HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	**Trask Hatchery Coho Salmon Program**
Species or Hatchery Stock:	**Coho Salmon (Hatchery Stock-34, Wild broodstock TBD)**
Agency/Operator:	**Oregon Department of Fish and Wildlife**
Watershed and Region:	**North Coast Watershed District**
Date Submitted: **First Update Submitted:** **Second Update Submitted:**	**September 7, 2001** **December 15, 2008** **July 27, 2016**
Date Last Updated:	**July 27, 2016**

SECTION 1

GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Trask Hatchery Coho Salmon Program.

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

Coho Salmon *Oncorhynchus kisutch* (Hatchery Stock-34; proposed wild broodstock identification number to be determined, after HGMP approval).

Tillamook Basin wild Coho Salmon are part of the Oregon Coast Coho Evolutionary Significant Unit (ESU), which was listed as threatened species under the federal ESA on February 11, 2008 (Federal Register Notice 2008).

1.3) Responsible organization and individuals.

Lead Contact:

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

On-site Lead Contacts:

Name (and title)	Robert Bradley, District Fish Biologist
Organization:	Oregon Department of Fish and Wildlife
Address:	4907 Third Street; Tillamook OR 97141
Telephone:	503/842-2741
Fax:	503/842-8385
Email:	chris.j.knutsen@state.or.us

Name (and title)	James Skaar, Trask Hatchery Manager
Organization:	Oregon Department of Fish and Wildlife
Address:	15020 Chance Road; Tillamook, Oregon 97141
Telephone:	503/842-4090
Fax:	503/842-2678
Email:	traskriver.hatchery@state.or.us or James.C.Skaar@state.or.us

Name (and title)	Christine Clapp, Salmon and Trout Enhancement Program Biologist
Organization:	Oregon Department of Fish and Wildlife
Address:	810 SW Alder St, Unit C, Newport OR 97365
Telephone:	541-265-8306
Fax:	541-265-9894
Email:	Christine.M.Clapp@state.or.us

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

The Depoe Bay Salmon Enhancement Commission (DBSEC), a group annexed into the Depoe Bay City Council, is involved in a STEP project that incubates 20,000 Trask Hatchery Coho Salmon eggs. This group has a hatchbox on North Fork Depoe Bay Creek that is used to produce fed fry. These fish are reared and released from North Fork Depoe Bay Creek Reservoir and provide the focal point of a community watershed health education program. The lead contact for the DBSEC is the Chairman Beanie Robison: (541) 961 2499. This program originally received Salmon River hatchery stock 33 coho eggs. That Coho Salmon program terminated in 2007 and the Depoe Bay STEP egg source was shifted to Trask Hatchery for coho eggs in 2008.

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

- Trask Hatchery has a staff of 3.75 permanent full-time employees.
- Funding for this program is currently from several sources.
- The annual budget for the coho program is presented in Table 1-1.

Table 1-1. Annual Allocated Budget

Year	Total Budget	Coho Budget [1]	Percent of Total	Coho Smolts
2005	222,911*	5,360	2.1%	102,669
2006	256,915*	4,111	1.6%	93,582
2007	287,599*	4,602	1.6%	102,656

Data Source: ODFW (2008)

1. Only covers spawning, early rearing, and release completed at Trask Hatchery. Budget figures for Nehalem Hatchery rearing component are found in the Nehalem Coho HGMP.

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

Trask Hatchery is located 8 miles east of Tillamook, adjacent to Trask River (ODFW waterbody code 0100130000) at about river mile (RM) 10. The regional mark processing code for Trask Hatchery is 5F22229-H29-21. The hatchery site is at an elevation of 100 feet above sea level, at latitude 45º 25' 53" N (45.43139) and longitude 123º 43' 58" W (123.7328). Trask Hatchery has two satellite rearing ponds (East Fork Trask Pond and Tuffy Creek Pond). East Fork Trask Pond is located 17 miles east of Tillamook, adjacent to the East Fork of South Fork Trask River at RM 0.5. The South Fork Trask River is a tributary of the mainstem Trask River at about RM 19. Tuffy Creek Pond is a cooperative project between ODFW, Oregon Department of Corrections, and Oregon Department of Forestry and is built on the site of a state prison camp. Tuffy Creek Pond is located 30 miles northeast of Tillamook, adjacent to the South Fork Wilson River (ODFW waterbody code 0100125000) at about RM 1. The South Fork Wilson River is a tributary of the mainstem Wilson River (ODFW waterbody code 0100120000) at

approximately RM 33. The Tuffy Creek and East Fork Pond facilities are not currently used as part of the stock-34 coho program.

Adult collection facilities: Adult Coho Salmon are usually collected at the Trask Hatchery trap (T-9) located on Gold Creek. Gold Creek enters the mainstem Trask River immediately upstream of the hatchery buildings at RM 10. The Gold Creek trap and weir (T-9) are located approximately 1,100 feet from the confluence with the mainstem Trask River. During some low water years the Trask Hatchery trap (T-3) located at RM 9.8 on the Trask River has been used to trap adult coho. The South Fork Wilson River trap is located at RM 1.5 on the South Fork Wilson River. The Trask Pond trap is located at approximately RM 0.5 on the East Fork of the South Fork Trask River. Alternative methods of broodstock collection (such angling, seining, tangle netting, or remote trapping/capture) may be considered if necessary.

Spawning, egg incubation, and rearing facilities: Spawning, incubation and early rearing activities all occur at Trask River Hatchery. Approximately 135,000 to 140,000 fingerlings at approximately 350 fish/lb are transferred from Trask Hatchery to North Fork Nehalem Hatchery for rearing to smolt size. Smolts are transferred back to Trask Hatchery and acclimated before being direct released from the hatchery pond. Nehalem Hatchery is located in the North Fork Nehalem. All rearing information for Trask Coho while at Nehalem hatchery will be presented in this HGMP.

Depoe Bay STEP Project

Hatchboxes are located on North Fork Depoe Bay Creek in Depoe Bay. The hatchboexes with gravel substrate are used to incubate 20,000 Trask Hatchery stock-34 coho eyed eggs.

Unfed fry (annual average of 18,700) are ponded in a net-pen in Depoe Bay Reservoir. Fry are fed until late June when they are 100% fin clipped and released into the reservoir at ~ 200 fish per pound.

Fish rear naturally in reservoir for ~8 months before being volitionally released into North Fork Depoe Bay Creek.

This STEP component of the program is primarily for education purpose with some potential benefits to ocean fisheries.

1.6) Type of program.

Isolated Harvest – The intent of this propagation program is for harvest augmentation and is not intended to produce fish to spawn in the wild or interbreed with natural populations. This program is currently operated as a segregated hatchery program.

As described within this HGMP, ODFW proposes to establish a new Tillamook Bay basin broodstock using wild Coho Salmon once approved by NOAA. Future production would include some level of integration of wild adults into the broodstock.

Depoe Bay STEP Project:
Prior to 2008 this STEP component of the program was operated under the Salmon River Hatchery HGMP, that program has since been terminated and the Depoe Bay program will continue operation using eggs from Trask Hatchery eggs.

Education: Volunteer involvement in the Salmon and Trout Enhancement Program (STEP) increases natural resource awareness and provides a volunteer base of individuals, and organizations, desiring to assist ODFW with natural resource program implementation activities.

1.7) Purpose (Goal) of program.

The goal of this program is to provide hatchery fish for consumptive fisheries in the waters of Oregon in a manner that minimizes the risk of adverse effects to listed wild populations.

Depoe Bay STEP program:

The primary goal of the STEP project is watershed education with some potential additional benefits to the ocean sport and commercial fisheries.

1.8) Justification for the program.

The program operates to provide harvestable fish to sport and commercial fisheries in the ocean and local freshwater areas. The program releases smolts which are mass marked (100%); historically a portion were also coded wire tagged (AD+CWT) but that was discontinued with the 2009 smolt releases due to reductions in CWT marking budgets. Fisheries in the North Coast area of Oregon had been restricted to finmarked fish only during approved seasons until 2009; wild Coho Salmon are now available for limited harvest fisheries in some years.

STEP Hatchbox / Rearing Program: Up to 20,000 (total) eggs are incubated in a hatchbox and later naturally reared for release. The STEP hatchbox and rearing program is allowed under STEP OAR's (Oregon Administrative Rules) and ORS's (Oregon Revised Statutes). Juveniles are mass marked prior to release and may provide harvestable fish during open ocean seasons.

1.9 – 1.10) List of program "Performance Standards" and "Performance Indicators designated by "benefits" and "risks".

Indicator 1 - Harvest

Standard 1.1: Harvest of Trask Hatchery and Depoe Bay STEP Coho Salmon will be managed to comply with Amendment 13 of the PFMC Salmon Fishery Management Plan, and/or Fishery Management and Evaluation Plans (FMEPs) developed for these fisheries. **(Benefit)**

Indicator: Number of Trask Hatchery and Depoe Bay coho harvested falls within guidelines of PFMC Salmon Fishery Management Plan or appropriate FMEP. **(Benefit)**

Indicator: Estimate of incidental mortality rate on wild Coho Salmon. **(Risk)**

Standard 1.2: All Trask Hatchery and Depoe Bay Coho Salmon will be externally marked or tagged. **(Benefit)**

Indicator: Pre-release quality checks indicate 95 percent retention of identifiable marks or tags. **(Benefit)**

Indicator: Mark rate by mark type for release group. **(Benefit)**

Indicator 2 - Life History Characteristics

Standard 2.1*:* Hatchery coho collected for broodstock in a manner that approximates the distribution in run timing, age, and size of fish returning to the Tillamook Bay basin. However, jacks typically make up no more than 5 percent of the males spawned. **(Benefit)**

Indicator: Temporal distribution of Trask Hatchery adult Coho Salmon returns and broodstock collected. **(Risk – unknown)**

Indicator: Age distribution of Trask Hatchery adult Coho Salmon returns and broodstock spawned. **(Benefit)**

Indicator: Fork length distributions of Trask Hatchery adult Coho Salmon returns and broodstock spawned. **(Risk – unknown)**

Standard 2.2: Releases of Trask Hatchery Coho smolts will minimize impacts to naturally produced salmonids through control of hatchery release numbers, and by minimizing spatial and temporal overlap with natural populations. **(Risk)**

Indicator: Number of Trask Hatchery Coho smolts released will not exceed basin smolt production capacities. **(Risk)**

Indicator: Temporal distribution of wild Coho Salmon smolt migration from Tillamook Basin smolt traps (Little North Fork Wilson River EF Trask). **(Risk)**

Indicator: Dates of Trask Hatchery Coho smolts releases. **(Risk)**

Indicator: Location of Trask Hatchery Coho smolts released. **(Risk)**

Standard 2.3: Trask Hatchery and Depoe Bay coho smolts will be volitionally released as yearlings. Any fish remaining after the volitional period, will be crowded out of Trask Hatchery. **(Risk – unknown)**

Indicator: Beginning and ending dates of Trask Hatchery coho release. **(Risk – unknown)**

Indicator: Estimated proportion of Trask Hatchery coho leaving volitionally. **(Risk – unknown)**

Standard 2.4: All Trask Hatchery coho smolts will be acclimated and released on station. Any fry or fingerlings in excess of needs for the Trask smolt program may be released into standing water bodies without natural coho production, or may be destroyed. **(Risk – unknown)**

***Indicator**:* Location of Trask Hatchery Coho smolts acclimation and release. **(Risk – unknown)**

Indicator 3 - Genetic Characteristics

Standard 3.1: Hatchery Coho Salmon will not exceed the stray rate identified in the Coastal Coho Conservation Plan (2007) for the Tillamook Basin naturally spawning coho population abundance. **(Benefit)**

***Indicator**:* Estimated abundance of naturally spawning Coho Salmon in Tillamook Basin. **(Benefit)**

***Indicator**:* Estimated abundance of naturally spawning Coho Salmon in the Tillamook Basin that are of hatchery origin, based on marks and/or tags. **(Benefit)**

Standard 3.2: Stock 34 coho, or wild adult returns from the Tillamook Bay basin, will be used as broodstock. **(Risk - unknown)**

Indicator: Location of broodstock collection. **(Risk - unknown)**

Indicator: Fin clips on hatchery fish collected for brood, or unmarked adults. **(Benefit)**

Standard 3.3: Stock 34 coho broodstock will be spawned following appropriate mating and spawning protocols to maintain genetic diversity of the population. **(Benefit)**

Indicator: Number and ratio of males and females spawned. **(Benefit)**

Indicator: Matings will follow procedures as outlined and appropriate for the stock size, in the Hatchery Management Policy, Fish Health Management Policy, IHOT fish health document, or as directed by the ODFW staff geneticist. **(Benefit)**

Indicator 4 - Operation of Artificial Production Facilities

Standard 4.1: The Trask Hatchery Coho Salmon program will be operated in compliance with ODFW Hatchery Management Policy, Fish Health Management Policy, and the IHOT fish health guidelines. The Depoe Bay STEP Program will be operated in accordance with applicable STEP OAR's and the Fish Health Management Policy. See attachment A. **(Benefit)**

***Indicator**:* Number of broodstock sampled and pathogens observed. **(Benefit)**

***Indicator**:* Rearing survival rates, egg to fry and fry to smolt. Results of fish health examinations. **(Benefit)**

***Indicator**:* Determine fish health status of juveniles prior to release, and release only certified fish. **(Benefit)**

Indicator: Release of full term smolts at the target size of 15 fish per pound. **(Benefit)**

Standard 4.2: Trask Hatchery water discharges will comply with the conditions and water quality limitations identified in the current NPDES permit as required by the Oregon Department of Environmental Quality (DEQ). **(Benefit)**

***Indicator**:* Water samples collected and result reported. **(Benefit)**

***Indicator**:* Results within accepted criteria. **(Benefit)**

Standard 4.3: Trask Hatchery water withdrawals will comply with NMFS juvenile screening criteria. **(Benefit)**

***Indicator**:* Screens inspected and are either in or are brought in to compliance. **(Benefit)**

Standard 4.4: Trask Hatchery coho carcass placements for stream enrichment comply with MOU between ODFW and DEQ. **(Benefit)**

***Indicator**:* Number and location of coho carcasses distributed. **(Benefit)**

***Indicator**:* Examine carcass health and use only pathogen free carcasses. **(Benefit)**.

Standard 4.5: Naturally produced steelhead, Chinook Salmon, Coho Salmon, Chum Salmon, and Cutthroat Trout that enter the Trask Hatchery adult traps are handled and released (except fish retained for brood) in a manner that minimizes stress, injury, mortality, and delay in migration. **(Risk).**

***Indicator**:* Number of unmarked adult steelhead, Chinook Salmon, Coho Salmon, Chum Salmon, and Cutthroat Trout collected and released alive (or retained for brood) from the Trask Hatchery traps. **(Risk - unknown).**

***Indicator**:* Number of unmarked adult steelhead, Chinook, coho, chum, and cutthroat mortalities at Trask Hatchery during operation of the hatchery adult traps. **(Risk).**

***Indicator**:* Dates of trap operation and frequency of handling steelhead, Chinook, coho, chum, and cutthroat. **(Benefit)**

Standard 4.6: Releases of hatchery coho smolts will limit predation impacts to naturally produced salmonids through control of hatchery release numbers and by minimizing spatial and temporal overlap with naturally produced salmonid juveniles. **(Risk - unknown).**

***Indicator**:* Dates, location and sizes of Trask Hatchery coho releases. **(Risk - unknown).**

***Indicator**:* Temporal and size distribution of wild coho smolt migration from Little North Fork Wilson and EF Trask LCM smolt traps. **(Risk - unknown).**

Indicator 5 - Socio-Economic Effectiveness

Standard 5.1: Estimated harvest benefits will equal or exceed hatchery production costs for Trask Hatchery coho, based on the benefit-cost model in ODFW (1999), or an updated version of that model. **(Benefit)**

***Indicator**:* Annual budget expenditures. **(Benefit)**

***Indicator**:* Estimated harvest benefits. **(Benefit)**

1.11) Expected size of program.

Trask Hatchery smolt release numbers for this program are currently 100,000 fish. All smolts are released in the Trask River from Trask Hatchery.

Depoe Bay STEP program volitionally release up to 20,000 smolts from the North Fork Depoe Bay Creek. Actual release numbers are unknown but are likely less than 20,000.

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

Existing program requires a minimum of 75 females and 75 males for broodstock purposes and to mainatin genetic diversity within the hatchery population. Additional adults may be collected as necessary to cover shortages resulting from, but not limited to, fecundity variation, early egg mortality, positive disease test, etc.

ODFW proposes to establish a new program using wild coho adults. A maximum of 110 adults (55 females and 55 males) would be needed for broodstock to meet full production goals.

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

Table 1-2. Proposed Annual Fish Release Levels.

Life Stage	Release Location	Annual Release Level
Eyed Eggs	NA	NA
Unfed Fry [1]	Standing water	Excess to productions, varies
Fry [1]	Standing water	Excess to productions
Fingerling [1]	Standing water	Excess to productions
Yearling	Trask River	100,000
Yearling [2]	North Fork Depoe Bay Cr.	<20,000

Data Source: District files

1. This program does not produce fry or fingerlings for release as a program goal for Stock 34 coho. In any given year there may be surplus fry or fingerlings (typically from above average fry and fingerling survival). These will be released to standing water bodies or destroyed.

2. All volitional release, no estimate on actual numbers outmigrating.

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

Estimates of adult Coho Salmon production from the Trask Hatchery coho program, for the years 1985-2004 are presented in Table 1-3. Estimates reflect program performance in relation to the harvest (ocean and freshwater) program goal. The estimated number of total adult hatchery Coho Salmon produced was derived from a variety of data sources.

The "Ocean Commercial" and "Ocean Sport" columns were estimated by expansion of coded-wire tag (CWT) recoveries to reflect total production as follows: {(Estimated CWT recoveries / number of CWT smolts released) * total fish released}. This calculation was made for each group of CWT smolts released, and then summed across all CWT groups released for each brood year. This estimate represents landed catch and does not include an estimate of non-landed coho mortality in chinook only fisheries. Included in the "Ocean Sport" column are any recoveries in the "Buoy 10" or other

estuary fisheries outside of the Tillamook Bay system. The "Freshwater Sport" column is based on catch card estimates of catch in the Tillamook Bay system. Selective harvest of hatchery coho in freshwater fisheries in Tillamook Bay began in the 1997-98 run year. Prior catch card catch estimates cannot be segregated into hatchery and wild coho, and thus are not reported here. The "Hatchery Return" column depicts the actual count of adult coho returns at Trask Hatchery and at East Fork Trask Pond. In 1998 and 1999, the returning hatchery fish were essentially 100 percent marked (adjusted for mark quality checks), and the hatchery return numbers do not include unmarked coho collected and released alive at Trask Hatchery. The "Hatchery Spawners" column is derived from the stratified random spawning ground survey (SRS) population estimates as: {(Hatchery strays = Total SRS population estimate – SRS wild coho population estimate)}, see Jacobs et al. 2000, for 1998-99 run year data. The total SRS coho population estimate is adjusted based on the hatchery to wild ratio, from scale samples and/or marks on coho salmon carcasses. Smolt to adult survival is calculated as the sum of the prior 5 columns divided by the "Smolt Release" column.

The 1996 run year is the first adult return from a 200,000 smolt (also 100 percent CWT) release. In 2004 smolt releases were further reduced to 100,000.

Hatchery strays comprised a significant portion of the Tillamook Complex coho salmon population in 1993-1995 (Table 2-2). Since then, the number of stray hatchery fish on the spawning grounds has been greatly reduced, undoubtedly in response to eliminating releases from East Fork Trask pond and reducing total releases to 200,000. Table 2-2 indicates that returns from the 200,000 releases (1996 to 1999 run years) average 9% hatchery fish on the spawning grounds (Range 3% to 14%). Therefore the existing program design of 100,000 smolt releases appears to be in compliance with the Native Fish Conservation Policy and the Coastal Coho Conservation Plan stray rate limits.

Table 1-3. Estimated smolt to adult survival rates of Trask Hatchery Coho Salmon (stock-34) program in different brood years (1985-2004).

Brood Year	Smolt Release	Adult Return Year	Estimated Total Adult Hatchery Coho Produced					
			Ocean Comm.	Ocean Sport	Freshwater Sport	Hatchery Return	Hatchery Spawners	Smolt to Adult Survival
1985	1,128,383	1988-89	11,632	5,004	NA	5,790	NA	1.99%
1986	1,035,346	1989-90	11,171	9,319	NA	10,153	NA	2.96%
1987	1,195,880	1990-91	9,765	10,492	NA	5,805	NA	2.18%
1988	1,011,339	1991-92	5,477	7,288	NA	5,268	NA	1.78%
1989	1,066,566	1992-93	731	2,992	NA	3,158	NA	0.65%
1990	1,037,941	1993-94	748	2,987	NA	2,897	961	0.73%
1991	1,091,351	1994-95	99	7	NA	4,796	272	0.47%
1992	1,251,709	1995-96	100	453	NA	6,943	472	0.64%
1993	216,801	1996-97	2	16	NA	930	107	0.49%
1994	201,098	1997-98	0	69	76	768	33	0.47%
1995	144,533	1998-99	6	112		1,485	0	1.11%
1996	212,525	1999-00	0	134		3,843	78	1.91%
1997	189,230	2000-01	124	436	72	4,671	7	2.80%
1998	196,385	2001-02	84	1227	435	19,644	29	10.90%
1999	194,634	2002-03	0	601	43	10,839	43	5.90%
2000	201,749	2003-04	33	1425	93	5,693	0	3.59%
2001	97,355	2004-05	26	346	4	1,776	5	2.23%
2002	100,382	2005-06	0	22	2	1,594	2	1.61%
2003	102,669	2006-07	13	93	4	1,221	0	1.29%
2004	93,582	2007-08	3	26	0	155	0	0.20%

Source: Derived from CWT expansions, SRS, hatchery, and catch card data. Data for 2004 is incomplete as 07 and 08 returns are not included.

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

Available reports (Wallis, 1963) indicate that egg take of Coho Salmon began in 1906, although the hatchery location was approximately 3 miles upriver of its current location. The hatchery at the current location became operational in 1914 and has operated continuously since. Historical records are incomplete but it appears likely that a coho program was in place and operational the majority of that timeframe.

Use of wild Coho broodstock would be implemented as soon as possible, provided conditions outlined in this HGMP, and approved by NOAA, are met.

1.14) Expected duration of program.

Trask Hatchery Coho Salmon program is ongoing, and expected to continue into the future.

Depoe Bay STEP program began in 1982 and is expected to continue indefinitely.

1.15) Watersheds targeted by program.

The Trask River Basin within the Tillamook Bay Basin is the release site and desired return site for Trask Hatchery coho released on station. Hatchery coho from these releases are expected to return to the Trask Hatchery site.

The North Fork Depoe Creek Basin within the Depoe Bay Basin is the release site and desired return site for all Depoe Bay STEP coho released under this program. Coho Salmon from these releases are expected to return to the NF Depoe Bay Creek site.

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.

Stock Composition - The Trask Hatchery Coho Salmon program is currently a long term domesticated stock. Alternatives to this program are being considered. See below section 1.16.2.

1.16.2) Potential Alternatives to the Current Program.

Alternative 1 - Increase size of stock-34 Coho Salmon program

Description and Implications - This alternative would increase the number of smolts released. The coho sport fishery in the Ocean, Tillamook Bay and Trask River may be enhanced if the increase resulted in more adults available to anglers. Any impacts from stock-34 hatchery coho on naturally rearing species would potentially increase. Hatchery operating costs would increase. Increased adult returns would increase the workload of hatchery personnel to handle the additional fish.

Alternative 2 - Eliminate the stock-34 Coho Salmon program

Description and Implications - This alternative would eliminate the Trask Hatchery and Depoe Bay programs. The consumptive coho recreational fishery in the Tillamook Bay and Trask River would be eliminated. Any impacts of stock 34 hatchery coho on naturally rearing species would be eliminated. Hatchery operating costs associated with the program would be eliminated.

Alternative 3 – Reduce the stock-34 Coho Salmon program

Description and Implications - This alternative would reduce this program to less than the present 100,000 smolt program. The consumptive coho sport fishery in the Tillamook basin would be reduced. Any interactions of hatchery coho with naturally produced fish would be reduced. It is likely that a reduced program may have trouble meeting annual broodstock needs, particularly in low survival years.

Alternative 4 - Incorporate unmarked wild fish into broodstock

Description and Implications - Use of unmarked, wild adults would replace the current broodstock. Alternatively, a wild brood program could be phased in during years of sufficient abundance while maintaining a portion of the releases from the existing program. Use of naturally produced adults from the Tillamook Bay basin may increase

potential straying of returning adults within the basin. This alternative is being proposed in this HGMP for implementation.

Alternative 5 – Install a barrier (i.e. weir) at Trask Hatchery to allow removal of hatchery Coho Salmon and limit their presence in the upper Trask River basin.

Description and Implications – A barrier facility would allow for the separation of hatchery and wild fish at the hatchery. Only naturally produced adults would be allowed upstream of the hatchery. This would necessitate handling of all fish migrating upstream past the hatchery. Workload associated with sorting hatchery coho from naturally produced fish in the hatchery trap would increase. Impacts to naturally produced fish from handling would increase. Any impacts to naturally produced salmonid populations from passing hatchery coho to the upper Trask River would be reduced or eliminated. Substantial cost would be associated with construction and maintenance of the barrier and it is questionable if it is even feasible from an engineering standpoint given the size of the river and the need to safely allow boat traffic to pass.

Alternative 6 – Develop a new broodstock from wild, naturally produced fish from the Trask River.

Description and Implications - It is unknown if sufficient numbers of naturally produced fish would be available to meet genetic needs without excessive impact to natural populations in the Trask basin. The consumptive coho sport fishery in the Tillamook basin would be maintained. Interactions of hatchery coho with naturally produced fish may result in negative impacts to wild coho populations.

Note: The alternatives listed are draft. They are presented here as a forum for further discussion. This list is not exhaustive, other ideas are welcome. The alternatives listed may not represent final decisions by ODFW.

1.16.3) Potential Reforms and Investments

Install updated screens at both of the intake structures that meet NOAA standards. Intake structures would need to be improved, modified, or rebuilt so that adequate water flows are met with the smaller screen size.

Installation of new aluminum pen dividers and jump panels to keep to keep adults from escaping and jumping from pen to pen.

Add a crane, or fish lift system (fork lift), to load totes on to trailers or trucks. This would require running electric power down to the trapping area (T-3) which would have to be a water proof system due to flooding.

Improvement of the existing abatement pond: This may involve increasing the size or physically relocating the pond location (on adjacent land). Improvements would likely require necessary in-flow and out-flow plumbing; and if an off station site is used pumping would be required.

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 program was submitted to NOAA Fisheries in 2001, which provided coverage for the take of ESA-listed fish. This is an updated version of Trask Hatchery Coho Salmon program, and is consistent with ODFW's Coastal Multi-Species Conservation and management Plan 2014.

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

Any take associated with this program is limited to incidental unmarked fish that would enter the trapping facilities at Trask Hatchery. The category would be "captured, handled, released" for any wild Coho Salmon trapped. Any unmarked trapped fish would be identified and immediately released back into the Trask River at the hatchery if only a few fish or transported a short distance and released back into the mainstem Trask River for larger numbers of fish.

Depoe Bay basin does not support any Coho Salmon populations (natural or artificial) and is therefore not addressed further in this section. It is not anticipated that any returning adults from this small program would significantly impact any natural populations in adjacent basins.

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

Tillamook Complex

The Tillamook Complex consists tributaries to Tillamook and Netarts bays and one small direct ocean tributary to the north of Tillamook Bay (Nickelson 2001), where listed natural Coho Salmon inhabit. There is an estimated 250 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 next brood. Spawning occurs primarily in small tributaries located throughout coastal basins. The parents normally exhibit strong homing to their natal stream. 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 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 that allow them to survive in seawater. They then migrate to the ocean as silvery smolts 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 portion 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 (53º 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 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 as in recent years, coho will be found in only 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.

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

The program has no intent to directly take any listed natural Coho Salmon. However, it is being proposed in this HGMP that a new broodstock for this program would be established using 100% wild Coho Salmon. And direct take of listed natural Coho Salmon to incorporate into broodstock would occur after approval of this HGMP by NMFS (details described in Section 6.2.3).

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

Indirect or incidental take of listed Coho Salmon may occur due to competitive interactions for food and space between hatchery-origin Coho Salmon and listed natural-origin Coho Salmon. Minimal indirect impact to listed coho may also occur due to water withdrawal for hatchery operations, and a few incidental take (catch and release) of listed coho may occur during Coho Salmon brood collection. Oregon coast steelhead populations are considered a "species of concern", and may also be indirectly affected by this program. There are no other ESA listed populations in the basin affected by this program.

2.2.2) Status of 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 status of listed natural Coastal Coho has been documented by the Oregon Department of Fish and Wildlife in the Oregon Coastal Coho Conservation Plan, in addition to the previously developed Oregon Native Fish Stock Status Report. The following information about the status of the Tillamook Complex Coho Salmon population was taken from Nickelson (2001), which is consistent with the coho population status described in the Oregon Coastal Coho Conservation Plan and the Oregon Native Fish Stock Status Report.

The critical population level of Coho Salmon for the Tillamook Complex is 1,000 adult spawners. However, this complex is not considered to be viable because high-quality habitat is estimated to be present in only 12 miles of stream, below the 15-mile threshold needed to support a viable population.

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

The abundance of wild Coho Salmon spawners in the Tillamook Complex has ranged from about 1,300 to 20,000 and has averaged about 8,500 since 2003 (Figure 2-1 and Table 2-2).

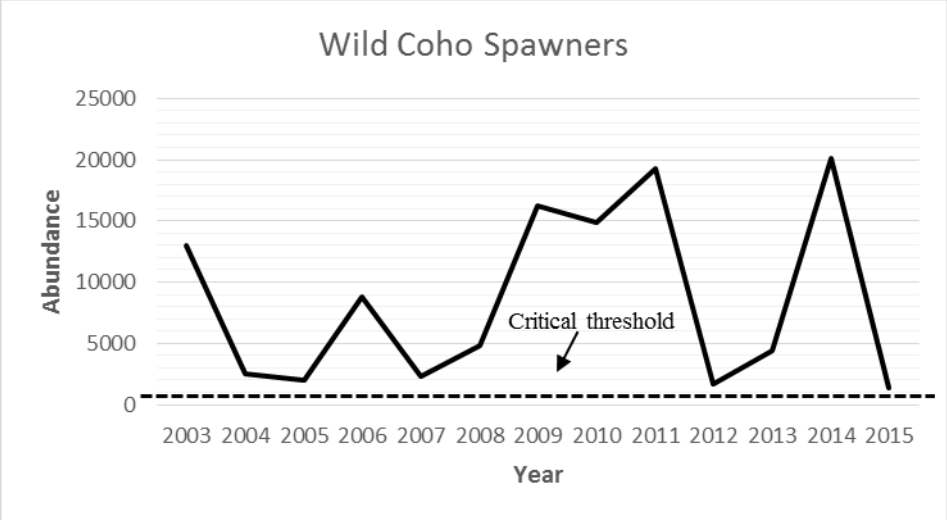

Figure 2-1. Trend in adult wild Coho Salmon spawner abundance relative to the critical population level for the Tillamook Complex, 2003-2015.

Table 2-2. Population Parameters of Coho Salmon showing recruit per spawner for the Tillamook Complex, 2003-2015.

Year	Wild Spawners	Hatchery Spawners	Percent Hatchery Spawners	Pre-harvest Wild Population	Recruits Per Spawner
2003	13,008	121	1%	14,139	6.5
2004	2,532	828	25%	2,743	1.4
2005	1,995	0	0%	2,087	0.2
2006	8,774	0	0%	9,496	0.7
2007	2,295	134	6%	2,602	1.0
2008	4,828	78	2%	4,922	2.5
2009	16,251	560	3%	17,418	2.0
2010	14,890	110	1%	15,592	6.8
2011	19,250	0	0%	20,457	4.2
2012	1,686	0	0%	2,064	0.1
2013	4,402	304	6%	5,137	0.3
2014	20,090	460	2%	23,470	1.2
2015	1,345	16	1%	1,679	1.0
Avg.	**8,565**	**201**	**3.6%**	**9,370**	**2.2**

Source: OASIS; District files

Estimated spawner abundance of Coho Salmon did not fall below the critical threshold of 1,000 fish in any year during this period. Nickelson (1998) estimated that 2,000 spawners were needed to seed productive freshwater rearing habitat during periods of poor marine survival and 5,700 were needed during periods of good marine survival.

Wild smolt production was estimated for the 1997 through 1999 broods. Estimated smolt abundance ranged from 34,000 to 85,000 for the Tillamook Complex (Table 2-3).

Table 2-3. Estimates of Abundance of Juvenile Coho Life Stages Based on Spawner Abundance.

Population Complex	1997 Brood (millions)				1998 Brood (millions)				1999 Brood (millions)			
	Eggs	Fry	Parr	Smolts	Eggs	Fry	Parr	Smolts	Eggs	Fry	Parr	Smolts
Tillamook	0.423	0.275	0.110	0.037	0.339	0.220	0.102	0.034	2.721	1.769	0.286	0.085
Data source: Nickelson (2001)												

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

Recruits per wild spawner have been highly variable, with six of the last 13 broods falling to one or below (Table 2-2 above and Figure 2-2).

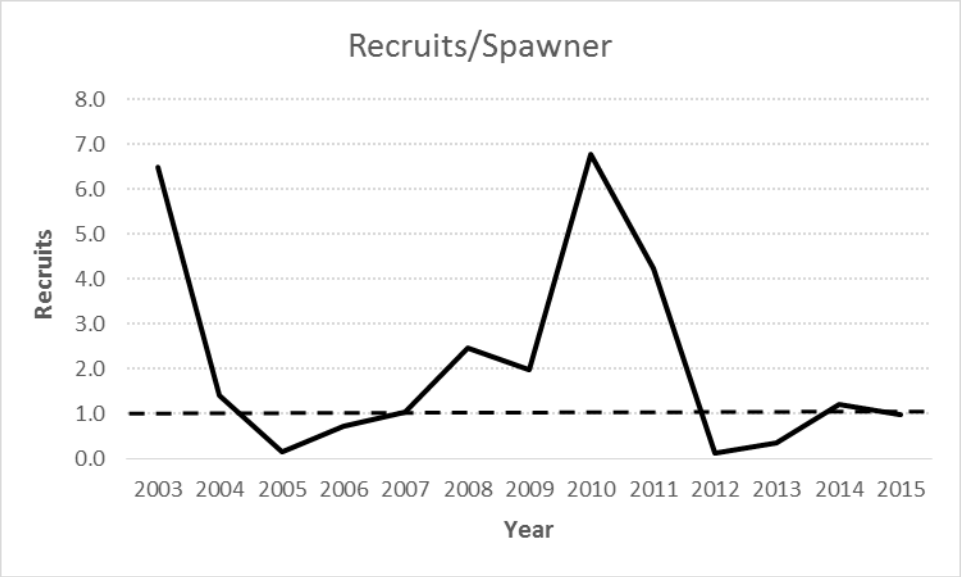

Figure 2-2. Trends in Recruits per Spawner for Tillamook Complex Wild Coho, 2003-2015.

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

Since 2003, hatchery strays have typically comprised a small portion of the Tillamook Complex Coho Salmon population observed on spawning grounds (Table 2-2). The decline is likely related to substantial decreases in hatchery coho production by the early 2000's, and ceasing to utilize the East Fork Trask Pond for rearing. No data is available for progeny of naturally spawning hatchery coho rearing in the wild.

There was no planned spawning ground survey to estimate the proportion of hatchery-origin Chinook Salmon spawning naturally. However, limited data collected during 2013-2015 revealed that hatchery-origin Chinook Salmon carcasses were less than 5% in Tillamook Bay area.

2.2.3) Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of 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.

Any take associated with this program is limited to incidental unmarked fish that would enter the trapping facilities at Trask Hatchery. The category would be "captured, handled, released" for any fish trapped. Any unmarked trapped fish would be identified and immediately released back into Gold Creek or transported a short distance and released back into the mainstem Trask River.

Trapping at Trap T-3 for Coho Salmon broodstock normally commences in late August and normally operates through early October yearly. Depending on timing and water flow conditions, adult coho may enter the trap. The potential for take of a listed stock, migrational delay, capture, handling, and release during this early trapping is low. Trapping and handling devices and methods may lead to injury of listed fish through descaling, delayed migration timing and spawning, and delayed mortality as a result of injury or increased susceptibility to predation. Any unmarked fish collected during this trapping are immediately released back (unless retained for brood) into the Trask River. Any take would be incidental take. Once spring chinook broodstock collection is complete, the trap facility is closed. The trap is rarely used to capture coho for broodstock. When used for adult coho broodstock collection it is usually during extremely dry years and flow in Gold Creek is insufficient to attract fish upstream to that trap.

Trapping for adult Coho Salmon broodstock takes place at the T-9 trap facility on Gold Creek at Trask Hatchery. The trap normally operates from mid-October through April for the collection of Coho Salmon and fall Chinook Salmon broodstock and the collection and removal of stray hatchery winter steelhead. Hatchery-origin Coho Salmon broodstock (finmarked) are collected during the period of October through November (see section 7.2 for details). The potential for take of a listed stock during this trapping is low and would consist of migrational delay, capture, handling, and release during the operational period. Trapping and handling devices and methods may lead to injury of listed fish through descaling, delayed migration timing and spawning, and delayed mortality as a result of injury or increased susceptibility to predation. Any unmarked fish collected during this trapping, if not retained for brood, are immediately released back into Gold Creek or Trask River. Any take would be incidental take.

The trapping facility on the South Fork Wilson River captures coho during the trapping period. Trask Hatchery personnel, with on site assistance from correctional facility staff and inmates, operate and sort fish collected at the Tuffy Creek trap site. Any hatchery coho (fin-clipped) are dispatched and disposed of in a landfill or are buried, or they may be used in stream enrichment programs. Naturally produced coho encountered may be retained for brood or are immediately released alive above the dam/trap facility on the South Fork.

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

Adult Coho Salmon returns in the 1996-97 return year are the first from mass marked smolt releases. Prior to this time, it was not possible to enumerate wild coho entering the spring Chinook trap or the Gold Creek trap at Trask Hatchery. Beginning with the 1997-98 return year, any unmarked adult Coho Salmon trapped at Trask Hatchery have been released into Gold Creek or Trask River. Unmarked adults and jacks trapped at Tuffy Creek have been immediately passed above the trapping facility (but may be retained for brood in the future). Trapping data for unmarked coho is presented in Table 2-4 below.

Table 2-4. Number of unmarked Coho Salmon captured at Trask Hatchery (Gold Creek) and South Fork Wilson River (Tuffy Creek) facilities[1].

Return Year	Unmarked Adult Coho		Unmarked Jack Coho	
	Gold Creek	Tuffy Creek	Gold Creek	Tuffy Creek
1999-00	0	50	0	0
2000-01	0	193	0	5
2001-02	10	32	0	26
2002-03	8	196	0	10
2003-04	118	26	15	0
2004-05	60	63	15	0
2005-06	96	102	13	13
2006-07	22	129	0	2
2007-08	38	179	5	2

Data source: ODFW HMS database

1. Number of coho captured at trapping facilities is for the entire adult trapping season for winter steelhead and other returning hatchery stocks (*i.e.* coho, fall chinook, spring chinook, etc.).

- 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 Table 2-5.

- 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.

The Trask Hatchery trap facility and handling procedures will be modified immediately if take, or incidental mortality, of naturally produced coho exceeding, or projected to exceed, levels specified in this HGMP can be identified, appears in or near the trap, and appears to be related to operation of the facility. This may include, but is not limited to, additional staff training or review of procedures, trap modifications, cessation of trapping, modified operation by hatchery personnel, etc.

Table 2-5. Estimated Listed Salmonid Take Levels by Hatchery Activity.

Listed Species Affected:	Coho Salmon	**ESU/Population:**	Oregon Coast Coho	**Activity:**	Coho broodstock collection
Location of Hatchery Activity:	Trask Hatchery and Tuffy Cr.	**Dates of Activity:**	September - November	**Hatchery Program Operator:**	ODFW

	Annual Take of Listed Fish By Life Stage *(Number of Fish)*			
Type of Take	**Egg/Fry**	**Juvenile/ Smolt**	**Adult**	**Carcass**
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)		0 – 100	0 – 750	
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)			0-110	
Intentional lethal take f)				
Unintentional lethal take g)		<10	<10	
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.

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.

Native Fish Conservation Policy - The Oregon Fish and Wildlife Commission has approved the Native Fish Conservation Policy (NFCP). The NFCP requires the development of a conservation plan for each native stock within the species management unit (SMU). The ODFW has completed the Oregon Coast Coho Conservation Plan (Coast Coho Plan), fulfilling the NFCP requirement for coho salmon along the Oregon Coast. The Coast Coho Plan provides the management direction for Coho Salmon populations along the coast from Sixes River in the south to the Necanicum River in the north, including the Tillamook population. The plan also provides guidance on the use of coho hatchery programs.

Coastal Multi-Species Conservation and Management Plan (CMP) – This plan addresses conservation and management of anadromous salmonids (salmon, steelhead and trout) on the Oregon coast from Cape Blanco to Seaside. The CMP is unique from other conservation plans in that it addresses both conservation and utilization of six distinct groups of fish species, none of which are listed under the ESA. In addition to meeting requirements of the Native Fish Conservation Policy, the CMP provides long-term management direction for species which are relatively healthy, with the intent to help ensure the continued existence of wild fish and the fisheries which wild and hatchery fish support.

Fish Hatchery Management Policy (FHMP) – 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 for 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. For the Oregon Coast Coho SMU, the conservation plan has been developed and adopted by the Commission, and this program is consistent with Coho Salmon conservation plan.

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

Oregon Plan for Salmon and Watersheds, Governors Executive Order EO 99-01:
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 Coho Salmon in the Tillamook watershed, including nutrient enrichment, separations of hatchery and natural production, and monitoring of hatchery and naturally produced runs.

NPDES Permit:
The Trask Hatchery is operated under the NPDES 300-J general permit to maintain the environmental quality of hatchery effluents.

Salmon Trout Enhancement Program:
The STEP component of the program operates under an ODFW approved STEP Fish Propagation Project Proposal. Projects are permitted for a 5-year period and must be renewed for program continuance. A copy of the proposal is on file at the Mid Coast Watershed District Office, 2040 SE Marine Science Drive, Newport, Oregon 97365.

3.3) Relationship to harvest objectives.

Trask Hatchery Coho Salmon have been mass marked since 1995, and Depoe Bay STEP Coho Salmon have been mass marked since 1997 as a means of integration of hatchery and harvest management. Mass marking allows for selective harvest of hatchery fish while requiring release of all unmarked wild Coho Salmon. Mass making also allows for better monitoring and control of impacts of the hatchery program to wild Coho Salmon populations. Incidental take of wild Trask River coho in harvests is limited by the ESA Section 4(d) rule. The 4(d) rule requires development of FMEPs. Such plans are under development and will be guided by the Pacific Coast Salmon Plan, specifically Amendment 13 (PFMC 1997). Under current conditions of marine survival and abundance, the take is limited to less than 10 percent of the total preharvest Oregon Coast ESU wild coho abundance. Take could increase to 35 percent if conditions improve (PFMC 1997). This standard is adopted as adequate for controlling incidental harvest impacts in this plan, pending completion of FMEPs. All further address of harvest impacts will occur under the FMEPs. Estimated harvest impacts (ocean and freshwater combined) on wild Coho Salmon for the period 1994 through 1999 averaged 9.2 percent and ranged from 6.8 percent to 12.4 percent. Current year (2000) harvest impacts are estimated to be about 8 percent.

The hatchery program evaluation presented in Section 1.12 (Tables 1-3) was as part of an ODFW hatchery review (ODFW 1999).

The Coho Salmon artificial production program is designed to have minimal biological impacts to naturally produced species. Likewise, fish culture practices are designed and carried out to rear full-term smolts to limit impacts to naturally rearing fish species.

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.

Trask Hatchery Coho Salmon are intended to contribute to ocean fisheries in the Oregon Production Index area, to freshwater fisheries in Tillamook Bay and the Trask River. The estimated number of Trask Hatchery adult Coho Salmon harvested in run years 1988 to 1999 is reported in Table 1-3.

Depoe Bay STEP Coho Salmon are intended to contribute to ocean fisheries in the Oregon Production Index area. There are no estimates for their contribution to these ocean sport or commercial fisheries.

3.4) Relationship to habitat protection and recovery strategies.

The Trask Hatchery Coho Salmon program is identified and operated as an isolated harvest program. Since the intent of the program is not to use the stock in a rebuilding or reintroduction process, there should not be a direct relationship between it and any habitat protection and recovery strategies associated with the Trask River or Tillamook Bay Basin. It is designed to provide hatchery Coho Salmon for harvest in ocean sport and commercial fisheries and freshwater sport fisheries, while other actions are taken to protect and restore habitat. Management of the hatchery program will focus on attaining harvest objectives using methods that minimize impacts to wild fish and their habitats.

The Depoe Bay STEP program's Coho Salmon are identified and operated as an isolated harvest program. Since the intent of the program is not to use the stock in a rebuilding or reintroduction process, there should not be a direct relationship between it and any habitat protection and recovery strategies associated with the Depoe Bay Bay Basin. It is designed to provide hatchery Coho Salmon for harvest in ocean sport and commercial fisheries. The Depoe Bay basin does not contain suitable coho habitat or existing natural coho populations and thus will not be further discussed in this section.

Major factors affecting natural production in the Tillamook basin are unknown; however, it is suspected that ocean survival may be the largest contributing factor. In general, habitat condition in the basin is slowly improving. A significant portion of the Tillamook Basin was severely impacted from a series of forest fires in the mid-1930s, collectively known as the "Tillamook Burn", which impacted habitat with loss of shade, increased sedimentation, and loss of stream complexity. The basin is recovering to a forested condition with shade and sedimentation impacts greatly reduced. Dominant land use in the basins in which this program operates is state and industrial forestland and to a lesser degree agriculture. Recent changes to regulations governing these activities should improve water quality and reduce sedimentation in streams. Unfavorable natural events (flooding) are common in the basin and can have detrimental effects on egg depositions and juvenile rearing.

Habitat restoration projects over the past seventeen years (on state and private timberlands, which make up the majority of the basin ownership) have addressed instream complexity concerns. Fish passage structures believed to impede migrations (primarily culverts) are being evaluated on most county, state, and privately owned

timberlands. Culverts on major highways and county road systems have been inventoried and priority ranked. Some sites have been addressed and others are in various planning stages; however, all are subject to funding availability. Oregon fish passage laws require fish passage to be addressed at all impediments to passage when a trigger event takes place. As such, fish passage in these basins is likely to continue to improve over time.

3.5) Ecological interactions.

(1) Species that could negatively impact program:
Competition for food between Trask Hatchery Coho Salmon smolts and other hatchery and wild smolts in the Tillamook Bay Estuary and near shore ocean environment may negatively impact this program. Avian and marine mammal predation may also negatively impact this program.

(2) Species that could be negatively impacted by program:
Competition for food between Trask Hatchery Coho Salmon smolts and wild salmon and steelhead juveniles in the Tillamook Bay Estuary and near shore ocean environment may negatively impact the wild juveniles. Straying of Trask Hatchery-origin Coho Salmon to natural spawning areas can negatively impact wild Coho Salmon populations through interbreeding and reduced genetic fitness. Large concentrations of hatchery fish may attract predators causing increased predation on hatchery and wild salmon and steelhead juveniles.

(3) Species that could positively impact program:
Increased abundance of wild Coho Salmon may allow for higher harvest rates on hatchery Coho Salmon from this program. Increased abundance of wild Coho Salmon may also positively impact this program by allowing for inclusion of wild Coho Salmon in the hatchery broodstock, thereby increasing its genetic similarity to wild coho.

(4) Species that could be positively impacted by program:
Trask Hatchery-origin Coho Salmon carcasses are used in stream enrichment programs. The nutrients provided by these carcasses should benefit salmonid and non-salmonid fishes in the streams where the carcasses are placed. This may be an especially important source of stream nutrients given the current low levels of naturally spawning salmon.

General Information

Several factors indicate current ecological impacts from Trask Hatchery coho should be substantially reduced from historic levels. Fry and fingerling releases of hatchery coho into the Tillamook Bay system were eliminated after 1988. The Trask Hatchery and STEP hatchbox fry releases were discontinued after 1991. There had been a STEP hatchbox program of 30,000 unfed fry for Daley Lake (direct ocean tributary south of Nestucca Bay) until the program was eliminated after 1999 releases. Surplus swim-up and unfed fry are released in Cape Meares Lake where there are no impacts to coho. The current number of smolts released is about 8 percent of the historic level (100,000 versus 1.2 million). Trask Hatchery is located fairly low in the Trask Basin and hatchery coho smolts are only released onsite; therefore, spatial overlap is limited to the freshwater and estuarine migration corridor (approximately 18 river miles) and the ocean. There appears

to be minimal overlap in smolt migration timing between Trask Hatchery coho and Little North Fork Wilson wild coho (Solazzi et al. 2000). Fork length of wild coho smolts is measured at the Little North Fork Wilson River trap (Solazzi et al. 2000). Average fork length of wild coho smolts was smaller than that of hatchery smolts, 107 millimeter (mm) versus150 mm in 1998; 112 mm versus 160 mm in 1999, and 109 mm versus 160 mm in 2000.

It is reasonable to assume that smolt size and timing in the Trask is similar to data collected from the Wilson. The substantially larger size of hatchery smolts creates a potential for negative impacts to wild coho smolts through competition. However, this larger size is important for promoting vigorous smolting so that the hatchery fish will promptly leave the river. Because the larger size appears to contribute to limiting the temporal overlap, the disadvantages that might exist are considered less disadvantageous due to slower migration/residualism. Finally, the fish health monitoring and treatment plan (see Attachment A) for this program documents the minimization of potential disease and ecological interactions.

Habitat Above Trapping Facilities

Aquatic inventory of habitat above the trap weir on Gold Creek was completed in 1993; however, it should be noted that several major flood events have occurred in subsequent years and the data presented may have changed substantially.

Gold Creek is a third-order stream. The area surveyed above the weir was approximately 5,245 meters with an overall gradient of 9.8 percent. The large wood debris condition score is low at 1.4 on a scale of 1 – 5 with 1 being woody debris absent or in very low abundance; and 5 being woody debris providing excellent persistent and complex habitat (Moore et al. 1997). The habitat is dominated by cascades and rapids over boulders. Overall stream complexity is low, with a minor amount of secondary channels present (OFIC /ODFW, 1993).

The North Fork of Gold Creek is a second-order stream. The area surveyed was approximately 5,504 meters with an overall gradient of 10.0 percent. The large-wood debris condition score is considered low to moderate at 1.8 (Moore et al. 1997). Pools were present in approximately 30 percent of the first 1,000+ meters; however, the habitat overall was dominated by cascades and rapids over boulders. Stream complexity is low with a minor amount of secondary channels present (OFIC/ODFW, 1993). This system was known to have a number of debris torrents associated with the 1996 flood event.

Resident cutthroat trout are present in both systems. No fish pass, or are being passed, above the trap weir at this time. These systems provide Trask Hatchery's main source of rearing water.

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.

NOTE: Adult Coho Salmon are trapped and spawned at Trask Hatchery. Approximately 135,000 fingerlings of stock-34 Coho Salmon are transferred to Nehalem hatchery for rearing and 100,000 smolts are returned to Trask Hatchery for acclimation and release in the Trask River. References to Nehalem Hatchery in this document pertain to the period of rearing these fish at that facility.

Trask Hatchery: Adult Coho Salmon (stock-34) are trapped and held at the Trask River Hatchery in a pond supplied with gravity flow water from Gold Creek. From the green-egg stage to ponding fry stage (in incubator trays and starter tanks) the water source is Gold Creek and Mary's Creek which is relatively pathogen free. Water temperature is only manipulated, if necessary, during the egg and fry incubation stages, by the use of immersion heaters placed into incubator trays. Water temperature during incubation ranges from 41 to 55º F.

During the juvenile stage, all fish are reared in water supplied from Gold Creek or Mary's Creek. Water availability varies from 1,796 to 2,245 gallons per minute (gpm) with a total water right of 10 cubic feet per second (cfs) for the two streams. Water temperatures during the rearing stage range from 38 to 65º F.

Trask Hatchery has applied for a water right transfer of 9.0 cfs from the Trask River (pumping station point of diversion) to the Gold Creek intake point of diversion water right. Trask River water usually contains various disease pathogens which adversely impacts fish rearing, additionally the pumping station intakes silt in during high water events and often became inoperable.

The facility is in compliance with the water rights, water withdrawals, and annual water uses reporting to Oregon Water Resource Department.

Nehalem Hatchery: Approximately 135,000 fingerling of stock-34 Coho Salmon are transferred from Trask Hatchery to Nehalem Hatchery in mid March with a target to 100,000 smolts returned to Trask for acclimation and release in the Trask River. Rearing ponds at Nehalem Hatchery are supplied with North Fork Nehalem River water by pumping, with a hatchery water right of 21.3 cfs. The facility is in compliance with the water rights, water withdrawals, and annual water uses reporting to Oregon Water Resource Department.

Water temperatures are usually in the 40 to 50º F range during winter and 50 to 65º F range in summer. River water contains a variety of pathogens and becomes turbid several times per year. Water from the North Fork Nehalem River can be limited by low flows, usually from July through September.

Depoe Bay STEP: Eggs are incubated in streamside hatchboxs, then as fry moved to a net pen in the North Fork Depoe Bay Creek Reservoir and fed until marking. After marking they are released into the reservoir to rear naturally and volitionally out migrate. No water quality or temperature data is available for this site, but in general winter temperatures range in the mid 40 to low 50 degrees (F); and high 50's to mid 60 degrees (F) in the summer.

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

Trask River Hatchery currently operates and discharges effluent as per NPDES 300-J general permit as required by DEQ.

The risk of take at Trask Hatchery is minimal because listed fish are not currently present above the trap and intake facilities and Gold Creek water intake structures.

Nehalem Hatchery also operates and discharges effluents as per NPDES 300-J permit as required by the DEQ. The hatchery is in compliance with the requirements of the permit. The hatchery takes quarterly samples during the months of heaviest production of settleable solids (SS) and total suspended solids (TSS), both during normal operations and during cleaning operations. Individual samples evenly spread over the day are taken and combined to form a composite. Contents from the composite are used to measure SS and TSS. Nehalem Hatchery does not have the pollution abatement/settling pond, however, the hatchery is able to meet the effluent qualities as required by the NPDES permit.

Intake screening for the main hatchery water supply from the North Fork Nehalem River at Nehalem Hatchery currently does not comply with NOAA criteria. This problem has been identified through the ODFW Fish Screening and Passage Program. To date, no funding is available to modify the facilities to meet NOAA standards. Long term plans include upgrading the screens when funding has been secured. Intake screening on the spring water source used for incubation does not meet NOAA criteria either, however, there are no fish present in the spring system.

Depoe Bay STEP: The hatchboxes are screened. The rearing reservoir (municipal water reservoir) has a screened intake and a screened overflow. The outflow screen is removed during the smolt out migration period. No naturally produced coho are present in the Depoe Bay basin, and do not appear to have been present historically.

SECTION 5
FACILITIES

5.1) Broodstock collection facilities (or methods).

Trask River hatchery-origin Coho Salmon adults are collected primarily in the Gold Creek trap (T-9) located at RM 0.209 at Trask Hatchery; they may also be trapped in the main Trask River trap (T-3) in low water periods. Both traps also have holding pens associated with them for a total capacity of approximately 2,750 fish. In years with normal water flows Coho Salmon are trapped in the Gold Creek trap (T-9). Once fish enter the trap, they are manually sorted and held in the collection facility until spawning. Unmarked coho (not retained for brood) that enter the Gold Creek trap are hauled in a portable tank back to the mainstem Trask and released. Unmarked wild Coho Salmon that are not retained for broodstock (trapped in the T-3 trap) are released directly back into the Trask River.

Wild Coho Salmon broodstock may be captured at the Tuffy Creek facility fish ladder/trap located at RM 1.5 on South Fork Wilson River, after approval of the proposed wild fish incorporation into broodstock (see Sction 6.2.3). Brood fish are held in fiberglass circular tanks until being transported to Trask Hatchery.

Broodstock may also be collected at other remote trap sites with the Tillamook Bay basin yet to be determined. Or, wild broodstock may be collected by hook and line (angling) or via nets (seine, tangle, or dip nets as determined by site conditions).

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

Currently, Trask Hatchery utilizes 3 separate types of fish transportation equipment available for the transportation of juveniles and adult fish. Individual needs at the time of transport dictate the equipment used.

1. A typical fish liberation unit of a cab-over flatbed truck with a 1,000-2,000 gallon fiberglass tank. The unit has a 12-inch outlet for releasing adults if needed. It also is equipped with recirculation pumps and an oxygen injection system, which utilizes carbon stones. The governing factors that determine the loading densities are: water temperature in the truck, water temperatures at the receiving water body, duration of transit, and size and species of fish to be hauled.
2. A portable fish liberation unit, which consist of a 300-gallon slip tank that fits onto the bed of a pickup truck. The portable liberation unit is equipped with an electric aeration system and an oxygen injection system. The governing factors determining loading densities are the same as identified for the 1,000-gallon liberation unit.

3. A 3,000-gallon tractor-trailer unit which consists of a Ford L-9000 tractor and a stainless steel tank on a fifth-wheel trailer. The tank trailer is equipped with electric aerators for circulation. In addition, there is bottled oxygen with carbon stones for oxygen replenishment

Wild Coho Salmon broodstock collected by angling, would be held in an aerated live box or large cooler and transported to the hatchery (or other collection site to be determined), or transferred to a portable tank. Wild Coho Salmon collected at alternative sites or by net would be hauled to the hatchery in a portable liberation tank.

STEP volunteers use the hatchbox tray from their facility and cover the eyed-eggs with wet burlap to transport eggs from the hatchery to their hatchbox. Swim-up fry are transferred from the hatchbox to the next pen by bucket (approximately 200 feet).

5.3) Broodstock holding and spawning facilities.

There are two separate adult trapping and holding facilities: one on Trask River (T-3) and one on Gold Creek (T-9), with a total capacity of approximately 2,750 fish.

The T-3 trap and holding pond is located at the lower section of the hatchery grounds and can be utilized to trap the coho adults which swim in directly from the Trask River. T-3 holding pond measures 37 feet by 20 feet by 4.4 feet. The gravity flow water supplying the pond comes from Ponds 1 and 2 discharge through underground pipeline. The T-3 trap is a "voluntary" swim-in type trap.

The T-9 trap and holding pond are the primary Coho Salmon trapping and holding facilities and are located in the upper area of the hatchery grounds and is utilized to trap the Coho Salmon adults swimming up Gold Creek from the Trask River. The T-9 holding pond measures 45 feet by 30 feet by 3.3 feet. The gravity flow water supplying the pond comes from Gold Creek. The water passing through the raceway ponds and Pond 10 (as well as water from an underground pipeline also supplying the raceway ponds) supplies T-9 holding pond. The T-9 trap is associated with a barrier weir to direct fish into the trap.

Both trap facilities have a covered/protected spawning shed structure where spawning apparatus is stored and spawning activities are conducted.

Wild Coho Salmon may also be held for spawning in one of several Canadian style troughs housed within an outbuilding on the hatchery grounds. See section 5.5 for further detail.

5.4) Incubation facilities.

The incubation room is located within the hatchery building and measures approximately 17 feet by 38 feet. Incubation is in 480 vertical incubator trays with a total capacity to hatching of approximately 2.6 million eggs. Water for incubation is gravity flow from the distribution pond through a pipeline to headboxes supplying the incubator trays. Water comes from both Gold Creek and Mary's Creek. Water is discharged from the incubation room through a pipeline to the Trask River. A low-water alarm system is in

place to detect interruption of water flow to the incubator trays. Water temperature may be manipulated by heating or chilling during the egg to fry incubation stage. Two Canadian tanks in the hatchery building and eight in the early rearing building are utilized for early rearing at fry ponding time.

5.5) Rearing facilities.

Initial rearing takes place at Trask Hatchery until fish reach approximately 350 - 400 fish/ lb and are then transferred to Nehalem Hatchery.

Trask Hatchery

There are ten 16-foot Canadian tanks, two in the hatch house and eight in the early rearing building used as starter tanks. The raceways are all concrete and are essentially in two groups. Two "lower" ponds (100 feet by 30 feet; water depth 3.5 feet) are adjacent to Trask River and can receive water from Gold Creek or Trask River if pumping station is working. The upper section of the hatchery has two large shallow ponds (48 feet by 50 feet; water depth, 1.5 feet) and (30 feet by 135 feet; water depth, 2.3 feet) and 8 ponds (50 feet by 8 feet; water depth, 2.7 feet). Any combination of these ponds may be used to rear Coho Salmon depending on flow and other production needs at the time.

Nehalem Hatchery

There are 20 concrete raceways (3,825 ft^3), each with a capacity of 5,000 pounds of fish. All raceways are in-ground and measure 75 ft long, 17 ft wide, and 4 ft deep, with a typical water depth of 3 ft. The raceways are modified Burrows ponds. As such they have a solid center wall down the length of the pond, except for 8 ft at the head and tail ends of the pond. Thus, each pond can be divided lengthwise into 2 raceways by blocking the openings at the head and tail ends of the pond. Trask Hatchery stock-34 Coho Salmon production is contained in 2 raceways (50,000 fish per raceway). At the target size of 15 fish per pound, there are about 3,300 pounds of fish in each raceway (about 67% of maximum capacity).

5.6) Acclimation/release facilities.

Smolts are returned to Trask Hatchery approximately 2-4 weeks before scheduled release. They are held in trap ponds fed by Gold Creek water and are volitionally released to Trask River from the hatchery pond. On occasion, when river flows are high and water backs up into the lower trap site, smolts are direct released to the Trask River.

Depoe Bay STEP does not use an acclimation facility as such but after marking the fish rear naturally in a reservoir situation and out migrate volitionally.

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

Operational difficulties have and could again occur during the rearing of juveniles at Nehalem Hatchery rearing ponds through the winter months. Rearing ponds containing these juveniles will fill with a considerable amount of silt and debris during high-stream flow events. Historical events of this nature have not caused significant fish mortality.

Disease history is presented in Attachment A, but there have been no significant losses attributed to disease outbreaks.

Depoe Bay STEP has had one event that led to significant fish mortality. In 2000, fry were reared in a circular tank to marking size. The tank was destroyed by a bear and resulted in an estimated 11,000 fish loss. Beginning in 2001, fry were transferred from hatchboxes directly to a net pen in the reservoir and reared to marking size. After marking they are released into the reservoir.

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.

Trask River Hatchery is staffed full time with at least one person; personnel are available 24 hours per day, 7 days per week. The facility is equipped with a low-water alarm system to help prevent catastrophic fish loss resulting from water system failure.

The Nehalem Hatchery is staffed full-time, 24 hours per day. Alarm systems are in place to warn employees of low water, plugged intakes, and other problems. Employees work schedules are adjusted as conditions warrant (i.e. during large storm events) to maintain hatchery operations. A backup generator is available to supply power for the pumps that supply water to the hatchery in the event of a power outage.

Depoe Bay STEP: Not applicable as no listed fish are present in the basin, and the bulk of the rearing is naturally occurring in the reservoir.

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.

This program currently uses one broodstock, originally derived from Trask River wild coho beginning in 1906. Records indicate that out-of-basin stock eggs were present at the facility but it is unclear if all were returned and released to basins of origin, other basins, or released in Trask River. Out-of-basin stocks originated primarily from the Nestucca and Nehalem River systems.

A new Tillamook Bay basin broodstock is proposed to be developed in this HGMP to replace the long-term broodstock currently used. If approved by NOAA, wild Coho Salmon would be collected from the Tillamook Bay basin population.

6.2) Supporting information.

6.2.1) History.

Trask Hatchery began operation near its current location in 1906 and was relocated to its present location in 1914. Two primary methods were used to collect broodstock from 1906 to 1961; sometimes both were used together. Originally, a rack was placed across the river to trap fish. Later, seining was also used to collect broodstock. In 1961, a trap was installed in the ladder structure present in the intake structure on Gold Creek (Trap T-9). Beginning in 1961, with a new adult holding pen, fish were trapped (directly from the river) at the (upper) Gold Creek pond, or the lower pond (spring Chinook Salmon trap, T-3). Since that time, egg takes were restricted to adults trapped at those facilities. Historical operation of the program may have changed spawn timing of those fish used for broodstock. Typically, fish were spawned until production numbers were met. This may have resulted in incomplete representation of the entire return/spawning timing with late-returning fish not incorporated into the brood. The East Fork Trask pond was used for rearing from 1969 to 1994. Budget reductions resulted in downsizing the Trask Hatchery Coho Salmon program. The program production level is now set at 100,000 smolts which maintains adequate broodstock returns.

The proposed use of wild Coho Salmon in the broodstock would be a new component of this program. No wild fish have been incorporated in the broodstock since mass marked hatchery adults began returning.

6.2.2) Annual size.

Current production of hatchery Coho Salmon smolts requires a broodstock of 150 fish (75 male, 75 female) to meet genetic and timing guidelines for a production goal of 100,000 smolts and provide eggs to the Depoe Bay STEP program.

Use of wild Coho Salmon adults for brood stock, if approved by NOAA, would require a maximum of 110 adults (55 males and 55 females). See section 6.2.3 below for details of wild fish incorporation.

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

Wild Coho Salmon have not been intentionally included in the coho stock-34 since 1996, the first year of mass marked adult returns to Trask. Prior to mass marking, any wild Coho Salmon that entered the hatchery could not have been distinguished from hatchery fish and could have been included in the broodstock. Any unmarked fish trapped (if not retained for brood) are transferred down to the Trask River and released (if numbers are small). Larger numbers of trapped wild fish are hauled upstream and released into the Trask River.

ODFW is proposing to utilize wild Coho Salmon as broodstock for this program as part of this HGMP. The intent of using wild brood is to replace the current long term hatchery stocks, which appear to not be contributing to harvest fisheries at a satisfactory rate.

ODFW proposes to establish a new broodstock derived from wild Coho Salmon by using 100% wild brood in three consecutive years. A maximum of 110 fish (55 males and 55 females) would be taken for broodstock. Wild brood would be collected from the natural population in any given year under the following conditions:

1. Wild adults removed from the population for brood will not exceed 2% of the pre-season escapement forecast to the basin, up to the proposed maximum of 110 fish.
2. No wild adults will be used for brood if the pre-season run forecast (a 3 year average basin proportion applied to the total OCN ocean forecast) to the Tillamook Bay basin is less than 2,500 fish.
3. For run forecasts from 2,500- 5,500 wild coho, no more than 2% of the forecasted run would be collected for brood.
4. For run forecasts greater than 5,500 wild coho, up to 110 fish would be collected for brood. This would represent less than 2% of the predicted escapement.
5. Once a new broodstock is established for each brood year cycle, wild coho adults will be integrated into the hatchery broodstock (subject to 1 and 2 above) at a rate consistent with Hatchery Scientific Review Group guidelines, ODFW staff recommendations, or other available information. This could include periodically using 100% wild Coho Salmon for broodstock.

In the event that insufficient adults are captured during the initial years of establishing the new wild broodstock, the hatchery program will operate in one of the following ways:

a. The program will utilize only the wild brood collected, which may result in releases less than the 100,000 smolt target; or

b. Stock-34 hatchery adults will be utilized to make up the difference such that the 100,000 smolts production target is reached. If this approach is taken, smolts will be differentially marked for stock identification. Maintaining a full production release is the preferred alternative in the event of a wild brood shortage.

The new wild-origin broodstock would be considered established once each of the three brood year cycles have used 100% wild fish. As stated above, the goal is to establish the new brood over three consecutive years. If not completed in consecutive years due to low abundance, low brood collection, or other factors, ODFW would continue to attempt to achieve this goal until a wild broodstock is established in each of the three brood year cycles.

6.2.4) Genetic or ecological differences.

The broodstock used in this program is essentially locally founded. However, the current hatchery coho stock is assumed to have diverged—to some unknown extent—from Trask Basin wild Coho Salmon populations. Historical trends indicate spawning timing of Tillamook Basin coho has changed over the last 40 years. Based on spawning surveys, most Tillamook Bay coho spawned during December in the 1950s to 1960s. During the early 1990s the majority of spawning occurred during November (Tillamook Bay Coho Stock Status Report 1995). Future incorporation of wild fish in the hatchery broodstock may help to reduce differences between the hatchery and wild fish. Because of the assumed differences between the hatchery and wild coho stocks, risks to wild coho may occur if the hatchery fish stray extensively. Therefore, the intent of this program is to keep the hatchery and wild populations isolated by limiting hatchery coho strays in wild Coho Salmon spawning areas.

Wild Coho Salmon used for broodstock, if approved, would be assumed to represent the natural population, and thus should not have any ecological or genetic differences. Hatchery rearing and subsequent use of returning hatchery fish may result in some divergence from the natural population over time. Hatchery fish from wild broodstock would be managed as described for the current stock-34 program. The intent of the program is to produce fish for harvest, and minimize straying to natural spawning areas.

6.2.5) Reasons for choosing.

Trask River stock-34 Coho Salmon was not chosen for any special traits or characteristics other than it was the stock indigenous to Trask Basin. Currently, this program is managed as a hatchery broodstock isolated from the wild Coho Salmon populations in the Tillamook Bay basin.

The wild-origin Coho Salmon broodstock would be expected to produce a better return to the fishery than the current long term hatchery stocks. Wild brood hatchery adults spawning naturally may pose less risk to the natural population.

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 following measures will be used to minimize adverse genetic or ecological effects to Trask Basin listed natural Coho Salmon.

Broodstock selection for the stock-34 Coho Salmon program should have minimal impact to naturally produced Coho Salmon. No naturally-produced Coho Salmon are used in the ongoing stock-34 hatchery program. Naturally produced Coho Salmon may be trapped during broodstock collection. Unmarked wild Coho Salmon trapped (and not retained for brood) are released into the Trask River to spawn naturally.

Wild broodstock will be collected randomly from the population once the HGMP is approved by NOAA. Brood collection will occur under certain circumstance (see section 6.2.3) that will reduce impacts to the wild population.

SECTION 7

BROODSTOCK COLLECTION

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

Adult Coho Salmon and jacks will be collected for this broodstock to meet the objective of 100,000 smolts and to meet genetic guidelines.

Wild-origin Coho Salmon adults will be collected as outlined in section 6.2.3 if approved by NOAA.

7.2) Collection or sampling design.

Hatchery-origin Coho Salmon adults for broodstock are captured at Trask River Hatchery upon swimming into either of the two fish ladder/trap facilities which are known to catch all sizes of fish that encompass the entire coho size and age distribution. Therefore, the trap is not considered to be selective for coho run-timing, adult size, or age. Adult collection in T-3, Trask River fish ladder/trap is incidental to spring Chinook trapping, and begins in late August. Trapping continues until early October to collect hatchery spring Chinook and remove them from the natural spawning population. Any un-marked coho trapped are immediately released back into the Trask River (unless held for brood). Any finmarked coho may be recycled, released back into the Trask River, or donated to a food bank program. Typically coho broodstock trapped at this time are not held due to space and flow limitations.

Adult collection in the T-9 trap will normally begin in late September to early October, depending on water flows, and continue throughout the month of November or until no other adults return for capture. During operation each trap is checked daily. The fish are sorted and removed from the trap as necessary in order to keep up with the arrival of fish and as pond space dictates. The frequency the trap checking may vary depending on run time and adult fish return numbers. The facility manager and crew determine the frequency that the trap is run dependent upon these conditions and numbers of fish in trap. Any unmarked coho not retained for brood are transported a short distance back to the Trask River and released or hauled upstream depending on numbers. Fish for broodstock will be selected at random from fish collected, will be collected from throughout the run, and will neither favor nor discard potential broodstock according to any characteristic observed.

Wild adults collected for brood will be captured at the hatchery trap, from the Tuffy Creek trap, at other remote trap sites (to be determined), via hook and line (angling), and/or by net (seine, tangle, or dip net as determined by site conditions).

7.3) Identity.

Hatchery-origin fish will be identified based on the absence of an adipose fin or an implanted coded wire tag. Currently Trask stock-34 fish are additionally marked with a

right maxillary clip to prevent inadvertent use as brood at Nehalem Hatchery in the event some stray back to that facility. These marks may be changes in the future.

Unmarked (non-fin-clipped) adults will be considered wild.

7.4) Proposed number to be collected:

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

The program currently utilizes a minimum of 75 males (including jacks) and 75 females for broodstock to meet production goals and genetic guidelines. Additional adults may be collected as necessary to cover shortages resulting from, but not limited to, fecundity variation, early egg mortality, positive disease test, etc. Adults are spawned throughout the entire run to maintain genetic diversity within the population. However, sufficient numbers of fish may be spawned during the early portion of the run to ensure that production goals will be met and for genetic purposes. Once spawning is complete, surplus eggs are culled randomly (except that a higher proportion of eggs may be culled from early groups if additional eggs were taken to ensure meeting production goals) across egg take groups and destroyed (see Section 9.1.2).

Wild coho broodstock, if approved, would utilize up to 110 fish (55 males and 55 females). See section 6.2.3 for further description of brood collection conditions.

7.4.2) Broodstock collection levels for the last twelve years (e.g. 1990-99), or for the most recent years available:

Table 7-1 below shows the number of coho spawned, the number of eggs collected, and the number of fry ponded for brood years 1988 through 2006.

Table 7-1. Broodstock collection and egg production levels of the past.

Brood Year	Adults			Total	
	Females	Males	Jacks	Eggs	Fry Ponded
1988	725	Unknown		2,122,000	1,353,000
1989	747	Unknown		1,977,000	1,414,000
1990	686	Unknown		1,835,000	1,341,000
1991	520	Unknown		1,349,000	1,195,000
1992	717	Unknown		1,488,000	1,229,000
1993	500	502		1,346,000	223,000 [1]
1994	100	99		284,000	209,000
1995	103	106		320,000	205,000
1996	97	94		295,000	218,000
1997	118	118		324,000	195,000
1998	117	117		303,000	211,000
1999	115	115		371,000	232,000
2000	1,917	2,187	5,930	310,036	243,666
2001	6,420	5,666	842	330,388	192,415
2002	4,290	7,959	1,951	227,154	149,300[2]
2003	1,999	2,719	156	241,620	160,000[2]
2004	841	1,226	82	266,614	160,000[2]
2005	630	917	160	259,348	219,193
2006	676	843	12	311,956	162,321

Source: ODFW Hatchery Management System (HMS) database.

1. Approximately 500K eggs sold, and 500K eggs destroyed, to meet reduced program production as a result of budget reductions.

2. Eyed eggs transferred to Nehalem Hatchery.

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

Currently all marked hatchery-origin Coho Salmon that are trapped are killed and used either for donation to food banks, used in stream enrichment, or buried in a landfill.

Any wild Coho Salmon collected that are surplus to broodstock needs would be released alive back to the river basin.

7.6) Fish transportation and holding methods.

Coho captured at Trask River Hatchery in trap T-3 during the month of September are the early-returning jacks and a few adult Coho Salmon captured during trapping of spring Chinook Salmon adults. The trap is checked daily and run as necessary. Any Coho Salmon captured with adipose fin intact are immediately released alive back into the

Trask River immediately adjacent to the trap. The hatchery coho trapped may be transported to a holding pond at Trask River Hatchery but is dependent on flow and space limitations.

During the months of October and November, Coho Salmon adults and jacks are typically captured in the Gold Creek trap (T-9). Adipose marked fish are inventoried then either held for broodstock or disposed of as surplus fish. Any unmarked coho captured (and not retained for brood) are released live back to the mainstem Trask River, or transported upstream and released depending on numbers and river flows. The transport time ranges from a matter of minutes up to an hour (if trucked upstream) and is done without use of any anesthetics, salves, or antibiotics.

Wild broodstock would be transported and held as described in sections 5.2 and 5.3.

7.7) Describe fish health maintenance and sanitation procedures applied.

See Attachment A.

7.8) Disposition of carcasses.

Fish in excess of what is needed for broodstock are donated to charity food banks if in suitable condition for consumption. Those fish not suitable for donation to food banks, are used for stream nutrient enrichment, or are otherwise disposed of. All hatchery coho carcasses used for stream enrichment in spawning survey streams are marked to prevent confusion with carcasses from naturally-spawned fish. ODFW has developed specific criteria and guidelines for operation of the stream enrichment program. All trap and pond mortalities are transported to a landfill for disposal or buried

Wild coho broodstock used for this program would be kill-spawned. Carcasses would be used for stream enrichment, taken to a landfill, or buried. Any wild broodstock surplus to production needs would be released alive back to the river basin.

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 following measures will be used to minimize adverse genetic or ecological effects to Tillamook Basin wild Coho Salmon.

- Coho (stock-34) will be managed as hatchery broodstock isolated from wild coho populations in the Tillamook Basin. Only returning hatchery fish will be included in the broodstock.
- Wild fish identified during sorting operations at Trask Hatchery trap will be released alive unless retained for brood. The hatchery trap will be visually checked at least daily and fish sorted at least weekly, or as needed, to minimize delay and potential harm to wild fish.
- No transfers are permitted from any other hatchery coho broodstock into stock-34.

- Only hatchery-origin Coho of stock-34, or any new broodstock derived from Tillamook Bay basin wild coho populations will be released in the Trask Basin.
- Wild broodstock will be collected as outlined in Section 6.2.3.
- Disease monitoring plans will be implemented. See Attachment A for details.
- To safeguard against catastrophic loss of broodstock additional adults are retained (up to the proposed maximum collection number for wild coho).

SECTION 8

MATING

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

8.1) Selection method.

Only marked hatchery fish are retained for broodstock. Adult Coho Salmon used for spawning are selected based on maturity/ripeness and on a random basis. Depending on river flows and entry timing, a portion of fish arriving each week, usually beginning around the first week in October extending through mid-November are held in the adult holding pond pen for broodstock. At least once week, beginning with the maturity of the first coho adults, fish are sorted from the brood pen for that particular week's egg take/spawning. Holding (for brood) a portion of fish arriving each week ensures that we have representation of the entire run. There will be a minimum of three egg-takes (early-run, mid-run, and late-run) to approximate the overall run timing of returning adults.

8.2) Males.

Males are generally only used once during spawning. If necessary, in the case of a shortage of males, individual fish may be spawned more than once, or additional males may be used. Up to 5 percent jacks may be included during spawning.

8.3) Fertilization.

A 1:1 male to female sex ratio will be maintained throughout spawning practices. Spawning is typically conducted using a matrix format (5x5, 10x10, etc.). This process provides increased family groups for the relatively small numbers of fish spawned to maintain genetic fitness. Matrix size is determined by physical capability of the hatchery, as well as the number of fish to be spawned on a given date. All females are bled prior to spawning.

Ovarian samples are taken from up to 60 females and visceral (kidney, spleen) samples are collected from up to 60 fish (either sex) for viral analysis. Fertilized eggs are water-hardened in an iodine solution prior to placement in incubators. Eggs that test positive for disease may be kept or destroyed, at the direction of ODFW fish health staff. Fish health and sanitation procedures are described in Attachment A.

8.4) Cryopreserved gametes.

Cryopreservation of gametes is not 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 following measures will be used to minimize adverse genetic or ecological effects to Trask Basin wild Coho Salmon.

- Hatchery or wild adults are spawned as outlined in this HGMP
- When possible, there will be a minimum of three egg-takes to include early-run, mid-run, and late-run fish in the broodstock.
- An equal number of females and males will be spawned each year (50:50 sex ratio) if possible.
- Each fish will be paired with a single other individual, or the hatchery may choose to use an even sex ration, matrix spawning scenario (2 by 2, 3 by 3, etc.).
- Males are generally only used once during spawning. If necessary, in the case of a shortage of males, individual fish may be spawned more than once, or additional males may be used.

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. Green Eggs Taken (1988-2007).

Brood Year	Green Egg Take	Percent Survival to Fry
1988-89	2,122,000	88.4%
1989-90	1,997,306	91.7%
1990-91	1,834,648	92.6%
1991-92	1,348,794	90.7%
1992-93	1,911,443	91.5%
1993-94	1,345,900	93.0%
1994-95	284,247	91.5%
1995-96	320,497	86.4%
1996-97	294,646	94.1%
1997-98	323,965	85.4%
1998-99	303,173	85.8%
1999-00	370,518	92.2%
2000-01	330,388	58.0% [1]
2001-02	227,154	80.5%
2002-03	241,620	82.9%
2003-04	266,614	82.9%
2004-05	259,348	84.5%
2005-06	311,956	89.2%
2006-07	226,913	89.4%

Data Source: ODFW HMS database and Trask Hatchery files

1. Egg treatment was changed from formalin to hydrogen peroxide resulting in significant egg loss. Subsequent years' treatments returned to a highly controlled use of formalin.

9.1.2) Cause for and disposition of surplus egg takes.

Extra eggs are collected to meet genetic guidelines for broodstock size, to account for typical losses during rearing, and to safeguard against catastrophic loss. Culling of excess production will occur at either the eyed-egg or at the time of fin marking. Culling of eggs will be done in such a way to reduce each family to an equal size (except that a

higher proportion of eggs may be culled from early groups if additional eggs were taken to ensure meeting production goals). All other culling will be done at random with an equal probability of affecting any family. Excess eggs will be destroyed. Excess fingerling may be released into standing waters where they will have low potential for contact with wild coho, or they will be destroyed.

9.1.3) Loading densities applied during incubation.

Coho egg size averages about 91 eggs per ounce. The standard loading density per tray from green to eyed stage is 5,000 to 7,000 eggs per unit. When eggs eye-up they are shocked, picked, inventoried, and densities are reduced to 4,000 to 5,000 eggs per unit depending on space available. The number of trays utilized per stack will vary from 1 to 15 depending on the isolation of family groups, heated versus ambient water, etc.

9.1.4) Incubation conditions.

Water to the incubator trays is monitored for temperature with the use of a seven-day thermograph. Use of spring water helps to control disease and siltation. The water temperature for eggs and fry in incubator trays ranges from 41º to 55ºF. Water temperature is manipulated with the use of immersion heaters placed in selected incubator tray stacks. Dissolved oxygen levels are not routinely measured.

9.1.5) Ponding.

Fry are ponded depending upon their development to button-up stage. The fry are removed from the incubator trays and placed into shallow baskets in the working troughs were the egg and fry mortalities are removed, then the fry are placed into the one of the Canadian tanks or appropriate rearing ponds. The fry are given approximately 24 to 36 hours to swim up before the first feedings begin. Several random samples are taken to determine the average fish per pound size at ponding. The average accumulated temperature units for ponding is approximately 1,350. The average fry size at ponding is approximately 950 to 1,050 fish per pound. If fry are ponded outside they are poured from working trough baskets into a transport tank filled with water. The tank is delivered to the starter pond with a motorized cart and the fry are flushed out of the tank and into the pond.

Depoe Bay STEP: Fish are initially ponded into a net pen in the reservoir and fed until reaching a size suitable for fin clipping. After clipping they are returned to the reservoir to complete rearing naturally. At the time of release after clipping the average length is 66mm.

9.1.6) Fish health maintenance and monitoring.

See Attachment A.

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 following measures will be used to minimize adverse genetic or ecological effects to Trask Basin wild Coho Salmon:

- A disease monitoring plan, as detailed in Attachment A, will be implemented.
- As possible, incubation units are supplied with spring water to control disease and siltation.
- Surplus eggs will be culled across family groups to maintain the genetic diversity expressed in all hatchery adults spawned.
- The number of eggs retained for production will be based on meeting the smolt release goal, assuming average egg to smolt survival.
- No intentional selective activities will be allowed; unintentional selection will be avoided as much as possible.

To safeguard against catastrophic egg or juvenile mortality, and to maintain diversity in the hatchery brood, excess eggs will be collected. Excess brood will be culled across family groups as indicated above at either the eyed-egg or fry stage.

9.2) Rearing:

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

Data of Trask Hatchery coho in-hatchery survival rates for brood years 1995 through 2006 are presented in Table 9-2.

Table 9-2. Stock-34 Coho Salmon fry survival rates.

Brood Year	Fry Ponded	Percent survival to transfer [1]	Fish Transferred	Percent Survival to release [2]
1995	205,000			70.7
1996	218,000			97.5
1997	195,000			96.8
1998	211,000			93.3
1999	232,000			83.8
2000	243,666			82.8
2001	192,415	99.9	109,057	98.1
2002	149,300[3]	99.7	125,308	95.9
2003	160,000[3]	99.9	145,163	95.9
2004	160,000[3]	99.9	137,664	90.2
2005	219,193	99.3	140,040	96.6
2006	162,321	93.8	136,591	98.0

Data Source: ODFW HMS database; Nehalem Hatchery files, Trask hatchery files

1. Includes fry released in standing water or destroyed

2. Includes any mortality on transfer back to Trask and acclimation before release at Trask since 2001.

3. Eyed eggs transferred directly to Nehalem Hatchery for incubation and rearing.

Depoe Bay STEP only has survival figures for egg to release into the reservoir (after fin marking). Since 2001 the mean survival for egg to reservoir release is 94.6%. Because this program completes rearing in a natural environment and uses a volitional release no further survival figures are available.

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

Loading density in rearing ponds does not exceed 1.0 pound of fish per cubic foot water (rearing space). Actual density level at smolt release time is 2.2 pounds of fish per cubic foot water. This loading density only occurs at Trask Hatchery during the 2-4 week acclimation period and is closely monitored by hatchery personnel.

The expected loading criterion is no more than 10 pounds of fish per gpm. Actual loading level is approximately 3.3 pounds of fish per gpm during acclimation.

Fingerlings are transferred from Trask Hatchery to Nehalem Hatchery in early March at about 400 fish per pound and are reared for approximately one year and then transferred

back to Trask Hatchery in mid-March to April where the fish are acclimated (except in years of high flows) prior to being volitionally released into the Trask River.

Depoe Bay STEP: No loading or density data is available because rearing is done in a natural environment and subject to daily, monthly, and annual weather variations. In general it appears loading densities are reasonable for the reservoir environment with no obvious signs of significant stress or mortality noted.

9.2.3) Fish rearing conditions.

Trask Hatchery coho are reared at Nehalem Hatchery using river water. Rearing water temperatures vary with seasons and with natural fluctuations. Water temperatures range approximately from 45º to 65ºF during spring and summer and from 36º to 45ºF during the fall and winter. Dissolved oxygen (DO) levels coming into the facility are typically between 10.0 ppm and 11.0 ppm in the fall and winter. However, in the summer, DO levels can be as low as 7.0 ppm. Re-circulation of effluent water through the ponds is possible in extreme drought conditions.

Monitoring of the pond conditions is done daily at feeding time. While feeding fish, personnel are observing for signs of stress, disease, water clarity, and general fish behavior. Pond mortality is picked and recorded daily. During late summer and early fall, the fish are closely monitored by ODFW fish health staff for external parasites. Water quality is monitored under the prescribed 300J general NPDES permit as required by the DEQ (see Section 4).

Depoe Bay STEP fish rear naturally in the North Fork Depoe Bay Creek Reservoir after being marked.

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.

- Fish size (fish per pound) is sampled bimonthly; data is reported on ODFW's Hatchery Management System (HMS) database and Monthly Ponded Fish Reports. See Table 9-3 for average monthly fish growth data from 1993 to 1999.
- Fish feed schedules are programmed based upon fish size data collected.
- Fork length (mm) frequency sampling is done just before smolt release (see Table 9-4).

Table 9-3. Average Monthly Fish Size.

Month	Size (fish / pound) [2]
January [1]	900
February [1]	543
March	218
April	140
May	87
June	66
July	45
August	35
September	26
October	22
November	21
December	19
January	16.9
February	15.7
March [1]	14

Data Source: HIMS, Hatchery files

1. Fish at Trask Hatchery, all other figures represent rearing taking place at Nehalem Hatchery.

2. Average end of month size

Depoe Bay STEP: No monthly data is collected.

Table 9-4. Average fork length frequency data of smolts at release (BY 2006).

Fork Length Size Range	Average Percentages at Release
< 13 cm.	8.35%
13 – 15 cm.	76.3%
> 15 cm.	15.35%

Data Source: ODFW HMS database and hatchery records.

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

Fish growth rate shows the fish roughly double in weight each month from January through May. Growth then begins slowing and by the time of marking (September/October) their feed is programmed to ensure that the fish do not exceed pond density limitations and are on target to meet production size goals.

Length frequency information is only collected at the time of release, energy reserve, and individual fish condition factor data are not collected. Average fork length of wild coho smolts (Little North Fork Wilson River trap site) is smaller than that of hatchery smolts (107 mm versus 150 mm in 1998, 112 mm versus 160 mm in 1999, and 109 versus 160 mm in 2000 (Solazzi et al. 2000).

Depoe Bay STEP: No monthly data is collected.

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).

The fish are started on feed by feeding once an hour 8 times per day. The amount fed is determined on a demand basis. When the fish reach the size of about 200 fish/lb the diet is changed to a more bulky dry diet. The dry diet is fed daily during the summer, and then intermittently as needed to maintain the fish growth through the winter. Feeding rates are programmed, and adjusted monthly, to achieve the desired target size at release and may vary with brand and type of feed used. Current target release size is 15 fish/lb (30 gm/fish). Historic feeding level, projected growth rates, anticipated food conversions, and feed manufactures recommendations, along with experience, are all used as tools to program and adjust feeding rates. Annual food conversion rates range from 1.0 to 1.2 on the dry diet.

Depoe Bay STEP: No feeding data is available.

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

Fish health of rearing juvenile Coho Salmon is monitored regularly by Nehalem or Trask Hatchery staff and ODFW fish health staff. ODFW fish health staff diagnose disease problems and prescribe the appropriate treatments to eliminate or control disease.

See Attachment A for description of treatments.

Tools and equipment used for coho rearing are not routinely disinfected (other than allowing to air dry). During the Coho Salmon spawning season, some fall Chinook Salmon do enter the trap at times. These Chinook may be released back into Gold Creek or held for brood depending on numbers and available holding space. The spawning facilities are not routinely disinfected during the spawning season.

If it becomes necessary, iodine antiseptic is used to sanitize hatchery equipment and prevent the incidence or spread of disease.

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

Weight samples of the fish are taken monthly to ensure proper growth rate (Table 9-3). Prior to release, length frequencies are taken (Table 9-4) and recorded. A visual mark quality check is completed on a representative sample (minimum 200 fish) of the fish targeted for release. No gill ATPase activity is measured.

No length frequency data is available for the Depoe Bay STEP project but limited sampling of smolts showed an average fork length of 102 mm.

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

No "natural" rearing methods are applied in this program, however smolts are returned to Trask Hatchery 2-4 weeks before scheduled release. Smolts are allowed to volitionally leave ponds and after approximately 2 weeks the remainders are forced out.

The Depoe Bay STEP project is predominantly a natural rearing project. Juvenile fish are held in net pens and fed until they attain marking size. Once marked, they are returned to the reservoir to rear and out migrate naturally.

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

Not applicable; no listed fish are under propagation.

However, the following measures will be used to minimize adverse genetic or ecological effects to Tillamook Basin wild Coho Salmon.

- A disease monitoring plan will be implemented (Attachment A).
- Culling of excess fingerlings will be done at random across family groups.
- Any excess fingerlings may be released into areas where they will have low potential for contact with wild coho (standing water bodies) or fingerlings may also be destroyed.
- No intentional selective activities will be allowed, and unintentional selection will be avoided as much as possible.
- To safe guard against catastrophic egg or juvenile mortality excess egg takes will occur; the excesses will be culled across family groups as indicated above, at either the eyed egg or fry stage.
- Depoe Bay basin does not have wild coho populations.

SECTION 10

RELEASE

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

10.1) Proposed fish levels.

Table 10-1. Proposed Fish Levels.

Age Class	Maximum Number	Size (fpp)	Release Date [2]	Location
Eggs	None			
Unfed Fry [1]	Surplus, varies	varies		Standing waters or destroy
Fry [1]	Surplus, varies	varies		Standing waters or destroy
Fingerling [1]	Surplus, varies	100 to 140	May to June	Standing waters or destroy
Yearling	100,000	15	March/April	Trask River @ hatchery
Yearling (STEP)	20,000	15	March & April (volitional release)	NF Depoe Creek

Data source: ODFW HMS database, hatchery files

1. This program does not produce fingerlings for release as a program goal for stock-34 coho. In any given year there may be surplus fry or fingerlings (typically from above average fry and fingerling survival). These will be released to standing water bodies or destroyed.

2. Period listed will be annually for releases

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

Stream, river, or watercourse:

Stream, river, or watercourse: Trask River
Release point: Trask Hatchery, RM 9.75
Major watershed: Trask River
Basin or Region: Tillamook Bay Basin

Stream, river, or watercourse: NF Depoe Creek
Release point: NF Depoe Creek reservoir
Major watershed: NF Depoe Creek
Basin or Region: Depoe Bay Basin

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

Table 10-2 shows the actual releases for the Trask Hatchery coho program from 1990 through 2007.

Depoe Bay STEP: Due to volitional release strategy no actual release numbers are available. Number presented in Table 10-3 reflect the number of fingerling released in the reservoir at the time of fin clipping to rear naturally and would represent the maximum number of potential smolts.

Table 10-2. Number and size of fish at release, 1990-2007 (size is expressed as number of fish/lb).

Release Year	Eggs/ Unfed Fry	Avg Size	Fry	Avg Size	Fingerling	Avg Size	Yearling	Avg Size
1990							1,011,339	10.7
1991							1,066,566	11.5
1992							1,037,941	10.2
1993							1,091,351	9.8
1994							1,251,713	10.2
1995							216,801	10.2
1996							201,098	10.1
1997							144,533	9.6
1998							212,525	10.0
1999							189,230	9.0
2000							196,385	9.5
2001							194,634	8.90
2002							201,749	9.69
2003							97,555	13.23
2004							100,382	14.37
2005							102,669	12.80
2006 [1]	43,722	777	33 K	389			93,582	14.74
2007 [1]			15 K	407			102,656	14.47
2008							102,939	15.30
2009							99,263	13.94
2010							93,793	14.94
2011							96,582	14.55
2012							99,472	15.79
2013							104,235	14.42
2014							100,167	15.00
2015							103,208	14.80

Data source: ODFW HMS database, District files

1. All fry released to standing waters

Table 10-3. Data of fish releases from Depoe Bay STEP[1]

Year	Eggs To hatchbox	Number Fin-clipped
2000		8,400 [2]
2001		19,725
2002		17,467
2003		19,745
2004		19,520
2005	Unk [3]	Unk
2006		18,069
2007		19,695
2008		0
2009		0
2010		12,000
2011		12,000
2012		12,000
2013		15,000
2014		12,000
2015		0

Data Source: ODFW HMS database, District files

1. Fingerling are fin-clipped and released into reservoir to rear naturally. Smolt out migrant numbers are not available

2. Swim-up fish were held in circular tank prior to marking. Bear predation destroyed tank resulting an approximate 11 K loss. Since 2001 fry have been held in a net pen in the reservoir prior to marking.

3. STEP position was vacant, no data available.

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

Coho Salmon smolts will be volitionally released at Trask Hatchery, with any remaining fish crowded out after the majority have left. Occasionally, due to high river levels, fish may be direct released to the Trask River at the hatchery. Releases will begin in March or April, which slightly precede the majority of the wild coho migration (Solazzi et al. 2000). See Table 10-4 below for fish release dates and numbers. Beginning in 2009 the program has been planned for a single volitional release group.

Table 10-4. Actual release dates of Trask Hatchery Coho Salmon Smolts, 1998-2015.

Release Year	Date Ranges	Release Number
1998	Apr. 14	212,525
1999	Apr. 16	189,230
2000	Apr. 13	196,385
2001	Apr. 12	194,634
2002	Apr. 15	201,749
2003	Mar. 13	48,981
	Apr. 11	48,374
2004	Mar. 15	51,959
	Apr. 12	48,423
2005	Mar. 1	51,293
	Apr. 4	51,376
2006	Mar. 13	44,771
	Apr. 7	48,811
2007	Mar. 9	51,395
	Apr. 7	51,261
2008	Apr. 7	102,939
2009	Apr. 3 - 6	99,263
2010	Mar. 29 - 31	93,793
2011	Apr. 2 - 5	96,582
2012	Apr. 11	99,472
2013	Mar. 20	104,235
2014	Mar. 21-28	100,167
2015	Mar.12	51,519
	Mar. 24	51,689
2015	Mar. 10	88,090

Data source: ODFW's Hatchery Management Information System (HMIS) database.

Depoe Bay STEP fish volitionally out-migrate from the NF reservoir. It is assumed the majority will migrate out during March and April, but timing may vary annually depending on water flows, temperatures, etc.

10.4) Fish transportation procedures, if applicable.

Fish are transported from Nehalem Hatchery to Trask Hatchery in large liberation trucks for acclimation/releases. Any releases of excess fingerlings are transported in an ODFW

fish liberation truck, or portable tank (see Section 5.2) using standard procedures. Transport time from Nehalem Hatchery to Trask Hatchery is about one hour, and transport time to local standing waters is approximately one-half hour.

10.5) Acclimation procedures.

All Coho Salmon smolts are transported from Nehalem hatchery back to Trask Hatchery for release. I n most years, fish are placed in the lower trap/holding area and allowed to volitionally exit the pond. Once the majority has left, the remaining fish may be crowded out of the pond. On occasion, in years of high river flows, smolts may be direct released into the Trask River at the hatchery. Fingerlings will be released directly into lakes or other closed water bodies.

Depoe Bay STEP fish are naturally reared in a reservoir and are allowed to volitionally out-migrate.

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

Trask Hatchery coho smolt releases are mass marked with an adipose finclip prior to release. Beginning with the 2008 releases smolts will be adipose fin clipped and right maxillary clipped, but will not have any CWT's. Excess fingerlings are released unmarked into standing waters (or are destroyed). Mark quality is checked prior to release at least 1 month after marking.

Depoe Bay STEP fish are mass marked with adipose clip prior to being released into the NF reservoir to begin their natural rearing. Because of the natural rearing they are unable to be sampled for mark quality prior to out-migration.

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

There are no surplus fish at the time of release. Surplus eggs are destroyed at the eyed-egg stage. Surplus fingerlings are released or destroyed in the summer as determined by production inventory. Finally, at the time of mass marking (usually November) an actual hand count is obtained and any fish surplus to the release goal (plus anticipated mortality) are released, unmarked, in standing water bodies or destroyed. Smolt releases have generally been within programmed and approved levels.

10.8) Fish health certification procedures applied pre-release.

See Attachment A.

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

The goal is that juvenile coho juveniles will not be released as a response to emergency conditions. However, an emergency release may be necessary, but may only occur after:

- The hatchery crew has exhausted all possibilities for retaining the fish.
- The hatchery crew has consulted with the ODFW District Fish Biologist.
- The release will be into the Trask River or into a closed water body.

10.10) 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.

The following measures will be used to minimize adverse genetic or ecological effects to Trask Basin wild Coho Salmon.

- All release activities will occur at Trask Hatchery.
- All hatchery coho smolts released in the Trask Basin will be marked.
- All hatchery smolts will be released at the hatchery, which is also the collection location for returning adult hatchery fish that are used in the broodstock.
- The only release strategy for coho of stock-34 will be as acclimated (or on occasion direct released) smolts at the hatchery location (Trask River, at RM ~9.75).
- Any excess fingerlings for this program may be released into closed water bodies; or they will be destroyed.
- Releases will occur at an average size of about 14 fish per pound, about 16 cm fork length.
- Smolts will be released in March or April.
- Depoe Bay basin does not have wild coho populations.

SECTION 11

MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

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

Information for Tillamook Basin wild Coho Salmon, spawner abundance, proportion of hatchery strays, and smolt size and emigration timing will be obtained from the *Oregon Plan for Salmon and Watersheds* (OPSW) monitoring projects: Salmonid Life-Cycle Monitoring project (Solazzi et al. 2000) and Coastal Salmonid Inventory project (Jacobs et al. 2000). Information on the ocean catch of Trask Hatchery-origin Coho Salmon and incidental harvest impacts to wild coho is obtained from the coastwide ocean salmon fishery sampling program and is compiled and analyzed by the Pacific Fishery Management Council (PFMC 2000).

Existing staff, funds, and resources are available to conduct the following monitoring and evaluation activities. These activities will directly measure performance standards and indicators previously described in Sections 1.9 and 1.10. Information of catch of hatchery coho is compiled from returned salmon/steelhead tags, and is available from Fish Division in the Salem office of ODFW. Specific economic data for sport caught fish is not routinely developed for all stocks. Economic data that is compiled is available in the Salem Headquarters Office. New performance standards (and subsequent M&E) may be prescribed in the future as implementation of the Coastal Coho Conservation Plan progresses. Monitoring of naturally spawning salmon and steelhead has increased coast-wide in recent years. Additional information regarding the number of naturally spawning coho of hatchery origin may become available in the future.

Monitoring of in-hatchery performance and adult returns to Trask Hatchery will be conducted by the hatchery crew. This information is stored on the ODFW mainframe computer in the Hatchery Management System (HMS) database. This will include at least the following information:

Adults

- The number of females, males, and jacks collected at Trask Hatchery (Standards 2.1 and 3.3).
- Number of unmarked winter steelhead, unmarked Coho Salmon, fall Chinook Salmon, Chum Salmon, and Cutthroat Trout handled and released from Trask Hatchery (Standard 4.5).
- Any observed mortalities of unmarked winter steelhead, unmarked Coho Salmon, fall Chinook Salmon, Chum Salmon, and Cutthroat Trout handled at Trask Hatchery (Standard 4.5).
- Date of entry into the Trask Hatchery trap, specified by hatchery and naturally produced fish (Standard 2.1).

- Date of entry into the Trask Hatchery trap for fish retained for broodstock (Standard 2.1).
- Dates of spawning at Trask Hatchery (Standard 2.1).
- The number of males, jacks, and females spawned (Standard 3.3).
- Fecundity of females spawned (Standard 2.1).
- Disposition (spawned, sold, stream enrichment, etc.) of all hatchery coho collected (Standard 4.4).

Juvenile Rearing

- Monthly number of eggs/fish on hand, mortality, feeding rate, and growth (Standard 4.1).
- Results of fish health checks and any incidence of disease occurrence (Standard 4.1).
- Results of water quality sampling (Standard 4.2).

Release

- Number of fish released, by mark type (Standard 1.2, 2.2).
- Fish age and size at release; average weight, and length frequency distribution (Standard 2.3).
- Location of releases (Standards 2.2 and 2.3).
- Date releases started and ended (Standard 2.2).

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

See Section 11.1.

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

Funding and staffing are available as part of normal hatchery operation for those activities associated with hatchery operations. However, as with all state and federal programs, budgets are approved by the Legislature, and no commitment of funds can be made past the approved budget period. Funds for various projects associated with this HGMP come from (or could come from) a variety of sources, possibly including license dollars, state general funds, and federal funding sources. Funds are committed for certain activities, but can change with relatively short notice. This could result in elimination or reduction in the hatchery program and associated monitoring and evaluation activities.

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.

Risk aversion measures for the salmonid life-cycle monitoring project and the coastal salmonid inventory project are included under the NMFS 4(d) rule as part of the OPSW Research and Monitoring Program. The in-hatchery monitoring program is not expected to increase risks to listed coho above those imposed by operation of the program. Thus, risk aversion measures for the monitoring program are the same as discussed under previous Sections in this document.

SECTION 12

RESEARCH

There are no research programs conducted in direct association with the Trask Hatchery coho program described in this HGMP. Therefore, the answer to all questions in Section 12 is not applicable.

SECTION 13

ATTACHMENTS AND CITATIONS

Citations

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Jacobs S., J. Firman, G. Susac, E. Brown, B, Riggers and K. Tempel. *Status of Oregon Coastal Stocks of Anadromous Salmonids.* Monitoring Program Report Number OPSW-ODFW-2000-3, Oregon Department of Fish and Wildlife, Portland, Oregon. 2000.

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Tillamook System Coho Task Force. 1994. Tillamook Bay coho stock status report (third draft). Oregon Department of Fish and Wildlife, Portland, OR.

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: Chris Knutsen, North Coast Watershed District Manager, West Region, ODFW

Signature:_____Date:_____

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

Signature: _____Date:_____

Attachment A

This fish health monitoring plan is identical 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).

- All fish health monitoring will be conducted by a qualified fish health specialist.
- Annually examine brood stock for the presence of viral reportable pathogens. Number of individuals examined, usually 60 fish, will be great enough to assure a 95% chance of detection of a pathogen present in the population at the 5% level. American Fisheries Society "Fish Health Blue Book" procedures will be followed.
- Annually screen each salmon broodstock for the presence of *R. salmoninarum* (*R.s*). Methodology and effort will be at the discretion of the fish health specialist.
- 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.
- Fish culture practices will be reviewed as necessary with facility personnel. Where and when pertinent, nutrition, water flow and chemistry, loading and density indices, handling, disinfecting procedures, and treatments will be discussed.

Disease Treatment

Treatments for disease at Trask Hatchery include: green eggs are routinely water hardened in diluted buffered iodophor; formalin flush treatments of 1:600 formalin for 15 minutes given three to five times per week for fungi prevention on eggs; and juvenile fish are treated with formalin. Depending on species of fish, parasite treating and water temperature, formalin is used at 1:15,000 to 1:6,000 for one hour for three to five consecutive days. Winter steelhead fry are given salt and acetic acid dip treatments to control i*chthyobodo* infestations. Juvenile fish are treated for bacterial infections with oxytetracycline or Romet medicated feed according to label or under an Investigational New Animal Drug Permit (INAD). Each spring a 28-day feeding of Aquamycin (erythromycin) medicated feed is administered to the coho juveniles under an INAD to prevent bacterial kidney disease. Adult Wilson River steelhead are given oxytetracycline injections under a veterinary prescription to prevent furunculosis and 1:6,000 formalin treatments for three to seven days per week to prevent external fungi infections. At East Fork Trask Pond the spring Chinook juveniles are given potassium permanganate one hour baths at 1.0 parts per million (ppm) treatment on the first day and 1.25 ppm treatment on days 2 and 3 to control bacterial gill disease. No chemical treatments for pathogens have been necessary at Tuffy Creek Pond.

Table A-1. Disease History (1995 to Present) by Fish Species and Stock at Trask Hatchery, East Fork Trask Pond, and Tuffy Creek Pond.

Disease or Organism	34 Coho[b]	34 CHF[b]	34 CHW[b]	34 CHS[b]	121 StW[b]	34 CHS[c]	34 CHS[d]	121 StW[d]	47 StW[d]
IHN Virus	No	No	No	No	No	No	No	No	No
EIBS Virus	Yes	No	No	No	No	No	No	No	No
Coho Anemia Disease	Yes	No	No	No	No	No	No	No	No
Aeromonas salmonicida	No	No	No	No	Yes	No	No	No	No
Aeromonas/Pseudomonas	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Flavobacterium psychrophilum	Yes	Yes	Yes	No	Yes	No	No	No	No
Fl. columnare	No	No	No	No	No	No	No	No	No
Fl. branchiophilum	No	No	No	No	No	Yes	No	No	No
Fusiform gill disease bacterium	No	No	No	No	No	No	No	No	No
Renibacterium. salmoninarum	Yes	Yes	No	Yes	No	Yes	Yes	No	No
Yersinia ruckeri	No	No	No	No	No	No	No	No	No
Carnobacterium sp.	No	No	No	No	Yes	No	No	No	No
Ichthyobodo	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No
Gyrodactylus	No	No	No	No	Yes	No	No	Yes	Yes
Ichthyophthirius multifilis	No	Yes	No	Yes	No	Yes	Yes	No	No
Gill Ameba	Yes	No	No	No	No	Yes	No	No	No
Trichodinids	Yes	Yes	Yes	No	Yes	No	No	No	Yes
Loma sp	Yes	No	No	No	No	No	No	No	No
Nanophyetus salmincola	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coagulated Yolk Disease	Yes	Yes	Yes	Yes	Yes	No	No	No	No
External Fungi.	Yes	Yes	No	Yes	Yes	Yes	No	No	No
Internal Fungi	Yes	No	No	Yes	No	No	No	No	No
Unidentified Trematode Cysts	No	No	No	Yes	No	No	No	No	No

[a] "Yes" indicates detection of the pathogen but in many cases no disease or fish loss was associated with presence of the pathogen. "No" indicates the pathogen has not been detected in that stock.
[b] Stocks held at Trask Hatchery.
[c] Stocks held at East Fork Trask Pond.
[d] Stocks held at Tuffy Creek Pond.
CHF = Fall Chinook Salmon
CHW= Winter Chinook Salmon
CHS= Spring Chinook Salmon
STW = Winter Steelhead
Co=Coho Salmon Trout
Stock 34 =Trask River
Stock 121W = Wilson River
Stock 047= Nestucca River