HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	Cole Rivers Hatchery Winter Steelhead Program
Species or Hatchery Stock:	Winter Steelhead (Applegate Stock-62)
Agency/Operator:	Oregon Department of Fish & Wildlife
Watershed and Region:	Rogue Watershed, Southwest Region
Date Submitted: **First Update Submitted:**	March 4, 2009 June 10, 2016
Date Last Updated:	June 9, 2016

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Cole Rivers Hatchery Winter Steelhead Program (Applegate River)

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

Winter Steelhead *Oncorhynchus mykiss* (Applegate Stock-62). ESA Status: Not Listed

1.3) Responsible organization and individuals.

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

The U.S. Army Corps of Engineers are involved through program funding.

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

The funding source is USACE, and the staffing level 14 full time and five seasonal

employees. The total USACE funded operating costs are $1,323,189 per fiscal year. This program represents ~10% of the total.

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

Cole Rivers Hatchery is located on the Rogue River, 30 miles northeast of Medford, Oregon on Highway 62, about ½ mile downstream of William Jess Dam and Lost Creek Reservoir at river kilometer 253.1. The hatchery site is at an elevation of 1,545 feet above sea level, at latitude 42º 39' 49.1" N and longitude 122º 41' 06.7" W. The Waterbody Code is 1500500000.

The trapping facility that collects returning adults is located on the Applegate River at the base of Applegate Dam at river kilometer 77.1. The trap site is located at latitude 42º 03' 28.0" N and longitude 123º 04' 33.0" W. The Waterbody Code is 1501000000.

1.6) Type of program.

Isolated Harvest Program.

1.7) Purpose (Goal) of program.

The goal of this program is to mitigate for the loss of winter steelhead spawning and rearing habitat that resulted from the construction of Applegate Dam by the United States Army Corps of Engineers (USACE).

1.8) Justification for the program.

The winter steelhead program comprises part of a packaged mitigation program that is designed to compensate for the loss of anadromous salmonid spawning habitat that resulted from the construction of USACE dams in the Rogue River Basin. The mitigation agreement outlines that the USACE will fund the production of 365,120 pounds of fish while providing ODFW with the flexibility to manage releases to optimize fishery benefits. Currently, ODFW is managing the program so as to annually release about 132,000 winter steelhead smolts to provide benefits to the sport fishery in the Rogue and Applegate rivers.

By providing fish for harvest, the program supports economic and cultural values associated with historic fisheries for adult fish and half-pounders, while reducing social pressures for additional harvest opportunities on naturally produced winter steelhead. Only a limited harvest of naturally produced winter steelhead is allowed in the Rogue River. Anglers may harvest one fish per day and five per year, during a three-four month period that varies slightly depending on the river location. Only adults 24 inches in length or greater may be harvested. The Applegate River is closed to the harvest of naturally produced winter steelhead. Throughout most of their life history, wild winter steelhead in the watershed are effectively precluded from harvest through three key angling regulations:

- Protection for juveniles: virtually all tributaries of the Rogue are closed to all fishing
- Protection for juveniles: trout harvest on the mainstem is limited to adipose fin-clipped rainbow trout
- Protection for juveniles: the mainstem is closed to trout fishing between April 1 and the May opener to protect outmigrating smolts.

The Applegate winter steelhead program minimizes adverse genetic and ecological impacts on listed and other candidate species by implementing specific measures for brood collection techniques, rearing, 100% fin marking, and release strategies.

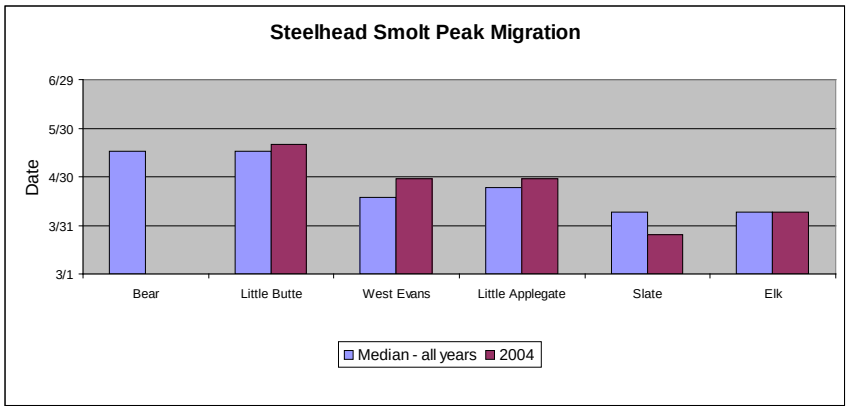
Brood Collection:
Adult collection occurs at the Applegate Trap at the base of Applegate Dam (additional collection methods such as angler caught brood could be implemented in the future if needed). Upstream migration of winter steelhead ends at the dam and trap site, and winter steelhead adults are collected from early February through early June each year. Migrating fish enter and progress into the collection pond until trapped, and are transported to Cole Rivers Hatchery. Both returning hatchery fish and naturally produced swim-ins are collected. Brood fish are collected from throughout the run in order to maintain genetic diversity within the hatchery produced population. Winter steelhead brood collection does not result in any handling stress or take of ESA-listed coho salmon, because of temporal differences in adult return time between coho and winter steelhead.

Release Strategies:
The hatchery program for winter steelhead is a mitigation program intended to replace lost natural production. Hatchery smolts are trucked back to the Applegate River for release (132,000 two year smolts at 4.0 f/lb in mid-late April, with a 100% adipose finclip), primarily in the mainstem.

In the past, a combination of one and two year smolts were produced. Releases of one year smolts may be reinitiated if needed to improve program performance and minimize impacts.

Acclimation sites are being implemented to improve contribution to the fishery.

The smolt release strategy maximizes survival rates and minimizes interaction with naturally produced fishes in the Rogue River, as they outmigrate soon after release. The timing of this upper river release matches outmigration peaks of naturally produced wild fish, as observed during smolt trapping on the Little Applegate River (Vogt, 2004).



As a pilot project testing the feasibility of restoring some natural production above Applegate Dam, a portion of the smolt release is being differentially marked (left and right ventral finclips) and released above and below the dam to gauge survival rates of smolts through the reservoir and dam. Recaptures will occur at existing project sites (Huntley seining project and Applegate trap). At this time, fry, presmolt and precocial releases are implemented at standing waterbodies or tributaries outside the current range of anadromous fish species. Additional releases are anticipated to evaluate restoration opportunities above Applegate Dam.

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

BENEFITS **Performance Standards**	**BENEFITS** **Performance Indicators**	**BENEFITS** **Monitoring & Evaluation**
Provide hatchery winter steelhead for an isolated harvest program (a limited harvest of naturally produced steelhead is allowed in the Rogue River only).	• All smolts will be adipose clipped. • Returning adults contribute to the freshwater fishery	• Annual preliberation exam to confirm mark rate. • Punchcard data provide an index of total harvest. • Freshwater angler creel on a periodic basis.
Meet mitigation goals	• Program will adequately mitigate for the habitat lost due to the construction of Applegate Dam.	• Punchcard data provide an index of total harvest. • Freshwater angler creel on a periodic basis. • Counts of returning steelhead maintained at the Applegate Trap and Cole Rivers Hatchery.

Program fish provide societal benefits	• Economic benefit to rural communities of Curry, Josephine and Jackson counties.	• Periodic creel survey and evaluation of the recreational/economic aspects of the fishery will reveal benefits to local communities.
Maintain fish health.	• Follow ODFW Fish Health Management Policy	• Conduct appropriate health checks throughout incubation, rearing, and prior to release.
The winter steelhead program will meet the criteria provided by the Native Fish Conservation Policy.	• A Conservation Plan will be developed by ODFW for the appropriate Species Management Unit (SMU), which will provide guidance for this propagation program.	• The program will follow the guidance provided by the Conservation Plan for Rogue Basin steelhead populations.
RISKS **Performance Standards**	**RISKS** **Performance Indicators**	**RISKS** **Monitoring & Evaluation**
Life history characteristics of hatchery winter steelhead will not diverge significantly from naturally produced winter steelhead.	• Broodstock collection reflects the run timing and age classes represented in the natural population. • Release of program fish mimic the emigration of naturally produced winter steelhead. • Behavioral and morphological characteristics of program fish are similar to naturally produced winter steelhead.	• Data on adult return timing, brood collection and spawning protocols will be maintained by hatchery staff • Length frequency and size at release data will be maintained by hatchery staff.

Releases of hatchery winter steelhead have minimal impact on listed coho salmon that rear primarily in tributaries.	• Program fish are released primarily into the mainstem of the Applegate River.	• Releases made when and where scheduled.
Hatchery operations comply with the Fish Hatchery Management Policy and other state and federal guidelines and permits.	• Hatchery operations conform to applicable fish health, sanitation, and operational guidelines. • Hatchery operations conform to DEQ/NPDES guidelines for water quality.	• 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.	• Any brood collection that increases interaction with coho salmon will be reviewed with NMFS staff prior to implementation	• Maintain accurate collection data for winter steelhead and coho at Cole Rivers.

1.11) Expected size of program.

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

The maximum number of winter steelhead to be held for broodstock each year shall be 300 females and 300 males.

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

Life Stage	Release Location	Annual Release Level
Eyed Eggs	Tributaries above dam	None planned at this time*
Unfed Fry	Tributaries above dam	None planned at this time*
Fry	Tributaries above dam	None planned at this time*
Fingerling (gradeouts)	Standing waterbodies or tributaries above dams	40,000
Yearling (precocials)	Standing waterbodies or tributaries above dams	40,000
Smolt	Applegate River	132,000

*In the future, however, releases may occur above the dam for re-introduction purposes, if necessary, and approved by the Fish Division. Additional adult, fry or fingerling may be released into standing waterbodies or tributaries outside the current range of anadromous fish species.

Note: Smolt release numbers may increase or decrease, primarily if other mitigation production is changed.

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

See notes and comments on table 1.12-1 below for fishery metrics (Tom Satterthwaite, personal communication, 2008).

- Summaries assume that all returning adults were first spawning migrants
- Purpose of summary is to estimate the average rate over a number of years, so age-at return errors are not important for this summary
- Harvest rates of adults are assumed to be 17% of the freshwater return (half the rate of hatchery winter steelhead that return directly to Cole Rivers Hatchery.
- Harvest rates of half-pounders are assumed to be 50% of the freshwater return.
- These preliminary estimates assume no straying.
- Return estimates of half-pounders are the passage estimates at Huntley Park
- Composition of the hatchery half-pounders is estimated based on the proportions of each type of steelhead among the release groups.

Table 1.12-1. Summary of fishery metrics related to the production and harvest of Applegate winter steelhead reared at Cole Rivers Hatchery.

Release Year	Number STW Smolts	Pounds of Smolts	Trap Return	River Harvest	Harvest/1000 lbs of Smolts	River Return	Return Rate to Freshwater (%)	
							Half-pounders	Adults
1990	141,355	29,952	332	2,036	14.4	4,337	3.1	0.2
1991	159,993	32,939	658	4,024	25.2	8,571	5.4	0.4
1992	115,932	23,585	224	4,015	34.6	8,208	7.1	0.2
1993	87,320	16,792	1,784	3,331	38.2	8,081	9.3	2.0
1994	155,017	33,686	1,299	8,462	54.6	17,957	11.6	0.8
1995	88,722	20,980	1,698	16,293	183.6	33,937	38.3	1.9
1996	190,551	44,192	1,624	10,423	54.7	22,137	11.6	0.9
1997	170,781	37,810	1,569	14,262	83.5	29,772	17.4	0.9
1998	170,363	41,006	1,423	8,659	50.8	18,450	10.8	0.8
1999	100,852	29,845	1,773	6,670	66.1	14,749	14.6	1.8
2000	209,474	50,947	4,774	27,562	131.6	58,920	28.1	2.3
2001	99,398	21,941	2,602	8,023	80.7	18,115	18.2	2.6
2002	115,533	29,557	4,820	9,292	80.4	22,417	19.4	4.2
2003	124,603	33,641	1,086	5,128	41.2	11,119	8.9	0.9
2004	152,952	37,889	1,887	4,440	29.0	10,381	6.8	1.2
2005	130,754	31,799	2,577	5,260	40.2	12,569	9.6	2.0
2006	148,827	36,336						
Mean 1993-05	138,178	33,083	2,224	9,831	72	21,431	15.7	1.7

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

The program started in 1981.

1.14) Expected duration of program.

The program is an ongoing program with no planned termination date.

1.15) Watersheds targeted by program.

Applegate River, Water-body code: 1501000000
Rogue River Section 1, Water-body code: 1500200000.
Rogue River Section 2, Water-body code: 1500300000
Rogue River Section 3, Water-body code: 1500400000

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

Issue 1: Release Strategies
Release of program fish into the mainstem, concurrent with peak outmigration of naturally produced smolts, is a key issue. This practice in fact is part of efforts to ensure that this mitigation program does not diverge from the life history characteristics of the naturally produced population. It's also a concern that competitive interaction with coho smolts and predation on newly emergent coho fry may occur. However, most coho fry are primarily produced in tributary streams of the Applegate River and thus are mostly not susceptible to predation by winter steelhead smolts of hatchery origin, as hatchery smolts are released directly into the mainstem.

Issue 2: Straying
Winter steelhead spawn later than coho salmon in the Rogue River Basin. Consequently, it is possible that hatchery fish spawning activity may impact redds of Coho Salmon.

1.16.2) Potential alternatives to current program.

Alternative 1: Terminate Applegate River winter steelhead hatchery program

Pros: The termination of the program will eliminate any possible risk to listed Coho Salmon due to interaction with hatchery winter steelhead. This alternative would ensure no interaction with listed wild and hatchery coho smolts and no risk of predation on newly emergent coho fry. This alternative would ensure no interaction between hatchery adults and wild coho adults on the spawning grounds, although there would be no change in coho broodstock collection, because Coho Salmon do not enter the collection facility during the winter steelhead collection period.

Cons: Eliminates the culturally and economically important harvest of hatchery winter steelhead in the recreational fishery. The discontinuation of the program would violate the mitigation agreement that was a key part of final public approval of dams in the Rogue River Basin, which may cause significant public concern.

Alternative 2: Reduce the number of hatchery winter steelhead smolts released into the Applegate River.

Pros: It would reduce the potential risk to listed coho due to interaction with hatchery winter steelhead. This alternative would minimize potential interaction with listed wild and hatchery coho smolts and decrease the risk of predation on newly emergent coho fry. Also, this alternative would reduce potential interaction between hatchery adults and wild coho adults on the spawning grounds, although there would be no change during broodstock collection, because coho do not enter the collection facility during the winter steelhead collection period.

Cons: This alternative would reduce the culturally and economically important harvest of hatchery winter steelhead in the recreational fishery. The reduction could violate the mitigation agreement and may cause significant public concern, as the agreement was a key part of final public approval of dams in the Rogue watershed.

Alternative 3: Increase the number of hatchery winter steelhead smolts released into the Applegate River.

Pros: This will provide additional hatchery winter steelhead for the recreational fishery.

Cons: This alternative may increase risk to listed coho salmon due to interaction with hatchery winter steelhead. The competitive interaction with coho smolts during outmigration could be for food or rearing habitat, as well as predation on smaller coho fry. Also, it may increase the potential for interaction between hatchery winter steelhead adults and coho adults on the spawning grounds. There would be no change during broodstock collection, because coho do not enter the collection facility during the winter steelhead collection period.

Alternative 4: Replace the Applegate winter steelhead program with an expanded Rogue winter steelhead program.

Pros: This alternative will increased harvest rates on hatchery fish and may decrease natural spawning by hatchery fish.
Cons: There would be no opportunity for anglers to harvest winter steelhead in the Applegate River unless the fishery is changed to allow the harvest of naturally produced winter steelhead.

1.16.3) Potential Reforms and Investments

Reform/Investment 1: Develop off-site acclimation sites to improve contribution to the fishery while striving to minimize the number of hatchery adults that stray and spawn in the wild. This may require moving some Applegate production to Rogue production for release in the Rogue.

Reform/Investment 2: Survey to determine the level of smoltification among various size groups at release, and determine whether facility or procedural improvements are possible to minimize adverse impacts on naturally produced fish and maximize survival to adult.

Reform/Investment 3: Investigate the potential for re-establishment of natural production in habitat remaining above Applegate Dam.

Reform/Investment 4: Implement additional changes to increase program performance consistent with ODFW's Native Fish Conservation Policy.

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 submission of this HGMP to NOAA Fisheries will serve as ESA take authorization for this program.

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

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

Southern Oregon Northern California Coast (SONCC) Coho Salmon populations may be affected by this propagation program.

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

No direct take of ESA-listed populations of SONCC Coho Salmon is expected due to this Applegate River winter steelhead hatchery program..

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

The ESA-listed populations of SONCC Coho Salmon may be incidentally affected by the program during program operation. In the Rogue Basin, SONCC Coho Salmon populations include the Illinois River, Middle Rogue River (including Applegate River), and Upper Rogue River (upstream from and including Evans Creek).

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.

The Final Recovery Plan for the Southern Oregon/Northern California Coast Evolutionarily Significant Unit of Coho Salmon (NOAA Fisheries, 2014) lists recovery goals by population. ODFW has expressed concerned about the analysis behind the recovery goals, and has recommended the use of alternate criteria for effective population size.

The Recovery Plan identifies the upper Rogue River Coho Salmon 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 Coho Salmon 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 Salmon 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 to 24,231 and has averaged 7,369 since 2000.

Table 2.2.2-1. Estimated escapement of naturally produced wild Coho Salmon in the Rogue River, 2000 - 2014. Mark-recapture estimate derived through capture at the Huntley Park seine site (~ River Mile 8).

Return Year	No. of Adult Wild Coho Salmon
2000	10,895
2001	11,654
2002	8,385
2003	6,534
2004	24,231
2005	9,715
2006	3,750
2007	5,103
2008	394
2009	2,566
2010	3,671
2011	4,545
2012	5,474
2013	11,210
2014	2,409

Upper Rogue Population Data--The counting station at Gold Ray Dam was operated between 1942 and 2010. Located at rivermile 126, the station provided a count of most (but not all) Coho Salmon in the upper Rogue population as identified by the National Marine Fisheries Service. Below is a graph of the Coho Salmon count at Gold Ray over time.

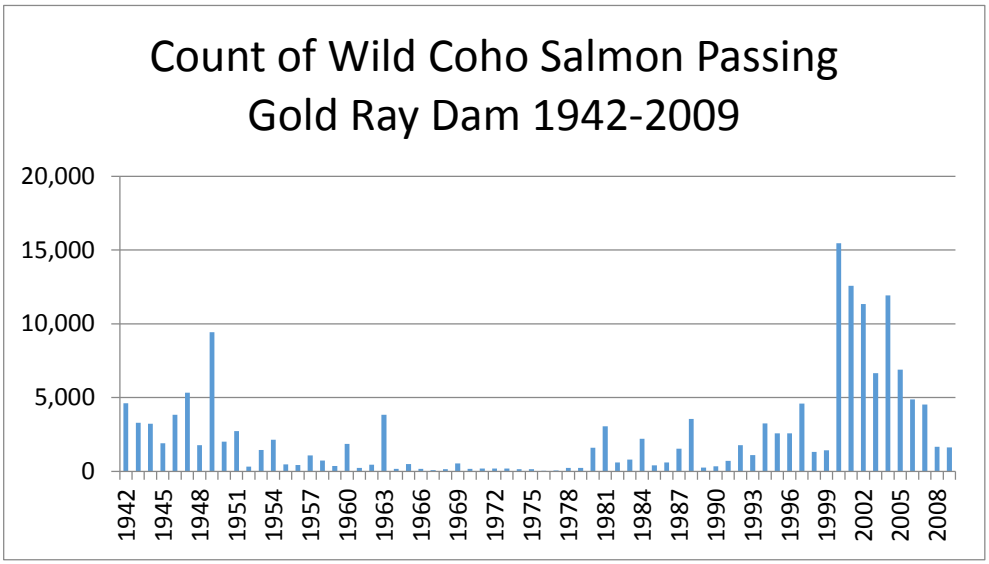


Figure 2.2.2-1—Count of wild Coho Salmon passing Gold Ray Dam over time.

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

Parent-progeny ratios for naturally produced coho salmon in the Rogue River Basin can be evaluated based on freshwater returns for the 1993 and later brood years. Earlier years can also be evaluated, but any evaluation would need to account for the marked changes in the ocean fishery impacts. Mortality impacts in the ocean fisheries were estimated to range between 0.07 and 0.15 during the 1994-2005 fishery years (PFMC 2006). In contrast, ocean fishery impacts in earlier years the impacts ranged between 0.27 and 0.87 (PFMC 2006).

The following figure shows recruits per returning adult of Rogue River Coho Salmon for the brood years 1993-2004. This figure of recruits per spawner has shown no discernable pattern over the 12 year period. Survival has shown dramatic inter-annual variation, ranging from less than one to greater than six recruits per brood year. Spawners failed to replace themselves five times during this period. Productivity rates were highest for the 1998 and 1999 brood years when brood productivity rates averaged about six recruits per returning adult. These estimates were derived from data presented in the previous table.

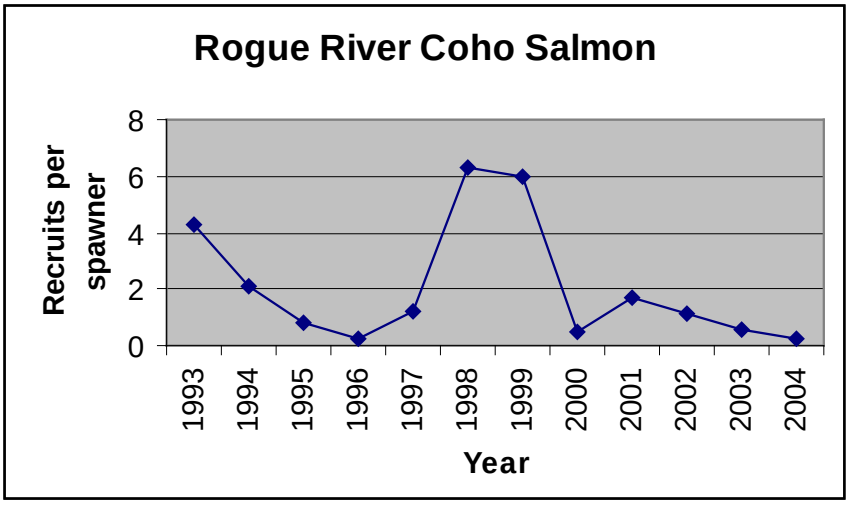


Figure 2.2.2-2. Recruits per spawner of Rogue River Coho Salmon (1993-2004)

Hatchery Coho Salmon produced at Cole Rivers Hatchery have included coded wire tag groups throughout the history of the program. Below is a graph of smolt to adult recruitment over time for Cole Rivers Hatchery-origin Coho Salmon. These data include only ocean harvest and hatchery returns. Poor returns in recent years hint at poor ocean conditions for Coho Salmon.

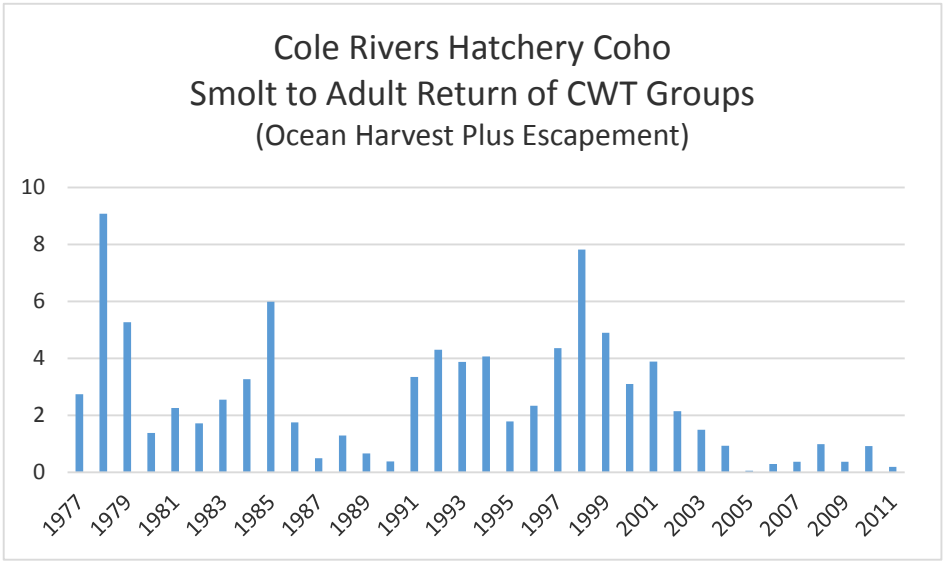


Figure 2.2.2-3. Smolt to adult return for Cole Rivers Coho Salmon over time.

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

A. Estimates of freshwater returns of naturally produced Coho Salmon to the Rogue watershed were presented above (Table 2.2-1). The figure below shows the number of adult returns of Rogue River Coho Salmon for the years 1980-2015.

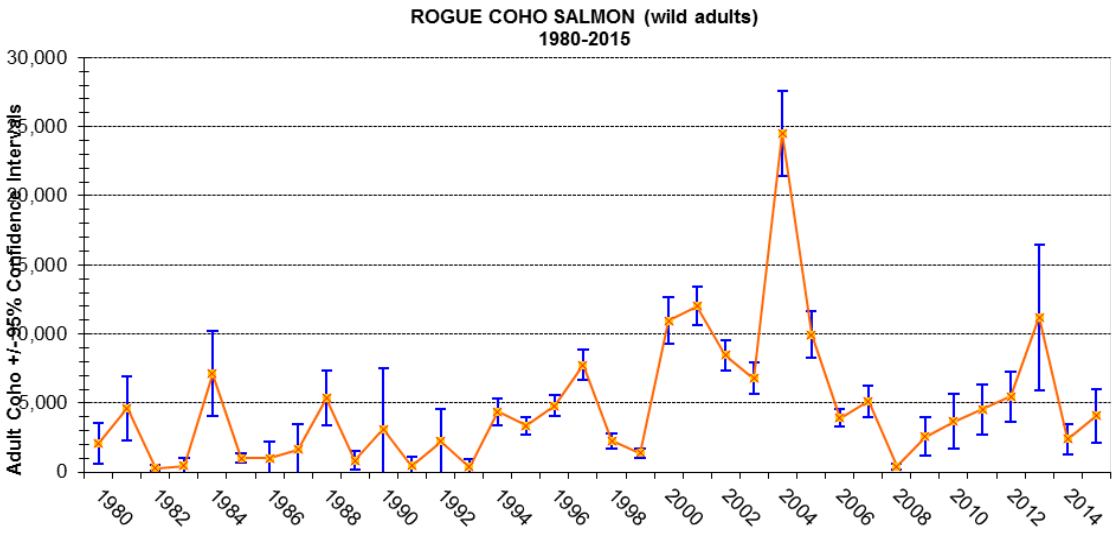


Figure 2.2.2-4 Number of Coho Salmon adult returns for the years 1980-2015.

Adult Distribution

The distribution of adult coho spawners among annual random sites in the Rogue River Basin is shown in Figure 2.2.2-4. Spawner densities are adjusted to compensate for differences in spawner abundance among the four return years. This figure illustrates the interannual consistency (or variability) of spawner distribution among these sites (Jacobs et al. 2002).

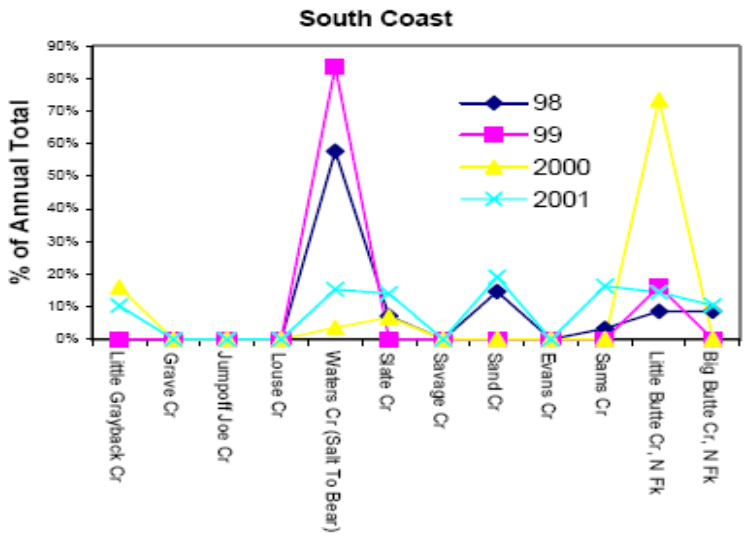


Figure 2.2.2-5. Distribution of adult Coho Salmon spawners among annual random sites in the Rogue River Basin, 1998-2001. Data are plotted as the proportion of annual total abundance among all sites that each individual site comprises. Only sites having valid Area Under the Curve (AUC) estimates in each 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 was 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).

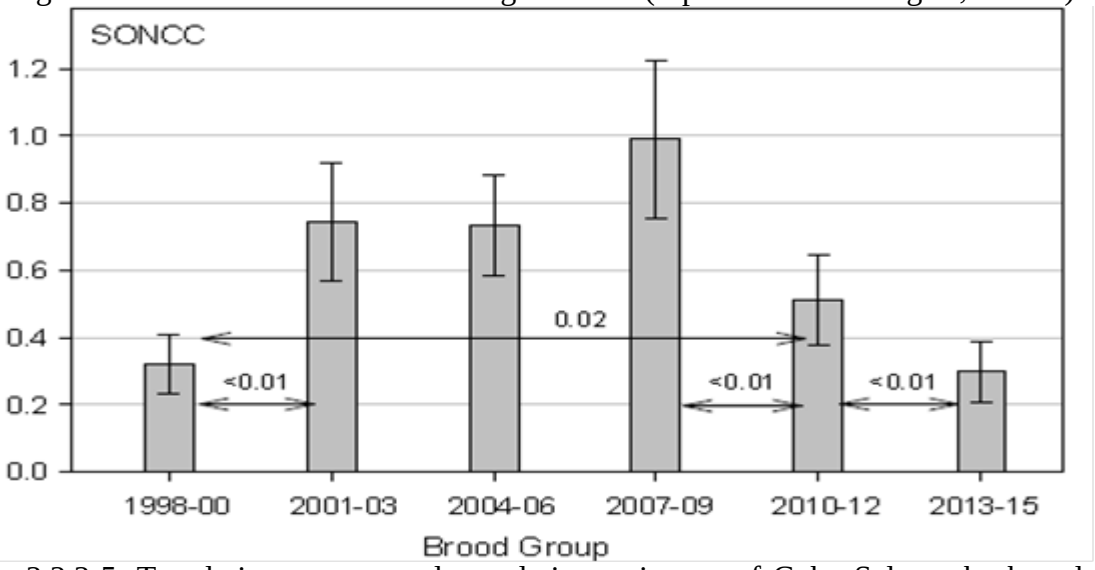


Figure 2.2.2-5. Trends in average pool population estimates of Coho Salmon by brood group in the Rogue portion of the Southern Oregon Northern California Coast Coho ESU. Gray bars show the population estimate (with 95%CI) for the brood group, p values for comparisons among brood groups are given above each vertical arrow where differences are significant.

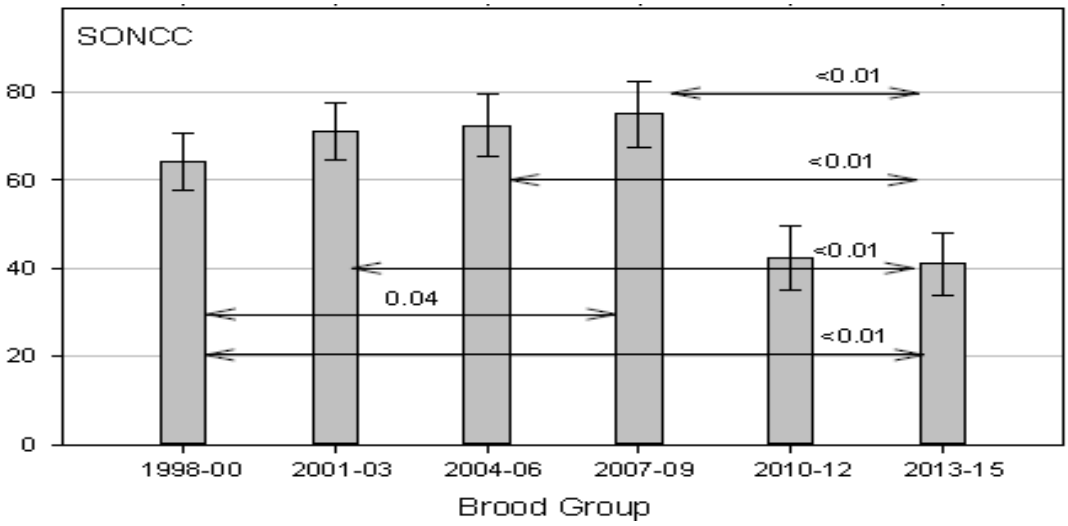


Figure 2.2.2-6. Trends in site occupancy of Coho Salmon by brood group in the Rogue portion of the Southern Oregon Northern California Coast Coho ESU. Gray bars show the percent occupied (with 95%CI) for the brood group, p values for comparisons among brood groups are given above each vertical arrow where there is a significant difference.

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

In the 2005 Oregon Native Fish Status Report, the Rogue winter steelhead SMU passed review criteria for reproductive independence (ODFW 2005). Data specific to the Applegate subbasin is limited. Spawning surveys conducted as part of a coast-wide survey to estimate winter steelhead redd abundance have been completed in the Rogue watershed for five years (2003 and 2005-2008). The surveys are intended to generate abundance estimates at the level of the distinct population segment (DPS), and not for individual subbasins. Surveys conducted within the Applegate subbasin have found an average of 6% hatchery fish among spawning fish observed clearly enough to determine finmarks. The percentage of hatchery fish among the spawners has ranged from 2% in 2003 to 22% in 2008, but small sample sizes will affect results. Only nine steelhead were surveyed accurately for finclips during the 2008 survey.

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

--Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where, and when the take may occur,

Brood Collection:
Winter steelhead brood collection occurs at the Applegate Trap at the base of Applegate Dam(additional collection methods such as angler caught brood could be implemented in the future if needed). Upstream migration of winter steelhead ends at the dam and trap site, and winter steelhead adults are collected from early February through early June each year. Migrating fish enter and progress up the collection pond until trapped. Both returning hatchery fish and naturally produced swim-ins are collected and are transported to Cole Rivers Hatchery. Brood fish are collected from throughout the run in order to maintain genetic diversity within the hatchery produced population. Winter steelhead brood collection does not result in any handling stress or take of ESA-listed coho salmon, because of temporal differences in adult return time between winter steelhead and coho.

*Smolt Release***:**
The hatchery program for winter steelhead is a mitigation program intended to replace lost natural production. Hatchery smolts are trucked back to the Applegate River for release (132,000 two year smolts at 4.0 f/lb in mid-late April, with a 100% adipose finclip) primarily in the mainstem.

In the past, a combination of one and two year smolts were produced. Releases of one year smolts may be reinitiated if needed to improve program performance and minimize impacts.

The smolt release strategy maximizes survival rates and minimizes interaction with naturally produced fishes in the Rogue River, as they outmigrate soon after release. The timing of this upper river release matches outmigration peaks of naturally produced wild fish, as observed during smolt trapping on the Little Applegate River (Vogt, 2004).

Coho spawning occurs primarily in tributary streams, with fry emergence occurring in early April. The mainstem release will have minimal impact because it matches the outmigration of naturally produced winter steelhead smolts, and coho fry will be found primarily in tributary streams at this time.

As a pilot project testing the feasibility of restoring some natural production above Applegate Dam, a portion of the smolt release is being differentially marked (left and right ventral finclips) and released above and below the dam to gauge survival rates of smolts through the reservoir and dam. Recaptures are planned to occur at existing projects (Huntley seining project and Applegate trap).

Presmolt Releases:
At this time, fry, presmolt and precocial releases are implemented at standing waterbodies or tributaries outside the current range of anadromous fish species. Additional releases are anticipated to evaluate restoration opportunities above Applegate Dam.

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

The winter steelhead brood collection did not cause any handling stress or take of ESA-listed Coho Salmon at the Applegate Trap or Cole Rivers Hatchery, because of temporal differences in adult return time between winter steelhead and coho.

--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).

See attachment for the take level (page 52). No adult Coho Salmon will be captured, handled or lethally taken during winter steelhead broodstock collection. A few adult and some juvenile Coho Salmon may be captured in smolt monitoring trap and will be released unharmed during smolt monitoring and evaluation of efforts to restore some natural production of winter steelhead above Applegate Dam.

Most monitoring activities associated with efforts to reintroduce winter steelhead above Applegate Dam will occur above the dam and outside the current range of anadromous fish species. Recaptures of marked smolt releases as half pounders and adults will occur at existing project sites (Huntley Park seining project and the Applegate trap and collection pond). An additional monitoring activity may involve the operation of a downstream migrant smolt trap below Applegate Dam. Juvenile coho salmon may be captured and released during smolt trapping at this location.

Estimates of handling that may occur during smolt trapping are listed in Take Table 1 (attachment, page 52). Captures are anticipated to range from 100-400 fry and 50 to 100 juveniles. It is possible that an adult could be captured, most likely a newly spawned-out adult.

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

The Rogue Watershed District of ODFW has a history of successfully completing smolt trap surveys in the watershed. This report includes data from past projects (see section 1.8). Coho Salmon captured during any smolt trap surveys associated with this hatchery program will be handled in accordance with all best management practices: the trap will be checked daily; all coho will be released as quickly as possible; only the minimum number of coho juveniles will be marked as needed for efficiency estimates, and no fry will be marked; during warm weather, the trap will be checked during the cool portions of the day. Take information will be monitored closely throughout the survey. If take levels are project to exceed permitted levels, the district will immediately contact NMFS and ODFW permit staff to discuss options.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1) Describe the alignment of the hatchery program with any ESU-wide hatchery plan or other regionally accepted policies. Explain any 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.

ODFW Fish Hatchery Management Policy: This policy provides guidance for the responsible use of hatchery-produced fish. It outlines the best management practices for hatchery programs to ensure conservation and management of both naturally produced native fish and hatchery produced fish in Oregon. The FHMP requires the development of Hatchery Program Management Plans (HPMPs) to outline the hatchery practices that will be followed for each hatchery program. A HPMP may be a Hatchery and Genetic Management Plan (HGMP) or an aspect of conservation plan developed under the Native NFCP. Once the conservation plan for Rogue Basin steelhead SMU is completed and approved by the ODFW, this HGMP may be revised and resubmitted to meet the requirement for a hatchery program management plan (HPMP).

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

(1) USACE/ODFW Cooperative Agreement
(2) ODFW Fish Health Management Policy
(3) ODFW/DEQ MOA: fish carcass distribution in Oregon streams
(4) NPDES permit for Cole Rivers Hatchery operation, to maintain Oregon water quality criteria for hatchery effluent

3.3) Relationship to harvest objectives.

Winter steelhead smolts are released primarily in the Applegate River immediately below Applegate Dam (river kilometer 77). The smolt release maximizes survival rates and minimizes the potential for competition between hatchery and wild juveniles. Hatchery origin winter steelhead returning as adults to the Rogue and Applegate River are intended to be caught in the recreational fisheries of both rivers, as the program was designed to provide a fishery to mitigate for lost habitat and fish production.

3.3.1) Describe fisheries benefiting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years if available.

The fishery for winter steelhead on the Rogue River allows a limited harvest opportunity on the healthy population of naturally produced winter steelhead in the basin. The Applegate River, however, is closed to the harvest of naturally produced winter steelhead. Hatchery steelhead (Rogue and Applegate releases) contribute to the sport fishery both as half-pounders and as adults, increasing the contribution rate for Rogue steelhead programs (see Table 1.12-1).

In 1994, the direct economic value of the winter steelhead fishery in the Rogue watershed was nearly $4 million. These totals resulted from an estimate of 48,242 local resident and 10,197 non-resident winter steelhead trips tallied in an economic study that was conducted from 1992 to 1994 by the Rogue Valley Council of Governments (Olson et al. 1994). The study included interviews of 1,200 anglers who participated in Rogue River fisheries.

3.4) Relationship to habitat protection and recovery strategies.

The climate of the Rogue watershed is more extreme than most of western Oregon, with much hotter and drier summers. Major factors affecting natural production include impacts to spawning habitat, rearing habitat, access to 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; irrigation 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. Protection of riparian habitat is the responsibility of city and county governments through Oregon's land use system.

The Applegate winter steelhead program is consistent with these habitat protection and recovery strategies. The program provides hatchery fish for harvest while only a limited harvest of naturally produced wild fish is allowed on the mainstem Rogue River. The selective fishery on the Applegate River means that the program provides the only fish available for harvest on the Applegate River

3.5) Ecological interactions.

(1) Species that could negatively impact program.
Mammalian predators including otters, harbor seals, sea lions and raccoons may adversely affect the program. Avian predators including the great blue heron, green herons, kingfishers, mergansers, cormorants, osprey, and gulls may negatively impact the program.

(2) Species that could be negatively impacted by program.
The listed coho within the basin could be negatively impacted by the program, but the impact is expected to be minimal due to the life history compatibility of the two populations, and spatial and temporal differences in habitat utilization.

(3) Species that could positively impact program.
Any fish (coho and chinook salmon as well as 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 the 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.

The Applegate River is the main water source for the trap facilities at Applegate Dam. Water is gravity fed to the trap from a supply pool originating from the side of the spillway at the dam. The pipeline is screened with a grizzly device to keep large debris from entering the collection facility. The trap and associated ladder are designed to operate at 32 cfs, resulting in a 12 inch head above each crest. The trap is in operation from the first week in February through approximately first week of June. All adult fish are trucked back to Cole Rivers for sorting and broodstock selection.

The Rogue River is main source of water for Cole Rivers Hatchery. Ambient water is gravity fed to the hatchery from an impoundment formed by a diversion dam. The intake structure is screened with a #4 mesh having 0.178 inch square holes. The supply system will provide up to 300 cfs. Ambient temperatures range from 41.2^{o}F to 56.7^{o}F.

The hatchery's warm water supply is piped from the surface of Lost Creek Reservoir.

This warmer water is gravity fed from a floating intake on the powerhouse intake tower, and energy is dissipated in a pool to lower the pressure before it enters the hatchery. The warm water supply system can provide up to 60 cfs, and annual temperatures range from 42.8^{o}F to 72.8 ^{o}F. When the warm water temperatures rise above 57 ^{o}F, ambient water is blended to acquire a maximum of 57 ^{o}F.

Incubation water is pumped from the ambient supply line and is ultraviolet sterilized. Incubation water is all single pass. The facility has the ability to filter all of the water through sand and drum filters. Also, it has boilers and chillers to manipulate growth rates of the developing embryos. The water quality is generally very good, and production at Cole Rivers has not been hampered by available water or its temperatures. The NPDES permit number for effluent discharge is #300J, and is under a general permit issued to ODF&W. The water right for Cole Rivers is for 224 cfs, and the permit number is (S 44910). The hatchery is in compliance with the water right, water uses, and annual reporting to Oregon Department of Water Resource.

4.2) Indicate risk aversion measures that will be applied to minimize the likelihood for the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge.

There are no listed fish above the water intake structures, and therefore they are exempt from NOAA Fisheries screening criteria, and downstream barriers prevent anadromous fish from reaching the water intake structures. The water diversion for fish culture is non-consumptive and is returned to the Rogue River below the hatchery. All wastewater effluent is pumped to a 150' X 100' X 6' asphalt lined pollution abatement settling basin. The water quality of hatchery effluent is monitored and reported quarterly to DEQ as per requirements of the NPDES 300-J permit. The facility is in compliance with the NPDES permit standards and requirements.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

Broodstock collection facilities below Applegate Dam consist of one 20' X 80' X 5' concrete pond with a finger weir trapping device, and a mechanical crowding device.

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

Cole Rivers has three liberation units assigned to it. One of the units is an insulated 250 gallon pickup driven slip tank with aeration, and oxygen supplementation. The other is a flatbed truck mounted, insulated 1,000 gallon tank, with aeration, oxygen supplementation, and cab mounted dissolved oxygen monitors. The third is an insulated, chassis mounted, 1,600 gallon tank, with aeration, oxygen supplementation, recirculation,

and cab mounted dissolved oxygen sensors.

5.3) Broodstock holding and spawning facilities.

There are six 20' X 100' X 5' broodstock holding ponds, of which the Applegate winter steelhead occupy only two ponds. Spawning facilities consist of an indoor room with mechanical lifts, sorting tables, spawning tables, and fresh water supplied horse troughs for fish recovery. Fish are anesthetized using electroshock and are mechanically lifted using a self draining brail to lift the fish up to table height.

5.4) Incubation facilities.

At Cole Rivers the total incubation capacity consists of 66 stacks of Marisource incubators. Each stack consists of 15 usable trays totaling 990. Only 98 trays are used for the Applegate winter steelhead production.

5.5) Rearing facilities.

Cole Rivers has 16-14'x3'x3' "Canadian" style fiberglass troughs; 26- 25' X 4' concrete circular ponds; and 87 – 100' X 20' X 5.5' concrete raceways. The Applegate winter steelhead require the use of up to six Canadian troughs and seven raceways.

5.6) Acclimation/release facilities.

All of the smolt size fish produced of this stock are released by using the one of the trucks described in Sec. 5.2, and are forcibly released. Acclimation sites are being implemented as well to improve contribution to the fishery. The fingerling and yearling/precocial fish are stocked using one of the trucks described in section 5.2, and are stocked directly into the water body.

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

The Applegate trapping facility had a mechanical problem during April of 2002 resulting in the loss of 230 adult fish in two incidents one week apart. Both incidents were related to the operation of the brail lift which transfers fish from the collection pond up into the trucks for transfer. Repairs and upgrades were made to the equipment to reduce the possibility of this happening again. Various minor losses occur from time to resulting in one or two fish getting pinched in the "catch lip" mechanism on the brail lifting frame. Additionally, fish are observed underneath the lifting brail that get around the brail bottom and are trapped. Both of these types of occurrences are rare, lead to very low losses, and are deemed insignificant.

At the hatchery, a water supply disruption resulted in a loss of 1999 brood year spring Chinook fry. An estimated 1.4 million fry were lost.

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.

Even though no listed fish are at issue with this section, Cole Rivers employs many risk aversion measures to protect its' program fish and the habitat. These include: full time staffing with trained personnel assigned to be on-call; back up generator systems that power essential equipment; alarm systems for water levels and intruders; daily alarm system checks; monthly fish health check-ups and pre-release fish health certification by Fish Health Services staff; and disinfection protocols to prevent the spread of disease.

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

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

6.1) Source.

The broodstock originated from wild fish entering the Applegate collection facility at the base of Applegate Dam.

6.2) Supporting information.

6.2.1) History.

Production began in 1981, and no selection procedures have been undertaken that would have adversely affected the basic characteristics of the founding broodstock.

6.2.2) Annual Size.

The goal is to use as many wild fish as possible from naturally produced adults returning to the trap. In years where low numbers of naturally produced fish return, marked hatchery fish are held for broodstock. Fish collected through April 15 are considered early and fish collected after April 15 are considered late. Fish spawning before May 1 are considered early, while fish spawning after May 1 are considered late. Currently, up to 150 pairs are kept from adults returning before April 15, and up to 150 pairs are kept from adults returning after April 15.

During spawning, the desire is to have eggs from a minimum of 75 pairs arriving before April 15, and 75 pairs arriving after April 15, as well as eggs from fish spawning before and after May 1 in each group to inherit the genetic quality of the entire population. The overriding and prevailing influences on the annual egg take are arrival and spawn timing, and wild fish are used as the primary source as long as the timing fits the four spawning schemes described above.

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

Table 6.2.3-1. Percentage of naturally produced fish used in egg takes (1999-2007).*

Brood Year	Males	Females
1999	No Data	No Data
2000	13.4%	11.6%
2001	57.9%	38.3%
2002	43.4%	66.7%
2003	48.3%	47.1%
2004	13.2%	12.7%
2005	15.3%	16.0%
2006	32.5%	34.4%
2007	15.2%	7.8%

*The proposed level is 100% naturally produced fish as broodstock, whenever possible.

6.2.4) Genetic or ecological differences.

ODF&W staff has detected no genetic, phenotypic, or ecological differences between hatchery and naturally produced Applegate winter steelhead.

6.2.5) Reasons for choosing.

Winter steelhead stock 62 is native to the Applegate River, remains well-adapted to the subbasin, and will have minimal impacts on naturally produced winter steelhead in the subbasin if they interbreed.

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.

Even though no listed fish (Coho Salmon) are expected to be impacted by the selection of winter steelhead broodstock, the risk aversion measures are being undertaken to minimize program impacts on naturally produced steelhead include utilizing a majority of wild fish in the broodstock selection and corresponding egg takes, and implementing elements of run timing and spawning timing into the spawn, which shall minimize the genetic impacts if they interbreed in the wild.

SECTION 7. BROODSTOCK COLLECTION

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

All fish retained for broodstock will be from maturing adults.

7.2) Collection or sampling design.

The adult fish are collected at the Applegate trap which is a finger weir design, and the collection pond which is open from early February through early June each year.
Upstream migration of winter steelhead ends at the dam and trap site. Additional collection methods such as angler caught brood could be implemented in the future if needed.

7.3) Identity.

Wild fish are identified by the presence of all fins and are generally described as "unmarked. Adults returning from hatchery origins are identified by scanning the fish for specific missing, or clipped fins. Virtually 100% of the hatchery released smolts are finclipped.

7.4) Proposed number to be collected:

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

Currently, the program goal is to collect a maximum of 300 pairs of adults to use for broodstock. A 1:1 male to female spawning ratio is used.

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

Year	Adults			Eggs	Juveniles
	Females	Males	Jacks		
1993	346	327	0	0	0
1994	261	206	0	0	0
1995	960	764	0	0	0
1996	695	826	0	0	0
1997	916	854	0	0	0
1998	852	880	0	0	0
1999	465	546	0	0	0
2000	275	305	0	0	0
2001	342	300	0	0	0

Year	Adults			Eggs	Juveniles
	Females	Males	Jacks		
2002	468	497	0	0	0
2003	406	398	0	0	0
2004	267	257	0	0	0
2005	285	269	0	0	0
2006	653	681	0	0	0
2007	312	310	0	0	0

Data source: ODFW Hatchery Management System (HMS) database.

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

Daily pre-spawning mortality is frozen in totes and later disposed of in a sanitary landfill. These fish are not used for nutrient enrichment, nor given to any food banks.

All wild fish that are spawned are spawned alive and released to the Rogue River after spawning. Unspawned wild fish are returned to the Applegate River alive with minimal handling stress. Hatchery females are spawned alive and released to the Rogue after spawning. Hatchery females that are surplus to brood needs may be stripped of eggs and released to the Rogue River. Males may be held for release in the future if acceptable techniques can be developed.

Currently, any remaining surplus hatchery adults are killed to minimize the risk of disease transmission (IHN). These fish are available for donation to foodbanks, for classroom dissection, and similar uses. Currently most carcasses are being used for nutrient enrichment as part of a Salmon Trout Enhancement Program project. Other uses include use as fertilizer by a local company Surplus adults were formerly released into local reservoirs for the trout fishery. This practice will be resumed as allowed under ODFW Fish Health Management Policy.

7.6) Fish transportation and holding methods.

Fish transported are usually on the truck less than 2 hours, and are loaded onto a liberation unit using a powered brail and chute. Fish held for broodstock are usually not treated. Mortality is picked daily, and any unusual losses would be promptly reported to ODF&W Fish Health Services for treatment recommendations.

7.7) Describe fish health maintenance and sanitation procedures applied.

Footbaths containing 100 ppm iodophor are utilized at the door of the adult area, and at the door into the incubation area to prevent the spread of disease. Latex surgical gloves when used are disposed of before leaving the adult area, and all rubberized outerwear is

disinfected with 100 ppm iodophor before leaving. Routine samplings from at least 60 adult fish, taken for the detection of any viral infections, are preformed each year. All equipment used during spawning is disinfected with either iodophor or chlorine on a routine basis.

7.8) Disposition of carcasses.

Daily pre-spawning mortality is frozen in totes and later disposed of in a sanitary landfill or processed for rendering. These fish are not used for nutrient enrichment, nor given to any food banks.

All wild fish that are spawned are spawned alive and returned to the river after spawning. Unspawned wild fish are also returned to the river alive. Hatchery females are spawned alive and returned to the river after spawning. Hatchery males are killed during spawning (Males may be held for release in the future if acceptable techniques can be developed). Currently most carcasses are being used for nutrient enrichment as part of a Salmon Trout Enhancement Program project. Other uses include use as fertilizer by a local company.

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.

No adverse genetic or ecological effects are expected, anticipated, or have been observed as a result of the winter steelhead broodstock collection program, because of the temporal differenced in adult return time between winter steelhead and ESA-listed coho salmon.

SECTION 8. MATING

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

8.1) Selection method.

Brood are retained throughout the run on a 1:1 male to female ratio, keeping a specified number of fish per week to achieve the goal for that particular period. For example if we need 150 pairs for the period February 15 – April 15, and there are 9 weeks in the period, then we will keep 17 pairs per week. Wild fish are given preference for brood, and hatchery fish are used to backfill up to the 17 pairs as needed. All egg groups are labeled and transferred to the incubator trays which are also labeled appropriately.

8.2) Males.

Males are used one time only.

8.3) Fertilization.

Females are live spawned individually in a bucket, and males are spawned individually in a “dixie” cup. Eggs from each female are fertilized using the milt from one male only. The fertilized eggs are left to stand for 2-3 minutes and are then pooled into one bucket in three mated pair family groups in preparation for incubation.

8.4) Cryopreserved gametes.

No cyropreserved gametes are used in this program.

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.

The mating scheme described for winter steelhead in the hatchery environment should pose no risk to listed coho salmon. The use of naturally produced fish in the mating pool reduces the risk of genetic drift, and the 300 fish spawning pool with 1:1 spawning reduces the threat of gene resource bottlenecking in the hatchery-produced winter steelhead 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 9.1.1-1. Table of egg take and survival rates (1993-2007).

Brood Year	Eggs Spawned	% Survival To Eyed	# Eggs Shipped	# Excess Culled	% Survival To Swim Up	# Fry Ponded
1993	374,060	97.0%	16,500	0	97.0%	346,413
1994	132,302	96.2%	0	0	88.5%	117,102
1995	605,882	95.8%	0	326,568	92.3%	232,878
1996	590,362	90.4%	0	167,031	75.5%	278,970
1997	821,434	87.0%	0	385,237	74.7%	228,596
1998	630,819	93.0%	0	251,066	87.5%	300,740
1999	561,600	95.4%	0	198,089	90.5%	310,058
2000	497,023	95.4%	0	206,244	94.8%	283,946
2001	538,755	88.6%	0	168,263	77.7%	250,145
2002	504,775	90.3%	0	147,084	78.5%	249,003
2003	432,753	92.5%	0	102,294	91.4%	293,438
2004	439,034	83.9%	0	0	78.5%	344,840
2005	394,605	91.5%	0	0	88.3%	348,603
2006	458,245	94.2%	0	0	91.2%	418,009
2007	601,705	87.0%	0	0	85.8%	516,305

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

Surplus eggs and/or fry may be destroyed when these are in excess of program needs. Enough green eggs are taken to fulfill the requirements described in Section 6.2.2. Often fecundity rates and survival exceed estimates and surplus alevins are randomly culled from the population with preference to wild progeny, parental run timing, and spawning timing. Eggs and/or fry are disposed of by freezing in totes and disposed of in a sanitary landfill or processed for rendering.

9.1.3) Loading densities applied during incubation.

Average fecundity is 2,400 eggs per female and eggs are trayed down at the rate of three females per tray, for an average rate of 7,200 total eggs per tray. Flow rates are set at 5 GPM, checked daily and maintained throughout the incubation period. When eye up occurs at about 400 temperature units the eggs are shocked, picked, enumerated and re-

incubated at the rate of 6,000 per tray. Hatching occurs between 500 – 600 temperature units, and button up occurs between 1,100-1,200 temperature units.

9.1.4) Incubation conditions.

Flows are set at five GPM and monitored daily. Temperatures can be manipulated, and usually are, using boilers and chillers, to achieve temperatures from 40-55 degrees F. Temperatures are manipulated to achieve the same size for all groups of fry for a common ponding date. Temperatures are monitored daily. Dissolved oxygen levels are not routinely monitored, and are only taken if deemed necessary. Incubation water is generally UV sterilized, filtered, and aerated prior to exposure to the eggs.

9.1.5) Ponding.

Ponding occurs at an estimated 99% button up usually between 1,100-1,200 temperature units. Fry are ponded in "Canadian" troughs between 2,500 and 3,000 fish per pound, and the ponding process is forced. Ponding occurs in late April- Early May**.**

9.1.6) Fish health maintenance and monitoring.

All eggs are water hardened in a bath solution of 100 ppm PPV buffered iodophor for 15 minutes when first trayed down. Fish Health Services staff examine the visceral tissues and ovarian fluids to detect the presence of any pathogens. Fertilized healthy eggs are treated on weekdays with a formalin solution to control fungal infections. Dead or diseased eggs are removed during the shocking process using a mechanical picker or salt bath, and hand tools. Dead and diseased fry are removed one day after ponding using hand tools, and the dead material is frozen in totes and disposed of in a local landfill or processed for rendering. All equipment and tools used during incubation are cleaned and sterilized between uses using either iodophor or bleach solutions.

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.

The winter steelhead populations in the Rogue Basin are not ESA-listed populations. However, to minimize the genetic and ecological effects to naturally produced steelhead, eggs are incubated in four subgroups for each egg take based on arrival time, spawn time, and wild or hatchery parentage. At the eyed stage, all eggs within each subgroup are mixed to help randomize any later reductions that could create bias. Catastrophic losses are minimized due to alarm systems and 24 hour surveillance.

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.

Table 9.2.1-1. Survival rates of fry to fingerling, and fingerling to smolt stages of Applegate winter steelhead at Cole Rivers Hatchery.

Brood Year	# Ponded	% Survival to Fingerling	% Survival to Smolt	# Smolt Released
1991	202,542	76.3%	75.3%	135,920
1992	237,343	87.9%	87.6%	89,981
1993	346,413	85.2%	83.5%	153,668
1994	146,947	86.1%	85.2%	89,529
1995	232,878	94.3%	92.9%	168,122
1996	278,970	84.1%	83.9%	172,273
1997	228,596	92.6%	91.3%	156,057
1998	300,740	79.5%	79.0%	153,609
1999	310,058	79.9%	79.5%	152,232
2000	283,946	79.4%	79.1%	156,846
2001	250,145	58.8%	58.3%	124,594
2002	294,003	73.3%	72.7%	152,922
2003	293,438	74.6%	67.8%	172,862
2004	344,840	68.8%	59.7%	180,298
2005	348,603	33.9%	30.3%	79,318

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

Fry are ponded into six "Canadian" troughs at the rate of 18 pounds of fry per trough. This is equivalent to 0.034 pounds per cubic foot of space and 1.8 pounds per GPM flow. Flows are increased as fish grow and when the size of fish approaches 100 pounds per trough they are transferred to outside raceways, usually in early – mid June at a size of 400 – 600 per pound. The maximum densities when transferred are 0.21 pounds per cubic foot of space, and 5.4 pounds per GPM flow. The final density goal is not expected to exceed 1.2 pounds per cubic foot of space, and 8.0 pounds per GPM of flow. For the 2002 brood released in 2004, the highest density of all of the raceways at release was 1.2 pounds per cubic foot of space, and 7.4 pounds per GPM.

9.2.3) Fish rearing conditions

Various water sources and fish facilities are described in sections 4.1, 5.3, and 5.5. Water temperatures are recorded daily from the various sources. Dissolved oxygen levels are taken at times of crisis or as needed as densities approach limits. Ponds are screened to prevent the escape of fish. Avian predator mesh covers the raceways. Any debris and wastes are broomed from the raceway bottom weekly.

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

Table 9.2.4-1. Fish growth expressed in number of fish per pound (BY 1999-2002)

MONTH	BY 98	BY 99	BY 00	BY 01	BY 02	AVG (98-02)
JUN	3038	2310	1299	1774	2700	2224
JUL	861	760	484	753	783	728
AUG	235	182	138	280	281	223
SEPT	59	70	93	113	144	96
OCT	42.6	36.6	58.4	72	101	62.1
NOV	31	25.3	35.5	58	49	39.8
DEC	28.5	22	30.7	56	42.3	35.9
JAN	24.2	17.5	26.2	43.2	38.1	29.8
FEB	19.5	13.3	20.1	39.2	30.6	24.6
MAR	17.5	10.6	19	28.7	27.5	20.7
APR	13.7	7.9	14.4	19.9	25.8	16.3
MAY	32.8	19.3	22.7	15.7	25.8	23.3
JUN	20.3	16.3	18	14.6	14.8	16.8
JUL	16.9	13.8	16.8	9.7	11.8	13.8
AUG	10.9	11.3	11.9	9.3	10.6	10.8
SEPT	10.7	9.6	9.4	8.4	10.4	9.7
OCT	9.3	7.0	8.7	6.8	7.9	7.9
NOV	6.9	6.7	7.3	6.7	7.3	7.0
DEC	7.2	6.6	6.6	5.7	6.2	6.5
JAN	6.1	5.6	5.4	5.2	5.4	5.5
FEB	5.3	4.9	5.1	4.2	4.7	4.8
MAR	4.3	4.2	4.5	3.8	4.3	4.2
FINAL	3.9	4.1	3.9	3.7	4.2	4.0

Table 9.2.4-2. Fish growth expressed in number of fish per pound (BY 2003-2005)

MONTH	BY 03	BY 04	BY 05	AVG (03-05)
JUN	2559	2345	3000	2635
JUL	1630	908	1114	1217
AUG	382	362	560	435
SEPT	178	156	137	157
OCT	94	78	77	83
NOV	73	60	58	64
DEC	53	58	43	51
JAN	73	55	41	56
FEB	48	45	35	43
MAR	40	35	27	34
APR	32	23	18	24
MAY	30	21	20	24
JUNE	21	20	14	18

JUL	16	15	11	14
AUG	10	11	9	10
SEPT	10	10	8	9
OCT	9	9	8	9
NOV	8	8	7	8
DEC	7	7	7	7
JAN	6	6	7	6
FEB	5	5	6	5
MAR	5	4	5	5
APR	6	4	4	5
FINAL	4	4	4	4

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

Table below shows the food conversion rates at different sizes (length) of fish from fry to smolt stage (a predicted schedule for a 132,000 smolt production from ponding to smolt release).

DATE	TEMP F	LENGTH	#/LB	% BOD WT	LB FED/D	FOOD CONV
06/30	50.4	1.46	865	3.849	5.87	1.2
07/31	54.1	1.99	342	3.397	13.12	1.2
08/31	56.1	2.60	154	2.834	24.24	1.2
09/30	44.9	3.08	93	1.285	18.27	1.2
10/31	44.0	3.41	68.5	1.073	20.7	1.2
11/30	44.0	3.71	52.9	0.988	24.7	1.2
12/31	41.9	4.00	42.2	0.758	23.7	1.2
01/31	38.9	4.23	35.8	0.498	18.3	1.2
02/28	40.9	4.41	31.5	0.615	25.8	1.2
03/31	42.0	4.66	26.7	0.658	32.6	1.2
04/30	45.6	4.96	22.2	0.839	50.01	1.2
05/31	49.1	5.30	17.8	0.928	69.03	1.2
06/30	50.4	5.77	14.1	0.923	86.45	1.2
07/31	54.1	6.27	11.0	1.022	122.90	1.2
08/31	56.1	6.84	8.4	1.018	159.17	1.2
09/30	44.9	7.29	7.0	0.513	97.24	1.2
10/31	44.0	7.61	6.1	0.455	97.72	1.2
11/30	44.0	7.89	5.5	0.440	105.65	1.2
12/31	41.9	8.17	5.0	0.351	93.51	1.2
01/31	38.9	8.38	4.6	0.237	68.27	1.2
02/28	40.9	8.56	4.3	0.300	91.81	1.2
03/31	42.0	8.79	4.0	0.330	109.70	1.2
FINAL	43.8	8.92	3.8	0.381	132.30	1.2

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

See tables above under sections 9.2.4 and 9.2.5 for further information. The starting diet is Bio BVS mash, followed by BVS size #0. The fish are then switched to BCS #1 and #2, before being fed BCF through to releases. Feed is fed to the fish using automatic timed feeders, and supplemented by hand to observe feeding habits.

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

Fish health and behavior are monitored daily. Any mortality is picked, discarded and recorded. Any unusually high losses are reported to ODF&W Fish Health Services for investigation. Fish Health Services performs monthly site visits for routine sampling and pre-liberation checkups. Infections/diseases of either parasitic or bacterial origin are treated as prescribed by Fish Health Services. Empty raceways are pressure washed and sun dried in preparation for incoming groups of fish. All equipment used in the raceways is disinfected with iodophor or bleach solutions prior to their use.

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

No gill ATPase or other quantitative analysis is performed. Degree of smoltification is determined by fish behavior, age of fish, fish size, time of year, scale loss, coloration, and body elongation characteristics, etc.

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

Natural rearing strategies include restricting the human exposure to the fish to ODF&W staff only.

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

The winter steelhead which is under propagation is not a listed population. However, all raceways are securely screened to prevent the escape of propagated fish prematurely. Fish rearing practices are programmed in a way that all fish will achieve full smolt stage at the desired time of year to optimize outmigration. Size at release and time of release are planned to mimic the characteristics of the natural population.

SECTION 10. RELEASE

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

10.1) Proposed fish release levels.

Life Stage	Release Location	Annual Release Level
Eyed Eggs	Tributaries above dam	None planned at this time*
Unfed Fry	Tributaries above dam	None planned at this time*
Fry	Tributaries above dam	None planned at this time*
Fingerling (gradeouts)	Standing waterbodies or tributaries above dams	40,000
Yearling (precocials)	Standing waterbodies or tributaries above dams	40,000
Smolt	Applegate River	132,000

*In the future, however, releases may occur above the dam for re-introduction purposes, if necessary, and approved by the Fish Division. Additional adult, fry or fingerling may be released into standing waterbodies or tributaries outside the current range of anadromous fish species.

Note: Smolt release numbers may increase or decrease, primarily if other mitigation production is changed.

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

Stream, river, or watercourse: Applegate River 1501000000
Release point: Applegate River**,** 42 03’ 28.0” N, 123 04’ 33.0” W
Major watershed: Applegate River
Basin or Region: Rogue

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

Table 10.3. Fish release data (1993-2015).

Release year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling/ Precocial*	Avg size	Smolt	Avg size
1993	0	NA	14,438	2700	139,137	70.8	16,416	10.6	87,309	5.2
1994	0	NA	0	NA	12,586	30.7	17,532	5.5	154,939	4.6
1995	0	NA	0	NA	14,613	26.7	24,448	4.1	88,710	4.2
1996	0	NA	0	NA	37,514	36.7	43,560	7.5	190,427	4.3
1997	0	NA	0	NA	11,794	33.6	10,134	6.5	163,412	4.3
1998	0	NA	0	NA	35,707	28.8	9,803	3.9	169,614	4.1
1999	0	NA	0	NA	30,537	100	71,699	9.1	100,844	4.7
2000	0	NA	0	NA	0	NA	52,701	11.1	209,473	4.1
2001	0	NA	0	NA	0	NA	77,578	12.5	99,368	4.5
2002	0	NA	0	NA	0	NA	19,416	11.4	115,530	3.9
2003	0	NA	0	NA	0	NA	41,262	5.7	124,594	3.7
2004	0	NA	0	NA	0	NA	39,700	5.6	152,922	4.0
2005							68,764	16.7	172,862	4.7
2006							27,652	16.4	148,675	4.10
2007							0	0	77,302	4.24
2008									116,623	4.29
2009									127,020	4.45
2010									140,176	3.90
2011									66,568	4.80
2012									112,968	4.67
2013									130,921	4.48
2014									70,017	4.08
2015									138,373	4.50
Ave.	0	NA	14.438	2700	40,270	46.8	34,711	8.44	129,637	4.34

*Released in standing water bodies
Data source: ODFW HMS database

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

Table 10.4 Actual dates of fish release, life stage and method of release for brood years 1996-2013.

BROOD YEAR	RELEASE DATE(S)	LIFE STAGE	RELEASE TYPE
1998	11/27/98	Fingerling	Forced
1998	8/4/99, 3/30-4/7/00	Yearling	Forced
1998	5/3/99, 4/11-14/00	Smolt	Forced
1999	9/8/99, 11/18/99	Fingerling	Forced
1999	6/30/00, 3/29-30/01	Yearling	Forced
1999	5/2/00 & 4/10/01	Smolt	Forced
2000	7/24/01	Fingerling	Forced
2000	3/2702, 4/5,15,18/02	Yearling	Forced
2000	5/1/01, 4/15-18/02	Smolt	Forced
2001	3/26-27/03	Yearling	Forced
2001	4/7-4/17/03	Smolt	Forced
2002	6/25/03	Fingerling	Forced
2002	4/19, 5/5, & 5/11/04	Yearling	Forced
2002	4/13-15/04	Smolt	Forced
2003	7/21-23/04	Yearling	Forced
2003	3/23-25/05& 4/11-13/05 5/13-26/05 6/17/05	Smolt	Forced
2004	9/23/04&2/5/05	Yearling	Forced
2004	4/9-21/06 & 5/2-4/06 & 6/1-23/06	Smolt	Forced
2005	4/16-20/07	Smolt	Forced
2006	4/17 - 23, 2008	Smolt	Forced
2007	4/13 – 15, 2009	Smolt	Forced

2008	4/12 – 15, 2010	Smolt	Forced
2009	4/11 – 13, 2011	Smolt	Forced
2010	4/16 – 20, 2012	Smolt	Forced
2011	4/9 – 16, 2013	Smolt	Forced
2012	4/14 – 16, 2014	Smolt	Forced
2013	4/8 – 15, 2015	Smolt	Forced

Source: ODFW HMS database

All fish released are trucked to the desired water body and are considered "forcibly" released**.** The smolt release is primarily a mainstem Applegate River release**.** The timing of smolt releases is mid-late April.

In the past, a combination of one and two year smolts were produced. Releases of one year smolts may be reinitiated if needed to improve program performance and minimize impacts.

Acclimation sites are being implemented to improve contribution to the fishery.

Fingerling release dates usually coincide with the outcome of final grading and splitting for final rearing purposes. The fingerling are excess to final rearing needs and the yearling are precocial males sorted from the population. Precocial yearling males are sorted from the population 1-2 months prior to release.

In standing waterbodies, fingerling are released forcibly from a tank truck. The dates usually coincide with the outcome of final grading and splitting for final rearing purposes. These fingerling are surplus the program's production goals.

10.5) Fish transportation procedures, if applicable.

Fish stocked by truck are loaded using a fish pump, and hand loaded as necessary using crowders and dipnets. There are no temperature control devices on any of the trucks used in this program. Oxygen supplementation is provided by a bottled source, and dispersed through ceramic diffusers at a rate of 2-4 liters per minute. Levels are monitored with a meter inside the cab. Additional oxygen supplementation is provided by powered aerators and water pump recirculation. Oxygen levels are maintained using these three methods to be above at least 10 ppm throughout loading and transport. Fish are generally in the truck tank less than two hours, and densities do not exceed 1.0 lb fish/gallon of total tank volume.

10.6) Acclimation procedures.

Acclimation sites are being implemented to improve contribution to the fishery. This has been described in Section 1.16 as a potential alternative/investment for the program.

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

Fingerling and yearling releases into standing water bodies or tributaries above dams may be released unmarked. Smolt releases into the Rogue River are virtually 100% marked with an adipose clip. An additional finclip, primarily a ventral finclip, will be used to facilitate monitoring and evaluation of efforts to restore natural production above Applegate Dam.

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

Surplus fish that are in excess of program needs/goals are released into standing waterbodies to generate additional fishing opportunities, depending on the available habitat.

10.9) Fish health certification procedures applied pre-release.

ODF&W Fish Health Services pathologists perform a pre-release examination within 30 days of the scheduled release of all fish of this stock. Any infected or diseased raceways are treated as necessary and prescribed, allowed to withdraw from the therapy as recommended, re-checked, and released if cleared to do so. Any raceways deemed unfit for release shall be destroyed, or stocked in water bodies where the infection may not cause any significant impacts. The decision to not stock smolt fish as scheduled would be a joint decision between the hatchery manager, ODF&W Fish Health Services, ODF&W Fish Division, ODF&W SW Region and Rogue Watershed staff, and consultation with appropriate NOAA Fisheries staff if needed.

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

Emergency releases of fingerling and precocial fish in standing water bodies can occur at the discretion of the hatchery manager anytime prior to their scheduled release time as long as they are certified disease free, are within 20% of scheduled release numbers, and are stocked only in scheduled water bodies. Emergency smolt releases can occur, at the discretion of the hatchery manager, within 60 days of their scheduled release, as long as the fish have been properly marked, are within 20% of scheduled release numbers, are stocked in scheduled water bodies, and are certified disease free. Emergency release of smolts earlier than 60 days prior to their scheduled release would be a joint management decision between the ODF&W Rogue Watershed staff, ODF&W Southwest Region staff, ODF&W Fish Division staff, the Cole Rivers Hatchery manager and consultation with appropriate NOAA Fisheries staff if needed.

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.

Smolt releases of Applegate winter steelhead are programmed to be at full smolt stage

during the peak outmigration period in the spring of the year. Release of fish at full smolt stage will enhance the speed of outmigration, and the likelihood of residualization shall be low, and thus will reduce the interaction with listed coho salmon in the watershed.

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.

Indicator--All smolts will be adipose clipped.

- Preliberation mark retention examination will be conducted to confirm mark rate

Indicator--Returning adults contribute to the freshwater fishery

- Punchcard data will provide indexes of total harvest
- Freshwater angler creel will be conducted on a periodic basis.

Indicator--Program will adequately mitigate for the habitat lost due to construction of USACE dams.

- Punchcard data will provide indexes of total harvest
- Freshwater angler creel will be conducted on a periodic basis.
- Counts of returning steelhead will be maintained at the Applegate Trap and Cole Rivers Hatchery.

Indicator--Economic benefit to rural communities of Curry, Josephine and Jackson counties.

- Periodic creel and evaluation of the economic benefits provided by the hatchery program and associated sport fishery.

Indicator--Release groups will meet ODFW fish health standards.

- Conduct appropriate health checks throughout incubation, rearing, and prior to release.

Indicator--A Conservation Plan will be developed for the appropriate Species Management Unit (SMU).

- Procedures for assessing stock status and risks will be developed in conjunction with the Conservation Plan.

Indicator--Broodstock collection reflects the run timing and age classes represented in the natural population.

- Data on adult return timing and spawning maintained by hatchery staff

Indicator--Release of program fish mimic the emigration of naturally produced winter steelhead.
Indicator--Behavioral and morphological characteristics of program fish are similar to naturally produced winter steelhead

- Length frequency and size at release data will be maintained by hatchery staff.

Indicator--Program fish are released within the period of peak outmigration for naturally produced smolts

- Releases shall be made as per scheduled time and locations

Indicator--Hatchery operations conform to applicable fish health, sanitation, and operational guidelines.
Indicator--Hatchery operations conform to DEQ/NPDES guidelines for water quality.
Indicator--Facility intakes are screened appropriately.

- Fish health is certified prior to release.
- Appropriate protocols will be followed for monitoring water quality as per NPDS permit.
- Screens will be checked on a regular basis.

Indicator--The program does not increase interaction with coho salmon. Handling of adult coho at Cole Rivers will follow the procedures outlined in the HGMP for the Rogue River coho propagation program.
Indicator--Any brood collection that increases interaction with coho salmon will be reviewed with NMFS staff prior to implementation

- Maintain accurate records data for all fish trapped in the collection facility below Applegate Dam.

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

Most actions are conducted as part of existing district, hatchery, and fish health program workload. Additional funding and assistance will be needed for future creel surveys and any economic evaluation.

The proposal to explore opportunities to restore natural production of winter steelhead above Applegate Dam will require monitoring and evaluation to determine the likelihood of success. The pilot project of a paired release of differentially marked smolt groups is proceeding, but will not require additional funding because recaptures are planned to occur at existing monitoring projects (Huntley seining project and Applegate trap). Additional releases will likely require the acquisition of additional funding for adequate monitoring and evaluation.

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.

No effect on listed species is expected from monitoring and evaluation activities planned in support of the Applegate winter steelhead program:

- Annual preliberation exam to confirm retention of mark rate
- Punchcard data will provide index of total harvest
- Freshwater angler creel will be conducted on a periodic basis
- Periodic evaluation of the economic benefits
- Conduct appropriate health checks throughout incubation, rearing, and prior to release
- Procedures for assessing stock status and risks will be developed by ODFW for the SMU
- Data on adult return timing and spawning maintained by hatchery staff
- Length frequency and size at release data will be maintained by hatchery staff
- Releases shall be made as per scheduled time and locations.
- Fish health is certified prior to release
- Appropriate protocols will be followed for monitoring water quality
- Screens will be checked on a regular basis.
- Maintain accurate records for all fish trapped in the collection facility below Applegate Dam.

SECTION 12. RESEARCH

12.1) Objective or purpose.

The proposal to restore natural production of winter steelhead above Applegate Dam will require monitoring and evaluation to determine the likelihood of success. The pilot project of a paired release of differentially marked smolt groups is proceeding. Additional releases will likely require the acquisition of additional funding for adequate monitoring and evaluation.

If successful, the project offers several potential benefits to the Applegate watershed, including: additional production of naturally produced winter steelhead; restoration of a keystone species to the watershed above Applegate Dam, with benefits to the ecology of the upper Applegate; the possibility that other species including coho salmon could be produced above the dam. Additional details are expected to be identified during conservation planning for Rogue steelhead. Research actions may be identified in the conservation plan.

Additional projects to improve performance of the program may be implemented in the future by ODFW and/or volunteers in the Salmon Trout Enhancement Program.

12.2-12.12) To be determined when appropriate.

SECTION 13. ATTACHMENTS AND CITATIONS

Citations:

Everest, F.H. 1973. Ecology and Management of Summer Steelhead in the Rogue River. Fishery Research Report Number 7, Oregon State Game Commision Final Report.

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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.

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Vogt, J. 2004. Upper Rogue Smolt Trapping project, 2004. Oregon Department of Fish and Wildlife, Central Point, Oregon.

Personal Communications

John Leppink. Email message with ODFW punchcard harvest estimates, February 28, 2008. Oregon Department of Fish and Wildlife, Salem Oregon.

Mark Lewis. Email message with Rogue coho summary table, January 29, 2007. Oregon Department of Fish and Wildlife, Corvallis Oregon.

Mike Evenson. Email message on corrected table of Elk Creek Trap data, March 26, 2008. Biologist, Rogue FishBio Services, Inc.

Rene Pellisier. Email message on Gold Ray coho data, August 11, 2008. Gold Ray fish counter, Oregon Department of Fish and Wildlife, Central Point Oregon.

Tom Satterthwaite. Email message on basic fishery metrics associated with steelhead production at Cole Rivers Hatchery, March 31, 2008. Fishery Biologist, Oregon Department of Fish and Widlife, Grants Pass Oregon.

SECTION 14 CERTIFICATION LANGUAGE, SIGNATURE OF RESPONSIBLE PARTY.

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

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

Signature of Applicant: _____ Date: _____

Certified by: Scott Patterson, Fish Propagation Program Manager

Signature: _____ Date: _____

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

Listed species affected: Coho ESU/Population: Southern Oregon Northern California; Activity: Smolt trap survey below Applegate Dam				
Location of hatchery activity: Applegate River RM 70-77; Dates of activity: September to June or later; Hatchery program operator: Dan Van Dyke.				
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)	400	100	10	
Capture, handle, tag/mark/tissue sample, and release d)	100	25	0	
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)	10	5	1	
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.

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.