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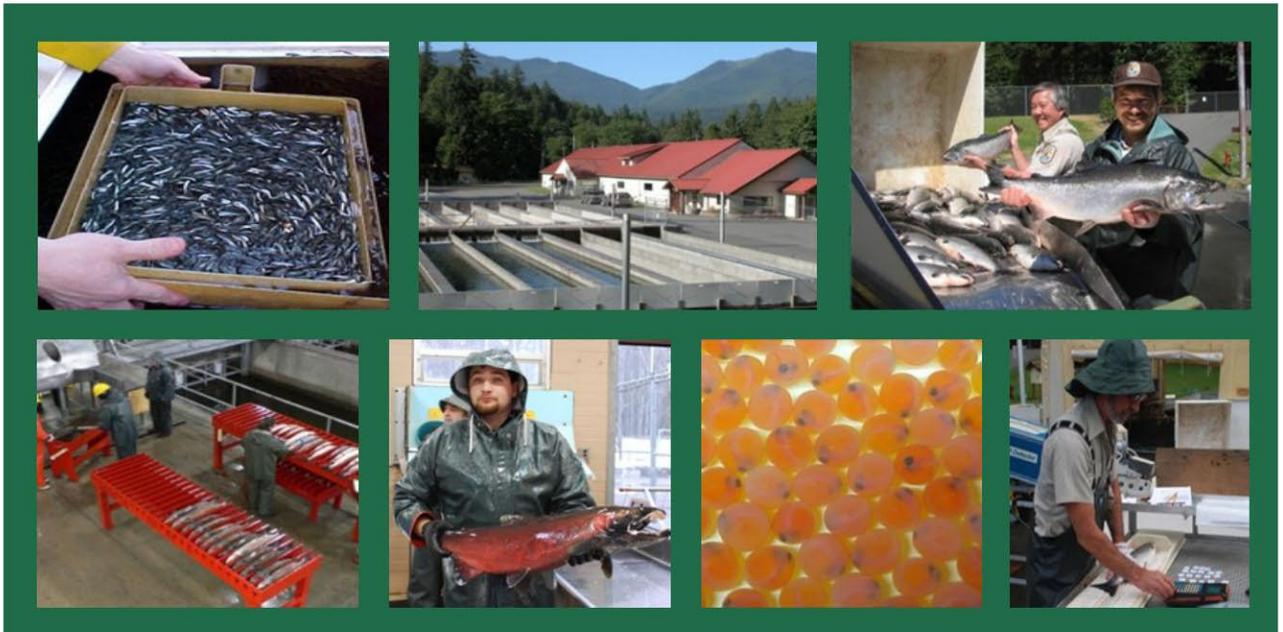
# Broodyear Report for Olympic Peninsula National Fish Hatcheries

*2001 Brood*

*March 2011*

*By Mark T. Celedonia*

*Washington Fish & Wildlife Office  
Lacey, Washington*



**Front cover photo descriptions and photo credits**

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1. One tray of 5,000 coho buttoned up fry being placed into distribution tank. Photo credit: Ron Wong
2. Quilcene National Fish Hatchery. Photo credit: Ron Wong
3. Left to right: Ron Wong, Paul Kaiser surplussing excess coho salmon to the tribes. Photo credit: Larry Telles
4. Makah National Fish Hatchery spawning facility. Photo credit: T.A. Peterschmidt
5. Joe Lemieux preparing to spawn a coho salmon at Quinault National Fish Hatchery. Photo credit: Bill Edwards.
6. Eyed fish eggs. Photo credit: Ron Wong
7. Dave Zajac collecting and entering information on a coded wire tagged coho salmon adult on a data logger. Photo credit: Ron Wong

**BROODYEAR REPORT FOR OLYMPIC PENINSULA  
NATIONAL FISH HATCHERIES**

**2001 BROOD**

by

Mark T. Celedonia

U.S. Fish and Wildlife Service  
Washington Fish and Wildlife Office  
Fisheries Division  
510 Desmond Dr. SE, Suite 102  
Lacey, Washington 98503

March 2011

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## INTRODUCTION

The U.S. Fish and Wildlife Service's (USFWS) Pacific Region Fisheries Program Strategic Plan states that USFWS will provide "...timely reports on hatchery effectiveness that includes annual updates on hatchery fish production, adult return rates, harvest rates, [and] brood year survival..." among other reporting requirements (USFWS 2009). Brood year reports partially fulfill these requirements by providing data on adults creating the brood, egg production, rearing and release, survival to fisheries, harvest rates, adult return rates, escapement, and overall survival. Broodyear reports are intended to provide a single-broodyear "snapshot" of stock performance. The scope of a broodyear report is to provide summary data only. In-depth analyses of observations and trends are beyond the scope of broodyear reports, and are intended to be addressed in comprehensive analytical reports.

This report contains data from 2001 broods of the following stocks from USFWS Olympic Peninsula National Fish Hatcheries (NFH):

- Makah NFH – Fall Chinook, Coho, Winter Steelhead
- Quilcene NFH – Fall Chum, Summer Chum, Coho
- Quinault NFH - Fall Chinook, Fall Chum, Coho, Winter Steelhead

For each stock, report details are presented chronologically from adult returns used as broodstock (i.e., parent data) through rearing and adult returns (i.e., progeny data) (Table 1). If a section is missing or contains incomplete data it is because those data were not collected or were otherwise unavailable.

All parent data and some progeny data (i.e., incubation, release and transfer, rack return) were derived from the Fisheries Resource Evaluation Database (FRED), maintained at the Washington Fish and Wildlife Office (WFWO) in Lacey, Washington. These parent and progeny data are recorded on-station by USFWS staff and forwarded to WFWO for entry into FRED.

Contribution data were obtained from the Regional Mark Information System (RMIS) website operated by the Pacific States Marine Fisheries Commission (PSMFC) (Nandor et al. 2009). RMIS is a regional coastwide data clearinghouse and interactive on-line data retrieval system containing searchable coded-wire tag (CWT) release and recovery information from Alaska, British Columbia, Washington, Oregon, and California. Data used in this report were extracted from RMIS on August 10, 2010.

Fish counted as rack returns may have originated from hatchery releases or from natural spawning below or above the hatchery. Also, returning adult hatchery fish may not enter the hatchery, but may contribute to natural spawning. Thus, the number of fish shown as rack returns may not accurately represent escapement.

The origin of many adults processed at the hatchery rack can be determined from coded wire tag recoveries. Coded-wire tagging is widely practiced throughout the region at hatcheries and other production facilities, and in some naturally-produced fish for research purposes. Some proportion of all species (except chum salmon) are coded-wire tagged at all three Olympic

Peninsula NFH's. Data for adults returning to their hatchery of origin, including fish that were transferred as juveniles from the hatchery to a net pen or other off-station rearing facility, were expanded to account for sampling effort and total station production (i.e., tagged and untagged fish). Data for identifiable strays (i.e., those with a CWT) from other hatcheries or other sources were expanded to account for sampling effort only. The category "other" includes fish from unidentifiable origins and sampling error. Unidentifiable fish may include strays from other systems, natural spawning of hatchery and/or natural fish below the hatchery, natural spawning of hatchery and/or natural fish passed above the hatchery either intentionally or unintentionally, and hatchery releases not represented by CWT's (e.g., fry outplants). In some cases, data provided for estimated origins conflict with that presented in rack disposition tables. For example, there were 736 Coho jacks identified at the Quilcene NFH rack in 2001. However, estimates based on CWT recoveries suggested that there were 1,605 jacks, a more than two-fold difference. Such discrepancies may arise from CWT sampling error, or from error in properly identifying jacks at the rack. Some jacks can grow quite large and may closely resemble small fully-matured fish, making proper identification difficult if not impossible.

Contribution to fisheries and escapement are based on coded-wire tag recoveries. Data presented are expanded to account for total station production (i.e., paired tagged and untagged releases). Ratios are presented for [catch : escapement] and [sport catch : commercial catch]. For these purposes, tribal treaty catch was included with commercial catch. Escapement includes both hatchery returns and other fish either not captured in a fishery nor returning to the hatchery of origin (usually carcasses found during spawning ground surveys).

Fish removal data were used as a surrogate for parent entry. Adults returning to the hatchery often are not counted or removed on a daily basis, and instead can "stack up" at the hatchery for several days or more prior to removal by hatchery staff. Fish are removed at least on a weekly basis and often are removed daily during peak entry. The dates of removal were used to represent parent entry, and may not represent exact time of entry.

Table 1. Description of sections and data contained in this report.

Section	Description
<b>Parent data</b>	
Run timing	Adult entry and spawning timing, including total counted, date range, and median dates of entry and spawning.
Rack disposition	Disposition (e.g., spawned, surplus, passed upstream, etc.) of adults returning to the hatchery.
Estimated origin of rack returns	Estimated origin of fish returning to the hatchery rack, based on CWT recoveries.
Spawned fish data	Age, sex, and size distribution of spawned broodstock.
<b>Progeny data</b>	
Incubation	Number of green eggs taken, mean number of green eggs per female, number of eggs eyed, percent of green eggs eyed, number of eggs hatched, and percent of green eggs hatched .
Release and Transfer	Locations, dates of transfer or release, fish size at transfer or release, number of fish, life history stage, and any associated CWT codes.
Contribution to fisheries and escapement	Number of fish captured in fisheries and returning to natal hatchery, including total survival of released fish, ratio of catch to escapement, and ratio of sport catch to commercial catch. Tribal catch is shown separately and is not included as part of the other commercial catches (i.e., U.S. State or Canadian catch). Tribal catch is considered part of the commercial catch for determining the sport:commercial catch ratio. Contribution estimates are expanded to represent total station production.
Rack return data for the surviving brood	Age, sex, and size distribution of fish returning to the hatchery, based on CWT recoveries. Sample sizes shown reflect unexpanded CWT recoveries.

**CONTRIBUTION SUMMARY**

Hatchery	Species	Escapement	Catch	Total	Total survival
Makah	Fall Chinook	3,537	4,607	8,144	0.26%
Quinalt	Fall Chinook	437	1,757	2,194	0.64%
Quinalt	Fall Chum	1,694	unk <sup>a</sup>	1,694	0.11%
Makah	Coho	2,786	821	3,607	1.52%
Quilcene	Coho	11,227	13,795	25,022	6.45%
Quilcene	Coho, Quilcene Bay Net Pen transfer	517	836	1,353	0.75%
Quinalt	Coho	8,429	12,674	21,103	3.82%
Quinalt	Coho, Camp 7 imprint pond transfer	94	529	623	1.01%
Makah	Winter Steelhead	334	2,001	2,335	1.31%
Quinalt	Winter Steelhead	3,360	1,968	5,328	2.81%
Quinalt	Winter Steelhead, Hoh R. release	105	141	246	0.38%
Quinalt	Winter Steelhead, Chalaat Cr. transfer	23	29	52	0.10%

a Catch in fisheries cannot be determined due to lack of CWT use in Quinalt NFH Fall Chum and lack of genetic stock identification in the fisheries.

The Quilcene NFH Fall Chum and Summer Chum programs were discontinued after BY 2002 and BY 2003, respectively. Therefore, escapement and survival data from BY 2001 were not collected.

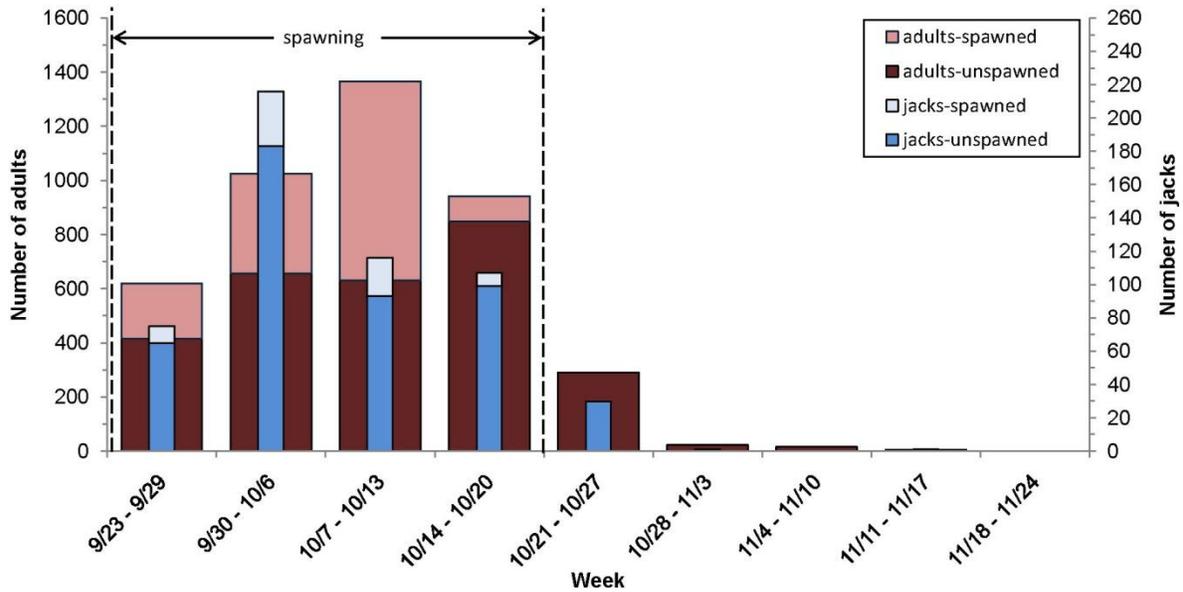
## MAKAH NFH, FALL CHINOOK

### PARENT DATA

Entry date range: 9/27/2001 – 11/19/2001 (median 10/10/2001)

Spawning date range: 9/27/2001 – 10/15/2001 (median 10/9/2001)

Entry and spawning timing:



Rack disposition:

Disposition	Females	Males	Jacks	Unknown or mixed sexes	Total	Percent
Spawned	748	653	74	0	1,475	31
Surplus	4	10	8	0	22	< 1
Passed upstream	594	2,243	463	0	3,300	68
Dead in pond	4	14	1	0	19	< 1
Green females	17	-	-	-	17	< 1
<b>Total returned</b>	<b>1,367</b>	<b>2,920</b>	<b>546</b>	<b>0</b>	<b>4,833</b>	-

**MAKAH NFH, FALL CHINOOK (cont.)**

Origin of rack returns:

Origin	Age	Number of fish
Makah NFH	2	10
Makah NFH	3	75
Makah NFH	4	1,733
Makah NFH	5	891
Makah NFH	6	561
Hoko Hatchery	-	3
Other <sup>a,b,c</sup>	-	1,560

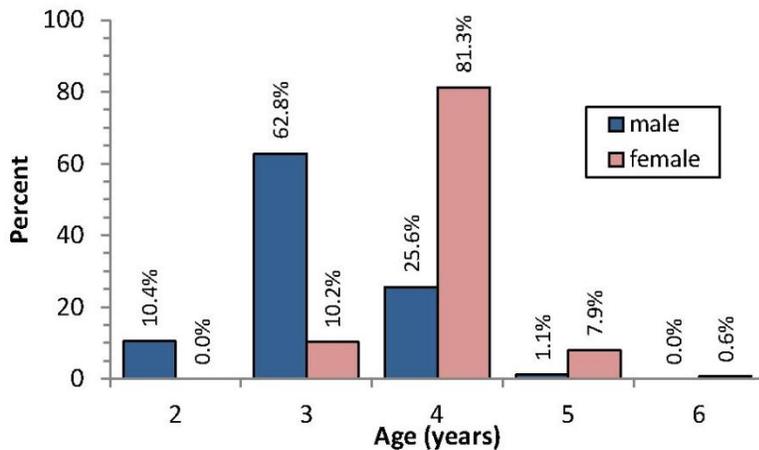
- a Untagged subyearling fish from Makah NFH were outplanted into the Sooes River in 1997 and 2000, and into the Waatch River in 1998.
- b Untagged subyearling fish from Makah NFH were transferred to the Educket Hatchery in 1998 and 1999.
- c Adults were passed above the hatchery in 1997 and 1998.

Sex distribution:

	Males	:	Females	:	Jacks
entry	60%	:	28%	:	11%
spawned	51%	:	44%	:	5%

Age and size distribution of spawned fish:

	Male	Female
Mean age [years] (n)	3.2 (441)	4.0 (491)
Mean FL [mm] (n)	751 (446)	853 (496)



Age	Mean FL [mm] (n)	
	Male	Female
2	461 (46)	
3	737 (277)	681 (50)
4	889 (113)	866 (399)
5	986 (5)	930 (39)
6		905 (3)

**MAKAH NFH, FALL CHINOOK (cont.)**

**PROGENY DATA**

Egg-to-fry incubation and rearing:

Description	Number	Comments
Eggs taken	3,883,464	5,192 eggs per female
Eggs eyed	3,449,779	89% of eggs taken
Fry ponded	3,313,405	85% of eggs taken

Transfers:

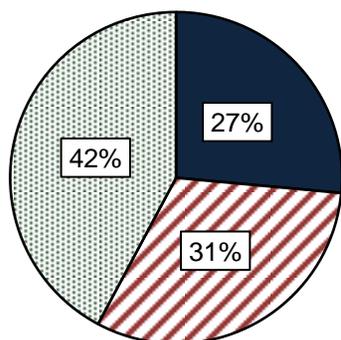
Transfer site	Date	No. fish/lb	No. fish	Stage	Tag codes
Educket Hatchery	4/4/02	280	100,000	fry	(none)

Releases:

Release site	Date	No. fish/lb	No. fish	Stage	Tag codes
Makah NFH	5/20/02 – 6/3/02	65.2	3,070,100	subyearling	
		tagged, clipped	259,391		050781,050782,050783,050784
		tagged, not clipped	0		-
		untagged, clipped	13,526		-
		untagged, not clipped	2,797,183		-

Contribution and survival estimates:

Tag code	Escapement (hatchery)	Sport fisheries			Commercial fisheries			Tribal treaty catch (U.S.)	Total survival
		AK	WA	Ca	AK	WA	Ca		
050781	526	0	19	171	270	18	192	0	0.16%
050782	783	75	0	186	345	0	507	0	0.25%
050783	1,227	34	38	376	655	0	621	24	0.39%
050784	827	66	105	38	450	0	405	12	0.25%
<b>Total</b>	<b>3,363</b>	<b>174</b>	<b>161</b>	<b>771</b>	<b>1,720</b>	<b>18</b>	<b>1,726</b>	<b>36</b>	<b>0.26%</b>



- U.S. catch
- ▨ Canada catch
- ▤ Escapement

Total catch 4,607  
 Catch : Escapement 1.4 : 1  
 Sport : Commercial 1 : 3.2

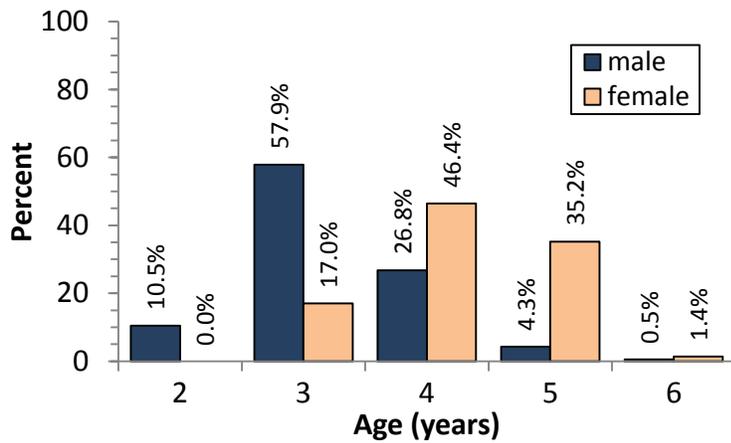
**MAKAH NFH, FALL CHINOOK (cont.)**

Sex distribution of rack returns:

Males : Females : Jacks  
 64% : 28% : 8%

Age and size distribution of rack returns:

	Male	Female
Mean age [years]	3.3 (119)	4.2 (49)
Mean FL [mm]	732 (119)	826 (49)



Age	Mean FL [mm]	
	Male	Female
2	468 (9)	
3	716 (77)	750 (9)
4	837 (25)	823 (17)
5	912 (7)	868 (22)
6	945 (1)	765 (1)

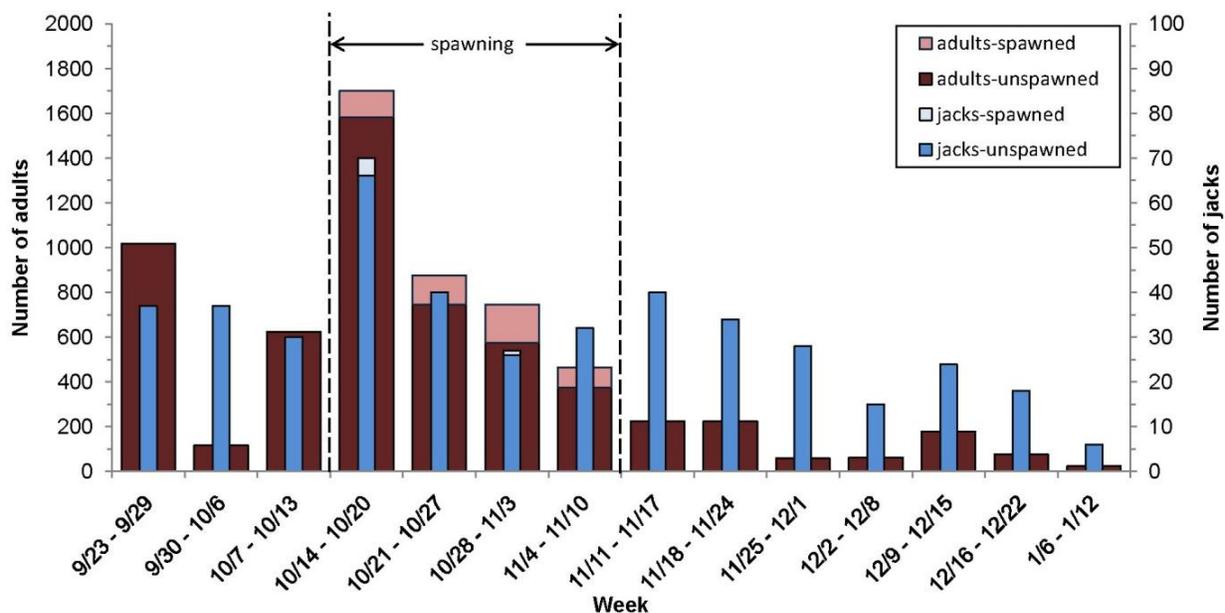
## MAKAH NFH, COHO

### PARENT DATA

Entry date range: 9/24/2001 – 1/7/2002 (median 10/18/2001)

Spawning date range: 10/18/2001 – 11/5/2001 (median 10/29/2001)

Entry and spawning timing:



Rack disposition:

Disposition	Females	Males	Jacks	Unknown or mixed sexes	Total	Percent
Spawned	254	260	5	0	519	8
Surplus	343	196	71	0	610	9
Passed upstream	2,860	2,405	354	0	5,619	82
Dead in pond	32	35	8	0	75	1
Green females	3	-	-	-	3	< 1
<b>Total returned</b>	<b>3,492</b>	<b>2,896</b>	<b>438</b>	<b>0</b>	<b>6,826</b>	-

Origin of rack returns:

Origin	Age	Number of fish
Makah NFH	2	149
Makah NFH	3	4,515
Other <sup>a,b</sup>	-	2,162

a Untagged yearling fish from Makah NFH were transferred to the Educkett Hatchery in 2000 and 2001.

b Adults were passed above the hatchery in 1998 and 1999.

**MAKAH NFH, COHO (cont.)**

## Sex distribution:

	Males	:	Females	:	Jacks
entry	42%	:	51%	:	6%
spawned	50%	:	49%	:	1%

## Size distribution of spawned fish:

	<u>Male</u>	<u>Female</u>	<u>Jack</u>
Mean FL [mm] (n):	761 (106)	727 (83)	365 (1)

**PROGENY DATA**

## Egg-to-fry incubation and rearing:

Description	Number	Comments
Eggs taken	862,697	3,396 eggs per female
Eggs eyed	700,102	81% of eggs taken
Fry ponded	351,500	41% of eggs taken
Eyed eggs discarded	221,102	discard dates: 11/18/01 – 12/13/01
Fry released to basin	127,500	release dates: 1/22/02 – 2/21/02; released prior to ponding

## Transfers:

Transfer site	Date	No. fish/lb	No. fish	Stage	Tag codes
Educket Hatchery	2/26/03	20.1	42,383	yearling	(none)

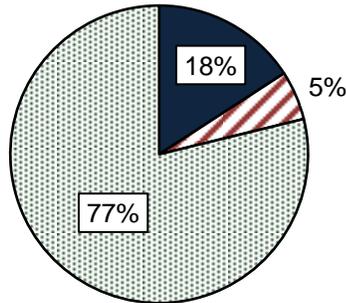
## Releases:

Release site	Date	No. fish/lb	No. fish	Stage	Tag codes
Makah NFH	4/15/03 – 4/16/03	17.1	232,901	yearling	
	tagged, clipped		35,602		051084, 051086, 051088, 051090
	tagged, not clipped		36,221		050188, 051085, 051087, 051089
	untagged, clipped		157,148		-
	untagged, not clipped		3,930		-

**MAKAH NFH, COHO (cont.)**

Contribution and survival estimates:

Tag code	Escapement (hatchery)	Sport fisheries			Commercial fisheries		Tribal treaty catch (U.S.)	Total survival
		OR	WA	Ca	WA	Ca		
050188	123						2	1.23%
051084	473		133	78			12	1.41%
051085	136					6	3	1.44%
051086	610	38	115		11		17	1.59%
051087	160		2				11	1.73%
051088	647		142		7		31	1.71%
051089	70		2		2		11	0.86%
051090	512	17	79	101				1.56%
<b>Total</b>	<b>2,730</b>	<b>56</b>	<b>472</b>	<b>179</b>	<b>20</b>	<b>6</b>	<b>87</b>	<b>1.52%</b>



■ U.S. catch  
 ■ Canada catch  
 ■ Escapement

Total catch                      821  
 Catch : Escapement      0.3 : 1  
 Sport : Commercial      1 : 0.2

Sex distribution of rack returns:

Males : Females : Jacks  
 41% : 50% : 10%

Size distribution of rack returns:

	Male	Female	Jacks
Mean FL [mm] (n)	741 (162)	700 (202)	375 (7)

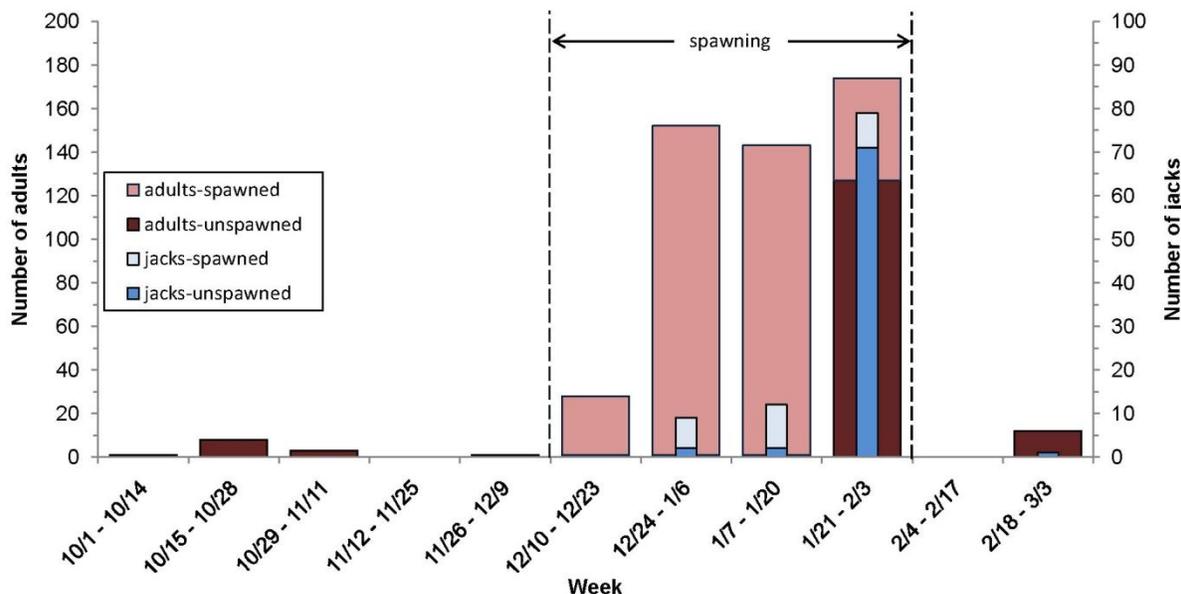
## MAKAH NFH, WINTER STEELHEAD

### PARENT DATA

Entry date range: 10/2/2000 – 2/21/2001 (median 1/16/2001)

Spawning date range: 12/12/2000 – 1/23/2001 (median 1/9/2001)

Entry and spawning timing:



Rack disposition:

Disposition	Females	Males	Jacks	Unknown or mixed sexes	Total	Percent
Spawned	206	161	25	0	392	63
Surplus	94	57	74	0	225	36
Dead in pond	1	1	2	0	4	1
Green females	2	-	-	-	2	< 1
<b>Total returned</b>	<b>303</b>	<b>219</b>	<b>101</b>	<b>0</b>	<b>623</b>	-

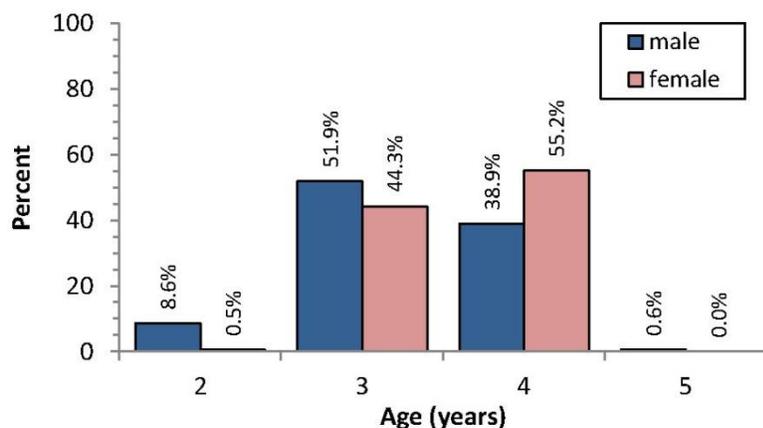
Sex distribution:

	Males	:	Females	:	Jacks
entry	35%	:	49%	:	16%
spawned	41%	:	53%	:	6%

Age and size distribution of spawned fish:

	Male	Female
Mean age [years] (n):	3.3 (162)	3.5 (192)
Mean FL [mm] (n):	698 (162)	724 (192)

**MAKAH NFH, WINTER STEELHEAD (cont.)**



Age	Mean FL [mm] (n)	
	Male	Female
2	448 (14)	636 (1)
3	662 (84)	666 (85)
4	801 (63)	771 (106)
5	834 (1)	

**PROGENY DATA**

Egg-to-fry incubation and rearing:

Description	Number	Comments
Eggs taken	994,784	4,925 eggs per female
Eggs eyed	743,003	75% of eggs taken
Fry ponded	330,000	33% of eggs taken
Eyed eggs discarded	245,841	
Fry released to basin	165,000	release date range: 3/30/01 – 4/25/01; released prior to ponding

Transfers:

Transfer site	Date	No. fish/lb	No. fish	Stage	Tag codes
Educket Hatchery	3/5/02	9.7	48,900	yearling	(none)

Releases:

Release site	Date	No. fish/lb	No. fish	Stage	Tag codes
Makah NFH	3/6/02	9.8	1,960	yearling	(untagged, not clipped)
Makah NFH	5/1/02	7.4	178,050	yearling	
			tagged, clipped	149,614	631092,631098,631164,631168,631169 <sup>a</sup>
			tagged, not clipped	0	-
			untagged, clipped	5,214	-
			untagged, not clipped	23,222	-

<sup>a</sup> Fish from each tag code were fed different diets in the month preceding release as part of a diet manipulation study (Tipping and Zajac 2010).

**MAKAH NFH, WINTER STEELHEAD (cont.)**

Contribution and survival estimates:

Tag code	Escapement (hatchery)	Tribal treaty catch (U.S.)	Total survival <sup>a</sup>
631092	86	478	1.58%
631098	56	345	1.12%
631164	77	405	1.32%
631168	69	474	1.51%
631169	46	299	1.01%
<b>Total</b>	<b>334</b>	<b>2,001</b>	<b>1.31%</b>

Catch : Escapement

6.0 : 1

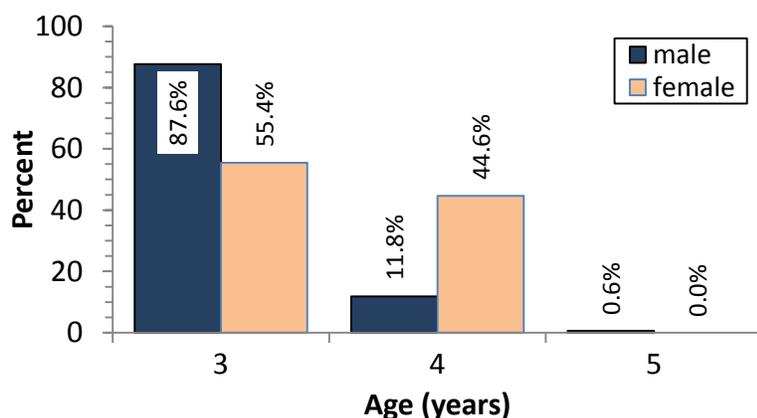
<sup>a</sup> Fish from each tag code were fed different diets in the month preceding release as part of a diet manipulation study (Tipping and Zajac 2010). Diet manipulation was not found to influence survival.

Sex distribution of rack returns:

Males : Females : Jacks  
64% : 36% : 0%

Age and size distribution of rack returns:

	Male	Female
Mean age [years] (n):	3.1 (164)	3.4 (91)
Mean FL [mm] (n):	631 (161)	653 (89)



Age	Mean FL [mm] (n)	
	Male	Female
3	627 (141)	617 (50)
4	751 (19)	730 (39)
5	736 (1)	

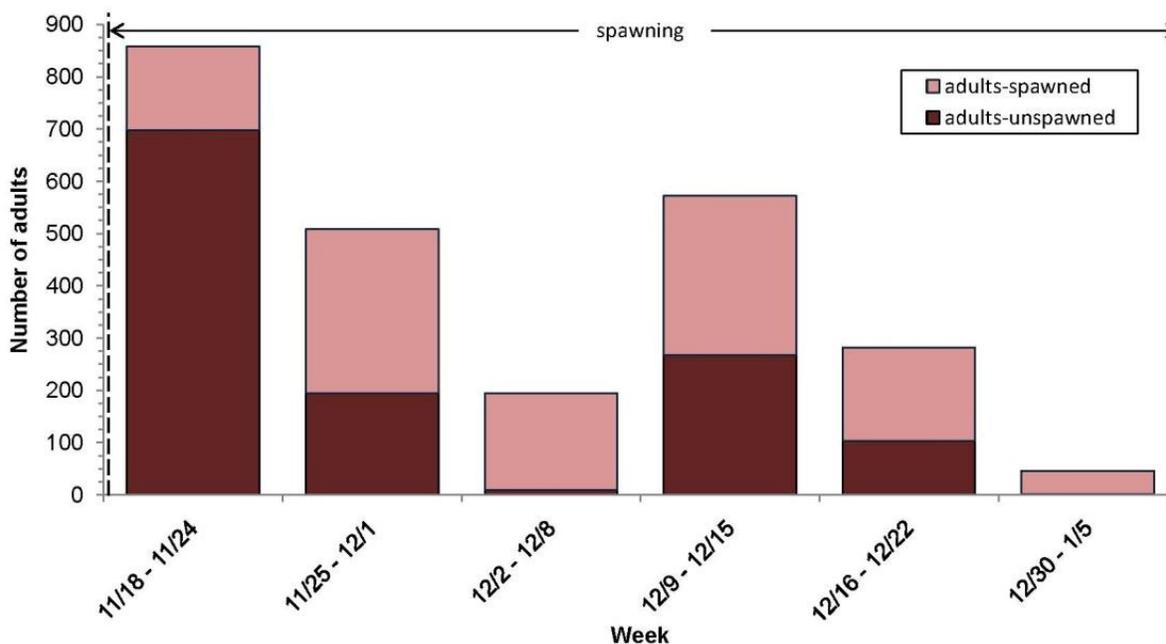
## QUILCENE NFH, FALL CHUM

### PARENT DATA

Entry date range: 11/20/2001 – 12/31/2001 (median 11/27/2001)

Spawning date range: 11/20/2001 – 12/31/2001 (median 12/3/2001)

Entry and spawning timing:



Rack disposition:

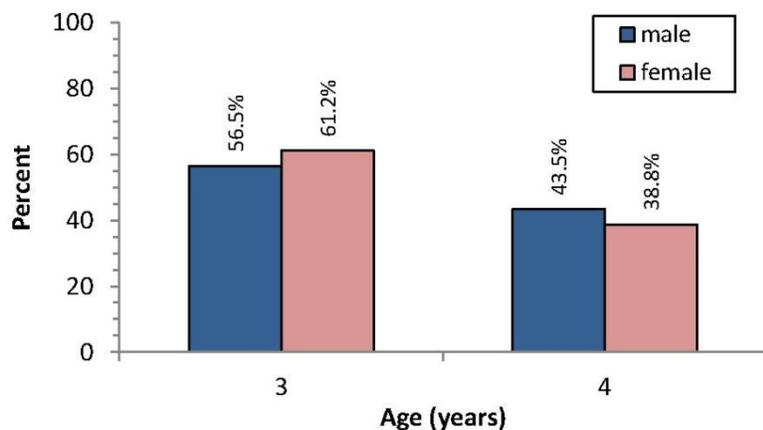
Disposition	Females	Males	Jacks	Unknown or mixed sexes	Total	Percent
Spawned	584	604	0	0	1,188	48
Surplus	96	211	0	856	1,163	47
Bad females	8	-	-	-	8	< 1
Green females	37	-	-	-	37	2
Dead before ponding	2	1	0	62	65	3
<b>Total returned</b>	<b>727</b>	<b>816</b>	<b>0</b>	<b>918</b>	<b>2,461</b>	-

	Males	:	Females	:	Jacks
entry	53%	:	47%	:	0%
spawned	51%	:	49%	:	0%

**QUILCENE NFH, FALL CHUM (cont.)**

Age and size distribution of spawned fish:

	Male	Female
Mean age [years] (n):	3.4 (170)	3.4 (170)
Mean FL [mm] (n):	705 (172)	659 (173)



Age	Mean FL [mm] (n)	
	Male	Female
3	681 (96)	639 (104)
4	737 (74)	700 (66)

**PROGENY DATA**

Egg-to-fry incubation and rearing:

Description	Number	Comments
Eggs taken	1,490,725	2,553 eggs per female
Eggs eyed	1,361,630	91% of eggs taken
Fry ponded	1,361,630	91% of eggs taken

Releases:

Release site	Date	No. fish/lb	No. fish	Stage	Tag codes
Quilcene NFH	5/2/02 – 5/15/02	580.5	1,259,080	fry	(untagged, not clipped)

Note: The Quilcene NFH Fall Chum program was discontinued after BY 2002. Therefore, return data on BY 2001 were not collected.

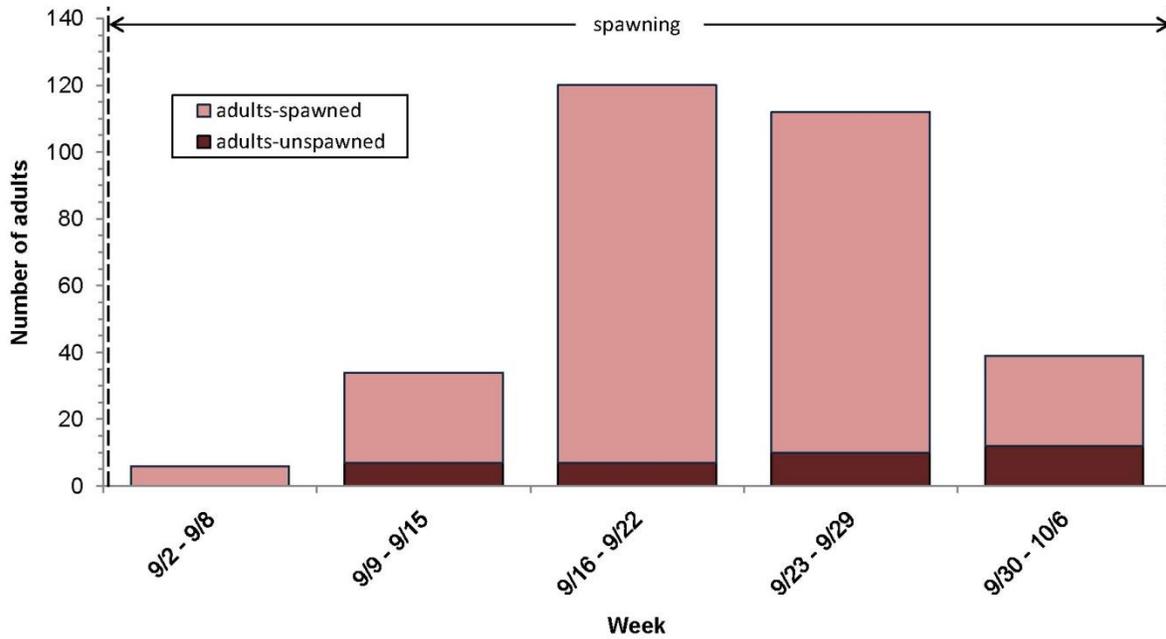
## QUILCENE NFH, SUMMER CHUM

### PARENT DATA

Entry date range: 9/4/2001 – 10/5/2001 (median 9/21/2001)

Spawning date range: 9/4/2001 – 10/5/2001 (median 9/21/2001)

Entry and spawning timing:



Rack disposition:

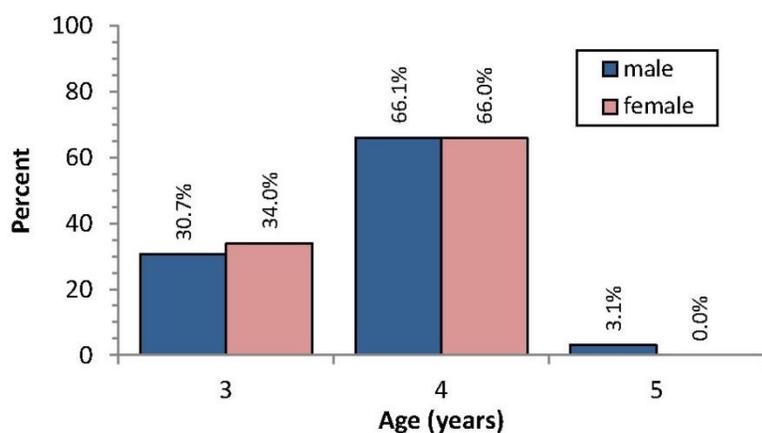
Disposition	Females	Males	Jacks	Unknown or mixed sexes	Total	Percent
Spawned	147	128	0	0	275	88
Returned to stream	0	5	0	0	5	2
Dead in pond	24	6	0	0	30	10
Green females	1	-	-	-	1	< 1
<b>Total returned</b>	<b>172</b>	<b>139</b>	<b>0</b>	<b>0</b>	<b>311</b>	-

	Males	:	Females	:	Jacks
entry	45%	:	55%	:	0%
spawned	47%	:	53%	:	0%

**QUILCENE NFH, SUMMER CHUM (cont.)**

Age and size distribution of spawned fish:

	Male	Female
Mean age [years] (n):	3.7 (127)	3.7 (144)
Mean FL [mm] (n):	704 (128)	650 (147)



Age	Mean FL [mm] (n)	
	Male	Female
3	680 (39)	622 (49)
4	713 (84)	664 (95)
5	754 (4)	

**PROGENY DATA**

Egg-to-fry incubation and rearing:

Description	Number	Comments
Eggs taken	387,504	2,636 eggs per female
Eggs eyed	365,197	94% of eggs taken
Fry ponded	365,197	94% of eggs taken

Releases:

Release site	Date	No. fish/lb	No. fish	Stage	Tag codes	
Quilcene NFH	3/3/02 – 3/22/02	484.9	351,709	fry		
				untagged, clipped	344,675	-
				untagged, not clipped	7,034	-

Note: The Quilcene NFH Summer Chum program was discontinued after BY 2003. Therefore, return data on BY 2001 were not collected.

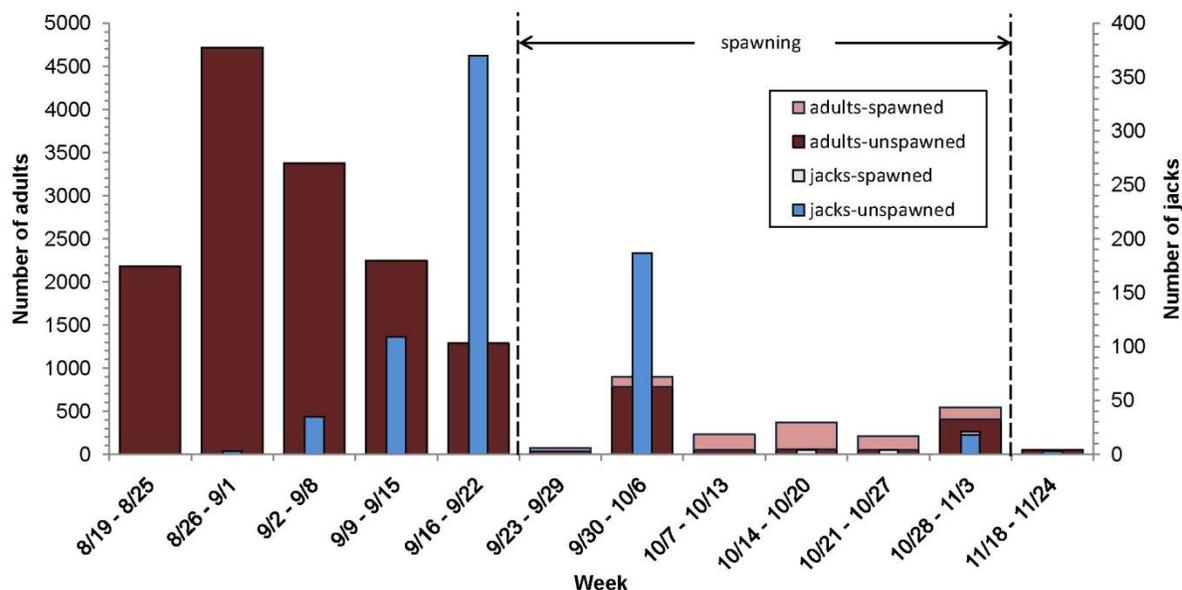
## QUILCENE NFH, COHO

### PARENT DATA

Entry date range: 8/23/2001 – 11/20/2001 (median 9/5/2001)

Spawning date range: 9/24/2001 – 10/30/2001 (median 10/16/2001)

Entry and spawning timing:



Rack disposition:

Disposition	Females	Males	Jacks	Unknown or mixed sexes	Total	Percent of total return
Spawned	480	471	11	0	962	6
Returned to stream	41	321	17	0	379	2
Surplus	0	0	706	14,545	15,251	90
Dead in pond	122	108	1	0	231	1
Dead before ponding	19	18	1	77	115	1
Bad females	3	-	-	-	3	< 1
<b>Total returned</b>	<b>665</b>	<b>918</b>	<b>736</b>	<b>14,622</b>	<b>16,941</b>	-

Origin of rack returns:

Origin	Age	Number of fish
Quilcene NFH	2	1,605
Quilcene NFH	3	9,666
Quilcene Bay Net Pens (from Quilcene NFH)	3	4,396
Port Gamble Bay Net Pens	3	12
Other <sup>a</sup>	-	1,262

a Untagged subyearling fish from Quilcene NFH were outplanted into the Big Quilcene River in 1998 and 1999.

**QUILCENE NFH, COHO (cont.)**

## Sex distribution:

	Males	:	Females	:	Jacks
rack returns	-	:	-	:	-
spawned	49%	:	50%	:	1%

## Size distribution of spawned fish:

	<u>Male</u>	<u>Female</u>	<u>Jack</u>
Mean FL [mm] (n):	623 (122)	601 (118)	311 (3)

**PROGENY DATA**

## Egg-to-fry incubation and rearing:

Description	Number	Comments
Eggs taken	1,295,653	2,699 eggs per female
Eggs eyed	1,231,905	95% of eggs taken
Fry ponded	673,663	55% of eggs taken
Eyed eggs discarded	81,617	
Fry released to basin	26,250	release date range: 1/31/02; released prior to ponding

## Transfers:

Transfer site	Date	No. fish/lb	Number transferred	Stage	Tag codes
George Adams SFH	11/29 – 12/12/01	-	450,375	eyed eggs	-
Quilcene Bay Net Pens	2/13/03	24.2	84,830 95,357	yearling yearling	050999,051064 -

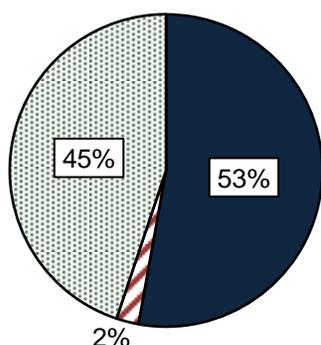
## Releases:

Release site	Date	No. fish/lb	No. fish	Stage	Tag codes
Quilcene NFH	5/3/03 – 5/5/03	22.3	388,212	yearling	
		tagged, clipped	45,691		051076,051078,051080,051083
		tagged, not clipped	48,331		051077,051079,051081,051082
		untagged, clipped	288,697		-
		untagged, not clipped	5,493		-

**QUILCENE NFH, COHO (cont.)**

Contribution and survival estimates, NFH release:

Tag code	Escapement (hatchery)	Escapement (other)	Sport fisheries			Commercial fisheries		Tribal treaty catch (U.S.)	Total survival
			OR	WA	Ca	OR	WA		
050188	2,435	7	39	1,398	102		1,012	160	6.09%
051084	465	3		79			172	65	5.49%
051085	2,512	29	56	1,534	138	23	1,238	450	6.98%
051086	447	4		167			180	32	6.19%
051087	2,358	22	108	1,321	107	22	1,429	352	6.52%
051088	409	1		122			238	18	5.86%
051089	402	3		39			93	17	4.37%
051090	2,122	7	166	1,430	229		1,095	166	6.82%
<b>Total</b>	<b>11,149</b>	<b>78</b>	<b>370</b>	<b>6,089</b>	<b>576</b>	<b>45</b>	<b>5,456</b>	<b>1,259</b>	<b>6.45%</b>

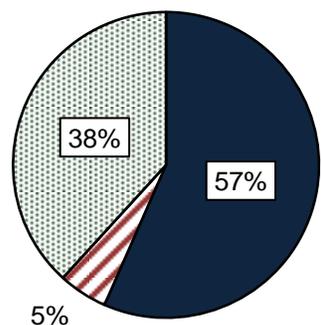


- U.S. catch
- ▨ Canada catch
- ▩ Escapement

Total catch 13,795  
 Catch : Escapement 1.2 : 1  
 Sport : Commercial 1 : 1.0

Contribution and survival estimates, Quilcene Bay Net Pen transfer:

Tag code	Escapement (hatchery)	Escapement (other)	Sport fisheries			Commercial fisheries		Tribal treaty catch (U.S.)	Total survival
			OR	WA	Ca	OR	WA		
050999	263		6	183	70		261	30	0.84%
051064	241	13		75			178	33	0.65%
<b>Total</b>	<b>504</b>	<b>13</b>	<b>6</b>	<b>257</b>	<b>70</b>	<b>0</b>	<b>439</b>	<b>63</b>	<b>0.75%</b>



- U.S. catch
- ▨ Canada catch
- ▩ Escapement

Total catch 836  
 Catch : Escapement 1.6 : 1  
 Sport : Commercial 1 : 1.5

**QUILCENE NFH, COHO (cont.)**

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Sex distribution of rack returns:

Males : Females : Jacks  
46% : 53% : 1%

Size distribution of rack returns:

	<u>Male</u>	<u>Female</u>	<u>Jacks</u>
Mean FL [mm] (n)	611 (972)	609 (1,098)	287 (45)

## QUINAULT NFH, FALL CHINOOK

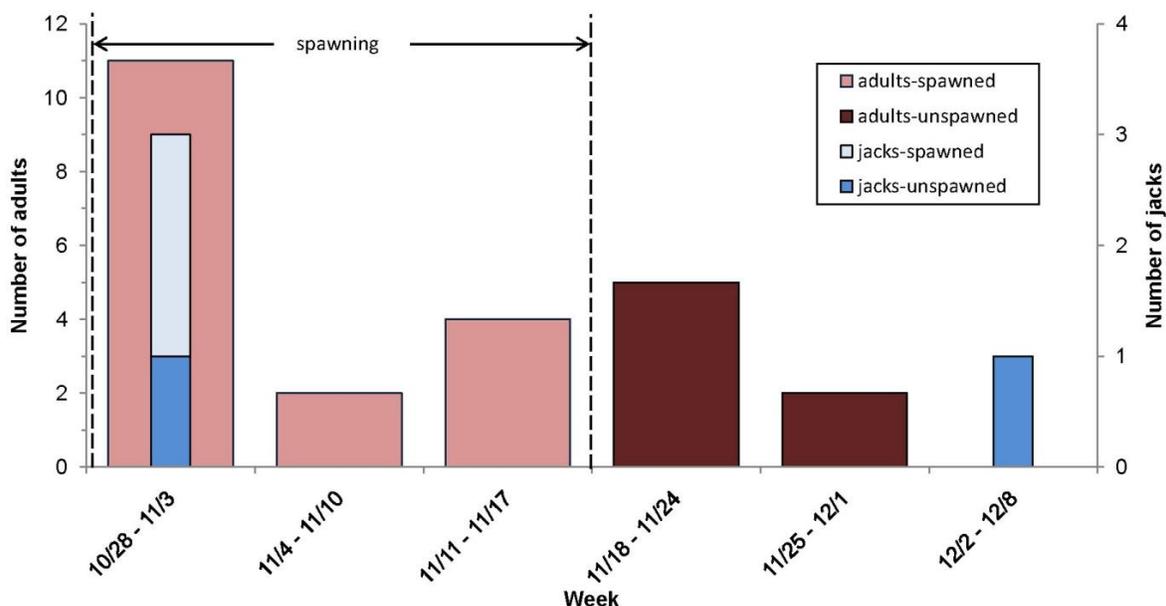
Note: Broodstock were obtained from hatchery returns and from Lake Quinault. Parent data and progeny incubation and rearing data presented below are for hatchery returns only. All other information - including release and contribution and survival data - reflect merged data from both broodstock sources.

### PARENT DATA

Entry date range: 10/29/2001 – 12/4/2001 (median 11/1/2001)

Spawning date range: 10/31/2001 – 11/14/2001 (median 11/1/2001)

Entry and spawning timing:



Rack disposition:

Disposition	Females	Males	Jacks	Unknown or mixed sexes	Total	Percent
Spawned	9	8	2	0	19	68
Dead in pond	1	6	2	0	9	32
<b>Total returned</b>	<b>10</b>	<b>14</b>	<b>4</b>	<b>0</b>	<b>28</b>	-

Origin of rack returns:

Origin	Age	Number of fish
Quinault NFH	2	3
Quinault NFH	3	6
Quinault NFH	4	1
Quinault NFH	5	3
Other	-	15

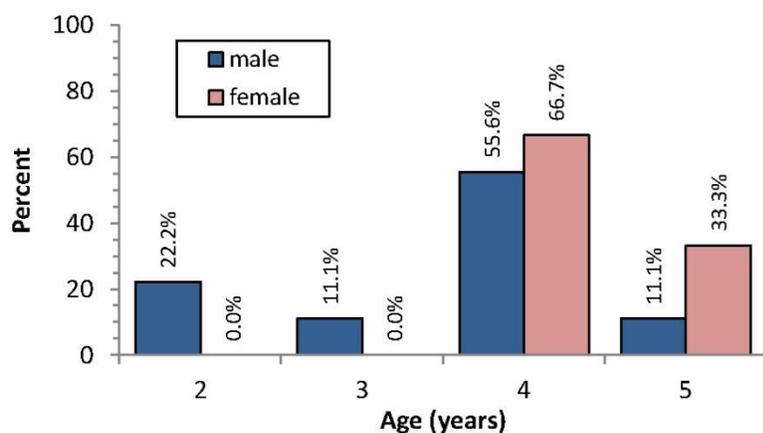
**QUINAULT NFH, FALL CHINOOK (cont.)**

Sex distribution:

	Males	:	Females	:	Jacks
entry	50%	:	36%	:	14%
spawned	42%	:	47%	:	11%

Age and size distribution of spawned fish:

	<u>Male</u>	<u>Female</u>
Mean age [years] (n):	3.6 (9)	4.3 (9)
Mean FL [mm] (n):	738 (9)	904 (9)



Age	Mean FL [mm] (n)	
	Male	Female
2	458 (2)	
3	662 (1)	
4	831 (5)	887 (6)
5	910 (1)	938 (3)

**PROGENY DATA**

Egg-to-fry incubation and rearing:

Description	Number	Comments
Eggs taken	48,443	5,383 eggs per female
Eggs eyed	37,816	78% of eggs taken
Fry ponded	36,849	76% of eggs taken

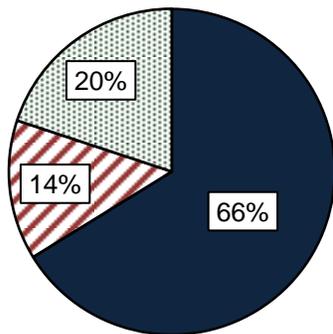
Releases:

Release site	Date	No. fish/lb	No. fish	Stage	Tag codes
Quinault NFH	7/15/02	58.4	344,665 <sup>a</sup>	subyearling	
			tagged, clipped	191,935	050785,050786,050787,050788
			tagged, not clipped	0	-
			untagged, clipped	11,927	-
			untagged, not clipped	140,803	-

**QUINAULT NFH, FALL CHINOOK (cont.)**

Contribution and survival estimates:

Tag code	Escapement		Sport fisheries			Commercial fisheries			Tribal treaty catch (U.S.)	Total survival
	Hatchery	Other	AK	WA	Ca	AK	WA	Ca		
050785	13	180	30		4	93	10	58	283	0.79%
050786	15	177	16		42	97		35	311	0.77%
050787	35	2	19		40	77		81	212	0.56%
050788	9	6	11	3	17	68	9	27	212	0.42%
<b>Total</b>	<b>72</b>	<b>365</b>	<b>77</b>	<b>3</b>	<b>104</b>	<b>335</b>	<b>19</b>	<b>201</b>	<b>1,018</b>	<b>0.64%</b>



■ U.S. catch  
 ■ Canada catch  
 ■ Escapement

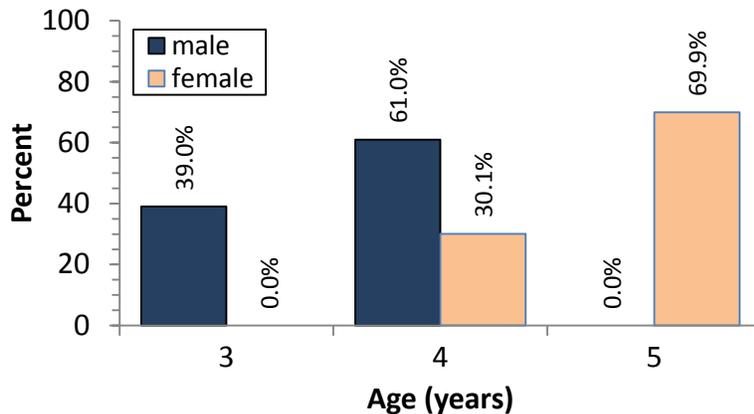
Total catch 1,757  
 Catch : Escapement 4.0 : 1  
 Sport : Commercial 1 : 8.6

Sex distribution of rack returns:

Males : Females : Jacks  
 53% : 47% : 0%

Age and size distribution of rack returns:

	Male	Female
Mean age [years] (n):	3.6 (16)	4.7 (5)
Mean FL [mm] (n):	738 (9)	904 (9)



Age	Mean FL [mm] (n)	
	Male	Female
3	721 (7)	
4	847 (9)	837 (4)
5		934 (1)

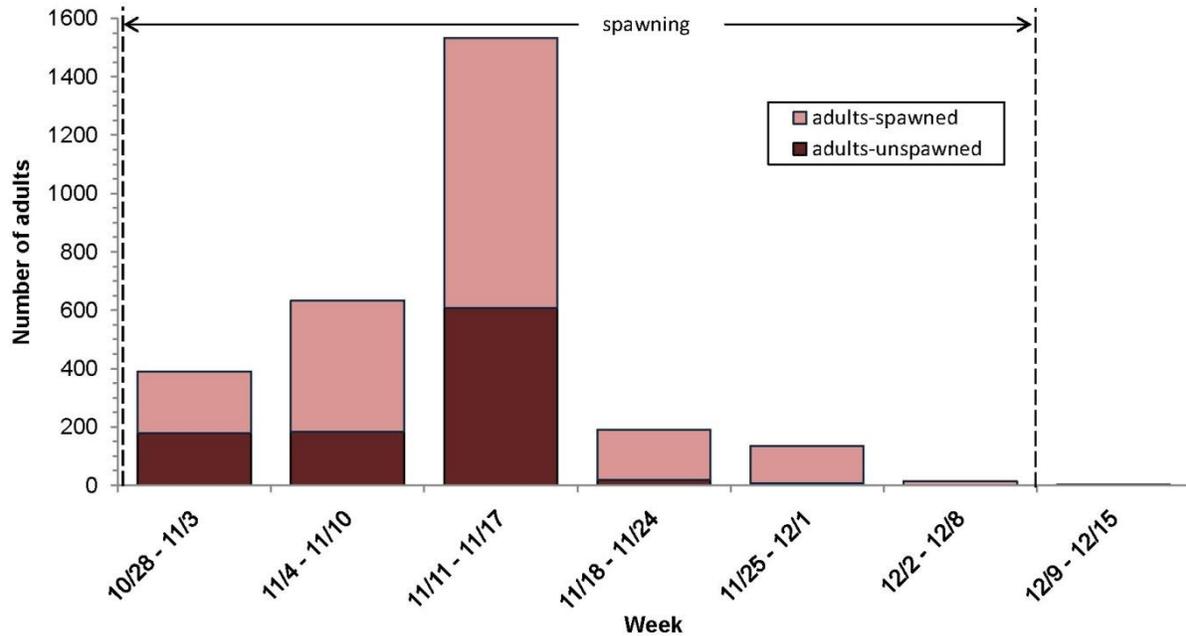
## QUINAULT NFH, FALL CHUM

### PARENT DATA

Entry date range: 10/29/2001 – 12/12/2001 (median 11/13/2001)

Spawning date range: 10/29/2001 – 12/4/2001 (median 11/13/2001)

Entry and spawning timing:



Rack disposition:

Disposition	Females	Males	Jacks	Unknown or mixed sexes	Total	Percent
Spawned	973	926	0	0	1,899	66
Surplus	181	581	0	0	762	26
Dead in pond	114	116	0	0	230	8
Bad females	5	-	-	-	5	< 1
Green females	1	-	-	-	1	< 1
<b>Total returned</b>	<b>1,274</b>	<b>1,623</b>	<b>0</b>	<b>0</b>	<b>2,897</b>	-

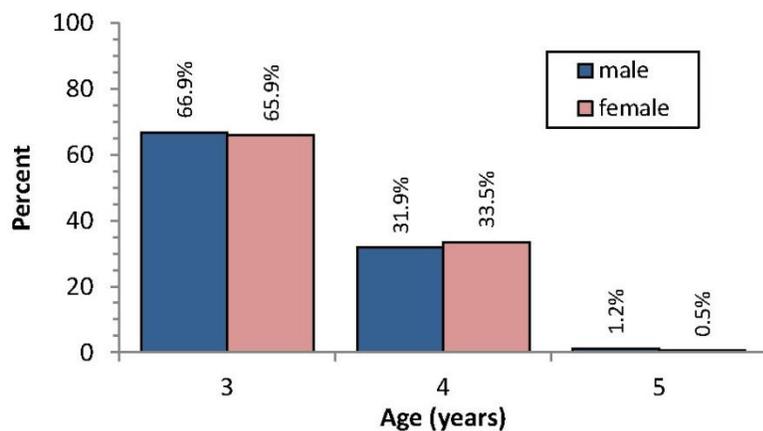
Sex distribution:

	Males	:	Females	:	Jacks
entry	56%	:	44%	:	0%
spawned	49%	:	51%	:	0%

**QUINAULT NFH, FALL CHUM (cont.)**

Age and size distribution of spawned fish:

	Male	Female
Mean age [years] (n):	3.3 (163)	3.3 (185)
Mean FL [mm] (n):	718 (164)	679 (185)



Age	Mean FL [mm] (n)	
	Male	Female
3	703 (109)	662 (122)
4	747 (52)	712 (62)
5	754 (2)	700 (1)

**PROGENY DATA**

Egg-to-fry incubation and rearing:

Description	Number	Comments
Eggs taken	2,281,053	2,344 eggs per female
Eggs eyed	1,623,761	71% of eggs taken
Fry ponded	1,607,524	70% of eggs taken

Releases:

Release site	Date	No. fish/lb	No. fish	Stage	Tag codes
Quinault NFH	3/26/02 – 4/10/02	562.6	1,605,185	fry	(untagged, not clipped)

Escapement (to hatchery): 1,694

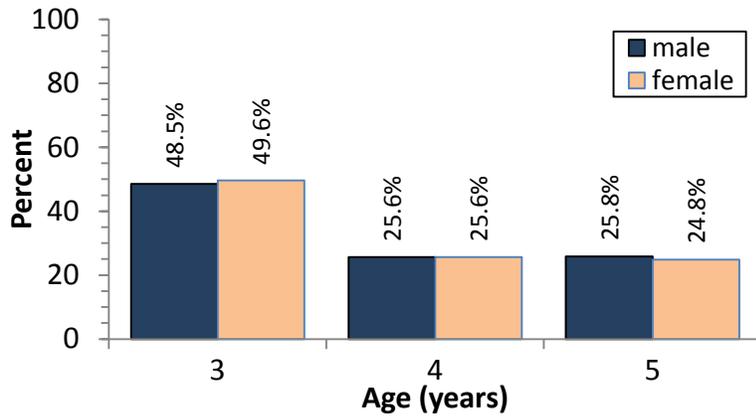
Total survival (excluding catch in fisheries): 0.11%

Note: Catch in fisheries cannot be determined due to lack of CWT use in Quinault NFH Fall Chum and lack of genetic stock identification in the fisheries.

**QUINULT NFH, FALL CHUM (cont.)**

Age and size distribution of rack returns:

	Male	Female
Mean age [years] (n):	3.8 (153)	3.8 (181)
Mean FL [mm] (n):	733 (153)	686 (181)



Age	Mean FL [mm] (n)	
	Male	Female
3	692 (49)	661 (72)
4	748 (69)	674 (68)
5	797 (35)	750 (41)

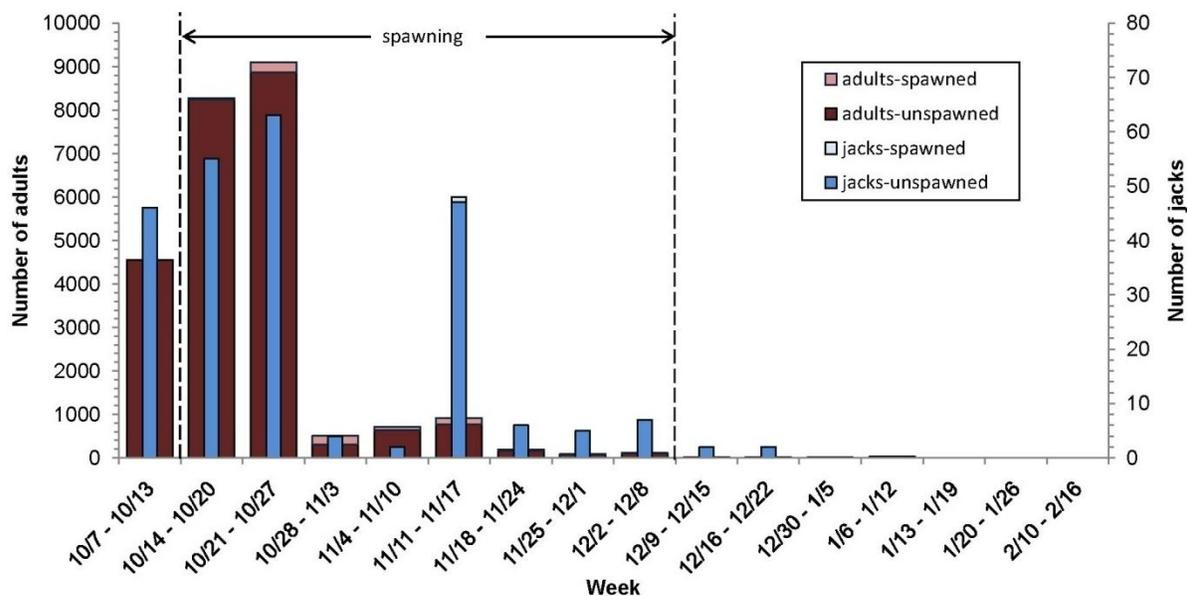
## QUINAULT NFH, COHO

### PARENT DATA

Entry date range: 10/9/2001 – 2/13/2002 (median 10/18/2001)

Spawning date range: 10/17/2001 – 12/4/2001 (median 11/1/2001)

Entry and spawning timing:



Rack disposition:

Disposition	Females	Males	Jacks	Unknown or mixed sexes	Total	Percent
Spawned	386	374	1	0	761	3
Surplus	9,717	8,903	163	0	18,783	76
Dead, other causes	2,530	2,024	46	0	4,600	19
Dead in pond	338	259	30	0	627	3
Green females	18	-	-	-	18	< 1
Bad females	2	-	-	-	2	< 1
<b>Total returned</b>	<b>12,991</b>	<b>11,560</b>	<b>240</b>	<b>0</b>	<b>24,791</b>	-

Origin of rack returns:

Origin	Age	Number of fish
Quinault NFH	2	223
Quinault NFH	3	15,492
Camp 7 Imprint Pond (from Quinault NFH)	3	326
Other <sup>a</sup>	-	8,750

<sup>a</sup> Untagged subyearling fish from Quinault NFH were released from the hatchery in 2000.

**QUINALT NFH, COHO (cont.)**

Sex distribution:

	Males	:	Females	:	Jacks
entry	47%	:	52%	:	1%
spawned	49%	:	51%	:	< 1%

Size distribution of spawned fish:

	<u>Male</u>	<u>Female</u>	<u>Jack</u>
Mean FL [mm] (n):	685 (60)	707 (76)	(0)

**PROGENY DATA**

Egg-to-fry incubation and rearing:

Description	Number	Comments
Eggs taken	1,154,801	2,992 eggs per female
Eggs eyed	774,788	67% of eggs taken
Fry ponded	732,248	63% of eggs taken

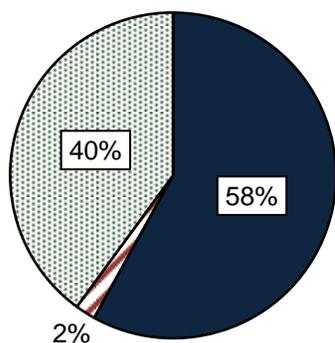
Releases:

Release site	Date	No. fish/lb	No. fish	Stage	Tag codes
Camp 7 imprint pond	3/11/03	19.2	61,470	yearling	050299
		tagged, clipped	19,864		
		untagged, clipped	41,606		
Quinalt NFH	4/15/03 – 4/23/03	17.1	522,274	yearling	050281,050282,050283,050284, 050285,050286,050287,050289, 050291,050293,050297,050364, 050366
		tagged, clipped	250,392		
		tagged, not clipped	131,619		
		untagged, clipped	162,333		
		untagged, not clipped	7,930		
					-
					-

**QUINAULT NFH, COHO (cont.)**

Contribution and survival estimates (Quinault NFH releases):

Tag code	Escapement		Sport fisheries			Commercial fisheries				Tribal treaty catch (U.S.)	Total survival
	Hatchery	Other	OR	WA	Ca	AK	OR	WA	Ca		
050281	512		36	73				4		679	4.32%
050282	586		16	78				7	11	669	4.63%
050283	710		52	129	144			8		913	5.85%
050284	537		46	94				3	2	488	3.89%
050285	500		15	120	24					733	4.40%
050286	550	2	26	95	92			17	9	721	4.62%
050287	523		21	83			9	25	9	635	4.19%
050288	328	1		9				3		361	3.67%
050289	522		35	61	55		3			557	3.98%
050290	324	1		1						507	4.35%
050291	464		27	86			5	3	9	452	3.35%
050292	259			3				3		356	3.17%
050293	150		12	64		5		3	9	449	2.05%
050294	132									304	2.04%
050297	851		15	82		6		17		531	4.69%
050298	433							3		490	4.70%
050364	344		23	88	26		2	53		662	3.67%
050365	160		2	3				5		299	2.30%
050366	313		2	63	31			8		503	2.75%
050367	228			9			6			275	2.57%
<b>Total</b>	<b>8,425</b>	<b>4</b>	<b>330</b>	<b>1,139</b>	<b>373</b>	<b>11</b>	<b>26</b>	<b>163</b>	<b>49</b>	<b>10,584</b>	<b>3.82%</b>



- U.S. catch
- Canada catch
- Escapement

Total catch                    12,674

Catch : Escapement        1.5 : 1

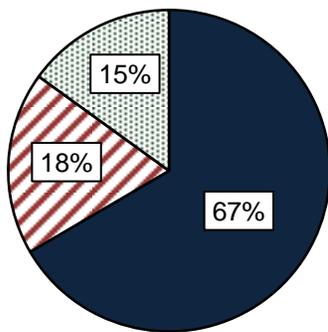
Sport : Commercial        1 : 5.9

**QUINULT NFH, COHO (cont.)**

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Contribution and survival estimates (Camp 7 imprint pond releases):

Tag code	Escapement (hatchery)	Sport fisheries		Commercial fisheries (WA)	Tribal treaty catch (U.S.)	Total survival
		WA	Ca			
050188	94	50	115	6	359	1.01%



- U.S. catch
- ▨ Canada catch
- ▩ Escapement

Total catch                    529

Catch : Escapement        5.7 : 1

Sport : Commercial        1 : 2.2

Sex distribution of rack returns:

Males : Females : Jacks

49% : 46% : 5%

Size distribution of rack returns:

	<u>Male</u>	<u>Female</u>	<u>Jack</u>
Mean FL [mm] (n):	660 (750)	691 (707)	344 (78)

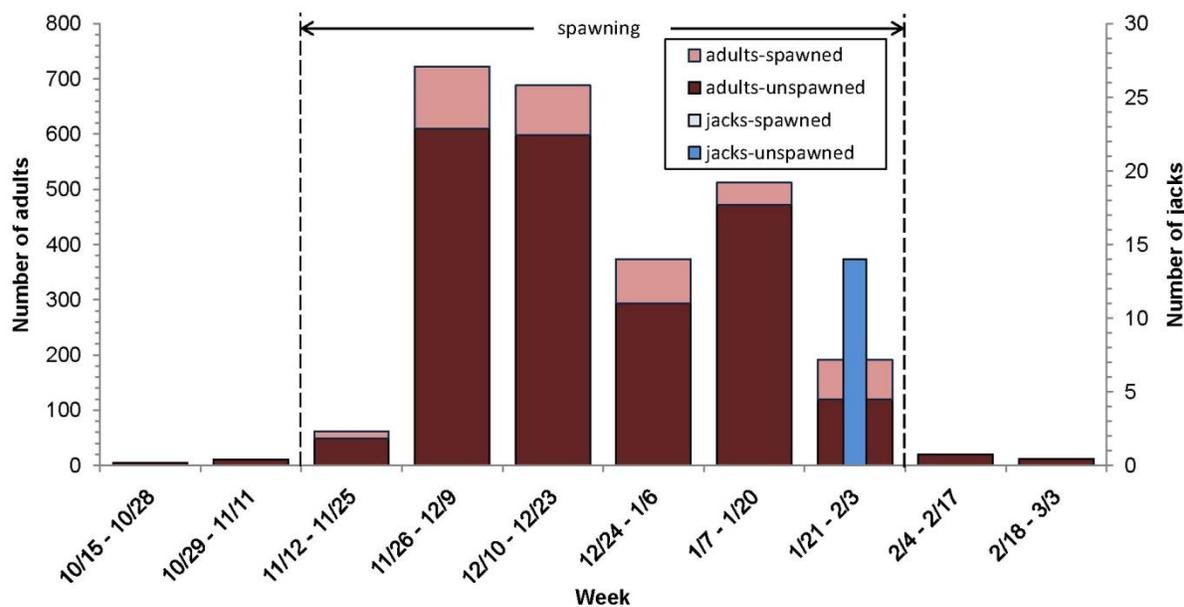
## QUINAULT NFH, WINTER STEELHEAD

### PARENT DATA

Entry date range: 10/18/2000 – 2/21/2001 (median 12/20/2000)

Spawning date range: 11/21/2000 – 1/31/2001 (median 12/20/2000)

Entry and spawning timing:



Rack disposition:

Disposition	Females	Males	Jacks	Unknown or mixed sexes	Total	Percent
Spawned	199	208	0	0	407	16
Surplus	1,097	1,051	14	0	2,162	83
Dead in pond	13	22	0	0	35	1
Spawned out	4	-	-	-	4	< 1
Green females	3	-	-	-	3	< 1
Jump out	1	0	0	0	1	< 1
<b>Total returned</b>	<b>1,317</b>	<b>1,281</b>	<b>14</b>	<b>0</b>	<b>2,612</b>	-

**QUINAULT NFH, WINTER STEELHEAD (cont.)**

Origin of rack returns:

Origin	Age	Number of fish
Quinault NFH	3	911
Quinault NFH	4	553
Hoh R. (from Quinault NFH)	4	16
Hoh R. (from Quinault NFH)	5	4
Chalaat Crk. Hatch. (from Quinault NFH)	4	3
Other <sup>a,b</sup>	-	1,125

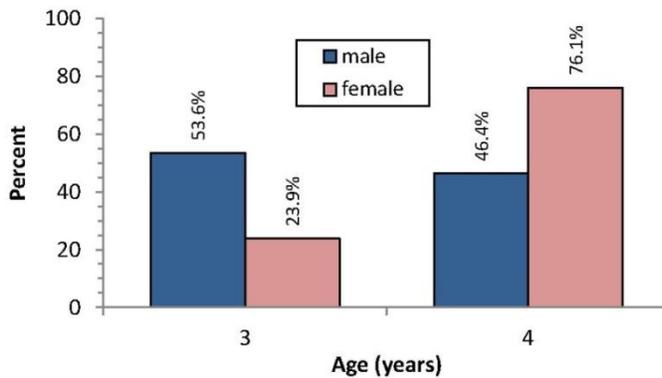
- a Untagged subyearling fish from Quinault NFH were released into the Raft River in 1996, 1997, and 1998.
- b Untagged yearling fish from Quinault NFH were released from the hatchery in 1996 and 1997.

Sex distribution of rack returns:

	Males	:	Females	:	Jacks
entry	49%	:	50%	:	1%
spawned	51%	:	49%	:	0%

Age and size distribution of rack returns:

	Male	Female
Mean age [years] (n):	3.5 (84)	3.8 (88)
Mean FL [mm] (n):	726 (84)	734 (88)



Age	Mean FL [mm] (n)	
	Male	Female
3	665 (45)	639 (21)
4	797 (39)	763 (67)

**QUINAULT NFH, WINTER STEELHEAD (cont.)**

**PROGENY DATA**

Egg-to-fry incubation and rearing:

Description	Number	Comments
Eggs taken	858,704	4,315 eggs per female
Eggs eyed	710,500	83% of eggs taken
Fry ponded	341,250	40% of eggs taken
Eyed eggs discarded	118,000	discarded 1/17/01 – 3/7/01
Fry discarded	242,092	discarded 2/23/01 – 4/24/01

Transfers:

Transfer site	Date	No. fish/lb	Number transferred	Stage	Tag codes
Chalaat Creek Hatchery	1/17/02	10.4	53,571	yearling	210337
		tagged, clipped	14,085		
		untagged, clipped	39,486		

Releases:

Release site	Date	No. fish/lb	No. fish	Stage	Tag codes
Quinalt NFH	4/16/02	5.8	189,707	yearling	210328
		tagged, clipped	24,695		
		untagged, clipped	1,016		
		untagged, not clipped	163,996		
Hoh River	4/17/02 – 4/19/02	6.4	65,351	yearling	210336
		tagged, clipped	14,149		
		untagged, clipped	51,202		

Contribution and survival estimates (Quinalt NFH release):

Tag code	Escapement		Tribal treaty catch (U.S.)	Total survival	Catch : Escapement
	Hatchery	Other			
210328	3,352	8	1,968	2.81%	0.6 : 1

Contribution and survival estimates (Hoh River releases):

Tag code	Escapement (hatchery)	Commercial (WA)	Tribal treaty catch (U.S.)	Total survival	Catch : Escapement
210336	105	5	136	0.38%	

Contribution and survival estimates (Chalaat Creek Hatchery release):

Tag code	Escapement (hatchery)	Tribal treaty catch (U.S.)	Total survival	Catch : Escapement
210337	23	29	0.10%	

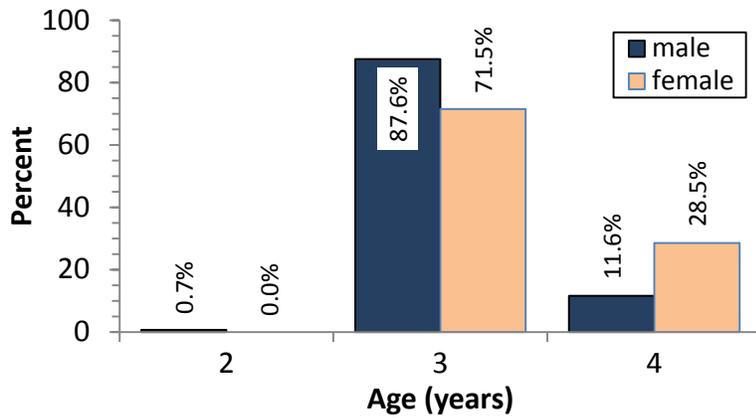
**QUINULT NFH, WINTER STEELHEAD (cont.)**

Sex distribution of rack returns:

Males : Females : Jacks  
 56% : 44% : < 1%

Age and size distribution of rack returns:

	Male	Female
Mean age [years] (n):	3.1 (158)	3.3 (139)
Mean FL [mm] (n):	726 (84)	734 (88)



Age	Mean FL [mm] (n)	
	Male	Female
2	427 (1)	
3	636 (127)	624 (82)
4	771 (30)	730 (57)

## REFERENCES

- Nandor, G.F., J.R. Longwill, and D.L. Webb. 2009. Overview of the Coded Wire Tag Program in the Greater Pacific Region of North America. pages 5-46 in K.S. Wolf and J.S. O'Neal, eds., Tagging, Telemetry, and Marking Measures for Monitoring Fish Populations. Pacific Northwest Aquatic Monitoring Partnership Special Publication 2010-02. <http://www.pnamp.org/TTM>
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- U.S. Fish and Wildlife Service (USFWS). 2009. Pacific Region: Fisheries Program Strategic Plan. U.S. Fish and Wildlife Service, Pacific Region, Portland, OR. <http://www.fws.gov/pacific/Fisheries/Docs/Pacific%20Region%20Step%20Down%20Plan.pdf>

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U.S. Fish & Wildlife Service  
Washington Fish & Wildlife Office  
Fisheries Division  
510 Desmond Drive SE, Suite 102  
Lacey, WA 98503-1263  
360/753-9440  
<http://www.fws.gov/wafwo>

