HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	**Indian Creek STEP Hatchery Program**
Species or Hatchery Stock:	**Fall Chinook Salmon (Lower Rogue Stock 61)**
Agency/Operator:	**Oregon Department of Fish and Wildlife**
Watershed and Region:	**Rogue Watershed, Southwest Region**
Date Submitted: **First Update Submitted:** **Second Update Submitted:**	**July 10, 2006** **September 8, 2014** **June 7, 2016**
Date Last Updated:	**June 6, 2016**

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Indian Creek STEP Hatchery Program (Fall Chinook Salmon).

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

The lower Rogue River fall Chinook Salmon *Oncorhynchus tshawytscha* Stock 61. ESA Status: Neither wild nor hatchery stock of lower Rogue River fall Chinook are ESA-listed populations.

1.3) Responsible organization and individuals.

Lead Contact:

Name (and title):	Scott Patterson, Fish Propagation Program Manager
Agency or Tribe:	Oregon Department of Fish and Wildlife
Address:	4034 Fairview Industrial Drive NE, Salem, OR 97302
Telephone:	(503) 947-6218
Fax:	(503) 947-6202
Email:	Scott.D.Patterson@state.or.us

On-site Operations Contact:

Name (and title):	Todd Confer, District Fish Biologist
Agency or Tribe:	Oregon Department of Fish and Wildlife
Address:	29907 Airport Way/ PO Box 642, Gold Beach, OR 97444
Telephone:	(541) 247-7605
Fax:	(541) 247-2321
Email:	Todd.A.Confer@state.or.us

Name (and title):	John Weber, STEP Biologist
Agency or Tribe:	Oregon Department of Fish and Wildlife
Address:	29907 Airport Way/ PO Box 642, Gold Beach, OR 97444
Telephone:	(541) 247-7605
Fax:	(541) 247-2321
Email:	John.A.Weber@state.or.us

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

Volunteer groups associated with the Salmon and Trout Enhancement Program (STEP) including Curry Anadromous Fisherman, Oregon South Coast Fisherman Inc., Friends of CA/OR, Southern Oregon Sport Fisherman, and Curry Sportfishing Association.

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

Approximately 100-150 volunteers, primarily members of Curry Anadromous Fishermen, assist the program providing an average of 3500 hours annually performing fish culture duties, collecting broodstock, fund raising and conducting educational events. Volunteers monetarily support the facilities through fund raising, grants, membership fees, sponsorships and donations.

Table 1-1. Estimated annual costs.

Item	**Cost/Value**	**Funding Source**
Labor	$78,000.00	STEP/Volunteer Labor
Operations	$10,000.00	Memberships/Donations/Grants
Fish Food	$2,620.00	ODFW STEP/R & E Grant
Coded Wire Tag	$2,610.00	Stock Assessment
Technical Assistance	$6,372.00	ODFW STEP Biologist
Minimum Annual Cost	**$99,602**	

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

Indian Creek Hatchery is located in Oregon on Indian Creek in Rogue River Basin. Indian Creek Hatchery is 0.8 kilometers upstream from the confluence of Indian Creek and the Rogue River. Indian Creek enters the Rogue River at RKm 2.3. Indian Creek Hatchery is approximately 3.0 kilometers northeast of the City of Gold Beach at latitude 42º 25’ 32’’ N and longitude 124º 23’ 50’’ W. The elevation of the hatchery site is approximately 24 feet above the sea level. Broodstock trapping, holding, spawning, and rearing take place at this location. The ODFW water body code for Indian Creek is 1500200020 and the regional mark processing code for Indian Creek Hatchery is 5F22241 H41 21.

Release Location:

Table 1-2. Hatchery fall Chinook release locations.

Life Stage	**Release**	**RKm**	**Basin**	**State**	**Waterbody Code**
Smolt	Mainstem Rogue River	RKm 1.5	Rogue	Oregon	1500200000
Unfed fry	Libby Pond	RKm 16.5	Rogue	Oregon	1508800000
Unfed fry	Garrison Lake		Garrison Lake	Oregon	1705200000
Unfed fry	Euchre Creek	RKm 5.0	Euchre	Oregon	1700105000

1.6) Type of program.

The Indian Creek Hatchery program is an Isolated Harvest Program.

1.7) Purpose (Goal) of program.

Since 1997 the goal of the Indian Creek fall Chinook program has been to provide fish for commercial and sport fishing harvest, while minimizing any potential adverse impacts to the wild populations, particularly the Southern Oregon Northern California Coast (SONCC) Coho Salmon which is listed as threatened population under the federal ESA.

Prior to 1997 Indian Creek was operated as a rehabilitation program to assist the recovery of the lower Rogue fall Chinook population.

1.8) Justification for the program.

The program provides adult Chinook Salmon for commercial and recreational ocean fisheries and a recreational fishery on the lower Rogue River. 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, critical life stages and special habitat requirements through the STEP program. The program minimizes indirect impacts to listed and other candidate species by implementing measures for brood collection techniques, rearing and release strategies.

Brood Collection:
A temporary weir is installed in Indian Creek in order to direct returning adults to a ladder that is located at the downstream end of the Indian Creek Hatchery site. Migrating fish enter and progress up the ladder until trapped. Naturally produced Chinook are also collected from the lower Rogue River (RKm 3.0 – 17.0) by beach seine, tangle net and hook and line. Brood fish are collected from throughout the run of lower Rogue fall Chinook (October through November 30) in order to maintain the genetic diversity of the population. The lower Rogue River fall Chinook are targeted for broodstock collection. However, broodstock collected for the Indian Creek fall Chinook program may include lower Applegate and Illinois fall Chinook due to their similar migration timing (ODFW, 1992). Tangle net, beach seine and hook and line collection will cease 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. Smolts are released incrementally between July and September. The smaller release groups minimize interaction with the naturally produced juvenile populations. Smolts are mass marked with an adipose fin-clip, beginning with 2007 release, allowing for improved monitoring of stray rates, and improved broodstock selection. Mark rate averages 85% annually. Smolts are released in the Rogue River estuary, at river kilometer 1.5 in order to expedite their migration to the sea.

Juvenile Coho Salmon 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 Rogue River at the time of smolt release may be subject to competition with hatchery produced fall Chinook smolts.

Unfed Fry are released between February and March. Unfed fry releases consist of fry excess to the needs of the smolt program. Unfed fry are released into standing waterbodies (Libby Pond, Garrison Lake) with limited access for anadromous populations in order to minimize ecological and genetic impacts. Unfed fry are also released into Euchre Creek, where no independent fall Chinook or Coho Salmon populations are thought to exist.

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

Table 1-3. Performance Standards, Indicators, and Monitoring for Benefits and Risks.

BENEFITS Performance Standards	**BENEFITS Performance Indicators**	**BENEFITS Monitoring & Evaluation**
Provide hatchery Chinook for an isolated harvest program.	• Program fish contribute to ocean and freshwater fisheries. • All smolt production will be adipose fin-clipped each year. Stock assessment release groups will be coded-wire tagged, as funds allow, to determine survival rate.	• Freshwater and ocean angler creel on an annual basis. • CWT retention checks to confirm mark rate. • Determine smolt to adult survival rate using voluntary return of CWTs by anglers.
Program fish provide societal benefits	• Program fish provide a venue for community and volunteer involvement. • Economic benefit to rural Curry County communities.	• Volunteer involvement is recorded and compiled annually. • Periodic evaluations are conducted to determine the contribution of program fish to the ocean and freshwater fishery.
Healthy fall Chinook are released.	• Release groups will meet ODFW fish health standards. • Release timing and size at release will mimic naturally produced fall Chinook	• Conduct appropriate health checks throughout incubation, rearing, and prior to release. • Document size and age of program fish prior to release and compare with naturally produced smolts.

The fall Chinook hatchery program will meet the criteria provided by the Native Fish Conservation Policy.	• A Conservation Plan was adopted Jan. 2013 for the Rogue fall Chinook Species Management Unit (SMU).	• Procedures for assessing stock status and risks included in the Conservation Plan.
RISKS **Performance Standards**	**RISKS** **Performance Indicators**	**RISKS** **Monitoring & Evaluation**
Life history characteristics of hatchery Chinook will not diverge significantly from naturally produced fall Chinook.	• Release of program fish mimic the emigration of naturally produced Chinook. • 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.	• Downstream monitoring techniques will evaluate juvenile emigration and size. • Adult return timing and in-season broodstock collection recorded by District staff.
Releases of hatchery fall Chinook have minimal impact on listed Coho salmon.	• Program fish are released in the mainstem at river kilometer 1.5 at a time when most juvenile Coho are rearing in tributaries.	• Releases made when and where scheduled.
Hatchery operations comply with the Fish Hatchery Policy and other state and federal guidelines and permits.	• 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.	• Fish health is certified prior to release. • Appropriate protocols will be followed for monitoring water quality. • Screens will be checked on a regular basis.
Broodstock collection will have minimal impact on listed Coho salmon.	• Remove Coho salmon from beach seine and tangle net immediately and return to the Rogue River.	• Record the date and number of Coho captured. • Record the number of fall

	• Mainstem tangle netting and beach seining operations will be suspended for the day if more than three wild Coho are captured.	Chinook used for brood.

1.11) Expected size of program.

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

The program goal for broodstock collection is up to 98 Chinook including 44 male, 44 female and 10 jack Chinook.

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

Table 1-4. Proposed fish release levels, locations and life stages.

Life Stage	Release Location	Annual Release Goal
Eyed Eggs	None	
Unfed Fry[1]	Libby Pond, Garrison Lake, Euchre Creek.	10,000
Fry	None	
Fingerling	None	
Yearling	Rogue River (RKm 2.5)	90,000

[1] Goal is to minimize production of surplus fry (<10,000). Due to annual variations in survival up to 30,000 surplus fry may be produced

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 1-5. Estimated contribution and survival rates of hatchery fall Chinook smolts released from Indian Creek Hatchery (Lewis 2004).

Brood Year	Smolt Release	#Ad+CWT	Ocean Commercial Harvest	Ocean Sport Harvest	Freshwater Sport Harvest[1]	Smolt to Adult Survival Rate %
1988	165,458	78,386	25	13		0.23
1989	70,274	53,933	29			0.08
1990						
1991	30,240	25,476	159	40	6	1.11
1992	14,236	13,638	102	30	9	1.53
1993	28,855	27,081	78	9	11	0.49
1994	53,817	22,910	17	3		0.26
1995	39,546	24,037	15	5		0.19
1996	71,144	31,633	17	3	43	0.19
1997	74,167	71,100	292	55	190	1.38
1998	68,065	62,948	183	26	45	0.59
1999	80,805	75,187	998	40	38	1.81
2000	72,250	67,752	1330	63	28	2.46

[1] Minimum harvest estimate based on voluntary return of Ad-CWT snouts by anglers.

Table 1-6. Estimated fall Chinook spawner escapement and hatchery proportions in the lower Rogue population area, 1986-2015 (escapement estimates are based on peak counts observed on standard and supplemental spawning ground surveys; and the proportion of hatchery-origin fish is determined from recovery of adipose fin-clipped carcasses).

Year	Spawning escapement	p hatch	# wild	# hatchery
1986	3,744	0.01	3,706	37
1987	8,171	0.01	8,089	82
1988	5,509	0.01	5,454	55
1989	2,656	0.01	2,629	27
1990	535	0.01	530	5
1991	648	0.04	623	25
1992	3,846	0.04	3,697	149
1993	322	0.04	310	12
1994	1,156	0.04	1,112	45
1995	2,223	0.04	2,137	86
1996	2,683	0.04	2,579	104
1997	1,615	0.03	1,571	44
1998	2,876	0.03	2,797	79
1999	3,086	0.03	3,001	85
2000	9,762	0.03	9,494	268
2001	13,713	0.03	13,335	377
2002	41,723	0.03	40,576	1,147
2003	35,908	0.03	34,921	988
2004	18,791	0.03	18,274	517
2005	7,187	0.03	6,990	198
2006	2,673	0.03	2,599	73
2007	1,176	0.03	1,143	32
2008	2,287	0.03	2,224	63
2009	10,572	0.03	10,297	275
2010	14,595	0.03	14,149	446
2011	11,829	0.01	11,715	115
2012	3,922	0.04	3,759	163
2013	3,995	0.09	3,646	349
2014	5,809	0.03	5,615	194
2015	6,012	0.04	5,749	263

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

The first smolt release of this program occurred in 1985.

1.14) Expected duration of program.

The Indian Creek fall Chinook program is on-going with no planned termination.

1.15) Watersheds targeted by program.

Targeted watershed is the lower Rogue River watershed, ODFW waterbody code 1500200000.

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. Indian Creek fall Chinook hatchery program and ESA listed Coho.

Issue 1: Straying
Straying of hatchery produced fish is 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) has averaged 3% annually since 2000 (Table 1-6. ODFW unpublished data).

Issue 2: Release Strategies
Release of program fish affects only the lower 1.5 kilometers of the Rogue 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 rearing in the lower mainstem/estuary of the Rogue River 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 Indian Creek Fall Chinook Hatchery Program

Pros: Eliminate potential risk to listed Coho due to interaction with hatchery fall Chinook in the Lower Rogue 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 and eliminate the education and public outreach program.

Alternative 2: Reduce the number of hatchery fall Chinook smolts released into the Lower Rogue River.

Pros: Reduce potential risk to listed Coho due to interaction with hatchery fall Chinook

in the Lower Rogue River Watershed and reduce the incidental take of Coho during broodstock collection.

Cons: Reduce the number of hatchery Chinook available for commercial and recreational fisheries and will also reduce volunteers' participation and public outreach.
Alternative 3: Reduce or eliminate the hatchery fall Chinook unfed fry program.

Pros: Reduce potential risk to listed Coho due to interaction with hatchery fall Chinook in the Lower Rogue River Watershed.

Cons: Would require that fry produced in excess of the needs of the smolt program be destroyed.

Alternative 4: Increase the number of hatchery fall Chinook smolts released into the lower Rogue River.

Pros: Provide additional hatchery fall Chinook for the commercial and recreational fisheries.

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

1.16.3) Potential Reforms and Investments.

Reform/Investment 1: Purchase additional transport tank for broodstock collection and smolt releases. The efficiency of broodstock collection could be increased by having better access transportation equipment. 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 transport tank is estimated at $4,000.

Reform/Investment 2: Increase Ad-CWT to 100%. Marking all hatchery smolts will improve identification of hatchery and wild fall Chinook when mainstem beach seining and tangle netting. In addition, by marking all hatchery smolts released, ODFW can more efficiently monitor the interaction between hatchery and naturally produced fish and develop better management practices to protect listed Coho and other naturally-produced native fish. The cost may be $10,000/year.
Beginning in 2007 smolt releases are 100% adipose fin-clipped, allowing improved identification of hatchery-produced fall Chinook during broodstock collection and spawning ground surveys.

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 program was submitted to NMFS on 7/10/2006 for approval and ESA coverage. This is an updated version of the previously submitted HGMP and is consistent with the ODFW's Rogue Fall Chinook Conservation Plan.

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 Lower Rogue population may be affected by this propagation program.

Lower Rogue Coho Salmon Life History

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

- While the Rogue River basin still produces many Coho Salmon, the indigenous stock adapted to the lower Rogue River sub-basin is diminished in range and abundance (USFS 2000a).
- Williams et al. (2006) used models to estimate that the lower Rogue River had 80.9 intrinsic-potential kilometers (IP-km) of Coho Salmon habitat, with the highest IP habitats concentrated mostly in tributaries near the estuary. An estimated 37 Coho Salmon spawners would be needed to fully utilize each IP-km, and would have produced an annual Coho Salmon population of 3,000 adults (Williams et al. 2008).
- Monitoring reports for the years 1998 through 2004 indicated that Coho Salmon are well distributed but at low levels in Lobster Creek, Quosatana Creek, Silver Creek, and Tom Fry Creek (ODFW 2005a). The Lower Rogue Watershed Council (2010) also found Coho Salmon in Edson Creek, Ranch Creek, and Saunders Creek.
- The Expert Panel stated key concerns for the Lower Rogue River were primarily loss of over-winter tributary habitat for juveniles, especially in the lowlands which are naturally very limited in this system and have been impacted by past and current forestry practices and rural residential development. (ODFW 2008b).
- The lower Rogue River population is at high risk of extinction because 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 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 populations of SONCC Coho Salmon may be incidentally affected by the program during brood collection. Four SONCC Coho populations have been identified in the Rogue Basin, including populations present in the Illinois River, Middle Rogue River (including Applegate River), lower Rogue, and upper Rogue River (NOAA, 2006). The naturally-produced eggs, fry, and adults of listed SONCC Coho Salmon may be indirectly affected by the program fish through competitive interactions for food and space, as well as through predation 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 lower Rogue River Coho population as a Non-Core, Potentially Independent Population with a High Extinction Risk and an ESU viability recovery goal of 320. Key limiting stresses are identified as 'Lack of Floodplain and Channel Structure' and 'Impaired Water Quality'.

The upper Rogue River Coho population is identified as a Core, Functionally Independent Population with a Moderate Extinction Risk and an ESU viability recovery goal of 13,800. Key limiting stresses are identified as 'Altered Hydrologic Function' and 'Impaired Water Quality'.

The middle Rogue/Applegate River Coho population is identified as a Non-Core, Functionally Independent Population with a High Extinction Risk and an ESU viability recovery goal of 2,400. Key limiting stresses are identified as 'Lack of Floodplain and Channel Structure' and 'Altered Hydrologic Function'.

The Illinois Coho population is identified as a Core, Functionally Independent Population with a High Extinction Risk and an ESU viability recovery goal of 11,800. Key limiting stresses are identified as 'Altered Hydrologic Function' and 'Degraded Riparian Forest Conditions'.

ODFW does not routinely monitor Coho escapement to individual population areas but total escapement of the aggregate populations is estimated at Huntley Park (RM 8). Estimates of run size of Coho salmon to the Rogue River Basin for 2000-2014 are presented in Table 2-1 (Sounhein et al. 2015). Estimates of wild fish are based on the observation of fin-marks at the Huntley Park seining site (Jacobs et al. 2002). The

estimated escapement of wild Coho to the Rogue River has ranged from 394 to24,231 and has averaged 7,369 since 2000.

Table 2-1. Estimated natural spawning population of Coho in the Rogue River, 2000 - 2014. Mark-recapture estimate derived through capture at the Huntley Park seine site (~ River Mile 8).

Return Year	Adult Wild Coho	Adult Hatchery Coho	Total	% Hatchery (pHOS)
2000	10,895	908	11,803	7.7
2001	11,654	1,214	12,868	9.4
2002	8,385	1.154	9,539	12.1
2003	6,534	915	7,449	12.3
2004	24,231	1,230	25,461	5.1
2005	9,715	479	10,194	4.7
2006	3,750	325	4,075	8.0
2007	5,103	83	5,186	1.6
2008	394	0	394	0.0
2009	2,566	0	2,566	0.0
2010	3,671	50	3,721	1.3
2011	4,545	71	4,616	1.5
2012	5,474	68	5,542	1.2
2013	11,210	44	11,254	0.4
2014	2,409	0	2,409	0.0
2015	4,072	199	4,271	4.7

Information specific to the lower Rogue River Watershed is less available. From 1998 through 2008 randomly selected Coho spawning surveys were conducted on tributaries of the lower Rogue River. In addition Coho Salmon are occasionally observed on fall Chinook Salmon surveys. Based on spawning surveys the estimated wild adult spawner abundance has ranged from 0 to a high of 281 in 2013 (Table 2-2, ODFW unpublished data).

Table 2-2. Estimated spawning escapement of Coho Salmon to the lower Rogue population area based on randomly selected Coho spawning surveys and standard + supplemental Chinook surveys, 1998-2015.

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**
1998	6	7.61	0	0	--	0
1999	6	7.61	0	0	--	0
2000	3	4.52	1	59	1	59
2001	9	13.47	157	3,090	0.08	235

2002	8	13.47	22	433	0.47	205
2003	8	10.65	3	75	1	75
2004	7	10.41	5	127	1	127
2005	4	6.28	3	127	1	127
2006	9	15.00	2	35	1	35
2007	10	15.11	11	193	1	193
2008	6	10.10	7	184	1	184
2009	5	9.03	2	59	1	59
2010	6	10.60	0	0	--	0
2011	7	11.94	4	89	0.50	44
2012	6	8.75	0	0	--	0
2013	7	10.36	11	281	1	281
2014	7	10.36	1	26	1	26
2015	7	10.36	0	0	--	0

- 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.

Estimates of total stock abundance for the years 1980-2001 of Rogue River Coho are presented in Figure 2-1 (Jacobs et al. 2002).

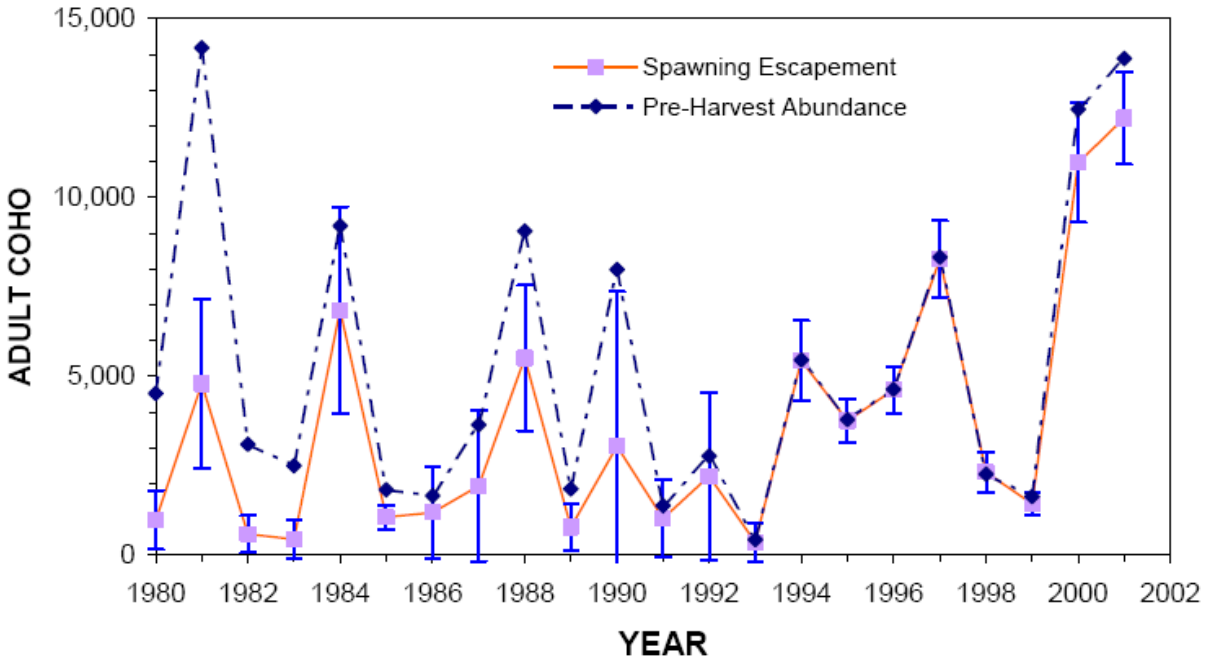


Figure 2-1. Trends in spawning escapement and pre-harvest abundance of Rogue River Coho Salmon, 1980-2001. Vertical bars represent 95% confidence intervals for estimates of spawner abundance.

Ocean fishery harvest can be estimated through coded-wire tag recoveries of Coho released from Cole Rivers Hatchery. Accounting for this harvest shows a somewhat different pattern of Rogue Coho abundance than run size estimates. Significant harvest occurred during 1980-90. Given this, total stock abundance peaked at about 14,000 adults in 1981 and 2001 (Jacobs et al. 2002).

Estimates of the ratio of adult recruits per spawner for the 1980-98 brood years of Rogue River Coho are shown below in Figure 2-2. This measure of survival has shown no discernable pattern over the 17-year period. Survival has shown dramatic inter-annual variation, ranging from less than one to greater than twelve recruits per spawner. Spawners failed to replace themselves five times during this period. Survival was highest for the 1985 and 1993 brood years when levels of about 8 and 13 recruits per spawner occurred (Jacobs et al. 2002).

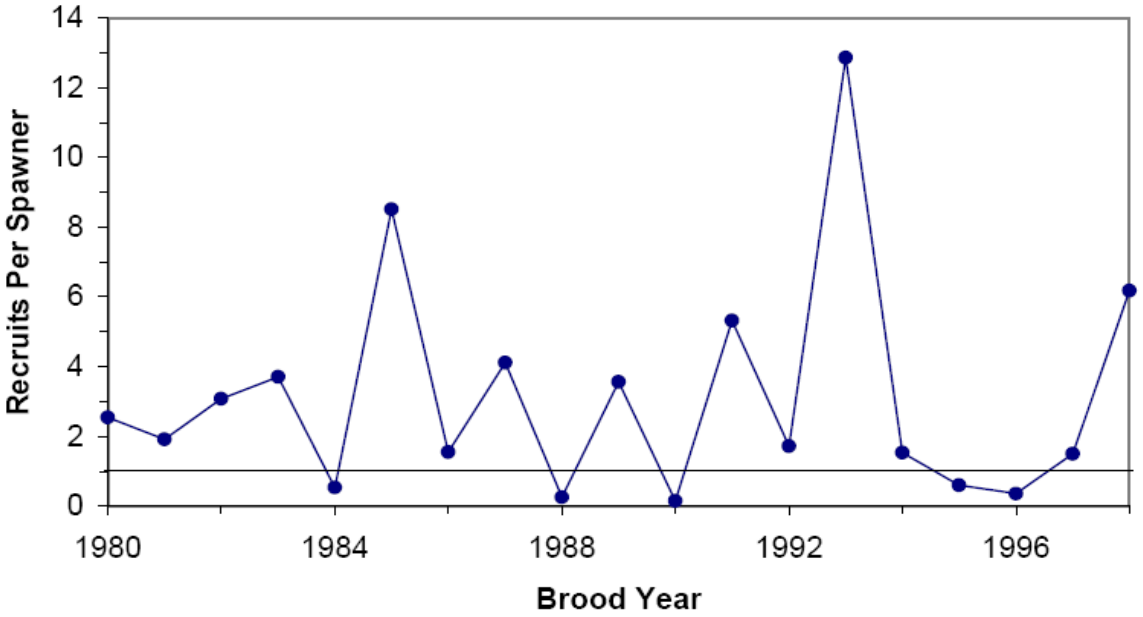


Figure 2-2. Estimated recruit per spawner ratio for adult Rogue River Coho salmon during the 1980-98 brood years. Horizontal line depicts level of spawner replacement.

- 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.

See Table 2-1 for Rogue River Coho abundance and Table 2-2 for lower Rogue spawning escapement estimates.

Spawner Distribution

The distribution of adult Coho spawners among annual random sites in the Rogue River Basin is shown in Figure 2-3. Spawner densities are adjusted to compensate for

differences in spawner abundance among the four return years. What this figure illustrates is the interannual consistency (or variability) of spawner distribution among these sites (Jacobs et al. 2002).

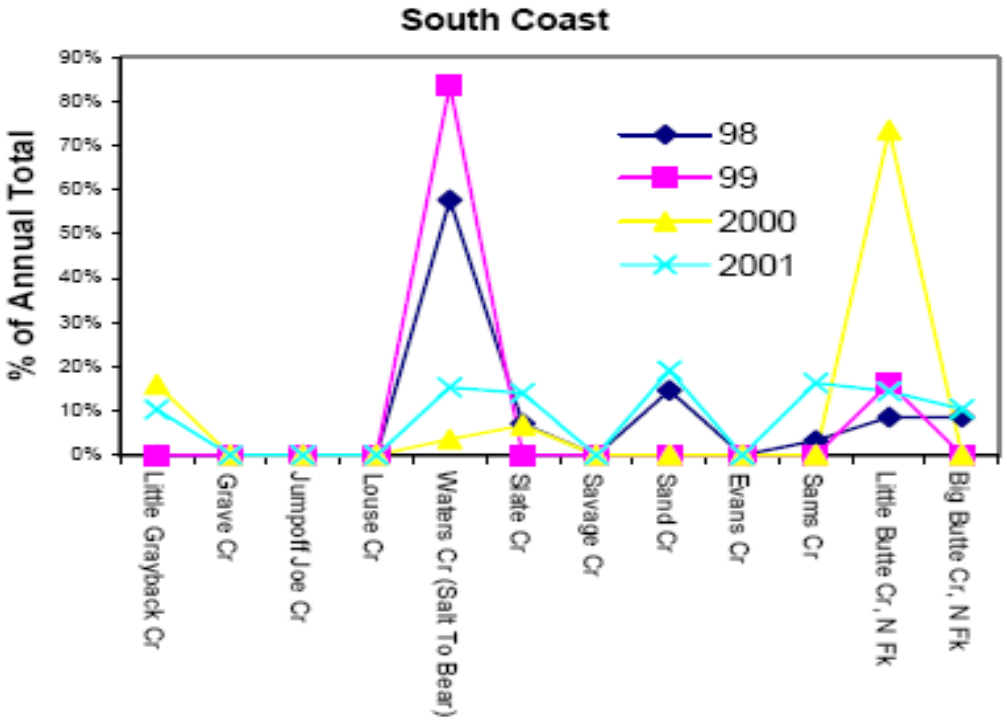


Figure 2-3. Distribution of adult Coho spawners among annual random sites in the Rogue River Basin, 1998-2001. Data are plotted as the proportion of annual total abundance among all sites that each individual site comprises. Only sites having valid Area Under the Curve (AUC) estimates in each of the four years are used.

Juvenile Abundance

In the summer of 1998 the Western Oregon Rearing Project began a program to monitor juvenile Coho salmon in Oregon coastal streams. The project is designed to monitor trends in abundance of juvenile Salmonids rearing in five coastal Monitoring Areas, including the South Coast Monitoring Area (Jepsen and Rodgers, 2004).

Figure 2-4 below depicts frequency of occurrence and density indices for the abundance of juvenile Coho in the South Coast Monitoring Area for the 1997-2002 brood years. The South Coast Monitoring Area includes the Rogue River Basin and direct ocean tributaries south of Cape Blanco. The percent of sites with at least one juvenile Coho has ranged from 54% to 81%. The percent of sites with a density of at least 0.7 coho/meter^2 has ranged from 5% to 50%. The average percent of pools per site with at least one juvenile Coho has ranged from 32% to 67%.

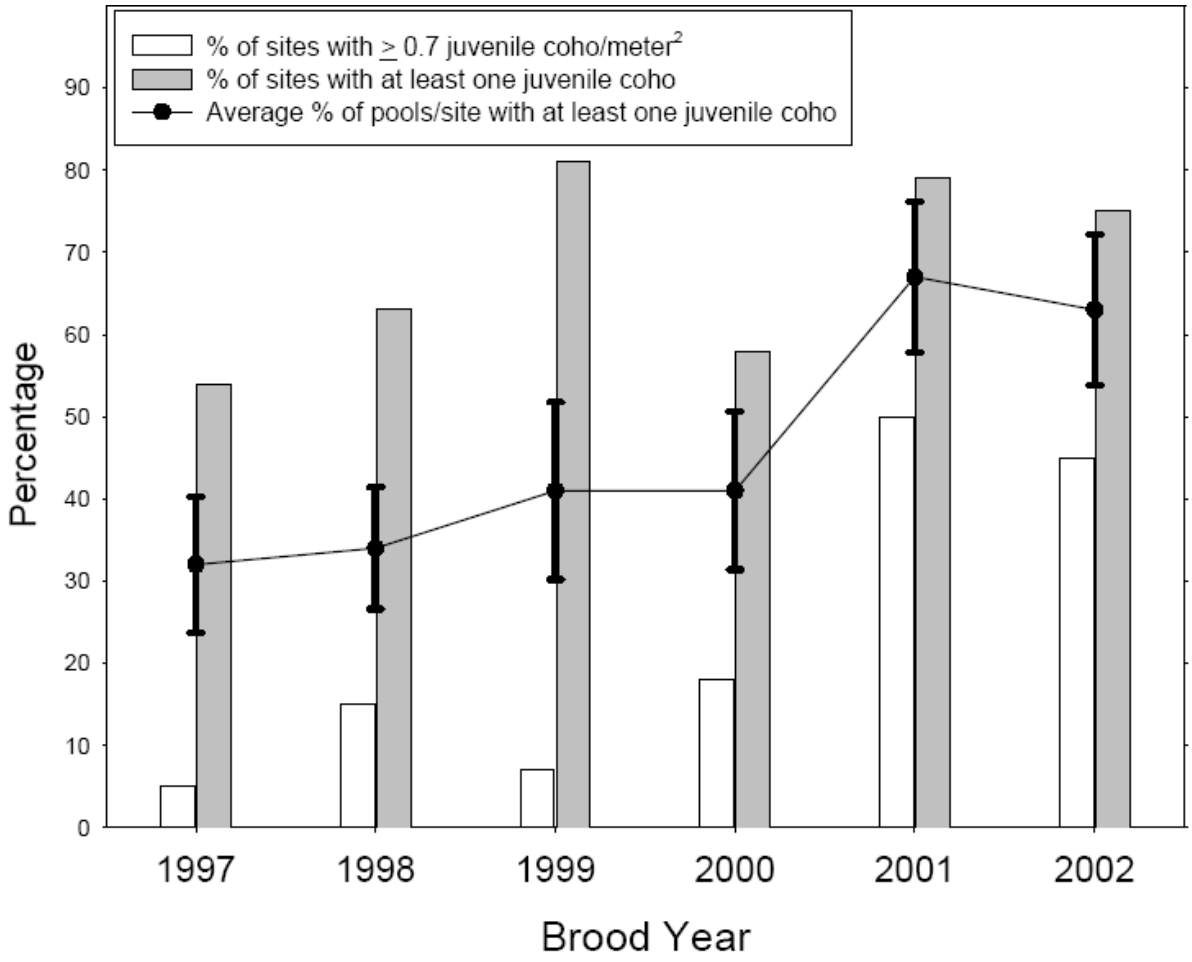


Figure 2-4. Abundance indices for juvenile Coho in the South Coast Monitoring Area, 1997-2002 brood years. Error bars represent 95% confidence intervals.

See Figure 2-5 below that summarizes sample sites specific to the lower Rogue River Watershed for the 1997-2003 brood years. Frequency of occurrence and density of juvenile Coho are much lower than in the South Coast Monitoring Area overall. In the lower Rogue River Watershed the percent of sites with at least one juvenile Coho has ranged from 0% to 67%. The percent of sites with a density of at least 0.7 coho/meter^2 is 0%. The average percent of pools per site with at least one juvenile Coho has ranged from 0% to 34%.

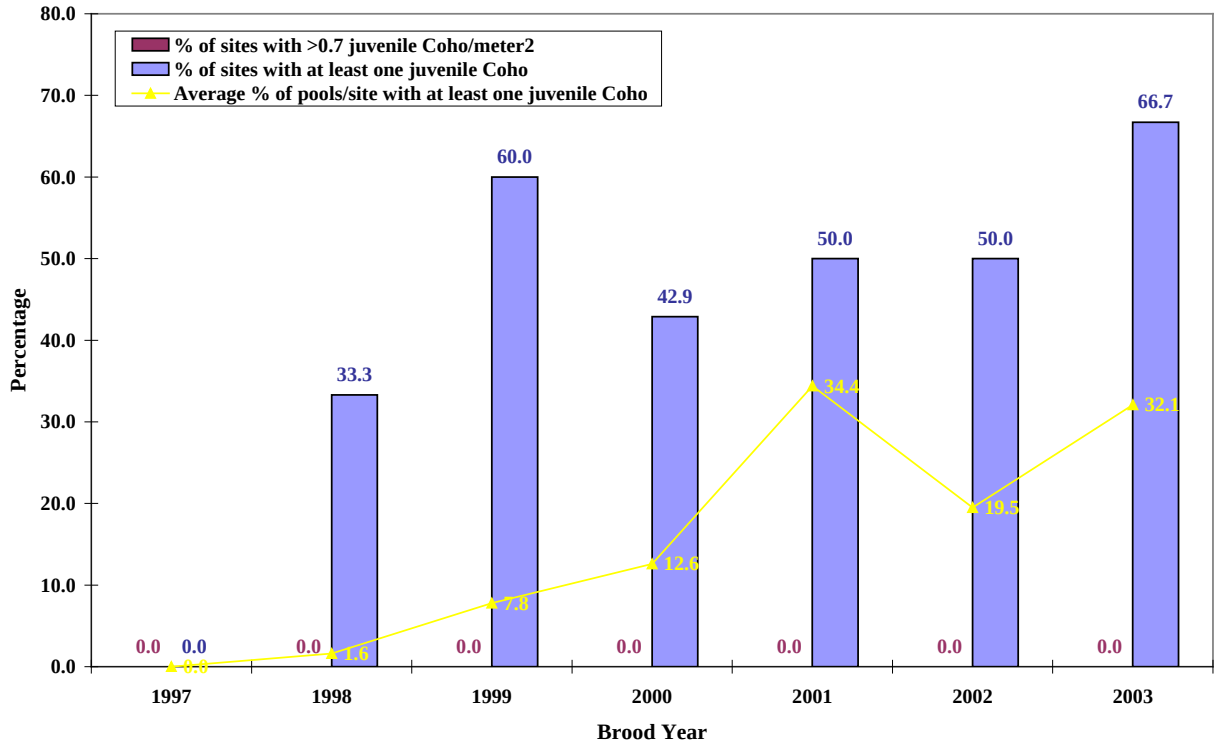


Figure 2-5. Abundance indices for juvenile Coho Salmon in the lower Rogue River Watershed, 1997-2003 brood years.

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 2-1 provides the best estimates of the proportions of hatchery-origin and listed natural-origin Coho Salmon returning to the Rogue River, estimated pHOS has averaged 4.4% annually since 2000. Table 2-2 provides estimates of annual proportions of hatchery-origin and listed natural-origin Coho Salmon on the natural spawning grounds within the lower Rogue population area, hatchery-origin spawners have been identified on 3 of the 13 years that Coho have been observed. Table 1.6 provides the estimated proportion of hatchery-origin and natural-origin fall Chinook on the natural spawning grounds, pHOS has averaged 3% annually since 2000.

2.2.3) <u>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</u> *(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 Salmon are collected from an off-channel ladder located at the downstream end of Indian Creek Hatchery. Adult Coho occasionally enter the ladder and are released unharmed back to Indian Creek. ODFW staff and volunteers may encounter adult Coho while conducting seining, tangle netting or hook and line collection on the main-stem of the lower Rogue River. Seining, tangle netting and hook and line collection will be ceased for any day if more than three wild Coho are caught in the net.

Smolt Release to Lower Rogue River:
Smolt releases have minimal impact on juvenile Coho rearing and migration due to the timing (July - September) and size (12 fish/lb) of the Chinook releases, and due to the short distance (approximately 1.5 Km) of seaward migration by Chinook smolts. While juvenile Coho 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 rearing in the lower mainstem/estuary of the Rogue River at the time of smolt release may be subject to competition with hatchery produced fall Chinook smolts.

Unfed Fry Releases:
Unfed fry releases may have minimal impact on juvenile Coho in rearing habitats and through the migration corridor due to the small number of unfed fry released and the release locations. Unfed fry are released into standing waterbodies (Libby Pond, Garrison Lake) with limited access to anadromous populations in order to minimize ecological and genetic impacts. Unfed fry are also released into Euchre Creek, where no independent fall Chinook or Coho populations are thought to exist.

- 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 2-3. Adult Coho Salmon handled at the Indian Creek hatchery trap, 2000-2015.

Brood Year	Males	Females	Jacks	Injured/Mortality
2000	1	0	0	0/0
2001	1	0	0	0/0
2002	1	1	0	0/0
2003	0	1	0	0/0
2004	1	1	0	0/0
2005	0	0	0	0/0
2006	0	0	0	0/0
2007	0	0	0	0/0
2008	0	0	1	0/0
2009	0	0	0	0/0
2010	0	1	0	0/0
2011	0	0	1	0/0
2012	0	0	0	0/0
2013	0	0	0	0/0
2014	0	0	0	0/0
2015	0	0	0	0/0

Table 2-4. Adult Coho Salmon handled during lower Rogue wild broodstock collection using tangle nets and seines, 2002-2015.

Brood Year	Males	Females	Jacks	Injured/Mortality
2002	2	5	0	0/0
2003	1	2	0	0/0
2004	6	6	0	0/0
2005	2	0	0	0/0
2006	12	13	0	0/0
2007	2	2	0	0/0
2008	0	0	0	0/0
2009	0	0	0	0/0
2010	0	0	0	0/0
2011	0	0	0	0/0
2012	0	0	0	0/0
2013	0	0	0	0/0
2014	0	0	0	0/0
2015	0	0	0	0/0

- 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 27 adult Coho may be handled and released during fall Chinook broodstock collection, including approximately 2 adult Coho handled and released at the Indian Creek Hatchery trap and approximately 25 adult Coho handled and released during fall Chinook brood collection while using tangle nets, seines, and hook and line collection. Mortality of up to six Coho is expected during brood collection.

- 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
2. Discontinue seine, tangle netting, and hook and line collection of fall Chinook as take limits are reached.
3. Discontinue trapping of fall Chinook at Indian Creek 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 ESU-wide hatchery plans or other regionally accepted policies. Explain proposed deviations from the plan or policies.

Oregon Plan for Salmon and Watersheds 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 Rogue 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.

This hatchery program is aligned with the above ESU-wide plans and policies.

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

1) ODFW Conservation Plan for Fall Chinook Salmon in the Rogue Species Management Unit, adopted 2013.
2) ODFW Fish Hatchery Management Policy, adopted 2003.
3) ODFW Fish Health Management Policy.
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 Plan, adopted 1991.
8) STEP Fish Propagation Project, approved 2012.

3.3) Relationship to harvest objectives.

Chinook smolts are released in the Rogue River estuary at river kilometer 2.5. The hatchery program emphasizes release of smolts. This emphasis is based on intent to minimize the potential for competition between hatchery and wild juveniles. Adult hatchery-origin fall Chinook returning to the Rogue 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 last twelve years (1988-99), if available.

See below Tables 3-1, 3-2 and 3-3 for harvest or fisheries benefits.

Table 3-1. Estimated fall Chinook Salmon harvested from the lower Rogue River and Bay, 1995-2014 (data includes both hatchery-origin and wild fish; and harvest estimates are derived from salmon-steelhead tag returns).

Run Year	Estimated Freshwater Harvest of Adult Fall Chinook
1995	6,358
1996	3,420
1997	1,947
1998	2,177
1999	1,688
2000	4,926
2001	3,767
2002	3,745
2003	8,339
2004	3,321
2005	1,704
2006	3,348
2007	1,804
2008	1,446
2009	5,747
2010	1,410
2011	1,899
2012	1,805
2013	686
2014	2,621

Table 3-2. Estimated catch of fall Chinook Salmon on the Rogue River between tidewater and Foster Bar (RKm 55.0) during September – October, 1998 and 1999 (harvest estimates are derived from creel surveys conducted 1998-1999).

Run Year	Species/Mark[1]	Total Kept	Total Released	Total Kept + Released
1998	Fall Chinook Adult/UM	2,855	389	3,244
	Fall Chinook Adult/AD	35	29	64
	Fall Chinook Jack/UM	993	169	1,162
	Fall Chinook Jack/AD	126	2	128
1999	Fall Chinook Adult/UM	1,722	156	1,878
	Fall Chinook Adult/AD	252	3	255
	Fall Chinook Jack/UM	2,600	226	2,826
	Fall Chinook Jack/AD	810	31	841

[1] UM = UnMarked, AD = Adipose Fin Clip

Table 3-3. Lower Rogue fall Chinook salmon average ocean recovery* for the last ten complete brood years, 1988 to 1997 (Lewis 2004). CA = California. Release area is underlined.

	Oregon Ocean Catch Area			
Stock Group	4	5	6&7	CA
Lower Rogue River	.06	.04	<u>.01</u>	.22

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

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 Indian Creek 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.
Competition and/or predation by Chinook smolts and unfed fry on listed (Coho) and candidate 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 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 Indian Creek Hatchery rearing ponds and adult collection is approximately 1.75 cfs of gravity fed surface water based on seasonal use from Indian Creek. The hatchery intake is located at a diversion dam approximately 300 yards upstream of the hatchery. The hatchery intake is equipped with NMFS compliant perforated plate screens. Water quality is generally excellent except that sediment accumulates in the hatchery facilities during major freshets. All water used for fish production is discharged at the hatchery outlet to Indian Creek. Although low flows occur in late summer, water supplies are sufficient. Program goals are met, and oxygen supplementation and pond recirculation are not required.

Water source for incubation of eggs and fry is approximately 30 gpm from a gravity fed spring system, which provides surface water to the hatch house between October and March. Water quality is generally excellent except that sediment may accumulate in egg trays during a major freshet. Temperature ranges between 40 and 60^{o}F. At current production levels no limitations are anticipated.

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.

Indian Creek Hatchery intake is equipped with NMFS specified perforated aluminum panels (3/16" slotted openings). Screen openings are sufficiently small to exclude listed juvenile Coho.

Discharge from Indian Creek Hatchery is not regulated by National Pollution Discharge Elimination System (NPDES) requirements due to the small size of the rearing program. Sediment and organic material cleaned from raceways, holding tanks, and incubation trays is discharged at a designated upland site in order to maintain water quality in Indian Creek.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

A temporary weir is placed in Indian Creek to divert adults into the facility. Adult Indian Creek fall Chinook are collected on site by an off-channel fish ladder. Adults entering the ladder are hand sorted by ODFW personnel and/or volunteers and placed in raceways. Adult fall Chinook are also collected by seine, tangle net or hook and line in the lower Rogue River in order to incorporate additional wild broodstock into the program.

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

An insulated, 250-gallon, portable tank with agitation, oxygen supplementation and recirculation is used to transport captured adults to the hatchery.

5.3) Broodstock holding and spawning facilities.

Wild broodstock are held in a 10x15x12 foot holding tank filled with approximately 6,000 gallons of Indian Creek water until ready to spawn. Hatchery broodstock collected from the ladder are placed in 8x66x3 foot aquabreeder modutank steel/vinyl raceways filled with approximately 9,900 gallons of Indian Creek water and separated by sex until ready to spawn. Spawning facilities include a closed construction, roofed spawn deck with overhead lighting and domestic water supply, concrete and asphalt surfaces for sorting spawned adults.

5.4) Incubation facilities.

Indian Creek Hatchery incubation facilities include a separate 20’ x 16’ hatch house. A gravity fed spring system provides 6 gpm of water to each of 6 stacks of Heath vertical incubators. Each stack consists of 16 usable trays (96 total trays) with combined capacity for 288,000 eggs or fry.

5.5) Rearing facilities.

Indian Creek Hatchery incubation facilities consist of three 8’x66’x3’ aquabreeder modutank steel/vinyl raceways. The capacity of each raceway is approximately 9,900 gallons of water.

5.6) Acclimation/release facilities.

Smolts produced from this stock are loaded onto transport trucks by forced crowding and netting from the raceway, and then delivered to the liberation site on the Lower Rogue River. The transport truck consists of an insulated, 250-gallon capacity portable tank with agitation, oxygen supplementation and recirculation.

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

No operational difficulties or disasters have led to significant fish mortality. Heavy sedimentation has led to higher than expected egg and fry mortality in some years.

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 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.

A combination of auto-switched electric water pumps and gas powered water pumps are available for emergency recirculation. An alarm system monitors intake water supply level and water pressure. Throughout the annual rearing cycle, trained volunteers follow disinfection and maintenance protocols to prevent the spread of disease. Fish Health Services employees perform regular pathology and pre-liberation examinations.

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.

The lower Rogue River fall Chinook are not an ESA listed population. Broodstock source includes mature fall Chinook of both hatchery and natural-origin adults.

6.2) Supporting information.

6.2.1) History.

The propagation program of Indian Creek fall Chinook began 1984. Prior to 1989, hatchery fall Chinook releases consisted of Upper Rogue River Stock (052). Since 1991 all broodstock of both hatchery- and natural-origin have been collected from the Lower Rogue River (Stock 061).

6.2.2) Annual size.

The goal is to use up to 88 adult fall Chinook and 10 jack fall Chinook from wild and hatchery origin fish.

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

The program averages 38% natural fish in the broodstock (1992-2005). The program goal is to maintain a level of at least 30% natural fish in the broodstock. See Table 6-1 below for the data of hatchery- and wild-origin fall Chinook used as broodstock in the past.

Table 6-1. Number of hatchery and wild Chinook Salmon spawned at Indian Creek Hatchery, 1992-2013 brood years.

BROOD YEAR	# WILD	# HATCHERY	% WILD
1992	39	23	63%
1993	20	6	77%
1994	35	71	33%
1995	19	35	35%
1996	42	20	68%
1997	34	66	34%
1998	37	148	20%
1999	48	110	30%
2000	57	83	41%
2001	49	63	44%
2002	25	109	19%
2003	46	76	38%
2004	39	57	41%
2005	72	30	71%
2006	40	91	31%
2007	67	9	88%
2008	29	50	37%
2009	50	63	44%
2010	41	61	40%
2011	39	54	42%
2012	14	79	15%
2013	28	60	32%
Average	**40**	**62**	**39%**

6.2.4) Genetic or ecological differences.

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

6.2.5) Reasons for choosing.

Brood selection and spawning guidelines were chosen to mimic naturally occurring characteristics of the Lower Rogue River fall Chinook.

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 Lower Rogue River fall Chinook.

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.

A temporary weir is placed in Indian Creek in order to divert adults into the ladder. The fish ladder is supplied continuously with hatchery effluent from October through November to capture upstream migrating Chinook. The ladder allows passage of all age classes of Chinook salmon and presents no physical or velocity barriers. Adult Chinook in the ladder are sorted by hand and transferred to raceways for holding. Adult fall Chinook are also collected by seine, tangle net or hook and line in the lower 17 kilometers of the Rogue River in order to incorporate additional wild broodstock into the program.

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 ≥ 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 Indian Creek fall Chinook are:

(1) Collect all available wild CHF, at least 30% of the broodstock
(2) Collect males that are larger than females
(3) No more than 6% of the collected males should be jacks.

7.3) Identity.

Fall Chinook Salmon collected in the lower Rogue River after October 1 are assumed to be of lower Rogue River origin. Upper Rogue River and most Applegate Chinook migrate through the lower Rogue before October 1 (ODFW, 1992). However, migration

timing of Illinois and lower Applegate Chinook is similar to lower Rogue fall Chinook and broodstock collected for the Indian Creek fall Chinook program may include Illinois and lower Applegate Chinook. All Chinook Salmon returning to Indian Creek Hatchery are assumed to be of hatchery-origin.

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 up to 44 pairs of adults and 10 jacks to use for broodstock.

7.4.2) Broodstock collection levels for the last twelve years (e.g. 1988-99), or for most recent years available:

Table 7-1. Total number of male and female Chinook Salmon collected for Indian Creek broodstock, 1989-2013 brood years. Totals include Chinook collected from Indian Creek trap and lower Rogue seining and tangle netting. Not all Chinook collected are spawned.

Brood Year	Numbers		
	Females	Males	Jacks
1989	56	39	13
1990	4	1	2
1991	22	23	7
1992	62	28	1
1993	16	7	7
1994	63	57	46
1995	31	24	12
1996	49	29	21
1997	84	64	19
1998	132	96	82
1999	91	51	228
2000	369	389	54
2001	215	166	217
2002	96	131	109
2003	196	149	129
2004	133	107	32
2005	116	61	32

2006	109	97	22
2007	50	34	4
2008	45	73	472
2009	260	109	47
2010	123	81	87
2011	129	79	38
2012	98	66	45
2013	98	66	45
Average	106	81	71

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

Surplus hatchery-origin fish are provided to the local food bank, double floy-tagged and recycled to the fishery, or distributed as carcasses in local streams to provide nutrient enrichment.

7.6) Fish transportation and holding methods.

Adults collected for broodstock are placed onto a fish transport truck and hauled for 0.5-1.0 hours to Indian Creek Hatchery where they are held until they are ripe to spawn. At the Hatchery, adults are supplied with at least 150 gpm of fresh water throughout the holding period. Adults held for broodstock are treated with 1:6,000 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 weekly. Ripe adults are removed, euthanized and spawned. Visceral and ovarian fluid samples are collected from 60 fish annually and examined for presence of pathogens by ODFW Fish Health Services employees.

7.8) Disposition of carcasses.

Spawned carcasses are transferred for distribution in local streams to provide nutrient enrichment. Holding tank and raceway mortalities are disposed of in a landfill.

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

The lower Rogue River fall Chinook Salmon is not an ESA listed population. No adverse genetic effects on listed Coho are expected or anticipated as a result of fall Chinook broodstock collection. To minimize ecological impacts during brood collection, daily tangle netting will be ceased if more than five Coho are captured on any day. All Coho inadvertently captured during steelhead brood collection will be released unharmed with minimum handling stress.

SECTION 8. MATING

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

8.1) Selection method.

Adults are sorted and examined for ripeness 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 6% 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, eggs from each female are divided evenly into the number of portions equal to the number of ripe males. Each portion is fertilized with a different male. The fertilized eggs from each female are recombined, water hardened and disinfected for one hour in 100 ppm iodophor prior to freshwater incubation. Sperm from each male used will fertilize some eggs from every female. Each male fertilizes egg portions equal to no more than one 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 6% of the eggs.

8.4) Cryopreserved gametes.

Not used.

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

Lower Rogue River fall Chinook is not an ESA listed population. No adverse genetic or ecological effects on listed Coho are expected or anticipated as a result of this mating scheme for fall Chinook. 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.

Table 9-1. Data of egg take and survival rates to eye-up stage, 1989-2005.

Year	Egg Take	Eyed Eggs for Program	Percent Survival to Eye-up
1989	126,950	85,033	67.0%
1990	0	0	0
1991	44,340	41,224	93.0%
1992	92,870	70,498	75.9%
1993	38,847	34,976	90.0%
1994	123,735	104,452	84.4%
1995	62,671	62,671	100.0%
1996	83,025	80,525	97.0%
1997	104,918	104,918	100.0%
1998	120,275	115,846	96.3%
1999	176,859	176,859	100.0%
2000	187,356	182,120	97.2%
2001	177,607	134,993	76.0%
2002	180,638	132,850	73.5%
2003	179,601	154,190	85.9%
2004	129,365	100,862	77.9%
2005	129,752	72,558	55.9%

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

The program goal is to minimize production of surplus eggs/fry. A small surplus is required to account for annual variations in broodstock collection and egg-to-fry survival

and ensure that smolt production goals are met. Surplus fry are relased into Libby Pond, Garrison Lake, or Euchre Creek.

9.1.3) Loading densities applied during incubation.

Fall Chinook eggs average approximately 45 eggs per ounce. Incubation density is approximately 3,000 - 5,000 eggs per tray in Heath vertical incubators. Gravity fed spring water is supplied at 5 gpm through each Heath stack throughout incubation.

9.1.4) Incubation conditions.

Incubation water flow is set, monitored and adjusted daily by trained volunteers. Ambient incubation temperature is 45-52^{o}F. Incubation temperature is monitored by calibrated thermometer on a daily basis. Influent dissolved oxygen ranges between 10.0 and 11.0 ppm.

9.1.5) Ponding.

Fry (700 fish/lb) are ponded at approximately 1,900 temperature units from February to March. Visual inspection confirms that fry are 95-100% buttoned up prior to transfer into aquabreeder modutank steel/vinyl raceways. No mean length and weight data are routinely collected.

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 shocked at the eyed stage; all non-viable and infected 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 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.

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

9.2) <u>Rearing</u>:

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

The survival rate data of the program fish from eyed-egg to smolt stage are presented in

Table 9-2.

Table 9-2. Survival Rate of Indian Creek Hatchery Fall Chinook.

Brood Year	Egg Survival %	Fry Survival %	Smolts Released	Smolt Goal
1993	90.0%	86.6%	28,855	75,000
1994	84.4%	82.4%	53,817	75,000
1995	100%	100%	39,535	75,000
1996	97.0%	90.4%	76,162	75,000
1997	100%	100%	74,167	75,000
1998	96.3%	96.3%	68,065	75,000
1999	100%	100%	80,806	75,000
2000	97.2%	97.2%	70,782	75,000
2001	76.0%	71.1%	77,261	75,000
2002	73.5%	72.8%	80,222	75,000
2003	85.9%	85.9%	83,441	75,000
2004	77.9%	96.1%	77,505	75,000

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

Targeted loading density is approximately 25,000 fish per raceway at 12 fish/lb in each of three 8' x 66' x 3' (1584 ft^3) raceways. Maximum flow is 260 gpm in each of the three raceways. This load equals a maximum density of 8.0 lbs fish/gpm and 1.32 lbs fish/ft^3.

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 daily during high water temperature or low flow events. Pond screens prevent the escape of fish. Avian and mammalian predators are excluded by the use of an enclosed screen housing and mesh overlay. 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 stand pipes 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 weight samples are collected for inclusion in monthly raceway reports while fish are on station. Length and condition factor data are not routinely collected. Mark quality observation is also made at this time. Table 9-3 shows monthly average weights in fish per pound for the program from ponding to release for the prior two years at the facility.

Table 9-3. Average monthly growth (fish/lb) for Indian Creek Hatchery fall Chinook.

Week	Number of Fish/lb	Life Stage
Ponding	740	Fry
Week 4	470	Fry
Week 8	200	Fry
Week 12	99	Fingerling
Week 16	50	Fingerling
Week 20	30	Fingerling
Week 24	20	Smolt
Week 28 or release	12/lb	Smolt

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

Table 9-4. Predicted average monthly growth (fish/lb), feeding ration, and food conversion for ~90,000 fish from ponding to release.

Date	Temp F	Fish/lb	Lbs Feed/Day	Feed Conversion
28 Feb	49	834	0.5-1	0.75
31 Mar	50	422	6-10	1.00
30 Apr	54	172	12-20	1.00
31 May	59	72	22-30	1.10
30 June	62	35	35-50	1.10
31 July	67	20	45-70	1.10
31 Aug	65	12	85-100	1.10

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 fed to this stock throughout the rearing cycle. Starter diet for each pond is a total of 30 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 140 lbs of 1.2 mm Bio-Clark Fry (BCF) fed ½ on demand and ½ mechanical feeder over a period of approximately 15-20 days. Larger pellets are introduced as fish grow. Each rearing pond receives a total of 190 lbs of 1.5 mm BCF, 675 lbs of 2.0 mm BCF and 425 lbs of 2.5 mm BCF, and 425 lbs of 2.5 mm Bio-Supreme. 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 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 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. No disease outbreaks have occurred in the fall Chinook program fish at Indian Creek Hatchery.

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.

The sides of the raceways have been darkened with material to help the fish develop normal coloration. No other natural rearing methods are intentionally used for fall Chinook under propagation.

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 Indian Creek Hatchery.

SECTION 10. RELEASE

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

10.1) Proposed fish release levels.

Table 10-1. Proposed fish release levels, life stage and release date.

Age Class	Release Goal	Size (fpp)	Release Date	Location
Unfed Fry[1]	10,000	900/lb	Feb-March	Libby Pond, Garrison Lake, Euchre Creek
Yearling	90,000	35-10/lb	July-August	Rogue River

[1] Goal is to minimize production of surplus fry (<10,000). Due to annual variations in survival up to 30,000 surplus fry may be produced

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

Table 10-2. Fish release locations.

Watercourse	Waterbody code	Fish Age	Release Point	Watershed	Basin
Rogue River	1500200000	Yearling	RKm 2.5	Lower Rogue	Rogue Basin
Libby Pond	1508800000	Unfed fry	RKm 16.5	Lower Rogue	Rogue Basin
Garrison Lake	1705200000	Unfed fry		Garrison Lake	South Coast
Euchre Creek	1700105000	Unfed Fry	RKm 5.0	Euchre	South Coast

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

Table 10-3. Numbers and sizes of fish released by age class, 1992-2015.

Release Year	Eggs/ Unfed Fry	Average size (fish/lb)	# Smolts	Early Release Ave. Size	Middle Release Ave. Size	Late Release Ave. Size
1992	0		30,240			15.0
1993	10,006	900	14,236			11.9
1994	46,088	900	28,855			16.7
1995	2,309	900	53,817		21.0	14.5
1996	2,736	900	39,535		15.0	12.0
1997	6,444	900	76,162	35.7	20.0	14.9
1998	47,761	900	74,167	20.0	17.6	12.0
1999	0		68,065	20.0	16.0	11.5
2000	87,419	900	80,806	25.9	16.0	13.0
2001	40,716	900	70,782	35.0	25.0	18.0
2002	64,065	900	77,261	28.0	18.5	15.0
2003	70,296	900	80,222	25.0	22.0	12.0
2004	70,282	900	83,441	31.7	18,0	11.0
2005	19,935	900	77,055	21.0	18.0	17.0
2006	0	900	62,553	29	24	13
2007	57,646	900	80,623	30	24	12
2008	38,431	900	71,177	34	36	26
2009	6,832	900	77,014	23	23	16
2010	89,892	900	85,371	19	12	13
2011	49461	900	80,900	18	13	14
2012	36,694	900	83,325	15	15	10
2013	42,207	900	89,140	18	16	13
2014	37,340	900	84,320	19	17	14
2015	59,023	900	89,453	18	13	13

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

Table 10-4. Actual dates of past releases, 1999-2014.

Brood Year	Release Dates	Release Type
1999	July 20 - September 8, 2000	trucked, direct release
2000	July 16 - Sept 5, 2001	trucked, direct release
2001	July 12 - August 20, 2002	trucked, direct release
2002	July 3 - August 25, 2003	trucked, direct release
2003	July 12 - August 12, 2004	trucked, direct release
2004	July 12 - August 18, 2005	trucked, direct release
2005	July 15 – August 31, 2006	trucked, direct release
2006	July 14 – August 31, 2007	trucked, direct release
2007	July 11 – September 4, 2008	trucked, direct release
2008	July 7 – August 19, 2009	trucked, direct release
2009	July 17 – August 25, 2010	trucked, direct release
2010	August 12 – August 31, 2011	trucked, direct release
2011	August 10 – September 1,2012	trucked, direct release
2012	August 16 – September 5,2013	trucked, direct release
2013	August 5 – August 25, 2014	trucked, direct release
2014	July 27 – August 25, 2015	trucked, direct release

Standard protocol is for fall Chinook yearlings to be released in three equal groups during mid to late summer. Releases occur as fish growth and low summer water flows restrict rearing capacity at Indian Creek Hatchery. The early release occurs in mid-July. The smolts average approximately 27 fish/lb. The middle group is released in mid-August at approximately 19 fish/lb. The late release occurs in late August/early September when the fish reach approximately 14 fish/lb. Yearlings are crowded, netted from the raceways, and transferred directly into an insulated, 250-gallonportable tank and hauled to the release site at RKm 2.5. Smolts are piped directly from the tank into the river via a 6" hose. Multiple trips are required to conduct the releases.

Unfed fry releases occur in February or March when their weight is 900 fish/lb and length is 40-45 mm.

10.5) Fish transportation procedures, if applicable.

Yearling releases are accomplished by crowding fish and netting, by hand, from the raceway. Fish are transferred to an insulated, 250 gallon, push-in tank equipped with oxygen injection and aeration and transported to the Rogue River for release at RKm 2.5. Oxygen saturation is maintained at 9-11 ppm. Transport time is approximately 0.75 hrs.

10.6) Acclimation procedures.

No acclimation devices or procedures are used in this program.

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

All (100%) of hatchery released smolts are adipose fin-clipped. Release groups are coded wire tagged dependent upon availability of Stock Assessment funds.

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 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 STEP Biologist 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 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 are designed to minimize ecological interactions between hatchery and naturally produced fish. Smolts are released incrementally between July and September. The smaller release groups minimize interaction with the naturally produced juvenile populations. Smolts are released in the Rogue River estuary, at river kilometer 2.5 in order to expedite their migration to the sea.

Unfed Fry are released between February and March. Unfed fry releases consist of fry excess to the needs of the smolt program, up to a maximum of 75,000. Unfed fry are targeted to sub-watersheds that have minimal natural spawning and are released in downstream areas to minimize ecological and genetic impacts.

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 are conducted on an annual basis.
Statistical creel is conducted on an annual basis to estimate ocean harvest.

Chinook smolts will be 100% Adipose fin-clipped. Release groups will be coded-wire tagged as funding allows.
Chinook smolts will be 100% adipose fin-clipped.
Coded wire tagging of release groups will be dependent upon availability of Stock Assessment funds.

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 estuary seining and snorkel surveys. (District staff as time allows conduct estuary seining/snorkel surveys).

Broodstock will be at least 30% wild Chinook salmon.
District ODFW staff monitor broodstock collection to ensure that wild Chinook are incorporated in the broodstock.

Release groups will meet ODFW fish health standard.
ODFW fish pathology will sample the hatchery cohorts prior to releases.

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**.*

No research program will be undertaken under this Indian Creek fall Chinook 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" (Table 1). See attached "take table".

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

Citations:

Good, T.P., R.S. Waples, and P. Adams (editors). 2005. Updated status of federally listed ESUs of West Coast salmon and steelhead. U.S Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-66, 598 p.

Hankin, D.G., J. Fitzgibbons, and Y. Chen. 2009. Unnatural random mating policies select for younger age at maturity in hatchery Chinook salmon (*Oncorhynchus tshawytscha*) populations. Canadian Journal of Fisheries and Aquatic Sciences 66:1505–1521.

Hatchery Scientific Review Group. 2005. Hatchery Reform in Washington State: principles and emerging issues. Fisheries 30(6): 11-23.

Jacobs, S., J. Firman, G. Susac, E. Brown, B. Riggers and K. Tempel. 2000. Status of Oregon coastal stocks of anadromous salmonids. Monitoring Program Report Number OPSW-ODFW-2000-3. Oregon Department of Fish and Wildlife, Salem, Oregon.

Jacobs S., J. Firman, and G. Susac. 2001. Status of Oregon coastal stock of anadromous salmonids, 1999-2000; Monitoring Program Report Number OPSW-ODFW-2001-3, Oregon Department of Fish and Wildlife, Salem, Oregon.

Jacobs S., J. Firman, G. Susac, D. Stewart and J. Weybright. 2002. Status of Oregon coastal stock of anadromous salmonids, 2000-2001 and 2001-2002; Monitoring Program Report Number OPSW-ODFW-2002-3, Oregon Department of Fish and Wildlife, Salem, Oregon.

Jepsen, D.B. and Rodgers, J.D. 2004. Abundance Monitoring of Juvenile Salmonids in Oregon Coastal Streams, 2002-2003. Monitoring Program Report Number OPSW-ODFW-2003-1, Oregon Department of Fish and Wildlife, Salem, Oregon.

Lewis, M.A. 2004. Stock Assessment of Anadromous Salmonids, 2003. Monitoring Program Report Number OPSW-ODFW-2004-04. Oregon Department of Fish and Wildlife, Salem, Oregon.

Lower Rogue Watershed Council (LRWC). 2010. Curry County coho spawning survey results 2003-2009. Gold Beach, Oregon. 20 p.

ODFW (Oregon Department of Fish and Wildlife). 1992. Effects of Lost Creek Dam on fall chinook salmon in the Rogue River. Phase II Completion Report. Oregon Department of Fish and Wildlife, DACW57-77-C-0033.

ODFW. 1999. Oregon Salmon and steelhead Catch Data, 1985-97. Oregon Department of Fish and Wildlife, Salem, Oregon.

ODFW. 2004. Huntley Park Seine Project Unpublished Report. Oregon Department of Fish and Wildlife, Rogue Watershed District.

ODFW. 2005. Oregon Native Fish Status Report 2005 Public Draft. 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.

ODFW. 2013. Conservation Plan for Fall Chinook Salmon in the Rogue Species Management Unit. Oregon Department of Fish and Wildlife, Salem, Oregon.

Sounhein, B., E. Brown, M. Lewis, M. Weeber. 2015. Status of Oregon Stocks of Coho Salmon, 2014. Monitoring Report No. OPSW-ODFW-2015-3. Oregon Department of Fish and Wildlife, Corvallis, Oregon. Oregon Adult Salmonid Inventory and Sampling Program at http://odfw.forestry.oregonstate.edu/spawn/cohoabund.htm

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

Rodgers, J.D. 2000. Abundance of Juvenile Coho Salmon in Oregon Coastal Streams, 1998-1999. Monitoring Program Report Number OPSW-ODFW-2000-1, Oregon Department of Fish and Wildlife, Salem, Oregon.

Rodgers, J.D. 2001. Monitoring of the Abundance of Juvenile Salmonids in Oregon Coastal Streams, 2000. Monitoring Program Report Number OPSW-ODFW-2001-1, Oregon Department of Fish and Wildlife, Salem, Oregon.

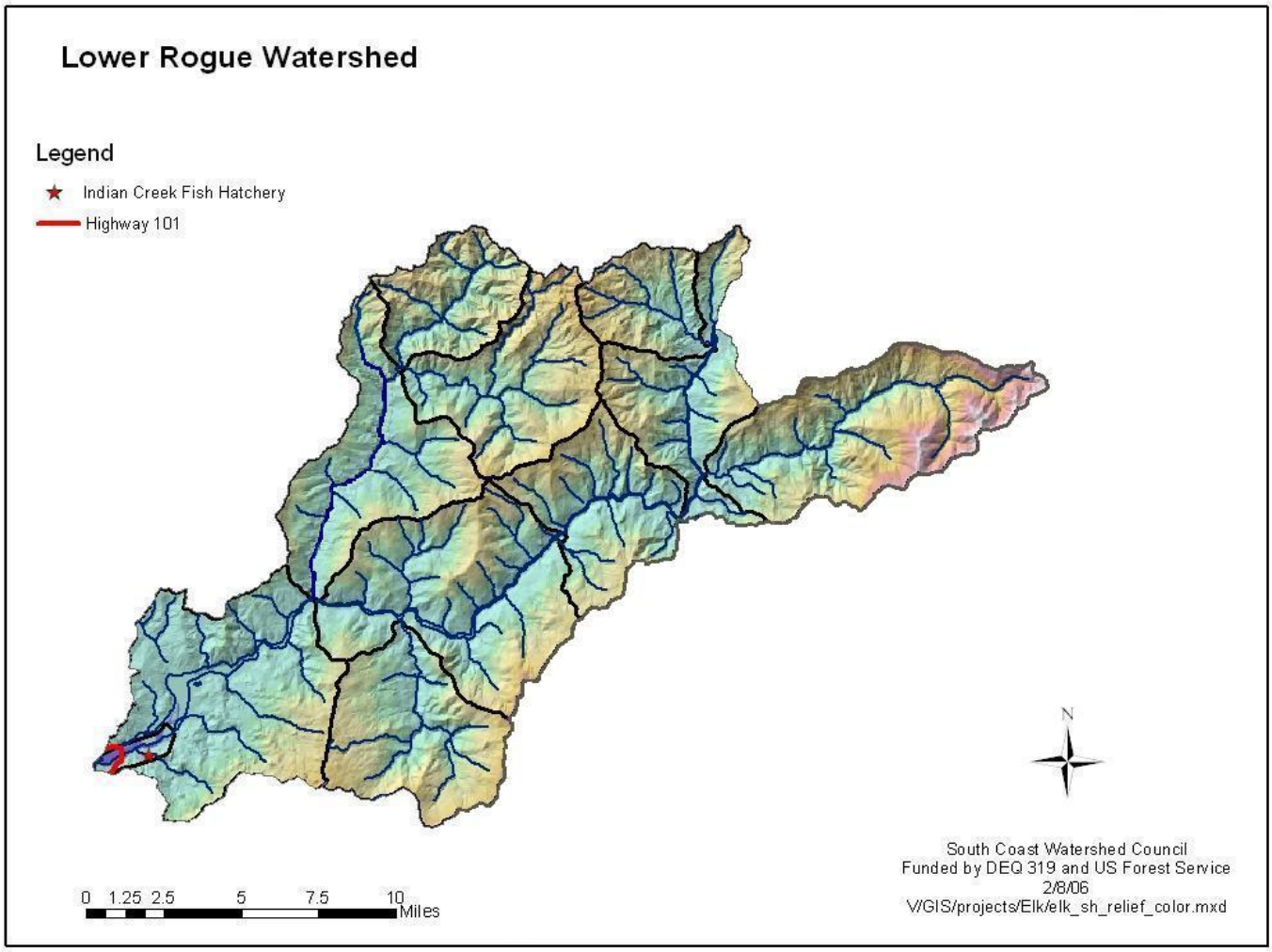
Rodgers, J.D. 2002. Abundance Monitoring of Juvenile Salmonids in Oregon Coastal Streams, 2001. Monitoring Program Report Number OPSW-ODFW-2002-1, Oregon Department of Fish and Wildlife, Salem, Oregon.

U.S. Forest Service (USFS). 2000a. Rogue River below Agness Watershed Analysis. Siskiyou National Forest, Gold Beach Ranger District, Gold Beach, 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.

Williams, T.H., E.P. Bjorkstedt, W.G. Duffy, D. Hillemeier, G. Kautsky, T.E. Lisle, M. McCain, M. Rode, R.G. Szerlong, R.S. Schick, M.N. Goslin, and A. Agrawal. 2006. Historical population structure of coho salmon in the Southern Oregon/Northern California Coasts evolutionarily significant unit. NOAA-TM-NMFS-SWFSC-390.

Map of the Lower Rogue 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, ODFW

Signature: _____ Date: _____

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

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: Rogue River (RM 1.0 to 12.0); Dates of activity: October to December **Hatchery program operator: John Weber**				
Type of Take	**Annual Take of Listed Fish By Life Stage (*Number of Fish*)**			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)			27	
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)			6	
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: depensatory 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	SIZE CRITERIA 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.