



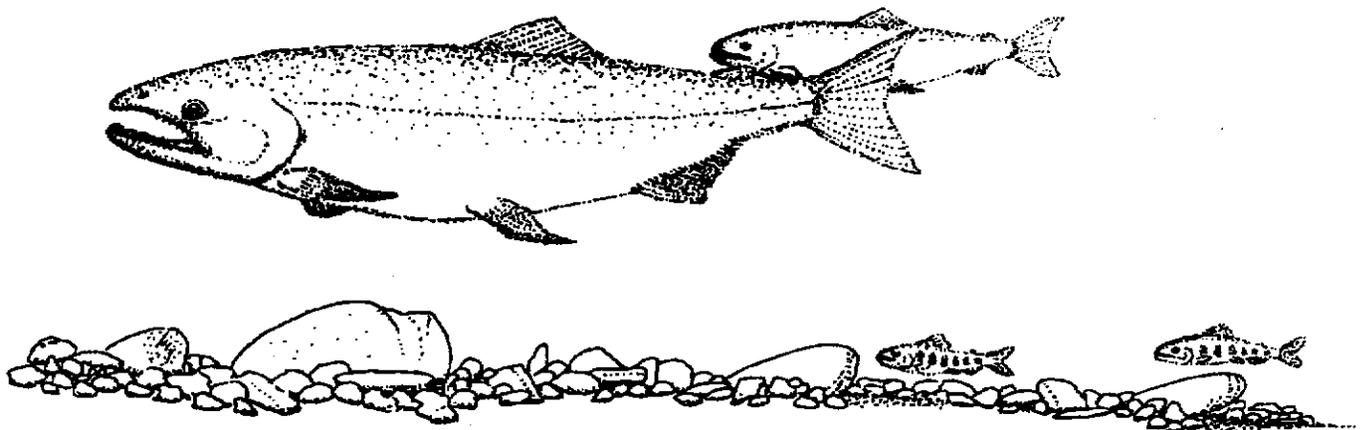
# National Fish Hatchery Programming and Evaluation Activities for Puget Sound and Coastal Washington

## Annual Progress Report 1997-1998

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**Western Washington Office**  
Division of Fisheries and Watershed Assessment  
Branch of Fisheries Assistance

Lacey, Washington  
February 2000



**NATIONAL FISH HATCHERY  
PROGRAMMING AND EVALUATION ACTIVITIES  
FOR PUGET SOUND AND COASTAL WASHINGTON  
ANNUAL PROGRESS REPORT 1997-1998**

**Thomas R. Kane  
U.S. Fish and Wildlife Service  
Western Washington Office  
Division of Fisheries and Watershed Assessment  
Branch of Fisheries Assistance  
Lacey, Washington**

**February 2000**

## PREFACE

The purpose of this report is to document annual hatchery programming and evaluation activities at U.S. Fish and Wildlife Service fish hatcheries on the Olympic Peninsula of Washington. Although this report contains some analysis of existing data and may recommend changes to programming activities, the intent is to provide annual updates and not to provide comprehensive analysis of the various programs. Individual broodyear reports will also be prepared to describe what is known about the production and performance of different hatchery stocks by brood. Comprehensive analytical reports that encompass multiple broodyears will be produced intermittently to describe trends in survival and production of the hatchery stocks. While one person may be listed as the author of an individual report, all reports result from the collaborative efforts of the staffs of the National Fish Hatcheries, Branch of Fisheries Assistance, and Fish Health Center.

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## INTRODUCTION

This report contains information regarding hatchery programming and evaluation activities at Quilcene, Makah, and Quinault National Fish Hatcheries (NFH) conducted from August 1, 1997 to July 31, 1998. The information is compiled using the Fisheries Resource Evaluation Database (FRED) (USFWS, 1991), designed and maintained by the Western Washington Office, Branch of Fisheries Assistance (WFOBFA). This database provides administratively required information, data used to describe biological characteristics of hatchery stocks, and data to correlate fish rearing variables with survival characteristics of hatchery stocks. A general summary of the types of data routinely collected at each facility is presented in Table 1. Summarized data for this reporting period are contained in Tables 2 through 8. Specific details about the data or the database are available from the Branch of Fisheries Assistance.

Fish production levels for all three hatcheries are determined in cooperation with representatives of the U.S. Fish and Wildlife Service (USFWS), tribal staffs, and the Washington Department of Fish and Wildlife (WDFW). Harvest levels, stock survival rates, wild stock interactions, and hatchery production capabilities are all considered when establishing production numbers. Programmed production goals for the broods reported in this document are presented in Table 2.

Hatchery evaluation teams for each hatchery met as specified by the USFWS Region 1 Vision Action Plan. The teams function as a focal point for involved Fish and Wildlife Service employees to participate in the programming and evaluation of the hatchery products. Membership includes hatchery staff, Olympia Fish Health Center staff, and WFOBFA staff.

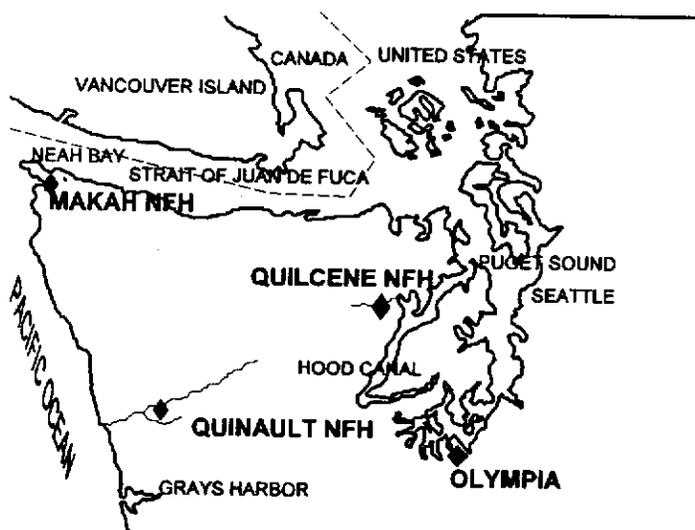


Figure 1. Western Washington locale map.

## QUILCENE NATIONAL FISH HATCHERY

The Quilcene NFH production program operates under the guidance of the Hood Canal Salmon Management Plan and the Hood Canal Production Evaluation Program (brood years 1988-1993). Fish production levels are determined cooperatively with representatives from the USFWS, Point No Point Treaty Council, and WDFW. Coho smolt production for the on-station release was mass marked with an adipose fin clip to identify them as hatchery fish for harvest in selective sport fisheries. Paired tag groups, both clipped and unclipped, were released to model survival of unclipped wild stocks and to determine mortality effects on those fish caught in selective fisheries but released based on their adipose clip status. Summer chum continue as a high priority program at the hatchery. Hood Canal summer chum were listed by National Marine Fisheries Service in March 1999 as threatened under the Endangered Species Act.

### Coho

Releases and Transfers: Coho production at Quilcene NFH included 452,203 Quilcene stock yearlings. No fingerlings were released upstream in lieu of adult passage this year, since adults were known to have passed above the electric weir during a power outage. In February, 1998 we transferred 239,730 Quilcene coho pre-smolts from the 1996 brood to the Skokomish tribe for rearing at their Quilcene Bay net-pen facility. We also transferred 450,000 eyed eggs to the George Adams state fish hatchery for subsequent hatching, rearing, and transfer to the Port Gamble tribal net pen program.

Tags and Marks Applied: We coded-wire tagged 46,641 adipose-clipped coho and 48,198 unclipped coho for the Quilcene Bay net pen program. Another 79,506 adipose clipped but untagged coho were marked for the Quilcene Bay net pen program. We coded-wire tagged 46,163 adipose-clipped coho and 42,931 unclipped coho for the on-station release. Another 266,567 adipose clipped but untagged coho were marked for the Quilcene on-station release.

Terminal Area Returns, 1997: Adult returns provided sufficient spawners to meet program needs for 1997. Escapement to the hatchery was 27,915. Net fisheries harvested 1,503 coho in the terminal fishery in Quilcene Bay.

Recoveries of Coded-Wire Tags: Seventy-one percent (19,947) of the coho returning to the hatchery were sampled for coded-wire tags. One thousand five hundred fifty tags were recovered, representing eleven different codes. Expanding the tag recoveries to account for the sampling rate yields an estimated total of 2,042 tag recoveries. One hundred and fifty-nine (10%) of these tag recoveries were

from coho that originated from releases from net-pen programs in Quilcene and Port Gamble Bays. Besides hatchery recoveries, Canadian and Washington sport and commercial fisheries also catch Quilcene NFH coho.

Egg viability study: We conducted a study to determine if the eye-up rate of eggs that flowed freely ("loose") from ripe females differed from the eye-up rate of eggs that remained in the ovaries and required extra manipulation ("shaken") to free them into the spawning vessel. Eye-up for loose eggs was 87.6% and for shaken eggs was 77.3%. The results for the two groups were significantly different,  $t=3.10$ ,  $df=9$ ,  $\alpha=0.013$ . A similar test was conducted with Quinault NFH coho with similar, though not as statistically significant results.

Discussion/Recommendations: The coho program at Quilcene continues to support sport and commercial fisheries in Canadian and US waters and a terminal fishery in Quilcene Bay. Due to the earlier run timing of Quilcene stock coho, there is concern about the interception harvest of summer chum, which enter Quilcene Bay simultaneously. Fishery managers have modified the terminal coho fishery to emphasize beach seine methods, which allow fishers to return summer chum to the water alive.

### Spring Chinook

Releases and Transfers: The hatchery released no spring chinook during this period. This production program was terminated in 1994 due to poor survival rates.

Terminal Area Returns, 1997: A total of 17 spring chinook adults returned to the hatchery rack. The run fell far short of the necessary escapement of 500 adults. We biosampled 12% of the return to find age composition. Age five fish were most common.

Recoveries of Coded-Wire Tags: All spring chinook returning to the hatchery were sampled for coded-wire tags. One tag was recovered. Besides hatchery recoveries, Canadian and Washington sport and commercial fisheries catch Quilcene spring chinook.

Discussion/Recommendations: This program has been discontinued at Quilcene due to poor return rates and the lack of a genetically pure donor stock. All adults were disposed of during this reporting period, as the state program at the Hood Canal Hatchery has also been discontinued.

## Summer Chum

Releases and Transfers: The hatchery released a total of 340,744 feeding summer chum fry in 1998. We transferred 157,000 eyed summer chum eggs to WDFW for rearing and reintroduction into Big Beef Creek.

Marks Applied: We marked approximately 342,000 summer chum with an adipose fin clip in March 1998. Returning fish with adipose clips will document the success of the hatchery program and will allow for separation of hatchery-origin and natural-origin adults.

Terminal Area Returns, 1997: Five hundred fifty-seven adult summer chum were handled at the hatchery. These fish came from returns to the hatchery rack and from broodstocking conducted during the coho fishery held in Quilcene Bay. In addition, an estimated 7,339 fish remained in the river and spawned naturally. We biosampled 83% of the summer chum at the hatchery to determine age composition. Three-year-old fish predominated in the run processed at the hatchery.

Recoveries of Coded-Wire Tags: Five hundred thirty-five (96%) of the summer chum handled at the hatchery were sampled for coded-wire tags from fish released from the 1992 brood. We recovered 3 tags representing two different codes.

Discussion/Recommendations: Total returns of large numbers of adult to the Big Quilcene River indicate positive results from hatchery supplementation and significant progress toward restoration of the run.

## Fall Chum

Releases and Transfers: The hatchery released 1,625,323 feeding chum fry into the Big Quilcene River.

Terminal Area Returns, 1997: A total of 4,158 adult fall chum returned to the hatchery rack. In addition, an estimated 3,558 fish remained in the river and spawned naturally. We biosampled 11% of the hatchery return to determine age composition. Most of the fish were four years old. Run reconstruction by WDFW shows that over 9,100 fall chum (4,200 natural origin, 4,900 hatchery origin) from the Quilcene River system were caught in 1997 net fisheries in Washington waters.

Discussion/Recommendations: This program continues successfully as a composite of hatchery and natural production.

## MAKAH NATIONAL FISH HATCHERY

Guidance for fish production at Makah NFH is provided through a steering committee with representation from the USFWS, the Makah Tribe, and WDFW. The 1996 coho brood was treated with an experimental furunculosis vaccine, as was the 1995 brood. Coho smolt production was mass marked with an adipose fin clip to identify them as hatchery fish for harvest in selective sport fisheries. Paired tag groups, both clipped and unclipped, were released to determine mortality effects on those fish caught in selective fisheries but released based on their adipose clip status.

### Coho

Releases and Transfers: Coho production at Makah NFH included 234,999 yearlings and 375,000 subyearlings released into the Sooes River. We transferred 42,390 subyearling coho to the Makah Tribe for further rearing, imprinting, and release at their Educket Creek facility on the Waatch River system.

Tags and Marks Applied: In December 1997 we applied coded-wire tags to 50,514 adipose-clipped coho and 39,633 unclipped coho for the Sooes River release. Another 144,990 adipose-clipped but untagged coho were also marked for the Sooes River release. We also coded-wire tagged 32,387 adipose-clipped coho and adipose clipped another 10,015 untagged coho for transfer to Educket Creek.

Terminal Area Returns, 1997: Coho returns provided sufficient spawners to meet program needs for 1997. Escapement to the hatchery was 2,685. Of these, we passed 1,805 fish upstream of the weir to contribute to natural production. The Sooes River net fishery harvested 309 coho in the river below the hatchery.

Recoveries of Coded-Wire Tags: Fifty-one percent (1,380) of the coho returning to the hatchery were sampled for coded-wire tags. One hundred thirty-seven tags were recovered, representing eleven different codes. Expansion of tags to account for subsampling of fish passed upstream yields an estimate of 264 tagged fish recovered. Twenty-nine of these tags, representing an estimated fifty tagged fish, originated from releases made from other hatcheries, primarily the Educket Creek facility. Besides hatchery recoveries, Canadian and Washington sport and commercial fisheries also catch Makah NFH coho.

Discussion/Recommendations: We abandoned our previous efforts to separate the timing of the coho run and the chinook run. We were unsuccessful in creating a separation in run timing during the relatively few years of the program, and the chinook run is building to a point where incidental or directed take of chinook during coho fisheries will not negatively impact the program.

### Fall Chinook

Releases and Transfers: The hatchery released 2,202,500 fall chinook in early May and 947,200 fall chinook fingerlings in late May. We are continuing to attempt a strategy of releasing chinook as late as possible (depending on water availability) to improve survival. A total of 531,135 chinook was released or transferred to the tribal facility at Educket Creek.

Tags Applied: A total of 262,800 fall chinook was coded-wire tagged in April 1998. These fish are an indicator group for the Pacific Salmon Treaty chinook stock rebuilding program.

Terminal Area Returns, 1997: A total of 2,875 fall chinook returned to the hatchery rack. We biosampled 34% of the return to determine age composition. Age four fish were most common. We passed 1,110 chinook above the hatchery to spawn in the Sooes River. One thousand five hundred and sixteen chinook were reported captured in directed chinook fisheries in the lower Sooes River.

Recoveries of Coded-Wire Tags: Sixty-one percent (1,765) of the fall chinook returning to the hatchery were sampled for coded-wire tags. Seventy-eight tags were recovered, representing 11 different codes. Expansion of tags to account for subsampling of fish passed upstream yields an estimate of 143 tagged fish recovered. Besides hatchery recoveries, Canadian, Alaskan, and Washington sport and commercial fisheries catch Makah NFH fall chinook.

Discussion/Recommendations: The chinook program continues to build at Makah. This year marked the first directed fishery for chinook since the hatchery began operating in 1981. A recurring problem at the hatchery is the lack of water in the Sooes River when adult chinook return. The hatchery is unable to operate the fish ladder until fall flows increase and adults must hold in the river below the weir.

## Winter Steelhead

Releases and Transfers: The hatchery released a total of 164,580 steelhead yearlings and 176,000 subyearling fish into the Sooes River. Twenty-five thousand one hundred eighty-five steelhead subyearlings were transferred to the Makah Tribe for rearing and release at their Educket Creek facility.

Marks Applied: No steelhead were marked. Previously marked year classes indicate that hatchery origin steelhead have a well-defined earlier return timing than wild origin steelhead.

Terminal Area Returns, 1997-98: A total of 449 adult steelhead returned to the hatchery rack from September 15 to February 17. After that time the ladder was closed and fish were allowed to pass upstream uncounted. Based on previous mark recoveries, we know that fish returning in the fall and winter are of hatchery origin and that fish returning in the early spring are of wild origin. We biosampled 84% of the hatchery steelhead to find age composition. Most of the fish were three-year-olds. A total of 1,705 steelhead was caught in net fisheries in the Sooes and Waatch Rivers.

## Fall Chum

Releases and Transfers: The hatchery released no chum fry in 1998.

Terminal Area Returns, 1997: No adult fall chum are recorded as having returned to the hatchery rack. Twenty-one fish were harvested in net fisheries in the Sooes River.

Discussion/Recommendations: This program was discontinued in 1996. The chum run in the Sooes River has historically been small as there is limited estuarine area for juvenile growth. The production program was founded with outside stocks, which have been unsuccessful at increasing the run size.

## QUINAULT NATIONAL FISH HATCHERY

Production levels for Quinault NFH are set through joint agreement between the USFWS and the Quinault Tribe in a steering committee. We forwarded three items to policy representatives for resolution: language changes to the cooperative agreement, options for managing risk to the Quinault NFH fall chinook broodstock program, and an unfunded plan for a coho rearing density study. This year the Service conducted weekly spawning surveys for fall chinook on the one mile of Cook Creek below the hatchery. Coded-wire tags from the surveys, numbers of live and dead fish observed, and redd counts were provided to Quinault Tribal fisheries for expansion and reporting. The Chinook Technical Committee of the Pacific Salmon Commission has requested the escapement information in order to use the Quinault River stock as an indicator group.

### Coho

Releases and Transfers: Coho production at Quinault NFH included 688,204 yearlings released on-station.

Tags Applied: We applied coded-wire tags to 85,545 adipose-clipped coho yearlings in November 1997 and 84,393 unclipped coho in March 1998 for the on-station release to Cook Creek. This pairing of tagged fish will be used to assess harvest mortality in selective ocean fisheries that use the adipose clip as an identifier for harvestable fish.

Terminal Area Returns, 1997: Coho returns provided sufficient spawners to meet program needs for 1997. Escapement to the hatchery was 865 adults and jacks. The Quinault River net fishery harvested an estimated 58 fish of Quinault NFH origin.

Recoveries of Coded-Wire Tags: We sampled 87% of the coho returning to the hatchery for coded-wire tags. One hundred fifty-eight tags were recovered, representing nine different codes. Expanding for subsampling of the run estimates that 180 tagged fish returned. Besides hatchery recoveries, Canadian and Washington sport and commercial fisheries also catch Quinault NFH coho.

Egg viability study: We conducted a study to determine if the eye-up rate of eggs that flowed freely ("loose") from ripe females differed from the eye-up rate of eggs that remained in the ovaries and required extra manipulation ("shaken") to free them into the spawning vessel. Eye-up for loose eggs was 74.0% and for shaken eggs was 64.6%. The results for the two groups were significantly

different,  $t=1.87$ ,  $df=11$ ,  $\alpha=0.089$ . A similar test was conducted with Quilcene NFH coho with similar, though more statistically significant results.

Discussion/Recommendations: Coho density levels have been reduced since the 1991 brood in an attempt to produce smolts with a lower incidence of bacterial kidney disease. It is thought that kidney disease may be a factor in the low coho survival rates (~2.0% mean) seen at Quinault NFH.

### Fall Chinook

Releases and Transfers: The hatchery released 550,408 fall chinook fingerlings of mixed Cook Creek stock and Quinault Lake stock into Cook Creek.

Tags Applied: In May 1998 we coded-wire tagged 204,406 fall chinook for release into Cook Creek. This release is tagged as an indicator group for the Pacific Salmon Commission's chinook stock rebuilding program.

Terminal Area Returns, 1997: One hundred sixty-eight fall chinook returned to the hatchery rack. We scale sampled 67% of the fish at the hatchery to determine age composition. Most of the fish were four years old. An estimated 446 chinook of Quinault NFH origin were caught in Quinault River fisheries.

Recoveries of Coded-Wire Tags: All fall chinook handled at the hatchery were sampled for coded-wire tags. We recovered 89 tags, representing 13 different codes. Besides hatchery recoveries, Canadian, Alaskan, and Washington sport and commercial fisheries catch Quinault NFH fall chinook.

Discussion/Recommendations: Insufficient broodstock were obtained from the run into the hatchery to meet the programmed production of 600,000 chinook. Additional eggs were obtained from broodstock captured with tended gillnets fished at the tribe's Quinault Lake net pen facility.

### Winter Steelhead

Releases and Transfers: The hatchery released 175,974 yearling steelhead at the hatchery and 49,102 at Allen's Bar on the Hoh River. A release of 44,000 sub-yearling steelhead was made into the Raft River. Transfers to tribal facilities included 44,955 fish to the Hoh Tribal facility at Chalaat Creek.

Tags and Marks Applied: Coded-wire tags were applied to 31,315 steelhead for the on-station release to Cook Creek. A total of 14,594 steelhead for transfer to the Chalaat Creek facility was coded-wire tagged and 6,000 fish were adipose-clipped only. A total of 15,365 steelhead for the release at Allen's Bar on the Hoh River was coded-wire tagged and an additional 6,000 fish for this release were adipose clipped to identify them as hatchery fish. Tagging and clipping was conducted in November and December 1997. We had intended to adipose clip all of the fish for the Hoh River release and Chalaat Creek transfer but had to stop marking due to a severe parasite infestation (*Epistylus sp.*)

Terminal Area Returns, 1997-98: A total of 2,228 adult steelhead returned to the hatchery rack. We biosampled 23% of the returning steelhead to determine age composition. Most of the fish were four-year-olds. An estimated 1,442 steelhead were caught in terminal fisheries in the 1997-98 catch year.

Recoveries of Coded-Wire Tags: All returning steelhead were sampled for coded-wire tags. Ninety tags were recovered, representing six different codes. Nineteen of these tag recoveries were from fish released at the Quinault Tribal facility at Salmon River (Queets) or from Quinault NFH origin steelhead transferred to other facilities or released off-station, at Chalaat Creek, or Hoh River.

Discussion/Recommendations: The steelhead program continues to support a vigorous net fishery in the Quinault River and a sport fishery in both the Quinault River and Cook Creek.

### Fall Chum

Releases and Transfers: The hatchery released a total 356,235 feeding chum fry in 1998.

Terminal Area Returns, 1997: A total of 594 adult fall chum returned to the hatchery rack. We biosampled 41% of the rack return to determine age composition. Age three fish were most common. Considerable spawning has been documented in Cook Creek below the hatchery rack.

Discussion/Recommendations: The large spawning population of chum in Cook Creek supports the notion that this stock should be considered a wild/hatchery composite.

## ACKNOWLEDGMENTS

Much of the data required for hatchery evaluation, programming, and coordination is collected solely by hatchery staff. That which is not is collected cooperatively with WWOBFA staff. Many suggested program changes and evaluation ideas originate from hatchery personnel. Makah, Quinault, and Quilcene NFH staff have contributed significantly to the current success and future direction of the hatcheries through their innovative ideas and cooperative natures. Fishery catch data are the result of sampling programs conducted by the WDFW, Northwest Indian Fish Commission, and the Quinault Department of Natural Resources.

## LITERATURE CITED

USFWS. 1991. Fisheries Resource Evaluation Database Users Manual. Western Washington Fishery Resource Office. Olympia, Washington. 131pp.

Table 1. Fisheries Resource Evaluation Database (FRED) data collected from Olympic Peninsula National Fish Hatcheries, August 1, 1997 to July 31, 1998.

	Quilcene NFH				Makah NFH				Quinalt NFH			
	Coho	Spring chinook	Summer chum	Fall chum	Coho	Fall chinook	Winter steelhead	Fall chum	Coho	Fall chinook	Winter steelhead	Fall chum
Adult entry	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fish removal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Group spawning	✓		✓	✓	✓	✓	✓		✓	✓	✓	✓
Mark sampling	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mark recovery	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Scale sample		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Marking	✓		✓		✓	✓		✓	✓	✓		✓
Fish/egg transfer	✓		✓		✓		✓		✓	✓		✓
General release	✓		✓	✓	✓		✓		✓	✓		✓
Specific release	✓		✓	✓	✓		✓		✓	✓		✓

Table 2. Programmed production for broods released from Olympic Peninsula National Fish Hatcheries, 8/1/97 - 7/31/98.

Hatchery	Species	Broodyear	Life stage	Number to release	Number to transfer
Quilcene NFH	Coho	1997	egg	0	450,000
	Coho	1996	smolt	450,000	300,000
	Summer chum	1997	fed-fry	400,000	200,000
	Fall chum	1997	fed-fry	2,200,000	0
Makah NFH	Coho	1996	smolt	250,000	50,000
	Fall chinook	1997	smolt	3,200,000	100,000
	Winter steelhead	1997	smolt	175,000	25,000
Quinault NFH	Coho	1996	smolt	660,000	0
	Fall chinook	1997	smolt	600,000	0
	Winter steelhead	1997	smolt	240,000	0
	Winter steelhead	1997	fingerling	0	50,000
	Fall chum	1997	fed-fry	1,500,000	0

Table 3. Release and tagging information for Olympic Peninsula National Fish Hatcheries, August 1, 1997 to July 31, 1998.

Hatchery	Species	Brood	Stock	Release site	Release date(s)	Size at release (g)	Tagcode	Tags released	Tag rejects released	Untagged released	Percent of release tagged	Month tagged	Size at tagging (g)	Tag retention rate (%)		
Quilcene	Coho	96	Quilcene River	Quilcene River	05/04/98	24.4	055025	11,333	164	66,756	19.1	Nov 97	15.1	98.6		
		96	"	"	05/04/98	24.4	055026	11,553	142	67,906	19.1	Nov 97	15.1	98.8		
		96	"	"	05/04/98	24.4	055027	11,314	0	65,694	19.1	Nov 97	15.1	100		
		96	"	"	05/04/98	24.4	055028	11,211	192	66,211	19.1	Nov 97	15.1	98.3		
		96	"	"	05/04/98	24.4	630258	9,815	460	23,290	19.1	Jan 98	18.1	95.5		
		96	"	"	05/04/98	24.4	630260	10,455	413	24,635	19.1	Jan 98	18.1	96.2		
		96	"	"	05/04/98	24.4	630263	10,397	364	24,392	19.1	Jan 98	18.1	96.6		
		96	"	"	05/04/98	24.4	630301	10,194	675	24,637	19.1	Jan 98	18.1	93.8		
		Summer chum	97	"	"	04/02/98-04/15/98	1.6			340,744						
		Fall chum	97	"	"	04/30/98	1.0			1,625,323						
		Makah	Coho	96	Sooes River	Sooes River	04/14/98-04/15/98	31.6	051263	10,043	185	29,423	37.2	Jan 98	15.1	98.2
				96	"	"	04/14/98-04/15/98	31.6	051316	9,864	202	0	37.2	Jan 98	15.1	98.0
				96	"	"	04/14/98-04/15/98	31.6	051317	10,025	148	29,265	37.2	Jan 98	15.1	98.5
				96	"	"	04/14/98-04/15/98	31.6	051318	9,874	260	0	37.2	Jan 98	15.1	97.4
96	"			"	04/14/98-04/15/98	31.6	055029	9,565	264	28,275	37.2	Dec 97	15.1	97.3		
96	"			"	04/14/98-04/15/98	31.6	055030	9,364	652	0	37.2	Dec 97	15.1	93.5		
96	"			"	04/14/98-04/15/98	31.6	055031	9,495	464	28,649	37.2	Dec 97	15.1	95.3		
96	"			"	04/14/98-04/15/98	31.6	055032	9,031	362	0	37.2	Dec 97	15.1	96.1		
96	"			"	04/14/98-04/15/98	31.6	055033	10,068	144	29,377	37.2	Dec 97	15.1	98.6		
97	"			"	"	02/02/98-02/17/98	0.5			375,000						
Fall chinook	97			"	"	04/30/98-05/08/98	6.3	054034	67,595	1,326	1,195,502	8.1	Apr 98	4.5	98.1	
"	97			"	"	05/08/98-05/14/98	6.3	054055	67,337	1,748	868,992	8.1	Apr 98	3.5	97.5	
"	97			"	"	05/22/98	6.3	055034	54,777	3,827	510,596	7.1	Apr 98	2.3	93.5	
"	97			"	"	05/27/98	6.3	055035	51,056	13,419	313,525	7.1	Apr 98	2.5	79.2	
Winter steelhead	97	"	Watch River	03/18/98	1.7			120,000								
"	97	"	Sooes River	04/15/98-04/23/98	64.3			164,580								
"	98	"	"	03/25/98-05/21/98	0.4			176,000								
Quinalt	Coho	96	Quinalt	Cook Creek	04/23/98-04/29/98	29.3	051139	20,676	125	128,552	13.7	Mar 98	20.6	99.4		
		96	"	"	04/23/98-04/29/98	29.3	051320	20,657	116	128,379	13.7	Mar 98	20.6	99.4		
		96	"	"	04/23/98-04/29/98	29.3	051321	20,136	748	129,065	13.7	Mar 98	20.6	96.4		
		96	"	"	04/23/98-04/29/98	29.3	051322	21,228	424	133,811	13.7	Mar 98	20.6	98.0		
		96	"	"	04/23/98-04/29/98	29.3	055021	20,837	245	0	98.9	Nov 97	9.1	98.8		
		96	"	"	04/23/98-04/29/98	29.3	055022	20,543	396	0	98.9	Nov 97	9.1	98.1		
		96	"	"	04/23/98-04/29/98	29.3	055023	20,976	80	0	98.9	Nov 97	9.1	99.6		
		96	"	"	"	"	29.3									

Table 3 (cont.). Release and tagging information for Olympic Peninsula National Fish Hatcheries, August 1, 1997 to July 31, 1998.

Hatchery	Species	Brood	Stock	Release site	Release date(s)	Size at release (g)	Tagcode	Tags released	Tag rejects released	Untagged released	Percent of release tagged	Month tagged	Size at tagging (g)	Tag retention rate (%)
	"	96	"	"	04/23/98-04/29/98	29.3	055024	20,962	248	0	98.9	Nov 97	9.1	98.8
Quinalt	Fall chinook	97	Cook Creek	"	07/01/98	7.5	055036	44,244	4,073	80,589	34.3	May 98	2.8	91.6
	"	97	Quinalt Lake	"	07/01/98	7.5	055038	48,177	2,486	87,744	33.5	May 98	2.3	95.1
	"	97	"	"	07/01/98	7.5	055039	45,133	6,104	88,738	33.5	May 98	2.3	88.1
	"	97	mixed	"	07/01/98	7.3	055037	50,984	1,661	90,475	35.6	May 98	2.8	96.8
	Winter steelhead	97	Cook Creek	"	05/15/98	77.5	215510	30,348	797	138,329	17.9	Nov 97	22.7	97.4
	"	97	"	"	06/09/98	96.6				6,500				
	"	97	"	Hoh River	05/14/98-05/15/98	78.3	210101	15,181	90	33,831	30.9	Dec 97	18.1	99.4
	"	98	"	Raft River	06/28/98	3.7				44,000				
Fall chum		97	Cook Creek	Cook Creek	04/19/98	1.8				356,235				

Table 4. Adipose clip status for coho released from Olympic Peninsula National Fish Hatcheries, August 1, 1997 to July 31, 1998.

Hatchery	Brood	Unclipped			Adipose clipped			percent of release with adipose clip
		Untagged	Tagged	Tagcodes	Untagged	Tagged	Tagcodes	
Quilcene	96	98,866	40,861	630258	267,065	45,411	055025	69.1%
				630260			055026	
				630263			055027	
				630301			055028	
Quinalt	96	521,220	82,697	051319	969	83,318	055021	12.3%
				051320			055022	
				051321			055023	
				051322			055024	
Makah	96	1,476	38,133	051326	146,194	49,196	051263	83.2%
				051318			051317	
				055030			055029	
				055032			055031	
							055033	

Table 5. Transfer information for Olympic Peninsula National Fish Hatcheries, August 1, 1997 to July 31, 1998.

Hatchery	Species	Brood	Stock	Transferred to	Date transferred	Size at transfer (g)	Number of fish
Quilcene	Coho	96	Quilcene	Quilcene Bay Net Pens	02/23/1998	18.1	239,730
Makah	Coho	96	Makah	Educket Creek	03/11/98	24.0	42,390
"	Fall chinook	97	Makah	Educket Creek	02/19/98	1.2	204,000
"	Fall chinook	97	Makah	Educket Creek	03/10/98	1.6	59,860
"	Fall chinook	97	Makah	Educket Creek	03/11/98	1.5	47,275
"	Fall chinook	97	Makah	Educket Creek	04/29/98	3.7	100,000
"	Winter steelhead	97	Makah	Educket Creek	04/02/98	64.9	25,185
Quinalt	Winter steelhead	97	Quinalt	Salmon River	02/03/98	36.6	37,766
"	Winter steelhead	97	"	Chalaat Creek	02/27/98	45.4	44,998

Table 6. Rack return of salmon and steelhead to Olympic Peninsula National Fish Hatcheries, August 1, 1997 to July 31, 1998.

Hatchery	Species	Number returned
Makah NFH	Coho	2,685
	Cutthroat	2
	Fall chinook	2,875
	Winter steelhead	449
Quilcene NFH	Fall chum	4,158
	Coho	5,813
	Spring chinook	17
	Summer chum <sup>1</sup>	557
Quinault NFH	Fall chum	594
	Coho	865
	Fall chinook <sup>1</sup>	168
	Winter steelhead	2,228

<sup>1</sup> From broodstocking efforts and rack return.

Table 7. Age composition of salmon and steelhead returning to Olympic Peninsula National Fish Hatcheries, 1997-98, in percent.

Species	Hatchery	age2	age3	age4	age5	age6	percent of run aged
Chum	Quilcene	0	8	91	1	0	11
	Quinalt	0	63	36	1	0	39
Summer chum	Quilcene	0	89	6	5	0	82
Fall chinook	Makah	2	5	89	4	0	32
	Quinalt	2	19	54	22	3	64
Spring chinook	Quilcene	0	0	0	100	0	12
Winter steelhead	Makah	1	55	43	0	0	84
	Quinalt	0	46	54	0	0	23

Table 8. Recoveries of coded-wire tags from Olympic Peninsula National Fish Hatcheries, 8/1/97 - 7/31/98.

Hatchery	Species	Number of codes	Number of tags	Expansion factor
Quilcene NFH	Spring chinook	1	1	1.00
	Coho	11	1,550	1.32
	Summer Chum	2	3	1.00
Quinalt NFH	Fall chinook	13	89	1.07
	Coho	9	158	1.14
	Winter steelhead	6	90	1.09
Makah NFH	Fall chinook	11	78	1.83
	Coho	11	137	1.93

2,106