish and Wildlife**
Watershed and Region:	**Umpqua Watershed-Southwest Region**
Date Submitted: **First Update Submitted:**	**March 13, 2006** **March 30, 2009**
Date Last Updated:	**March 10, 2009**

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Calapooya Creek STEP Fall Chinook Program.

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

South Umpqua Fall Chinook, *Oncorhynchus tshawytscha* stock 18. These Fall Chinook are not ESA listed populations in the 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 volunteers with the Umpqua Fishermen's Association (UFA).

- Gardiner-Reedsport-Winchester Bay STEP (GRWB) may assist with egg incubation and/or fry rearing in years when UFA facilities are non-functional, i.e. in drought years.

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

Approximately 100 - 200 volunteers assist the program offering an average of about 3,000 hours per year in collecting brood, spawning activities, and rearing fish. The volunteers also pay for the cost of utilities, equipment and maintenance at their facilities via membership fees, sponsorships,

donations, and grants. Gardiner-Reedsport-Winchester Bay STEP is a nonprofit organization (IRS#93-1166963) and the Umpqua Fishermen's Association is also a nonprofit organization (IRS#93-0878110).

Table 1-1. Anticipated facility operation and maintenance cost.

Item	**Cost/Value**	**Source**
Labor	$66,000	Volunteers
Maintenance	$3,000	Memberships, donations, volunteer fund raising & labor
Fish Food	$3,000	ODFW STEP/R & E Grant
Coded-Wire-Tagging	0 – $20,000	Donations, grants
Spawn to Eyed Eggs	$3,520*	ODFW Rock Creek Hatchery
Technical Assistance	$4,360	ODFW STEP Bio & Travel
Minimum Annual Cost	**$79,880**	

* This is an estimated cost based 1% of Rock Creek Hatchery's 2003 annual budget.

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

Current Facilities:

Holding Brood, Spawning, Egg Incubation

Rock Creek Hatchery is primarily responsible for the spawning of adults and incubating of green eggs for the stock 18 program. Rock Creek Hatchery is located on Rock Creek, a tributary to the North Umpqua River at River Mile (RM) 36. This is 146 miles upstream from the Pacific Ocean (mainstem Umpqua 111 miles, Rock Creek at 36 RM above the confluence of the North and South). The hatchery is located on 26.5 acres of land 23 miles East of Roseburg in Douglas County, Oregon, at latitude 43° 20' 07'' N and longitude 123° 00' 05" W.

GRWB STEP facility may be used if necessary and is located below Gardiner Reservoir with the outlet of Gardiner/STEP Creek which passes through the property and drains into the mainstem Umpqua at RM 10. The facility is at portion NWNW, section 26, T21S, R12W, W.M. lying south of Gardiner Reservoir and north of Highway 101. The property is part of a 197.7-acre parcel owned by Roseburg Resources. GRWB STEP operates the facility under a renewal lease with Roseburg Resources.

Either Rock Creek or Gardiner hatchery can be used to hold, spawn and tray green eggs of stock 18 brood fish. Volunteers assist spawning and rearing of fish. The UFA generally receives its eggs at the eyed stage. In the event of a UFA facility problem, GRWB could raise the fish from the green or eyed egg stage to the fry stage.

Brood Collection and Adult Trap Sites

Happy Valley Trap Facility: This facility is at RM 18 located on the lower South Umpqua River. This is a picket weir type trap located at a river pinch point and can be operated only during lower water levels. This site is used to collect South Umpqua (stock 18) brood.

Tangle Netting: In Calapooya Creek or South Umpqua for stock 18.

Hook-and-Line: This method may be used to augment brood above Elkton for stock 18.

Incubation/Rearing from Eyed Egg

For the stock 18 program, volunteers' hatch-boxes are used for raising the fish from the eyed egg to the fry stage. Once the fry are 99% buttoned-up they are transferred to rearing pools on site. For coded-wire-tagging (CWT) the chinook are transferred to the Canyonville Acclimation site. Chinook raised to the presmolt stage for the stock 18 program are released in late April to mid-May.

Volunteers' Hatch-boxes: These hatch-boxes are presently used at:

- Eastwood Elementary on Deer Creek, tributary to South Umpqua at RM 11.
- Barrett Creek (Tributary to Rice Creek which joins the South Umpqua at RM 28).
- Cooper Creek (below Cooper Creek Reservoir in Calapooya sub-basin).
- Fall Creek (tributary to Little River at RM 3, which is a tributary to the North Umpqua at RM 30).
- Seasonal Tributary (tributary to Deer Creek, then South Umpqua at RM 11).

Volunteers' Rearing Sites: Pools available at Eastwood Elementary School, Barrett Creek, and Cooper Creek. Acclimation pond at Canyon Creek (tributary to South Umpqua at RM 51) can be used for marking presmolts.

Watershed Codes for All Sites

a) The Mainstem Umpqua: 1600100000 (Tangle Netting)
b) Rock Creek: 1600200000 (Rock Creek Hatchery)
c) Gardiner/STEP Creek: 1600101000 (GRWB Hatchery)
d) South Umpqua: 1600300000 (Happy Valley Trap)
e) Cooper Creek: 1600201000 (Hatchboxes & Rearing)
f) Deer Creek: 1600301000 (Hatchboxes & Rearing)
g) Barrett Creek: 1600300164 (Hatchboxes & Rearing)
h) Fall Creek: 1600210040 (Hatchboxes)
i) Canyon Creek: 1600302000 (Rearing & Tagging)
j) Calapooya: 16001300000 (Release Site 2000 – 2004 and 2008 - 2013)
k) Seasonal Tributary to Deer Ck.: 1600301000 (Hatchbox)

*There are no watershed codes for the seasonal tributary to Deer Creek.

Release Sites

Releases are conducted into Calapooya Creek, near Oakland, OR at approximately river mile 17. The program's new propagation proposal was approved by the ODFW commission April 2008, moving the release location to Calapooya Creek. This location for release provides a higher potential for returning adults to be available in the fishable portion of the Umpqua River

1.6) Type of program.

The Calapooya Creek Fall Chinook program is a Harvest Augmentation Program.

1.7) Purpose (Goal) of program.

The goal of the Calapooya Creek Fall Chinook Program is Harvest Augmentation. A goal of increasing angling opportunity and catch is the objective of this program. Survival estimates demonstrate that program chinook provide some ocean and freshwater harvest opportunity. Part of the increase in angling opportunity will be the enhancement of the fishery between Elkton and the Calapooya where fish will linger prior to entering the Calapooya. This section of the Umpqua is currently under utilized despite the number of access points.

1.8) Justification for the program.

The goal of this program is to provide both an ocean commercial and recreational fishery, as well as an in-river recreational fishery on the Umpqua River. At 300,000 pre-smolts released in the Calapooya, approximately 400-600 fall Chinook would subsequently be available for harvest.

Overall this program has a minimal impact on naturally-produced coho while providing ocean and freshwater harvest opportunities. Since Chinook generally rear and spawn in larger streams and in the lower watershed than do coho, spatial impacts to naturally-produced coho are reduced. In addition, juvenile fall Chinook tend to migrate toward the ocean during their first spring. This behavior reduces potential impacts to coho in rearing areas. The Calapooya project releases Chinook in the lower 25 miles of the mainstem Calapooya. There is at least 119 miles of coho rearing and spawning habitat (Stream Net 2001) in the Calapooya basin. Therefore the releases affected less than 21% of the available coho habitat in the Calapooya basin. Although there is some spatial and temporal overlap between Chinook and coho during emigration, program Chinook tend to be smaller than naturally produced coho smolts. This size segregation minimizes potential interspecific competition.

The program can also be used to educate and increase students/public awareness about salmon biology, life cycles, distribution and special habitat requirements as well as increasing relationships with volunteer based angling clubs in the district.

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

BENEFITS	BENEFITS	BENEFITS
Performance Standards	**Performance Indicators**	**Monitoring & Evaluation**
Provide hatchery Chinook for a harvest augmentation program.	• Program fish contribute to the ocean and freshwater fishery.	• All releases are properly documented. • Spawning surveys are conducted to monitor the number of returning adults. • Program fish are externally (fin-clipped) and/or internally (coded-wire tagged) marked to evaluate survival, distribution,

		straying, and contribution to the fishery. • Creel census information will be collected with the assistance of volunteers
Program fish provide societal benefits.	• Program fish provide a venue for community and volunteer involvement. • Program fish contribute to the fishery.	• The number of volunteers interested and involved in the program will be recorded. • The program is used for educational purposes and will be evaluated by volunteers' active participation in fish spawning, incubation, rearing and release of fish. • Periodic evaluations are conducted to determine the contribution of the program fish to the ocean and freshwater fishery.
Healthy fall Chinook 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 and compare with naturally produced smolts. • Periodically monitor the size and age distribution of naturally produced Chinook and coho.
The fall Chinook harvest augmentation 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.	• Conservation and Hatchery Management Plan • Public input will be sought during the development of the plans.

Risks	**Risks**	**Risks**
Performance Standards	**Performance Indicators**	**Monitoring & Evaluation**
Life history characteristics of program Chinook will	• Releases of program fish mimic the emigration of naturally produced	• Appropriate downstream monitoring techniques will be periodically used

not diverge significantly from naturally produced fall Chinook.	Chinook. • 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 established by the Native Fish Conservation Policy.	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. • Scales are collected annually for comparative purposes of brood fall Chinook collected and the wild fall Chinook population. Scales are also used as part of the Pacific Salmon Treaty's desire to get 500 scales for age class analysis.
Releases of program Chinook have a minimum impact on naturally-produced coho.	• Program fish are released in a small percentage of the overall habitat available for coho. • Program fish are released in May/June to reduce temporal and spatial overlap with emigrating coho. • Program fish are released at sizes which mimic naturally produced fish and generally smaller than emigrating coho. • The different spatial and habitat preferences of Chinook reduce impacts to coho on spawning grounds.	• Appropriate downstream monitoring is periodically conducted to monitor run timing and size of emigrating Chinook and coho. • Release size and dates are recorded for program fish. • Spawning ground surveys are periodically conducted to monitor fall Chinook and coho 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	• Fish health is regularly monitored to avoid the introduction of new pathogens or significant levels of existing pathogens.

	poundage and/or DEQ/NPDES guidelines for water quality. • Facility intakes are appropriately screened or installed above anadromous salmon distribution.	• 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.
Hatchery facilities do not interfere with the emigration or return of naturally-produced coho.	• Hatchbox sites are above anadromous fish distribution or are screened.	• Periodically check and repair the screens on sites within anadromous fish distribution.
Broodstock collection operations will have a minimal impact on coho.	• Keep traps well maintained and free or irregularities that could harm salmon. • Check traps at least daily • With a minimum of handling, remove coho from traps and place above the trap. • If more than 50% of the captures are coho for 10 days, suspend trapping operations.	• Record the date and number of Chinook and coho captured at each trap. • Record the number of Chinook used for brood or passed. • Monitor captured fish for signs of stress or injury • Evaluate and repair traps prior to use each season.
Guidelines set forth in the Native Fish Conservation Policy regarding returning spawners will be followed.	• Returning program adult fall Chinook are not to exceed 10% of the total spawner population.	• Spawning ground surveys will be conducting to monitor the percentage of program fall chinook spawners.

1.11) Expected size of program.

The goal of this Harvest Augmentation Program is to increase angling and harvest opportunities below Calapooya Creek on the mainstem Umpqua River by providing approximately 400-600 adult fall Chinook annually. The production goal for this program is 300,000 pre-smolt Chinook annually.

1.11.1) Proposed annual broodstock collection levels for a current single restoration program (maximum number of adult fish).

To achieve a release goal of 300,000 pre-smolts of fall Chinook, 93 pairs of fall Chinook are needed for brood. The majority of the broodstock will be naturally produced fall Chinook and hatchery fish will be used if captured.

1.11.2) Proposed fish release levels per restoration project (maximum number) by life stage and location.

Life Stage	Release Location	Annual Release Level
Eyed Eggs	None	
Presmolts	Calapooya Creek	300,000
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.

Based on coded-wire tag data (sample size ~ 25,000 - 59,000) survival of program fish adults back to freshwater that were released in the South Umpqua and Cow Creek from 1987 - 1999 ranged from 0.01% to 0.2% and averaged 0.04% (Lewis 2005). The best survival occurred in Cow Creek (a tributary to the South Umpqua) from an early May release. May coincided with adequate waterflows and cooler water temperatures and enhanced emigration. We now prefer the presmolt releases to occur primarily during May.

Ocean harvest levels of hatchery and wild Chinook combined have varied widely in recent years but are estimated to be about 20%. Using punch card data, freshwater harvest varied from 6% to 41% from 1980 to 2007 and averaged 16%. According to the most recent creel surveys, freshwater harvest ranged from 1,436 Chinook in the Umpqua in 2001 to 948 in 2002. This represents 21% to 8.3% of the South Umpqua fall Chinook escapement (Moyers et al. 2003). With the closure of Chinook fishing in the South Umpqua beginning in 1992, the downstream freshwater harvest of chinook is estimated at 15%. Freshwater harvest occurs primarily in the estuary and lower mainstem of the Umpqua. This program will increase angling opportunity upstream between Elkton and the Calapooya.

Using a 0.2% survival rate to freshwater in the Lower Umpqua, a release of 300,000 Chinook pre-smolts would provide 600 fall Chinook for ocean/freshwater harvest.

To better evaluate this program, 100,000 presmolt released into the Calapooya in 2004 were coded-wire-tagged and fin-clipped. Previous coded-wire-tagging evaluations were for Chinook released into the South Umpqua or Cow Creek rather than a smaller tributary to the mainstem. These fish will return to the Calapooya from 2007 to 2009. Data on these fish is currently unavailable. Ocean recoveries beyond brood year 2002 are not yet complete. Meanwhile annual spawning ground surveys to monitor the number of spawners/mile will be continued.

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

The South and Mainstem Umpqua Fall Chinook program began in 1985 and has been ongoing. The program has released unfed fry or presmolt in the South Umpqua, Cow Creek, Umpqua, Calapooya, Elk Creek, and Deer Creek. Release numbers have varied annually. The Calapooya was the target sub-basin for releases from 2000 to 2004. The program shifted to

Lookingglass/Olalla and Paradise Creek in 2005. The current program releases a maximum of 300,000 pre-smolts into Calapooya Creek and began with releases in 2008.

1.14) Expected duration of program.

Harvest Augmentation releases are expected to continue as an option for a select fishery and to create a popular, easily accessible fishery in the upper mainstem Umpqua near several population centers.

1.15) Watersheds targeted by program.

This fall Chinook program targets the Main and South Umpqua River and Calapooya Creek.

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 Calapooya Creek Fall Chinook hatchery program in regard to naturally-produced coho are: the overlap in spawning ground use between the species, the impacts of hatchery pre-smolts on coho smolts, and the incidental take of coho during Chinook broodstock collecting activities. Coho tend to spawn in areas with smaller gravel, higher in the watershed than Chinook. Juvenile fall Chinook emigrate their first spring/summer, whereas coho emerge from the gravel at their first spring and tend to remain in their natal stream until the following spring when they emigrate as 1-year old smolts. This difference in habitat use and life history reduces the spatial and temporal overlap between returning program fish and coho on spawning beds and in juvenile rearing habitat. Releases of program fish are timed to mimic naturally produced Chinook at the presmolt stage. Additionally, both program Chinook and naturally produced Chinook emigrate at a smaller size than coho smolts, further reducing potential negative interactions.

Broodstock collection is also an issue as naturally-produced coho may be caught during Chinook brood collection. However, broodstock collection is carefully monitored to reduce negative impacts to coho. Most of the stock-18 (Chinook) are collected prior to many coho crossing the trap at Happy Valley. To reduce negative impacts and any incidental take of coho, all traps will be checked on a daily basis. Thus any coho captured will be detained no more than 24 hours. Captured coho will be removed and placed above the trap with a minimum of handling. Coho will be monitored for signs of stress or injury. Some coho 18's are used for the South Umpqua hatchery program and will be described in the HGMP for that program.

1.16.2) Potential alternatives to the current program.

Alternative 1: Terminate Releases

Pros: This would eliminate any risk to naturally-produced coho or Chinook due to interactions from hatchery fall Chinook in the South and Mainstem Umpqua basin. It would also eliminate the incidental take of coho during broodstock collection activities.

Cons: Without this program, Chinook angling opportunities in the lower Umpqua and upper mainstem Umpqua would be reduced. Elimination of this program would also eliminate public involvement and educational opportunities.

Alternative 2: Capture and Transplant Adult Fall Chinook to Target Streams

Pros: May increase homing of progeny produced by the transplanted adults thus creating an area in which fish will "linger" and become susceptible to angler harvest.

Cons: Number of adults needed to have an effective transplant program may exceed what would be required by using brood stock for a standard hatchery program. Transplanted adults may be disoriented and not find suitable spawning habitat or drop out of the targeted basin. Transplanted adults may also compete with early returning coho for spawning habitat. Monitoring would be based on spawning ground surveys since it would not be possible to mark progeny produced by the transplanted adults. Consequently, these progeny could not be identified for selective fisheries or for program monitoring.

1.16.3) Potential Reforms and Investments

To achieve a higher survival rate and increased angler harvests, this program has been reformed by eliminating unfed fry release.

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

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

The ODFW submitted an HGMP for this program to NOAA/NMFS on 03/13/2006, which serves as ESA take authorization for this program. This is an updated version of HGMP for the program.

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

Oregon Coast coho populations are listed on the federal ESA. See attachment (Table 1) for the estimated take levels of natural listed species during the operation of this Calapooya Creek fall Fall Chinook program.

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

Umpqua Complex

The naturally-produced salmonid populations in the Umpqua Complex consist of coho salmon inhabiting the Umpqua Basin. Populations are found in Smith River, lower mainstem tributaries, and the North Fork and South Fork sub-basins. There is an estimated 1,230 miles of spawning habitat available to the coho salmon of this 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 3 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. The eggs are covered by digging and displacing gravel from the upstream edge of the nest. Each female lays about 2,500 eggs. The adults die soon after spawning. Sex ratios of spawning adults tend to average around 50:50 at most locations (Table 2.2.1-1). 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 a lot 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 2 or 3 weeks until the yolk is absorbed and emerge as fry to actively feed in the spring. Most juvenile coho salmon spend 1 summer and 1 winter in fresh water. The following spring, approximately 1-year after emergence, they undergo physiological changes that allow them to survive in seawater. They then migrate to the ocean as silvery smolts about 10-12 cm in length.

Table 2.2.1-1. Observations of sex ratio in coho salmon captured in adult traps.

Population Complex	Males (%)	Females (%)	Trap Location	Run Year	Data Source
Nehalem	52	48	North Fork trap	1998-1999	Life Cycle Monitoring
Siletz	50	50	Mill Creek trap	1997-1999	Life Cycle Monitoring
Yaquina	51	49	Mill Creek trap	1997-1999	Life Cycle Monitoring
Alsea	77	23	Drift Cr. Tributaries	1959-1972	Moring and Lantz (1975)
,,	50	50	Cascade Creek trap	1997-1999	Life Cycle Monitoring
Umpqua	55	45	Smith River trap	1999	Life Cycle Monitoring
Coos	63	37	S. Coos R., Winchester Cr., and Fall Creek	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 based on what is known 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 the males attain sexual maturity and return to spawn as jacks. Migration patterns during the fall and winter is 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, a substantial percentage of these 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 (53-58°F preferred, 68°F maximum) for rearing (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). During summer, coho 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 as in recent years, coho will be found in only the highest quality habitats. Coast-wide, these habitats comprise about 22% of the habitat (Nickelson 1998). When marine survival increases, as could occur with a changing climate regime, coho 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

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

The critical coho-population level for the Umpqua Complex is 4,900 adult spawners. The habitat of this complex has the potential to support a viable population, as the high quality habitat is estimated to be present in 169 miles of stream, well above the 45-mile threshold.

The abundance of coho salmon spawners of the Umpqua Complex has ranged from about 3,000 to about 12,800 and has averaged about 7,200 over the past 10 years (Figure 2.2.2-1 and Table 2.2.2-1). In four of the past ten years, spawner abundance fell below the critical threshold of 4,900 fish. Recruits per wild spawner have exhibited a downward trend over the last 7 years, with the last three falling to below one (Table 2.2.2-1 and Figure 2.2.2-2).

b) Provide the most recent 12 year (e.g. 1990-present) progeny to parent rations, survival data by life-stage or other measures of productivity for the listed population. Indicate the source of data.

See Figures 2.2.2-1 and 2.2.2-2 below.

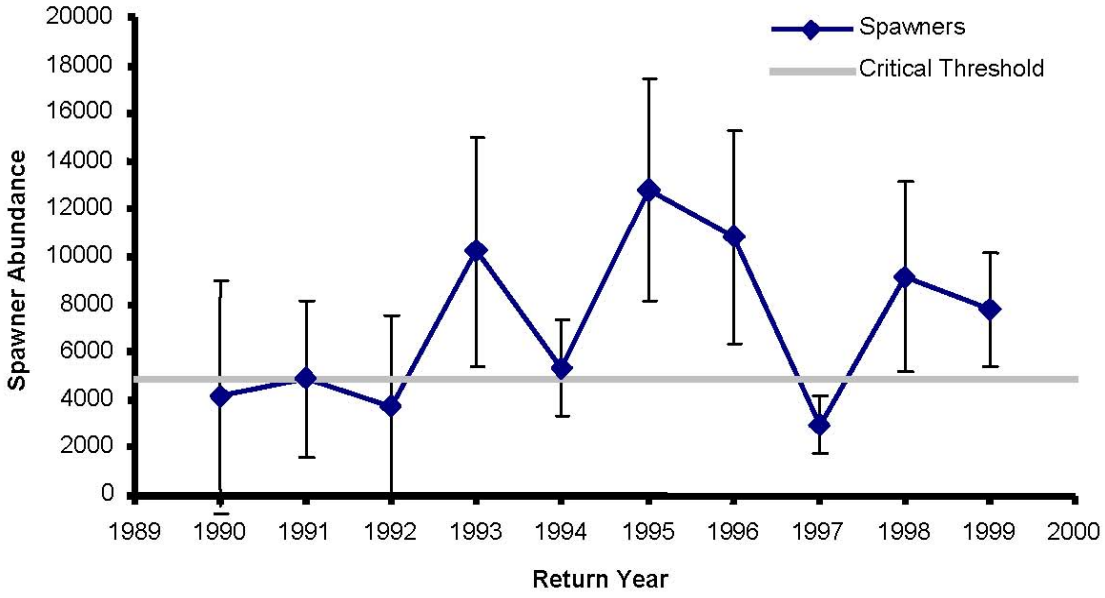

Figure 2.2.2-1. Trend in adult coho salmon abundance relative to the critical population level for the Umpqua Complex. Error bars are 95% confidence limits.

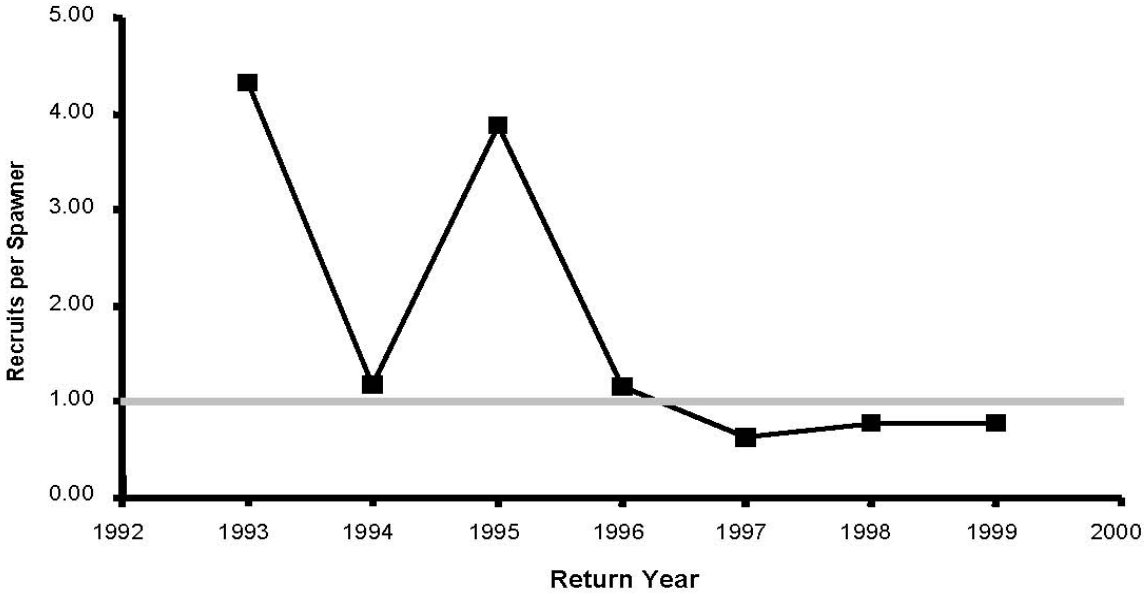

Figure 2.2.2-2. Trend in recruits per spawner in Umpqua Coho Complex.

c) Provide the most recent 12 year (e.g. 1990-2002) annual spawning abundance estimates, or any other abundance information. Indicate source of data.

See table 2.2.2-1 below.

Table 2.2.2-1. Annual estimates of wild coho spawner abundance by return year in the Umpqua Basin (1991-2004).

Basin	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Lower Umpqua R. and Smith River	1,316	1,759	4,804	1,689	6,803	4,904	935	5,118	2,323	3,696	8,850	15,630	12,760	8,046
Mainstem Umpqua	n/a	192	1,431	1,240	352	339	397	444	1,289	2,774	8,177	9,188	5,770	5,309
Elk & Calapooya Cr.	n/a	n/a	n/a	708	2,315	1,709	196	379	434	1,864	2,581	1,731	4,450	2,602
South Umpqua	2,284	201	2,415	579	755	1,685	512	1,807	1,219	479	6,482	1,664	2,345	9,333
Cow Creek	n/a	n/a	661	269	1,124	1,112	193	678	1,234	1,582	6,661	6,721	1,277	2,351
Total	**3,600**	**2,152**	**9,311**	**4,485**	**11,349**	**9,749**	**2,233**	**8,426**	**6,466**	**10,395**	**32,751**	**34,933**	**26,615**	**27,639**

d) 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.

Usually the proportion of hatchery-origin fall Chinook in natural spawning grounds is low. In a survey conducted on the lower Calapooya in 2003, it was observed that only one fin-clipped fall Chinook was present out of 54 fall Chinook carcasses in natural spawning ground, which is only 1.9% of the natural fall Chinook population. In a previous survey conducted in 2002 at Nonpariel trap (RM 26), only two fall Chinook of natural origin was found and no fin-clipped fish was observed. Limited surveys during 2004-2007, no marked fall Chinook carcasses were observed in natural spawning grounds. There is extensive coho spawning habitat above the trap, covering a distance of approximately 52 km. On average, over 1,100 coho passed the trap facility since 2002. These data recorded in fish trap suggest that impacts of hatchery-origin fall Chinook on listed coho above the Nonpariel trap facility are non-existent.

The increase in fall Chinook pre-smolt releases in the future may however increase the potential for coho and hatchery chinook interactions. Increased monitoring will occur in the future and all hatchery Chinook released will be fin-clipped in order to monitor the spawning activity of the program fish.

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

a) 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.

Downstream Migrant Rotary Traps: Rotary traps that help evaluate the Upper Umpqua fall Chinook program are periodically run by the ODFW on Cow Creek. Operation is subject to funding constraints. These traps are operated based on information on run size and timing of fall Chinook provided by other agencies which periodically run rotary traps on Myrtle Creek, Olalla Creek, Calapooya Creek, and Lookingglass Creek. The impacts to out-migrating coho are minimal as precautions are made to minimize handling of these fish. Traps are also checked on a daily basis to ensure fish do not spend extended periods of time in the trap.

Spawner Escapement Monitoring: In 2001 spawning ground surveys were established in the Calapooya basin to document Chinook spawning and hatchery returns. The selected survey sites are in the lower 25 miles of the basin which is less than 3% of the available coho spawning ground habitat. Spawning ground surveys will also be conducted via helicopter to monitor the brood source population for the South Umpqua, pending available funding.

Impacts to coho are minimal during these surveys, most coho are migrating through the Calapooya during this time period and precautions are taken to minimize any stress on these migrating fish

Happy Valley Trap Site: ODFW operated a fall Chinook trap at Happy Valley on the lower South Umpqua (RM 18) to capture fall Chinook for broodstock and a mark/recapture research program (1999 – 2004). The research program was used to establish population estimates for the Pacific Salmon Treaty population assessment program (Moyers et al. 2003). Starting in 2005, the research project will conclude and the trap will primarily be used for broodstock collection. Some early returning coho are captured during the operation of the trap, and are either taken as brood for the coho propagation program or released above the trap unharmed with minimum stress. ODFW personnel and STEP volunteers monitor the site to prevent vandalism. During operation, the trap is checked daily. Mortality from this project is minimal, due to the short duration of keeping fish in the trap, the careful handling and the early operation of trap prior to the normal return period for coho. Coho mortalities have ranged from zero to less than 2% of the coho trapped at Happy Valley. The Happy Valley Trap is operated from September until the first sustained high water event makes operating the trap unsafe and unfeasible, usually around November 1-15. Chinook trapping and broodstock collection is normally completed prior to the bulk of the coho run.

Tangle Netting: Tangle netting for broodstock would only be done if other, more passive trap methods were unsuccessful in obtaining enough brood. Coho take levels for the Umpqua Watershed would be verified prior to initiating tangle netting to ensure take levels would not be exceeded. Tangle nets would be used in areas likely to have concentrations of Chinook, with few

coho present. A block and push net would be used. Several people in drysuits and snorkel gear would be with each net to immediately free any salmon captured. Chinook would be taken for brood, and coho would be placed above the net. This method was used for another fall Chinook program in Mill Creek in 1997. The number of coho captured was not recorded, but no mortalities were observed. This method was also used in 2002, 16 Chinook were collected, no coho were captured and no mortalities occurred. Tangle netting would take place in the South Umpqua or Calapooya Creek.

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 take levels would be verified prior to initiation to ensure that take levels would not be exceeded. Hook-and-line technique would be used in areas likely to have concentrations of Chinook. Incidental take would be similar to the current allowable in-river Chinook harvest. Any coho captured would be released with a minimum of handling. Hook and line collection would take place in the Mainstem Umpqua, South Umpqua or Calapooya Creek.

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

Fish captured in the smolt trap located on Cow Creek have historically experienced less than 1% handling mortality. At a maximum 5,000 smolts observed (which exceeds the maximum number observed the past 12 years), the mortality would equate to a maximum of 50 smolts. Adult coho mortality at Happy Valley trap has ranged from zero to less than 2%. Coho captured at Happy Valley by year are: 1999--59, 2000--694 (43% hatchery), 2001--879. No adult coho mortality occurred during tangle netting operations in 1997 and 2002.

c) 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 above under (b). Also, see attachment (Table 1) for the projected take levels.

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

Any significant delays in coho migration will be avoided by checking all traps on a daily basis, by 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, trapping at the site will be suspended. Tangle netting will be halted at any given location if the number of coho exceeds the number of Chinook captured. All coho will be passed from the various sites with a minimum of handling. Normally the peak coho run occurs while the bulk of the Chinook broodstock collection is over. Incidence of any significant mortality at capture facilities will be evaluated on individual basis and addressed according to IHOT and fish handling protocols and procedures identified under best management practices.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1) Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the NPPC *Annual Production Review* Report and Recommendations -NPPC document 99-15). Explain any proposed deviations from the plan or policies.

The Native Fish Conservation Policy: The Oregon Fish and Wildlife Commission adopted the policy in 2002 to ensure the conservation and recovery of native fish in Oregon, and manage hatchery based fisheries consistent with conservation of naturally produced native species. Conservation plans will provide guidance for hatchery programs for species within the associated Species Management Units.

Hatchery Fish Management Policy: This policy provides guidance for the responsible use of hatchery fish. The Policy outlines the best management practices for hatchery programs. This Hatchery and Genetic Management Plan will serve as the guiding document for the Calapooya Creek fall Chinook program under the Hatchery Fish Management Policy. The Hatchery Management Policy requires for the development of Hatchery Program Management Plans (HPMPs) to outline the hatchery practices that will be followed for each hatchery program. A HPMP may be a Hatchery and Genetic Management Plan (HGMP) or an aspect of conservation plan developed under the Native NFCP. Once the conservation plan for Umpqua fall Chinook SMU is developed and adopted by ODFW, this HGMP may be revised to make it consistent with the conservation plan.

Oregon Administrative Rules (635) and Revised Statutes (496): These rules directed the ODFW to create a Salmon and Trout Enhancement Program (STEP) to provide the greatest possible opportunity for citizen participation in achieving the Department's management objectives. This HGMP reflects a cooperative program and commission approved propagation proposal by the UFA.

Until May 2000, the Calapooya Creek Fall Chinook program operated under 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.

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 300J for Rock Creek Hatchery operations and DEQ Memorandum of Agreement regarding fish carcass distribution in Oregon streams.

7) ODFW STEP Project Proposals, Umpqua Fishermen's Association 2002, and 2008.

8) Nonprofit status, Umpqua Fishermen's Association, IRS#93-0878100.

9) GRWB Nonprofit status, IRS#93-1166963.

10) ODFW Native Fish Conservation Policy, adopted 2003

11) ODFW Fish Hatchery Management Plan, adopted 2003

12) STEP Oregon Revised Statues (496) and Oregon Administrative Rules (635) Program Guidelines

13) STEP Program ORS 537.142 Water Rights

14) The Oregon Plan for Salmon and Watersheds (Executive Order 99-01)

15) Douglas County Public Works & Timberland Logging (Contract No. 22387), contract for aerial chinook survey flights, 2006 – 2010.

16) Calapooya Fall Chinook STEP proposal Exhibit D. April 17, 2008 ODFW Commission Meeting

This program is consistent with all permits and agreements above.

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 Calapooya Creek Fall Chinook Program operates within the ODFW's Coastal Chinook Salmon Plan (1991). Harvest of marked or unmarked fall Chinook is allowed in the mainstem Umpqua River. There is no fall Chinook harvest in the South Umpqua. As an augmentation harvest program the primary goal of this program is to help provide angling opportunity in the upper mainstem Umpqua. An estimated 20% of the adult Chinook produced by this program are likely harvested in the ocean while 15% are harvested in freshwater.

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.

The intent of this program is to provide enhanced angling opportunity in the upper mainstem Umpqua. Harvest rates for program fish are estimated at 20% for the ocean fishery and 15% for the freshwater fishery. Fishing for Chinook in the South Umpqua has been closed since 1992. According to punch card data, the freshwater harvest has ranged from 6% to 41% from 1980 to 2007 and averaged 16%. . Table 3.3.1-1 shows the estimated harvest of program fish released from 1988 to 1999 based on CWT data (Lewis 2005). No other brood years were marked until 2003. Consequently no additional data is yet available on the presmolts marked and released in the Calapooya. The most recent creel surveys conducted on the mainstem Umpqua showed 8 - 21% harvest of South Umpqua escapement (Moyers et al. 2003), with harvest ranging from 948 – 1,436 adult fish in 2002 and 2001.

Table 3.3.1-1. Estimated number of harvest of Upper Umpqua fall Chinook based on years when program fish were CWT marked

Brood Year	Harvest
1987	46
1988	3
1992	18
1993	2
1994	2
1999	30

3.4) Relationship to habitat protection and recovery strategies.

Fall Chinook and coho populations in the Umpqua basin have varied over the past decades. Declines in population have been the result of various reasons including poor ocean conditions which negatively affect smolts survival; predation, over harvest, lack of screening at irrigation diversions and pumps, degradation of sufficient suitable habitats (spawning gravel and large woody debris), unfavorable freshwater conditions and inadequate fish passage at culverts. Habitat conditions appear to be improving in the Umpqua Basin as well as the ocean, which are benefiting the survival of both species. For example, local watershed councils, in conjunction with federal and state agencies, are implementing numerous habitat improvement projects throughout the basin, including fencing riparian habitats, placing large woody debris in the streams, improving fish passage, and watershed assessments to evaluate needs and educate local landowners. The ODFW has an active screening program which has screened 45 irrigation pumps in the Umpqua Basin.

3.5) Ecological interactions.

a) Species that could negatively impact program.

Other fish that could negatively impact outmigrating fall Chinook smolts include two native predatory fish (Umpqua pikeminnow and coastal cutthroat trout) and two non-native fish (smallmouth bass and striped bass). Effects of predation by pikeminnow and cutthroat trout on the wild Chinook population are unknown. Stomach analysis of smallmouth bass over a four-year period verified smallmouth bass eat coho smolts but suggested the overall impact on wild populations is insignificant in the Umpqua basin. This is due to little overlap of Chinook smolt outmigration and warmer water temperatures when the smallmouth bass were actively feeding. 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. Little is known regarding competitive interactions of hatchery Chinook and wild coho during the estuary and ocean phases of their life history. Predation by aquatic mammals like otters, seals, sea lions etc. could negatively impact the program. Avian predation from birds such as blue herons, Caspian terns, cormorants, and gulls could impact the program.

b) Species that could be negatively impacted by program

Competition for food and space by Chinook may negatively impact the naturally-produced coho in the estuary, but because of relatively smaller size of Chinook the juvenile coho smolts would likely dominate over released fish and impact on naturally-produced fish would be minimal. Also, the primary habitat for fall Chinook occurs in the lower 25 miles of the Calapooya basin while coho distribution continues upstream, including a variety of

tributaries and encompasses at least 119 miles (Stream Net 2001). Thus concentrating the Chinook releases within the lower 25 miles of the mainstem Calapooya reduces the potential for competition and niche displacement and affects less than 21% of the available coho habitat in the Calapooya basin and less than 2% of the coho habitat in the Umpqua basin. Hatchery releases occur in May/June depending on water flow and temperature. Chinook out-migration peaks from mid-May to early June while coho runs peak from late April to mid-May (BLM Calapooya Smolt Trap Data 1999, 1998). Naturally produced Chinook in the Calapooya ranged from 60 - 105 mm in length while hatchery presmolt are 75 to 95 mm in May/June (BLM 1999 Smolt trap, ODFW release data). Naturally-produced coho in the Calapooya are larger than the program fish and are 105 to 160 mm in length during the same time period. Presmolt releases are timed to reduce interaction between the two species. Overall, although competitive interaction between hatchery fall Chinook and coho may occur, there is little evidence to suggest there is any negative competitive or niche displacement interaction in terms of the carrying capacity of the Umpqua basin. This program uses the lower stream habitat, and release strategies to reduce competitive interactions. To minimize the impacts of niche-displacement or other density dependent factors, hatchery releases are timed to avoid the peak of coho out migration and are concentrated in a small portion of the available coho habitat. The releases are conducted lower in the watershed and in mainstem areas which encourages spatial segregation between the species and a faster emigration of program fish. The hatchery presmolt are also smaller than naturally-produced coho smolts in the system.

Fall Chinook are not a listed species in the Umpqua basin, but could be impacted by this program. Releases of program fish in areas that have low numbers of naturally reproducing Chinook may have some negative impact on naturally produced Chinook juveniles by significantly increasing the numbers of Chinook utilizing the habitat. The program fish may also compete with juvenile Chinook as they migrate downstream and rear in the estuary. Returning program adults may compete for spawning habitat, or may interbreed with naturally produced Chinook adults that could reduce the offspring's productivity. Competitive impacts are reduced by releasing program fish at a size within the normal size range of naturally produced Chinook, and encouraging harvest of program fish prior to entering the tributaries.

c) Species that could positively impact program.

Any hatchery or wild fish that dies or is recycled for nutrient enrichment may positively impact the program by providing nutrients to juvenile salmon.

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.

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.

Water source 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's water temperatures are too high in the summer for fish health, which necessitates the need for the cooler North Umpqua water supply. The fall Chinook are usually transferred from Rock Creek to the various hatchbox sites in December and early January.

All of the hatchboxes are operated with a gravity fed flow except for Eastwood Elementary which use pumps. During the normal operation periods (December to May) the hatchboxes and rearing ponds receive sufficient water flow.

In rare instances the GRWB facility would be utilized as a backup for this program, water for GRWB STEP is from Gardiner Reservoir. GRWB uses a gravity fed system that operates the hatch house from late October through March and the raceways from March to June. The same system is also used for holding broodstock in the raceways from September through November. The reservoir does have a sediment 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 to hold broodstock can 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.

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.

The Rock Creek Hatchery intake is equipped with NMFS specified mesh screening of 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' pond before dismissal to Rock Creek. Discharged effluents are monitored and reported quarterly to DEQ as per NPDES permit 300J.

With the exception of Eastwood Elementary School, all of the hatchboxes used for raising fall Chinook have gravity flow water intakes above anadromous fish distribution. The ODFW Screens Program is currently reviewing the intake at Eastwood to improve screening. Water use for hatchboxes is permitted through ORS 537.142. Discharge from hatchboxes during incubation does not add organic matter and does not require DEQ - NPDES monitoring. Likewise present levels of fish producing in these hatchboxes are well below the poundage's required for NPDES permit and effluent monitoring. Volunteers however are implementing measures to monitor water temperature and DO. Organic effluent from cleaning of rearing ponds is discharged at a designated upland site away from the stream.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

1) ***Happy Valley Trap on Lower South Umpqua River: This*** trap is a picket weir with a temporary holding area for adult fish. Fish enter the trap through a V-fyke and are enclosed by a PVC pipe picket fence. Chinook transported for brood are netted and carried to the transport tank. Fish being passed are netted and individually passed through an upstream slot in the picket fence. Adult Chinook of stock-18 are collected at this facility.

2) ***Tangle Netting:*** This method uses monofilament net of 4 - 6 inch mesh size to avoid capturing salmon by the gill plate. Personnel and volunteers attend each net. As soon as a salmon hits the net, the fish is restrained and removed from the net. Chinook used for brood are then placed in a hand net or inner tube for transport and placed in the transportation tank. Fish passed are placed to the open sides or above the nets. Locations for using the nets vary by the location of Chinook. Sections netted need to be calm, pool areas, relatively free from obstructions. Netting would be done in the South Umpqua or Calapooya Creek.

3) ***Hook-and-Line Technique:*** This technique uses hook, rod and reel to capture Chinook. Fish are not "played out" and are reeled to a cloth hand net for removing the hook. Coho are released unharmed. Site selection depends on the stock being sought and areas of Chinook concentrations. Hook-and-line would be done in the Mainstem Umpqua, South Umpqua or Calapooya Creek.

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

There are three transportation trucks to transport fish. 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. Two insulated portable tanks with diffused oxygen and spray aeration. One holds 250 gallons of water and the other 220 gallons. Six push-in aluminum tanks with spray aeration and each holds 200-250 gallons of water. Two push-in aluminum tanks with spray aeration and diffused oxygen, each with 350 gallons capacity.

5.3) Broodstock holding and spawning facilities.

Rock Creek Hatchery is used to hold and spawn all fish of stock 18. Holding pens are 12' x 30' concrete structures. Water depth is adjustable from 1.5' to 4' deep and normally kept at a 4' depth. Water is supplied from Rock Creek from October to June and the N. Umpqua from June to October. Flow is adjustable, but normally is set at 1.5 cfs. All adult salmonids are held in this collection/holding pond until spawned. Spawning occurs in an adjacent hatch house building inside the shop area converted during times of spawning.

If needed, GRWB's facility could also be used as a back-up for holding fall Chinook. There are 5 holding tanks at GRWB, 4 are 20'x 6'x 4'= 480 cu feet, and 1 tank is 59' 4"x 6'x 4' = 1,416 cu feet.

5.4) Incubation facilities.

At Rock Creek Hatchery incubation takes place in 20 Marisource 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. Water used to treat incubating eggs is diverted to the abatement pond for further dilution before dismissal into Rock Creek. Eggs are incubated at the hatchery from the green egg stage to the eyed egg stage.

After reaching the eyed egg stage at Rock Creek hatchery, stock 18 chinook eggs are transferred to volunteer hatchboxes located at Cooper Creek, Fall Creek, Seasonal Tributary of Deer Creek, and/or Barrett Ck. Hatchboxes used for Chinook rearing are similar to the boxes designed by Junge (1984). They use gravity flow water at 6-10 gal/minute through the boxes. Each hatchbox can hold three screened baskets. Each basket holds 5,000 eyed eggs and uses a subsurface water intake, barrel sand filter, or screens to control water flow, debris, and sediment.

In a drought year Gardiner STEP could be used for incubating eggs, incubation takes place in 13 Marisource 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.

There are 21 rearing containers at Rock Creek Hatchery. These are two 30’ x 80’ concrete; six 20’ x 80’ concrete; six 145’ x 20’concrete; one 20’ x 80’ concrete with center wall; and six 16’ Canadian troughs; all are single pass containers. Flows are adjustable in all containers. All containers carry a maximum 5’ depth except the Canadian troughs which are 2’ deep.

Two above ground containers are used for rearing at Barrett Creek (24’long x 8’wide x 4’deep) and Cooper Creek (20’ round, 4’ deep). Eastwood School has two, 1,500gallon concrete containers. All flows are adjustable. The sides of the swimming pools have been darkened with black cloth to provide a more natural color. Swimming pools are also equipped with submerged feeders.

By adding more natural coloration to the rearing pools and submerged feeders, the program is rearing fish to develop more natural characteristics. The submerged feeders eliminate the need for hand broadcasting food, therefore the fish feed throughout the water column instead of rising to the surface.

5.6) Acclimation/release facilities.

Canyonville Acclimation Pond: This is a concrete raceway facility which is 47’ 8” X 12’ X 4’ 8” deep. The water is gravity flow, screened through the City of Canyonville and has adjustable flow. This site is used for marking the pre-smolts prior to release. Fish are held at Canyonville for no longer than two weeks.

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

A flood in 1996 caused the early release of some fish from other programs being reared at Rock Creek Hatchery. The gradual degradation of the Rock Creek hatchery intake over the 60 years prompted building a new intake in 1998. The intake structure complies with the NMFS screening criteria.

Hatchbox sites are checked at least once daily. The hatchboxes at Rock Creek Springs suffered high losses in 2003 when the intake pipe became blocked. The site was reviewed, pipe improved and a new volunteer operator was assigned to care for the site. A flood in 1996 caused some GRWB brood to escape from the raceways. In 1999, the program suffered a significant mortality of eggs due to suffocation caused by sediment after a heavy rainfall in December. In 2000, the program added filter cloth screens to the hatch house intake. In 2003, GRWB lost a significant number of brood when DO dropped below levels necessary to sustain the fish. This occurred due to drought conditions that lead to warmer than normal water temperatures, inadequate water flow, and accidentally over stocking the holding tank. This problem was corrected in 2004 by adding a re-circulating pump, a flow gage to maintain water flows at 100 - 200 gpm, and additional aeration. The program also reviewed the holding capacity of each tank to avoid overstocking and held a training session with the volunteers. A table was posted at the facility which states how much gpm flow is needed per number of fish in the raceway.

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

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 hrs, 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. Nearly all of the hatchbox sites are above the anadromous fish distribution area and have no impact on naturally-produced coho. Hatchbox sites are checked at least once daily. During periods of water events which could cause interruptions to flows or potential escapement, the sites are checked more frequently. Glendale and Eastwood schools operate on screened pumps and are checked several times daily.

GRWB STEP added a re-circulation pump and aeration systems to improve brood holding conditions in its raceways. The program also gauges water flow daily and frequently measures DO levels, especially during periods of warm water temperatures or when numerous brood fish are being held on site. No take of a listed 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 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. Methods of hatchery operations are followed as IHOT, Fish Health Management Policy and Hatchery Management

Policy. Fish are treated as prescribed by ODFW fish health pathologists at Oregon State University. All propagation equipment is disinfected with chlorine or iodiphore as it is received or dismissed from station premises to prevent disease transmission. 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 disease. GRWB also added a flow alarm in case of a water emergency at the site.

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.

Fall Chinook are not ESA listed population. The Calapooya Creek Fall Chinook Program has used primarily South Umpqua (stock 18) broodstock which were captured either on the South Umpqua at Happy Valley or in Cow Creek for projects in the upper portion of the Umpqua basin or South Umpqua. To reduce impacts to naturally produced Chinook, the number of fish used for brood is below 25% of the total local Chinook run. Counts are made at the trapping location or surveys are conducted above the trap site to ensure that less than 25% of the run is collected for brood.

6.2) Supporting information.

6.2.1) History.

The Umpqua basin has five Chinook 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 entered the Umpqua year-round and were very abundant (1995 Biennial Report). Harvest records during the 1920s indicate that the fall run was the most common. The Chinook populations reached at very low levels in the late 1940s and had extremely low numbers for fall fish into the 1960s (Nicholas and Hankin 1989). Chinook no longer enter the Umpqua year-round indicating some loss of various population segments. Chinook hatchery programs were initiated in the Umpqua during the 1950s to rebuild populations. Some Chinook from the Columbia basin were transferred to the Umpqua during the early phases. All current programs use locally founded broodstock. Helicopter and trap counts have indicated an increase in the South Umpqua population since the 1980s. Based on redd data, and an estimated ratio of three Chinook per redd, the South Umpqua/Cow Creek run has ranged from 960 fish to 10,477 since 1990. The population has a 5-year average of 6,154 fish and a ten-year average of 6,522 Chinook.

All broodstock for fall Chinook programs in the Umpqua basin originated from the South Umpqua basin (stock 18). The fall Chinook run is the dominant run of the basin, and the dominant run of Umpqua mainstem tributaries. Guidelines established by the Native Fish Conservation Policy will be met or exceeded for broodstock use.

6.2.2) Annual size.

This program has used 110 - 115 pairs of brood fish annually. Table 6.2.2 represents fish actually collected and passed. Some fish also pass through the trap with no handling. The current brood goal is 93 pairs.

Table. 6.2.2-1. Number of fall Chinook adult fish used for spawning (1997-2007).

Brood Year	Number of Brood Fish (Happy Valley Trap, South Umpqua)	Estimated South Umpqua Population
1997	0	6,758
1998	15 female, 15 male, passed N/A	1,231
1999	90 female, 85 male, passed 299	1,979
2000	105 female, 106 male, passed 739	2,697
2001	112 female, 122 male, passed 1,466	5,402
2002	114 female, 110 male, passed 1,141	10,477
2003	111 female, 119 male, passed 1,321	10,213
2004	68 female, 58 male, passed 881	11,384
2005	0 female, 0 male,	3,085
2006	71 female, 88 male	
2007	13 female, 24 male	5,622

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

Broodstock has been nearly 100% wild since the initiation of the program in 1985. Some unmarked hatchery fish may have been used for brood since this program has not marked unfed fry released into the South Umpqua or 100% of the presmolt released. Due to the location of the trapping facility on the South Umpqua at Happy Valley the majority of fish used for brood are wild. If hatchery fish are captured they will be taken to the hatchery to spawn. The Calapooya is predominately bordered by private land with little to no access at sites that may be suitable to safely capture and transport brood fish. Options will continue to be explored. Both tangle-netting and hook-and-line have been included in this HGMP as methods that might be suitable in Calapooya Creek.

6.2.4) Genetic or ecological differences.

Since nearly 100% of the brood is naturally produced Chinook, no genetic, phenotypic or ecological differences have been noted. Brood stock trapping limitations during high water may prohibit the capture of the tail end of the Chinook run. This could potentially cause some differences genetic or ecological differences in the future. This can be minimized by capturing some late brood stock with tangle nets.

6.2.5) Reasons for choosing.

The main reason for choosing this brood is to produce progeny that will have similar genetic characteristics to the local Chinook population. No deliberate selection of specific traits or

characteristics is made for during broodstock collection. The ratio system of collection technique further eliminates any bias in selecting brood fish. With this technique, the program usually spreads its brood collection by passing 3 fish, and collecting one to maintain a 25% ratio. The program can also pass fish for several days and collect fish one day to stagger collection and reduce selection bias. The aforementioned techniques also help brood collection to be proportional to the natural run timing. Trap operation becomes difficult and unsafe during high flows. Tangle netting can be used to capture later brood.

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 impacts to naturally-produced coho are expected while collecting brood. To minimize adverse ecological impacts, most of the broodstock will be collected prior to the peak run of coho. Where broodstock collection coincides with coho migration, risk aversion measures will be applied. Traps will be kept in good repair and checked daily. Coho will be passed with a minimum of handling. Take levels will be reviewed prior to implementing collection methods such as tangle nets or hook-and-line. Wild brood at a higher percentage will be incorporated each year to minimize any genetic differences between the hatchery-produced and naturally-produced Chinook populations.

SECTION 7. BROODSTOCK COLLECTION

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

This program needs 93 pairs of fall Chinook collected for brood. All fish captured for broodstock are randomly collected and should represent a naturally occurring age class distribution in the run (jacks, 3-year old, 4-year old etc.).

7.2) Collection or sampling design.

The program usually collects approximately one out of every four fish which enter the trap. This helps ensure that 75% of the run is passed and that selection is random and represents the naturally occurring age classes. The program may occasionally pass all fish for several days to “get ahead”, and then in one day collect enough fish to make the 3:1 ratio “even”. Broodstock collection continues as long as possible to represent the entire window of run timing. Collection at trap sites becomes difficult and unsafe at high water levels.

7.3) Identity.

South Umpqua broodstock (stock 18) is used for South Umpqua and the upper Umpqua projects. Hatchery and native fish are not identifiable from one another since unfed fry are not marked and only a percentage of the presmolt were marked from 1987 - 1994. In 2000, 31,722 of 75,096 presmolt released into the South Umpqua were CWT’ed and fin-clipped. About 100,000 unmarked, unfed fry were annually released from 2000 to 2004. Starting in 2008, 75%-100% of pre-smolts released will be marked with an adipose fin clip.

7.4) Proposed number to be collected.

About 93 pairs (93 males and 93 females) would be collected.

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

About 93 pairs of adult fall Chinook would be collected and male to female ratio would be 1:1.

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

Brood Year	Adult Females	Adult Males	Jacks
1997	0	0	
1998	15	15	
1999	90	85	
2000	105	106	
2001	112	122	
2002	114	110	
2003	1151	119	
2004	68	58	
2005	0	0	
2006	71	88	
2007	13	24	

Note: Normally 10 of the males each year are jacks.

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

There has been no surplus hatchery origin fish collected. No surplus is expected in the foreseeable future, however if hatchery fish are captured at the Happy Valley trap they will be taken to Rock Creek Hatchery to be utilized as brood for the program.

7.5) Fish transportation and holding methods.

Adults transported from Happy Valley are enroute for less than two hour before reaching Rock Creek. Adult Chinook are transported in a 1,000 to 3,000 gallon fish liberation tank. Loading density is estimated at 1 pound of fish per gallon of water or a maximum of 100 fish at one time. Portable tanks (200 to 350 gallon capacity) with loading rates of one pound of fish per gallon of water are also used. Oxygen level is maintained at 6 -10 ppm. Poly-Aqua may be used to help reduce the loss of external slime due to handling. In addition, MS222 may be used to reduce transportation stress. Except for when the large liberation tank is used and watered up at Rock Creek Hatchery, water is pumped from the trap site so that the water temperatures between the tank and the trap site remain similar.

If GRWB was used to hold brood the same equipment would be used as described above, but transport time would equal two hours.

7.6) Describe fish health maintenance and sanitation procedures applied.

At Rock Creek Hatchery fish are treated with 167 ppm formalin for 1.0 hour upon receipt at facility and continued 3 treatments weekly to spawning to prevent fungal infections. Outbreaks of furunculosis are monitored and antibiotic (oxytetracycline) injections shall be used if warranted.

At GRWB, brood fish are normally not treated. If conditions warrant (severe fungal infection), fish will be treated as per prescriptions of ODFW's pathologists. Spawned adults are sampled and tested by ODFW's pathology unit to detect the presence of any viral and bacterial infection. Eggs taken from any infected females will be frozen and buried. Tanks are disinfected with chlorine. All equipment is disinfected with iodiphore before and after each use.

7.8) Disposition of carcasses.

Chinook carcasses from fish spawned at Rock Creek Hatchery are transported to the local landfill or are donated to Wildlife Safari as a food source for their bears. Chinook spawned at GRWB are placed into the North Fork Smith River for nutrient enrichment following the DEQ permit.

7.9) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed fish resulting from the broodstock collection.

No adverse genetic effects to naturally-produced fish are anticipated from the Chinook brood collection program. 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 of the coho run. See Section 6.3 for risk aversion measures that will be applied to minimize adverse ecological effects to listed natural fish.

SECTION 8. MATING

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

8.1) Selection method.

Broods will be randomly selected from the entire run timing. No deliberate selection for specific traits or characteristics will be made during broodstock collection. The ratio system of collection technique will be followed to eliminate any bias in selecting brood fish. In this technique, 3 randomly selected fish will be allowed to pass and one will be taken as brood representing a proportion of the entire run. Fish are tested weekly from October-December for ripeness and ripe fish are randomly selected for spawning. This ensures egg representation from the entire span of the spawning period. A matrix system of spawning is used to reduce any inadvertent selection.

8.2) Males.

Males are used one time only. Male to female ratio of 1:1 is easily obtainable. Jacks are incorporated at random proportional to their existence in the run for that year.

8.3) Fertilization.

Eggs are fertilized on a 5 male x 5 female matrix. Fertilized eggs are water hardened in 100 ppm iodine for 30 minutes. Ovarian and tissue samples are drawn on 65 fish to monitor viral presence. Fish are examined by a fish pathologist to monitor overall health and condition.

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.

It is unlikely that the mating scheme for fall Chinook will have any adverse genetic or ecological effects on natural coho. However, to maintain genetic quality within the hatchery population, brood fish are randomly picked for the mating scheme and represent a wide migration time. Also, nearly 100% wild Chinook will be used as brood to maintain the genetic quality and diversity of the natural population in the basin. A matrix mating process is performed to further randomize the mating process.

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 Loss %	Fry Loss%	Juvenile Loss %	Unfed Fry Releases	pre-smolts released *	Smolt goal
1997	No fish	0	0	0	0	363,500
1998	11	3.2	8.7	0	30,112	363,500
1999	1.3	1.2	3.6	0	301,160	363,500
2000	24.7	3.6	6.9	0	303,378	363,500
2001	12.6	5.9	6.6	0	340,374	363,500
2002	6.3	9.6	21.8	274,657	96,680	100,000
2003	9.8	4.2	19.7	271,050	105,788	100,000
2004	9.4	5.3	14.5	164,164	47,000	100,000
2005	0	0	0	0	0	100,000
2006	19.9	8.0	0.5	89,197	113,538	100,000
2007	32.1	3.3	6.0	0	31,773	100,000

*Pre-smolts are released in late-April or May.

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

The ODFW transfers the eyed eggs to STEP volunteers who raise them to the unfed fry or presmolt stage. Surplus eggs noted at this time can be destroyed at Rock Creek Hatchery.

9.1.3) Loading densities applied during incubation.

Rock Creek:
Trays are vertical stack Marisource replica to Heath.
Green egg size is 65 eggs/ounce.
Density for green eggs is 200 ounces per tray.
Eyed eggs transferred to STEP are trayed at 5,000 per basket.
Water flows in incubators & hatchboxes are set at 5-8 gallons per minute.

GRWB:
Trays are vertical stack Marisource replica to Heath
Green egg size is 507 eggs per cup.
Density for green eggs is 8 cup per tray.
Egg density for hatching tray is 4,000 to 5,000 fry per tray.
Water flows in incubators are set at 5-6 gallons per minute for egg and fry incubation.

9.1.4) Incubation conditions.

Rock Creek;
At Rock Creek Hatchery incubation temperatures monitored and recorded at 8:00 a.m. and 4:00 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 can be controlled to speed up or slow down egg development to unify rates of maturity.

GRWB:
Gardiner STEP incubation temperatures are monitored and recorded daily. Dissolved oxygen is also monitored. Silt is managed 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 650 ppm hydrogen peroxide for 15 minutes per day to control fungus. Eggs are not picked until after shocking.

Hatchboxes:
At hatchboxes, the eggs are checked at least once per day and the daily water temperature is recorded. Dissolved oxygen is monitored monthly or as needed at each site. Values range from 8 to 11 ppm. Dead eggs and/or fry are removed daily.

9.1.5) Ponding.

Hatchbox sites - Forced ponding of fry at 99% buttonup stage. Length= 40-45mm. Average weight is 900 fish per pound. No feeding occurs for 24 to 48 hours after ponding. Ponding normally occurs in February - March.

9.1.6) Fish health maintenance and monitoring.

Rock Creek;
At Rock Creek, green eggs are water hardened in 100 ppm iodiphore for 30 minutes. Pathology samples of tissues and ovarian fluid are taken to detect viral infection on each species. Eggs taken from infected females are frozen and buried to prevent disease transmission. Fungal infections are

controlled with 1,250 ppm formalin for 15 minute drip 4 times weekly. Hatch house water are filtered and disinfected with UV light. Dead egg are removed daily by machine and buried. No incidence of yolk-sac malformation occurred at this facility.

Hatchboxes:
Daily temperatures, temperature units and mortality are recorded on data sheets. Any abnormalities are reported to the STEP Biologist for investigation. Ponded fish are weighed and inventoried at least once per month to monitor growth. These program fish have not required any bacterial or viral treatment to date. Fish health status is determined prior to release or ponding.

GRWB:
Green eggs are water hardened in 100 ppm iodiphore for 30 minutes. ODFW Pathologist analyzes samples of tissues and ovarian fluid for viral infections. All eggs taken from any infected females are destroyed and buried. Fungal infections are controlled with 650 ppm hydrogen peroxide with a 15 minute drip per daily until hatching. Dead eggs are handpicked after shocking and then once per week until hatching occur. No yolk-sac malformations have been recorded. Trays and tanks are annually scrubbed with a 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.

Rock Creek:
At Rock Creek Hatchery, fall Chinook eggs are incubated in filtered and UV sterilized water and treated with formalin to minimize potential disease in program fish or transfer to the receiving stream and listed species. Incubation effluent water is discharged into 100' X 180' abatement pond to meet DEQ requirements for dilution to reduce impacts from water discharge. Discharge effluent is monitored and reported quarterly to DEQ as per NPDES permit 300J. This helps ensure that discharged water meets certain water quality standards to reduce any potential impacts on fish habitats and inhabiting species.

Hatchboxes:
Most hatchboxes are above the normal distribution of naturally-produced coho. No disease problems have been noted in hatchbox reared program fish. Program fish are checked daily. If any abnormalities occur (high mortality, water flow interruption, etc.) the STEP Biologist is contacted for necessary actions.

GRWB:
Fall Chinook eggs at GRWB are treated with hydrogen peroxide to minimize potential disease in program fish and transfer to the receiving stream and listed species. Water used for egg treatment is sand percolated to reduce impacts from 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 Section 9.1.1.

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

Rearing densities at Rock Creek Hatchery are stated for temperatures below 58^{o}F. Fish density and flow rate = 8.0 lbs fish/gal/min. Loading density with respect to pond space is 1.0 lb fish/cubic foot. Fish densities both in Cooper Creek and Barrett Creek rearing facilities are 1,800 pounds of fish. Therefore the facilities have the capacity to rear 306,000 pre-smolts to 85/lb. Fish are normally transported to the Canyonville acclimation facility at approximately 200/lb for marking. Canyonville has a capacity of 3,000 pounds.

9.2.3) Fish rearing conditions.

Water source, fish holding and rearing 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. Adequate flow of water is maintained. Dissolved oxygen is monitored during times of crisis, critically 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 from cleaning operations is passed to pollution abatement pond (Rock Creek Hatchery) or upland site for sand perculation (GRWB). Containers are protected from predators with a mesh cover. Fish are fed via submerged feeders when possible to simulate natural conditions.

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 9.2.4-1. Summary of Excel Growth Program for spring released fall Chinook.

Date	Water Temp	Feed/day	# of fish/lb	% Body weight	Number of Fish	K Factor	Feed Conversion	% AGR*
March 1, 2004	44.9F	3.91 lbs	900	3.52	100,000	0.00037	1.1	100
June 1, 2004	55.6	38.9	70.8	2.756	100,000	0.00037	1.1	100
Total Food		1,457 lbs over 93 days						

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.

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

See Table 9.2.4 -1

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*).

Table 9.2.4 -1.

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

Fish health and behavior are monitored daily. Mortalities are collected and analyzed daily and continuously. Scheduled pathology examinations are conducted at random as needed and as prophylactic. Parasitic and bacterial infections treated as needed under prescription of ODFW pathologist. Viral infections monitored by Pathology department. Disinfecting techniques are practiced as prevention of lateral transfer of viral infection. To date, fish reared by this program have not had a disease out break at the hatchbox or rearing sites. Temperature is monitored and recorded daily at each hatchbox site. Dissolved oxygen is monitored monthly and as conditions warrant. Mortalities are collected daily. Ponds are vacuumed weekly. Fish are fed from a submerged feeder to simulate natural feeding conditions. Hatchboxes and pools are drained, rinsed, and dried each year after use.

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

The smolt development indices are generally the age of fish, size, and condition factor, color, behavior of fish etc. No ATPase studies are conducted.

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

Fish are fed via a submerged feeder consisting of a PVC pipe. This simulates a more natural behavior of feeding in the water column instead of rising to the surface during hand broadcasting of food. The sides of the pool have also been darkened with material to help the fish develop normal coloration.

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 Umpqua fall Chinook which is under this propagation program is not an ESA-listed population. See Sections 5.8, 6.3, 7.9, 8.5 and 9.1.7 for risk aversion measures taken under this propagation program.

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	None			
Fry	None			
Fingerling	None			
Presmolt	0 – 300,000	250-80/lb	May-June, 2007-2010	Calapooya Creek

The current goal is to release enough program fish to have approximately 600 adults returning to be available for harvest. To achieve this goal ODFW will release 300,000 presmolt into Calapooya Creek. Return rates may exceed 600 adults since this return estimate is based on older CWT data from releases 10-40 miles upstream and later in the spring (June). CWT data collected in 2007-2009 from the 2004 release should help evaluate the current program fish's survival.

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

Stream/River	Watershed Code	Fish Age	Release Point	Major Watershed	Basin
Calapooya	1600130000	Presmolt	RM 15- 25	Umpqua (upper)	Umpqua

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

Release Year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
1990	31,198	900/lb	77,457					
1991	23,290	"	239,603					
1992			308,923					
1993	96,238	"	2,485,871					
1994			135,876					
1995	114,278	"	129,887					
1996	9,800	"	242,044					
1997			62,000					
1998	None		None					
1999			30,112	128/ lb				
2000			302,756	115/ lb				
2001			303,778	220280/ lb				
2002			340,374	108 -159/ lb				
2003	273,123	900/lb	96,680	82/ Lb				
2004	233,259	900/lb	105,788	119/ Lb				
2005	134,938	900/lb	89,104	100/ lb				

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

Currently the program has been approved to release 300,000 pre-smolt fall Chinook. Presmolts are weighed and counted to determine the number per pound prior to release. Their overall health is also noted at this time. They are netted from the rearing pond and placed into a transport trailer at less than 1 pound of fish per gallon, then hauled to the ODFW designated release site. Multiple push-in tanks and trips are required to conduct the releases. Releases occur from late-April to mid-May depending on water flow and temperature. Ideal release conditions include adequate flow and relatively cool temperatures (45 to 55 degrees). The timing is also intended to increase presmolt survival by providing the opportunity for the program fish to outmigrate prior to an increase in bass activity. If the fish are coded-wire-tagged they are released in late May to mid-June. Presmolt size at release is generally 70 - 120 fish/lb. The fish are piped directly from the transport tank to the target stream via a 6" hose.

10.5) Fish transportation procedures, if applicable.

Fish are transported approximately for 2 hours in an insulated tank equipped with oxygen and aeration; or in 5 push-in tanks with aeration. These tanks hold 250 and 200 gallons respectively. A 350-gallon push-in tank with aeration and oxygen is also available. Densities up to 1.0 lb fish/gallon of total tank volume can be loaded. Generally only 100 pounds of fish are placed in the 200-gallon push-in tanks and 200 pounds in the 250-gallon tank.

10.6) Acclimation procedures.

Fish are reared in pools with darkened sides to provide natural coloration and cover. The fish are also fed via submerged feeders to encourage natural feeding behavior. Acclimation to Calapooya Creek occurs naturally by being released into large pools, this allows fish to outmigrate on their own volition.

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

Marking strategies for the stock 18 Fall Chinook is to adipose fin-clip at least 75% of pre-smolts released with a goal of marking 100%.

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

Since the eyed eggs are transferred from Rock Creek or Gardiner to the hatchbox sites, any surplus would be identified at the egg stage. If a surplus was noted the program would work with ODFW hatchery, district and policy guidelines to determine the disposition of the excess eggs. To date, no surplus has occurred.

10.9) Fish health certification procedures applied pre-release.

If problems are observed once the eggs are transferred to the hatchboxes, samples are collected and the STEP Biologist, District Biologist, Rock Creek Hatchery and ODFW pathology are contacted for consultation. All presmolt are inspected by the STEP Biologist prior to release to

verify fish health status. Volunteers contact the STEP Biologist prior to the release of unfed fry and submit a "Record of Operation" after the release. Volunteers rearing the unfed fry have been trained and each has experience with fish rearing and the facility. New volunteers work as an apprentice with an experienced volunteer. Fish health is reported to the STEP biologist at least monthly. Any abnormalities are reported to the STEP biologist for investigation.

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

Rock Creek Hatchery - Contact district biologist to initiate pre-established contingency plan. Since Rock Creek only holds eggs to the eyed stage, no survival would be expected with an early release. Eggs would be retained on site maintained via a pump system until the water supply was stabilized.

Hatchbox Sites - Contact STEP biologist or other ODFW fish staff to implement contingency Plan. Plans include releasing buttoned-up indigenous juveniles in order of closest to release date or maintaining them in the rearing ponds via a portable pump and spray nozzle for aeration. Hold eggs and sac fry on life support via a portable pump until the water supply is stabilized. If a release of fish had to occur, the program could transfer the fish to another hatchbox facility, or would make every attempt to get the fish to the target basin for release.

GRWB - Contact STEP Biologist or other ODFW fish staff to implement contingency plans. GRWB also only holds eggs to the eyed stage for this program so a temporary water flow would have to be established via a pump to maintain life support for the eggs.

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

Program fish are released at a size which is smaller than naturally-produced coho present at the same time. Releases are restricted to mainstem areas in less than a third of the coho habitat in a given target sub-basin and less than 2% of the South Umpqua and mainstem coho habitat. This reduces spatial overlap. Fish are also released during a time frame which should be after the peak in coho outmigration. Program fish also produced from a high percent of naturally produced broodstock to increase the genetic similarity between program and natural fish.

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 1.10.1.

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.) and grants. Funds are committed for portions of the HGMP monitoring but, can change with relatively short notice. Volunteer commitment and interest can also change over time depending on local interest, individual personalities, ODFW support, and community support. Presently the volunteers in the Umpqua Fishermen's Association and Gardiner-Reedsport-Winchester Bay STEP are strongly committed to the Calapooya Creek Fall Chinook Program.

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 our monitoring program.

SECTION 12. RESEARCH

12.1) Objective or purpose.

- Spawning ground surveys will be conducted in Calapooya Creek in an effort to determine the percentage of program fish spawning in the wild.

- Winchester Dam counts allow for the visual observation of any marked fall Chinook, indicating a potential stray from either of our hatchery programs into the North Umpqua.

- If funding becomes available, CWT program fish to help evaluate the survival, distribution, contribution to fishery, stray rates and spawners/mile of the fish released by this program.

- If funding and technology becomes available, otolith mark fry to evaluate survival and return rates.

- If funding and technology becomes available, test for genetic similarities/differences between hatchery and naturally produced fall Chinook and stock 18 and stock 151.

12.2) Cooperating and funding agencies.

- Oregon Department of Fish & Wildlife
- U.S. Section, Chinook Technical Committee Project
- National Oceanic and Atmospheric Administration Awards
- Umpqua Fishermen's Association
- Gardiner-Reedsport-Winchester Bay STEP
- Umpqua Fishery Enhancement Derby
- Douglas County
- 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.

Laura Jackson, District Biologist ODFW
Greg Huchko, STEP Biologist ODFW
Brian Riggers, Corvallis Research ODFW
ODFW Umpqua Watershed Fish Staff

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

No other naturally-produced fish stocks in the Umpqua basin are ESA listed.

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

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

Program fall chinook snouts will be collected from various locations along the Umpqua River where anglers are instructed to remove the snout and place it into a barrel. These snouts will be scanned for CWT tags and will help better determine the survival of program fish. In addition to the snout collection project, voluntary creel cards are located near the barrels for anglers to fill out. This creel information will provide further insight to catch rates of program fish.

ODFW tagging trailers use seasonal finclippers and/or volunteers to tag and mark the fish. MS222 is used on the fish prior to marking. Three weeks after marking, at least 500 fish are tested for size, mark accuracy and CWT retention. This is done only on program fish prior to release.
To otolith mark fish, the program fish would either have to have their incubation water warmed and chilled at regular intervals, or be dipped in an oxytetracycline solution. This would only be done to program fish prior to release.

To conduct genetic 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 paper punch sized 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.

- The Fall Chinook Escapement Study used tangle nets in the lower Umpqua in July, August, and September prior to the arrival of significant numbers of coho.
- The trap at Happy Valley will be operational from September through early November. Lower mainstem traps (Mill Creek, Paradise Creek) will be operated from October to early December.
- Spawning ground surveys take place from October - December.
- Smolt traps would be operated from March - June.

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 in Section 5.1. 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 use to slow the fish down for handling.

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

Incidental mortality of fall Chinook during radio tagging is expected to be 3 - 5%. External marking (floy tag, maxillary, and tissue punch) or genetic tissue sampling requires less handling than radio tagging and likely has less mortality. If tangle nets are used, some descaling and line abrasions may occur. Mortality may occur, but is estimated at less than 10% 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 hooking damage may occur to the mouth. Hook-and-line methods used for a steelhead radio telemetry study noted less than 10% hooking mortality of marked fish. No mortality is expected while otolith-marking program fish. Take of listed coho during research projects would be even less than fall Chinook since handling would be reduced or avoided.

12.9) 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 attached "take table" (page 46).

12.10) Alternative methods to achieve project objectives.

The South Umpqua was used as a Pacific Salmon Treaty study area from 1999-2004. It is currently being considered as an index stream and therefore helicopter counts and some scale collection occurs to monitor the population and age class distribution.

- 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 is necessary for mark-recapture population estimates, there would be no alternative that would satisfy this condition.

- Funds could be saved and more program fish could be marked if fall Chinook could be adipose clipped without having a CWT inserted.

- There is no alternative to genetic sampling. Currently the program relies on morphological and behavioral characteristics to note similarities/differences between natural and program Chinook.

12.11) List species similar or related to the threatened species; provide number and causes of

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 for trapping activities will occur before large numbers of coho are present. Adjust or discontinue trapping techniques when listed coho begin to get captured.

SECTION 13. ATTACHMENTS AND CITATIONS

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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: Michael Gray, Umpqua Watershed District Manager

Signature: _____Date:_____

Certified by: John Thorpe, Fish Propagation Program Manager

Signature: _____Date:_____

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

Listed species affected: Coho ESU/Population: Oregon Coast Coho Activity: Fall Chinook Propagation				
Location of hatchery activity: Calapooya Creek Dates of activity:_09/01-12/01 Annually_____ Hatchery program operator: Umpqua Watershed District STEP program				
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	500	500
Collect for transport b)	0	0	0	0
Capture, handle, and release c)	0	5,000	1,000	0
Capture, handle, tag/mark/tissue sample, & release d)	0	0	0	0
Removal (e.g. broodstock) e)	0	0	20	0
Intentional lethal take f)	0	0	0	0
Unintentional lethal take g)	0	50	25	0
Other Take (specify) h)	0	1	1	0

a. Contact with listed fish through spawning surveys in target basins to determine return of program fish.
b. Take associated with weir or trapping operations where listed fish are captured and transported for release.
c. Take associated with brood collection operations where listed fish are captured, handled and released upstream or downstream.
d. Take occurring due to tagging and/or bio sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.
e. Listed fish removed from the wild and collected for use as broodstock. Broodstock collection under the Coho HGMP.
f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.
g. Unintentional mortality of listed fish, including loss of fish during smolt trapping and potential during adult trapping efforts.
h. Other takes not identified above as a category.

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.*