

HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	Tenmile Lakes Rainbow Trout Program
Species or Hatchery Stock:	Rainbow Trout (Stock 72T)
Agency/Operator:	Oregon Department of Fish & Wildlife
Watershed and Region:	Tenmile Lakes Watershed– West Region
Date Submitted:	September 22, 2008
First Update Submitted:	June 13, 2016
Date Last Updated:	June 13, 2016

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Tenmile Lakes Rainbow Trout Program.

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

Species: Rainbow Trout *Oncorhynchus mykiss*.

Stock: Cape Cod Rainbow Trout - Stock 72T (domestic stock of ODFW hatchery trout--triploid); and this stock of Rainbow Trout is not ESA-listed.

1.3) Responsible organization and individuals.

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Hatchery Contact:

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

Roaring River Hatchery (ODFW) – captive broodstock rearing (stock-072) and egg take for transfer to other ODFW facilities listed below.

Cole Rivers Hatchery and Bandon Hatchery (ODFW) – incubate, raise, and rear stock to time of release.

Klamath Hatchery (ODFW) – may raise and rear fish which are eventually transferred to Cole Rivers or Bandon Hatchery for further rearing until release. At the current time, no hatchery Rainbow Trout come directly to the Tenmile Basin from Klamath or Roaring River hatcheries.

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

Funding source-approximately 50% from State dollars from the sale of fishing licenses and 50% from State general fund (tax dollars).

Bandon Hatchery staffing level:

One Hatchery Manager 2; one Hatchery Technician 2; one Hatchery Technician 1.

Cole Rivers Hatchery staffing level:

One Hatchery Manager 3; One Hatchery Technician 3; one Hatchery Technician 2; nine Hatchery Technician 1; two Trades Maintenance, and one Office Coordinator.

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

Cole M. Rivers Hatchery is located in the upper Rogue watershed approximately 30 miles NE of Medford, Oregon. The site is at an elevation of 1,255 feet above sea level and, at latitude 42° 39' 49" N and longitude 122° 41' 01" W. This hatchery is located at the base of Lost Creek Dam at river mile 157. The regional mark processing code for Cole M. Rivers Hatchery is 5F22208 H8 21.

Bandon Hatchery is located in the Coquille watershed one mile east of the city of Bandon at latitude 43° 06' 54" N and longitude 124° 23' 03" W. The site elevation is approximately 98 feet above sea level. The hatchery sits at the confluence of Geiger and Ferry Creeks. Ferry Creek enters the Coquille estuary at river mile (RM 1.0). The watershed code is 1700301000; and the regional mark processing code for Bandon Hatchery is 5F22237 H37 21.

Roaring River Hatchery is located along the Roaring River which is a tributary to Crabtree Creek on the South Santiam River in the Willamette subbasin. The hatchery is about 18 miles (29 kilometers) northeast of Albany, Oregon. The hatchery intake is at River Mile 1.4. The hatchery facility is at an elevation of 570 feet above sea level, at latitude 44° 37' 28" N and longitude 122° 43' 20" W. The regional mark processing code for Roaring River Hatchery is 5F33322 H22 21.

Klamath Hatchery is located approximately 30 miles north of Klamath Falls on Hwy 62 at an elevation of 4,120 feet above sea level and, at latitude 42° 39' 05" N and longitude 121° 56' 47" W.

Rock Creek and Klamath hatcheries have only periodically and partially reared trout that were destined for release in the Tenmile Lake basin. Because of the short period of rearing of program fish at these facilities no further discussion will ensue about the

parameters of these facilities.

The Eel Lake Net Pen is in Eel Lake near the boat ramp at Tugman State Park near Lakeside, Oregon at latitude 43° 36'147' N and longitude 124° 10' 350' W.

See Sections 5.3, 5.4, 5.5 and 5.6 for spawning, rearing and release processes.

1.6) Type of program.

Isolated Harvest Program

1.7) Purpose (Goal) of program.

This program is intended for recreational put-and-take fishery with no goal for natural reproduction. Legal trout (approximately 3 fish per pound or ~ 9 inches in length each) are released into the Tenmile Basin to provide recreational fishing opportunities. The program uses 100% hatchery-raised Rainbow Trout to stock the Tenmile lakes system to create recreational fishing while having a minimal impact on native fish including wild Coho Salmon present in the system.

Fall trout (approximately 0.8 fish per pound or 14 to 16 in.) are released into Saunders Lake in the Tenmile Basin to provide enhanced recreational fishing opportunities. These Rainbow Trout are a small part of the legal trout production reared at Bandon or Cole Rivers Hatchery, and instead of releasing these fish in the spring, these are held until the fall when they are released at a larger size. These trout serve the purpose of offering larger fish to catch by the anglers.

Eel Lake net pen program is intended for the Free Fishing Weekend event (early June each year). During this weekend, young children come and catch legal trout out of the net pen as an enjoyable angling opportunity for those young children who do not normally go fishing. Leftover trout are released from the pen at the end of the Free Fishing event.

1.8) Justification for the program.

The program is carried out for the economic and recreational benefits to the community. This program is expected to have minimal effect on federal ESA listed populations of Coho Salmon. Incidental impacts to Coho Salmon from Rainbow Trout anglers are expected to be low since gear selection typically is targeted towards trout size and location in the water column. Anglers are required to release all Coho Salmon in the Tenmile Basin, and there is no current Coho Salmon hatchery program in the Tenmile Basin. Tenmile Creek is closed to all angling from April 30th (when steelhead season closes) to the fourth Saturday in May, in order to protect out migrating juvenile salmonids.

1.9) List of program “Performance Standards” and 1.10) Performance Indicators.

1. Contribution to Fisheries

Standard 1: Provide an opportunity for anglers to harvest legal-sized hatchery-produced Rainbow Trout in the Tenmile Lakes system.

Indicator (a): Assess the success of the fishery through interviews with anglers and observations of fishing effort at each of the lakes.

Indicator (b): Enumerate Coho Salmon passed above Eel Lake Trap for run status information. Minimize handling of Coho at Eel Lake Trap, and minimize holding time in the trap to the extent possible.

Standard 2: Stock hatchery Rainbow Trout into North and South Tenmile Lakes and Eel Lake.

Indicator (a): Trout will be inventoried at time of release to enumerate trout numbers released in these lakes.

2. Facility Operation and Maintenance

Standard 3: Follow approved fish health disease and disinfection monitoring guidelines provided by ODFW's Pathology Section to minimize disease impacts to natural populations.

Indicator(a): Verify compliance with approved fish health standards and criteria. (See Appendix A)

1.11) Expected size of program.

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

No adults need to be collected from natural populations. The hatchery captive broodstocks are maintained at ODFW’s Roaring River Hatchery.

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

Table 1. Proposed annual release levels for Tenmile Rainbow Trout.

Life Stage	Release Location	Annual Release Level ^a
Eyed Eggs		
Unfed Fry		
Fry		
Fingerling		
Yearling	Eel Lake	7,000
	N. Tenmile Lake	9,000
	S. Tenmile Lake	9,000
	Saunders Lake	9,000
Fall Trout ^b	Saunders Lake	1,500

^a Proposed annual release levels at current funding level. Releases may be increased with increased funding of the legal trout program.

^b “Fall Trout” are legal-sized trout in the spring, held to October and released at approx. 14-16” in length.

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

The hatchery Rainbow Trout program in the Tenmile Basin is designed to provide legal-sized Rainbow Trout, 8 inches or greater in length, for recreational fishing. Smolt-to-adult survival rates, adult spawners, and escapement numbers are not a measurable part of the program. Total number of fish released and subsequently caught has not been determined, in part due to the variability in angler success rates at different water bodies. No evaluation of harvest or exploitation has occurred in Tenmile Lakes since the early 1990’s.

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

According to the Tenmile Basin Fish Management Plan (ODFW 1991), stocking of hatchery Rainbow in Tenmile Basin lakes has been occurring since the late 1930’s. The exact year when hatchery Rainbow were first stocked in the Tenmile system was not readily available.

1.14) Expected duration of program.

The trout stocking program is intended to be ongoing.

1.15) Watersheds targeted by program.

This program is targeted at the Tenmile Lakes watershed, near the town of Lakeside.

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.

One key issue involving the trout stocking in these coastal lakes is its impacts on wild Coho Salmon juveniles. Impacts to wild Coho Salmon from stocked Rainbow Trout could involve anglers targeting the stocked trout and inadvertently catching wild Coho juveniles that may cause hooking mortality during release. Juvenile wild Coho Salmon can also be miss-identified as a legal trout and illegally retained by anglers. There are also popular fisheries for warm-water species in these lakes. Another potential impact from the Rainbow Trout stocking is competition for food and space with wild salmon. This is generally not thought to be a major concern because most of the stocked trout are either quickly caught or perish. The abundance of both the stocked Rainbow and juvenile Coho in these lakes is usually low compared to prolific populations of warmwater game fish. The juvenile Coho that are present in these lakes are considerably larger as smolts than stream reared Coho juveniles. Improved spring growth of juvenile Coho immediately prior to smolting is common to Coho in all these lakes.

1.16.2) Potential Alternatives to the Current Program.

The alternatives listed below are draft only. They are presented here as forum for further reviews/discussions. Any other new ideas are welcome. The alternatives listed may not represent final decisions by ODFW.

Draft Alternative 1—Program expansion.

Description and Implications:

This alternative would likely increase the harvest of trout in these lakes. It could also increase trout angling effort.

PROS AND CONS:

Pros—Provide more recreational opportunities which would be beneficial to anglers, businesses, and campgrounds. The “put-and-take” Rainbow Trout fisheries in ODFW Fish Districts are family-oriented outdoor activities for the beginners in fisheries. This program provides fishing opportunities for very young anglers with limited or no fishing skills or resources.

Cons— This increased harvest and effort could lead to higher numbers of Coho juveniles being caught by trout anglers and an increase in the mortality rate to wild Coho from the fishery. More stocked trout could also increase competitive interactions with juvenile wild coho.

Draft Alternative 2—Adipose fin-clip all hatchery trout stocked in coastal lakes with Coho Salmon and implement “fin-clipped trout only” regulations.

Description and Implications:

By fin marking the liberated trout, there would be a distinction between the stocked trout and wild listed Coho Salmon.

PROS AND CONS:

Pros— This alternative would help to eliminate the inadvertent take through misidentification of wild Coho by trout anglers in these lakes. Anglers would learn that any fish with an intact adipose fin must be released.

Cons— This would not prevent wild Coho from being caught and released by trout anglers and thus would not reduce the mortality incurred on Coho from being caught and released. This alternative would eliminate the consumptive harvest of wild Cutthroat Trout in these lakes. There would be an increased cost to hatchery trout production with fin marking, and a potential decrease in hatchery trout survival due to stress from the fin marking operation.

Draft Alternative 3—Eliminate Tenmile Rainbow Trout program.

Description and Implications:

This would pose the least risk to wild Coho Salmon of any of the alternatives. Fewer anglers would target trout in these lakes if the lakes were no longer stocked. Some trout fishing will continue in the lakes even if they are not stocked with trout because these lakes contain wild Cutthroat Trout. Closing the lakes to all trout fishing could further enhance protection of Coho Salmon in the lakes by eliminating any anglers targeting trout. This alternative could be implemented by shifting Rainbow Trout stocking to lakes that do not contain wild Coho Salmon. The shift away from lakes with Coho has already been done to the extent that non Coho lakes are currently stocked near maximum levels. Shifting more trout stocking to these lakes may not benefit the fisheries. This would completely eliminate the learning opportunities of fishing for young children/anglers and other social and economic benefits of the program, while eliminating any potential impacts on coho.

PROS AND CONS:

Pros— This could result in fewer wild Coho Salmon juveniles being caught incidentally. The saved budgeted dollars would be available for other programs.

Cons— Eliminating the trout stocking will negatively impact trout anglers who fish in the Tenmile Lake Basin. There would create considerable public criticism of ODFW if this alternative is implemented. Elimination of the stocked trout program would have negative impacts on the local economy of Lakeside and Coos County.

1.16.3) Potential Reforms and Investments.

The idea below is a draft for further discussions only, not final decision.

Reform / Investment 1: Fin-clip all hatchery trout stocked in lakes and allow harvest of only fin-clipped Rainbow Trout. This would require the fin-clipping of approximately 21,000 trout (at current stocking levels). Estimated cost would be about \$1,000. This reform and investment would prevent inadvertent harvest of wild Cutthroat Trout and Coho Salmon. These wild Cutthroat Trout populations are healthy and provide for year-round fisheries in Tenmile, Eel, and Saunders lakes.

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

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

The HGMP for this Rainbow Trout hatchery program was submitted to NMFS on 9/22/2008 for the ESA permit or take authorization. This is an updated version of the HGMP submitted in 2008.

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

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

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

There will be no direct take of ESA-listed Coho Salmon due to this Rainbow Trout hatchery program.

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

No incidental take of listed Coho Salmon will occur due to broodstock collection as hatchery-stock of Rainbow Trout are used as broodstock. There could be incidental or indirect effects to listed Coho Salmon due to release of Rainbow Trout in Coho Salmon inhabiting lakes through competitive interactions for food and space.

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

Lakes Complex

The Lakes Complex consists of three major coastal lake basins called Siltcoos, Tahkenitch, and Tenmile where Coho Salmon inhabit (Nickelson 2001). There is an estimated 100 miles of spawning habitat available to the Coho Salmon of this complex.

Coho Salmon Life History

Adult Coho Salmon migrate into fresh water in the fall to spawn. Spawning of wild Coho Salmon usually occurs from mid-November through February. Adult spawning Coho Salmon are typically 3 years old and are often accompanied by 2-year-old jacks (precocious males) from the subsequent brood year. Spawning occurs primarily in small tributaries located throughout coastal basins. The parents normally exhibit strong homing to their natal stream for spawning. The female digs a nest (redd) in the gravel and lays her eggs, which are immediately fertilized by accompanying adult males or jacks. The eggs are covered by digging and displacing gravel from the upstream edge of the nest. Each female lays about 2,500 eggs. The adults die soon after spawning. Sex ratios of spawning adults tend to average around 50:50 at most locations (Table 2-1). However, Moring and Lantz (1975) observed 77 percent males in three small Alsea River tributaries over a period of 14 years. They concluded that males tend to move around a lot and visit multiple streams.

The eggs hatch in about 35 to 50 days, depending upon water temperature (warm temperature speeds hatching). The alevins remain in the gravel for 2 or 3 weeks until the yolk is absorbed and emerge as fry to actively feed in the spring. Most juvenile Coho Salmon spend 1 summer and 1 winter in fresh water. The following spring, approximately 1 year after emergence, they undergo physiological changes for smoltification that allow them to survive in seawater and then migrate to the ocean as silvery smolts of about 10 to 12 centimeters (cm) in length.

Table 2-1. Observations of Coho Salmon Sex Ratio at Adult Traps.

Population Complex	Percent Males	Percent Females	Location	Run Years	Data Source
Nehalem	52%	48%	North Fork trap	1998-1999	Life Cycle Monitoring
Siletz	50%	50%	Mill Creek trap	1997-1999	Life Cycle Monitoring
Yaquina	51%	49%	Mill Creek trap	1997-1999	Life Cycle Monitoring
Alsea	77%	23%	Drift Creek tributaries	1959-1972	Moring & Lantz (1975)
	50%	50%	Cascade Creek trap	1997-1999	Life Cycle Monitoring
Umpqua	55%	45%	Smith River trap	1999	Life Cycle Monitoring
Coos	63%	37%	S. Coos River, Winchester Creek, and Fall Creek	1999	Oregon Plan Monitoring

The smolts undergo rapid growth in the ocean, reaching about 40 to 50 cm by fall. Little is known of the ocean migrations of Coho Salmon from Oregon coastal streams; however, based on what is known, it appears migrations are mostly limited to coastal waters. Initial ocean migration appears to be to the north of their natal stream (Fisher and

Pearcy 1985; Hartt and Dell 1986). After the first summer in the ocean, a small proportion of the males attain sexual maturity and return to spawn as jacks. Migration patterns during the fall and winter are unknown. Those fish remaining at sea grow little during winter but feed voraciously during the next spring and summer, growing to about 60 to 80 cm in length. During this second summer in the ocean, a substantial percentage of these maturing adults are caught in ocean troll and sport fisheries, usually to the south of their natal stream (Lewis 2000). The survivors return to their home streams or neighboring streams where they spawn and die to complete the life cycle.

Habitat Use and Freshwater Distribution

Spawning and rearing of juvenile Coho Salmon generally take place in small, low-gradient (generally less than 3 percent) tributary streams, although rearing may also take place in lakes where available. Coho Salmon require clean gravel for spawning and cool water temperatures (53° to 58°F preferred, 68°F maximum) for rearing (Reiser and Bjornn 1979). Fry emerge from February to early June (Moring and Lantz 1975) and occupy backwater pools and the stream margins (Mundie 1969; Lister and Genoe 1970; Nickelson et al. 1992a). During the summer, Coho Salmon prefer pools in small streams, whereas during winter, they prefer off-channel alcoves, beaver ponds, and dam pools with complex cover (Nickelson et al. 1992a, 1992b). Complexity, primarily in the form of large and small wood is an important element of productive Coho Salmon streams (Nickelson et al. 1992b; Rodgers et al. 1993). Little is known about residence time or habitat use of estuaries during seaward migration. It is usually assumed that Coho Salmon spend only a short time in the estuary before entering the ocean. However, recent research is finding that rearing in the upper ends of tidal reaches can be extensive. The distribution of Coho Salmon within a basin is primarily determined by two factors: marine survival and the distribution of freshwater habitat of different levels of quality. When marine survival has been very poor, Coho Salmon are generally found within the highest quality habitats. Coast-wide, these habitats comprise about 22 percent of the habitat (Nickelson 1998). When marine survival increases, as could occur with a changing climate regime, Coho will redistribute into freshwater habitats of lower quality. Thus, Coho Salmon population dynamics function with a classic “source-sink” relationship among stream reaches.

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

Lakes Complex

The Tenmile Lakes population of the Oregon Coast Coho Salmon ESU is federally listed under the ESA. The “Lakes Complex” defined by ODFW consists of Coho Salmon inhabiting the three major coastal lake basins: Siltcoos, Tahkenitch, and Tenmile. There are an estimated 100 miles of spawning habitat available to the Coho Salmon of this complex (Nickelson 2001). The critical population level for the Lakes Complex is 400 adult spawners. The habitat of this complex has the potential to support a viable population. The lakes provide excellent winter rearing habitat, which has the effect that all 100 miles of stream function as high quality habitat. As a result, this is one of the most productive complexes on the coast and trends in abundance reflect just that.

The abundance of Coho Salmon spawners of the Lakes Complex has ranged from about 2,000 to about 13,500 and has averaged about 9,000 over the past 10 years (Figure 2-1 and Table 2-2). Abundance during the past decade has never fallen below the critical threshold of 400 fish. Recruits per spawner have been variable over the last 8 years, with the only one year falling to below one (Table 2-2 and Figure 2-2). Hatchery fish have been rare in the spawning population with only 22 of 2,540 (0.9%) of scales sampled during 1990-99 having hatchery scale patterns. Of the 168 adult and jack Coho that were trapped at the outlet of Eel Lake during that period, three of the fish were hatchery strays. The trap at the outlet of Eel Lake is operated for collection of steelhead broodstock (refers to Tenmile Lake Steelhead HGMP), and can be used to remove stray hatchery Coho Salmon, if captured.

Smolt production was estimated for the 1997 through 1999 broods. Estimated smolt abundance ranged from 274,000 to 311,000 for the Lakes Complex (Table 2-3).

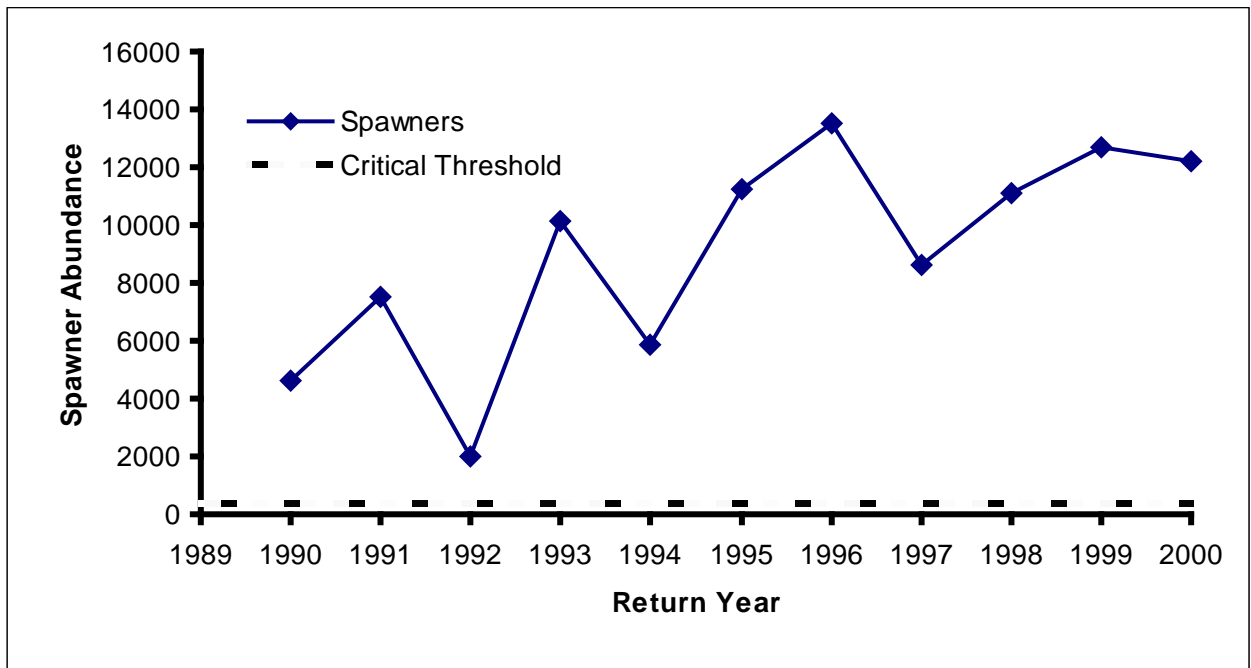


Figure 2-1. Trend in adult Coho Salmon abundance relative to the critical population level for the lake complex. Population estimation methods do not allow calculation of confidence intervals.

- Provide the most recent 12 annual spawning abundance estimates, progeny to parent ratios, or any other abundance information.

Table 2-2. Population parameters for the lakes complex Coho Salmon.

Return Year	Wild spawners	Pre-harvest wild population	Recruits per spawner
1990	4,629	14,884	
1991	7,495	13,727	
1992	1,986	4,061	
1993	10,145	17,582	3.8
1994	5,841	6,267	0.8
1995	11,216	12,804	6.5
1996	13,493	14,714	1.5
1997	8,603	9,821	1.7
1998	11,108	12,048	1.1
1999	12,710	13,755	1.0
2000	12,178	13,180	1.5
Annual mean	9,037	12,077	2.2

The updated Coho Salmon escapement estimates for the Lakes Complex and Tenmile Basin are as follows:

	<u>Complex</u>	<u>Tenmile</u>
2001	19,669	11,039
2002	22,162	13,861
2003	16,668	6,620
2004	18,687	7,166
2005	14,724	8,464
2006	24,378	15,187
2007	8,885	3,957
2008	23,608	17,131
2009	17,349	9,175
2010	38,744	20,385
2011	20,282	7,284
2012	18,922	9,302
2013	13,659	6,449
2014	22,010	11,141
2015	4,729	2,086

The ODFW—OASIS website (ODFW 2016) provides the estimated abundance of wild- and hatchery-origin Coho Salmon for the Oregon Coast ESU from 1990 through 2015.

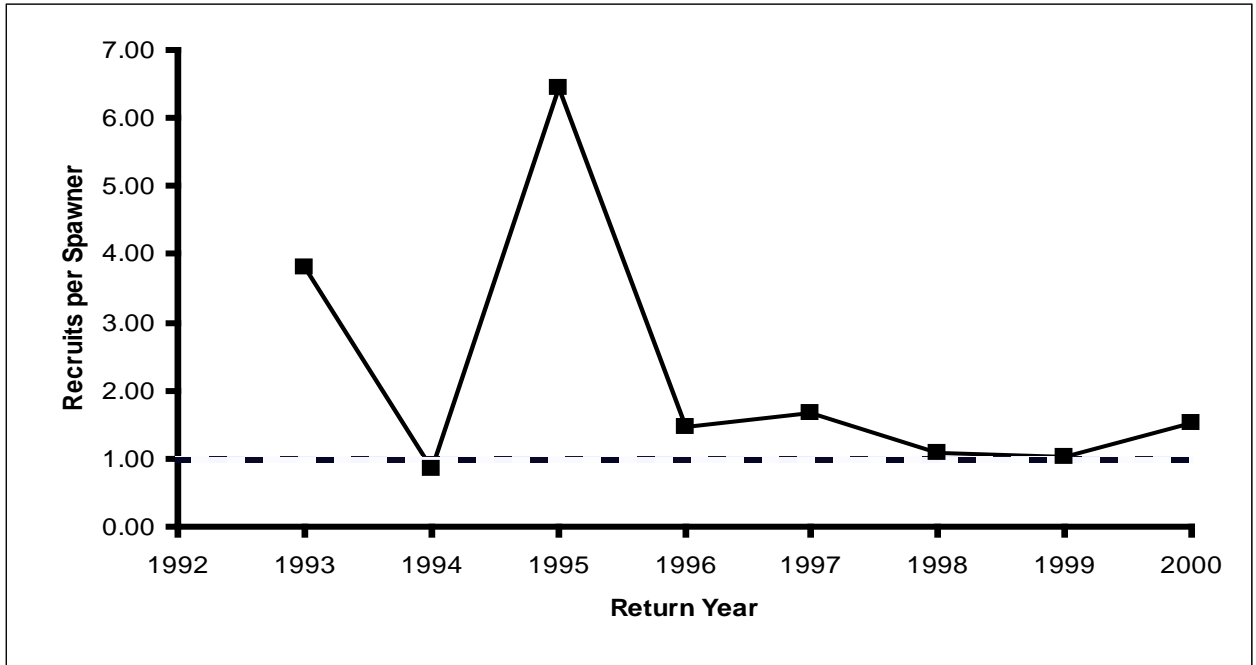


Figure 2-2. Trend in recruits per spawner for the lakes complex of wild Coho Salmon.

Table 2-3. Estimates of abundance of juvenile life stages based on spawner abundance.

Population	1997 Brood (millions)				1998 Brood (millions)				1999 Brood (millions)			
	Eggs	Fry	Parr	Smolts	Eggs	Fry	Parr	Smolts	Eggs	Fry	Parr	Smolts
Coho												
Lakes	10.753	6.990	0.809	0.274	13.885	9.025	0.881	0.298	15.888	10.327	0.921	0.311

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

The proportion of hatchery-origin Rainbow Trout (pHOS) on spawning grounds for listed Coho Salmon is unknown. It is possible for these hatchery Rainbow Trout to be observed on spawning grounds with wild steelhead, however there would be no genetic risks due to their triploidy. There are no genetic impacts from triploid Rainbow Trout on listed wild Coho Salmon. No observations of hatchery Rainbow Trout on spawning surveys have been reported.

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

- Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.

Activities associated with this program (stocking of legal-sized Rainbow Trout) that may

lead to a take of wild Coho Salmon would be accidental catch or harvest of wild Coho Salmon from the lakes, while fishing for trout. Also, the take could be in the form of harassment to wild Coho Salmon by the trout, predation on wild Coho Salmon fry by the trout, disease transmission from the trout to wild Coho, or competition for food or habitat between the trout and wild Coho Salmon. There is no information available to determine whether any of these takes are occurring or what the effects of any take would be. A take has been documented in association with the fishery on hatchery trout in Coho Salmon inhabiting lakes. The take levels associated with the fishery activities has been addressed in the Section 7 Consultation for fisheries with the Pacific Fisheries Management Council. Under this plan, the take is limited to an allowable percent of the total pre-harvest Oregon Coast ESU wild Coho Salmon abundance, through the Plan's Amendment 13.

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

There are no quantified takes associated with this program.

- 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).

There are no quantified takes associated with this program.

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

There are no quantified takes associated with this program.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

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

The Oregon Plan for Salmon and Watersheds is a prescriptive set of measures for recovering threatened and endangered salmon and steelhead, and meeting federal water quality standards, established by Executive Order of the Governor. The Oregon Plan includes measures linked to the hatchery production of steelhead in the Tenmile Basin including nutrient enrichment, acclimation and other separations of hatchery and wild

production, terminal fisheries that reduce harvest impacts on wild coho, and monitoring of hatchery and wild runs.

ODFW Native Fish Conservation Policy is the guiding policy for state management of wild and hatchery fish for protection of genetic resources. The Native Fish Conservation Policy will continue to direct protection of native trout, steelhead, and Coho Salmon. The new policy is a directive of the Oregon Legislature and the Governor. ODFW fish managers continue to refine the hatchery programs for all species in order to minimize impacts of hatchery fish releases on wild fish production and watershed ecology.

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. Oregon Plan for Salmon and Watersheds
2. PFMC Harvest Program Section 7 consultation
3. Tenmile Basin Fish Management Plan—(ODFW 1991)
4. ODFW Hatchery Management Policy
5. ODFW Fish Health Management Policy
6. Integrated Hatchery Operations Team (IHOT)
7. DEQ Memorandum of Agreement regarding fish carcass distribution in Oregon streams
8. US Army Corps of Engineers general authorization for fish habitat improvement in Western Oregon
9. ESA Section 7 consultation, biological opinion with Roseburg and Coos BLM Districts, Interagency population and monitoring program approved NMFS April 10, 1997.
10. ODFW Native Fish Conservation Policy

3.3) Relationship to harvest objectives.

The artificial production component of this program is designed to minimize the biological impacts to listed species. Fish culture practices are designed and carried out to limit impacts to naturally rearing Coho Salmon. Releasing rainbows at legal size minimizes the potential impacts by avoiding competition for food and habitat in the lakes that could exist if the trout were released as smaller juveniles.

The Tenmile Basin is closed to Coho Salmon angling. Angling for Rainbow Trout is permitted year round. Incidental take of wild Coho Salmon during trout angling occurs at a very low level. Juvenile and adult Coho Salmon caught must be released immediately. Impacts to wild Coho populations are addressed under the Pacific Coast Salmon Plan. Under this plan, the take is limited to an allowable percent of the total pre-harvest Oregon Coast ESU wild Coho abundance, through the Plan's Amendment 13. Estimated harvest impacts for the period 1994-1999 averaged 9.2% and ranged from 6.8% to 12.4%. Year 2000 harvest impacts to Coho Salmon were estimated to be approximately 8%.

3.3.1) Describe fisheries benefiting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1988-99), if available.

The recreational fishery will benefit from this program. The Rainbow Trout stocking program in the lake is construed to be a “put and take” program. Most Rainbow Trout are quickly harvested. Without the stocking program the trout fishery would be minimal. No data is available relevant to the harvest of Rainbow Trout in the lakes. The trout fishery in the lakes would be reduced to targeting the naturally produced cutthroat. The sport fishery targeting Rainbow Trout is expected to have minimal impact to Coho Salmon in the Tenmile Basin. As mentioned above, all Coho Salmon must be released immediately unharmed with minimum stress. It is likely that some juvenile Coho Salmon may suffer injury or mortality from hooking and handling. A very limited trout fishery occurs during the time of adult and jack Coho Salmon migrating through the lakes.

3.4) Relationship to habitat protection and recovery strategies.

Major factors affecting natural production of Coho Salmon include habitat, ocean conditions, predation, water flows, water quality, climatic conditions, rearing in-basin habitat, etc. The Oregon Plan for Salmon and Watersheds lays out habitat protection measures to be followed by all the state agencies including Forest Practices rules by Oregon Dept. of Forestry, water quality protection by Dept. of Environmental Quality, diversion monitoring by Water Resources Division, Senate Bill 10-10 implementation by Dept. of Agriculture. These are all designed to protect and improve salmonid habitat, both short and long term, and will ultimately improve natural production of Coho Salmon. The Tenmile Lakes Basin Partnership is also in place developing habitat improvement projects throughout the Tenmile Basin that include riparian fencing and planting, placement of large woody debris, and culvert replacement to improve or restore fish passage.

3.5) Ecological interactions.

a) Species that could negatively impact program.

Predacious fish that could negatively impact Rainbow Trout include the non-native introduced (Striped Bass). Predation by aquatic mammals like otters, seals, sea lions etc. may negatively impact the program. Also, birds like blue herons, Caspian terns, cormorants, and gulls may impact the program fish (Rainbow Trout).

b) Species that could be negatively impacted by program.

The consequences of interactions between hatchery Rainbow Trout and listed natural Coho Salmon is not well understood or measurable. The natural anadromous steelhead could be impacted by the Rainbow Trout through interbreeding and through food competition activities. Coho Salmon fry/smolts inhabiting in Tenmile Lake Basin could be negatively impacted due to predation activities by the legal and trophy-size Rainbow Trout.

c) *Species that could positively impact program.*

Any hatchery or wild fish that dies or is recycled for nutrient enrichment of the basin may positively impact the program.

d) *Species that could be positively impacted by the program.*

The freshwater and marine species that depend directly or indirectly on salmonids for their food and nutrient supply could be positively impacted by the program. These include larger salmonids, other fish species, aquatic mammals, birds etc. Thus the hatchery Rainbow Trout has the potential for playing a positive in the 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.**

Cole Rivers Hatchery

Eyed eggs from Roaring River Hatchery are shipped to Cole Rivers Hatchery where they are hatched and reared to legal size. Cole Rivers Hatchery's main water supply is the Rogue River. Ambient water is gravity fed to the hatchery from an impoundment formed by a diversion dam. The intake structure is screened with #4 mesh having 0.178 inch square holes. This supply system will provide up to 300 cubic feet of water per second. Annual ambient water temperatures range from 41.2°F to 56.7°F. The hatchery's warm water supply is piped from the surface of Lost Creek Reservoir. Warmer water is gravity fed to the hatchery from a floating intake on the Powerhouse Intake Tower. The supply system will provide up to 60 cubic feet of water per second. Annual warm water temperatures range from 42.8°F to 72.8°F. When the warm water temperature rises above 55°F it is mixed with ambient water to achieve an upper limit goal of 55°F.

Incubation water is pumped from the ambient water supply line and ultra violet light sterilized. Incubation water is all single pass. The hatchery has the ability to filter some of the incubation water with pressure sand filters. Fish for Tenmile Basin stocking are generally incubated on sand filtered UV sterilized ambient water. When necessary, water heating and chilling methods are applied to speed up and slow down the egg or fry development. This strategy is practiced to "catch up" the development of all eggs to achieve a common ponding date. The overall quality of the water is very good. Fish production at Cole M. Rivers has not been limited by water quality or quantity. The water right is for 224 cfs and the permit number is (S 44910).

Bandon Hatchery

The water sources at Bandon Hatchery for holding and rearing fish are Ferry Creek and Geiger Creek. These small, surface water tributaries feed into the Coquille River estuary at river mile 1.5, near the Port of Bandon. Average summer flows are approximately 1.25 cfs each. Winter flows vary greatly with storm activity, but average about 5 cfs each.

Bandon Hatchery has water rights for a total of 3.0 cfs (1.5 cfs from each stream). These water rights are senior to all other active water rights.

Both Cole Rivers and Bandon hatcheries are in compliance with the water rights, water uses, and annual reporting to the Oregon Department of Water Resource.

Eel Lake Net Pen

The water source for the net pen is Eel Lake. The pen is situated in Eel Lake. Currents in the lake passively move water in and out of the net pen. The lake is deep (up to 80') and does not warm in the springtime to the extent that shallow lakes (e.g. Tenmile Lakes) do. Water temperatures and quality are not an issue in the spring period when these fish are reared.

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 natural fish above Cole Rivers Hatchery. Intake structures and barriers prevent anadromous fish from reaching intake structures. The water diversion for fish culture purposes is non-consumptive and is returned to the Rogue River below the hatchery. All wastewater is pumped to a 150' x 100' x 6' asphalt lined pollution abatement settling basin. Hatchery effluents are monitored as per NPDES permit and data are reported to DEQ quarterly.

Intakes for Bandon Hatchery are screened with perforated aluminum plates with 1/8" x 3/4" slots. Intakes are in two reservoirs just upstream of the hatchery on Ferry and Geiger Creeks. These intakes are not accessible to formerly listed Coho Salmon. Hatchery discharges are monitored and data are reported to DEQ as required by the NPDES permit 300J.

The net pen in Eel Lake is only operated from March through early June. The mesh to the pen is one quarter inch. Since water flow in and out to the pen is passive the potential impacts to the listed Coho Salmon are minimal.

SECTION 5. FACILITIES

5.1) Broodstock collection facilities (or methods).

All broodstock is captive and dealt with at Roaring River Hatchery. Broodstock are not collected from the wild, and thus there are no broodstock collection facilities. No collection efforts are conducted in the Tenmile Basin.

5.2) Fish Transportation Equipment.

A small, 200-gallon portable slip tank is used for moving fish at the Roaring River

Hatchery to other stations. Eggs are shipped from Roaring River Hatchery to Cole Rivers Hatchery, via a truck with insulated shipping crates. Fingerlings from Cole Rivers are transported to Bandon Hatchery in small portable tanks in the back of a pickup.

Transport equipment for fish en route to liberation is described in section 10.5.

5.3) Broodstock holding and spawning facilities.

All broodstock holding and spawning takes place at Roaring River Hatchery. No holding or spawning efforts take place in the Tenmile basin. The Roaring River Hatchery holding facilities consist of two 20-foot by 100-foot raceways. The water supply comes from Roaring River at an average of 800 gpm per pond. Spawning operations occur in a covered building where adult fish are separated into pens by year class and sex. Fish are anesthetized using MS222 prior to spawning in a 120-gallon tank. All fish are live-spawned using compressed air.

5.4) Incubation facilities.

At Cole Rivers, incubation takes place in 66 stacks of Marisource incubators. Each stack has 15 usable trays totaling 990 trays. The water is generally ambient, sand filtered and UV sterilized.

At Roaring Rivers, incubation occurs in 16-tray vertical stack incubators. Water supply is from Roaring River, which is diverted from the stream at the main intake. No temperature manipulation is used during the incubation period. Troughs for picking and enumerating eggs are utilized when needed. Most egg picking and counting is done by machine. Water supply is equipped with alarm system to monitor for low-water conditions.

5.5) Rearing facilities.

Cole Rivers Hatchery is equipped with 87-100'x20'x5.5' concrete ponds. All ponds are supplied with ambient water and 21 ponds have warm water capability. Flows are adjustable in all containers and all containers are single pass.

Roaring Rivers Hatchery consists of twenty 16-foot by 30-inch concrete starter tanks housed inside the hatchery building, twenty 100-foot by 20-foot concrete raceways, one 200-foot by 16-foot concrete pond, three 29-foot circular ponds, and two concrete raceway show ponds. Cleaning effluent is distributed to a 310-foot by 110-foot pollution abatement pond used to settle out solids and dilution of chemical wastes. All holding tanks utilized for production are individually alarmed.

Trout transferred to Bandon Hatchery are placed in rearing ponds measuring 20' x 80' x 3'. Water supply is alarmed; the hatchery incorporates one of the ponds for pollution abatement prior to discharge.

The Eel Lake net pen is 20-foot long, and 20-foot wide by 20-foot deep. The net pen is made of one quarter inch nylon mesh. The floats of the pen are Styrofoam that is enclosed in plywood. The perimeter of the pen has one inch chicken wire that is four feet deep to deter otters. The top of the pen is made of 2” by 4” frames and 2” by 4” stock wire.

5.6) Acclimation/release facilities.

The Rainbow Trout are not acclimated before stocking. They are flushed from a liberation truck into the lake system usually from a boat ramp. Fish left over from the Free Fishing event at Eel Lake are released from the net pen into the lake after the event.

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

The program operates under normal hatchery operations. Hatchery operations are faced with seasonal environmental difficulties that could lead to fish mortality. This includes high muddy water, extreme low-flow situations, seasonal parasite infestation, and disease problems. Although there has not been significant fish mortality due to these conditions in recent history, these conditions do exist and must be dealt with. Nearly all of the Rainbow Trout are incubated and reared at facilities far away from the Tenmile Basin. Only 1,000 Rainbow Trout are reared in May and early June in the Eel Lake net pen. With the exception of disease, other operational difficulties or disasters during the production of hatchery Rainbow Trout would not impact Coho Salmon in the Tenmile Basin. Disease risks are minimized through fish health protocols (**See Appendix A.**) and only certified healthy fish are stocked.

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.

Equipment failure, water loss, flooding, and other failures in the production of hatchery Rainbow Trout would not affect formerly listed Coho Salmon in the Tenmile Basin. The facilities that rear most of the trout that are released into the basin are not located in the watershed. Fish losses at the rearing stations would not adversely affect Tenmile basin coho. However, all measures are taken at the respective hatchery facility to minimize any adverse effects to the listed fish. Only 1,000 fish are reared in the Eel Lake net pen of Tenmile Basin. This rearing program is small and for a very limited duration. The net pen project has minimal likelihood of adversely affecting coho.

Disease transmission is addressed in Section 13, Appendix A.

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 Stock 72 Rainbow Trout have been reared at Roaring River Hatchery since 1970. They are referred to as the Cape Cod stock and came from the Spokane Hatchery in Washington State. The Cape Cod stock of Rainbow Trout is not a listed species.

6.2) Supporting information.

6.2.1) History.

The Rainbow Trout stock-72 has been held in captivity at Roaring River Hatchery since the late 1880s. The Cape Cod hatchery Rainbow Trout brood stock came from a commercial hatchery in Massachusetts. The strain was transported to the Spokane Hatchery in 1941 or 1942. In 1967, eggs were transported from Washington to Roaring River Hatchery and a broodstock program was established in 1971. No significant alterations have been made to the Cape Cod stock at the Roaring River Hatchery.

6.2.2) Annual size.

For the Roaring River stock, the average number of adults used in broodstock is 500 males, 800 females from the 3-year class, and 375 females from the 4-year brood class. *Note:* Roaring River Hatchery provides eyed eggs to several Rainbow Trout programs throughout the state and has an annual egg take of 7.5 million.

Broodstock size for ODFW or private hatchery stocks does not impact listed natural Coho Salmon in the Tenmile Basin.

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

Not applicable. All are domesticated broodstocks.

6.2.4) Genetic or ecological differences.

Not applicable to listed Coho Salmon. The broodstocks of the program fish are domesticated Rainbow Trout.

6.2.5) Reasons for choosing.

The Cape Cod stock was chosen for trout stocking programs because of its inability to reproduce in the wild in Oregon and its tendency to hold in the area of release. For these reasons, this stock is less likely to have negative impacts to native populations of salmonids.

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.

The Cape Cod stock-72 Rainbow Trout will continue to be used by ODFW hatcheries for trout stocking. This will minimize adverse effects to native salmonids as described in Item 6.2.5. As mentioned above, Roaring River Hatchery is responsible for all broodstock collection efforts. This is a captive broodstock. ODFW is experimenting with the use of triploid Rainbow Trout to further minimize the potential for genetic impacts to wild rainbow/steelhead.

SECTION 7. BROODSTOCK COLLECTION.

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

The stock 72 Rainbow Trout utilizes only adult captive brood. There is no collection of broodstock outside the hatchery environment.

Collection or sampling design.

The broodstocks for this program are reared under captive conditions throughout their lives. Broodstock, in both populations, are not selected for any trait. They are spawned at random as they become mature.

7.3) Identity.

The broodstocks for this program are reared under captive conditions throughout their lives. Identity of the broodstocks is easy in this scenario. No collection of additional natural broodstock is needed.

Proposed number to be collected:

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

Captive Cape Cod age-3 fish average 40% males and 60% female. All age-4s are females. The average number of broodstock needed for the Tenmile program is 26 males and 26 females.

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

The broodstocks for this program are reared under captive conditions throughout their lives. No collection of additional natural breed broodstock is needed.

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

This is a captive broodstock program. No fish are collected for natural broodstock.

7.6) Fish transportation and holding methods.

This is a captive broodstock program. There is no need to transport broodstock.

7.7) Describe fish health maintenance and sanitation procedures applied.

The Cape Cod-origin hatchery Rainbow Trout broodstock are held at Roaring River Hatchery. As per ODFW Fish Health Management Policy and IHOT guidelines, broodstock are kept isolated from general population. All equipment used in the broodstock ponds is sterilized before and after use, fish health is examined as needed, and mortality is closely monitored. Alarms are placed in ponds to warn of low flow situations.

7.8) Disposition of carcasses.

For Roaring River Hatchery, fish are live-spawned, and broodstock fish are released into closed bodies of water (lakes and ponds) in the Willamette Valley after spawning, for angling harvest. All males (~500) are released after one spawning season. All 4-year class females (~375) and approximately 400 of the 3-year females are also released. Mortalities are either rendered or buried.

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

The utilization of Cape Cod-origin captive broodstock eliminates the need to collect native broodstock, and eliminates the potential for incidental take of listed natural fish via broodstock collection.

SECTION 8. MATING

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

8.1) Selection method.

- All adults are checked for ripeness, sorted, and spawned as they reach maturation beginning in late fall.
- Fish are selected randomly from ripe fish on the day of spawning.
- Fish are checked each week thereafter, and subsequently spawned as they become ripe.

- Eyed eggs are selected from each egg take and are identified and reared separately as future brood.

8.2) Males.

- Only 3-year-old class males are used in this program.
- After all males have been spawned once, they are reused, but not more than three times.

8.3) Fertilization.

- All adults are live spawned using accepted air spawning techniques.
- A 1:1 male-to-female ratio is maintained.
- Males may be used more than once, but no more than three times in a spawning season.
- Eggs are spawned into a container where milt from one male is added. Eggs and milt are then set aside for approximately 1 to 2 minutes. Eggs are then put into a common container for transport to the incubation facility.
- At Trout Lodge Hatchery, fertilized eggs are given pressure shock to produce triploid eggs.
- All fish health monitoring will be conducted by a qualified fish health specialist, according to approved fish health standards.
- Brood stock will be examined annually to detect the presence of any viral (reportable) pathogens. Number of individuals examined, usually 60 fish, will be great enough to assure a 95 percent chance of detection of a pathogen present in the population at the 5 percent level. American Fisheries Society “Fish Health Blue Book” procedures will be followed. Wild fish will be sampled using non-lethal techniques.
- Findings and results of fish health monitoring will be recorded on a standard fish health reporting form and maintained in a fish health database.
- All eggs will be disinfected at during egg water-hardening phase to reduce bacterial transfer from parent to progeny.
- Equipment and spawning areas will be disinfected following spawning operations.

The fertilization procedure for domestic Rainbow Trout produced at ODFW or private hatcheries is not anticipated to have any genetic or ecological effect on listed Coho Salmon.

8.4) Cryopreserved gametes.

Not applicable.

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 Cape Cod-origin Rainbow Trout is captive broodstock. It's not anticipated to have any adverse genetic or ecological impacts on ESA-listed natural fish resulting from the mating scheme using captive Rainbow Trout broodstock.

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.

The total number of eggs taken at Roaring River Hatchery is 7.5 million. The average survival from egg take to eyed stage is 90 percent. These eggs are incubated and reared for trout programs around the State, not just for Tenmile Basin releases.

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

For ODFW hatcheries, when surplus eggs and fry exist as a result of high survival rates, surpluses are removed and buried.

9.1.3) Loading densities applied during incubation.

At Roaring River Hatchery, green eggs are trayed down at a rate of 22,000 to 25,000 per tray in vertical stack incubators. Green egg sizes are 370 to 450 per ounce. Water hardened sizes are 250 to 335 per ounce for eggs from 4-year and 3-year females, respectively. Incubator stacks are operated with an incoming water flow of 5 gpm of fresh water.

Upon arrival at Cole Rivers Hatchery and Klamath Hatchery, eyed eggs are loaded into stack incubators, which are a replica of Heath trays, at a density of approximately 5000 eggs/tray. The standard flow rate is 5 gpm for egg and fry incubation. The 12-year average for egg size is 73.6 eggs per ounce.

9.1.4) Incubation conditions.

- Incubation conditions are virtually the same for both facilities as per IHOT guidelines.
- A drip treatment of formalin at 1:600 is administered daily to control fungus on eggs up to the eyed stage. Incubators are visually inspected twice daily for proper flow.
- Water supply to the incubator head box is monitored continuously by a low-water alarm.

- Silt loads in incubator trays are monitored. Rodding techniques are used to remove silt loads when necessary.
- Water temperature is tracked continuously. Temperature units are reported and projected on a weekly basis. This information, along with visual inspections, is used to track egg development and to determine proper timing of eggshell removal during hatching, egg shocking, and fry ponding.
- Eggs are incubated on ambient river water; the hatchery does not thermally control incubator water supply.
- Dissolved oxygen is not monitored unless conditions indicate a need to do so. For example, influent water supplies are tested if less than saturation, with high-density egg or fish loading, and/or if warm temperatures exist.

9.1.5) Ponding.

- Ponding will occur when several fry samples indicate 95 percent of fry show complete button up, regardless of temperature units.
- Cumulative temperature units will most often range from 900 to 1,000 at time of ponding.
- Average weight sample at ponding is 2,500 to 3,400 fish per pound depending on the age class of the females from which eggs were taken.
- Average length at time of ponding should be 2.1 cm.
- Approximate ponding dates will depend on water temperatures and dates when eggs are received but generally occur early to mid March.
- Mortality is picked from swim up fry and disposed of.
- Fry are placed into starter tanks.

9.1.6) Fish health maintenance and monitoring.

A qualified fish health specialist will conduct all fish health monitoring. Appropriate actions including drug or chemical treatments will be recommended as necessary. If bacterial pathogens require treatment with antibiotics, a drug sensitivity profile will be generated (if feasible).

Fish health maintenance and monitoring for the Tenmile Rainbow Trout program are carried out according to existing standardized procedures. These protocols include:

- Eggs are disinfected during water hardening phase with Iodophore treatment at 1:150 ppm for 15 to 30 minutes.
- To control fungus, eggs are treated with a flow-through formalin treatment (at 1:600 ppm), every other day, until eye-up and shocking.
- Incubators are monitored daily for environmental conditions (water temperature, water flow, and silting).
- Fish mortality is removed at eye-up (during shocking) and ponding, unless significant losses dictate otherwise. Folded vexar is used (in each incubator tray)

to isolate mortalities to particular locations on the tray. This method also allows mortalities to be easily removed during ponding.

Egg mortalities are removed 24 hours after shocking, initially via an automated egg picker, followed by thorough handpicking. Mortalities are also removed (by hand) at the time of ponding. Incubators are continuously monitored by a float alarm system and by a visual inspection, which occurs twice daily and again during evening check rounds.

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 program does not incubate any listed natural fish stock under this program. Incubation of domestic Rainbow Trout stock at an out-of-basin facilities creates no risk to listed Coho Salmon.

9.2) Rearing:

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

Table 9.1. Cole Rivers Hatchery Survival Rate Data.

Brood Year	Fry % Loss	Juvenile % Loss
1992	2.3	17.82
1993	2.7	11.56
1994	1.9	8.15
1995	3.1	10.53
1996	3.6	18.9
1997	5.8	34.3
1998	3.1	16.05
1999	3	33.6
2000	2.9	15.47
2001	2	5.5
2002	1.5	6.93
2003	NA	NA
2004	NA	NA

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

The stock 72 Rainbow Trout are managed according to rearing density equivalency (spatial and volume) guidelines recommended by IHOT protocols and by protocols stated in the 1999 Artificial Production Review.

- Starter tank rearing density goal: Not to exceed 25,000 fish at ponding and/or a flow index factor of 1.5 during any period of tank rearing.

- Raceway pond density goal: Maintain a flow index factor of less than 1.5. This is sometimes exceeded during late summer low flows or if fall rains have been delayed.
- Density levels are monitored weekly by updating flow and growth data. Weekly reports are reviewed for compliance with onsite operating guidelines with adjustments being made as needed.

9.2.3) Fish rearing conditions.

The following parameters and procedures have been established to maintain optimal pond rearing environments.

- Pond density levels are monitored weekly (flow index and fish growth). This data is used to calculate individual pond density levels based upon pounds per gpm, pounds per cubic feet, and flow index.
- Dissolved oxygen is monitored weekly during summer flows and throughout the year when environmental factors indicate a need.
- Hatchery effluent water quality parameters are measured and monitored quarterly: total suspended solids, settleable solids, pH, and flow. Data is completed according to conditions identified in a 300-J NPEDS General State Permit. Data is reported on a standard Discharge Monitoring Report, and is administered by DEQ.
- Ponds are cleaned weekly or as necessary.

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.

Growth program data are not provided for all facilities that may rear Tenmile Basin Rainbow Trout. Appendix B displays an example of growth program for Cole Rivers Hatchery.

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

Growth program data are not provided for all facilities that may rear Rainbow Trout for Tenmile Basin stocking. Appendix B displays an example of growth program for Cole Rivers Hatchery.

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*).

- Fish are started on a dry diet (Moore Clark Nutra Starter).
- Feed is changed to dry diet at 150 fish per pound (Silver Cup Salmon Diet).
- Fish are put on a different diet at 20 fish per pound (Silver Cup Trout Diet).

- At 3 to 5 fish per pound (depending on scheduled release size), astaxanthin is added to the diet and fed until release.
- Feed schedule is utilized to calculate growth development indicators such as percent body weight, length, weight, expected conversion, k factor, expected average growth rate, and desired release size.
- A schedule with daily adjustments is developed to meet the needs of program.
- Average overall food conversion for this program are 1.1 to 1.2.

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

Incubation trays, rearing tanks, and rearing ponds are disinfected prior to and after each rearing. In addition, all equipment used during daily rearing activities is disinfected between uses. Disinfection procedures for onsite operations were developed from IHOT recommendations for hatchery disinfection. Fish health monitoring is accomplished from daily observation of fish behavior, pond environment monitoring, and daily recording of fish mortality. In addition to daily on-site monitoring, the following steps are carried out routinely by a qualified ODFW fish pathologist.

- Conduct examinations of juvenile fish at least monthly and more often as necessary. A representative sample of healthy and moribund fish from each lot of fish will be examined. The number of fish examined will be at the discretion of the fish health specialist.
- Investigate abnormal levels of fish loss when they occur.
- Determine fish health status prior to release or transfer to another facility. The exam may occur during the regular monthly monitoring visit; i.e., within 1 month of release.
- Appropriate actions including drug or chemical treatments will be recommended as necessary. If a bacterial pathogen requires treatment with antibiotics a drug sensitivity profile will be generated when possible.
- Findings and results of fish health monitoring will be recorded on a standard fish health reporting form and maintained in a fish health database.

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

Not applicable.

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

No natural rearing method is applied.

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 fish under this propagation program is not a listed population. It is unlikely that trout stocking in the Tenmile Lakes will have any adverse genetic impacts on Coho Salmon. However, to minimize ecological impacts, fish health procedures are strictly followed

during rearing period and only certified healthy fish are stocked to prevent transmission of diseases to native populations in the basin. After stocking, food competition with wild fish is considered to be minimal as most of the legal-sized stocked trout will be harvested soon after stocking.

SECTION 10. RELEASE

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

10.1) Proposed fish release levels.

Table 10-1. Proposed fish release levels at current funding levels.

Age Class	Number	Size(f/lb)	Release Date	Location
Legal	7,000	3	Mar.-June	Eel Lake
Legal	9,000	3	Mar.-June	N. Tenmile Lake
Legal	9,000	3	Mar.-June	S. Tenmile Lake
Legal	9,000	3	Mar.-June	Saunders Lake
Fall Trout	1,500	0.8	October	Saunders Lake

These numbers are approximate, and based on current funding level. With increases in funding for legal trout programs, it may be proposed to increase stocking levels for additional trout angling opportunity in the future.

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

- (1) North Tenmile Lake: North Tenmile Lake boat ramp located at T23S R12W Sec. 18.
- (2) South Tenmile Lake: Located within Lakeside at South Tenmile Lake boat ramp located at T23S R12W Sec. 17.
- (3) Eel Lake: Located within Tugman State Park at boat ramp located at T23S R12W Sec. 6.
- (4) Saunders Lake: Located within a Coos County park at boat ramp located at T23S R13W Sec. 35.

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

Release Year	Number Released*	Size (fish/lb)	Date Released
1992	30,352	3	3/19-6/4
1993	28,184	3	3/15-6/10
1994	31,579	3	3/16-5/11
1995	22,482	3	3/21-5/14
1996	20,970	3	3/14-5/14
1997	19,662	3	3/25-6/5
1998	27,162	3	3/24-12/17
1999	27,137	3	3/23-6/12
	1,617	0.77	10/14
2000	30,505	3	3/21-6/10
	1,015	0.70	10/12
2001	19,383	3	4/2-6/5
	1,620	0.73	10/19
2002	12,798	3	4/5-6/4
	1,404	0.65	10/31
2003	12,791	3	3/31-6/3
	1,605	0.75	10/23
2004	18,040	3	4/2-6/10
2005	24,366	3	3/15-6/08
2006	3,207	2.49	3/29 - 11/8
2007	5,515	2.89	5/2 - 6/9
2008	17,301	2.32	3/6 - 10/10
2009	17,563	2.75	3/5 - 10/8
2010	15,544	2.30	3/24 - 9/30
2011	15,725	2.26	3/1 - 10/11
2012	15,850	2.27	3/1 - 10/5
2013	16,446	2.64	2/28 - 10/4
2014	17,002	2.43	3/3 - 10/6
2015	18,036	2.81	2/25 - 5/14

* Numbers combined for lakes of the Tenmile Basin.

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

Legal size trout are flushed from liberation trucks directly into the lake environment at selected sites. Legal trout are stocked in the spring before water temperatures reach undesirable levels. Eel Lake net pen project holds approximately 1,000 to 2,000 fish for the annual Free Fishing Weekend event which are then released by dumping net pen into the open lake following the event.

Fall Trout are also flushed from liberation trucks, but they are only stocked in Saunders Lake currently. These trout are held all summer at Cole Rivers Hatchery, so they will

reach a larger size to be stocked in the fall. See Table under Section 10.3, for release dates of Rainbow Trout.

10.5) Fish transportation procedures, if applicable.

Legal Rainbow Trout are transported in ODFW liberation trucks to release sites. The capacity of transportation tanks range in size from 1,000-gallon to 2,500-gallon. Some units utilize recirculatory refrigeration systems which are used to maintain or cool temperature of water taken at the hatchery site; oxygen is added at a rate of 1.5 Lpm. Some units utilize insulated tanks equipped with aerators; oxygen is added at a rate of 1.5 Lpm. All units haul trout at an average density of 1.2 pounds per gallon.

10.6) Acclimation procedures.

Rainbow Trout are released into the Tenmile Lakes system without acclimation.

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

Rainbow Trout released into the lakes are not marked.

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

Any surplus fish from ODFW hatcheries may be utilized in other legal trout planting locations within the state.

10.9) Fish health certification procedures applied pre-release.

Fish health are examined and certified by an ODFW fish health pathologist prior to transportation and liberation, whether fish come from ODFW or private hatcheries.

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

Cole Rivers Hatchery has never had a flooding problem, since it is located at the base of a large federal dam. Water supply problems have been a rare occurrence. Emergency procedures in the case of water supply problems would start with contact of the Watershed District Managers and District Fish Biologists for the Upper Rogue and Tenmile Basins. Options for saving fish in the event of water system failure include: (1) implementation of backup or alternative water supplies, (2) truck and release in the scheduled water body, (3) truck and release in an alternative approved standing water body, or (4) transport to another hatchery facility. These options would only include release into water bodies already having stocked trout, and deemed to be acceptable with regard to impacts on native fish.

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.

This program of stocking legal-sized trout is intended to be a put-and-take fishery with high harvest rates soon after stocking that will minimize food competition with naturally-produced fish in the basin. To minimize adverse genetic impacts, Cape Cod stock will be used for stocking which usually does not reproduce in the Tenmile Lake Basin or mix with native trout/steelhead stocks. Fish used for stocking with Trout Lodge stock are triploid or sterile and are not capable of reproducing. These stocks are also highly domesticated and prone to staying where stocked, rendering no evidence of competition in streams above the lake systems.

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

11.1) Monitoring and evaluation of “Performance Indicators” presented in Section 1.10.

11.1.1) Describe plans and methods proposed to collect data necessary to respond to each “Performance Indicator” identified for the program.

Standard I.1: ODFW Fish Pathology will sample the hatchery fish prior to releases.

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

As with all state programs, budgets are approved by the Legislature for a two-year period. No commitment of funds can be made past the approved budget period. Funds for various projects associated with this HGMP come from a variety of sources including license dollars, State general funds, and Federal Sport Fish Restoration Program. Funds are committed for portions of program monitoring and evaluation but can change with relatively short notice. For example, in the past Rock Creek and Butte Falls Hatchery have been designated for closure under the Governor's proposed budget due to general fund shortfalls. Butte Falls Hatchery was closed for a time, reopened, then closed for good and the property sold off by ODFW. Such closures could result in elimination or reduction in many hatchery programs depending on reprioritization by ODFW. Also funding for ODFW's fish programs has experienced several rounds of cuts during recent biennia. As a result, the performance standards may be difficult to meet with fluctuating staffing and funding levels.

Other “ideal” performance standards:

Conduct in-basin creel surveys to monitor the success of the stocked trout program. Test and compare the performance (e.g. catch rates, return to creel) for ODFW and private hatchery trout.

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.

There are no anticipated genetic or ecological effects from current or proposed trout monitoring activities.

SECTION 12. RESEARCH

There is no current or proposed research on Tenmile Basin Trout Program.

- 12.1) Objective or purpose. N/A
- 12.2) Cooperating and funding agencies. N/A
- 12.3) Principal investigator or project supervisor and staff. N/A
- 12.4) Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2. N/A
- 12.5) Techniques: include capture methods, drugs, samples collected, tags applied. N/A
- 12.6) Dates or time period in which research activity occurs. N/A
- 12.7) Care and maintenance of live fish or eggs, holding duration, transport methods. N/A
- 12.8) Expected type and effects of take and potential for injury or mortality. N/A
- 12.9) Level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached “take table” (Table 1). N/A
- 12.10) Alternative methods to achieve project objectives. N/A
- 12.11) List species similar or related to the threatened species; provide number and causes of mortality related to this research project. N/A
- 12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities. N/A

SECTION 13. ATTACHMENTS AND CITATIONS

Appendix A. Fish Health Monitoring

Treatments for disease at Cole Rivers Hatchery include treating juvenile fish for fungus and external parasites using either hydrogen peroxide (50 ppm for 1 hour exposure) or formalin (1:4,000 to 1:7,000 depending on species treated and water temperature). *Ichthyophthirius* may be treated with a prolonged formalin drip (1:25,000 for 8 hours). On rare occasions it is necessary to treat fish for bacterial pathogens, in which case medicated food containing oxytetracycline is used. In the event of bacterial gill disease potassium permanganate is used at a rate of 1.0 ppm, 1.25 ppm or 1.5 ppm administered either as a bath or a flow through treatment.

In the spring and summer of 2006 both Butte Falls and Cole Rivers hatcheries had outbreaks of IHN. In the case of Cole Rivers Hatchery adult steelhead that were infected with IHN accidentally entered into the water distribution system. Subsequently, these fish shed the virus and infected the entire facility. Many stocks of fish being reared at Cole Rivers contracted the disease and had substantial losses. Several stocks of fish were destroyed because of the infection and the possibility that if they were released back into their respective watersheds that they might transmit the disease to area where it had not been previously detected. The Fish Pathology section wanted to protect water bodies that they termed “negative.” Water bodies that had IHN already present were termed “positive” water bodies.

The outbreak of IHN at Butte Falls was caused by adult steelhead that were infected with IHN were able to swim above the facility. Several stocks of fish were also infected at Butte Falls and had to be destroyed.

At Cole Rivers Hatchery pathologists believe that the outbreak was limited event because of the physical nature of the area where the steelhead were able to escape into. This area was an unlighted water distribution system that has a limited potential to keep steelhead alive for an extended period of time. Pathologists are optimistic that the threat of further outbreaks of IHN at Cole Rivers is probably not going to occur. Most programs at Cole Rivers Hatchery have been reinstated as normal in 2007. Pathologist are being cautious at this point with all stocks of fish at the facility.

The outbreak of IHN at these facilities has disrupted the normal stocking of rainbows into the Tenmile Lakes watershed. In 2006 release numbers were near programmed levels because of surplus fish at other facilities. In 2007 release numbers are proposed to be not significantly different than normal. Because of disease concerns, rainbows will not be released from Butte Falls Hatchery into the Tenmile Lakes Watershed in the foreseeable future.

Treatments for disease at Bandon Hatchery include: treating juvenile fish for external parasites using either hydrogen peroxide (75-100 ppm for 1 hour exposure) or formalin 1:6000 to 1:40000 depending on species treated and water temperature. *Ichthyophthirius* may be treated with a prolonged formalin drip (1:25,000 for 8 hours). On rare occasions it is necessary to treat fish for bacterial pathogens and medicated food containing oxytetracycline is used.

A five-year disease history of ODFW’s hatcheries is summarized in Tables 13-1, 13-2, and 13-3.

Table 13.1. Five year disease history by fish stock at Cole Rivers Hatchery, 2001-2006.

Disease/Organism	Stock/Species					
	53 Rb	44 ChF	18 Co	72 Rb	44 Co	55 Co
IHNV	yes	yes	yes	yes	no	no
EIBS	no	no	no	no	no	no
CAD	no	no	no	no	no	no
<i>Fl. psychrophilum</i>	yes	yes	yes	yes	yes	yes
<i>Fl. columnare</i>	no	no	no	no	no	no
<i>Aeromonas salmonicida</i>	no	no	no	no	no	no
<i>Aeromonas/Pseudomonas</i>	no	no	yes	yes	yes	yes
<i>Yersinia ruckeri</i>	no	no	no	no	no	no
<i>R. salmoninarum</i>	no	no	yes	no	yes	no
Internal mycosis	no	no	no	no	no	no
External mycosis	no	no	no	no	no	no
<i>Ichthyobodo</i>	no	yes	no	yes	yes	yes
<i>Gyrodactylus</i>	no	no	yes	yes	no	no
<i>Ichthyophthirius</i>	yes	yes	yes	no	no	no
Gill Amoeba	no	no	no	no	no	no
Trichodinids	yes	yes	yes	yes	yes	yes

Table 13-2. Five year disease history by fish stock at Butte Falls Hatchery, 2001-2006.

Disease/Organism	Stock/Species					
	53 Rb	44 ChF	18 Co	72 Rb	44 Co	55 Co
IHNV	yes	yes	no	yes	no	no
EIBS	no	no	no	no	no	no
CAD	no	no	yes	no	no	no
<i>Fl. psychrophilum</i>	yes	yes	yes	yes	yes	yes
<i>Fl. columnare</i>	no	no	no	no	no	no
<i>Aeromonas salmonicida</i>	no	no	no	no	no	no
<i>Aeromonas/Pseudomonas</i>	no	no	yes	yes	no	yes
<i>Yersinia ruckeri</i>	no	no	no	no	no	no
<i>R. salmoninarum</i>	no	no	yes	no	no	no
Internal mycosis	no	no	no	no	no	no
External mycosis	no	no	no	no	no	no
<i>Ichthyobodo</i>	no	yes	yes	no	yes	yes
<i>Gyrodactylus</i>	no	no	no	yes	no	no
<i>Ichthyophthirius</i>	yes	yes	no	yes	no	no
Gill Amoeba	no	no	no	no	no	no
Trichodinids	yes	yes	yes	yes	no	yes

Table 13-3. Five-year disease history by fish stock at Bandon Hatchery, 2001-2006.

Disease/Organism	Stock/Species						
	72 Rb	44 Co	44 ChF	44 StW	144 StW	37 ChF	88 StW
IHNV	no	no	no	no	yes	no	no
CAD	no	no	no	no	no	no	no
<i>Fl. psychrophilum</i>	yes	no	no	yes	yes	no	yes
<i>Fl. columnare</i>	no	no	no	no	yes	no	no
<i>Aeromonas salmonicida</i>	no	no	yes	no	yes	no	no
<i>Aeromonas/Pseudomonas</i>	yes	yes	no	yes	yes	yes	yes
<i>Yersinia ruckeri</i>	no	no	no	no	no	yes	no
<i>R. salmoninarum</i>	no	yes	yes	yes	no	no	no
Internal mycosis	no	no	no	no	no	yes	no
External mycosis	no	yes	yes	yes	yes	yes	yes
<i>Ichthyobodo</i>	no	no	no	yes	yes	no	yes
<i>Gyrodactylus</i>	yes	no	no	yes	yes	no	yes
<i>Ichthyophthirius</i>	no	no	no	no	no	no	no
Gill Amoeba	no	no	no	no	no	no	no
Trichodinids	yes	no	no	yes	yes	no	no

Fish Health Monitoring Plan

Monitoring will be conducted by a qualified fish health specialist. The monitoring plan is similar to that developed by the Integrated Hatchery Operations Team for the Columbia Basin anadromous salmonid hatcheries. (see Policies and Procedures for the Columbia Basin Anadromous Salmonid Hatcheries, Annual Report 1994. Bonneville Power Administration).

Conduct examinations of fish at least monthly and more often as necessary. Investigate fish losses when they occur. A representative sample of healthy and moribund fish (if available) from each lot of fish will be examined. The number of fish examined will be at the discretion of the fish health specialist. Appropriate actions including drug or chemical treatments will be recommended as necessary. If a bacterial pathogen requires treatment with antibiotics a drug sensitivity profile will be generated when possible.

Fish culture practices will be reviewed as necessary by facility personnel. Whenever is pertinent, issues like fish nutrition, water flow and chemistry, loading and density indices, handling, disinfection procedures, and treatments etc. shall be discussed and measures be taken as per staff recommendations.

Findings and results of fish health monitoring will be recorded on a standard fish health reporting form and maintained in a fish health data base.

Fish health status prior to release or transfer to another facility will be determined and reported on the standard reporting form. The exam may occur during the regular monthly monitoring visit, i.e. within 1 month of release.

Fish Health Inspection for Broodstock

Fall Chinook Salmon, Coho Salmon and two lots of winter steelhead are examined for the presence of viruses and the Chinook and Coho are also sampled for bacterial kidney disease.

Appendix B: Growth Program

Cole Rivers Hatchery Growth Program.

	Jan	Mar	May	July	Sep	Nov	Jan	Mar	April, May, or June	AVG
F/LB	3350	1095	257	73	22	12	8	5	3	184.38
FEED	Nutri Starter			Bio Dry						NA
%BW/DAY	3.1	2.9	2.8	2.4	2.1	0.9	1.1	0.9	1.2	1.93
CONV.	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.20
LBS/GPM	0.87	1.27	2.05	3.12	4.67	5.75	6.63	7.56	8.99	4.55

April, May and June are months in which liberations occur. This growth program is based on a May release, which is approximately the same for April and June.

References

- Fisher, J. P., and W. G. Pearcy. 1985. Studies of juvenile salmonids off the Oregon and Washington coast, 1985. Oregon State University Sea Grant College Program, ORESU-T-85-004, Corvallis.
- Hartt, A. C., and M. B. Dell. 1986. Early oceanic migrations and growth of juvenile Pacific salmon and steelhead trout. International North Pacific Fisheries Commission Bulletin 46:1-105.
- Lewis, M.A. 2000. Stock assessment of anadromous salmonids, 1999. Oregon Department of Fish and Wildlife, Oregon Plan for Salmon and Watersheds, Annual Progress Report number OPSW-ODFW-2000-4, Portland.
- Lister, D. B., and H. S. Genoe. 1970. Stream habitat utilization by cohabiting underyearlings of chinook (*Oncorhynchus tshawytscha*) and Coho (*O. kisutch*) salmon in the Big Qualicum River, British Columbia. Journal of the Fisheries Research Board of Canada 27:1215-1224.
- Moring, J. R., and R. L. Lantz. 1975. The Alsea watershed study: Effects of logging on the aquatic resources of three headwater streams of the Alsea River, Oregon. Part I - Biological studies. Oregon Department of Fish and Wildlife, Fishery Research Report Number 9, Corvallis.
- Mundie, J. H. 1969. Ecological implications of the diet of juvenile Coho in streams. Pages 135-152. In T. G. Northcote [ed.] Symposium on salmon and trout in streams. H. R. MacMillan Lectures in Fisheries. University of British Columbia, Vancouver, B.C.

- Nickelson, T.E. 1998. A habitat-based assessment of Coho Salmon production potential and spawner escapement needs for Oregon coastal streams. Oregon Department of Fish and Wildlife, Fish Information Report 98-4. Portland.
- Nickelson, T.E. 2001. Population assessment: Oregon coast Coho Salmon ESU. Oregon Department of Fish and Wildlife, Fish Information Report 2001-2. Portland.
- Nickelson, T. E., J. D. Rodgers, S. L. Johnson, and M. F. Solazzi. 1992a. Seasonal changes in habitat use by juvenile Coho Salmon (*Oncorhynchus kisutch*) in Oregon coastal streams. Canadian Journal of Fisheries and Aquatic Sciences 49:783-789.
- Nickelson, T. E., M. F. Solazzi, S. L. Johnson, and J. D. Rodgers. 1992b. Effectiveness of selected stream improvement techniques to create suitable summer and winter rearing habitat for juvenile Coho Salmon (*Oncorhynchus kisutch*) in Oregon coastal streams. Canadian Journal of Fisheries and Aquatic Sciences 49:790-794.
- ODFW. 1991. Tenmile Basin Fish Management Plan. Oregon Department of Fish and Wildlife. Portland. February 1991.
- ODFW. 2016. Coho Abundance Data. OASIS website:
<http://odfw.forestry.oregonstate.edu/spawn/cohoabund.htm>
- Reiser, D. W., and T. C. Bjornn. 1979. Habitat requirements of anadromous salmonids. Ch. 1. *In* W. R. Meehan [tech. ed.] Influence of forest and rangeland management on anadromous fish habitat in the western United States and Canada. Pacific Northwest Forest and Range Experiment Station, USDA. Forest Service, Portland.
- Rodgers, J. D., S. L. Johnson, T. E. Nickelson, and M. F. Solazzi. 1993. The seasonal use of natural and constructed habitat by juvenile Coho Salmon (*Oncorhynchus kisutch*) and preliminary results from two habitat improvement projects on smolt production in Oregon coastal streams. *In* Proceedings of the Coho workshop, May 26-28, 1992 at Nanaimo, B.C.

SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

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

Name and Title of Applicant: Tim Walters, Umpqua Watershed District Manager

Signature: _____ Date: _____

Certified by: Scott Patterson, Fish Propagation Program Manager

Signature: _____ Date: _____

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

Listed species affected: <i>Coho Salmon</i> ESU/Population: <i>Oregon Coastal ESU</i> Activity: Tenmile Basin Rainbow Trout Stocking for fishery				
Location of hatchery activity: <i>Tenmile Lks Basin</i> Dates of activity: <i>Ongoing</i> Hatchery program operator: <i>Mike Gray</i>				
Type of take	Annual Take of Listed Fish By Life Stage (<i>Number of Fish</i>)			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)	No Take Identified for the hatchery trout program			
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)				
Other Take (specify) h)				

- a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at weirs.
- b. Take associated with weir or trapping operations where listed fish are captured and transported for release.
- c. Take associated with weir or trapping operations where listed fish are captured, handled and released upstream or downstream.
- d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.
- e. Listed fish removed from the wild and collected for use as broodstock.
- f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.
- g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.
- h. Other takes not identified above as a category.

Instructions:

1. An entry for a fish to be taken should be in the take category that describes the greatest impact.
2. Each take to be entered in the table should be in one take category only (there should not be more than one entry for the same sampling event).
3. If an individual fish is to be taken more than once on separate occasions, each take must be entered in the take table.

Tenmile Basin Rainbow Release Sites

