

HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:

Elk River Fall Chinook Salmon Program

**Species or
Hatchery Stock:**

Fall Chinook (Stock 35)

Agency/Operator:

Oregon Department of Fish and Wildlife

Watershed and Region:

Rogue Watershed-Southwest Region

**Date Submitted:
First Update Submitted:
Second Update Submitted:**

**January 5, 2006
September 8, 2014
June 7, 2016**

Date Last Updated:

June 7, 2016

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Elk River Fish Hatchery, Fall Chinook Salmon Program

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

Fall Chinook Salmon *Oncorhynchus tshawytscha*, Elk River Hatchery stock 35. ESA status: Not listed.

1.3) Responsible organization and individuals

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

Elk River Fish Hatchery is funded by the State of Oregon's General Fund. Four permanent employees operate the facility full time. Annual operational cost for the facility is approximately \$330,000. Of this amount, the annual Elk River fall Chinook program costs approximately \$145,000.

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

Elk River Hatchery is located in Oregon on Elk River at Rkm 22.5 in Elk River Basin. Elk River Hatchery is at latitude 42° 44.322' N and longitude 124° 24.191' W. The hatchery area is 13.2 acres. Broodstock collection, holding, spawning, rearing and release take place at this location. The regional mark processing code for this hatchery facility is: 5F22209 H9 21. Water body code for Elk River is 1700130000.

1.6) Type of program.

The Elk River fall Chinook program is an Isolated Harvest Program.

1.7) Purpose (Goal) of program.

The goal of the Elk River fall Chinook Program is to provide fish for commercial and sport fishing harvest, while minimizing any potential adverse impacts to the wild population of this species or other species.

1.8) Justification for the program.

This program provides adult Chinook salmon for ocean commercial and recreational fisheries and the recreational fishery on Elk River. Maintaining these and other fisheries directed at unlisted species supports economic and cultural values associated with historic salmon fisheries while reducing social pressures to increase fisheries directed at listed species. Another justification is that the program is also designed to educate students and increase public awareness about salmon biology, its critical life stages and special habitat requirements, through the STEP program. The program minimizes indirect impacts to listed species through brood collection techniques and rearing and release strategies.

Brood Collection:

A passive trap is located at the downstream end of the Elk River Hatchery site. Migrating fish enter voluntarily and progress up the ladder until trapped. A portion of the hatchery fall Chinook smolt production is reared for use as metabolic attractant to increase capture of hatchery origin fall Chinook adults. Brood fish are collected throughout the run to maintain the genetic diversity of the population, and only Elk River Fall Chinook (hatchery and wild) are used for broodstock. Current levels of wild fall Chinook incorporated into the brood are below 10%. Proposed improvements in broodstock hatchery to wild composition may include ODFW staff and STEP volunteers collecting wild Elk River fall Chinook in the mainstem by tangle net. Daily tangle netting will cease if more than two Coho are captured.

Rearing and Release Strategies:

Rearing and release strategies minimize the ecological interactions between hatchery and naturally produced fish. Fish are reared to a size sufficient to transform 98-100% of the entire population into smolt stage, reducing retention time during seaward migration. Smolts are mass marked with an adipose fin-clip, beginning with 2007 release, allowing

for the implementation of mark selective fishery regulations, improved monitoring for stray rates, and improved broodstock selection. Smolts are released from mid September to mid November, after most of the wild population has migrated out of the system.

Juvenile Coho may be present in the lower main-stem/estuary but it is expected that most juvenile Coho are rearing in tributary streams when hatchery produced fall Chinook smolts are released. Any naturally produced juvenile Coho rearing in the lower main-stem/estuary of the Chetco at the time of smolt release may be subject to competition with hatchery produced fall Chinook Salmon smolts.

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

Benefits Performance Standards	Benefits Performance Indicators	Benefits Monitoring & Evaluation
<ul style="list-style-type: none"> • Hatchery-produced adult Chinook meets production goal for harvest. • All hatchery-produced fish are identifiable. 	<ul style="list-style-type: none"> • Program fish contribute to ocean and freshwater fisheries. • One hundred percent of Chinook smolts are adipose fin-clipped (beginning with the 2007 release). Up to 100% of Chinook smolts are coded wire-tagged (minimum 70%). 	<ul style="list-style-type: none"> • Annual abundance estimates and harvest rates of adult hatchery fall Chinook. • Annual CWT retention check to confirm mark rate.
<ul style="list-style-type: none"> • Produce a healthy population of fall Chinook. 	<ul style="list-style-type: none"> • Release groups will meet ODFW fish health standards. • Release timing and size of release will mimic naturally produced fall Chinook, except that release will occur after most of the wild population has migrated out of the system. 	<ul style="list-style-type: none"> • Conduct appropriate health checks throughout incubation, rearing and release. • Document size and age of program fish prior to release.
<ul style="list-style-type: none"> • The fall Chinook hatchery program will meet criteria provided by the Native Fish Conservation Policy. 	<ul style="list-style-type: none"> • A Conservation Plan for the Species Management Unit (SMU) was adopted June 2014. 	<ul style="list-style-type: none"> • Assess stock status and risks.

1.9) (cont'd) List of program “Performance Standards” and 1.10) Performance Indicators addressing benefits (1.10.1) and risks (1.10.2)

Risks Performance Standards	Risks Performance Indicators	Risks Monitoring &Evaluation
<ul style="list-style-type: none"> • Life history characteristics of hatchery Chinook will not diverge significantly from naturally produced fall Chinook. 	<ul style="list-style-type: none"> • Release of program fish mimic the emigration of naturally produced Chinook, except that release will occur after most of the wild population has migrated out of the system. Program fish are released in the mainstem at river mile 13 at a time when most juvenile coho salmon are rearing in tributaries. • Behavioral and morphological characteristics of program fish are similar to naturally produced fall Chinook. • Broodstock collection reflects the run timing and age classes represented in the natural population (including late-run Chinook). • Adequately represent age 4-6 Chinook in the broodstock. 	<ul style="list-style-type: none"> • Downstream monitoring techniques will evaluate juvenile emigration timing and their size. • The fish ladder will remain open throughout the fall Chinook run. • In-season broodstock collection records by District staff

1.9) (cont'd) List of program “Performance Standards” and 1.10) Performance Indicators addressing benefits (1.10.1) and risks (1.10.2)

Risks Performance Standards	Risks Performance Indicators	Risks Monitoring &Evaluation
<ul style="list-style-type: none"> Minimize interactions between hatchery and wild Chinook in natural spawning areas (pHOS goal = 30%) 	<ul style="list-style-type: none"> Remove hatchery Chinook from Rock and Anvil creeks through the use of weirs. Improve ladder outlet (for attraction). Implement additional attractant options (increased ladder flow, chemical attractant). 	<ul style="list-style-type: none"> Annual carcass counts to document pHOS.
<ul style="list-style-type: none"> Release timing of hatchery-produced fall Chinook smolts will have minimal impact on listed Coho salmon. 	<ul style="list-style-type: none"> Program fish are released so that spatial and temporal differences in habitat utilization will minimize impacts on juvenile Coho rearing in the upper watershed. 	<ul style="list-style-type: none"> Release timing and locations will be recorded.
<ul style="list-style-type: none"> Hatchery operations comply with the Fish Hatchery Policy and other state and federal guidelines and permits. 	<ul style="list-style-type: none"> Hatchery operations conform to applicable fish health, sanitation, and operational guidelines. <p>Hatchery operations conform to DEQ/NPDES guidelines for water quality.</p> <ul style="list-style-type: none"> Facility intakes are screened appropriately. 	<ul style="list-style-type: none"> Fish health is certified prior to release. Appropriate protocols will be followed for monitoring water quality. Screens will be checked on a regular basis.
<ul style="list-style-type: none"> Broodstock collection will have minimal impact on Coho Salmon. 	<ul style="list-style-type: none"> Maintain passive collection device. Remove wild Coho from trap and return to Elk River. Tangle netting operations on the mainstem will be suspended for the day if more than two Coho are captured. 	<ul style="list-style-type: none"> Record the date and number of Coho captured in the trap or tangle net. Check trap daily and record the number of Chinook used for brood.

1.11) Expected size of program.

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

Elk River Hatchery operates a fish ladder to collect returning adult fall Chinook Salmon. The ladder is a passive collection device. The highest recorded collection at the site is 4,000 adult fish. Only fish returning to the ladder are used for broodstock. To introduce more wild fish into the broodstock, mainstem collection of up to 300 wild fall Chinook may be utilized.

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

Life Stage	Release Location	Annual Release Level
Unfed Fry	Elk River (STEP)	700
	Euchre Creek (STEP)	10,000
Unfed Fry	Garrison Lake (surplus to needs of smolt program)	240,000
Fry	None	
Fingerling	None	
Yearling	Elk River	275,000, implemented beginning with 2015 release

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

Table 1. Estimated freshwater escapement of hatchery-origin fall Chinook Salmon to Elk River.

Run Year	Smolt Release	# Ad+CWT	Estimated Escapement of Hatchery Chinook
1991	354,314	175,617	2,560
1992	293,246	157,395	2,601
1993	329,366	190,921	2,451
1994	334,078	187,215	2,395
1995	337,189	194,243	4,757
1996	333,879	174,479	3,341
1997	332,200	175,967	3,242
1998	341,461	189,194	5,311
1999	363,367	193,648	7,992
2000	340,441	198,583	5,362
2001	340,153	198,756	12,117
2002	322,709	210,491	9,577
2003	332,873	215,361	5,602
2004	323,584	207,925	6,824
2005	322,446	222,789	2,086
2006	326,965	207,128	2,579
2007	328,893	111,415	2,291
2008	369,634	53,022	7,439
2009	357,160	27,182	6,926
2010	327,519	215,167	13,344
2011	324,234	311,130	6,253
2012	332,825	323,328	5,176

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

Elk River Hatchery program began in 1968 with the collection of fall Chinook broodstock. The first smolts were released in 1969.

1.14) Expected duration of program.

The program is expected to continue on a yearly basis, depending on management objectives of the watershed.

1.15) Watersheds targeted by program.

The program is targeted for the Elk River watershed.

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

1. Elk River fall Chinook hatchery program and ESA listed Coho.

Issue 1: Straying

Straying of hatchery produced fish is a concern. Spawning ground surveys suggest that Chinook and Coho spawn in similar tributary locations and at the same time. The increased abundance of naturally spawning fall Chinook, due to the large number of hatchery produced fall Chinook in the natural spawning population, may result in increased competition between Coho and fall Chinook for spawning habitat.

Steps taken to reduce the proportion of hatchery produced fall Chinook in the natural spawning population (pHOS) are expected to also benefit Coho Salmon. Generally, pHOS averages 51% annually (Table 1.16. ODFW unpublished data). Actions identified to reduce pHOS to <30% include reducing production from 325,000 to 275,000 smolts, altering ladder operation, flow, and outlet; and the use of chemical attractants to improve homing; the use of surface flow (rather than well water) during incubation to improve imprinting; implementing mark selective angling regulations to increase harvest of hatchery produced fall Chinook; and trapping and removing returning adults from Rock and Anvil creeks. Fall Chinook production will be further reduced if pHOS goals are not met by 2021.

Removing strays from Rock and Anvil creek is intended to be a short term (several years) action to be implemented while exploring the efficacy of improving homing back to Elk River Hatchery. Wild Coho may be encountered during trapping operations on Rock and Anvil creeks. Coho will be collected from the traps and passed upstream to spawn naturally. Trapping, handling, and delayed migration may result in elevated prespawning mortality of any adult Coho trapped.

Table 1.16. Estimated escapement of adult fall Chinook to the natural spawning grounds in Elk River and proportion of hatchery-origin fall Chinook on natural spawning grounds (pHOS), 2000 - 2015.

Return Year	Wild Escapement	Hatchery Escapement	pHOS
2000	1,911	1,539	45%
2001	1,686	5,236	76%
2002	1,660	5,394	76%
2003	1,523	2,424	61%
2004	2,177	4,222	66%
2005	1,446	496	26%
2006	1,761	885	33%
2007	1,165	360	24%
2008	1,534	2,934	66%
2009	1,859	2,733	60%
2010	2,162	7,466	78%
2011	1,945	2,302	54%
2012	1,913	1,302	40%
2013	1,807	2,158	54%
2014	1,945	849	30%
2015	2,519	1,172	32%

Issue 2: Release Strategies

Release of program fish affects the lower 13 miles of the Elk River main-stem. While juvenile Coho may be present in the lower main-stem/estuary it is expected that most juvenile Coho are rearing in tributary streams when hatchery produced fall Chinook smolts are released. Any naturally produced juvenile Coho rearing in the lower main-stem/estuary of the Elk at the time of smolt release may be subject to competition with hatchery produced fall Chinook smolts.

Issue 3: Broodstock collection

ESA-listed Coho may enter the trap during fall Chinook broodstock collections. Wild Coho may be encountered during tangle netting in the lower mainstem. Daily tangle netting will cease if more than two Coho are captured.

1.16.2) Potential alternatives to current program.

Alternative 1: Terminate Elk River Fall Chinook Salmon Hatchery Program

Pros: This may eliminate potential risks to listed Coho due to interactions with hatchery fall Chinook in the Elk River Watershed and eliminate incidental take of Coho during broodstock collections.

Cons: This action will eliminate the valuable commercial and recreational fisheries. Elk River could no longer be utilized as an Exploitation Rate Indicator stock for Oregon mid-

coastal wild stock aggregate of Chinook.

Alternative 2: Reduce Number of Hatchery Fall Chinook Smolts Released in Elk River.

Pros: This alternative will reduce potential risks to listed Coho due to interaction with hatchery fall Chinook and reduce incidental take of Coho during broodstock collections.

Cons: It will reduce hatchery Chinook available for commercial and recreational fisheries, and possibly reduce or eliminate the Port Orford terminal fishery.

Potential Reforms and Investments

Reform/Investment 1: Purchase liberation truck for broodstock collection and smolt releases. Presently Elk River Hatchery has limited use of a liberation truck and the proposed collection of additional wild broodstock will be limited to a small transport tank. Tangle netting in the mainstem may result in more Chinook captured than a small transport tank can carry. By having to release these Chinook the result may be additional tangle net sets with the increased likelihood of encountering listed Coho. Collecting additional wild broodstock in the lower mainstem will require a transport truck on a regular basis. The cost of purchasing a liberation truck is estimated at \$120,000.

Reform/Investment 2: Increase Ad-CWT marking to 100%. Marking of 100% smolts would allow the ODFW to liberalize the harvest of hatchery fall Chinook with the intent of reducing the number of hatchery fall Chinook interacting with wild fall Chinook on the spawning grounds. Also, a 100% mark would improve the efficiency of broodstock collection activities which should reduce the likelihood of encountering listed Coho during tangle-netting operations. Cost = \$15,000 annually.

Smolts are mass marked with an adipose fin-clip, beginning with 2007 release, allowing for the implementation of mark selective fishery regulations, improved monitoring for stray rates, and improved broodstock selection.

Reform/Investment 3: Construct additional employee residence. Construction of a new residence on the hatchery grounds will add an additional employee able to respond to an emergency. Emergencies that may affect listed fish include: loss of water pressure which would result in the early release of fall Chinook smolts into the watershed, and de-water ladder and trap at a time when Coho could be present. Cost = \$150,000.

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

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

The HGMP for this fall Chinook hatchery program was submitted to NMFS on 01/05/2006 for ESA permit or take authorization. This is an updated version of the HGMP submitted in 2006.

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

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

Southern Oregon/Northern California Coast (SONCC) Coho Salmon are listed as threatened and the Elk Coho population may be affected by this Chinook propagation program.

Coho Salmon Life History

Final Recovery Plan for the Southern Oregon/Northern California Coast Evolutionarily Significant Unit of Coho Salmon (NOAA Fisheries, 2014) states:

- Adult Coho Salmon were found in Anvil, Indian, Butler, and Red Cedar creeks as well as the main-stem Elk River between Sunshine Creek and Red Cedar Creek. Juvenile Coho Salmon were found in Panther, Red Cedar, Swamp, Cedar, and Blackberry creeks as well as the middle main-stem Elk River. USFS (1998a) identified Red Cedar, the North Fork Elk, Panther Creek, and Anvil Creeks as those most important for Coho Salmon production, as they appeared to account for most coho salmon production in the basin.).
- The Expert Panel stated Key concerns were primarily loss of over-winter tributary and freshwater estuarine habitat complexity and floodplain connectivity for juveniles, especially in the lowlands which are naturally limited in this system and have been impacted by past and current agricultural practices (ODFW 2008b).
- The Elk River population is at high risk of extinction because NMFS estimates the ratio of the three consecutive years of lowest abundance within the last twelve years to the amount of IP-km in a watershed is less than one, the criterion described by Williams et al. (2008).

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

This is a fall Chinook hatchery program, and no direct take of ESA listed SONCC Coho Salmon is expected to occur due to this program.

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

The ESA listed Elk River population of SONCC Coho Salmon may be incidentally affected by the program during fall Chinook brood collection. Also, there may be indirect effects of the program fish on listed natural Coho eggs, fry and adults through competitive interactions for food, space, and predations.

2.2.2) Status of NMFS ESA-listed salmonid population(s) affected by the program.

- Describe the status of the listed natural population(s) relative to “critical” and “viable” population thresholds (see definitions in “Attachment 1”).

Final Recovery Plan for the Southern Oregon/Northern California Coast Evolutionarily Significant Unit of Coho Salmon (NOAA Fisheries, 2014) identifies the Elk River Coho population as a Core, Functionally Independent Population with a High Extinction Risk and an ESU viability recovery goal of 2,400 adults for the Elk River population. Key limiting stresses are identified as ‘Lack of Floodplain and Channel Structure’ and ‘Impaired Water Quality’.

- Provide the most recent 12 year (e.g. 1988-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.

Not enough data is available to determine measures of productivity for the listed natural population.

- Provide the most recent 12 year (e.g. 1988-1999) annual spawning abundance estimates, or any other abundance information. Indicate the source of these data.

Coho Salmon are not routinely monitored in Elk River watershed. Coho are occasionally observed on fall Chinook Salmon surveys. In addition, between 1998 and 2007 stream reaches in Elk River Watershed were occasionally selected as random Coho spawner surveys. Based on standard fall Chinook + random Coho spawning surveys the estimated wild adult spawner abundance has ranged from 18 to a high of 615 in 2015 (Table 2, ODFW unpublished data).

Juvenile Coho are occasionally observed during sampling by seining and visual surveys and these are listed in Table 3 (Jepsen 2005). Presently, not enough information is available to adequately describe juvenile seeding.

Table 2. Estimated spawning escapement of Coho Salmon to the Elk River Watershed based on randomly selected Coho spawning surveys and standard Chinook Salmon surveys, 1995-2015.

Adult Coho Spawner Abundance						
Return Year	Number of surveys	Survey (Km)	Peak Count	Estimated escapement	Proportion of spawners w/o fin clips	Estimated escapement of unmarked adults
1995	6	9.16	6	148	1	148
1996	7	9.96	1	23	1	23
1997	6	9.16	1	25	1	25
1998	6	9.16	1	25	1	25
1999	8	12.70	1	18	1	18
2000	7	11.57	1	19	1	19
2001	6	9.64	12	281	0.600	168
2002	8	12.70	23	409	0.942	385
2003	9	13.50	17	284	1	284
2004	9	13.50	17	284	1	284
2005	9	13.50	9	150	1	150
2006	8	12.70	27	480	0.952	456
2007	9	13.50	11	184	1	184
2008	8	12.70	7	124	1	124
2009	9	13.50	36	602	1	602
2010	9	13.50	6	100	1	100
2011	9	13.50	23	384	1	384
2012	9	13.50	11	184	1	184
2013	6	9.16	21	517	1	517
2014	6	9.16	17	419	1	419
2015	6	9.16	25	616	1	616

Table 3. Western Oregon Rearing Project Abundance Monitoring of Juvenile Salmonids, Elk River snorkel survey data, 2002-2004.

Year	Snorkel Survey Site #	Location	Distance (RM) from Hatchery Release Site	Number of pools sampled for occurrence/density	% of pools containing juvenile Coho	Juvenile Coho density (fish/m ²)
2002	1616	Mainstem	7.5 dnstream	5/5	0	0.00
2002	1624	Mainstem	0.7 dnstream	4/4	0	0.00
2002	1628	Mainstem	8.5 upstream	10/10	0	0.00
2002	1651	Mainstem	0.5 upstream	3/3	0	0.00
2002	1643	Mainstem	9.9 upstream	8/8	0	0.00
2002	1632	Mainstem	13.2 dnstream	3/3	0	0.00
2003	1614	S.F. Elk River	20.6 upstream	21/21	0	0.00
2003	1616	Mainstem	7.5 dnstream	8/8	0	0.00
2003	1628	Mainstem	8.5 upstream	7/7	0	0.00
2003	1630	Mainstem	11.9 upstream	11/11	9.1	0.007
2003	1632	Mainstem	13.2 dnstream	7/7	0	0.00
2003	1643	Mainstem	9.9 upstream	8/8	0	0.00
2003	1624	Mainstem	0.7 dnstream	6/5	16.7	0.00
2004	1651	Mainstem	0.5 upstream	7/7	28.6	0.001
2004	1659	Panther Cr.	14.6 upstream	16/16	12.5	0.005
2004	1667	Mainstem	9.6 dnstream	8/8	50.0	0.059
2004	1675	Mainstem	5.8 upstream	10/10	0	0.000
2004	378	Blackberry Cr.	19.1 upstream	39/39	25.6	0.017
2004	418	Red Cedar Cr.	9.3 upstream	11/11	9.1	0.001

- Provide the most recent 12 year (e.g. 1988-1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.

Table 2 provides the best estimates of the proportions of hatchery-origin and listed natural-origin Coho Salmon on natural spawning grounds and Table 1.16 provides the estimated proportion of hatchery-origin and natural-origin fall Chinook on natural spawning grounds.

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

- Describe hatchery activities that may lead to the 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.

Fish Propagation:

Final Recovery Plan for the Southern Oregon/Northern California Coast Evolutionarily Significant Unit of Coho Salmon (NOAA Fisheries, 2014) identifies ‘Impaired Water Quality’ as a key limiting stress for Elk River Coho. Hatchery operations may impact water quality. Any measurable impacts to water quality would most likely occur during the summer low flow period, when water use is highest. The water quality parameter most likely impacted by hatchery operations is water temperature. Hatchery operations may affect the rearing and growth of juvenile Coho rearing in the Elk River main-stem downstream of Elk River Hatchery if operations increase water temperature.

Elk River Hatchery operations comply with the National Pollutant Discharge Elimination System (NPDES) general permit 300J issued by the Oregon Department of Environmental Quality (DEQ). Beginning April 2016 temperature loggers have been deployed for monitoring effluent and ambient stream temperatures in order to evaluate the effects of hatchery operations on water temperature. Monitoring will continue through October 2016. Loggers will be deployed in subsequent years as necessary to complete the evaluation.

Fall Chinook Broodstock Collection:

ODFW staff and volunteers may encounter up to 10 adult Coho while tangle netting on the lower mainstem. Tangle netting will cease for the day if more than two wild Coho are caught in the net. Indirect mortality is expected to be up to 3 adult Coho.

Adult Chinook are collected from an off-channel ladder and trap located at the downstream end of Elk River Hatchery. Adult Coho occasionally enter the trap and are released unharmed back to the Elk River. In an effort to track adult Coho that enter the Elk River Hatchery ladder, all Coho will be double floy tagged before being returned to Elk River. Marking the Coho will serve two purposes: 1) Coho that return a second time to the ladder will not be counted twice; and 2) a mark and recapture population estimate can be generated from marked and unmarked Coho recovered on spawning ground surveys. To minimize any potential impacts, Coho will not be anesthetized. All Coho netted in the ladder will be left in the water while marking. Once marked, Coho will be placed in a rubber boot with water for transfer back to Elk River. Expected take is up to 125 adult Coho per year but will vary annually; similar to what is described in Table 5. Indirect mortality is expected to be 6 adult Coho.

Beginning 2014 it is anticipated that temporary weirs and collection facilities will be operated on Anvil Creek and Rock Creek in order to collect stray hatchery-produced fall Chinook. Weirs likely will be operated between approximately November 15 and January 31. Adult Coho are likely to be collected at the weirs. All Coho collected at the weirs will be passed upstream. Expected take is approximately 10 Coho per year. Indirect mortality due to trapping, handling, and delayed migration is expected to be 3 adult Coho.

Smolt Release to Elk River:

Smolt releases likely have minimal impact on juvenile Coho rearing and migration because few juvenile Coho are likely to be present within the lower 13 miles of the Elk River mainstem at the time of smolt release.

Juvenile Coho Salmon may be present in the lower main-stem/estuary but it is expected that most juvenile Coho are rearing in tributary streams when hatchery produced fall Chinook smolts are released. Any naturally produced juvenile Coho rearing in the lower main-stem/estuary of the Elk at the time of smolt release may be subject to competition with hatchery produced fall Chinook smolts.

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

Adult listed Coho Salmon occasionally enter the brood collection trap and are released unharmed back into the Elk River. Some Coho may have reentered the ladder and been counted twice. One direct mortality occurred in 2013 (Table 5). Tangle netting has not yet been utilized. Tributary weirs were utilized in 2015.

Table 5. Data of listed adult Coho Salmon capture and injury/mortality in the Elk River hatchery trap, 1993-2013.

Brood Year	Males	Females	Jacks	Injured/Mortality
1993	0	0	0	0/0
1994	5	3	5	0/0
1995	4	1	1	0/0
1996	4	0	1	0/0
1997	11	3	1	0/0
1998	3	2	0	0/0
1999	11	8	4	0/0
2000	24	7	17	0/0
2001	57	68	7	0/0
2002	26	21	9	0/0
2003	15	5	10	0/0
2004	10	8	2	0/0
2005	5	2	5	0/0
2006	17	10	2	0/0
2007	3	1	2	0/0
2008	5	4	9	0/0

2009	10	2	0	0/0
2010	2	1	0	0/0
2011	7	1	1	0/0
2012	20	9	9	0/0
2013	19	12	7	0/1

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

Up to 145 adult Coho may be handled and released during fall Chinook broodstock collection and operation of tributary weirs. Approximately 125 adult coho may be handled and released at the Elk River Hatchery trap. In addition, approximately 10 adult Coho may be handled and released during fall Chinook brood collection while using tangle nets and approximately 10 adult coho may be handled and released during the operation of tributary weirs to collect stray hatchery-produced fall Chinook. Mortality of up to 12 adult Coho is expected.

- 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.

Options include:

1. Request an increased take limit to observe/handle/release.
1. Discontinue tangle netting of fall Chinook as take limits are reached.
2. Discontinue trapping operations on tributaries.
3. Discontinue trapping of fall Chinook at Elk River Hatchery trap as take limits are reached.

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.**

Oregon Plan for Salmon and Watersheds: This is a prescriptive set of measures for recovering salmon and steelhead populations and habitats, and meeting federal water quality standards, established by Executive Order of the Governor. The Oregon Plan includes measures linked to the hatchery production of Coho salmon in the Elk River Basin including nutrient enrichment, and monitoring hatchery and wild runs. While

many of the particular measures in the OPSW make reference to a particular species, the measures are broadly applicable to all salmonids.

ODFW 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.

Coastal Multi-Species Conservation and Management Plan: Adopted by the Oregon Fish and Wildlife Commission in June 2014, the plan guides management to ensure the conservation of Oregon Coast fall Chinook stocks and provides guidance for hatchery programs with the Coastal SMU.

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

- 1) US-Canada Salmon Treaty. Chinook stock would be used as an Exploitation Rate Indicator stock for Oregon mid coastal wild stock aggregate of Chinook.
- 2) ODFW Fish Hatchery Management Policy, adopted 2003.
- 3) ODFW Fish Health Management Policy.
- 4) National Pollutant Discharge Elimination Permit.
- 5) DEQ Memorandum of Agreement regarding fish carcass distribution in Oregon streams.
- 6) ODFW Native Fish Conservation Policy, adopted 2002.
- 7) ODFW Chinook Plan, adopted 1991.
- 8) ODFW Coastal Multi-Species Conservation and Management Plan, adopted June 2014.

3.3) Relationship to harvest objectives.

Chinook smolts are released directly from the hatchery facility. The hatchery program emphasizes release of full term smolts, rather than presmolts or fry that will expedite migration and minimize the potential for competition between hatchery and wild juveniles in the Elk River basin. Adult hatchery Chinook returning to Elk River are intended to remain below the hatchery to provide anglers with an opportunity to harvest the fish. The upper river is closed to fishing from Bald Mountain Creek upstream to the headwaters.

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.

This program provides adult Chinook Salmon for ocean commercial and recreational fisheries and the recreational fishery on Elk River (Tables 6, 7, 8).

Table 6. Total return of adult hatchery-origin fall Chinook Salmon to the Elk River and estimates of freshwater harvest and harvest rates (1992-2012).

Run Year	Adult Hatchery Chinook Freshwater Escapement	Adult Hatchery Chinook Estimated Freshwater Harvest	Estimated Harvest Rate
1992	2,601	410	22.2%
1993	2,451	307	18.1%
1994	2,395	435	26.4%
1995	4,757	806	23.4%
1996	3,341	461	17.2%
1997	3,242	804	31.4%
1998	5,311	1161	22.7%
1999	7,992	1353	20.6%
2000	5,362	1378	32.1%
2001	12,117	2210	20.3%
2002	9,577	1201	14.7%
2003	5,602	1569	29.6%
2004	6,824	859	13.6%
2005	2,086	449	23.2%
2006	2,579	349	16.8%
2007	2,291	691	33.8%
2008	7,439	1340	23.9%
2009	6,926	1375	21.8%
2010	13,344	1593	13.5%
2011	6,253	1516	29.0%
2012	5,176	1039	20.8%

Table 7. Summary of estimated catch of Elk River hatchery fall Chinook by run year in the Port Orford Terminal Fishery from week 42-52, during 1992-2013.

Run Year	Estimated Port Orford Catch
1992	380
1993	644
1994	371
1995	112
1996	997
1997	616
1998	900
1999	1,255
2000	1,747
2001	1,085
2002	1,445
2003	1,169
2004	2,184
2004	1,056
2006	896
2007	621
2008	208
2009	293
2010	1,315
2011	1,961
2012	636
2013	1,196

Table 8. Elk River fall Chinook Average Ocean Recovery* for the last ten complete brood years, 1988-1997. AK= Alaska, NCBC= North Central British Columbia, WCVI = West Coast Vancouver Island, WA = Washington Coast. Release area is underlined.

Stock Group	AK	NCBC	WCVI	WA	Oregon Ocean Catch Area		
					3	4	5
Elk River	0.13	0.05	0.04	0.02	0.01	0.08	<u>0.31</u>

*Percent recovery by area is calculated as (total estimated recoveries in an area/number of tagged fish released)*100.

The large percentage of recovery of Elk River stock fall Chinook in Oregon area 5 is an artifact of a late season ocean fishery near the mouth of the Elk River, targeting returning hatchery fish.

3.4) Relationship to habitat protection and recovery strategies.

Major factors affecting natural production include spawning habitat, rearing habitat, ocean conditions, predation, water flows, water quality, and climatic conditions. The Oregon Plan for Salmon and Watersheds lays out measures to be followed by all state agencies including habitat protection, restoration, harvest, and hatchery refinement measures, by Oregon Department of Fish and Wildlife; forest practices revisions by Oregon Department of Forestry; water quality protection by Department of Environment Quality; diversion monitoring by Water Resources Division, and Senate Bill 1010 implementation by Department of Agriculture; all of which are designed to protect and improve salmonid habitat. The Elk River fall Chinook program is consistent with these habitat protection and recovery strategies.

3.5) Ecological interactions.

(1) Species that could negatively impact program.

Predation by Coastal Cutthroat Trout could negatively impact migrating Chinook smolts. Predation by otters, harbor seals, sea lions and raccoons could impact the program. Predation by blue herons, king fishers, mergansers, cormorants, and gulls may impact the program.

(2) Species that could be negatively impacted by program.

Listed (Coho) and candidate (Steelhead, Cutthroat) salmonids may be negatively impacted by the program due to competition for food and space, but impacts are expected to be minimal due to competitive exclusion, spatial and temporal differences in habitat utilization, and relative size of juvenile Chinook compared to juvenile listed/candidate species.

(3) Species that could positively impact program.

Any fish (Coho, Chinook, Steelhead) that dies (or is recycled for nutrient enrichment) in the basin may positively impact the program.

(4) Species that could be positively impacted by the program.

Aquatic species (salmonids, other fish, mammals, birds, etc.) that depend directly or indirectly on salmonids for food and nutrient supply could be positively impacted by the program. Hatchery production has potential for significant influence on predator-prey relationships and community ecology during periods of low natural productivity.

SECTION 4. WATER SOURCE

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

Water source for Elk River Hatchery rearing ponds and adult collection is approximately 5-20 cfs of pumped surface water based on seasonal use from the mainstem Elk River. The hatchery intake is equipped with NMFS compliant perforated plate screens. Water quality is generally excellent with low turbidity, incoming dissolved oxygen at approximately 9 ppm and a seasonal temperature range of 42-72 °F. At current levels of production no limitations are anticipated. Water rights for this source are listed with ODFW Certificate #54007. All pumped water used for fish production is discharged at the hatchery outlet to the mainstem Elk River. Effluent discharged to the mainstem is monitored and reported as per NPDES General Permit 300J issued by Oregon DEQ. Elk River Hatchery remains in compliance with DEQ's NPDES permit water quality standards. Although low flows can occur in late summer of drought years, water supplies are more than sufficient. Program goals are met easily, and oxygen supplementation and pond recirculation are not required.

Water source for incubation of eggs and fry is approximately 300 gpm from a subsurface well, which provides filtered river water to the hatch house. Water quality is generally excellent with no turbidity, incoming dissolved oxygen at approximately 10-11 ppm and a seasonal (November – May) temperature range of 48-52 °F. At current production levels no limitations are anticipated. Water rights for this source are listed with ODFW Certificate #60600. The facility is in compliance with the water rights, water uses, and reporting to Oregon Department of Water Resource.

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.

Elk River Hatchery intake is equipped with NMFS specified perforated aluminum panels (3/32" slotted openings April – October and 1/8" slotted openings November – March). Screened area of the intake vault is sufficient to prevent excessive approach velocity on the river side of the screens. Screen openings are sufficiently small to exclude listed Coho juveniles. Discharged effluent limits are not exceeded, and quarterly discharge sampling results are monitored and reported to DEQ as per NPDES permit 300J.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

No barrier exists to divert adults into the trap. Adult Elk River fall Chinook are collected on site by a 6' x 95' "L"-shaped fish ladder which leads to a 6' x 2' horizontal bar trap. Adults jump over the trap into a 6' x 60' x 4' collection alley. Mainstem tangle netting may be utilized in an effort to introduce additional wild broodstock into the program.

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

An insulated 150-gallon pickup driven slip tank with agitation and oxygen supplementation is used for transport of unfed fry. An insulated, chassis mounted, 1,800-gallon tank with agitation, oxygen supplementation, recirculation and cab mounted dissolved oxygen sensors is used to transport smolts in emergency conditions only.

5.3) Broodstock holding and spawning facilities.

Adults are sorted by age and sex into one of four separate 6' x 20' x 4' holding pens. Spawning facilities include an open construction, roofed spawn deck with overhead lighting and domestic water supply, concrete and asphalt surfaces for sorting spawned adults, water level monitor and alarm system.

5.4) Incubation facilities.

Elk River Hatchery incubation facilities include a separate 16' x 35' hatch house. A sub-surface well pump provides 300 gpm of filtered well water to 35 stacks of Heath vertical incubators. Each stack consists of 15 usable trays (525 total trays) with combined capacity for incubating 3,150,000 eggs or fry. Of this capacity, approximately 14-18 stacks are used for the Elk River fall Chinook project to incubate a maximum of 1,620,000 eggs/fry annually.

5.5) Rearing facilities.

Elk River Hatchery rearing facilities for this stock include twelve 17.5' x 75' x 3' modified Burrows concrete ponds for rearing fry to smolts.

5.6) Acclimation/release facilities.

Smolts produced from this stock are released on site by forced crowding through the hatchery outlet directly to Elk River. No acclimation facilities are used for this program. Unfed fry are released directly into Euchre Creek, Elk River, and Garrison Lake.

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

No operational difficulties or disasters have led to significant fish mortality.

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.

No listed fish are incubated under this program. No adverse impacts to listed Coho are expected as a result of equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

However, four permanent, full time employees are trained to respond to emergency situations at all times in any weather. Employees living on station are assigned to be on-call 24 hours/day. An emergency generator provides full electricity to all buildings and water pumps in the event of commercial power failure. A back-up diesel engine provides power to the incubation well pump in the unlikely event that the emergency generator fails. Gas powered water pumps are available at all times for emergency recirculation. An alarm system monitors commercial power supply, intake water supply level, water pump status and rearing and incubation water levels. The alarm system conducts a daily self-check. A Fish Health Services employee performs monthly fish pathology and pre-liberation examinations on this stock. Throughout spawning, incubation and rearing activities, trained employees apply disinfection and maintenance protocols to prevent the spread of diseases.

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.

Elk River fall Chinook salmon are not an ESA listed population. Broodstock source includes all mature fall Chinook salmon returning to the Elk River Hatchery trap. The proportion of wild brood has ranged from 1% to 10% in recent years (table 9). Future collection of wild broodstock from the mainstem may occur.

6.2) Supporting information.

6.2.1) History.

Collection and spawning of Elk River fall Chinook initiated in 1968 used native Elk River Chinook broodstock representing historic age and run timing characteristics inherent to the stock. No purposeful or inadvertent selection has been applied to change characteristics of the founding broodstock.

6.2.2) Annual size.

The goal of the program is to incorporate at least 250 adult Chinook of which 30% is proposed to be of natural origin (equal to pHOS goal).

6.2.3) Past and proposed level of natural fish in broodstock (M+F+J).

Past levels of natural fish included in broodstock are listed in Table 9. The Conservation Plan goal is a pHOS of 30%. Therefore it is proposed to maintain a level of at least 30% natural fish in the broodstock (Hatchery Scientific Review Group 2005). The proportion of natural fish may be reduced in the future commensurate with a reduction in the proportion of hatchery fish in the natural spawning population.

Table 9. Data of wild and hatchery-origin adult Chinook collected at Elk River Hatchery (1990-2013).

Run Year	# Natural Broodstock	# Hatchery Broodstock	% Natural Fish
1990	4	366	1.1
1991	20	233	7.9
1992	30	459	6.1
1993	46	352	11.6
1994	50	550	8.3
1995	31	889	3.4
1996	35	953	3.5
1997	78	1,282	5.7
1998	83	1,619	4.9
1999	68	1,686	3.9
2000	36	1,373	2.6
2001	18	3,417	0.5
2002	30	1,548	1.9
2003	49	1,314	3.6
2004	58	1,246	4.4
2005	53	988	5.1
2006	36	848	4.1
2007	25	996	2.4
2008	47	1,339	3.4
2009	41	2,211	1.8
2010	26	2,358	1.1
2011	29	1,166	2.4
2012	25	2,439	1.0

6.2.4) Genetic or ecological differences.

ODFW staff has detected no genetic, phenotypic, or ecological differences between hatchery and naturally produced Elk River fall Chinook salmon.

6.2.5) Reasons for choosing.

Brood selection and spawning guidelines were chosen to best mimic naturally occurring characteristics of the Elk River fall Chinook salmon.

6.3) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices.

No adverse genetic or ecological impacts to listed Coho are expected as a result of broodstock selection practices for Elk River fall Chinook Salmon.

SECTION 7. BROODSTOCK COLLECTION

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

All broodstock will be sexually mature adult fall Chinook Salmon.

7.2) Collection or sampling design.

No barrier exists to divert adults into the trap. The fish ladder is supplied continuously with hatchery effluent from late October through late January to capture at random approximately 10-15% of the upstream Chinook migration. The ladder allows passage of all age classes of Chinook salmon and presents no physical or velocity barriers. Tangle netting of wild fall Chinook broodstock may be conducted in the lower 4 miles of the mainstem October through January.

Hankin et al. (2009) found that a random choice of spawners leads to substantial long-term selection for younger age at maturity, while a spawner choice of male length \geq female length is similar to the natural outcome of Chinook salmon mating under natural conditions. As a result of these findings, they recommended, to prevent the unintentional selection for younger age at maturity, hatchery programs for Chinook salmon spawn larger males with smaller females. However, since the publication of the Hankin et al. (2009) document, Hankin has acknowledged that some jacks successfully spawn with females and has proposed the following modification to the recommended guidelines: The percentage of jacks in the male broodstock should not exceed X%, where $X = 0.20$ * the average percentage of jacks among the returning male spawners.

Based on the preceding recommendations, broodstock composition goals for Elk River fall Chinook are:

1. Collect all available wild CHF
2. Hatchery-produced females collected should be at least 800 mm fork length to ensure that age 3 Chinook are not over represented in the broodstock
3. Collect males that are larger than females
4. No more than 2% of the collected males should be jacks

7.3) Identity.

Returning adults of hatchery origins are identified by external examination for clipped fins (adipose or ventral), and by wand scanning for presence of coded wire tags. Approximately 95% of the hatchery released smolts are adipose fin-clipped, 3% are ventral fin clipped, and 2% are unmarked (due to missed clips and/or regeneration). Naturally reared adults can be identified by the presence of all fins and are generally described as “unmarked”. Definitive distinction between hatchery and natural origin of unmarked adults is accomplished by scale analysis.

7.4) Proposed number to be collected:

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

The program goal is to collect at least 250 pairs of adults to use for broodstock. During those years when less than 100% of the returning hatchery fish are marked with fin clips, all collected adults will be spawned by full factorial matrix. During those years when all returning hatchery fish are marked with fin clips, the broodstock will be capped at 250 pairs in order to minimize the number of wild fish to be collected for broodstock.

7.4.2) Broodstock collection levels for the last twelve years 1992-2004 or for most recent years available:

Table 10. Number of females, males, and jacks collected during brood years 1992-2013.

Year	Adults		Jacks
	Females	Males	
1992	148	346	185
1993	178	217	128
1994	314	284	174
1995	394	505	303
1996	396	614	189
1997	739	617	299
1998	757	965	67
1999	1047	711	311
2000	476	940	355
2001	1662	1728	439
2002	742	837	316
2003	622	742	130
2004	635	660	137
2005	416	498	130
2006	394	418	179
2007	308	631	169
2008	529	601	513
2009	471	522	201
2010	1053	984	106
2011	477	458	181
2012	737	390	27
2013	594	467	23

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

Currently, all trapped fish are included in the broodstock. During those years when the broodstock is capped at 250 pairs, surplus fish will be provided to the local food bank,

provided to the Coquille Tribe for ceremonial purposes, delivered to the Port Orford dock for use as hanging bait in the commercial crab fishery, or distributed in local streams to provide nutrient enrichment.

7.6) Fish transportation and holding methods.

Adults collected for broodstock are held until ripe to spawn (typically 0-10 days post-capture) and are supplied with 3,000-6,000 gpm of fresh water. Adults held for broodstock are not treated and are never transported.

7.7) Describe fish health maintenance and sanitation procedures applied.

All outer clothing, equipment and facilities used during sorting/spawning are hosed down with fresh water and disinfected with dilute iodine prior to the next use. Adults are observed for mortality and stress on a daily basis. Infrequent mortalities are removed from the holding pens immediately. Adults are sorted and examined for ripeness once or twice weekly. To prevent over-crowding, ripe adults are removed, euthanized and spawned. Visceral and ovarian fluid samples are collected from 60 fish annually and examined to diagnose the presence of any pathogens by ODFW Fish Health Services employees.

7.8) Disposition of carcasses.

The majority of spawned carcasses and mortalities are delivered to the Port Orford dock for use as hanging bait in the commercial crab fishery. Some spawned carcasses are transferred for distribution in local streams to provide nutrient enrichment.

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

Elk River fall Chinook salmon are not an ESA listed population. No adverse genetic ecological effects are expected as a result of this broodstock collection program. However, to minimize any ecological effects, unmarked Coho captured during Chinook collection will be carefully handled and released unharmed.

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 are collected from throughout the entire spawning run. Adults are sorted and examined for ripeness once or twice weekly. Ripe adults discovered during sorting are used to produce a single spawn group on that day. Chinook are selected for spawning

consistent with broodstock criteria listed in section 7.2.

8.2) Males.

All males are used one time only. Jacks are used to fertilize up to 2% of the egg take.

8.3) Fertilization.

Adults collected from throughout the run are spawned using the full factorial matrix method. Green eggs are gathered from each female and the carcass is inspected internally for signs of obvious pathology. If no signs of pathology exist, a measured portion of eggs from each female is placed into a common vessel. Green eggs are mixed, and then measured into containers equal to the number of ripe males. Sperm from a single male is ejected into a single container of eggs. Sperm from each male used will fertilize some eggs from every female. Larger males are preferentially spawned with smaller females to ensure that older age classes are adequately represented in the broodstock, except that jacks are used to fertilize up to 2% of the eggs. Fertilized eggs are then water hardened and disinfected in 100 ppm iodophor for one hour prior to fresh water incubation.

8.4) Cryopreserved gametes.

Not used.

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

Elk River fall Chinook Salmon are not an ESA listed population. No adverse genetic or ecological effects are expected as a result of this mating scheme. The large number of adults (hatchery and natural) used and the full factorial matrix method employed ensures robust diversity and preservation of historic age composition and run timing characteristics.

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	Eggs Taken	% Survival to Eyed	% Survival Eyed To Swim-Up
1992	635,429	89.64	96.42
1993	697,070	86.79	91.38
1994	1,353,579	85.81	94.50
1995	1,554,623	88.81	91.27
1996	1,190,073	89.41	92.21
1997	1,047,836	93.91	91.62
1998	1,143,629	94.04	91.10
1999	953,147	93.34	89.81
2000	798,000	89.26	84.37
2001	1,311,465	93.46	93.91
2002	692,717	90.37	91.26
2003	682,990	92.82	87.55

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

Surplus eggs are collected routinely to maximize genetic diversity in every spawn group. When identified as excess to program needs, surplus eggs or fry are removed from incubation and frozen prior to transport to a local landfill.

9.1.3) Loading densities applied during incubation.

Egg size data collected in the late 1980's indicates Elk River stock fall Chinook eggs range from about 50-80 eggs/ounce. Initial incubation density is approximately 6,000 eggs per tray in Heath vertical incubators. Well water is supplied at 5 gpm through each Heath stack throughout incubation. After shocking, eggs are counted and incubated at 5,000 eggs per tray.

9.1.4) Incubation conditions.

Magnetic floats monitor incubation water level and activate the alarm system when flow is lost. Incubation water flow is set, monitored and adjusted daily by trained employees. Ambient incubation temperature is 48-52 °F. Incubation temperature is monitored by calibrated thermometer on a daily basis. Incubation temperature is adjusted using 240 V electric heaters to increase temperature by 3 °F. Influent dissolved oxygen is 10.9 ppm. Effluent dissolved oxygen is approximately 10.3 ppm.

9.1.5) Ponding.

Fry (900 fish/lb) are ponded at approximately 1,750-1,900 temperature units from mid-February to early May. Visual inspection confirms that fry are 95-100% buttoned up prior to forced swim up and transfer into modified Burrows rearing ponds. No mean length and weight data are collected routinely.

9.1.6) Fish health maintenance and monitoring.

Fertilized eggs are water hardened and disinfected in 100 ppm buffered iodophor for one hour prior to incubation. Eggs are treated with 1:600 formalin solution consecutively for 3 days on and 3 days off, to control fungus. Eggs are shocked at the eyed stage; all non-viable and diseased eggs are removed with hand tools or a mechanical picker. Dead and diseased fry are removed prior to ponding using hand tools. All equipment and tools used during incubation are cleaned and sterilized with concentrated iodophor between uses. No yolk-sac malformations have been recorded. All incubators are pressure washed and dried after each season.

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.

Elk River stock fall Chinook are not listed fish, therefore no adverse effects to listed fish are anticipated during incubation of fall Chinook.

9.2) Rearing:

9.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for twelve years (1992-2003).

Data of fry survival up to smolt stage are presented in Table 11.

Table 11. Survival data of fry to fingerling and fingerling to smolt of Elk River fall Chinook (1992-2003).

Brood Year	Fry Poned	% Survival to Fingerling	% Survival to Smolt	Smolts Released
1992	338,810	98.06	97.21	329,366
1993	335,282	97.65	97.28	334,078
1994	350,151	97.23	96.29	337,189
1995	372,210	97.72	97.33	333,879
1996	349,017	97.10	95.12	332,200
1997	365,407	96.37	93.45	341,461
1998	377,578	97.84	97.24	363,367
1999	349,651	98.32	97.36	340,441
2000	346,243	98.88	98.24	340,153
2001	339,149	98.82	95.15	322,709
2002	342,408	98.86	97.21	332,873
2003	338,214	98.67	95.67	323,584

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

Targeted loading criteria at ponding is approximately 30,000 fry at 900 fish/lb (33.3 lbs of fish) in each of eleven 8.5' x 38' x 3' (969 cu ft) rearing ponds supplied with approximately 150 gpm of fresh water for the first month. This method equals an approximate 0.222 lbs fish/gpm and 0.034 lbs fish/cu ft. As fish grow, water flow increases to approximately 250-500 gpm and rearing space increases to an approximate 3,876 cu ft. Target size at liberation is 12 fish/lb in mid-September, when pond loads equal 2,500 lbs. This load equals 5 lbs fish/gpm and 0.64 lbs fish/cu ft.

An additional pond for “yearling program” is loaded with approximately 10,000 fry at 900 fish/lb (11.11 lbs) with flow of 150 gpm. The rearing dimensions of this pond is 8.5' x 38' x 3' (969 cu ft) and used with initial rearing density at 0.074 lbs fish/gpm and 0.011 lbs fish/cu ft. As fish grow, water flow increases to approximately 250 gpm and rearing space increases to 1,938 cu ft. Target size at liberation is 6 fish/lb in mid-February, when pond load equals 1,667 lbs. This load equals 6.67 lbs fish/gpm and 0.86 lbs fish/cu ft.

9.2.3) Fish rearing conditions

Water sources and rearing facilities are described in sections 4.1, 5.3, and 5.5. Rearing water temperatures are recorded daily. Dissolved oxygen levels are monitored occasionally during high water temperature or low flow events. Pond screens prevent the escape of fish. Avian and mammalian predators are present through the rearing cycle but are not excluded or harassed. Debris and wastes are cleaned from rearing ponds as needed. Standard pond management includes ponding of this stock in the same rearing

ponds each year, routine adjustment of water supplies, installation of screens to prevent fish loss, and adjustment of tilt tubes and dam boards to control water height.

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.

Routine monthly lengths and condition factors are not collected. See table 12 for monthly weights in fish per pound for the last five brood years.

Table 12. Monthly growth (body weight) information of fall Chinook at Elk River Hatchery (data are # of fish per pound).

Month	1999	2000	2001	2002	2003	Average
Feb	826	N/A	N/A	N/A	N/A	826
Mar	620	704	734	797	588	689
April	279	395	244	235	217	274
May	82	92	96	80	85	87
June	42	46	43	40	41	42.4
July	23.6	26.1	23.1	23.5	22.1	23.7
Aug	14.8	16.6	14.5	15.7	14.5	15.2
Sept	10.9	12.8	11.9	11.9	10.8	11.7
Oct	9.4	10.4	N/A	9.5	9.9	9.8
Nov	N/A	N/A	N/A	8.5	N/A	8.5

9.2.5) Monthly fish growth rate (*average program performance*).

Table 13 is a predicted average schedule for 325,000 fish from ponding to release.

Table 13. Monthly weight gain (fish/lb) and feed conversion ratio of fall Chinook at Elk River Hatchery.

Date	Temp F	Fish/Lb	Lbs Feed/Day	Feed Conversion
28 Feb	49	825	.5	.75
31 Mar	52	588	5	1
30 Apr	54	215	30	1
31 May	57	85	75	1
30 June	61	41	140	1.02
31 July	67	22	220	1.02
31 Aug	65	14	270	1.1
30 Sept	62	11	280	1.1
31 Oct	56	10	275	1.1

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*).

Bio-Oregon feed products are hand fed to this stock throughout the rearing cycle. Starter diet for each pond is a total of 10 lbs of Bio-Diet Starter #2 fed on demand over a period of 10-14 days. Pellet diet for each pond begins with a total of 46 lbs of 1.0 mm Bio-Moist Grower (BMG) fed on demand over a period of approximately 21 days. Larger pellets are introduced on demand as fish grow. Each rearing pond receives a total of 70 lbs of 1.3 mm BMG, 100 lbs of 1.5 mm BMG and 130 lbs of 2.0 mm BMG. The Bio-Moist Feed (BMF) diet is introduced in early June with 300 lbs per pond of the 2.5 mm pellet. At that time, most fish have reached adequate size to be placed on a controlled growth program typified by a scheduled daily ration of BMF. Finishing diet includes 3.0 mm and 4.0 mm BMF fed at a rate of 0.75-1.0% body weight per day. Average feed conversion for this stock for the rearing cycle is 1.1 lbs feed/1 lb fish.

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

Fish health and behavior are monitored daily. Mortality is picked, discarded and recorded daily. Mortality and treatment records are reported to ODFW Fish Health Services. Fish Health Services employees perform monthly site visits for routine sampling and pre-liberation examinations. Parasitic and bacterial problems are treated as prescribed by Fish Health Services, and may include antibiotic, flush or bath treatments. Empty rearing ponds are pressure washed and sun dried in preparation for incoming groups of fish. All equipment used in the rearing ponds is disinfected with iodophor or bleach solutions prior to the next use.

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

No gill ATPase or other quantitative analysis is performed. Smoltification is determined

by fish behavior, age and size, time of year, scale loss and coloration.

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

Natural rearing strategies include minimal handling of the fish, allowing avian and mammalian predation and restricting human presence near the fish to ODFW staff only.

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

Listed stocks are not reared at Elk River Hatchery.

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
Unfed Fry (STEP)	700	900	February-March	Elk River
	10,000	900	February-March	Euchre Cr.
Unfed Fry	240,000	900	January-May	Garrison Lake
Fry	None			
Fingerling	None			
Yearling	255,000	12	August-November	Elk River
Yearling	20,000	5	January-February	Elk River

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

Stream, river, or watercourse: Elk River 1700130000.

Garrison Lake 1705200000.

Euchre Creek 1700105000

Release point: Hatchery Outlet RK 22.53 (42° 44.332' N, 124° 24.326' W)

Garrison Lake Boat Launch (42° 44.891' N, 124° 30.531' W)

Euchre Creek (42° 32.178' N, 124° 22.280' W)

Ironhead Boat Ramp (42° 47.1108' N, 124° 28.7491' W)

Major watershed: Elk River

Basin or Region: Rogue Watershed District

10.3) Actual numbers and sizes of program fish released by brood year and age class.

Table 14. Number and average size of fall Chinook released from Elk River Hatchery (Brood Year 1991-2015).

Brood Year	Eggs/ Unfed Fry¹	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
1991	117,327	900					293,246	11.69
1992	200,559	900					329,366	8.72
1993	202,088	900					334,078	9.10
1994	204,180	900					337,189	9.00
1995	200,023	900					333,879	12.18
1996	181,128	900					332,200	14.16
1997	200,000	900					341,461	8.66
1998	214,981	900					363,367	8.26
1999	0	900					340,441	9.32
2000	159,481	900					340,153	13.56
2001	219,759	900					322,709	11.95
2002	141,405	900					332,873	8.54
2003	159,673	900					323,584	11.23
2004	134,107	900					322,446	10.39
2005	191,356	900					326,965	10.41
2006	233,143	900					328,893	12.01
2007	142,669	900					369,634	11.80
2008	352,828	900					357,160	9.46
2009	262,214	900					327,519	11.80
2010	223,381	900					324,234	9.90
2011	237,001	900					332,825	13.19
2012	221,950	900					324,071	14.42
2013	221,950	900					333,568	14.51
2014	242,201	900					323,741	13.26
2015	400,018	900					255,955	10.28
Average	202,537	900					330,062	11.11

¹700 released in Elk River and up to 10,000 released in Euchre Creek as part of STEP education projects. Remainder are released into Garrison Lake.

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

Table 15. Fish release dates, life stages at release and release protocols for Elk River fall Chinook (Brood Year 1999-2003).

Brood	Life Stage	Release Date(s)	Release Type
1999	Unfed Fry	None	
1999	Yearling	20 Oct 2000 – 25 Jan 2001	Forced
2000	Unfed Fry	12 Mar – 14 May 2001	Forced
2000	Yearling	23 Aug 2001 – 31 Jan 2002	Forced
2001	Unfed Fry	14 Feb – 18 Mar 2002	Forced
2001	Yearling	17 Sept 2002 – 28 Jan 2003	Forced
2002	Unfed Fry	4 Mar – 10 Apr 2003	Forced
2002	Yearling	16 Nov 2003 – 22 Jan 2004	Forced
2003	Unfed Fry	27 Feb – 28 Apr 2004	Forced
2003	Yearling	9 Oct 2004 – 21 Jan 2005	Forced

Unfed fry released to Garrison Lake are excess to program needs at button up. Unfed fry released into Garrison Lake are effectively removed from the Elk River population because the Garrison Lake outlet is bar-bound July – October and juvenile Chinook are unable to migrate to the ocean. Yearling liberation timing is designed for post-emigration of natural Chinook smolts in Elk River. Yearling releases are forced by lowering rearing pond water levels, removing dam boards and screens, and then crowding fish by hand to rearing pond outlets. No culling procedures are used for this program.

10.5) Fish transportation procedures, if applicable.

Off site liberation of unfed fry is accomplished by loading incubation trays of fry into a 150-gallon pickup-mounted portable tank supplied with agitation/aeration and supplemental oxygen. Time in transit is approximately 45 minutes. Agitation/aeration is supplied with a battery powered bilge pump which circulates water to an above-surface spray nozzle. Oxygen is diffused through a ceramic air stone at a rate of 3 liters/minute. Temperature control is not used or necessary.

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

No acclimation procedures are used in this program.

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

Approximately 93% of hatchery released smolts are adipose fin-clipped and coded wire tagged. Approximately 7% of hatchery released smolts are ventral fin-clipped.

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

None.

10.9) Fish health certification procedures applied pre-release.

ODFW Fish Health Services pathologists perform a pre-release examination within 30 days of the scheduled release of this stock. Identified pathology issues are treated as necessary and prescribed, fish are allowed to withdraw from therapy as recommended, and then the fish are rechecked and released if certified. Fish deemed unfit for release are destroyed. To not stock fish as scheduled would be a joint decision between the hatchery manager, ODFW Fish Health Services, ODFW Fish Division, ODFW SW Region and Rogue Watershed staff, and consultation with appropriate NOAA Fisheries staff.

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

Emergency release of yearlings to scheduled water bodies may occur at the discretion of the hatchery manager within 60 days of scheduled liberation dates when fish are certified disease free, are within 20% of scheduled release goals and are marked and tagged properly. Emergency release of yearlings earlier than 60 days prior to scheduled release dates would be a joint management decision between ODFW Rogue Watershed staff, ODFW Southwest Region staff, ODFW Fish Division staff, the Elk River Hatchery manager and consultation with appropriate NOAA Fisheries staff.

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.

Rearing and release strategies limit ecological interactions between hatchery and naturally produced fish. Fish are reared to a size sufficient to transform 98-100% of the entire population to smolt, reducing retention time during seaward migration. Elk River stock fall Chinook are reared on parent river water for seven to ten months prior to liberation, ensuring strong homing to the hatchery and reducing stray rates to natural populations. Yearling releases of Elk River Hatchery fall Chinook occur after seaward migration of the natural Chinook population in the fall of the year. Rapid emigration is expected and the likelihood of residuals is low, reducing interaction with listed Coho salmon in the watershed. Juvenile Coho may be present in the lower main-stem/estuary but it is expected that most juvenile Coho are rearing in tributary streams when hatchery produced fall Chinook smolts are released. Any naturally produced juvenile Coho

rearing in the lower mainstem/estuary of the Elk at the time of smolt release may be subject to competition with hatchery produced fall Chinook smolts.

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.

Program Fish contribute to the ocean and freshwater fishery:

Spawning ground surveys on an annual basis (currently funded 2004/2005).

Statistical creel on an annual basis (currently funded 2004/2005).

Chinook smolts will be 100% Adipose fin-clipped starting with 2006 brood year:

Chinook smolts will be 100% marked starting with 2006 brood year.

Release groups of Chinook smolts will be coded-wire tagged to meet PST exploitation rate indicator criteria:

At least 200,000 smolts will be coded-wire tagged to meet minimum PST criteria.

Release timing and size of release will mimic naturally produced fall Chinook:

District staff will continue to monitor juvenile Chinook downstream of Elk River Hatchery through smolt traps, estuary seining, and snorkel surveys. (Currently no funding is available to run smolt traps. District staff as time allows conduct estuary seining/snorkel surveys).

Broodstock will be at least 30% wild Chinook salmon:

Elk River Hatchery personnel, and District ODFW staff will work together to increase the number of wild Chinook incorporated in the broodstock. (Currently funding is only available to collect wild broodstock from the trap located at Elk River Hatchery. No funding is available for staffing to tangle net wild broodstock).

Release groups will meet ODFW fish health standards:

ODFW fish pathology will sample and inspect the hatchery cohorts prior to releases (currently funded for 2004 - 2005).

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

See Section 11.1.1.

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.

Downstream monitoring techniques will be periodically used to monitor juvenile emigration and size:

All Coho juveniles captured during smolt trapping or estuary seining will be immediately returned to the river with minimum stress.

Perform a run reconstruction on an annual basis to determine hatchery fall Chinook return:

No effect is expected.

The fish ladder will remain open for the duration of the fall Chinook run:

The trap will be checked daily and all Coho adults will be released immediately with minimum stress.

Releases made when and where scheduled:

Hatchery maintenance will be current and properly funded so emergency releases are not necessary.

Fish health is certified prior to release:

No effect.

Appropriate protocols will be followed for monitoring water quality:

No effect.

Screens will be checked on a regular basis:

No effect.

Record the date and number of Coho captured in the trap or tangle netting:

No effect.

Record the number of Chinook used for brood:

No effect.

SECTION 12. RESEARCH

12.1) Objective or purpose.

A survey will be conducted as per ODFW's plan to determine the Oregon mid-coastal wild stock aggregate of fall Chinook using the Elk River hatchery-origin fall Chinook as an indicator of exploitation rate.

12.2) Cooperating and funding agencies.

ODFW, Pacific Salmon Commission.

12.3) Principle investigator or project supervisor and staff.

ODFW staff.

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

N/A

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

Creel surveys:

Contact anglers, collect scales and snouts (cwt), record lengths and sex of all harvest fish

Spawning ground surveys:

(a) Walk designated stream reaches.

(b) Record live fish, dead fish, and redds.

(c) Collect fish scales and snouts (cwt); and record lengths and sex of all dead fish.

Broodstock:

Collect scales and snouts (cwt), record lengths and sex of all dead fish.

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

October to February.

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

N/A

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

N/A

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).

N/A

12.10) Alternative methods to achieve project objectives.

N/A

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

Only fall Chinook utilized for broodstock are killed. Mortality of any listed fish is not expected from this project.

12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities.

N/A

SECTION 13. ATTACHMENTS AND CITATIONS

References:

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ODFW. 1991. Comprehensive Plan for Production and Management of Oregon's Anadromous Salmon and Steelhead: Coastal Chinook Salmon Plan. Oregon Department of Fish and Wildlife,

Salem, Oregon.

ODFW. 2008b. Limiting factors and threats to the recovery of Oregon coho populations in the Southern Oregon-Northern California Coast Evolutionarily Significant Unit: Results of Expert Panel deliberations. September 5, 2008. 38 p.

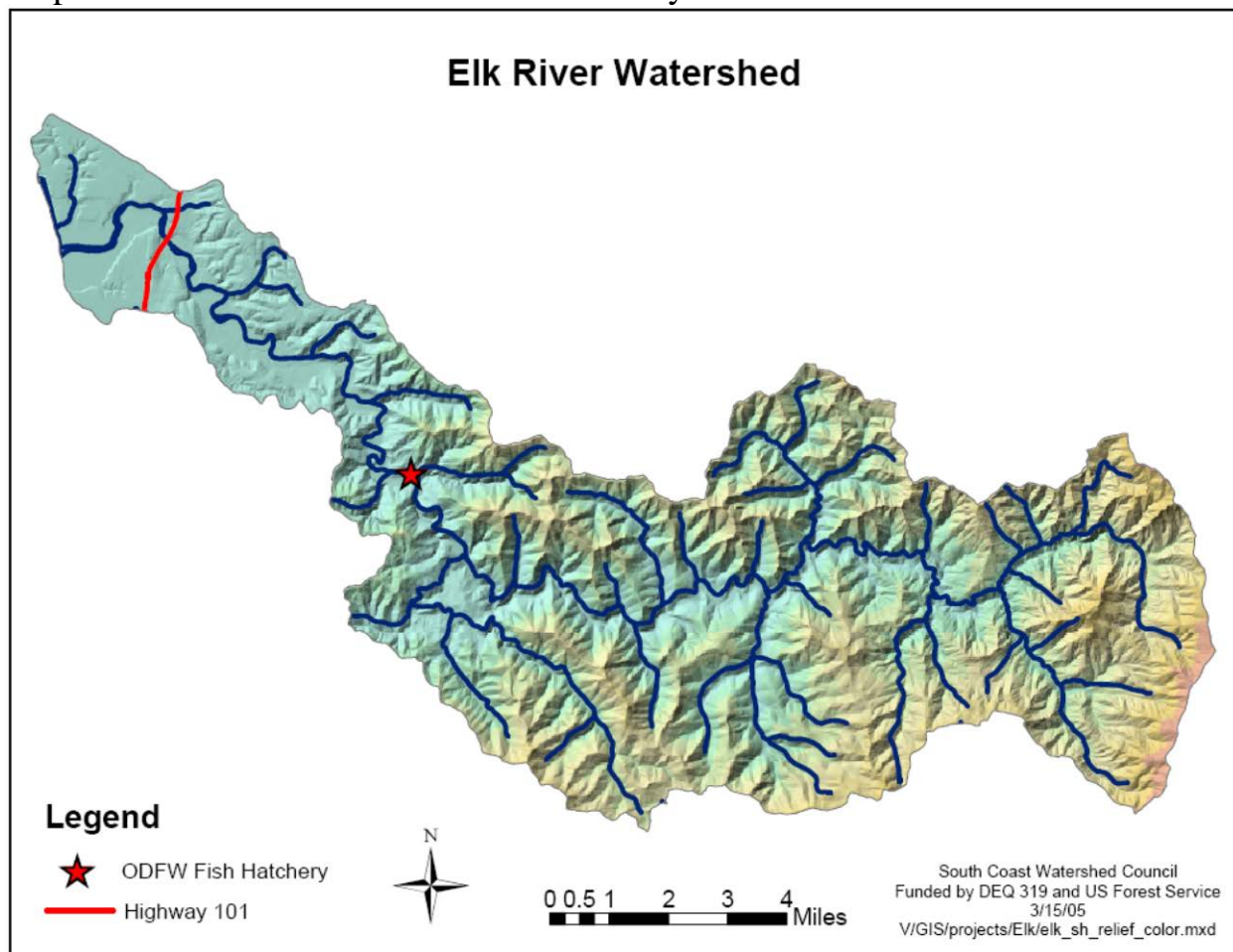
Pacific State Marine Fisheries Commission. RMIS database at www.rmis.org/index.html

Williams, Ron. 2004. Stock Assessment of Elk River Fall Chinook Salmon for Exploitation Rate Analysis. Oregon Department of Fish and Wildlife, Salem, Oregon.

Williams, T.H., B. Spence, W. Duffy, D. Hillemeier, G. Kautsky, T. Lisle, M. McCain, T. Nickelson, E. Mora, and T. Pearson. 2008. Framework for assessing viability of threatened coho salmon in the Southern Oregon / Northern California Coasts Evolutionarily Significant Unit. NOAA Technical Memorandum NMFS-SWFSC-432.

USFS. 1998a. *Elk River Watershed Analysis*. Powers Ranger District, 42861 Hwy 242, Powers, Oregon 97466.

Map of Elk River and Location Fish Hatchery



SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

“I hereby certify that the information provided is complete, true and correct to the best of my knowledge and belief. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973.”

Name and Title of Applicant: Russell Stauff, Rogue Watershed District Manager

Signature: _____ Date: _____

Certified by: Scott Patterson, Fish Propagation Program Manager

Signature: _____ Date: _____

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

Listed species affected: Coho Salmon		ESU/Population: Southern Oregon Northern California Coast		
Activity: Fall Chinook Broodstock Collection				
Location of hatchery activity: Elk River RM 2.0 to 13.0)		Dates of activity: October to February		
Hatchery program operator: ODFW				
Type of Take	Annual Take of Listed Fish By Life Stage (<i>Number of Fish</i>)			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)			20	
Capture, handle, tag/mark/tissue sample, and release d)			125	
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)			12	
Other Take (specify) h)				

- a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at weirs.
- b. Take associated with weir or trapping operations where listed fish are captured and transported for release.
- c. Take associated with weir or trapping 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.
- 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 transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.
- 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.

Attachment 1. Definition of terms referenced in the HGMP template.

Augmentation - The use of artificial production to increase harvestable numbers of fish in areas where the natural freshwater production capacity is limited, but the capacity of other salmonid habitat areas will support increased production. Also referred to as “fishery enhancement”.

Critical population threshold - An abundance level for an independent Pacific salmonid population below which: compensatory processes are likely to reduce it below replacement; short-term effects of inbreeding depression or loss of rare alleles cannot be avoided; and productivity variation due to demographic stochasticity becomes a substantial source of risk.

Direct take - The intentional take of a listed species. Direct takes may be authorized under the ESA for the purpose of propagation to enhance the species or research.

Evolutionarily Significant Unit (ESU) - NMFS definition of a distinct population segment (the smallest biological unit that will be considered to be a species under the Endangered Species Act). A population will be/is considered to be an ESU if 1) it is substantially reproductively isolated from other conspecific population units, and 2) it represents an important component in the evolutionary legacy of the species.

Harvest project - Projects designed for the production of fish that are primarily intended to be caught in fisheries.

Hatchery fish - A fish that has spent some part of its life-cycle in an artificial environment and whose parents were spawned in an artificial environment.

Hatchery population - A population that depends on spawning, incubation, hatching or rearing in a hatchery or other artificial propagation facility.

Hazard - Hazards are undesirable events that a hatchery program is attempting to avoid.

Incidental take - The unintentional take of a listed species as a result of the conduct of an otherwise lawful activity.

Integrated harvest program - Project in which artificially propagated fish produced primarily for harvest are intended to spawn in the wild and are fully reproductively integrated with a particular natural population.

Integrated recovery program - An artificial propagation project primarily designed to aid in the recovery, conservation or reintroduction of particular natural population(s), and fish produced are intended to spawn in the wild or be genetically integrated with the targeted natural population(s). Sometimes referred to as “supplementation”.

Isolated harvest program - Project in which artificially propagated fish produced primarily for harvest are not intended to spawn in the wild or be genetically integrated with any specific natural population.

Isolated recovery program - An artificial propagation project primarily designed to aid in the recovery, conservation or reintroduction of particular natural population(s), but the fish produced are not intended to spawn in the wild or be genetically integrated with any specific natural population.

Mitigation - The use of artificial propagation to produce fish to replace or compensate for loss of fish or fish production capacity resulting from the permanent blockage or alteration of habitat by human activities.

Natural fish - A fish that has spent essentially all of its life-cycle in the wild and whose parents spawned in the wild. Synonymous with *natural origin recruit (NOR)*.

Natural origin recruit (NOR) - See *natural fish* .

Natural population - A population that is sustained by natural spawning and rearing in the natural habitat.

Population - A group of historically interbreeding salmonids of the same species of hatchery, natural, or unknown parentage that have developed a unique gene pool, that breed in approximately the same place and time, and whose progeny tend to return and breed in approximately the same place and time. They often, but not always, can be separated from another population by genotypic or demographic characteristics. This term is synonymous with stock.

Preservation (Conservation) - The use of artificial propagation to conserve genetic resources of a fish population at extremely low population abundance, and potential for extinction, using methods such as captive propagation and cryopreservation.

Research - The study of critical uncertainties regarding the application and effectiveness of artificial propagation for augmentation, mitigation, conservation, and restoration purposes, and identification of how to effectively use artificial propagation to address those purposes.

Restoration - The use of artificial propagation to hasten rebuilding or reintroduction of a fish population to harvestable levels in areas where there is low, or no natural production, but potential for increase or reintroduction exists because sufficient habitat for sustainable natural production exists or is being restored.

Stock - (see "Population").

Take - To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.

Viable population threshold - An abundance level above which an independent Pacific salmonid population has a negligible risk of extinction due to threats from demographic variation (random or directional), local environmental variation, and genetic diversity changes (random or directional) over a 100-year time frame.

Attachment 2. Age class designations by fish size and species for salmonids released from hatchery facilities.

(generally from Washington Department of Fish and Wildlife, November, 1999).

	SPECIES/AGE CLASS	Number of fish/pound	SIZE CRITERIA Grams/fish
X	Chinook Yearling	<=20	>=23
X	Chinook (Zero) Fingerling	>20 to 150	3 to <23
X	Chinook Fry	>150 to 900	0.5 to <3
X	Chinook Unfed Fry	>900	<0.5
X	Coho Yearling 1/	<20	>=23
X	Coho Fingerling	>20 to 200	2.3 to <23
X	Coho Fry	>200 to 900	0.5 to <2.3

X	Coho Unfed Fry	>900	<0.5
X	Chum Fed Fry	<=1000	>=0.45
X	Chum Unfed Fry	>1000	<0.45
X	Sockeye Yearling 2/	<=20	>=23
X	Sockeye Fingerling	>20 to 800	0.6 to <23
X	Sockeye Fall Releases	<150	>2.9
X	Sockeye Fry	> 800 to 1500	0.3 to <0.6
X	Sockeye Unfed Fry	>1500	<0.3
X	Pink Fed Fry	<=1000	>=0.45
X	Pink Unfed Fry	>1000	<0.45
X	Steelhead Smolt	<=10	>=45
X	Steelhead Yearling	<=20	>=23
X	Steelhead Fingerling	>20 to 150	3 to <23
X	Steelhead Fry	>150	<3
X	Cutthroat Trout Yearling	<=20	>=23
X	Cutthroat Trout Fingerling	>20 to 150	3 to <23
X	Cutthroat Trout Fry	>150	<3
X	Trout Legals	<=10	>=45
X	Trout Fry	>10	<45

1/ Coho yearlings defined as meeting size criteria and 1 year old at release, and released prior to June 1st.
2/ Sockeye yearlings defined as meeting size criteria and 1 year old.