

HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	Chetco River Fall Chinook Salmon Program
Species or Hatchery Stock:	Fall Chinook (Stock 96)
Agency/Operator:	Oregon Department of Fish and Wildlife
Watershed and Region:	Rogue Watershed, Southwest Region
Date Submitted: First Update Submitted: Second Update Submitted:	February 3, 2006 September 18, 2014 June 7, 2016
Date Last Updated:	June 2, 2016

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Elk River Fish Hatchery (Chetco River Fall Chinook Salmon Program)

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

Chetco River fall Chinook Salmon *Oncorhynchus tshawytscha* Stock 96. ESA Status: Neither wild nor hatchery stock of Chetco River fall Chinook are ESA-listed populations.

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 and full time employees operate the hatchery facility. Annual operational cost for the facility is approximately \$330,000. Of this amount, the annual Chetco River fall Chinook program costs approximately \$100,000.

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

Elk River Hatchery is located in Oregon on Elk River at RM 14 in Elk River Basin. It is 7.5 miles upriver from Highway 101 and at north east of the city of Port Orford. Elk River Hatchery is at latitude 42° 44' 20'' N and longitude 124° 24' 10'' W. The elevation of the hatchery site is approximately 108 feet above the sea level. The hatchery area is 13.2 acres. Broodstock holding, spawning, and rearing take place at this location (ODFW 2004). The ODFW water body code for Elk River is 1700130000 and the regional mark processing code for Elk River Hatchery is 5F22209 H9 21

1.6) Type of program.

The Chetco River fall Chinook Salmon program is an Isolated Harvest Program.

1.7) Purpose (Goal) of program.

The goal of the Chetco River fall Chinook Salmon program is to provide fish for commercial and sport fishing harvest, while minimizing any potential adverse impacts to the wild populations, particularly the SONCC Coho Salmon which is a threatened population under the federal ESA.

1.8) Justification for the program.

The program provides adult Chinook Salmon for commercial and recreational ocean fisheries and a recreational fishery on the Chetco River (ODFW 1991). The program fish support economic and cultural values associated with historic salmon fisheries while reducing social pressures to increase fisheries directed at listed or candidate 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 and other candidate species following measures like brood collection techniques, rearing and release strategies.

Brood Collection:

Migrating fish enter the Chetco River from October to December. ODFW staff and volunteers collect Chetco River fall Chinook by beach seine and tangle net. Adults are collected from throughout the run to maintain the genetic diversity of the population, and only Chetco River fall Chinook are used for broodstock. Tangle netting and beach seining will be ceased if more than three wild Coho are captured in a day.

Rearing and Release Strategies:

Rearing and release strategies are designed to minimize ecological interactions between hatchery and naturally produced fish. Fish are reared to a size sufficient for 98-100% smoltification of the entire population before release, which will expedite their downward migration to the sea immediately after release and minimize interaction with the naturally

produced juvenile populations. 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 in mid-October, at river mile 4.0 (Social Security Bar), after most of the Chinook smolts produced by the wild population have migrated to the ocean.

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

Beginning in 2011 up to 40,000 smolts are acclimated at Ferry Creek for approximately two weeks prior to release. The purpose is to reduce straying of hatchery fall Chinook in the natural spawning grounds of wild fall Chinook and Coho.

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"> • Provide hatchery Chinook Salmon for an isolated harvest program. 	<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 2007 release). In addition, stock assessment groups will be coded-wire tagged as funding allows. 	<ul style="list-style-type: none"> • Freshwater and ocean angler creel on an annual basis. • Annual CWT retention check to confirm mark rate.
<ul style="list-style-type: none"> • Healthy fall Chinook Salmon are released. 	<ul style="list-style-type: none"> • Release timing and size of release will mimic naturally produced fall Chinook, except that smolts are released after most of the wild population has migrated out of the system. • Release groups will meet ODFW fish health standards 	<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.

Benefits Performance Standards	Benefits Performance Indicators	Benefits Monitoring & Evaluation
<ul style="list-style-type: none"> The fall Chinook Salmon hatchery program will meet criteria provided by the Native Fish Conservation Policy. 	<ul style="list-style-type: none"> A Conservation Plan for the Rogue Fall Chinook Species Management Unit (SMU) was adopted January, 2013. 	<ul style="list-style-type: none"> Assess stock status and risks.

Risks Performance Standards	Risks Performance Indicators	Risks Monitoring & Evaluation
<ul style="list-style-type: none"> Life history characteristics of hatchery Chinook Salmon 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 smolts are released after most of the wild population has migrated out of the system. 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. 	<ul style="list-style-type: none"> Downstream monitoring techniques will evaluate juvenile emigration and size. In-season broodstock collection records by District staff.
<ul style="list-style-type: none"> Releases of hatchery fall Chinook have minimal impact on listed Coho Salmon. 	<ul style="list-style-type: none"> Program fish are released in the mainstem at river mile 4 at a time when most juvenile Coho salmon are rearing in tributaries. 	<ul style="list-style-type: none"> Releases made when and where scheduled.
<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. Hatchery operations conform to DEQ/NPDES guidelines for water quality. 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.

Risks Performance Standards	Risks Performance Indicators	Risks Monitoring & Evaluation
<ul style="list-style-type: none"> • Broodstock collection will have minimal impact on listed Coho Salmon. 	<ul style="list-style-type: none"> • Remove Coho Salmon from beach seine and tangle net immediately and return to the Chetco River. • Mainstem beach seining and tangle netting operations will be suspended for the day if more than three wild Coho are captured. 	<ul style="list-style-type: none"> • Record the date and number of Coho captured. • Record the number of fall Chinook used for brood.

1.11) Expected size of program.

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

Only fish captured by beach seine and tangle net are used for broodstock. Maximum number of proposed broodstock collection: males 80, females 80, and jacks 40.

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

Life Stage	Release Location	Annual Release Level
Eyed Eggs		None
Unfed Fry	Chetco River (STEP)	1,500
	Garrison Lake (Surplus)	40,000
Fry		None
Fingerling		None
Yearling	Chetco River (Social Security) (RM 4.0)	160,000
	Chetco River (Ferry Cr) (RM 1.5)	40,000

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 1.12. Number of fall Chinook smolts released, estimated survival, and spawning escapement of hatchery origin fall Chinook to the Chetco River (1991-2012 brood years).

Return Year	Smolt Release	# Ad+CWT	Estimated Smolt-to-Adult Survival (Expanded Recovery Rate) ^b	Estimated Hatchery Return	Estimated Spawning Escapement of Hatchery Origin Chinook
1991	393,953	76,396	0.47%	n/a	3,116
1992	389,509	46,217	0.88%	n/a	1,773
1993	357,829	24,669	0.45%	n/a	3,198
1994	330,254	25,933	0.33%	n/a	2,677
1995	165,717	24,971	0.22%	5,155 ^a	2,166
1996	226,309	24,109	0.03%	5,113 ^a	1,530
1997	223,621	25,050	0.39%	n/a	1,230
1998	158,208	26,994	0.08%	n/a	869
1999	164,741	24,594	0.36%	n/a	312
2000	158,150	24,916	0.93%	n/a	670
2001	156,088	25,587	0.33%	n/a	894
2002	153,681	27,792	0.13%	n/a	2,677
2003	156,835	28,292	0.22%	n/a	325
2004	156,338	27,216	0.14%	n/a	519
2005	144,653	37,978	0.05%	n/a	182
2006	115,833	27,470	0.15%	n/a	118
2007	156,271	0	--	n/a	96
2008	147,537	0	--	n/a	243
2009	162,237	0	--	n/a	603
2010	164,927	66,277	0.54%	n/a	633
2011	154,708	64,577	0.95%	n/a	1,214
2012	136,989	75,556	0.04%	n/a	536

^aChetco Fall Chinook Studies, ODFW, 1995 and 1996. Estimate derived from proportion of hatchery fish for each year, multiplied by overall abundance estimate.

^bPacific States Marine Fisheries Commission RMIS database www.rmis.org/index.html

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

Fall Chinook broodstock was first collected in 1968, with the first smolt release in 1969.

1.14) Expected duration of program.

The Chetco River fall Chinook Salmon program is on-going with no planned termination.

1.15) Watersheds targeted by program.

Targeted watershed is Chetco River drainage, ODFW waterbody code 1700150000.

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. Chetco River fall Chinook hatchery program and ESA listed Coho Salmon.

Issue 1: Straying

Straying of hatchery produced fish may be a concern. Spawning ground surveys suggest that some Chinook and Coho spawn in similar locations and at the same time. Generally, the proportion of hatchery-origin fall Chinook on the natural spawning grounds (pHOS) averages 14% annually (Table 1.16. ODFW unpublished data).

Table 1.16. Estimated escapement of adult fall Chinook to the natural spawning grounds in the Chetco River and the proportion of hatchery-origin fall Chinook on natural spawning grounds. Estimates are based on carcass recoveries from fall Chinook spawning surveys (1998-2015).

Run Year	Wild Escapement	Hatchery Escapement	pHOS
1998	4,383	869	17%
1999	1,916	312	14%
2000	4,191	670	14%
2001	5,712	894	14%
2002	5,025	2,677	35%
2003	2,112	325	13%
2004	3,306	519	14%
2005	1,146	182	14%
2006	819	118	13%
2007	685	96	12%
2008	1,731	243	12%
2009	6,487	603	8%
2010	4,786	633	12%
2011	6,591	1,214	16%
2012	4,282	536	11%
2013	2,991	631	17%
2014	5,474	576	10%
2015	5,793	448	7%

Issue 2: Release Strategies

Release of program fish affects only the lower 4 miles of the Chetco River mainstem. While juvenile Coho Salmon may be present in the lower mainstem/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 Salmon rearing in the lower mainstem/estuary of the Chetco at the time of smolt release may be subject to competition with hatchery produced fall Chinook smolts.

Issue 3: Broodstock collection

ESA-listed Coho Salmon may be encountered during tangle netting and beach seining in the lower mainstem. Seining and/or tangle netting will cease for the day if more than 3 wild Coho are handled.

1.16.2) Potential alternatives to current program.

Alternative 1: Terminate Chetco River Fall Chinook Salmon Hatchery Program

Pros: Eliminate potential risk to listed Coho due to interaction with hatchery fall Chinook in the Chetco River Watershed and eliminate the incidental take of Coho during broodstock collection.

Cons: Reduce the number of Chinook Salmon available for commercial and recreational fisheries.

Alternative 2: Reduce the number of hatchery fall Chinook smolts released into the Chetco River. Note: smolt program was reduced from 350,000 to 200,000 beginning with the 1996 release.

Pros: Reduce potential risk to listed Coho due to interaction with hatchery fall Chinook in the Chetco River Watershed and reduce the incidental take of Coho during broodstock collection.

Cons: Reduce hatchery-origin Chinook available for commercial and recreational fisheries, and possibly reduce or eliminate the Chetco River terminal ocean fishery.

Alternative 3: Increase the number of hatchery fall Chinook smolts released into the Chetco River.

Pros: Provide additional hatchery fall Chinook for the commercial and recreational fisheries without increasing the number of broodstock collected.

Cons: Increases the potential risk to listed Coho salmon due to interaction with hatchery fall Chinook on the spawning grounds in the Chetco River Watershed. Potential to increase straying of hatchery Chinook into nearby watersheds.

1.16.3) Potential Reforms and Investments.

Reform/Investment 1: Purchase liberation truck for broodstock collection and smolt releases. Elk River Hatchery has limited use of a liberation truck. The efficiency of broodstock collection could be increased by having better access to a liberation truck. Increasing the efficiency of broodstock collection would result in fewer net sets. Reducing the number of net sets should reduce the likelihood of encountering listed Coho and result in reduced take. The cost of purchasing a liberation truck is estimated at \$120,000.

Reform/Investment 2: Increase Ad-CWT to 100%. Presently there is no way to improve hatchery to wild ratios in the broodstock. By marking all hatchery smolts, ODFW personnel can easily identify hatchery and wild fall Chinook when mainstem

beach seining and tangle netting. In addition, by marking all hatchery smolts released, ODFW can liberalize harvest of marked fall Chinook, thereby reducing potential straying of hatchery fish onto the spawning grounds of native wild fish. The cost may be \$17,000/year.

Beginning in 2007 smolt releases are 100% adipose fin-clipped, allowing improved identification of hatchery-produced fall Chinook during broodstock collection. As a result broodstock collection goals were reduced from 300 adults to 160 adults, along with a corresponding reduction in seining/tangle netting effort.

Reform/Investment 3: Develop a fall Chinook acclimation site at Ferry Creek. The purpose would be to attempt to reduce straying of hatchery fish onto natural spawning grounds by increasing the angler harvest of hatchery fall Chinook. Acclimation of Chinook smolts at Ferry Creek should make these fish more accessible to bank and boat anglers. Cost may be \$2,000/year.

Beginning in 2011 smolts have been acclimated at Ferry Creek Reservoir. The annual acclimation of 35,000 coded-wire tagged chinook smolts will be evaluated to determine if: 1) acclimation reduces stray rates to natural spawning grounds and; 2) if acclimation increases harvest rate. If successful, additional smolts may be acclimated in the future.

Reform/Investment 4: Construct additional employee residence. Construction of a new residence on the hatchery grounds will add an additional on campus employee able to respond to emergencies related to hatchery operations, which may affect listed fish due to power failure or loss of water pressure which may result in catastrophic loss of fish or may force early release of fall Chinook at the presmolt stage which may increase adverse effects on listed juvenile fish into the watershed. Cost may be \$150,000.

SECTION 2. PROGRAM EFFECTS ON NMFS ESA-LISTED SALMONID POPULATIONS. (USFWS ESA-Listed Salmonid Species and Non-Salmonid Species are addressed in Addendum A)

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

The HGMP for this Chetco River fall Chinook Salmon program was submitted to NMFS on 2/3/2006 for ESA permit or take authorization. This is an updated version of the previously submitted HGMP.

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 Chetco River SONCC Coho population may be affected by this fall Chinook Salmon 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:

- The Chetco River Coho Salmon population is not well studied and consequently there is very little data of Coho Salmon trend within the basin.
- Coho Salmon exist in many parts of the Chetco River population area and juvenile Coho Salmon have been found in the upper mainstem reaches in the Kalmiopsis Wilderness (ODFW 2005a).
- The Expert Panel stated that the Chetco River Coho Salmon population has a very low abundance and is verging on extirpation (ODFW 2008b).
- The Chetco River population is at high risk of extinction because the estimated average spawner abundance has been less than the critical depensation threshold in the three consecutive years of lowest abundance within the last twelve years (Williams et al. 2008).

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

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

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

The ESA listed Chetco population of SONCC Coho Salmon may be incidentally affected by the program during fall Chinook Salmon brood collection. Also, there may be indirect

effects of the program fish on listed natural Coho Salmon eggs, fry and adults through competitive interactions for food and space, as well as due to predations activities.

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 Chetco Coho population as a Core, Functionally Independent Population with a High Extinction Risk and an ESU viability recovery goal of 4,500 for the Chetco population. Key limiting stresses are identified as ‘Lack of Floodplain and Channel Structure’ and ‘Degraded Riparian Forest Conditions’.

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

These data or any other productivity measures for listed Coho in the Chetco River are not available.

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

Adult and jack Coho Salmon are identified and enumerated during surveys to count spawning Chinook Salmon. Escapement estimates of wild adult Coho Salmon during Chinook Salmon surveys, has ranged from 0 to a high of 665 in 2001 (Table 2.1, ODFW unpublished data).

Very low densities of juvenile Coho have been found in the Chetco River watershed as indicated in Table 2.2, Table 2.3, and Table 2.4. Western Oregon Rearing Project Abundance Monitoring is the only currently funded project collecting information on presence of juvenile Coho in the Chetco River watershed. Due to the limited number of sites sampled no watershed estimate of juvenile Coho densities have been made.

Table 2.1. Estimated spawning escapement of Coho Salmon to the Chetco River Watershed. Estimates are based on Coho sampled during standard + supplemental 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	10.36	4	207	1	207
1996	6	10.36	0	0	--	0
1997	6	10.36	0	0	--	0
1998	6	9.94	0	0	--	0
1999	6	9.94	0	0	--	0
2000	4	8.74	5	307	1	307
2001	6	10.36	20	1034	0.643	665
2002	4	8.74	0	0	--	0
2003	5	9.54	0	0	--	0
2004	7	10.76	6	299	1	299
2005	3	7.13	0	0	--	0
2006	3	7.13	1	75	1	75
2007	3	7.13	8	601	1	601
2008	3	7.13	1	75	1	75
2009	6	8.64	0	0	--	0
2010	5	8.32	1	64	1	64
2011	9	12.34	3	130	1	130
2012	7	10.89	0	0	1	0
2013	7	10.09	1	53	1	53
2014	6	9.95	5	269	1	269
2015	6	9.95	2	108	1	108

Table 2.2. Information of juvenile Coho Salmon captured during juvenile Chinook Salmon trapping (ODFW unpublished data).

Year	Location	Time Period	Trap type	Juvenile Coho captured
1988	Jack Creek	April 1 to August 2	Modified Adult trapping facility	0
1989	Jack Creek	April 18 to August 4	Modified Adult trapping facility	0
1989	Chetco Mainstem	June 21 to August 4	Humphreys trap	0
1991	Chetco Mainstem	June 11 to July 23	Screw trap	0
1991	Jack Creek	April 8 to July 9	Modified Adult trapping facility	0

Table 2.3. Estimated densities of juvenile Coho at various locations in the Chetco River Basin (1999-2001) (Satterthwaite, 2002). Survey was conducted at 51 locations and at each location 4 pools and 4 riffles were sampled. Locations are described using Universal Transverse Mercator (UTM) grid lines spaced every kilometer or 1000 meters. The vertical grid lines (UTM-E) determine East-West position and the horizontal grid lines (UTM-N) determine North-South position.

Stream	Year	Location		Estimated densities 0+ Coho
		UTM-E	UTM-N	
Chetco River	1999	424736	4669300	0
South Fork Chetco River	1999	410143	4671148	0
South Fork Chetco River	1999	410646	4670582	0
Basin Creek	1999	410625	4670419	0
Henry Creek	1999	427359	4670818	0
Madstone Creek	1999	425689	4668026	0
Red Mountain Creek	1999	414734	4666907	0
South Fork Chetco River	1999	414549	4666496	0
Bravo Creek	1999	397487	4665269	0
North Fork Chetco River	1999	396481	4663393	0
North Fork Chetco River	1999	399321	4660684	0
Joe Hall Creek	1999	396103	4658796	0
Hamilton Creek	1999	399939	4656470	0
Jack Creek	1999	403215	4654938	0

Stream	Year	Location		Estimated densities 0+ Coho
		UTM-E	UTM-N	
Jack Creek	1999	400972	4654714	0
Chetco River	1999	425828	4673738	0
Chetco River	2000	426063	4667826	0
Henry Creek	2000	427334	4670922	0
Quail Prairie Creek	2000	412341	4673980	0
Mineral Hill Creek	2000	405357	4676402	0
Little Chetco River	2000	431611	4669102	0
Tincup Creek	2000	417277	4686469	0
Box Canyon Creek	2000	422982	4680740	0
Chetco River	2000	425734	4667940	0
West Coon Creek	2000	412636	4664426	0
Boulder Creek	2000	417008	4677699	0
Bravo Creek	2000	397520	4665296	0
Emily Creek	2000	402284	4663118	0
West Coon Creek	2000	413221	4664974	0
Quail Prairie Creek	2000	408943	4672913	0
Wilson Creek	2000	402658	4666222	0
Mislatnah Creek	2001	411045	4682422	0
North Fork Chetco River	2001	394357	4669340	0
Red Mountain Creek Tributary	2001	415231	4667169	0
South Fork Chetco River	2001	419185	4666028	0
Eagle Creek	2001	405822	4674190	0.006
Slide Creek	2001	429068	4679022	0
Emily Creek Tributary	2001	408095	4664900	0
Chetco River	2001	425491	4668437	0
South Fork Chetco River	2001	413335	4667470	0
Little Chetco River	2001	425876	4673637	0
Tincup Creek	2001	418455	4688579	0

Stream	Year	Location		Estimated densities 0+ Coho
		UTM-E	UTM-N	
Emily Creek	2001	404363	4663996	0
Nook Creek	2001	410371	4674811	0
Jack Creek	2001	403416	4655199	0
Mineral Hill Creek	2001	405563	4679436	0
North Fork Chetco River	2001	397372	4672144	0
Little Chetco River	2001	428653	4670683	0
Jack Creek	2001	399222	4657155	0
North Fork Chetco Creek	2001	395379	4665865	0
Jack Creek	2001	399873	4656369	0

Table 2.4. Western Oregon Rearing Project Abundance Monitoring of Juvenile Salmonids, Chetco River snorkel survey data, 2003-2004 (Jepsen 2005).

Year	Snorkel Survey Site #	Location	Distance (RM) upstream from Hatchery Release Site	Number of pools sampled for occurrence/density	% of pools containing juvenile Coho	Juvenile Coho density (fish/m ²)
2003	1601	Mainstem	51.6	23/23	0	0.00
2003	1603	Tincup Cr	36.3	31/31	0	0.00
2003	1610	Elk Cr	7.6	34/29	0	0.00
2003	1611	BoxCanyon Cr	41.0	28/28	0	0.00
2003	1615	Eagle Cr	18.7	34/34	0	0.00
2003	1617	Little Chetco	56.1	25/25	0	0.00
2003	1621	Emily Cr	12.5	37/37	0	0.00
2003	1623	S. F. Chetco	16.4	14/14	0	0.00
2003	1626	N. F. Chetco	3.2	6/6	0	0.00
2003	1627	Granite Cr	44.5	20/20	0	0.00
2003	1633	Brokencot Cr	58.8	28/27	0	0.00
2003	1635	Mainstem	34.5	12/12	0	0.00
2003	1641	N. F. Chetco	4.5	10/10	0	0.00
2003	1642	Mainstem	37.1	14/14	0	0.00
2003	1644	Little Chetco	57.0	29/28	0	0.00
2003	1646	Mislatnah Cr	29.0	23/23	0	0.00
2003	1648	Emily Cr	11.7	25/25	8	0.002
2003	1652	Mainstem	57.0	21/21	0	0.00
2003	2202	Mainstem	6.6	4/4	0	0.00
2003	2204	Mainstem	3.2	1/1	0	0.00
2003	2205	Mainstem	18.2	4/3	0	0.00
2003	2207	Mainstem	13.1	4/4	0	0.00
2004	1650	Quail Prairie Cr	21.3	33/33	0	0.00
2004	1652	Mainstem	57.0	23/23	17.4	0.005
2004	1654	Mainstem	37.0	16/16	6.3	<0.001
2004	1656	S. F. Chetco	28.9	29/29	0	0.00
2004	1657	Bravo Cr	8.0	31/31	0	0.00
2004	1658	S. F. Chetco	22.4	16/16	0	0.00
2004	1660	Hamilton Cr	2.8	16/15	0	0.00

Year	Snorkel Survey Site #	Location	Distance (RM) upstream from Hatchery Release Site	Number of pools sampled for occurrence/density	% of pools containing juvenile Coho	Juvenile Coho density (fish/m ²)
2004	1665	N. F. Chetco	7.4	21/21	0	0.00
2004	1666	Panther Cr	16.6	20/20	0	0.00
2004	1668	Little Chetco	52.6	25/25	0	0.00
2004	1673	Emily Cr	7.8	19/19	0	0.00
2004	1674	Red Mtn Cr	30.0	21/21	0	0.00
2004	1676	Little Chetco	55.3	21/21	0	0.00
2004	1678	Mineral Hill Fk	24.4	31/31	0	0.00
2004	1680	Emily Cr	13.6	12/12	0	0.00
2004	1681	N. F. Chetco	11.1	15/15	0	0.00
2004	1682	S. F. Chetco	18.6	16/16	0	0.00
2004	1684	Mainstem	52.6	15/15	0	0.00
2004	1686	Mainstem	31.8	5/5	0	0.00
2004	2208	Mainstem	28.1	3/3	0	0.00
2004	2209	Mainstem	7.5	3/3	0	0.00
2004	2212	Mainstem	16.3	5/5	0	0.00

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

Table 2.1 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 the 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 (see "Attachment 1" for definition 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.

Fall Chinook Broodstock Collection:

Adult Chinook and Coho have similar spawn migration timing in the Chetco River. However, because the numbers of Coho are low, few adult Coho are captured each year during broodstock collection. Consequently, incidental capture of adult Coho is likely to remain at a low proportion over time. Seining and tangle netting to capture brood fish is conducted from late October through mid-December and typically occurs between RM 1 and RM 10. Any Coho caught incidentally are immediately released. No seining mortalities have been observed. There have been no recorded captures of Coho in tangle nets.

Smolt Release to Chetco 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 4 miles of the Chetco River at the time of smolt release.

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

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

Table 2.5. Adult Coho handled during Chetco River fall Chinook broodstock collection 1989-2013.

Brood Year	Males	Females	Jacks	Unknown	Injured/Mortality
1989	0	0	0	0	0/0
1990	0	0	0	0	0/0
1991	0	0	0	0	0/0
1993	0	2	0	2	0/0
1994	0	0	0	0	0/0
1995	0	0	0	*10	0/0
1996	0	0	0	*4	0/0
1997	0	0	0	0	0/0
1998	0	0	0	0	0/0
1999	0	0	0	0	0/0
2000	0	0	0	0	0/0
2001	0	0	0	0	0/0
2002	0	0	0	0	0/0
2003	0	0	0	0	0/0
2004	0	0	0	4	0/0
2005	1	1	0	2	0/0
2006	0	0	0	0	0/0
2007	0	0	0	2	0/0
2008	0	0	0	1	0/0
2009	0	0	0	0	0/0
2010	0	0	1	0	0/0
2011	0	0	0	2	0/0
2012	0	0	0	0	0/0
2013	0	0	0	6	0/0

*Chetco Fall Chinook Salmon Study, 1995 and 1996. ODFW. Intensive 3-month beach seining to capture and tag fall Chinook Salmon.

- 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).

Approximately 10 adult Coho Salmon may be handled during fall Chinook Salmon broodstock collection. Mortality of up to 3 Coho/year is expected during brood collection.

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

Options include:

1. Request an increased take limit to observe/handle/release.
2. Discontinue netting of fall Chinook as take limits are reached.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1) Describe alignment of the hatchery program with ESU-wide hatchery plans or other regionally accepted policies. Explain 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 Chetco 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 2003 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.

Conservation Plan for Fall Chinook Salmon in the Rogue Species Management Unit: Adopted by the Oregon Fish and Wildlife Commission in January 2013, the plan guides management to ensure the conservation of South Oregon Coast fall Chinook stocks and provides guidance for hatchery programs with the SMU.

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

1. ODFW Fish Hatchery Management Policy, adopted 2003.
2. ODFW Fish Health Management Policy.
3. National Pollutant Discharge Elimination System (NPDES) Permit.
4. DEQ Memorandum of Agreement: fish carcass distribution in Oregon streams.
5. ODFW Native Fish Conservation Policy, adopted 2003.
6. Pacific Coast Salmon Fishery Management Plan.
7. Coastal Chinook Salmon Plan, adopted 1991.
8. Conservation Plan for Fall Chinook Salmon in the Rogue Species Management Unit, adopted 2013.

3.3) Relationship to harvest objectives.

Hatchery-produced Chinook Salmon smolts are released at Social Security Bar, river mile 4.0. The hatchery program emphasizes release of smolts rather than pre smolts or fry. This emphasis is based on intent to minimize the potential for competition between hatchery and wild juveniles. Adult hatchery-origin Chinook are intended to supplement commercial and recreational ocean fisheries. Adult hatchery-origin Chinook returning to the Chetco River are intended to return to the release site and remain in the area adjacent to the release site thereby providing anglers with an extended opportunity to harvest the fish.

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.

Estimated fall Chinook harvested from the Chetco River. Includes hatchery and wild fall Chinook Salmon.

Run Year	Angler Hours	Estimated Freshwater Harvest		Freshwater Harvest rate (%)*
		Adult	Jack	
1995	67,082	2,202	597	22.6%
1996	53,545	1,138	531	18.8%

* Harvest rate based on estimated freshwater escapement.

Chetco River fall Chinook Salmon average ocean recovery* for the last ten complete brood years, 1988 to 1997. CA = California. Release area is underlined (Lewis 2004).

Stock Group	Oregon Ocean Catch Area			CA
	4	5	6&7	
Chetco River	.08	.02	<u>.13</u>	.05

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

Summary of estimated catch of fall Chinook in the Chetco River terminal fishery* from week 34-38, during 1992-2013.

Run Year	Estimated Commercial Chinook Catch	Estimated Recreational Chinook Catch
1992	--	706
1993	--	--
1994	1,009	1,078
1995	1,319	829
1996	775	1,281
1997	878	675
1998	596	401
1999	317	447
2000	852	810
2001	599	856
2002	277	301
2003	517	552
2004	249	516
2005	840	495
2006	743	436
2007	233	535
2008	236	280
2009	--	--
2010	529	689
2011	104	289
2012	118	534
2013	155	814
Avg '92-13	517	626

*Mixed Chinook stock fishery.

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 Chetco 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 out 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.

Competition and/or predation by Chinook smolts on Coho and Steelhead, Cutthroat salmonids 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 quantitative and narrative descriptions of the water source, 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 degrees 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 permitted, monitored and reported under the NPDES General Permit 300J issued by Oregon DEQ. Elk River Hatchery remains in compliance with DEQ's NPDES permit water quality standards for temperature and effluent discharge. 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 degrees 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 applied to minimize 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).

Adult Chetco River fall Chinook are collected by seine and tangle net in the lower Chetco River.

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

An insulated, chassis mounted, 1,800-gallon tank with agitation, oxygen supplementation, recirculation and cab mounted dissolved oxygen sensors is used to transport seined adults to the hatchery and smolts to the liberation site at Social Security Bar.

5.3) Broodstock holding and spawning facilities.

Adults are sorted by sex into one of the two separate 17.5' x 75' x 3' holding ponds. 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 3,150,000 eggs/fry. Of this capacity, approximately 6-10 stacks are used for the Chetco River fall Chinook program to incubate a maximum of 900,000 eggs/fry annually.

5.5) Rearing facilities.

Elk River Hatchery rearing facilities for this stock include four 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 loaded onto liberation trucks by forced crowding to a fish pump, and then delivered to the liberation site on Chetco River at RM 4.0. An experimental acclimation facility, located at Ferry Creek Reservoir, is currently utilized for the acclimation of up to 40,000 smolts. The smolts are held in a net pen and acclimated for 2 weeks in the reservoir and then trucked to a release site located at RM 1.5 on the Chetco River. Unfed fry are released into Jack Creek at RM 0.3. Jack Creek enters the Chetco River at RM 4.5. Unfed fry surplus to program needs are released into 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 back-up systems and risk aversion measures applied to minimize the take of listed natural fish resulting from equipment failure, water loss, flooding, disease transmission or other events that could lead to injury or mortality.

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.

Four permanent, full time employees are trained to respond to emergency situations at all times in any weather conditions. Employees living on station are assigned to be on-call 24 hours a 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 disease.

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.

Chetco River fall Chinook Salmon are not an ESA listed population. Broodstock source includes all of the mature unmarked fall Chinook Salmon (hatchery- and natural-origin) collected.

6.2) Supporting information.

6.2.1) History.

Collection and spawning of Chetco River fall Chinook Salmon was initiated in 1968 and used native Chetco 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 is to use up to 200 adult and jack fall Chinook from wild and hatchery origin, including 160 adult and 40 jack Chinook.

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

Based on scale analysis the proportion of naturally-produced fish in the broodstock is 79% (2008-2013). The estimated proportion of hatchery origin fish in the natural spawning population averages 16% (1995-2013). Proposed to maintain a level of at least 30% natural fish in the broodstock (Hatchery Scientific Review Group 2005).

6.2.4) Genetic or ecological differences.

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

6.3) Indicate risk aversion measures applied to minimize adverse genetic or ecological effects to listed natural fish as a result of broodstock selection practices.

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

SECTION 7. BROODSTOCK COLLECTION

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

All broodstock will be mature adult fall Chinook Salmon.

7.2) Collection or sampling design.

Adults are collected by beach seine and/or tangle net from late October through mid-December in the lower 10 miles of the Chetco River.

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 Chetco River fall Chinook are:

1. Collect all available wild CHF, at least 30% of the broodstock
2. Females collected should be at least 800 mm fork length to ensure that no age 3 females are utilized as broodstock
3. Collect males that are larger than females
4. No more than 4% of the collected males should be jacks

7.3) Identity.

Adult fall Chinook Salmon collected during seining or tangle netting are transported to Elk River Hatchery. Broodstock origin is determined by adipose fin clips.

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 60 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 80 pairs in order to minimize the number of wild fish to be collected for broodstock. Up to 40 jacks will be collected for broodstock. Jacks are used to fertilize up to 4% of the egg take.

7.4.2) Broodstock collection levels during 1997-2013.

Brood Year	Males	Adults	
		Females	Jacks
1997	99	109	5
1998	75	61	11
1999	76	104	7
2000	124	134	16
2001	82	114	2
2002	143	134	10
2003	111	140	28
2004	134	150	62
2005	134	104	25
2006	130	64	60
2007	139	120	28
2008	49	52	17
2009	42	44	6
2010	59	58	15
2011	60	57	7
2012	58	44	7
2013	65	70	7

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

None. Currently, all fish collected are included in the broodstock.

7.6) Fish transportation and holding methods.

Adults collected for broodstock are placed onto a fish transport truck and hauled for 1.5 hours north to Elk River Fish Hatchery where they are held until they are ripe to spawn. At the Hatchery, adults are supplied with at least 3000 gpm of fresh water throughout the holding period. Adults held for broodstock are treated with 1:4000 hydrogen peroxide to control fungus.

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 a week. 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 detect the presence of pathogens by ODFW Fish Health Services employees.

7.8) Disposition of carcasses.

Spawned carcasses are transferred for distribution in the Chetco River Watershed to provide nutrient enrichment.

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

Chetco River fall Chinook Salmon are not an ESA listed population. No adverse genetic effects on listed Coho Salmon are expected or anticipated during broodstock collection for fall Chinook program. To minimize the ecological effects on Coho, unmarked Coho captured during Chinook collection will be released unharmed with minimum stress.

SECTION 8. MATING

Describe fish mating procedures used to meet performance indicators identified previously.

8.1) Selection method.

Adults are sorted and examined for ripeness once a week. 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 4% of the egg take.

8.3) Fertilization.

Adults collected from throughout the run are spawned using the full factorial matrix method. Green eggs are sampled from each female and the carcass is inspected internally to detect the presence of any pathogens. If no infectious pathogens are found, a measured portion of eggs from each female is placed into a common vessel and mixed. The eggs are then divided into several 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 4% 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 adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.
Chetco River fall Chinook salmon are not an ESA listed population. No adverse genetic or ecological effects on listed Coho are expected or anticipated from the mating scheme of fall Chinook propagation. The number of adults (hatchery and natural) used and the full factorial matrix method employed ensure robust diversity and preservation of historic age composition and run timing characteristics of the fall Chinook population.

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.

Egg Take and Survival of Egg and Fry during 1992 - 2004.

Brood Year	Eggs Taken	% Survival to Eyed	% Survival Eyed To Swim-Up
1992	777,095	90.71	92.29
1993	432,905	81.42	93.60
1994	195,378	90.94	97.28
1995	514,706	86.48	93.82
1996	438,437	90.75	95.63
1997	415,399	93.02	93.27
1998	189,764	93.45	90.99
1999	309,736	95.72	91.23
2000	318,000	95.25	84.64
2001	338,546	95.84	92.67
2002	245,432	94.23	92.57
2003	227,653	90.00	81.61
2004	373,087	91.66	92.37

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

Surplus eggs are collected to maximize genetic diversity in every spawn group. Surplus fry are released in Garrison Lake.

9.1.3) Loading densities applied during incubation.

Egg size data collected in the late 1980's indicates Chetco 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 throughout incubation. After shocking, eggs are counted and incubated at 5000 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 degrees 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 degrees 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 formalin (1:600 for 3 days on, 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 applied to minimize adverse genetic and ecological effects to listed fish during incubation.

Chetco River stock fall Chinook Salmon are not listed, therefore no adverse effects on listed Coho Salmon are anticipated from the incubation of program fish.

9.2) Rearing:

9.2.1) Provide the most recent twelve years' survival rate data by hatchery life stage (fry to fingerling; fingerling to smolt).

Fry to fingerling and fingerling to smolt survival rate of Chetco fall Chinook, 1992-2004.

Brood Year	Fry Poned	% Survival to Fingerling	% Survival Fry to Smolt	Smolts Released
1992	372,376	98.30	96.11	357,873
1993	339,861	98.60	97.21	330,375
1994	174,236	98.83	95.16	165,798
1995	234,090	98.32	96.69	226,340
1996	239,073	98.42	97.72	233,621
1997	161,949	98.44	97.69	158,208
1998	168,020	98.89	98.07	164,777
1999	161,356	98.67	98.04	158,187
2000	161,927	97.15	96.40	156,092
2001	154,820	98.32	93.11	144,157
2002	157,112	98.79	97.82	153,681
2003	161,258	98.60	97.26	156,835
2004	160,062	98.51	97.67	156,329

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

Target pond load at ponding is approximately 39,000 fry at 900 fish/lb (43.3 lbs of fish) in each of four 8.5' x 38' x 3' (969 ft³) rearing ponds supplied with approximately 150 gpm of fresh water for the first month. This method equals an approximate 0.288 lbs fish/gpm and 0.044 lbs fish/ft³. As fish grow, water flow increases to approximately 250-500 gpm and rearing space increases to an approximate 3,876 ft³. Target size at liberation is 12 fish/lb in mid-September, when pond loads equal 3,200 lbs. This load equals 6.4 lbs fish/gpm and 0.82 lbs fish/ft³.

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 throughout 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 monthly fish growth information including length, weight, and condition factor data collected during rearing.

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

Monthly Growth Information, in fish/pound, of Chetco fall Chinook, 1999-2004.

Month	1999	2000	2001	2002	2003	2004	Average
Feb	889	-	796	809	841	860	839
Mar	567	595	600	428	462	607	543
April	197	224	235	145	180	224	201
May	59	69	70	54	69	73	66
June	39	38	40	35	33	43	38
July	24.4	27.5	22.2	22.9	20.7	25.4	23.9
Aug	15.0	15.5	14.1	14.4	17.1	15.7	15.3
Sept	12.9	12.6	13.5	12.9	15.6	14.7	13.7

9.2.5) Monthly fish growth rate (average program performance)

Predicted average schedule for 155,000 fish from ponding to release.

Date	Temp F	Fish/lb	Lbs Feed/Day	Feed Conversion
28 Feb	49	834	.5	.75
31 Mar	52	530	5-6	1
30 Apr	54	196	12-20	1
31 May	57	64	35-50	1
30 June	61	37	50-70	1.02
31 July	67	23.5	80-100	1.02
31 Aug	65	15.2	110-130	1.1
30 Sept	62	13.5	140	1.1

9.2.6) Indicate food type, daily ration schedule, feeding rate range and estimates of 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 55 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 80 lbs of 1.3 mm BMG, 120 lbs of 1.5 mm BMG and 160 lbs of 2.0 mm BMG. The Bio-Moist Feed (BMF) diet is introduced in early June with 400 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 to produce 1.0 lb of 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, 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 applied to minimize 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, practices and locations through the hatchery program.

10.1) Proposed fish release levels.

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Unfed Fry STEP	1,500	900	January- March	Jack Creek (RM 0.3)
Unfed Fry	40,000	900	January- March	Garrison Lake
Yearling	160,000	12	Mid- October	Chetco River (RM 4.0)
Yearling (Ferry Cr. Acclimation)	40,000	12	Mid- October	Chetco River (RM 1.5)

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

Stream, river, or watercourse: Chetco River 1700150000, Jack Creek 1700150040,
Garrison Lake 1705200000

Release Point: Chetco River (Social Security Bar, RM 4.0; 42.0638N, 124.2292W);
Chetco River (Snug Harbor, RM 1.5; 42.0621N, 124.2673W)
Jack Creek, RM 0.3, 42.0620N, 124.2190W

Major watershed: Chetco River

Basin or Region: Rogue Watershed District

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

Numbers and size (fpp) of Chetco fall Chinook released from BY 1998–2014.

Brood Year	Eggs/ Unfed Fry¹	Avg size (fpp)	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size (fpp)
1997	1,000	900					158,208	12.00
1998	1,000	900					164,777	12.76
1999	1,000	900					158,187	12.97
2000	1,000	900					156,092	12.56
2001	1,000	900					144,157	13.52
2002	1,000	900					153,681	12.89
2003	1,000	900					156,835	15.47
2004	1,000	900					156,338	14.80
2005	1,000	900					144,653	13.64
2006	1,000	900					115,833	15.72
2007	72,912	900					156,271	15.05
2008	30,567	900					147,537	14.55
2009	4,636	900					162,237	11.05
2010	6,444	900					164,927	10.37
2011	20,618	900					154,708	11.07
2012	100	900					136,989	10.44
2013	100	900					182,697	11.63
2014	100	900					190,007	14.38
Average		900					155,785	13.05

Source: ODFW HMS database

¹Up to 1,500 released in Chetco River (Jack Creek) as part of STEP education projects. Remainder are released into Garrison Lake.

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

Brood	Life Stage	Release Date(s)	Release Type
2005	Yearling	8-14 Sept 2006	Crowded/Pumped/Trucked
	Unfed Fry		
2006	Yearling	11-13 Sept 2007	Crowded/Pumped/Trucked
	Unfed Fry		
2007	Yearling	15-18 Sept 2008	Crowded/Pumped/Trucked
	Unfed Fry		
2008	Yearling	15-17 Sept 2009	Crowded/Pumped/Trucked
	Unfed Fry		
2009	Yearling	12-15 Oct 2010	Crowded/Pumped/Trucked
	Unfed Fry		
2010	Yearling	18-21 Oct 2011	Crowded/Pumped/Trucked
	Unfed Fry		
2011	Yearling	15-18 Oct 2012	Crowded/Pumped/Trucked
	Unfed Fry		
2012	Yearling	14-17 Oct 2013	Crowded/Pumped/Trucked
	Unfed Fry		
2013	Yearling	13-30 Oct 2014	Crowded/Pumped/Trucked
2014	Yearling	9/14-11/6, 2015	Crowded/Pumped/Trucked

Yearling liberation timing is designed for post-emigration of natural Chinook smolts in the Chetco River. Beginning with the 2009 brood mid-October releases were implemented in order to improve survival (survival rates of September releases were very low, presumably due to warm water temperatures typical during mid-September).

10.5) Fish transportation procedures, if applicable.

Yearling releases are accomplished by lowering rearing pond water levels, crowding fish by hand to a fish pump which loads liberation trucks supplied with agitation/aeration and supplemental oxygen. Time in transit is approximately 1.5 hours. Oxygen is diffused through ceramic air stones at 3 liters/minute. Temperature control is not used unless necessary.

10.6) Acclimation procedures.

Up to 40,000 smolts are transported to Ferry Creek Reservoir between Sept. 15 and Oct. 15 for acclimation. Smolts are loaded into a net pen and held for 2 weeks then netted, loaded on a liberation truck and transported 1 mile to a release site at RM 1.5 on the Chetco River. Transit time is approximately 30 minutes. Oxygen is diffused through

ceramic airstones at 3 liters/minute.

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

Approximately 25% of hatchery released smolts are adipose fin-clipped and coded wire tagged. The remaining production is 100% is adipose 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 applied to minimize adverse genetic and ecological effects to listed fish resulting from fish releases.

Rearing and release strategies are designed to minimize ecological interactions between hatchery and naturally produced fish. Fish are reared to a size which is sufficient to cause 95-100% smoltification within the entire population, reducing retention time during seaward migration. Chetco River stock fall Chinook are reared on Elk River water for seven to ten months prior to liberation in the lower Chetco, which is proven to reduce stray rates to natural populations. In addition, yearling releases of Chetco River 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 mainstem/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 Chetco 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

This section describes how “Performance Indicators” listed in Section 1.10 will be monitored. Results of “Performance Indicator” monitoring will be evaluated annually and used to adaptively manage the hatchery program, as needed, to meet “Performance Standards”.

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 for 2005/2006)
Statistical creel on an annual basis; ocean (currently funded for 2005/2006), and freshwater (not currently funded).

Chinook smolts will be 100% adipose fin-clipped starting with 2006 brood year.

Chinook smolts will be 100 % marked starting with 2006 brood year (currently funding is available to mark only 18% of the smolt release).

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

District staff will continue to monitor juvenile Chinook near the release site 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.

District ODFW staff and Elk River Hatchery personnel will be better able to monitor wild Chinook numbers incorporated in the broodstock after 100% adipose fin-clipping is implemented.

Release groups will meet ODFW fish health standard.

ODFW fish pathology will sample the hatchery cohorts prior to releases (currently funded for 2005/2006).

A conservation plan will be developed for the appropriate Species Management Unit (SMU).

A conservation plan was adopted by the Oregon Fish and Wildlife Commission January 2013.

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

Funding level is noted in 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.

Any Coho juveniles captured during smolt trapping and estuary seining will be immediately returned to the river.

Conduct spawning ground surveys on an annual basis.

No effect.

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

*Provide the following information for any research programs conducted in **direct association with the hatchery program described in this HGMP. Provide sufficient detail to allow for the independent assessment of the effects of the research program on listed fish.** If applicable, correlate with research indicated as needed in any ESU hatchery plan approved by the co-managers and NMFS. Attach a copy of any formal research proposal addressing activities covered in this section. Include estimated take levels for the research program with take levels provided for the associated hatchery program in **Table 1.***

Currently no research is being conducted in association with the Chetco River fall Chinook hatchery program.

12.1) Objective or purpose. N/A

12.2) Cooperating and funding agencies. N/A

12.3) Principle investigator or project supervisor and staff. N/A

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. N/A

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

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” (attachment 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. N/A

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

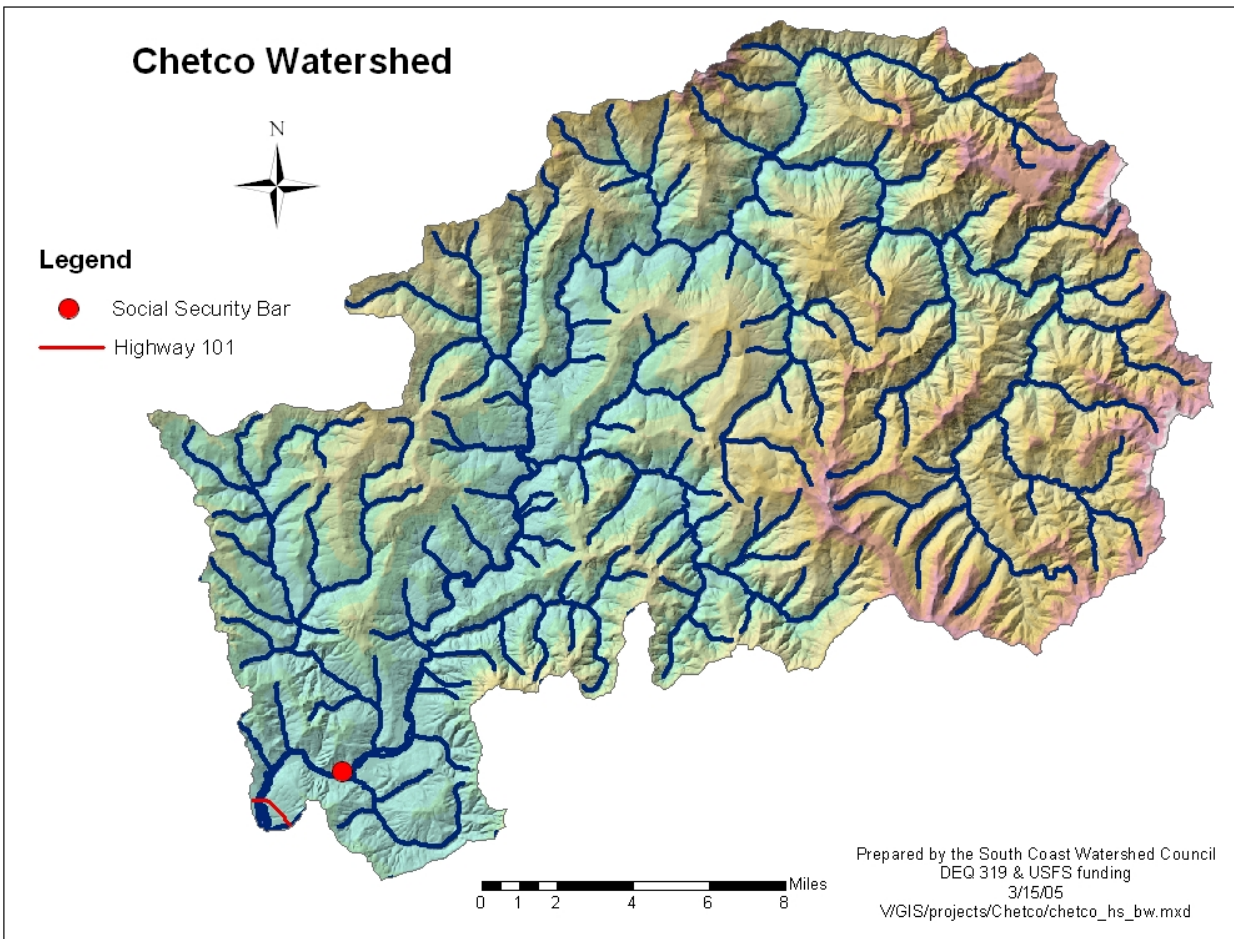
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Map of Chetco Watershed



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 and Northern California Coast Activity: Fall Chinook Broodstock Collection				
Location of hatchery activity: Chetco River (RM 2.0 to 10.0) Dates of activity: October 15 to December 15				
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)			10	
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)			3	
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	<u>SIZE CRITERIA</u>	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.