HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

Hatchery Program:	**Trask Hatchery Fall Chinook Salmon Program**
Species or Hatchery Stock:	**Fall Chinook *Oncorhynchus tshawytscha* (Stock 34)**
Agency/Operator:	**Oregon Department of Fish and Wildlife**
Watershed and Region:	**North Coast Watershed District, West Region**
Date Submitted: First Update Submitted: Second Update Submitted: Third Update Submitted:	**November 14, 2005 August 4, 2008 October 30, 2014 July26, 2016**
Date Last Updated:	**July26, 2016**

SECTION 1

GENERAL PROGRAM DESCRIPTION

1.1) Name of hatchery or program.

Trask Hatchery Fall Chinook Salmon Program (stock 34) for release into the Trask and Necanicum rivers.

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

Fall Chinook Salmon *Oncorhynchus tshawytscha* (stock 34) will be propagated under this program. Trask River fall Chinook Salmon are part of the Oregon Coast Chinook Evolutionary Significant Unit (ESU), which was listed as Not Warranted under the Federal Endangered Species Act (ESA) on March 9, 1998 (Federal Register Notice 1998).

1.3) Responsible organization and individuals.

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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 is provided from the Oregon State funding sources.
- The annual budget for the fall Chinook Salmon program is presented in Table 1-1.

Table 1-1. Trask Hatchery Stock-34 Fall Chinook Salmon Annual Budget (FY *2015 budget is estimated with addition of new CMP production).*

Year	Total Budget	Stock-34 Fall Chinook Budget	Percent of Total	Stock-34 Fall Chinook Smolts Produced
2001	$210,778	$20,867	9.9%	103,750
2002	$230,085	$30,026	13.1%	123,139
2003	$268,689	$37,697	14.0%	132,943
2004	$235,158	$28,454	12.1%	118,310
2005	$255,245	$33,182	13.0%	122,816
2006	$256,914	$33,913	13.2%	119,892
2007	$287,599	$39,113	13.6%	113,604
2015 Est.	$370,421	$47,413	12.8%	175,000
Note: Information provided by ODFW Trask Hatchery				

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

Trask Hatchery is located 8 miles east of Tillamook, adjacent to the Trask River at about river mile (RM) 9.9. Elevation at the hatchery is 40 feet above sea level. Trask Hatchery has two satellite rearing ponds (East Fork Trask Pond [*i.e.* 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 (ODFW waterbody code 0100130000) 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. It is located 30 miles northeast of Tillamook, adjacent to the South Fork Wilson River at about RM 1.5. The South Fork Wilson River (ODFW waterbody code 0100125000) 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 fall Chinook program, but could be utilized if necessary.

Adult collection facilities: Adult fall Chinook Salmon are usually collected at the Trask Hatchery trap 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 are located approximately 1,100 feet from the confluence with the mainstem Trask River. During some low water years the Trask Hatchery trap located at RM 9.8 on the Trask River has been used to trap adult fall Chinook Salmon.

Spawning, egg incubation, and rearing facilities: Spawning, incubation and rearing activities occur at Trask River Hatchery. Approximately 80,000 eyed-eggs are transferred to STEP hatchbox facilities or are used in classroom incubators. Approximately 100,000 eyed-eggs are transferred to the Whiskey Creek STEP facility on

Netart's Bay for eventual release into the Wilson and Trask rivers as unfed fry. Approximately 100,000 eyed-eggs are transferred to the Miami Anglers STEP hatchbox program located on Minich Creek (Miami River tributary) for eventual release as unfed fry into the Miami and Kilchis rivers. Note: STEP hatchbox programs are being phased out over a 10 year period. Approximately 26,000 fingerlings are transferred from Trask Hatchery to North Fork Nehalem Hatchery for final rearing to smolt size. Approximately 25,000 smolts are eventually released into the Necanicum River (ODFW waterbody code 0100110000). Nehalem Hatchery is located in the North Fork Nehalem River watershed, approximately 12 miles east of the town of Nehalem on Highway 53. The hatchery facility is located on the North Fork Nehalem River at River Mile 10.3. The hatchery site is 26.2 acres in size, at an elevation of 141 feet above sea level. The North Fork Nehalem River is assigned ODFW waterbody code 0100310000. The regional mark processing code for Nehalem Hatchery is 5F22218-H18-21. Rearing to smolt size for the remaining 150,000 fish occurs at Trask Hatchery for eventual release into the Trask River.

Additional acclimation and adult recapture facilities may be developed elsewhere in the basin as needed in order to meet hatchery stray rate objectives identified in ODFW's Coastal Multi-Species Conservation and Management Plan (CMP).

1.6) Type of program.

Isolated Harvest Program for fall Chinook Salmon.

1.7) Purpose (Goal) of program.

The goal of this program is to provide hatchery fish for sport and commercial harvest in ocean and freshwater fisheries.

An additional purpose of this program is to provide educational learning opportunities to students and to encourage volunteer involvement from the public with natural resources through STEP activities. A portion of those activities includes the incubation of fall Chinook eggs and release of unfed fry. The primary purpose of the classroom incubator program, is to teach students about salmonid life history and their habitat requirements. Fry from classroom incubator programs are not marked. The STEP hatchbox program is allowed under Oregon Administrative Rules (OAR) and Oregon Revised Statutes (ORS). This component of the STEP program will be reviewed and evaluated during development of Native Fish Conservation Policy (NFCP) conservation plans.

1.8) Justification for the program.

This program is designed to support consumptive recreational and commercial fisheries in the ocean and local freshwater areas. The program releases full-term ocean-type smolts into the Trask and Necanicum rivers. Approximately 30,000 of the smolts released into the Trask River are currently fin-marked and coded-wire tagged. The remainder of the smolts are marked with an adipose fin clip. The local freshwater fisheries take place primarily in Tillamook Bay, Trask River and the Necanicum River. Stray fish from Trask River releases may be taken in the Miami, Kilchis, Wilson and

Tillamook Rivers, but catch in these areas likely make up a small percentage of the total annual reported recreational catch.

This program releases sub-yearling (ocean-type) smolts to stimulate rapid migration to the ocean. This strategy is intended to minimize residualism and ecological interactions with wild juvenile fall Chinook Salmon and other juvenile wild fish, including Federal ESA-listed (*Threatened*) Coho Salmon. Standard fish health inspections are done for both adult and juvenile fall Chinook Salmon in this program to minimize potential disease concerns.

Up to approximately 280,000 unfed fry are released annually as part of the STEP program (hatchboxes and classroom incubators). The classroom incubator program, when used, is to teach students about salmonid life history and their habitat requirements. Fry from classroom incubator programs are not marked. The STEP hatchbox program is allowed under STEP OAR's (Oregon Administrative Rules) and ORS's (Oregon Revised Statutes). Fry from the hatchbox program are also not marked. STEP hatchbox operations are to be phased out over a ten year period as part of ODFW's Coastal Multi-Species Conservation and Management Plan (adopted in 2014). Classroom incubators will still be utilized for educational opportunities.

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

Harvest

Standard 1.1: Provide adult hatchery fall Chinook Salmon for harvest. **(Benefit)**

Indicator: Number of Trask Hatchery stock 34 fall Chinook Salmon caught and number of angler days generated associated with this program. **(Benefit)**

Indicator: Estimated number or rate of wild coho and wild fall Chinook Salmon caught and released. **(Risk)**

Standard 1.2: Trask Hatchery stock 34 juvenile fall Chinook Salmon will be externally marked. **(Benefit)**

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

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

Life History Characteristics

Standard 2.1: Fall Chinook Salmon broodstock will be collected in a manner that approximates the distribution in timing, age, & size of fish returning to Trask Hatchery. However, jacks will typically make up no more than 5 percent of males spawned. **(Benefit)**

Indicator: Temporal distribution of Trask Hatchery adult fall Chinook Salmon returns and adults collected for broodstock. **(Benefit)**

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

Indicator: Size distribution of Trask Hatchery adult fall Chinook returns and broodstock spawned. **(Benefit)**

Standard 2.2: Stock 34 fall Chinook broodstock will be managed to maintain genetic diversity within the population: A minimum goal of 127 pairs are matrix spawned each year with a goal of using a 1:1 male to female broodstock sex ratio. **(Benefit)**

Indicator: Number of hatchery or wild fish spawned each year, by gender. **(Benefit)**

Standard 2.3: Releases of stock 34 fall Chinook will minimize impacts to naturally produced salmonids through control of hatchery release numbers and timing by minimizing spatial and temporal overlap with natural populations. **(Risk)**

Indicator: Number of stock 34 fall Chinook released. **(Risk)**

Indicator: Dates of stock 34 fall Chinook releases. **(Risk)**

Indicator: Location of stock 34 fall Chinook smolt releases. **(Risk)**

Standard 2.4: All stock 34 fall Chinook smolts will be released as sub-yearlings. **(Risk - unknown)**

Indicator: Beginning and ending dates of stock 34 fall Chinook smolt releases. **(Risk - unknown)**

Indicator: Size and length frequency of stock 34 fall Chinook smolts released. **(Risk - unknown)**

Standard 2.5: Stock 34 fall Chinook fry and/or fingerlings in excess of production needs will be released at times and locations that reduce impacts to naturally rearing salmonids. Any surplus stock 34 fry or fingerlings may be released into standing water bodies, or they may be destroyed. **(Benefit)**

Indicator: Location, number, and timing of stock 34 fall Chinook fry and fingerling releases. **(Benefit)**

<u>Genetic and Ecological Characteristics</u>

Standard 3.1: The portion of naturally spawning hatchery fall chinook (pHOS) in the Tillamook Bay basin will be consistent with the goals specified in ODFW's Coastal Multi-Species Conservation and Management Plan. **(Benefit)**

Indicator: Estimated abundance of naturally produced fall Chinook Salmon spawning in the basin. **(Benefit)**

Indicator: Estimated abundance of naturally spawning fall Chinook Salmon in the basin that are of hatchery origin based on marks or tags. **(Benefit)**

Standard 3.2: Only adult fall Chinook Salmon returning to the Trask River will be used as broodstock. **(Risk - unknown)**

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

Standard 3.3: 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 Fish Hatchery Management Policy, Fish Health Management Policy, Integrated Hatchery Operations Team (IHOT) fish health document, or as directed by the ODFW staff. **(Benefit)**

Operation of Artificial Production Facilities

Standard 4.1: The Trask Hatchery stock 34 fall Chinook Salmon program will be operated in compliance with ODFW's Hatchery Management Policy, and the IHOT fish health guidelines (IHOT 1995). See Attachment A. **(Benefit)**

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

Standard 4.2: Trask Hatchery effluent will comply with prescribed 300J general NPDES permit as required by the Oregon Department of Environmental Quality (DEQ). **(Benefit)**

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

Indicator: Results within permit requirements. **(Benefit)**

Standard 4.3: Trask Hatchery and satellite facility water withdrawals will comply with National Oceanic and Atmospheric Administration (NOAA) Fisheries juvenile screening criteria. **(Benefit)**

Indicator: Screens inspected and are in compliance, or are brought into compliance. **(Benefit)**

Standard 4.4: Trask Hatchery stock 34 fall Chinook Salmon carcass placements for stream nutrient enrichment comply with ODFW established guidelines for loading densities. **(Benefit)**

Indicator: Number and location of fall Chinook Salmon 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 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 from the Trask Hatchery traps. **(Risk - unknown)**

Indicator: Number of unmarked adult steelhead, Chinook Salmon, Coho Salmon, Chum Salmon, and Cutthroat Trout mortalities at Trask Hatchery traps during operation of the hatchery adult trap. **(Risk)**

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

Standard 4.6: Releases of stock 34 fall Chinook smolts will limit predation impacts to naturally produced salmonids through control of hatchery release numbers and by minimizing spatial and temporal overlap of naturally produced salmonid juveniles. **(Risk - unknown)**

Indicator: Location of juvenile fall Chinook releases. **(Benefit)**

Indicator: Record of the beginning and ending dates of stock 34 hatchery fall Chinook releases. **(Risk - unknown)**

Indicator: Number of stock 34 hatchery fall Chinook released. **(Benefit)**

Standard 4.7: Releases of stock 34 fall Chinook will limit impacts to naturally produced juvenile salmonids through control of hatchery release numbers and by minimizing spatial and temporal overlap with naturally produced juvenile salmonids. Sub-yearling smolt releases will be in late summer. Any fry or fingerlings in excess of needs for smolt production may be released into standing bodies of water without natural coho production or may be destroyed. **(Benefit)**

Indicator: Location of juvenile fall Chinook releases. **(Benefit)**

Indicator: Record of the beginning and ending dates of stock 34 hatchery fall Chinook releases. **(Risk)**

Indicator: Number of stock 34 hatchery fall Chinook released. **(Benefit)**

Socio-Economic Effectiveness

Standard 5.1: Estimated harvest benefits will equal or exceed hatchery production costs for Trask Hatchery stock-34 fall Chinook, based on the benefit-cost model (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.

Production of the 2014 brood year Trask Hatchery stock 34 fall Chinook Salmon in the North Coast Watershed District includes approximately 150,000 smolts to the Trask River, 25,000 smolts to the Necanicum River, and approximately 280,000 unfed fry to the Salmon Trout Enhancement Program (STEP). The number of unfed will decrease over time (10 year period) as the STEP hatchbox program is phased out.

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

Proposed annual collection level for broodstock will typically be a minimum of 127 pairs; however, 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.

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

Table 1-2. Proposed Annual Fish Release Levels for Stock-34 Fall Chinook Salmon.

Life Stage	Release Location	Annual Release Level
Eyed Eggs	NA	NA
Unfed Fry	Standing waters; locations vary	Excess, Varies
STEP – unfed fry	Tillamook Bay Tributaries	~280,000 – STEP hatchboxes and classroom incubators[1]
Fry	NA	NA
Fingerling[2]	Standing waters; locations vary	Excess, Varies
Sub-Yearling Smolt	Trask River Basin	150,000
Sub-Yearling Smolt	Necanicum River Basin	25,000

Data source: District Files

[1] Represents current production. STEP hatchboxes are planned to be phased out over a ten year period

[2] This program does not produce fingerling for release as a program goal for stock-34. In any given year there may be surplus fingerling at the time of marking (typically resulting from above average fry and fingerling survival); stock-34 surplus fingerlings will be released in standing water bodies or destroyed.

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 fall Chinook Salmon production from the Trask Hatchery stock 34 fall Chinook program, for the period 1983-1998 are presented in Table 1-3. Coded-wire tagging (CWT) of the Necanicum River release of hatchery fall Chinook smolts began in the 1997 brood year. Thus, there are only two years of data presented for the Necanicum River portion of the program available during that time frame. Estimates of adults produced reflect program performance in relation to the harvest (ocean and freshwater) program goal. The estimated number of total adult hatchery fall Chinook produced was derived from a variety of data sources.

The "Ocean Commercial" and "Ocean Sport" columns were estimated by expansion of 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 only. Over the last 16 years of available data (1988 through 2003) Tillamook Basin fall Chinook catch, based on

punch cards, averaged 11,611 fish, and ranged from 3,226 to 18,901. However, punch card estimates of catch in the Tillamook Basin cannot be separated into hatchery and wild fish. Therefore, the "Freshwater Sport" column of Table 1-3 is not available. The "Hatchery Return" column depicts the actual count of adult fall Chinook returns at Trask Hatchery. The adult fall Chinook returns for each run year were allocated to brood years based on the age composition of hatchery recoveries of CWT fall and winter Chinook. While fall Chinook spawning ground surveys provide information on the occurrence of hatchery -produced fish on the spawning grounds, estimates are not available of the total number of hatchery fall Chinook that strayed to natural spawning areas in each basin. Therefore, the "Spawning Areas" column is not available. Smolt to adult survival is calculated as the sum of the prior 5 columns divided by the "Smolt Release" column. This is a minimum survival estimate as we do not have estimates of the number of hatchery fall Chinook Salmon caught in freshwater fisheries or straying to spawning areas.

Table 1-3. Estimated minimum total adult Trask Hatchery fall Chinook produced per brood year (taken from CWT expansions and hatchery data), 1983-1998.

Brood Year	Pre-Smolt Release	Smolt Release		Estimated Total Adult Hatchery Fall Chinook Produced					
		"Fall"	"Winter"	Ocean Comm.	Ocean Sport	Freshwater Sport[a]	Hatchery Return[b]	Spawning Areas	Smolt to Adult
Tillamook Basin Releases									
1983	331,467	143,078	0	1,357	58	n.a.	1,425	n.a.	0.60%
1984	317,338	140,904	0	2,192	162	n.a.	2,083	n.a.	0.97%
1985	348,145	99,994	0	1,289	167	n.a.	1,836	n.a.	0.73%
1986	224,506	135,663	13,194	745	89	n.a.	484	n.a.	0.35%
1987	354,998	90,989	47,969	1,609	45	n.a.	1,172	n.a.	0.57%
1988	213,182	81,994	5,808	1,316	79	n.a.	662	n.a.	0.68%
1989	58,822	156,411	0	369	0	n.a.	90	n.a.	0.21%
1990	56,519	117,981	43,512	564	124	n.a.	240	n.a.	0.43%
1991	49,664	159,576	46,617	293	32	n.a.	327	n.a.	0.25%
1992	62,626	115,367	51,877	668	82	n.a.	775	n.a.	0.66%
1993	0	61,072	47,598	254	7	n.a.	223	n.a.	0.45%
1994	0	58,217	50,383	259	28	n.a.	206	n.a.	0.45%
1995	0	82,655	35,719	186	45	n.a.	347	n.a.	0.49%
1996	0	66,986	49,100	106	15	n.a.	276	n.a.	0.34%
1997	0	53,296	49,381	432	133	n.a.	370	n.a.	0.91%
1998	0	85,133	19,279	311	30	n.a.	520	n.a.	0.82%
Necanicum River Releases									
1997	0	27,900	0	123	16	n.a.	n.a.	n.a.	0.50%
1998	0	26,995	0	132	6	n.a.	n.a.	n.a.	0.51%

Source: ODFW catch cards and HMS database.

[a] Tillamook Basin Catch, based on punch card returns, cannot be separated into hatchery and wild fish.

[b] Used age composition from hatchery CWT recoveries to assign age to Trask Hatchery returns.

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

Available reports (Wallis, 1963) indicate that egg take of fall Chinook 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.

1.14) Expected duration of program.

The Trask Hatchery stock 34 fall Chinook Salmon program is ongoing and is expected to continue.

1.15) Watersheds targeted by program.

Trask River, a tributary of Tillamook Bay; and Necanicum Rivers, a tributary of the Necanicum/Neawanna Estuary.

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.

- Hatchery/Wild Composition – Marking all Trask River and Necanicum River releases with an adipose fin clip (and/or CWT) allows for a reliable estimation of hatchery versus naturally-produced fish on the spawning grounds (where surveyed). Mass marking began in 2008, and all age classes are now represented by marked hatchery fish. To date low numbers of hatchery fall Chinook Salmon have been observed on spawning grounds.
- Necanicum Out-of Basin Stocking – The practice of stocking Trask Hatchery fall Chinook Salmon in the Necanicum basin needs further evaluation to ensure that Necanicum wild stocks are not adversely affected.
- Fall Chinook Salmon Unfed Fry Releases – Releases of large numbers of unfed fry into Tillamook Bay Basin streams is considered a risk, albeit at an unknown level, to naturally produced fall Chinook populations. Under the recently adopted Coastal Multi-Species Conservation and Management Plan, unfed fry releases from STEP hatchbox programs will be phased out over the next 10 years.

1.16.2) Potential alternatives to the current program.

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

Alternative 1: Reduce program size.

Description and Implications: This alternative would reduce the number of fish released. The reduction in program size could reduce the budget at Trask and Nehalem Hatchery and allow savings to be used elsewhere for other programs. Lower release numbers

would reduce potential impacts of hatchery fall Chinook Salmon on wild populations and could increase wild productivity. This alternative could decrease the number of fall Chinook Salmon available for harvest in the Trask River, Necanicum River, and Tillamook Bay. This could disenfranchise local and out of area volunteers and anglers.

Alternative 2: Elimination of the Trask River and Necanicum River fall Chinook Salmon hatchery program.

Description and Implications: This alternative would eliminate all fall Chinook Salmon production at Trask Hatchery. Loss of the program would reduce the budget at Trask and Nehalem Hatchery and allow savings to be used elsewhere for other programs. This alternative would eliminate potential impacts of hatchery fall Chinook Salmon on wild populations and could increase population productivity. Eliminating hatchery releases would decrease the number of fish available for harvest. This could disenfranchise local and out of area volunteers and anglers. Impacts to ocean sport and commercial fisheries are unknown.

Alternative 3: Elimination of either the Trask River or Necanicum River fall Chinook Salmon hatchery program.

Description and Implications: This alternative would eliminate hatchery fall Chinook Salmon releases in either the Trask River or Necanicum River. This would reduce the budget at Trask and Nehalem Hatchery and allow savings to be used elsewhere for other programs. This alternative would reduce potential impacts of hatchery fall Chinook on wild populations in one basin and could increase population productivity. Eliminating hatchery releases in one basin could decrease the number of fish available for harvest. This could disenfranchise local and out of area volunteers and anglers. Impacts to ocean sport and commercial fisheries are unknown.

Alternative 4: Increase Trask Hatchery fall Chinook Salmon program.

Description and Implications: This alternative would increase the size of the hatchery fall Chinook Salmon program at Trask Hatchery and increase releases into the Trask and/or Necanicum rivers. Increasing the program size could increase the number of fish available for harvest. This could enhance participation by some out of area volunteers and anglers. Increase in program size may increase the budget and workload at Trask Hatchery unless other programs were reduced. This alternative could increase potential adverse impacts of hatchery fall Chinook Salmon on wild populations and could decrease productivity. Note: this alternative is being implemented as part of this revised HGMP. It could still be considered an alternative to further increase the production of stock-34 fall Chinook Salmon.

1.16.3) Potential reforms and investments.

Alternative hatchery operations, facilities, and techniques in regard to conservation and restoration of wild fish populations, will be one of the areas of research questions at the Oregon Hatchery Research Center. In the future, the results of this and other research efforts, may lead to additional reforms and investments at Trask Hatchery and its satellite facilities, and STEP rearing facilities.

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 fall Chinook Salmon program was submitted to NMFS on 11/14/2005 for approval and ESA coverage. This is an updated version of the previously submitted HGMP and is consistent with the 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.

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

Oregon coastal Coho Salmon ESU is currently listed under the federal ESA as *Threatened*. The listed Coho Salmon also inhabit the Tillamook Bay and Necanicum River basins which may be incidentally and/or indirectly affected by the stock-34 fall Chinook Salmon hatchery program. The program has no intent to directly take any ESA-listed natural Coho Salmon.

Tillamook Complex

The Tillamook Complex consists of tributaries to Tillamook and Netarts Bays and one small direct ocean tributary to the north of Tillamook Bay where listed Coho Salmon inhabit (Nickelson 2001). There is an estimated 250 miles of spawning habitats available to the listed natural Coho Salmon within this Tillamook complex.

Necanicum Complex

The Necanicum Complex consists of the Necanicum River and a few small direct oceans tributaries to its south (Nickelson 20000, where listed natural Coho Salmon inhabit. There is an estimated 70 miles of spawning habitats available to listed natural Coho Salmon within 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.

- 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 the program fish and listed 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 spring fall Chinook 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.

Tillamook Complex

-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).

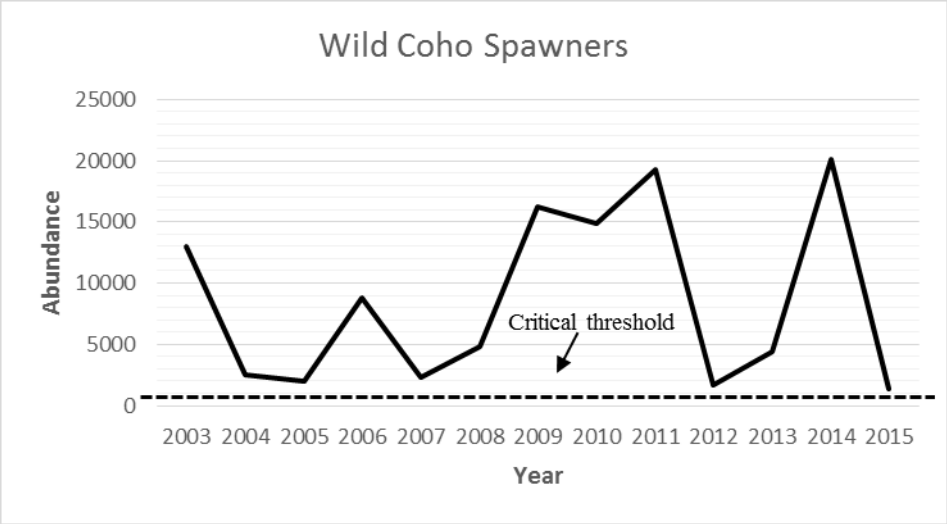

Figure 2-1. Trend in adult wild Coho Salmon spawner abundance relative to the critical population level for the Tillamook Complex, 2003-2015.

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).

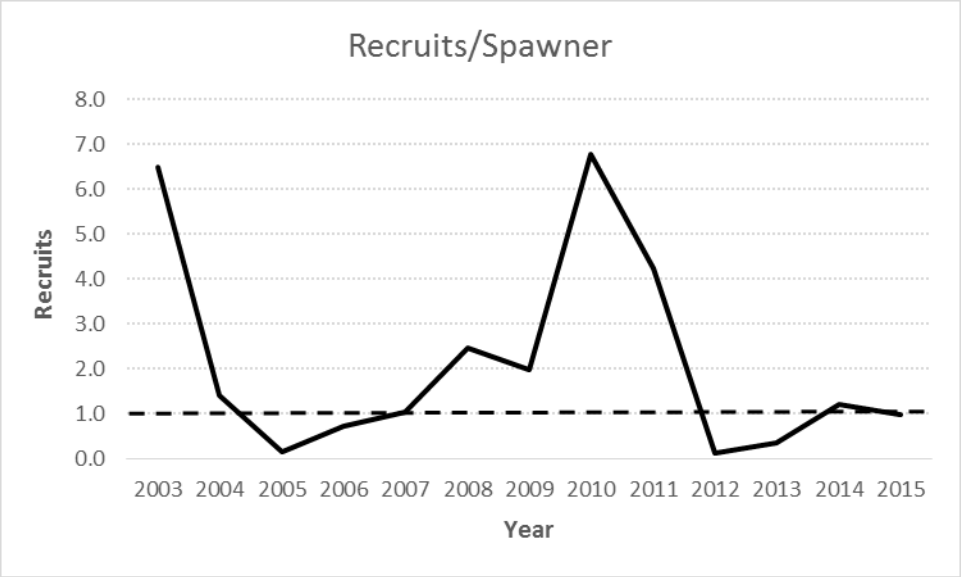

Figure 2-2. Trends in Recruits per Spawner for Tillamook Complex Wild Coho, 2003-2015.

- 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.

Necanicum Complex

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

The Necanicum Complex consists of coho salmon inhabiting the Necanicum River and a few small direct oceans tributaries to its south. There is an estimated 70 miles of spawning habitat available to the coho salmon of this complex. The critical population level for the Necanicum Complex is 300 adult spawners (Nickelson, 2001), and the spawner abundance was always above the critical threshols during 2003-2015.

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

The abundance of Coho Salmon spawners of the Necanicum Complex has ranged from about 400 to about 5,700 and has averaged about 2,050 since 2003 (Figure 2-1 and Table 2-2). Spawner abundance did not fall below the critical threshold of 300 fish during that period.

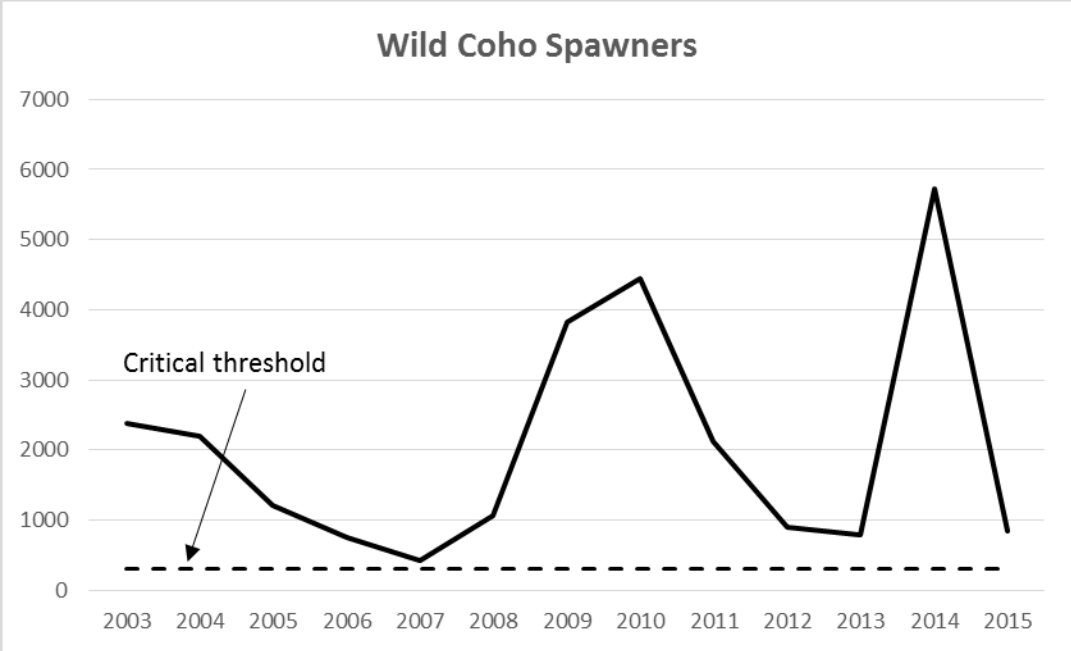

Figure 2-1. Trend in adult wild Coho Salmon spawner abundance relative to the critical population level for the Necanicum Complex, 2003-2015.

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

Year	Wild Spawners	Hatchery Spawners	Percent Hatchery Spawners	Pre-harvest Wild Population	Recruits Per Spawner
2003	2,377	158	6%	2,584	7.2
2004	2,198	141	6%	2,381	0.5
2005	1,218	34	3%	1,274	0.6
2006	750	93	11%	812	0.3
2007	431	33	7%	489	0.2
2008	1,055	128	11%	1,075	0.9
2009	3,827	42	1%	4,102	5.5
2010	4,445	0	0%	4,654	10.8
2011	2,120	39	2%	2,253	2.1
2012	902	0	0%	1,104	0.3
2013	798	0	0%	931	0.2
2014	5,727	98	2%	6,690	3.2
2015	847	0	0%	1,057	1.2
Avg.	**2053**	**59**	**3.7%**	**2,262**	**2.5**

Smolt production in Necanicum complex was estimated for the 1997 through 1999

broods. Estimated smolt abundance ranged from 15,000 to 55,000 for the Necanicum Complex (Table 2-3).

Table 2-3. Estimates of Abundance of Juvenile 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
Necanicum	0.316	0.206	0.045	0.015	1.183	0.769	0.232	0.055	0.885	0.575	0.113	0.031
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 in Necanicum complex have been highly variable, with seven of the last thirteen broods falling to one or below (Table 2-2 above and Figure 2-2 below).

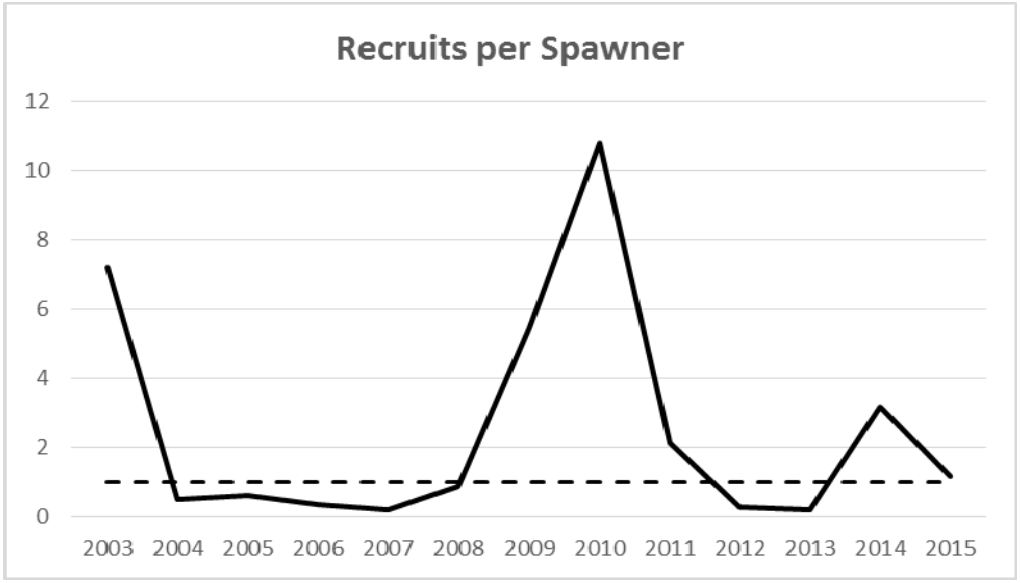

Figure 2-2. Trends in Recruits per Spawner for Necanicum Complex Wild Coho Salmon, 2003-2015.

- 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.

Hatchery fish have been observed on the spawning grounds. Hatchery spawners have comprised from 0-11% of observed spawners since 2003 (Table 2-2). 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 the Necanicum River.

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.

During fall Chinook Salmon brood collection wild Coho Salmon are captured and handled by hatchery personnel at the trap on the Trask River and occasionally at the trap on Gold Creek. Hatchery coho captured at these facilities may be used for hatchery broodstock (described in Trask Hatchery Stock-34 Coho HGMP) or as part of the stream enrichment program. Wild Coho Salmon encountered in the traps are immediately transported upstream (usually RM 14) on the Trask River and released. In 2007-08, 38 unmarked coho were handled at the Gold Creek trap.

- 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 are present in low numbers during trapping periods for fall Chinook Salmon, and therefore, impacts resulting from broodstock collection are expected to be minimal. Potential impacts have been listed above; however, there have been no observations or reports of any mortality or injury from those activities.

Table 2-4. Number of unmarked coho captured at Trask Hatchery (Gold Creek) and South Fork Wilson River (Tuffy Creek) facilities.

	Unmarked Adult Coho		Unmarked Jack Coho	
Return Year	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.

[a] 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.

Trapping of adult stock 34 fall Chinook Salmon occurs primarily at the adult trap at Trask Hatchery (Trap-9). If incidental handling of wild coho at Trask Hatchery or in any of its facilities is expected to exceed projections, trap facility handling procedures will be modified immediately. This may include, but is not limited to, review of procedures and operation, trap modifications, cessation of trapping, modified operation by hatchery personnel, improved training, etc.

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

Listed Species Affected:	**Coho Salmon**	**ESU/Population:**	**Oregon Coast Coho**	**Activity:**	**Trapping Stock-34 Fall Chinook Salmon**
Location of Hatchery Activity:	**Trask Hatchery and Tuffy Creek**	**Dates of Activity:**	**Oct 1 – Dec. 31**	**Hatchery Program Operator:**	**ODFW**

Type of Take	**Annual Take of Listed Fish By Life Stage *(Number of Fish)***			
	Egg/Fry	**Juvenile/ Smolt**	**Adult**	**Carcass**
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)		0-100	< 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.

Note: The take figures are not cumulative take at the facility but are total take for the indicated trapping period. Collection of fall Chinook Salmon broodstock may overlap with trapping of spring Chinook, coho and winter steelhead. The number of unmarked coho handled represents a season total during fall Chinook collection, and is not necessarily additive to numbers presented in other HGMP.

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), which was completed in 2014 and is described below
- **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 calls 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.

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 fall Chinook in the Tillamook Bay and Necanicum watersheds including nutrient enrichment, acclimation and other separations of hatchery and wild production, and monitoring of hatchery and wild runs.

NPDES Permit:
The Trask Hatchery (and satellite facilities where required) is operated under the NPDES 300-J general permit to maintain the environmental standards of hatchery effluent.

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 North Coast Watershed District Office, 4907 Third Street, Tillamook, OR 97141.

3.3) Relationship to harvest objectives.

The artificial production component of this project is designed to minimize biological impacts to listed species. Likewise, fish culture practices are designed and carried out to rear smolts to size and condition that limit impacts to naturally rearing coho.

Trask Hatchery fall Chinook Salmon are mass marked (100%) as a means of integration of hatchery and harvest management. Marking allows for better monitoring and control of impacts of the hatchery program to wild fall Chinook Salmon populations. Incidental take of wild Tillamook Basin Coho Salmon in harvests is limited by the ESA Section 4(d) rule. The 4(d) rule requires development of Fishery Management and Evaluation Plans (FMEP). Such plans have been developed and are guided by the Pacific Coast Salmon Plan, specifically Amendment 13 (Pacific Fisheries Management Council [PFMC] 1997). Under recent conditions of marine survival and abundance, the take is limited to approximately 10-30 percent of the total, pre-harvest Oregon Coast ESU wild coho abundance. Take could increase to 35% 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 for the period 1994 through 1999 averaged 9.2% and ranged from 6.8% to 12.4%. Year 2000 harvest impacts were estimated to be about 8%.

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

The fall Chinook freshwater and ocean sport, and ocean commercial Chinook fisheries will benefit from this program. See Table 1-3 for past harvest level data.

3.4) Relationship to habitat protection and recovery strategies.

This isolated harvest program is not directly related to habitat protection or recovery. It is designed to provide hatchery fall Chinook 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.

Major factors affecting natural production in the Trask and Necanicum rivers are largely unknown; however, it is assumed that ocean survival may be the largest contributing factor. Loss of available estuarine habitat is considered a contributing factor also. In general, habitat condition in the Trask and Necanicum basins is slowly improving. A series of fires in the mid to late 1930s in the Trask Basin (Tillamook Burns) drastically impacted habitat with loss of shade, increased sedimentation, and loss of stream complexity. The basin is now recovered to a forest condition with more shade and sedimentation impacts reduced; however, there is still a lack of instream complexity throughout the system. Unfavorable natural events (flooding) are common in the basin and can have detrimental effects on egg depositions and juvenile rearing. However, these events also provide some long term benefits in the form of gravel and large woody debris recruitment.

Habitat restoration projects conducted over the past twenty five years or more (on state, federal, and private lands, which make up the majority of the basin ownership) have worked to address instream complexity concerns. Watershed council volunteers have been active in addressing and implementing riparian improvements on private lands within the basin. Recent or ongoing projects are working to improve habitat conditions and/or access to habitat in the Tillamook Bay estuary. Fish passage barriers (primarily culverts) are being evaluated and addressed on these lands as well as on major highways and county road systems. Oregon fish passage laws require fish passage to be addressed at all impediments to migration. 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 fall Chinook Salmon smolts and other hatchery and wild smolts in the Tillamook Bay and Necanicum 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 fall Chinook Salmon smolts and wild salmon and steelhead juveniles in the Tillamook Bay and Necanicum estuary and near shore ocean environment may negatively impact the wild juveniles. Straying of Trask Hatchery fall Chinook Salmon to natural spawning areas can negatively impact populations through interbreeding that may reduce genetic fitness of wild population. Large concentrations of hatchery fish may attract predators causing increased predation on hatchery and wild salmon and steelhead juveniles. Increased angling pressure on hatchery fall Chinook may increase incidental mortality on wild Coho Salmon, fall Chinook Salmon (primarily adult), and steelhead stocks (both adult and juvenile). Release of unfed fry from the STEP hatchbox program may negatively impact wild juveniles.

(3) Species that could positively impact program:

Increased abundance of naturally produced fall Chinook may positively impact this program by easing management concerns over stock viability and by providing wild fish for incorporation into the hatchery broodstock.

(4) Species that could be positively impacted by program:

Stock-34 fall Chinook 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. Carcasses used in the stream enrichment program in the Trask and Necanicum basin are permitted through the Oregon Department of Environmental Quality.

General Information

Interactions between migrating fall Chinook hatchery smolts and ESA Threatened Oregon Coast coho are likely to be minimal. Fall Chinook are reared to smolt size and expected to migrate upon, or soon after, release. Trask Hatchery production smolt releases occur in the mainstem Trask and Necanicum rivers. These typically are areas with minimal rearing of wild juvenile coho. Target release size is 18-19 fish per pound. Release timing is mid-August to early September, which is well after the wild coho smolt migration timing of April and May (Solazzi et al. 2000). All release groups are sampled and disease tested by ODFW Fish Health staff and cleared before release. It is possible that some hatchery fall Chinook juveniles may residualize after release, but it is anticipated that interaction(s) between residual fall Chinook and rearing coho are minimal based upon their species-specific rearing and life history characteristics.

Carcass recoveries of fall Chinook Salmon occur during salmon spawning ground surveys conducted in the Tillamook Bay basin annually. Hatchery-origin fall Chinook Salmon smolts on the north coast are mass marked (100%) with an adipose fin clip. This provides for identification of hatchery fall Chinook Salmon on spawning ground surveys. However, these surveys are not designed to estimate the total proportion of hatchery fall Chinook Salmon spawning naturally, so that data is not available. The proportion of hatchery carcasses recovered has been low (less than 5% annually during the 2013-2015 period).

Carcass recoveries of fall Chinook Salmon occur during salmon spawning ground surveys conducted in the Necanicum River basin annually. Hatchery-origin fall Chinook Salmon smolts on the north coast are mass marked with an adipose fin clip. This provides for identification of hatchery fall Chinook on spawning ground surveys. However, these surveys are not designed to estimate the total proportion of hatchery fall Chinook Salmon spawning naturally, so that data is not available. However, the proportion of hatchery carcasses recovered was a minimum of 20-35% during the 2013-2015 period.

The ODFW has had a Salmon and Trout Enhancement Program (STEP) in place and operational since 1981. A portion of the program (STEP hatchbox program) is the incubation of eggs and release of unfed fry by public participants. Egg requests are

handled as part of annual hatchery production operations. Early-stage eyed-eggs are given to volunteers for incubation in streamside hatchboxes. Direct stream releases are made when fish are in the late "button-up" stage. Typical releases were directed to a basin area, or tributaries in a basin, and were distributed at a varying number of "sites" within the identified area. Unfed fry releases are planned to be phased out over a period of 10 years.

Habitat Above Trapping Facilities

The Gold Creek trap is generally operated from late August until spring primarily for collection of hatchery Chinook and Coho Salmon broodstock, but also for collection of hatchery winter steelhead strays. Following are assessments of the habitat available above trapping facilities associated with this program.

Gold Creek (Trask Hatchery facility)
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%. 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%. The large wood debris condition score is considered low to moderate at 1.8 (Moore et al., 1997). Pools were present in approximately 30% 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 are being passed above the weir at this time; however, coho and winter steelhead may be passed in the near future once screens have been upgraded to NOAA standards. Gold Creek does not provide very much suitable spawning habitat for fall Chinook. Gold Creek provides 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.

Trask Hatchery: Adult fall Chinook 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. Water temperature is only manipulated during the egg and fry incubation stages, by the use of immersion heaters placed into incubator trays. Water temperatures during incubation range 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.

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

Nehalem Hatchery: Approximately 26,000 fingerling stock-34 fall Chinook are transferred from Trask Hatchery to Nehalem Hatchery in late spring/early summer for an eventual release of approximately 25,000 smolts into the Necanicum 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. 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.

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

STEP: STEP hatchboxes are not required to obtain a water right. While there are several different types or styles of hatchboxes, the design is geared to operate with a flow of 4 to 5 gpm through the box. Systems are gravity fed and rely on ambient water temperature.

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.

The risk of take at Trask Hatchery is minimal because ESA *threatened* coho are not currently passed above the Gold Creek water intake structures; however, ODFW may pass unmarked fish in the future and is currently evaluating screen compliance relative to NOAA Fisheries screening guidelines.

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. STEP hatchbox operations have screened water withdrawals.

All hatchery effluent from Trask and Nehalem Hatchery (and associated satellite facilities where required) is monitored and reported quarterly under a National Pollutant Discharge Elimination System (300J) permit. All conditions of the permit are administered within ODFW and regulated by the Oregon Department of Environmental Quality.

SECTION 5
FACILITIES

Adult collection and spawning of Trask Hatchery stock-34 fall Chinook Salmon is located at Trask Hatchery. Currently, approximately 280,000 eyed-eggs are transferred for use in hatchboxes or classroom incubators. This number will be reduced as the hatchbox portion of the program is phased out. The remaining production remains at Trask Hatchery until they reach marking size. Approximately 26,000 fingerlings are transferred to Nehalem Hatchery for eventual release of 25,000 sub-yealing smolts into the Necanicum River. Trask Hatchery retains approximately 154,000 fingerlings for eventual release of 150,000 sub-yearling smolts into the Trask River.

5.1) Broodstock collection facilities (or methods).

Trask River hatchery-origin fall Chinook Salmon adults are collected primarily in the Gold Creek trap located at Trask Hatchery; however the lower trap (on the Trask River at the downstream end of the hatchery property) is occasionally used. Water flow diverted from Gold Creek attracts adult fall Chinook entering the trap via a fish ladder. Once fish enter the trap, they are manually sorted and held in the collection facility until spawning in November-December. Although the trap is generally opened in late August for spring Chinook collection fall Chinook are typically not collected until October. During some low water years when adult fall Chinook Salmon fail to enter the trap, it has been necessary to use seines or tangle nets deployed from boats in the Trask River adjacent to the hatchery to collect adult fall Chinook for broodstock. This has only been necessary a couple of times in the past 30 years.

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

The ODFW North Coast Watershed District in Tillamook currently has one small stainless steel transport tank used for fry, a 200-gallon tank that can be loaded in a pickup truck used for transporting juveniles, and a 430-gallon tank mounted on a flatbed trailer used for adults/juvenile transportation. Currently, Trask Hatchery utilizes 3 separate types of fish transportation equipment for the transportation of juveniles and adult fish. Fish transportation equipment will be replaced or upgraded as needed to meet transportation needs.

a) A typical fish liberation unit consists of a cab-over flatbed truck with a 1,000-gallon (or larger) 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. 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.

b) A portable fish liberation unit, which consist of a 300-gallon slip tank that fits onto the bed of a 1-ton 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.

c) A tractor-trailer unit with a capacity of up to 3,000-gallons 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 diffusing stones for oxygen replenishment.

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. Fry releases may use one of several methods, depending on release location. Those released at the hatchbox site are usually carried to the stream in a bucket and poured directly into the stream. If release is to be remote from the site, fry are transported in a circular stainless steel tank holding 50 to 60 gallons of water and equipped with a battery operated aerator/circulation pump.

5.3) Broodstock holding and spawning facilities.

Trask Hatchery stock-34 fall Chinook Salmon broodstock are usually held for spawning at the Trask River Hatchery in one 50-foot by 30-foot by 2.6-foot (working volume) holding pond. This holding pond receives water by gravity flow from Gold Creek. During the time of collecting and holding adult fish for spawning, water flow through the pond ranges from 500-1200 gpm. This trap facility has a spawning shed structure where spawning apparatus is stored and spawning activities are conducted. The lower hatchery trap may be used to hold brood in some years (typically low flow years).

5.4) Incubation facilities.

Incubation occurs in vertical incubator trays supplied with gravity flow water from Gold Creek and Mary's Creek. Flow rate for incubation is 4.5 gpm. A low-water alarm system (mercury float type) is in place to detect interruption of water flow to the incubator trays; however a new alarm system is currently being installed. Immersion heaters may be used to manipulate water temperature during the egg to fry incubation stage. Discharge water is returned directly to the Trask River; however, a system has been developed to divert incubation flow to the tailrace of Ponds 1 and 2, or to the pollution abatement pond for additional treatment, when necessary.

STEP hatchboxes come in a variety of sizes and shapes; however, most are in the style of typical hatchery incubation troughs and sized to hold two baskets approximately 20 by 10 by 8 inches. Troughs are a flow-through design and baffled to keep velocities down and provide correct flow patterns; they are covered with a secured lid.

5.5) Rearing facilities.

Trask hatchery has a 40'x 24' early rearing building. The early rearing building contains eight 16-foot deep Canadian troughs that have the capacity to rear 100 pounds of fish each. In addition, there are two 16-foot long Canadian troughs located in the main hatchery building. These troughs are used to start fish on feed. Prior to reaching a maximum density, fish are transferred to raceway ponds located at Trask Hatchery.

Up to eight single-pass raceway ponds—measuring 50-feet by 8-feet by 2.7-feet—are used for early rearing of the juveniles at Trask Hatchery. After marking, approximately 26,000 fingerlings are transferred to Nehalem Hatchery. Trask Hatchery retains approximately 154,000 fingerlings for final rearing to smolt size.

Fish transferred from Trask Hatchery to Nehalem Hatchery are held in concrete raceways. All raceways are in-ground and measure 75-feet long, 16-feet wide, and 4-feet deep, with a typical water depth of 3 feet (3,825 cubic feet of water). The raceways are actually modified Burrows ponds. As such, they have a solid center wall down the length of the pond, except for 8 feet 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. Each raceway has a maximum capacity of 5,000 pounds of fish.

5.6) Acclimation/release facilities.

The 150,000 smolts of Trask Hatchery stock-34 fall Chinook produced at Trask Hatchery are released into the Trask River. Smolts are volitionally released from the hatchery or are loaded into liberation trucks and released at other locations in the Trask River. Releases of 25,000 sub-yearling smolts into the Necanicum River are shipped from Nehalem Hatchery by a liberation truck and then direct release into the river.

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

There have been no operational difficulties or disasters that have led to significant fish mortality.

It is not uncommon to have high mortalities at times associated with STEP hatchboxes. Most common causes are water flow problems, usually a plugged intake line from debris and, on occasion, from freezing. Because they normally are placed close to streams, they are also vulnerable during flood events. Losses at times may also be attributable to the lack of routine picking of dead eggs, hatching mortalities related to storm events, and the ensuing fungus outbreaks on the mortalities in the baskets.

5.8) Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

No listed fish are under propagation in this program. However, equipment failures at rearing facilities could potentially lead to juvenile releases which may impact rearing juvenile coho in the Trask and Necanicum rivers system.

The Trask River Hatchery is staffed full time with at least one person; personnel are available 24 hours per day, 7 days per week. 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.

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.

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.

Adult fall Chinook Salmon returning to Trask Hatchery are collected for broodstock. Records indicate that out-of-basin stock eggs were, in some years, 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 in several cases in the past from Bonneville (Columbia River).

6.2) Supporting information.

6.2.1) History.

This program currently uses one broodstock, originally derived from Trask River wild fall Chinook beginning in 1906. While the lineage is unclear, the early 1900's broodstock was collected by racking the Trask River. Beginning in 1959, broodstock was collected by seining at the hatchery (Wallis, 1963). Wallis indicated a new adult holding pond was constructed in 1961, and fish (Coho and fall Chinook Salmon) were either trapped in the upper pond from Gold Creek trap, or from the lower pond directly from the river.

6.2.2) Annual size.

A minimum goal of 127 pairs will be needed to fulfill existing smolt production goals (150,000 smolts for Trask Hatchery, and egg take for 26,000 fingerlings reared at Nehalem Hatchery for the Necanicum River), and STEP hatchbox egg requests. Adults are generally spawned at a one-to-one, male-to-female ratio. Additional fish may be collected and held as necessary to cover shortages resulting from, but not limited to, fecundity variations, early egg mortality, positive disease tests, etc.

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

Historic records indicate the original broodstock were from wild origin. Because fish were not routinely marked and origin cannot be determined from scale reading, it is not known to what extent naturally-produced, or hatchery broodstock have been incorporated over time. At the time of the Wallis report, it was assumed that fall Chinook holding in the lower river were primarily of hatchery origin based on spawning ground data and hatchery trapping data early in the hatchery's operation. Wild broodstock may be used in the broodstock at a rate proportional to the number unmarked fish entering the hatchery trap. Additional wild broodstock may be utilized if necessary to meet management goals.

6.2.4) Genetic or ecological differences.

The broodstock used in this program is locally founded. However, the current hatchery-origin fall Chinook stock may have diverged—to some unknown extent—from Trask Basin wild fall Chinook populations, based on hatchery practices and probable lack of recent incorporation of naturally-produced fish into the broodstock. But no genetic study has been conducted to determine any genetic differences between the naturally-produced and hatchery-origin adults. Future incorporation of known naturally-produced fish in the hatchery broodstock could help to reduce differences between the hatchery and naturally-produced fish.

6.2.5) Reasons for choosing.

Trask River stock-34 fall Chinook Salmon was not chosen for any special traits or characteristics other than it is the stock indigenous to the Trask River Basin.

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.

Stock-34 fall Chinook hatchery broodstock selection should have minimal ecological or genetic impacts to naturally-produced Coho Salmon. Naturally-produced Coho Salmon may be trapped during fall Chinook Salmon broodstock collection; however, unmarked coho that are trapped are released from the hatchery facility to spawn naturally. Juvenile Coho Salmon may be encountered during seining operations to collect broodstock (which is rarely necessary). However, large mesh seines which easily pass juvenile fish are used, and few, if any coho juveniles have been observed during this operation. Any juvenile fish captured would be immediately released.

SECTION 7

BROODSTOCK COLLECTION

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

Adult fall Chinook Salmon will be captured for broodstock. A minimum of 127 pairs must be spawned to meet the proposed objective of 175,000 smolts, STEP's eyed-egg requests (currently 280,000 eggs), and maintain genetic quality of the population. Additional fish may be collected and held as necessary to cover shortages resulting from, but not limited to, fecundity variations, early egg mortality, positive disease tests, etc.

7.2) Collection or sampling design.

Fall Chinook Salmon broodstock adults are captured at Trask River Hatchery upon swimming into the trap(s) or collected by seining if necessary in low water years. The traps are operated such that the fall Chinook run-timing, adult size, and age distribution are represented. Adult fall Chinook collection begins in late October and continues throughout the remainder of the run (usually late December). The Gold Creek and Trask Hatchery traps are not considered to be size or age selective. Eggs are collected throughout the period that adult fall Chinook enter the traps. Generally, eggs collection is initially weighted towards the beginning of the run to ensure that production needs are met. After egg collection is over for the run period, eggs are culled as needed to represent the adult return period. If low flows inhibit entry into the traps, it may be necessary to seine fall Chinook from the large pool adjacent to Trask Hatchery. Seining for broodstock collection has only been necessary a couple of times in the past 30 years.

7.3) Identity.

A portion of Trask Hatchery fall Chinook Salmon are currently identifiable by adipose fin clipped and presence coded wire tag (AD+CWT). The remainder are mass marked (100%) with an adipose fin clip only.

7.4) Proposed number to be collected:

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

A minimum of 127 pairs will be needed to fulfill existing production goals (150,000 smolts at Trask Hatchery, 26,000 fingerlings at Nehalem Hatchery, and production request for eyed eggs for STEP hatchboxes and classroom incubators). The broodstock sex ratio at collection time is assumed to be 1:1. Adults are spawned at a one-to-one, male-to-female ratio using a spawning matrix. Jacks are included in the broodstock when available.

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

Following are numbers of adults actually spawned. The number of spawned males for 1989 – 1992 are unknown. Males were not recorded as spawned or unspawned in those years.

Table 7-1. Trask Hatchery and STEP Stock-34 Trask Hatchery Fall Chinook Salmon Broodstock Collection, Spawning, Egg Take, and Fry Ponded Levels, 1989-2007. Adult collection and production numbers shown are pre-CMP levels.

Year	Adults [a]			Total Egg Take	Eyed eggs to STEP	Production Eyed eggs	Trask Fry Ponded
	Females	Males	Jacks				
1989	169	n.a.	n.a.	927,177	575,000	271,825	227,581
1990	159	n.a.	n.a.	857,732	381,200	185,300	182,118
1991	168	n.a.	n.a.	881,914	415,000	377,250	184,410
1992	146	n.a.	n.a.	825,354	445,000	283,000	188,727
1993	21	14	n.a.	161,250	27,250	67,500	66,209
1994	20	20	n.a.	99,964	24,541	70,500	69,862
1995	81	89	n.a.	403,211	230,648	117,710	116,199
1996	116	116	n.a.	587,530	335,700	108,000	106,636
1997	54	51	n.a.	276,811	138,295	97,163	94,605
1998	76	79	n.a.	371,097	237,500	104,628	103,613
1999	111	110	n.a.	507,017	366,250	101,350	100,350
2000	57	57	n.a.	270,161	139,185	105,200	103,095
2001	98	96	n.a.	489,596	169,150	174,135	167,865
2002	74	73	n.a.	355,964	132,000	154,812	148,987
2003	148	148	n.a.	706,133	279,600	236,000	229,364
2004	127	131	n.a.	573,422	284,050	255,556	253,318
2005	304	486	44	627,882	284,250	309,674	193,879
2006	374	621	21	676,632	259,750	307,100	182,703
2007	277	373	26	576,421	235,200	216,125	180,779

Data source: HMIS, Trask Hatchery, and North Coast Fish District

[a] Number of fish spawned. The number of jacks spawned is not reported in the HMIS database, except in comments. Number of males spawned has only been recorded in HMIS since 1993.

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

The trap at Trask Hatchery is operated through the end of the fall Chinook Salmon run and into the winter steelhead run. The current operating procedure is to continue to

operate the trap to remove any fin-clipped adult hatchery fall Chinook from the system. Excess hatchery fall Chinook are generally dispatched and used in the stream enrichment program. Carcasses suitable for human consumption may be used for food programs, or carcasses may be sold for processing into fish food or other products. Carcasses not used for stream enrichment, food programs, or sold, are buried or disposed of in a landfill.

7.6) Fish transportation and holding methods.

All broodstock collected at Trask Hatchery are held and spawned at Trask Hatchery. See sections 5.2 and 5.3 for fish transportation and holding methods respectively.

7.7) Describe fish health maintenance and sanitation procedures applied.

Developing eggs receive regular treatments with formalin or other approved treatments to prevent/control fungus (*Saprolegnia parasitica*) outbreaks. Green eggs are water-hardened in an iodine solution to prevent disease or viral contamination. Juveniles are treated (usually with medicated feed, hydrogen peroxide, or possibly formalin) as directed by ODFW fish health staff if necessary. Additional sanitation procedures are described in section 9.2.7. Also, see Attachment A fish health management protocol.

7.8) Disposition of carcasses.

Hatchery fall Chinook Salmon carcasses may be used for stream enrichment activities in the Tillamook Bay basin. Carcasses suitable for human consumption may be used for food programs, or carcasses may be sold for processing into fish food or other products. Carcasses not used for stream enrichment, food programs, or sold, are buried or disposed of in a landfill.

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

There should be minimal likelihood for adverse genetic or ecological effects to listed fish as a result of broodstock collection. To ensure that impacts to wild Coho Salmon are minimized during broodstock collection, the hatchery trap(s) is monitored frequently. Fish are typically processed weekly or more often as warranted. If wild coho are present, they are released back to the Trask River in the vicinity of the hatchery or occasionally by transporting further upstream. Future plans may include passing adults upstream of the hatchery in Gold Creek. Listed natural Coho Salmon may be present in the system when seining or tangle netting is necessary to collect fall Chinook Salmon broodstock. The seine is pursed only to the point that fish are contained and are removed individually by hand. Tangle nets are light mesh that is easily breakable. Any Coho Salmon collected are immediately released outside the seine. Any juvenile coho that may be present can easily escape the large-mesh seine net used.

SECTION 8
MATING

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

8.1) Selection method.

Collection of fall Chinook Salmon is conducted throughout the whole run. Adults (males and females) and jacks are chosen and paired randomly, from fish that are ripe, on the day of spawning. Excess eggs may be collected to ensure meeting the production goal. Excess eggs may be culled randomly across egg take groups after spawning is completed if necessary (see section 9.1.2).

8.2) Males.

Males are typically only used once for spawning in the prescribed matrix. If necessary, in the case of a shortage of males, individual fish may be spawned more than once. Jacks are included in the broodstock when available.

8.3) Fertilization.

Fall Chinook Salmon are kill-spawned with the goal of a 1:1 male-to-female ratio. Each fish is typically only used once in spawning, however if necessary, in the case of a shortage of males, individual fish may be spawned more than once.

Spawning is conducted using a modified matrix. Eggs from females are spawned into a single plastic bucket and mixed. The eggs are then divided into separate buckets. Males are spawned, one into each of the buckets of eggs. These groups are held separate and transferred to the incubation facility in the plastic buckets. Once in the incubation facility, the fertilized eggs are water hardened in a solution of iodophore and placed in the incubation baskets. Each family group is incubated in separate baskets or trays. This matrix-spawning regime provides for the possibility of multiple family groups per female spawned.

Ovarian samples and visceral (kidney, spleen) samples are collected from 60 fish spawned for viral analysis. Eggs that test positive for disease may be kept or destroyed, at the direction of ODFW fish health staff.

8.4) Cryopreserved gametes.

Cryopreservation of fall Chinook 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.

No genetic or ecological effects to naturally produced listed fish species is expected from the mating scheme of the stock 34 hatchery fall Chinook Salmon program. However, to maintain the genetic diversity within the propagated fall Chinook Salmon population, broodstock are randomly selected from throughout the entire run. Spawning is done randomly based on availability of ripe fish. Matings are done with a goal of a 1:1 sex ratio (i.e. one male and one female) using a spawning matrix. Each fish is only used once in spawning, however if necessary, in the case of a shortage of males, individual fish may be spawned more than once.

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.

Trask Hatchery takes stock-34 fall Chinook Salmon eggs for several programs. Egg survival to ponding, is based on eyed-eggs retained for Trask Hatchery production (*i.e.* Trask Hatchery stock 34 Fall Chinook Program). Green egg take to ponding survival would not necessarily provide an accurate representation of the Trask Hatchery fall Chinook Salmon program, primarily because of the large number of eggs collected for the STEP hatchbox program.

9.1.1) Number of eggs taken and survival rates to ponding.

Table 9-1. Eyed Egg Survival – Trask Hatchery Stock-34 Fall Chinook Salmon Program. Values are pre-CMP levels.

Brood Year	Eyed Eggs for Program	Measure	Percent survival to Ponding
1989[a]	271,825	Survival to ponding	98.7
1990	185,300	Survival to ponding	98.4
1991[a]	377,250	Survival to ponding	98.9
1992[a]	283,000	Survival to ponding	98.4
1993	67,500	Survival to ponding	98.0
1994	70,500	Survival to ponding	98.5
1995	117,710	Survival to ponding	98.4
1996	108,000	Survival to ponding	98.8
1997	97,163	Survival to ponding	97.5
1998	104,628	Survival to ponding	98.1
1999	101,350	Survival to ponding	98.0
2000	105,200	Survival to ponding	96.8
2001	174,135	Survival to ponding	96.4
2002	154,182	Survival to ponding	96.2
2003	236,000	Survival to ponding	97.1
2004	255,556	Survival to ponding	99.1
2005	309,674	Survival to ponding	98.7
2006	307,100	Survival to ponding	98.1
2007	216,125	Survival to ponding	97.9

Source: ODFW HMS database, Trask Hatchery

[a] Represent years where eyed-eggs retained greatly exceeded production needs.

9.1.2) Cause for and disposition of surplus egg takes.

Green eggs taken are incubated to meet Trask Hatchery stock 34 fall Chinook Salmon smolt production goals and STEP requests. Trask Hatchery stock-34 fall Chinook egg take is managed to compensate for egg-to-smolt mortality and genetic considerations, such as increased family size to promote genetic diversity, etc. Surpluses are a result of egg take beyond eyed-egg needs to represent full run timing and to account for mortality. Surplus eggs are identified at the eyed-egg stage and are destroyed. Mortality and culled eggs are all disposed of by freezing and then buried.

9.1.3) Loading densities applied during incubation.

Fall Chinook green-egg size is approximately 80 eggs per ounce. Heath style incubator trays are loaded with approximately 64 ounces of eggs (or 5,120 eggs) per tray. Typically, eggs from different family groups are loaded into several trays and kept separate because of disease concern.

Criteria for STEP hatchboxes vary; however, in general they incubate 5,000 to 7,000 eggs per basket; two baskets per box. Water flow rate is typically 4 to 5 gpm through the system.

Loading densities for STEP classroom incubators varies with the size and setup of equipment being used, but typically ranges from 200 to 1,000 eggs. A standard aquarium recirculating pump supplies water flow. Flow rates have not been calculated, but have been sufficient for the small number of eggs being used.

9.1.4) Incubation conditions.

The water supply to the egg incubators used at Trask Hatchery is monitored for flow and temperature daily. The incubating eggs are held in water that is maintained at 41º to 55º F with an average flow rate of 4.5 gpm per tray. Immersion heaters may be placed in selected incubator tray stacks as needed to maintain the desired temperature. The dissolved oxygen for the influent water ranges between 10 to 11 ppm.

STEP hatchbox eggs are incubated at ambient stream temperatures. Water flow is checked daily, but the flow rate is not measured. Dissolved oxygen and temperatures are seldom monitored unless incubation problems are identified by the operator and assistance is requested.

9.1.5) Ponding.

Fry are removed from the incubator trays and placed into clean-up troughs where mortalities are removed and the remaining fish are counted. This generally occurs shortly before the fish are 100% buttoned-up. Fish are then moved into Canadian-style deep troughs. Trask hatchery has built a 40’x24’ early rearing building which houses 8 of the 10 Canadian tanks. Two additional tanks are located in the main hatchery building. Flow rate in the Canadian-style troughs is approximately 10 gpm. Within a few days fish

feeding occurs and within a few weeks fish are transferred to raceway ponds. The average fry size at ponding is approximately 850-900 fish per pound.

9.1.6) Fish health maintenance and monitoring.

See Attachment A regarding state approved fish health maintenance protocols.

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.

Not Applicable. This program does not incubate listed fish species.

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.

Table 9-2(a). Trask Hatchery Stock-34 Fall Chinook Salmon Survival Rates (Fry to Smolt). Values are pre-CMP levels.

Year	Percent Survival of Fry to Smolt[1]
1988	96.7
1989	94.7
1990	93.1
1991	91.5
1992	94.3
1993	91.3
1994	84.6
1995	90.8
1996	92.9
1997	99.3
1998	99.2
1999	97.1
2000	98.0
2001	97.8
2002	97.8
2003	98.9
2004	99.8
2005	100.0
2006	94.6

Source: ODFW HMS database

[1] Counts are estimated by weight sampling, and are approximate counts. Differences in the accuracy of the counting methods likely accounts for more fish at marking and/or release than were ponded.

Table 9-2(b). Trask Hatchery Stock-34 Fall Chinook Salmon survival rates reared to smolt size at Nehalem Hatchery (Fingerling to smolt). (Note: 1997 was the first year for Trask Hatchery Stock-34 fall Chinook rearing at Nehalem Hatchery). Values are pre-CMP levels.

Year	Percent Survival of Fingerling to Smolt[1]
1997	98.5
1998	99.5
1999	96.9
2000	94.4
2001	99.3
2002	99.2
2003	98.7
2004	96.0
2005	97.0
2006	99.7

Source: HMIS

[1] Counts are estimated by weight sampling, and are approximate counts. Differences in the accuracy of the counting methods likely accounts for more fish at marking and/or release than were ponded.

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

Density (rearing space) targets from fry to smolt are not to exceed 1.0 pound of fish per cubic foot of water at any of the facilities. Maximum loading level at Trask Hatchery raceways is approximately 5.2 pounds of fish per gpm. Maximum loading level at Nehalem Hatchery raceways is approximately 4.1 pounds of fish per gpm.

9.2.3) Fish rearing conditions.

Pond monitoring is done daily at feeding time. While feeding fish, personnel observe for signs of stress, disease, water quality problems, and unusual fish behavior. Pond mortality is picked and recorded daily. During summer, ODFW Fish Health Staff monitor fish for external parasites once per month. Water quality at Trask and Nehalem Hatchery is monitored under the prescribed 300J general NPDES permit as required by DEQ (see Section 4).

Trask Hatchery: winter and spring (October through March) water temperatures are usually in the mid-30º to mid-40º range. Summer water temperature typically averages 55-65º F.

Nehalem Hatchery fish rear on incoming river water; hence, rearing water temperatures vary with seasons and with natural fluctuations; however stock-34 fall Chinook Salmon are currently held at Nehalem Hatchery only during the spring and summer. Water temperatures range approximately from 45º to 65ºF during spring and summer and from 36 º to 45 º F during the fall and winter. Dissolved oxygen (DO) levels coming into the facility are typically between 10.0 ppm and 11 ppm in the fall and winter. However, in the summer, DO levels can be as low as 7 ppm. Re-circulation of effluent water through the ponds is possible in extreme drought conditions.

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 at both facilities (fish per pound) is sampled regularly; data is reported on HMS Monthly Ponded Fish Reports. Fish feed schedules are programmed based upon fish size data collected. Fork length (millimeters) frequency sampling is done just before smolt release. Table 9-3(a) and 9-3(b) show monthly average weights for the program from ponding to release for 2005 and 2006 broods at Trask Hatchery, and from transfer to release at Nehalem Hatchery. Average length frequency percentages at time of release from both hatcheries for the 2005 and 2006 broods are presented in Table 9-4.

Fish size (fish per pound) is sampled bimonthly; data is reported on HMS Monthly Ponded Fish Reports. Fish feed schedules are programmed based upon fish size data collected. Fork length (millimeters) frequency sampling is done just before smolt release. Tables 9-3(a) and 9-3(b) shows monthly average weights for the program from ponding to release for 2005 and 2006 broods. Average length frequency percentages at time of release for the 2005 and 2006 broods are presented in Table 9-4.

Table 9-3(a). Average Monthly Fish Growth Data on Stock-34 Fall Chinook Salmon reared at Trask Hatchery facilities, 2005 and 2006 brood years.

Month	Size (fish per pound)	Stage
March	695.8	Fry
April	333.7	Fry
May	106.7	Fingerling
June	49.2	Fingerling
July	24.9	Fingerling
August	21.4	Smolt
Source: HMIS database		

Table 9-3(b). Average Monthly Fish Growth Data on Stock-34 fall Chinook Salmon reared at Nehalem Hatchery, 2005 and 2006 brood years.

Month	Size (fish per pound)	Stage
June	49.2	Fingerling
July	25.7	Fingerling
August	17.0	Smolt
September	15.8	Smolt
Source: HMS database		

Table 9-4. Trask Hatchery Fall Chinook Salmon Smolts Average Fork Length Frequency at *Release from Trask and Nehalem Hatchery, 2005 and 2006 brood years.*

Fork Length Size Range	Trask Hatchery	Nehalem Hatchery
< 10 cm.	9.9%	0.5%
10 – 14 cm.	90.1%	90.0%
> 14 cm.	0%	9.5%
Source: Trask and Nehalem Hatchery		

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

Monthly fish growth rate of fry ponded in March shows that fall Chinook Salmon will obtain a size of approximately 747 fish per pound by the end of that month. Then from April to July, fall Chinook fingerlings roughly double in weight each month. Growth rate slows and an average weight of 18 fish per pound is achieved by August for Trask River releases, and 16 fish per pound in September for Necanicum River releases.

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).

Trask Hatchery stock-34 fall Chinook Salmon juveniles are fed a fish food diet at a rate and frequency that varies with fish size. The fish are typically fed a dry feed, and most feeding is done by hand. Fry are fed 8-10 times per day. As the fish grow, frequency of feeding is reduced gradually until the fish are being fed only two to three times per day as the time of release approaches. The fish are fed at a programmed rate to control their growth in order to meet the desired size at release.

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

Fish health is monitored monthly by Trask Hatchery and ODFW Fish Health staff. Fish Health staff diagnose diseases and prescribe the appropriate treatments to eliminate or control disease. See Attachment A.

Tools and equipment used for fall Chinook Salmon spawning are disinfected between family groups using an iodine antiseptic (100ppm). Nets and sampling equipment used for fall Chinook is also disinfected in this manner. Some tools and equipment used for rearing are not routinely disinfected (other than allowing to air dry) because they are kept separate from other fish at the hatchery. For further description, see Attachment A.

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

Weight samples are taken often during early rearing, and regularly during the fingerling stage. Prior to release, length frequencies (see Section 9.2.4) are conducted. A visual examination of mark quality is also taken prior to release.

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

No "natural" rearing methods are used.

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.

We anticipate no adverse genetic effect to listed Coho Salmon due to this fall Chinook Salmon program. In order to minimize the ecological risks to wild coho from the in-hatchery fall Chinook rearing techniques, rearing ponds are cleaned regularly and no dead fish from rearing ponds are allowed to enter the water of the state to prevent transmission of diseases. Fish health is monitored monthly or more if necessary; and in the event of fish diseases, fish are treated per prescriptions of ODFW's fish pathologist. Also, fish health status is examined prior to release or transfer and only certified fish are released.

SECTION 10
RELEASE

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

10.1) Proposed fish levels.

Table10-1. **Trask Hatchery Stock-34 Fall Chinook Salmon Program Proposed Fish Release Levels.**

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs	NA	NA	NA	NA
Unfed Fry	Varies (excess, un-programmed)	900/lb	Jan/Feb.	Standing water bodies
	STEP 280,000 (approx.)	900/lb (est.)	February	Necanicum & Tillamook Bay tributaries
Fry	Varies (excess, un-programmed)	900-150/lb	Mar/April	Standing water bodies
Fingerling	Varies (excess, un-programmed)	150-20/lb	May-July	Standing water bodies
Sub-yearling smolt	25,000	16/lb (target)	Aug/Sept	Necanicum River
Sub-yearling Smolt	150,000	18/lb (target)	Aug/Sept	Trask River
Data source: Hatchery Production Schedules				

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

Stream, river, or watercourse:	Trask River
Release point:	Trask River mainstem up to RM 18
Major watershed:	Trask River
Basin or region:	Tillamook Bay Basin

Stream, river, or watercourse:	Necanicum River
Release point:	Necanicum River mainstem up to RM 18
Major watershed:	Necanicum River
Basin or region:	Necanicum Basin

STEP Fry Releases:
Unfed fry releases from hatchboxes varies yearly depending on the number of volunteers that may choose to become involved. As such, it is difficult to predict a "proposed" release level; however, releases will not exceed 280,000 in any year. Release sites are normally low in river systems where hatchery fall Chinook are already released in the system. Release areas for Tillamook Bay Basin unfed fry are as follows: Miami R. (RM 0-3); Kilchis R. (RM 0-3); Wilson R. (RM 0-10); Trask R. (RM 0-15); and Tillamook R. (RM 0-9). The STEP hatchbox program will be phased out over the next ten years, and releases will be discontinued. Additional data is provided in Section 10.3.

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

Table10-2. Hatchery Stock-34 Fall Chinook Released by age class, from Trask Hatchery and Nehalem Hatchery. (Note: from 1995 through 2001 this program consisted of an early run "Fall" and late run "Winter" Chinook components. Since 2002 the program still uses early and late returning adults in the broodstock, but all are classified as fall Chinook).

Brood Year	Eggs/ Unfed Fry	Avg Size	Fry	Avg Size	Fingerling[b]	Avg Size	Smolt	Avg Size
1995	98,298	n.a.	24,969	123	0	n.a.	118,374	16.9
1996	329,208	n.a.	0	n.a.	6,298	47.0	137,828	18.3
1997	132,463	n.a.	0	n.a.	0	n.a.	131,191	18.6
1998	200,701	n.a.	0	n.a.	0	n.a.	131,407	18.1
1999	344,842	n.a.	0	n.a.	0	n.a.	129,793	19.4
2000	136,096	n.a.	0	n.a.	6,401	37.0	141,841	20.2
2001	164,017	n.a.	0	n.a.	19,740	40.7	139,443	17.9
2002[a]	118,167	n.a.	0	n.a.	4,410	59.6	139,889	20.1
2003[a]	273,516	n.a.	77,497	475	12,631	50.7	139,207	18.1
2004[a]	236,705	n.a.	102,999	361	9,983	30.9	138,878	19.5
2005	240,119	n.a.	0	n.a.	41,751	55.0	148,300	18.7
2006	258,113	n.a.	0	n.a.	33,390	38.4	139,316	22.1
2007	259,881	n.a.	26,796	329	8,841	85.0	140,839	24.1
2008	308,741	n.a.	0	n.a.	25,450	72.9	141,546	21.7
2009	275,587	n.a.	49,551	326	0	n.a.	143,262	18.0
2010	267,590	n.a.	55,202	561	21,053	75.0	141,281	18.5
2011	251,184	n.a.	20,971	337	63,941	83.7	143,313	21.5
2012	259,082	n.a.	74,417	193	11,827	88.3	141,864	18.2
2013	248,172	n.a.	92,613	215	0	n.a.	137,422	19.8
2014	225,455	n.a.	13,015	995	176,618	47.0	n.a.	n.a.
2015	186,670	n.a.	89,725	419	n.a.	n.a.	n.a.	n.a.
Average	**196,177**	**n.a.**	**10,937**	**300**	**12,275**	**56.6**	**138,158**	**19.3**

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

[a] Final release numbers of STEP unfed fry are missing or incomplete.

[b] The 1996 fingerling release was in the Necanicum River, and the 2014 fingerling releases were in the Necanicum and Trask rivers. All other fry and fingerling releases have been in standing water bodies.

Table 10-3. Trask Hatchery Stock-34 Fall Chinook Fry Release Summary for STEP Program (Number of Fry Released by Basin).

Brood Year	Miami	Kilchis	Wilson	Trask	Tillamook River	Tillamook Bay	Necanicum	Totals
1995	15,000	0	51,050	12,203	19,787	258	0	98,298
1996	98,190	97,451	49,048	35,046	34,357	194	14,922	329,208
1997	27,064	14,799	43,197	15,781	17,313	64	14,245	132,463
1998	51,464	50,000	43,846	18,184	17,139	526	19,542	200,701
1999	82,363	65,000	24,617	112,697	40,016	996	19,153	344,842
2000	15,653	38,800	9,680	46,046	10,190	248	15,479	136,096
2001	54,713	0	43,406	46,531	0	242	19,125	164,017
2002	21,465	0	38,630	48,135	9,698	239	0	118,167
2003	111,419	0	51,811	93,026	0	37	17,223	273,516
2004	51,000	50,437	85,866	80,065	5,200	163	9,874	282,605
2005	49,285	49,289	64,666	64,993	1,500	198	10,188	240,119
2006	48,780	48,779	64,228	78,261	7,357	200	10,508	258,113
2007	98,172	0	34,351	89,023	6,975	198	297	229,016
2008	49,240	49,277	64,221	97,870	4,645	0	657	265,910
2009	49,403	49,403	15,173	128,754	32,182	0	672	275,587
2010	47,926	47,927	54,348	79,520	37,484	196	189	267,590
2011	49,333	49,334	34,172	77,631	39,876	190	678	251,214
2012	47,878	47,878	63,367	77,272	22,000	193	494	259,082
2013	48,473	48,473	62,992	63,252	24,300	199	483	248,172
2014	44,623	44,623	32,718	47,836	55,316	164	175	225,455
2015	0	93,244	0	93,243	0	0	183	186,670

Data source: ODFW HMS) database.

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

Table 10-4. Trask Hatchery Stock 34 Fall Chinook Smolt Release Dates from Trask Hatchery and Nehalem Hatchery. *Values shown are pre-CMP levels.*

Release Year	Date Ranges	Trask River Release Totals	Necanicum River Releasae Totals
1995	Aug. 9 – 20	108,600	0
1996	Aug. 15 – 16	118,374	0
1997	Aug. 19 – 25	116,086	21,742
1998	Aug. 16 – 25	102,677	28,514
1999	Aug. 15 – 23	104,412	26,995
2000	Aug. 14 – 25	103,714	26,079
2001	Aug. 11 – Sept. 5	116,731	25,110
2002	Aug. 11 – Sept. 4	113,203	26,240
2003	Aug. 8 – Sept. 3	113,900	25,989
2004	Aug. 8 – 31	113,239	25,968
2005	Aug. 5 – Sept. 1	112,833	26,852
2006	Aug. 9 – Sept. 5	119,892	27,305
2007	Aug. 7 – Sept. 4	113,604	25,712
2008	Aug. 11 - Sept. 3	115,358	25,481
2009	Aug. 6 - Sept. 8	114,509	27,037
2010	Aug. 11 - Sept. 8	117,215	26,047
2011	Aug. 12 - Sept. 1	115,508	25,773
2012	Aug. 10 - 31	115,516	27,797
2013	Aug. 14 - 30	115,669	26,195
2014	Aug. 11 - Sept. 3	111,750	25,672
2015	June 24 - 25	153,032	25,586
Data source: ODFW's Hatchery Management System (HMS) database.			

Table 10-5. Trask Hatchery Stock 34 Fall Chinook Salmon Excess Unfed Fry & Fry Release Dates and Locations.

Release Year	Date Ranges	Release Totals	Release Location
1995	n.a.	0	n.a.
1996	May 22	24,969	Necanicum River
1997	July 3	6,298	Cape Meares Lake
1998	n.a.	0	n.a.
1999	n.a.	0	n.a.
2000	n.a.	0	n.a.
2001	July 26	6,401	Cape Meares Lake
2002	July 10 – 11	19,740	Cape Meares Lake
2003	July 2	4,410	Loren's Pond
2004	Apr. 8 – May 5 July 9	77,497 12,631	Loren's Pond Loren's Pond
2005	May 14 May 29	64,685	Cape Meares Lake
2006	March 23 July 5	39,253 41,751	Cape Meares Lake
2007	July 26	33,390	Cape Meares Lake
Data source: ODFW's Hatchery Management System (HMS) database.			

10.5) Fish transportation procedures, if applicable.

Trask River Releases: Smolts are released volitionally at Trask Hatchery or are transported to other release locations in the Trask River. Transportation trucks are usually equipped with oxygen, DO meters, and water recirculation agitators.

Necanicum River Releases: Fish from Nehalem Hatchery are transported to the Necanicum River and are released directly into the mainstem. Transportation trucks are usually equipped with oxygen, DO meters, and water recirculation agitators.

STEP Releases: STEP fry are usually released from January to February, dependent on incubation water temperatures. Transportation is typically done in buckets, or the incubation trays, for a direct release into the stream if near the rearing site. When transported to a remote location, a larger tank may be used. Transportation time is typically 20 to 30 minutes, but may be as high as 60 minutes in some instances. After transportation, the fish are directly released into the stream.

10.6) Acclimation procedures.

Acclimation is not currently used as part of the Trask Hatchery stock-34 fall Chinook Salmon program but may be considered in the future if necessary to meet management goals.

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

Trask Hatchery fall Chinook Salmon are mass marked (100%) with an adipose fin clip. Approximately 30,000 of the fingerlings retained at Trask Hatchery for Trask River releases may also receive a coded-wire-tag. All releases into the Necanicum River are marked with ad-clip, but presently with no CWT. Fish released through STEP program are not marked.

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

Releases have been within programmed and approved levels.

10.9) Fish health certification procedures applied pre-release.

All smolts are inspected by ODFW Fish Health staff prior to release or transfer from the Trask River Hatchery or satellite facilities. Also, see Attachment A for fish management protocol.

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

Trask and Nehalem Hatchery personnel are generally present at the facilities 24 hours per day during periods when fish are present. Water supply for these facilities is connected to a central alarm system that notifies staff in the event of operational failure. In the event of water supply failure or other emergency situation at any of the facilities, the following procedure will be used:

- The hatchery crew will exhaust all possibilities for retaining the fish.
- The hatchery crew will consult with the ODFW District Biologist.
- If emergency fish release is deemed necessary at Trask Hatchery, the fish will be released directly into the mainstem Trask River at Trask Hatchery, or into a closed water body dependent on time of year, lifestage of the fish, and availability of transport equipment. If an emergency release is necessary at Nehalem Hatchery, hatchery personnel will attempt to transport fish to a release site on the Necanicum River or to a nearby closed waterbody. If transportation equipment is not readily available, fish may be released directly into the North Fork Nehalem River at Nehalem Hatchery or may be destroyed.

10.11) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases.

Fish are released as full-term smolts in late summer to enhance outmigration and minimize interactions with naturally-produced fish in the basin. All smolts are released

into mainstem areas in the Trask and Necanicum rivers. Given the life history characteristics, smolt migration rates, and preference for estuary rearing of fall Chinook, any adverse genetic or ecological impacts to coho are anticipated to be minimal. STEP fry releases are generally in the lower 30 – 40% of the river.

SECTION 11

MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

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

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

Information for Tillamook Bay and Necanicum basin wild and hatchery fall Chinook Salmon spawner abundance, proportion of hatchery strays, smolt size, and timing, will be obtained from the District's monitoring program, as well as *The Oregon Plan for Salmon and Watersheds (OPSW)* monitoring projects: Salmonid Life-Cycle Monitoring project (Solazzi et al. 2000 and 2003); and Coastal Salmonid Inventory project (Jacobs, et al. 2000). Information on the ocean catch of fall Chinook is obtained from the coastwide CWT marking and mark recovery program, and is available through PSMFC's on-line database. Information on the freshwater catch of fall Chinook is compiled from returned salmon / steelhead tags and is available from ODFW Fish Division at Salem Headquarters. Volunteer anglers also maintain log books and collect scale samples from the sport catch. Specific economic data for sport caught fish is not routinely developed for all stocks. Economic data that is compiled is available at Salem Headquarters.

Salmon and steelhead population health goals are currently being addressed through *Oregon Plan for Salmon and Watersheds* activities and through the Coastal Multi-Species Conservation and Management Plan. New performance standards (and subsequent M&E) may be prescribed in the future as these population health goals are established.

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 main frame computer in the Hatchery Information Management System (HIMS) database. This will include at least the following information:

Adults

- The number of females, males, and jack fall Chinook Salmon collected at Trask Hatchery (Standard 2.1).
- Number of wild Coho Salmon handled and released from Trask Hatchery (Standard 4.5).
- Any observed mortalities of adult fall Chinook and wild Coho Salmon at Trask Hatchery (Standard 4.5).
- Date of entry of hatchery and wild fish into the Trask Hatchery trap (or collected by other means) (Standard 4.5).
- Dates of fall Chinook Salmon spawning at Trask Hatchery (Standards 2.1 and 2.2).

- The number of males, jacks, and female fall Chinook spawned (Standards 2.1 and 2.2).
- Fecundity of females spawned (Standard 4.1).
- Disposition (spawned, sold, stream enrichment, etc.) of all fall Chinook collected (Standard 4.4).
- Collection of adult fall Chinook straying data (Standard 3.1).
- Harvest of adult fall Chinook (Standards1.1 and 5.1).

Juvenile Rearing

- Monthly number of fall Chinook 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 fall Chinook released, by mark type (Standard 2.3 and 3.2).
- Fish size at release, average weight, and length frequency distribution (Standard 2.4 and 4.5).
- Location of releases (Standard 2.4 and 4.6).
- Date releases started and ended (Standard 2.4 and 4.6).

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.

Neither the in-hatchery monitoring program nor other monitoring activities (i.e. life cycle monitoring, coastal salmonid inventories) is expected to increase risks to naturally produced fish above those imposed by operation of the program. Thus, risk aversion measures for the monitoring program are the same as those discussed under prior sections of this document.

SECTION 12

RESEARCH

There is no research program undertaken in direct association with the Trask Hatchery fall Chinook Salmon 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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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 HQs, Salem

Signature: _____Date:_____

ATTACHMENT A

Table A-1. Hatchery Programs Stock Code and Species Disease History (1999 to 2004) by Fish 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

The 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 broodstock 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 3 to 7 times per week for fungi prevention on eggs. Juvenile fish are treated with formalin or hydrogen peroxide. Depending on species of fish, parasite treating and water temperature, hydrogen peroxide is used at 1:3500 for 1 hour, or formalin is used at 1:15,000 to 1:6,000 for 1 hour for 3 to 5 consecutive days. Winter steelhead fry may be given salt and acetic acid dip treatments to control *ichthyobodo* 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). Adult Wilson River steelhead are given oxytetracycline injections under a veterinary prescription to prevent furunculosis and 1:6,000 formalin treatments for 3 to 7 days per week to prevent external fungi infections. At East Fork Trask Pond, the spring Chinook juveniles are given potassium permanganate1-hour baths at 1.0 ppm treatment on the first day and 1.25 ppm treatment on days 2 and 3 to control bacterial gill disease. Fingerlings held at the Tuffy Creek facility are treated with hydrogen peroxide at 1:3500 flow for one hour to control *Costia* and *Trichodona*.