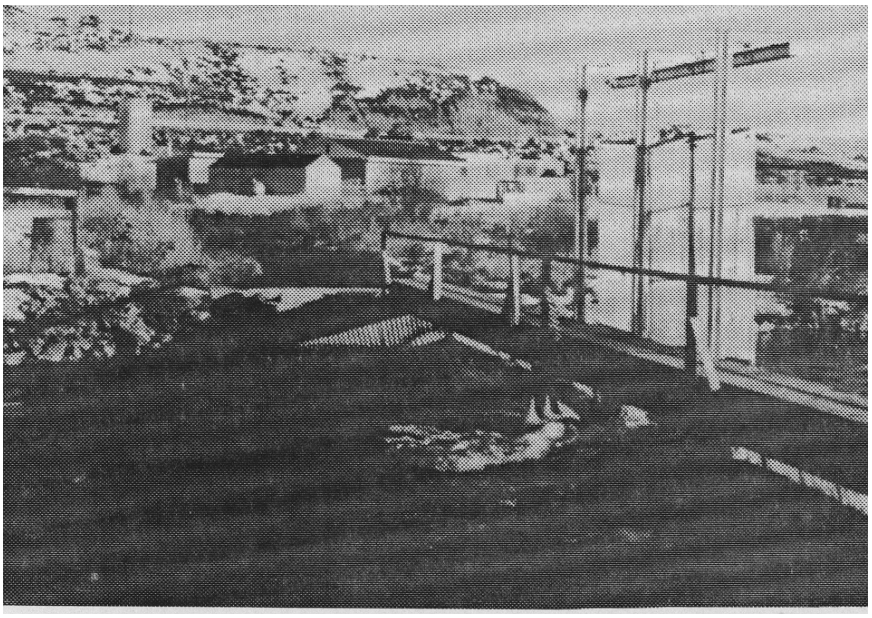
PAHSIMEROI FISH HATCHERY

1997 Summer Chinook Brood Year Report



by

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ABSTRACT

The Pahsimeroi River weir was installed, and trapping of summer chinook salmon began on July 13, 1997 as part of an Idaho Power Company supplementation/conservation program. The weir was left in place until trapping ceased on October 14, 1997. The first trip was trapped on July 17, 1997 and the last on October 2, 1997. A total of 147 chinook salmon (*Oncorhynchus tshawytscha)* were trapped during the 1997 brood year (3 jacks, 81 adult males, and 63 females). Of the 147 fish trapped, 72 were returned to the Pahsimeroi River to spawn naturally, 73 were retained for hatchery production, and 2 died in the trap before ponding.

Fish returning to the Pahsimeroi River for natural spawning consisted of 18 unmarked females, 30 unmarked males, 10 right ventral (RV)-clipped males, 11 RV-clipped females, two unmarked jacks, and one jack from the Eagle Hatchery captive broodstock program. Fish held for hatchery production consisted of 9 unmarked females, 17 unmarked males, 19 RV-clipped males, 19 RV-clipped females, 4 adipose (AD)-cliipped males, and 5 AD-clipped females.

Hatchery spawning for summer chinook salmon commenced on September 1, 1997, and concluded on October 2, 1997. A total of 32 females were spawned, yielding 171,836 green eggs, for an average fecundity rate of 5,370 eggs per female. The overall eye-up percentage was 90.4%.

Starting on April 14, 1999, outlet screens of rearing pond #1 were removed to allow volitional release of chinook smolts into the Pahsimeroi River. All fish had migrated from the pond by April 19, 1999. There were 135,669 smolts released. At an average of 9.92 fish per pound the release totaled 13,676 pounds.

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INTRODUCTION

Pahsimeroi Fish Hatchery (PFH), located near the town of Ellis, Idaho, is one mile upstream of the confluence of the Pahsimeroi and Salmon rivers. Two rearing ponds are located at a separate location seven miles further upstream on the Pahsimeroi River. The hatchery was constructed in 1967 by Idaho Power Company (IPC) and is owned and funded by IPC. Hatchery operations and management are the responsibility of the Idaho Department of Fish and Game (Department). The summer chinook program is IPCs mitigation obligation for anadromous fish losses caused by the construction and operation of the Hells Canyon Complex on the Snake River. However, due to the 1992 listing of Snake River summer chinook salmon *Oncorhynchus tshawytscha* as threatened under the Federal Endangered Species Act of 1973 (ESA), the PFH has shifted from a fishery mitigation program to a supplementation/conservation program. The number of adult chinook salmon released into the Pahsimeroi River for natural spawning, as well as the number of those kept at the hatchery for artificial propagation, depends on marked and unmarked fish returns and its listing status. National Marine Fisheries Service (NMFS) permits #922 and #903 authorize the direct and incidental take of listed, naturally produced and artificially propagated summer chinook salmon.

OBJECTIVES

The hatchery's mitigation goals are set for summer chinook salmon and for A-run steelhead. The following objectives are designed to help accomplish the goals:

1. Rear one million summer chinook smolts for release into the Pahsimeroi River.
2. Trap and spawn adult summer chinook returning to the Pahsimeroi Hatchery to produce 1.5 million green summer chinook eggs.
3. Trap adult steelhead and produce 1.5 million steelhead eggs, incubate to the eyed stage, and transport eyed-eggs to Niagara Springs Hatchery for rearing to smolt size.
4. Work with management, research, and IPC to identify the most effective operating procedures, rearing strategies and develop the facility to enhance survival, fish health, and genetic diversity.

HATCHERY FACILITIES

The PFH is split into two locations. The main site consists of six buildings, two residences for full-time employees (a 1994 wood-frame home and a 1976 double-wide mobile home). The third building houses a garage, shop, and two bedroom/living quarters for temporary employees. The fourth contains the office, public restrooms, and an incubation room. The storage building has two sections: one for chemical and machinery storage, the other for non-chemical equipment storage. The final building is the spawning building. The upper site consists of a garage/shop, walk-in freezer, and a 7-ft x 10-ft. storage shed.

The fish production facilities include the following:

Main Facility

- Removable weir across the Pahsimeroi River.
- Fish ladder and three ponds (each pond measures 70-ft x 16-ft x 6-ft. Two are for holding and the center one is considered the trap.
- Four raceways (100-ft x 4-ft x 3-ft) supplied by river water and limited (200 gpm) spring water.
- Incubation room with twenty16-tray stacks of Heath tray vertical-flow incubators supplied by pumped spring or river water.

Upper Facility

- Two earthen rearing ponds (300-ft x 40-ft x 5-ft) supplied with water from the Pahsimeroi River.
- Two earthen settling ponds (300-ft x 40-ft x 4-ft) located directly below the rearing ponds.

The holding capacity for the trap and holding ponds is approximately 2000 adult summer chinook and 5,000 adult A-run steelhead. With 3 cubic feet per second (cfs) of river water, the raceways can hold up to one million two-inch chinook fry at a .50 density index. At inflows of 20 cfs, holding capacity in the two rearing ponds at the upper facility is one million summer chinook smolts.

WATER SUPPLY

Incubation water consists of specific-pathogen-free (SPF) spring water, which is pumped to a 10,000 gallon holding tank and gravity fed to the incubators. The spring source can produce up to 200 gallons per minute (gpm) of 54ºF to 58ºF water.

The adult trap and holding ponds are supplied from the Pahsimeroi River through a 0.25-mile earthen intake canal. Water from the canal may also be used to supply the early rearing raceways. A water right of 40 cfs for the hatchery allows IPC to divert water from the Pahsimeroi River into the canal. Water quality varies throughout the year. Water temperatures also vary from seasonal lows of 33ºF in the winter to seasonal highs of 72ºF in the summer. Daily fluctuations can be as high as 12 degrees.

Water for the rearing ponds comes from a diversion in the Pahsimeroi River. A water right for 20 cfs allows a flow of 10 cfs per pond. The water is diverted down a concrete canal and flows through the ponds and into the settling ponds before being discharged back to the Pahsimeroi River.

STAFFING

The hatchery is staffed by two permanent employees: a Hatchery Manager I and an Assistant Hatchery Manager. In addition, three temporary employees assist during the steelhead and summer chinook trapping and spawning seasons. The temporary positions are for two bio-aides and one laborer.

At the height of the steelhead and chinook spawning seasons, Department regional staff, Sawtooth Fish Hatchery staff, and one fishery technician from the Nampa Fisheries Research Office also assist the hatchery staff.

ADULT SUMMER CHINOOK TRAPPING

The trap was operational from July 13 through October 14, 1997. The first adult summer chinook arrived on July 17 and the last arrived on October 2, 1997. The run timing was condensed from a 10-year average of 3.5 months to 2.5 months, which was also true for the previous year (Table 1, & Figure 1).

A total of 147 summer chinook were trapped in 1997. The run consisted of 144 adults and 3 jacks, with a sex ratio of 84 males to 63 females. Of the 84 males trapped, 35 were of hatchery-origin and 49 were of natural-origin. Hatchery-origin summer chinook were marked with either AD- or RV-fin clips. The exception was a radio-tagged fish from the Eagle Fish Hatchery captive rearing program. The fin of this fish was not clipped. Summer chinook of natural-origin were unmarked. Of the 63 females trapped, 36 were of hatchery-origin and 27 were of natural-origin (Tables 1-3, & Figures 2-4).

ADULT AGE CLASS DETERMINATION

Two sets of criteria were used to determine age-class in 1997. The age of hatchery-origin summer chinook was determined by mark type, while the natural-origin summer chinook were aged by fork length.

Hatchery-origin summer chinook with AD clips were classified as five-year-olds. These fish, from BY92, were released as smolts in 1994. All hatchery-origin summer Chinook with RV clips were classified as for-year-olds. These fish, from BY93, were released as smolts in 1995. All adult summer chinook trapped at the PFH in 1994 were released to spawn naturally above the weir. Therefore, with the exception of the one radio-tagged male from the Eagle Fish Hatchery captive rearing program, no jacks of hatchery-origin were trapped this season.

Table 1. Pahsimeroi Hatchery Brood Year 1997 summer Chinook salmon run timing.

Date Trapped	Hatchery Males	Natural Males	Total Males	Hatchery Females	Natural Females	Total Females	Total Trapped
17-Jul	0	2	2	0	1	1	3
18-Jul	3	1	4	2	1	3	7
19-Jul	0	1	1	0	2	2	3
20-Jul	0	2	2	0	1	1	3
21-Jul	1	2	3	1	0	1	4
22-Jul	5	3	8	1	1	2	10
23-Jul	1	2	3	1	1	2	5
24-Jul	4	4	8	3	3	3	11
25-Jul	1	3	4	8	5	13	17
26-Jul	0	1	1	1	0	1	2
27-Jul	0	0	0	1	1	2	2
28-Jul	0	1	1	1	0	1	2
29-Jul	4	0	4	0	0	0	4
30-Jul	0	0	0	0	0	0	0
31-Jul	3	0	3	2	1	3	6
1-Aug	0	1	1	0	1	1	2
2-Aug	0	0	0	0	0	0	0
3-Aug	0	0	0	0	1	1	1
4-Aug	0	0	0	2	1	3	3
5-Aug	1	0	1	0	1	1	2
6-Aug	1	0	1	0	0	0	1
7-Aug	0	1	1	1	0	1	2
8-Aug	0	1	1	1	0	1	2
9-Aug	0	1	1	0	1	1	2
10-Aug	0	1	1	0	1	1	2
11-Aug	0	0	0	0	0	0	0
12-Aug	0	1	1	0	0	0	1
13-Aug	0	0	0	0	0	0	0
14-Aug	0	2	2	0	1	1	3
15-Aug	0	0	0	0	0	0	0
16-Aug	0	0	0	0	1	1	1
17-Aug	0	0	0	1	1	2	2
18-Aug	0	0	0	0	0	0	0
19-Aug	0	0	0	0	0	0	0
20-Aug	0	0	0	1	0	1	1
21-Aug	1	0	1	0	0	0	1
22-Aug	0	0	0	0	0	0	0
23-Aug	0	0	0	0	0	0	0
24-Aug	0	0	0	0	0	0	0
25-Aug	0	0	0	0	0	0	0
26-Aug	0	0	0	1	0	1	1
27-Aug	0	0	0	0	0	0	0
28-Aug	0	0	0	0	0	0	0
29-Aug	0	0	0	0	0	0	0
30-Aug	0	0	0	0	0	0	0

Table 1 (continued). Pahsimeroi Hatchery Brood Year 1997 summer chinook salmon run timing

Date Trapped	Hatchery Males	Natural Males	Total Males	Hatchery Females	Natural Females	Total Females	Total Trapped
31-Aug	0	0	0	0	0	0	0
1-Sep	0	0	0	1	0	1	1
2-Sep	0	2	2	0	0	0	2
3-Sep	1	0	1	0	0	0	1
4-Sep	0	0	0	0	0	0	0
5-Sep	0	0	0	0	0	0	0
6-Sep	0	0	0	0	0	0	0
7-Sep	0	0	0	0	0	0	0
8-Sep	0	1	1	0	0	0	1
9-Sep	0	0	0	0	0	0	0
10-Sep	4	3	7	0	1	1	8
11-Sep	2	1	3	0	0	0	3
12-Sep	1	2	3	4	0	4	7
13-Sep	1	1	2	1	1	2	4
14-Sep	0	2	2	0	0	0	2
15-Sep	0	1	1	0	2	2	3
16-Sep	0	1	1	0	0	0	1
17-Sep	0	1	1	0	0	0	1
18-Sep	0	1	1	0	0	0	1
19-Sep	0	1	1	0	0	0	1
20-Sep	0	1	1	0	0	0	1
21-Sep	0	0	0	1	1	2	2
22-Sep	0	0	0	0	0	0	0
23-Sep	0	0	0	0	0	0	0
24-Sep	0	0	0	0	0	0	0
25-Sep	0	0	0	0	0	0	0
26-Sep	0	0	0	0	0	0	0
27-Sep	0	0	0	0	0	0	0
28-Sep	0	0	0	0	0	0	0
29-Sep	0	1	1	0	0	0	1
30-Sep	0	0	0	0	0	0	0
1-Oct	1	0	1	0	0	0	1
2-Oct	0	0	0	1	0	1	1
Totals	35	49	84	36	27	63	147

Figure 1. Brood Year 1997 summer chinook salmon run timing for Pahsimeroi Fish Hatchery

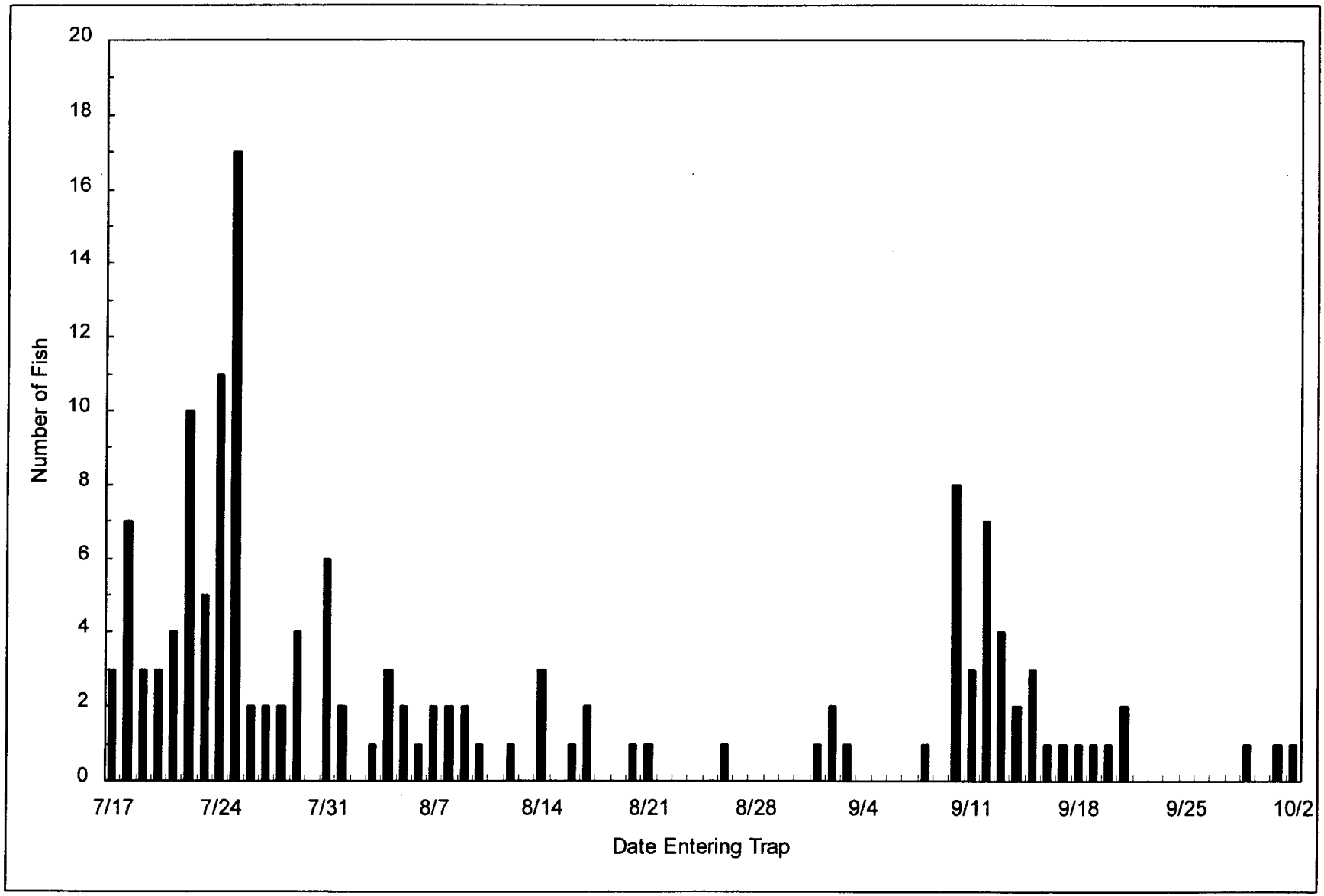


Table 2. Length frequency of male summer chinook for Pahsimeroi Fish Hatchery.

Males

TOTAL TRAPPED		AD-CLIP PONDED		RV-CLIP PONDED		UNMRK PONDED		RV-CLIP RELEASED		UNMRK RELEASED		TRAP MORTALITY	
FL(CM)	NUMBER	FL(CM)	NUMBER	FL(CM)	NUMBER	FL(CM)	NUMBER	FL(CM)	NUMBER	FL(CM)	NUMBER	FL(CM)	NUMBER
55	1	55	0	55	0	55	0	55	0	55	1	55	0
56	0	56	0	56	0	56	0	56	0	56	0	56	0
57	0	57	0	57	0	57	0	57	0	57	0	57	0
58	1	58	0	58	0	58	0	58	0	58	1	58	0
59	0	59	0	59	0	59	0	59	0	59	0	59	0
60	1	60	0	60	1	60	0	60	0	60	0	60	0
61	0	61	0	61	0	61	0	61	0	61	0	61	0
62	0	62	0	62	0	62	0	62	0	62	0	62	0
63	0	63	0	63	0	63	0	63	0	63	0	63	0
64	0	64	0	64	0	64	0	64	0	64	0	64	0
65	2	65	0	65	1	65	0	65	1	65	0	65	0
66	0	66	0	66	0	66	0	66	0	66	0	66	0
67	1	67	0	67	0	67	1	67	0	67	0	67	0
68	2	68	0	68	1	68	0	68	0	68	1	68	0
69	1	69	0	69	0	69	0	69	1	69	0	69	0
70	0	70	0	70	0	70	0	70	0	70	0	70	0
71	3	71	0	71	1	71	1	71	0	71	1	71	0
72	0	72	0	72	0	72	0	72	0	72	0	72	0
73	1	73	0	73	0	73	1	73	0	73	0	73	0
74	1	74	0	74	0	74	0	74	1	74	0	74	0
75	3	75	0	75	0	75	0	75	1	75	2	75	0
76	1	76	0	76	0	76	0	76	0	76	1	76	0
77	4	77	0	77	4	77	0	77	0	77	0	77	0
78	2	78	0	78	0	78	1	78	1	78	0	78	0
79	1	79	0	79	0	79	0	79	0	79	1	79	0
80	3	80	0	80	0	80	0	80	2	80	1	80	0
81	2	81	0	81	0	81	0	81	0	81	2	81	0
82	6	82	0	82	2	82	1	82	1	82	2	82	0
83	3	83	0	83	1	83	1	83	0	83	0	83	1
84	6	84	0	84	3	84	1	84	0	84	2	84	0
85	4	85	0	85	2	85	0	85	1	85	1	85	0
86	7	86	1	86	1	86	3	86	0	86	2	86	0
87	4	87	0	87	0	87	2	87	1	87	1	87	0
88	3	88	0	88	1	88	2	88	0	88	0	88	0
89	6	89	0	89	1	89	1	89	0	89	4	89	0
90	0	90	0	90	0	90	0	90	0	90	0	90	0
91	1	91	1	91	0	91	0	91	0	91	0	91	0
92	2	92	1	92	0	92	0	92	0	92	1	92	0
93	1	93	1	93	0	93	0	93	0	93	0	93	0
94	0	94	0	94	0	94	0	94	0	94	0	94	0
95	3	95	0	95	0	95	1	95	0	95	2	95	0
96	0	96	0	96	0	96	0	96	0	96	0	96	0
97	1	97	0	97	0	97	1	97	0	97	0	97	0
98	1	98	0	98	0	98	0	98	0	98	1	98	0
99	2	99	0	99	0	99	0	99	0	99	2	99	0
100	1	100	0	100	0	100	0	100	0	100	1	100	0
101	0	101	0	101	0	101	0	101	0	101	0	101	0
102	0	102	0	102	0	102	0	102	0	102	0	102	0
103	1	103	0	103	0	103	0	103	0	103	1	103	0
104	0	104	0	104	0	104	0	104	0	104	0	104	0
105	0	105	0	105	0	105	0	105	0	105	0	105	0
106	0	106	0	106	0	106	0	106	0	106	0	106	0
107	0	107	0	107	0	107	0	107	0	107	0	107	0
108	1	108	0	108	0	108	0	108	0	108	1	108	0
TOTALS	83		4		19		17		10		32		1

Also, one male 48 cm.fk In. Trap mort. = RV-clipped
From Eagle Captive Rearing Program-Released

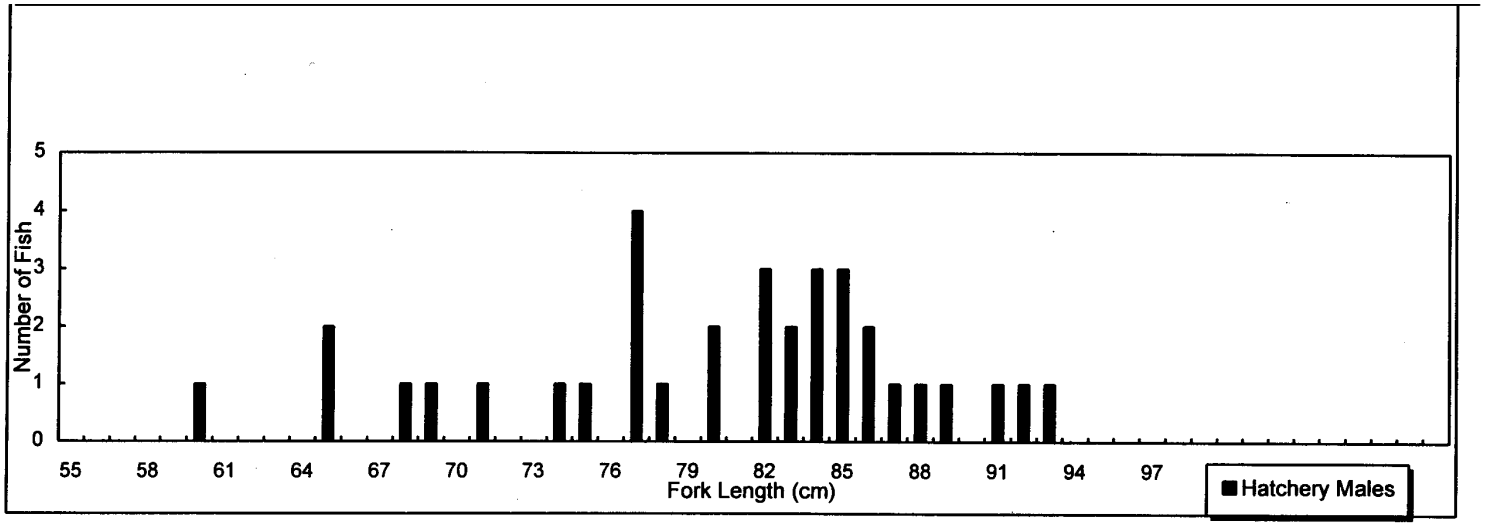
Table 3. Length frequency of female summer chinook for Pahsimeroi Fish Hatchery.

Females

TOTAL TRAPPED		AD-CLIP PONDED		RV-CLIP PONDED		UNMRK PONDED		RV-CLIP RELEASED		UNMRK RELEASED		TRAP MORTALITY	
FL(CM)	NUMBER	FL(CM)	NUMBER	FL(CM)	NUMBER	FL(CM)	NUMBER	FL(CM)	NUMBER	FL(CM)	NUMBER	FL(CM)	NUMBER
55	0	55	0	55	0	55	0	55	0	55	0	55	0
56	0	56	0	56	0	56	0	56	0	56	0	56	0
57	0	57	0	57	0	57	0	57	0	57	0	57	0
58	0	58	0	58	0	58	0	58	0	58	0	58	0
59	0	59	0	59	0	59	0	59	0	59	0	59	0
60	0	60	0	60	0	60	0	60	0	60	0	60	0
61	0	61	0	61	0	61	0	61	0	61	0	61	0
62	0	62	0	62	0	62	0	62	0	62	0	62	0
63	0	63	0	63	0	63	0	63	0	63	0	63	0
64	0	64	0	64	0	64	0	64	0	64	0	64	0
65	0	65	0	65	0	65	0	65	0	65	0	65	0
66	0	66	0	66	0	66	0	66	0	66	0	66	0
67	0	67	0	67	0	67	0	67	0	67	0	67	0
68	0	68	0	68	0	68	0	68	0	68	0	68	0
69	0	69	0	69	0	69	0	69	0	69	0	69	0
70	0	70	0	70	0	70	0	70	0	70	0	70	0
71	1	71	0	71	0	71	0	71	1	71	0	71	0
72	0	72	0	72	0	72	0	72	0	72	0	72	0
73	2	73	0	73	1	73	0	73	0	73	1	73	0
74	2	74	0	74	0	74	0	74	0	74	2	74	0
75	4	75	0	75	3	75	0	75	0	75	1	75	0
76	0	76	0	76	0	76	0	76	0	76	0	76	0
77	1	77	0	77	0	77	0	77	0	77	1	77	0
78	3	78	0	78	0	78	0	78	3	78	0	78	0
79	2	79	0	79	2	79	0	79	0	79	0	79	0
80	7	80	0	80	0	80	0	80	0	80	7	80	0
81	5	81	0	81	1	81	1	81	2	81	0	81	1
82	9	82	0	82	4	82	3	82	2	82	0	82	0
83	5	83	0	83	2	83	1	83	0	83	2	83	0
84	6	84	0	84	2	84	1	84	2	84	1	84	0
85	3	85	0	85	1	85	0	85	1	85	1	85	0
86	4	86	1	86	2	86	1	86	0	86	0	86	0
87	2	87	0	87	1	87	1	87	0	87	0	87	0
88	2	88	1	88	0	88	0	88	0	88	1	88	0
89	0	89	0	89	0	89	0	89	0	89	0	89	0
90	0	90	0	90	0	90	0	90	0	90	0	90	0
91	0	91	0	91	0	91	0	91	0	91	0	91	0
92	0	92	0	92	0	92	0	92	0	92	0	92	0
93	1	93	0	93	0	93	0	93	0	93	1	93	0
94	0	94	0	94	0	94	0	94	0	94	0	94	0
95	0	95	0	95	0	95	0	95	0	95	0	95	0
96	0	96	0	96	0	96	0	96	0	96	0	96	0
97	1	97	1	97	0	97	0	97	0	97	0	97	0
98	1	98	1	98	0	98	0	98	0	98	0	98	0
99	1	99	0	99	0	99	1	99	0	99	0	99	0
100	0	100	0	100	0	100	0	100	0	100	0	100	0
101	0	101	0	101	0	101	0	101	0	101	0	101	0
102	0	102	0	102	0	102	0	102	0	102	0	102	0
103	0	103	0	103	0	103	0	103	0	103	0	103	0
104	0	104	0	104	0	104	0	104	0	104	0	104	0
105	0	105	0	105	0	105	0	105	0	105	0	105	0
106	1	106	1	106	0	106	0	106	0	106	0	106	0
107	0	107	0	107	0	107	0	107	0	107	0	107	0
108	0	108	0	108	0	108	0	108	0	108	0	108	0
TOTALS	63		5		19		9		11		18		1

Trap mort. = RV-clipped

Figure 2. Length frequency of hatchery-origin summer chinook salmon, Brood Year 1997



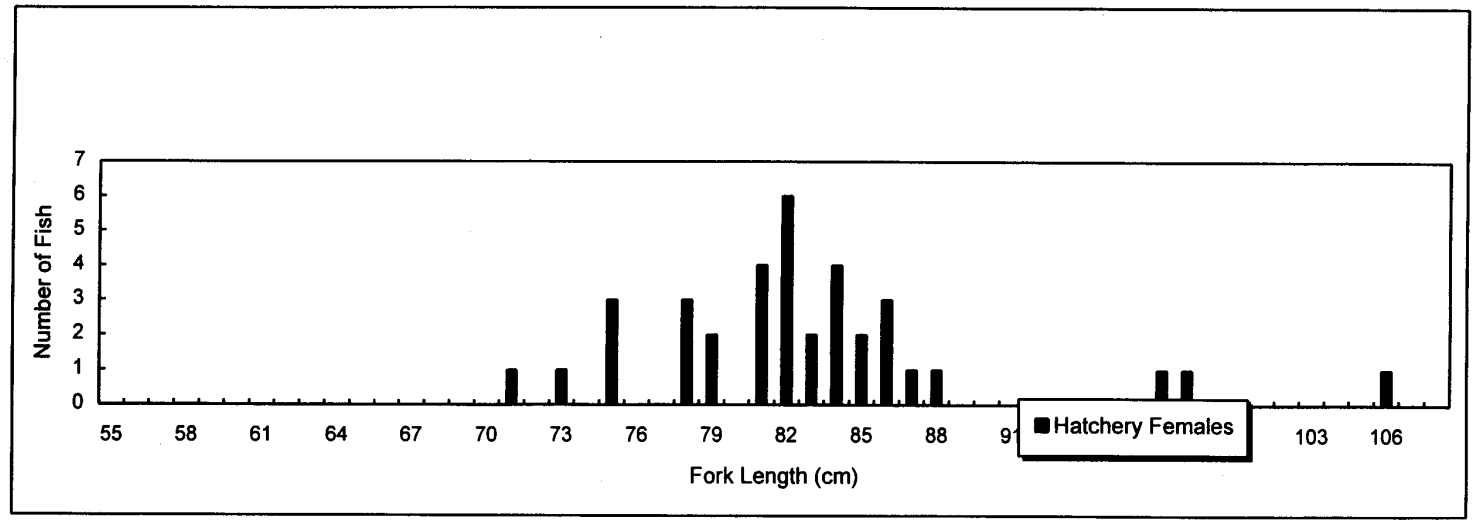
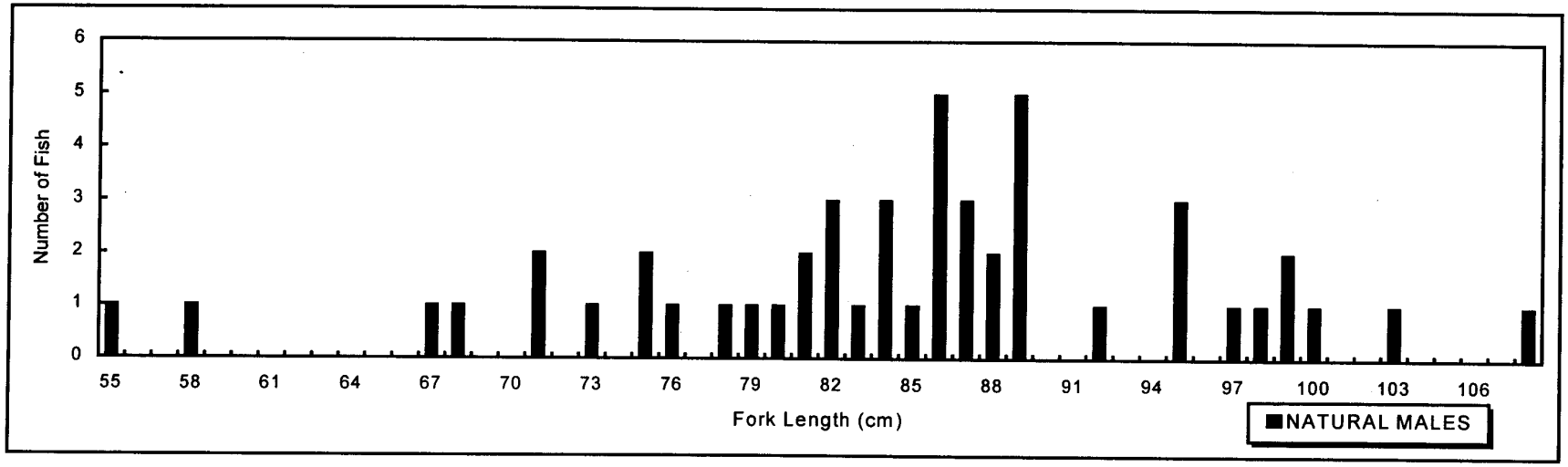


Figure 3. Length frequency of natural-origin summer chinook salmon, Brood Year 1997



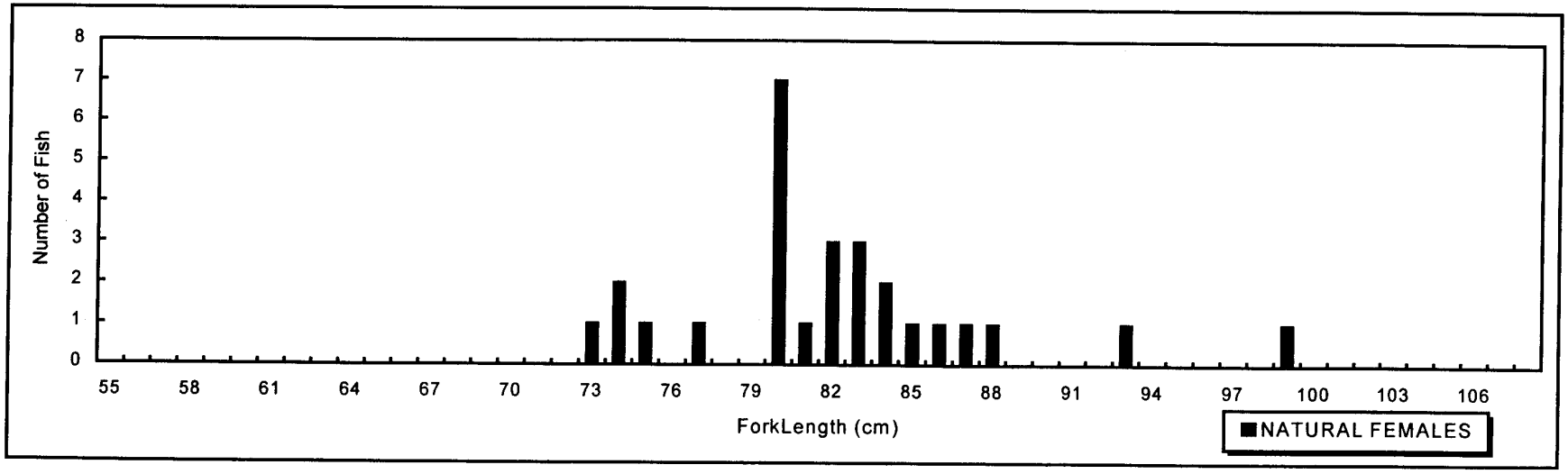
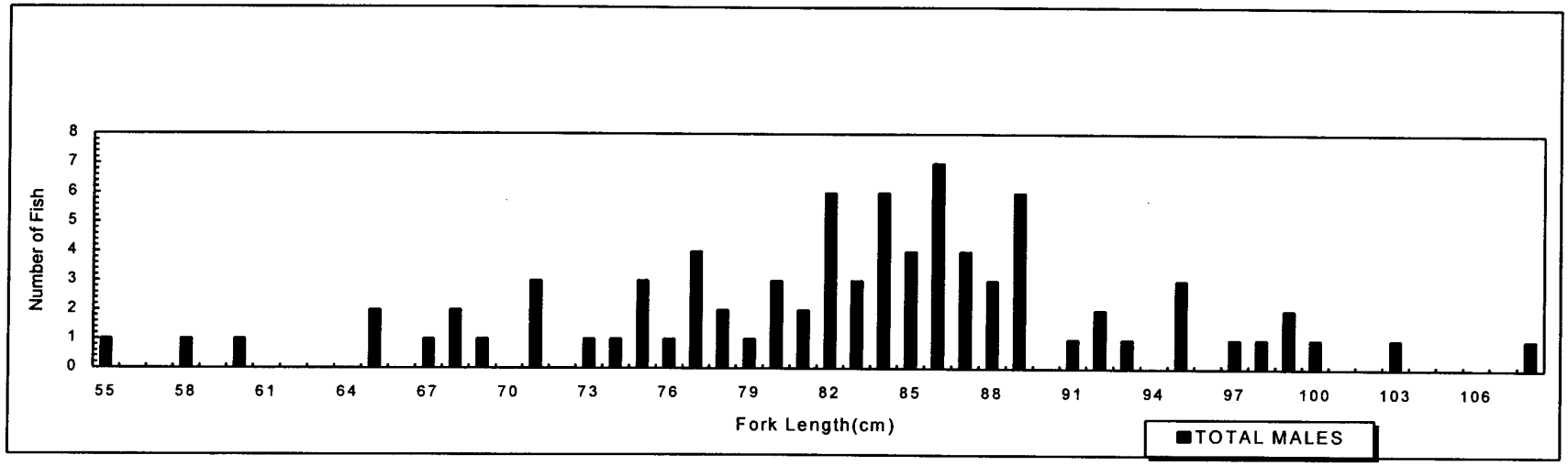


Figure 4. Length frequency of all summer chinook salmon, Brood Year 1997



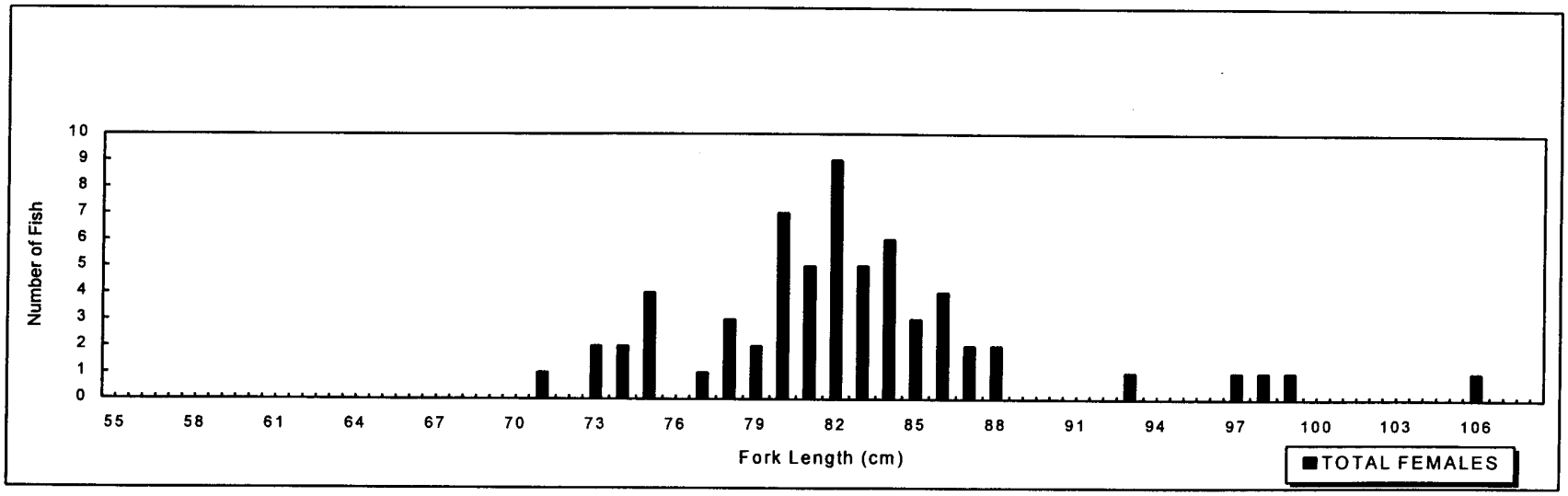


Table 4. Pahsimeroi Fish Hatchery summer chinook disposition summary, Brood Year 1997

Released For Natural Spawning

	4-yr-old HM	5-yr-old HM	4-yr-old HF	5-yr-old HF	4-yr-old NM	5-yr-old NM	4-yr-old NF	5-yr-old NF	NJ	*Eagle Hatchery captive-reared Jacks
Total	10	0	11	0	11	19	12	6	2	1
% of Total Released	13.8	0	15.3	0	15.3	26.4	16.7	8.3	2.8	1.4

Ponded for Hatchery Production

	4-yr-old HM	5-yr-old HM	4-yr-old HF	5-yr-old HF	4-yr-old NM	5-yr-old NM	4-yr-old NF	5-yr-old NF	NJ	*Eagle Hatchery captive-reared Jacks
Total	19	4	19	5	5	12	4	5	0	0
% of Total Released	26	5.5	26	6.8	6.8	16.4	5.5	6.8	0	0

Total Trapped for BY97

	4-yr-old HM	5-yr-old HM	4-yr-old HF	5-yr-old HF	4-yr-old NM	5-yr-old NM	4-yr-old NF	5-yr-old NF	NJ	*Eagle Hatchery captive-reared Jacks
Total	30 *(29)	4	31 *(30)	5	16	31	16	11	2	1
% of Total Released	20.4	2.7	21.1	3.4	10.9	21.1	10.9	7.5	1.3	0.7

*one trap mortality never ponded or released
HM - Hatchery Males
HF - Hatchery Females
NM - Natural Males
NF - Natural Females
NJ - Natural Jacks

The age class criteria for natural-origin (unmarked) fish follows:

- Chinook with fork lengths greater than 82 cm were classified as five years old.
- Chinook with fork lengths between 62 cm and 82 cm inclusive were classified as four years old.
- Chinook with fork lengths less than 62 cm were classified as jacks.

Table 4 includes a breakdown of age class results.

If these same length criteria had been used to determine the age of hatchery adults, the results would have been significantly different. For example, length breakdown for age structure would have shown one three-year-old, 37 four-year-olds, and 32 five-year-olds. However, known age structure of hatchery adults, based on fin clips, showed 61 four-year-olds plus 9 five-year-olds. Results would indicate almost four times as many five-year-old adults under the length criteria versus the known age, when in fact, very few five-year-old adults are returning, which contradicts past information. This phenomenon was seen in 1996, also. Therefore, data collected prior to 1996 are suspect, and fishery research personnel should explore modifying the age structure classification criteria.

SPECIAL MARKS/TAGS

Three summer Chinook were found to have radio tags: a four-year-old hatchery-origin female (RV-clip), a four-year-old natural-origin female, and the Eagle Fish Hatchery jack discussed earlier. The hatchery-origin female had a visual implant (VI) tag as well as the radio tag. No fish with jaw tags or floy tags were trapped this year.

Actual trap information on these PIT-tagged fish is as follows:

Trap Date	Sex	Fork Length	Radio Channel/Frequency	Marks	VI #
07/25/97	F	82	Ch 20, Cd 40	RV	KC 9
08/01/97	F	73	Ch 12, Cd 60	None	None
10/01/97	M*	48	150.923	None	None

ADULT HANDLING PROCEDURES

The trap was checked daily. All salmon were anesthetized in a solution of MS-222. While anesthetized, fish were examined for fin clips, scanned for coded-wire-tags (CWTs), and Passive Integrated Transponder (PIT) tags, measured to the nearest centimeter for fork length, and identified by sex. No PIT- or CWT-tags were found this season. Scale samples were collected from all fish trapped, and every fish was injected (intraperitoneal) with erythromycin at a double dosage rate of 20-mg/kg-body weight. Most adults were measured for standard hypural length in addition to fork length and then weighed. Fishery research personnel performed regression analysis on the length and weight data. A small piece of ventral fin was removed from all summer chinook and placed in a small vial of alcohol for later DNA analysis and conservation genetics studies. All fish were allowed to recover in a freshwater recovery tank before being ponded or released.

All summer Chinook trapped were assigned an opercle tag number in order to identify individual fish and to track DNA samples we had extracted. Those ponded for spawn take had the tag attached with two staples. Those released to spawn naturally did not have the tag attached.

Tag retention for females was 91%, with only 3 lost out of 35 attached. However, tag retention was poor for males. Of the 41 tags attached, only 24 remained through the spawning season, resulting in a 59% tag retention. Males were handled several times and were more aggressive than the females. Although tag retention was low on the males, retention improved over the previous year because of some procedural changes. In 1997, the male pond was treated with formalin. In addition, in 1997, handling was restricted to specific males on spawn days, whereas in 1996 all males were sorted every spawn day.

ADULT HOLDING POND RECORD

Seventeen natural-origin males and twenty-three hatchery-origin males were ponded for spawn take. Twenty-four hatchery-origin females and nine natural-origin females were ponded for spawn take.

Natural males ponded included 5 four-year-olds and 12 five-year olds. Nineteen of the hatchery-origin males ponded were four-year-olds and four were five-year olds. Nineteen of the hatchery-origin females ponded were four-year-olds and five were five-year-olds. Four of the ponded natural-origin females were four-year-olds and five were five-year-olds (Table 4). Of the hatchery males retained, four were transported to Boise for display at the Morrison-Knudsen Nature Center at Department headquarters. All four had been spawned once prior to transporting.

The holding pens were sorted for the first time on August 25, 1997. They were then sorted twice a week. In 1997, both male and female pens were treated 3 times weekly with a 1-hour, 167-ppm formalin treatment to prevent mortality caused by secondary mycotic infections.

Female pre-spawn mortality totaled two. One AD-clipped female (five-year-old) died in the holding pen and one RV-clipped female (four-year-old) died in the trap prior to handling. Male pre-spawn mortality also totaled two. A RV-clipped male (four-year-old) died in the trap, and another RV-clipped male (four-year-old) died in the holding pen.

ADULT RELEASES

Eleven hatchery-origin and eighteen natural-origin female summer chinook were released to spawn naturally in the Pahsimeroi River. Ten hatchery-origin and thirty-two natural-origin male summer chinook were released. Additionally, one non-Pahsimeroi River Fish Hatchery male (jack) was released above the weir to spawn naturally. This male, the only three-year-old male of hatchery-origin trapped in 1997, was one of the last fish trapped and released for the season (Table 4). This male was radio-tagged and originated from the Eagle Hatchery captive rearing program.

With the exception of seven fish, all natural summer Chinook were immediately released into the river after pertinent trap data were recorded. Five males were used for spawning and later released. One unmarked female and one unmarked male were initially ponded for spawn take and later released.

SUMMER CHINOOK SPAWNING AND INCUBATION

Spawning began on September 1, 1997 and concluded on October 2, 1997. A total of 32 females were spawned, yielding 171,836 green eggs. Eggs were enumerated with a Jensorter electronic counter/picker at the eye-up stage. Fecundity averaged 5,370 eggs per female and the overall eye-up percentage was 90.4%. Otoliths were collected from all fish killed to provide another means of age-class determination. Nampa Fisheries Research personnel will age these otoliths.

Each ripe female was killed and then spawned by the incision method. Prior to incision, a 1-cc sample of ovarian fluid was collected for viral testing. To ensure fertilization, fish were spawned at a ratio of two males per female. Consequently, some males were spawned more than once. Milt from each male was expressed into an individual cup. When two cups of milt were obtained, they were both added to the eggs from one female. The gametes were gently stirred for 5 to 10 seconds to ensure fertilization. Egg buckets were covered and set aside for five minutes. Well water was then used to rinse the eggs. The eggs were water-hardened in a 100-ppm solution of Argentyne and allowed to sit for 30 minutes. The Argentyne was then poured off and replaced with well water and the eggs were allowed to sit for another 30 minutes. Each female's eggs were then poured into individual Heath trays with a 5-gpm inflow of SPF spring water to begin incubation. Isolation incubation was maintained until pathology results were known.

In addition to samples taken for Infectious Hematopoietic Necrosis/Infectious Hematopoietic Pancreatic Necrosis (IHN.IPN) viral pathogens before spawning incisions were made, kidney samples were collected after egg collection and fertilization to test females for the Bacterial Kidney Disease (BKD) causative agent. Because all kidney samples tested low-positive or negative, no eggs were culled. All viral samples tested negative.

From 48 hours after spawn take until hatched, the eggs were treated three times weekly with 1,667 ppm of formalin solution for 15 minutes to prevent fungus growth. The eggs eyed-up after three weeks, or 450 temperature units. During the three-week period from egg take to eye-up, they were undisturbed. At eye-up, the eggs were enumerated with a Jensorter electronic counter/picker. The eggs were not shocked prior to enumeration because of the shock they would receive while being run through the counter. The Jensorter counted 156,360 eyed-eggs and 16,476 dead eggs for a green egg total of 171,836 (Table 5).

After enumeration, 107,800 eyed-eggs were transferred to Sawtooth Fish Hatchery for early rearing on SPF spring water, a water source known to be free of the causative agent of whirling disease. Additionally, 47,550 eyed-eggs were retained at Pahsimeroi Fish Hatchery and incubated on SPF spring water for the first few weeks.

ADULT CARCASS DISPOSITION

During the spawning season, all carcasses were placed directly into the Pahsimeroi River below the weir.

Table 5. Brood Year 1997 summer chinook egg incubation record for Pahsimeroi Fish Hatchery.

OPERC. TAG	SPAWN DATE	EYED	PICKOFF	GREEN	BKD	VIRO	DESTINATION	PERCENT EYE-UP	COMMENTS
258a	9/1/97	4,375	137	4,512	low+	neg	shipped sfh	97.0%	
2644a	9/1/97	4,573	174	4,747	neg	neg	shipped sfh	96.3%	
277a	9/4/97	4,400	160	4,560	low+	neg	shipped sfh	96.5%	
268a	9/4/97	4,250	180	6,430	neg	neg	shipped sfh	97.2%	
287a	9/8/97	4,525	1,914	6,439	neg	neg	shipped sfh	70.3%	
294a	9/8/97	5,664	232	5,896	neg	neg	shipped sfh	96.1%	
254a	9/8/97	5,512	469	5,981	low+	neg	shipped sfh	92.2%	
248a	9/8/97	3,709	804	4,513	neg	neg	shipped sfh	82.2%	
237a	9/8/97	2,906	2,208	5,114	low+	neg	retained pfh	56.8%	soft-shell
213a	9/11/97	3,766	262	4,028	low+	neg	shipped sfh	93.5%	
284a	9/11/97	3,676	380	4,056	low+	neg	shipped sfh	90.6%	
missing	9/16/97	5,106	548	5,654	low+	neg	shipped sfh	90.3%	
228a	9/16/97	4,619	839	5,458	neg	neg	shipped sfh	84.6%	
337a	9/16/97	6,518	529	7,047	low+	neg	shipped sfh	92.5%	
267a	9/16/97	3,867	261	4,128	low+	neg	shipped sfh	93.7%	
307a	9/16/97	4,899	433	5,332	neg	neg	shipped sfh	91.9%	
212a	9/16/97	4,670	787	5,457	low+	neg	shipped sfh	85.6%	
312a	9/16/97	4,173	516	4,689	neg	neg	shipped sfh	89.0%	
263a	9/18/97	4,319	336	4,655	low+	neg	shipped sfh	92.8%	
232a	9/18/97	5,056	240	5,296	neg	neg	shipped sfh	95.5%	
303a	9/18/97	5,857	71	5,928	low+	neg	shipped sfh	98.8%	
243a	9/22/97	7,198	92	7,290	low+	neg	shipped sfh	98.7%	
257a	9/22/97	5,075	343	5,418	low+	neg	shipped sfh	93.7%	
missing	9/22/97	5,794	463	6,257	low+	neg	retained pfh	92.6%	
missing	9/25/97	5,630	285	5,915	neg	neg	retained pfh	95.2%	
324a	9/25/97	4,800	244	5,044	neg	neg	retained pfh	95.2%	
326a	9/25/97	3,760	2,230	5,990	low+	neg	retained pfh	62.8%	poor eggs
missing	9/29/97	4,265	70	4,335	neg	neg	retained pfh	98.4	
332a	9/29/97	3,998	226	4,224	low+	n/a	retained pfh	94.6%	
276a	9/29/97	5,843	132	5,975	neg	neg	retained pfh	97.8%	
282a	10/2/97	4,719	358	5,077	neg	neg	retained pfh	92.9%	
345a	10/2/97	5,838	553	6,391	neg	neg	retained pfh	91.3%	
TOTALS		153,360	16,476	171,836				90.4%	

Eyed eggs retained at Pahsimeroi Fish Hatchery: 47,560
Eyed eggs shipped to Sawtooth Fish Hatchery: 107,800

FISH PRODUCTION

A total of 105,444 swim-up fry were ponded in the early rearing vats at Sawtooth Fish Hatchery from December 1997 and January 1998. In addition, 42,826 fry were ponded in the early rearing raceways at Pahsimeroi Fish Hatchery. Specific pathogen free (SPF) well water with a temperature of 40ºF was used for early rearing at Sawtooth Fish Hatchery, and SPF spring water with a temperature of 55ºF was used at Pahsimeroi Fish Hatchery. Summer chinook salmon are more susceptible to whirling disease when they are 3.5 inches or smaller. At Sawtooth Fish Hatchery, the fish are reared on SPF water until they reach a size of approximately 3.5 inches in length. Resulting fingerlings are transferred to Pahsimeroi after they have reached at least 3.5 inches and received all necessary clips and or tags. Once the summer chinook reach this size, they are transferred to outside raceways supplied with river water. Both hatcheries reared the summer chinook according to Integrated Hatcheries Operation Team (IHOT) guidelines. All fish were fed BioOregon and Ranged feed.

Initially, the fish at Pahsimeroi Fish Hatchery were reared on well water supplied with SPF spring water at a fairly constant 55ºF. However, due to chronic high mortality symptomatic of coagulated yolk disease, river water was allowed to mix with the SPF inflow beginning December 30, 1997.

Hatchery and pathology personnel were not sure how or why the SPF water source was related to coagulated yolk disorders. Abnormally high dissolved gas levels of between 108% and 112% were previously measured, which were thought to be the problem. To lower measured dissolved gas levels to 102% in the raceway, a large degassing tower was plumbed in before these summer Chinook were ponded. Chronic high mortality levels continued however, with daily mortality sometimes exceeding 30 fish, which is unacceptable considering the listed status of these fish. External symptoms of white pectoral fins continued to reveal the presence of coagulated yolk disorder.

Another possible cause of the problem may have been high water temperatures. To alleviate the problem, the spring water was mixed with cold river water, which brought the temperature down to 44 ºF. Reducing the water temperature dropped the daily mortality from 30 fish to fewer than three fish. Until a new SPF source can be found for Pahsimeroi Fish Hatchery, all eggs will be sent to Sawtooth Fish Hatchery for incubation and early rearing.

During February 1998, one group of 12,000 Pahsimeroi summer chinook rearing at Sawtooth Fish Hatchery was diagnosed with a *Pseudomonas* infection. Beginning on March 1, 1998 the fish were administered a 10-day treatment of medicated feed containing oxytetracycline (OTC). During July 1998, another *Pseudomonas* infection occurred at Sawtooth Fish Hatchery and all Pahsimeroi summer chinook were again treated for 10 days with OTC. Despite the infections, losses were few.

Due to water quality problems and a limited supply of SPF water at Pahsimeroi Fish Hatchery, 33,184 fingerlings, averaging 63 fish per pound (3.4 inches), were transferred to Sawtooth Fish Hatchery on April 29, 1998 for further rearing.

To prevent Bacterial Kidney Disease (BKD), the fish received two prophylactic medicated-feed treatments, the first of which was administered during late May and the second in late September 1998. The first treatment lasted for 21 days and the second treatment for 28 days. A total of 971 pounds of Aquamycin 2.0 mm and 353 pounds of Aquamycin 2.5-mm feed were administered during the May treatment (Table 6). The second treatment consisted of 4,579 pounds of Aquamycin 3.0-mm feed. During August 1998 the water temperature at Sawtooth Fish Hatchery approached 70ºF. The fish were observed "flashing" in the pond and consequently diagnosed with *Costia sp.* On August 7, 1998, a 10-day treatment of formalin was begun to alleviate the problem.

On September 23, 1998, 135,845 summer chinook pre-smolts were transferred by truck to Pahsimeroi Fish Hatchery from Sawtooth Fish Hatchery and ponded in rearing pond #1. They averaged 23 fish per pound (5.1 inches) for a total biomass of 5,906 pounds.

Brood Year 1997 smolts reared at Pahsimeroi Fish Hatchery were fed 17,517 pounds of feed during their rearing cycle, resulting in a feed conversion of 1.30 (Table 6). The original number of summer chinook, less observable moralities, was used to calculate the conversion rate. It should be noted however, that a family of otters moved into the area and preyed on the fish. Attempts to trap the otters were unsuccessful. The otters probably reduced the number of fish in the pond enough to skew our conversion rate calculations. Efforts are being made to install a small fence around the ponds to keep the otters and other predators out.

Prerelease Organosomatic indices can be found in Table 7. Production costs are summarized in Table 8 and losses and survival percentages by life stage are summarized in Table 9.

SMOLT RELEASES

There were 135,669 smolts were released volitionally from April 14, 1999 to April 19, 1999. The outlet screens were pulled on April 14, 1999 and a set of dam boards was pulled each day thereafter until all fish migrated from the pond. Pulling dam boards increases the turnover rate through the ponds and speeds outmigration. The smolts averaged 9.92 fish per pound (6.45 inches) at the time of release for a total weight of 13,676 pounds.

Table 6. Brood Year 1997 feed summary for Pahsimeroi Fish Hatchery.

FEED SIZE	LBS. FED TO DATE	COST PER POUND	TOTAL COST TO DATE
#2 Bio-Diet Starter 2	176	$1.01	$177.76
#3 Bio-Diet Starter	220	$1.01	$222.20
1.0 MM Bio-Diet Grower	441	$0.79	$348.39
1.3 MM Bio-Diet Grower	396	$0.78	$306.90
1.5 MM Bio-Diet Grower	881	$0.72	$634.32
2.0 MM Bio-Diet Grower	617	$0.68	$419.56
2.0 MM AQM-100 Bio-Diet Grower	971	$1.57	$1,523.50
2.5 MM AQM-100 Bio-Diet Grower	353	$0.69	$243.57
3.0 MM Bio-Diet Grower	7000	$0.63	$4,410.00
3.0 MM AQM-100 Bio-Diet Grower	4579	$1.57	$7,184.45
3/32” Rangen TM-100	250	$0.47	$118.25
1/8” Rangen TM-100	200	$0.47	$94.60
3/32” Floating	1200	$0.34	$408.00
1/8” Rangen Floating	233	$0.33	$76.19
TOTALS:	17,517.00		$16,167.69

Table 7. Pathology fish health report.

Summary of Fish Autopsy

ACCESSION NO:	99-055	LOCATION:	Pahsimeroi Hatchery
SPECIES:	Chinook Summer	AUTOPSY DATE:	3/18/1999
STRAIN:		AGE:	Juv
UNIT:	Pahsimeroi	SAMPLE SIZE:	20
REASON FOR AUTOPSY:	prelib		
INVESTIGATOR(S):	Munson		
REMARKS:	Blood parameters not assayed. Centrifuge down.		

	MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION
LENGTH	0.00	0.00	0.00
WEIGHT	0.00	0.00	0.00
KTL *	0.00	0.00	0.00
CTL *	0.00	0.00	0.00
HEMATOCRIT	0	0	0
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	0	0	0

*EXPRESSED AT KTL TIMES 10 TO THE FIFTH POWER

**CONVERTED FROM KTL; EXPRESSED AS CTL TIMES 10 TO FOUTH POWER

EYES		GILLS		PSEUDO-BRANCHS		THYMUS		MESEN. FAT		SPLEEN		HIND GUT		KIDNEY		LIVER		BILE	
N	20	N	20	N	20	0	20	0	0	B	0	0	20	N	20	A	0	0	0
B1	0	F	0	S	0	1	0	1	0	R	20	1	0	S	0	B	20	1	0
B2	0	C	0	L	0	2	0	2	3	G	0	2	0	M	0	C	0	2	0
E1	0	M	0	S&L	0			3	14	NO	0			G	0	D	0	3	0
E2	0	P	0	I	0	Mean=0.00		4	3	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0	Mean=0.00	
H2	0			O	0			Mean=3.00								OT	0		
M1	0																		
OT	0																		

SUMMARY OF NORMALS

20	20	20	20	20	20	20	20	20	20

SEX M: 0 F: 0 U: 0

GENERAL REMARKS:

FINS: GONADS:

SKIN: OTHER:

Table 8. Brood Year 1997 production costs for Pahsimeroi Fish Hatchery.

Number of fish	Pounds of feed	Cost of Feed	Pounds of Fish	Conversion	Total Budget	Cost per Thousand fish	Cost per Pound of Fish
135,669	17,517	$16,167.69	13,676	1.3	$435,500.86	$3,210.02	$31.84

* Does not include capital outlay or construction.

Table 9. Brood Year 1999 smolt survival by life stage at Pahsimeroi Fish Hatchery.

Life Stages	Numbers	Survival Percentages
Green Eggs	171,836	
Egg Pickoff	16,476	
Eyed Eggs	155,360	90.4%
Alevin Pickoff	6,788	
Fry Ponded	148,572	86.5%
Fry Mortality	12,727	
Fingerling Ponded	135,845	79.1%
Fingerling Mortality	176	
Smolts Released	135,669	79.0%

FISH HEALTH

Diseases Encountered and Treatment

Renibacterium was detected through ELISA technology in both juvenile and adult summer Chinook salmon. *Myxobolus cerebralis* was found in all stocks reared on surface water at this facility. Under FDA Investigational New Animal Drug (INAD) #4333, Pahsimeroi summer chinook were fed two prophylactic treatments of erythromycin-medicated feed to control *Renibacterium*. One of these medicated feedings took place at Sawtooth Fish Hatchery during early rearing.

Organosomatic Indices

See Table 7.

Acute Losses

Neither acute nor chronic losses were experienced at this facility.

Other Assessments

Department personnel are currently working with IPC to locate a suitable water source to rear juvenile summer Chinook. A SPF water source will eliminate the need for early rearing at Sawtooth Fish Hatchery and possibly reduce infection by *Myxobolus cerebralis.*

FISH MARKING

All BY97 fish received an AD-clip during September 1998 at Sawtooth Fish Hatchery before being transferred to the Pahsimeroi Fish Hatchery. In addition, 500 pre-smolts were injected with PIT-tags in March 1999.

HATCHERY IMPROVEMENTS

- A new pre-framed wood door was installed on the south side of the spawn shed, and all hatchery buildings received a new coat of white paint.
- A new laptop computer was purchased from Micron in Boise during August 1999. The new computer features a 3.5-inch disk drive, a CD-ROM drive, 64K RAM, and a 2-gigabyte hard drive.
- In October 1999, hatchery personnel designed and installed an underground automatic sprinkler system at the lower facility.

- Contractors worked on various projects during December 1998 and January 1999. The projects they completed are listed below:

  1. Installed a new entry door on residence #1.

  2. Remodeled the public restroom to meet ADA guidelines.

  3. Installed a ventilation system in the spawn shed.

  4. Replaced the sinks and countertops in the bathrooms of residence #2.

  5. Replaced and repainted the incubator door and installed a threshold.

  6. Installed self-closing hinges on the door between the shop and dormitory.

  7. Installed a 220-volt outlet in the shop at the upper facility.

  8. Replaced the garage door on residence #1.

- A zip drive, camera, and microphone were installed on the hatchery computer. The camera and microphone are to be used for video-conferencing with other fisheries personnel.

- Idaho Power purchased a combination fax, scanner, copier, and printer for the hatchery.

- Berry Electric installed a new 220-volt heater and ventilation fan in the public restroom. In addition, a new wall-mounted thermostat was installed in the shop at the upper facility.

- New sink faucets were installed in the shop at the lower facility and in residence #2. Three new Hobo thermometers were purchased with which to collect water temperature data for identifying A new water source.

- Chester Plumbing and Heating installed a new Well Mate pressure tank in the pump house.

- A US Robotics PCMCIA phone modem and serial mouse were purchased for the laptop computer.

- In April 1999, a new 1999 ¾-ton extended-cab Dodge pickup was leased from Latham Motors In Twin Falls.

RECOMMENDATIONS

Recommendations for Pahsimeroi Fish Hatchery include developing a SPF water source to provide rearing conditions free of disease.

ACKNOWLEDGEMENTS

We would like to thank Paul Abbott and the staff of IPC for their continued help and support. In addition, we would like to thank the crew at Sawtooth Fish Hatchery for all their help with incubation and early rearing.

APPENDICES

Appendix A. Pahsimeroi Fish Hatchery summer chinook smolt release and adult return information.

RELEASE DATE	NUMBER	3-YRS	4-YRS	5-YRS	TOTAL	RETURN YEARS	% RETURN
May-70	3,000,000	89	N/A	101	N/A	71,72,73	N/A
May-71	250,000	40	425	14	479	72,73,74	0.192%
May-72	250,000	20	138	76	234	73,74,75	0.094%
May-73	347,000	1	5	32	38	74,75,76	0.011%
May-74	330,000	8	189	436	633	75,76,77	0.192%
May-75	114,000	53	115	X	X	76,77,78	N/A
May-76	121,000	7	X	32	X	77,78,79	N/A
May-77	235,000	X	0	4	X	78,79,80	N/A
May-78	218,000	1	29	13	43	79,80,81	0.020%
Mar-83	13,690	11	72	30	113	84,85,86	0.825%
Apr-84	55,800	27	278	52	357	85,86,87	0.640%
Apr-85	209,155	37	408	716	1,161	86,87,88	0.555%
Mar-86	12,095	13	47	31	91	87,88,89	0.752%
Mar-87	258,600	75	180	42	297	88,89,90	0.115%
Mar-88	598,500	135	389	79	603	89,90,91	0.101%
Mar-89	1,016,300	39	139	27	205	90,91,92	0.020%
Mar-90	1,058,000	20	98	119	237	91,92,93	0.022%
Mar-91	227,500	6	37	1	44	92,93,94	0.019%
Mar-92	605,900	13	26	0	39	93,94,95	0.006%
Apr-93	375,000	7	73	8	88	94,95,96	0.023%
Apr-94	130,510	7	27	9	43	95,96,97	0.033%
Apr-95	147,429	5	60	34	99	96,97,98	0.067%

Appendix B. Pahsimeroi Fish Hatchery chinook salmon stock history.

Brood Year	Egg Source	No. Eggs	Genetic Stock	Release Year	Smolts Released	Release Site
1981	Hayden Creek	<500,000	Spring Chinook	1983	437,332	Pahsimeroi River
1981	Pahsimeroi	<25,000	Summer Chinook	1983	13,700	Pahsimeroi River
1982	Pahsimeroi	75,402	Summer Chinook	1984	55,800	Pahsimeroi River
1982	Hayden Creek	107,234	Spring Chinook	1984	99,750	Pahsimeroi River
1982	Sawtooth	451,902	Spring Chinook	1984	420,400	Pahsimeroi River
1982	Rapid River	669,500	Spring Chinook	1984	622,850	Pahsimeroi River
1983	Pahsimeroi	261,188	Summer Chinook	1985	209,105	Pahsimeroi River
1983	Hayden Creek	279,398	Spring Chinook	1985	178,800	Pahsimeroi River
1984	Pahsimeroi	23,999	Summer Chinook	1986	12,100	Pahsimeroi River
1984	Hayden Creek	145,341	Spring Chinook	1986	81,000	Pahsimeroi River
1985	Pahsimeroi	2,602,404	Spring Chinook	1987	1,200,000	Hayden Creek and Yankee Fork
1985	Pahsimeroi	200,448	Summer Chinook	1987	158,007	Pahsimeroi River
1985	Pahsimeroi	127,332	Summer Chinook	1987	100,593	Pahsimeroi River
1987	Pahsimeroi	2,128,750	Spring Chinook	1989	1,128,750	Sawtooth Hatchery
1987	Pahsimeroi	696,004	Summer Chinook	1989	536,500	Pahsimeroi River
1987	McCall	605,091	Summer Chinook	1989	479,800	Pahsimeroi River
1988	Pahsimeroi	1,053,536	Summer Chinook	1990	808,536	Pahsimeroi River
1988	McCall	317,272	Summer Chinook	1990	245,000	Pahsimeroi River
1989	Pahsimeroi	294,893	Summer Chinook	1991	227,500	Pahsimeroi River
1990	Pahsimeroi	662,641	Summer Chinook	1992	605,900	Pahsimeroi River
1991	Pahsimeroi	22,235	Spring Chinook	1993	15,000	Rapid River
1991	Pahsimeroi	437,157	Summer Chinook	1993	375,000	Pahsimeroi River
1992	Pahsimeroi	172,139	Summer Chinook	1994	130,510	Pahsimeroi River
1993	Pahsimeroi	167,200	Summer Chinook	1995	147,429	Pahsimeroi River
1994	Pahsimeroi	0	Summer Chinook	1996	0	Pahsimeroi River
1995	Pahsimeroi	157,938	Summer Chinook	1997	122,017	Pahsimeroi River
1996	Pahsimeroi	85,660	Summer Chinook	1998	65,648	Pahsimeroi River
1997	Pahsimeroi	171,836	Summer Chinook	1999	135,669	Pahsimeroi River

Submitted by:

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