

REF 90162

State of California
THE RESOURCES AGENCY
Department of Fish and Game

ANNUAL REPORT
FEATHER RIVER SALMON AND STEELHEAD HATCHERY
1970-71

by

Donald Schlichting
Region 2, Inland Fisheries

Anadromous Fisheries Branch
Administrative Report No, 74-11

1974

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ABSTRACT

This report describes the hatchery's fourth year of operation, July 1, 1970 to June 30, 1971. Tables present numbers of salmon and steelhead received, eggs and fish produced; and daily weather, water temperature, and fish trapping data for the fiscal year.

^{1/} Anadromous Fisheries Branch Administrative Report No. 74-11
Submitted for publication April 1974

INTRODUCTION

This is the fourth annual report of the Feather River Hatchery. It summarizes the activities from July 1, 1970 to June 30, 1971. The emphasis is on the numbers of adult salmonids trapped, eggs taken, and numbers and weight of juveniles planted (for production summary, see Table 1).

The hatchery is located near the upper Thermalito Bridge in Oroville, California, and was constructed by the California Department of Water Resources to compensate for loss of spawning area above Oroville Dam. It is operated by the Department of Fish and Game with funds provided by the Department of Water Resources.

VISITOR USE

A total of 84,334 people visited Feather River Hatchery during the 1970-71 fiscal year. This included various tour groups which were guided by hatchery personnel and Department of Water Resources Employees.

KING SALMON MAINTENANCE PROGRAM

Spring Run (Feather River)

History of the 1970 Run

A total of 235 adult spring-run salmon were received between August 13, 1970 and August 25, 1970. There were 153 females and 82 males in this group. Of the females received, a total of 65 were spawned for an egg take of 364,000. The egg loss in this group totaled 58,000 for a hatching percentage of 84.1. In January, 1971, 26,500 were planted at an average size of 1.0 g/fish (450/lb) (Appendix Table 1).

A total of 265,400 fish were still on hand June 30, 1971, making the egg-to-fingerling survival rate 80%.

1969 Brood Year

A total of 71,900 1969 brood year spring-run king salmon yearlings was planted in the Feather River from October 11 through November 17, 1970. These fish averaged 50 g (9.1/lb) when planted (Appendix Table 1).

Fall Run (Feather River)

History of the 1970 Run

A total of 3,346 adult fall-run king salmon came into the hatchery between October 1, 1970 and December 16, 1970. The run consisted of 867 adult males, 1,537 females and 942 grilse. We artificially spawned 1,423 females; 114 females died unspawned. The spawning yielded a total of 7,968,800 eggs.

Table 1

Production Summary, Feather River Hatchery, 1970-71 Season

Species	Brood year	Fish trapped			Total	Females spawned	Eggs taken or received	Fish planted*		On hand 6/30/71
		Grilse	Adult male	Adult female				Fingerlings	Yearlings	
Feather River King salmon Spring run	1969	-	-	-	-	-	-	-	71,900	0
	1970	-	82	153	235	65	364,000	26,500	-	265,400
Feather River Fall run King salmon	1969	-	-	-	-	-	-	535,500	157,800	0
	1970	942	867**	1,537**	3,346**	1,423	7,968,800	5,599,670	-	1,305,200
Nimbus Fall run King salmon	1969	-	-	-	-	-	-	-	631,250	0
	1970	-	-	-	-	-	2,334,090	2,276,020	-	0
Coleman Fall run King salmon	1969	-	-	-	-	-	-	-	912,200	0
Silver salmon	1970	-	23	35	58	35	100,900	42,000	-	0
<u>STEELHEAD (by strain)</u>										
Feather River Domestic	1970	-	-	-	-	-	-	562,000	208,000	2,000
Wild	1970	-	-	-	-	-	-	75,000	48,000	0
Nimbus	1970	-	-	-	-	-	149,460(fish)	-	147,500	0
Feather River Wild	1971	0	36	42	78	42	121,950	-	-	85,800
Domestic	1971	-	-	-	-	1,469	3,214,600	-	-	1,472,400
Domestic 1967-1969		-	-	-	-	-	-	-	1,000	1,050

* Spawning channel production not included.

** An additional 640 female and 486 male adult king salmon were received from Nimbus Hatchery, and were placed in the spawning channel.

Losses of eggs amounted to 634,780 (8%) leaving a balance of 7,334,020 fry to transfer to ponds. From January 6 through June 25, 1971, 5.6 million 1970 brood year Feather River fall-run fingerlings were released in the Feather and Sacramento Rivers. A total of 1.3 million of these were released before May, at 1.4 g/fish (324/lb) or smaller. The remaining 4.3 million were released in May and June at sizes ranging from 3.4 to 8.3 g/fish (135-55/lb) (Appendix Table 1). We had an estimated 1,305,200 on hand June 30, 1971.

1969 Brood Year

A total of 693,300 1969 brood year Feather River fall-run king salmon were released in the Feather and Sacramento Rivers: 535,500 from July 3 through August 6, 1970, at sizes ranging from 8.7 to 14 g/fish (32-52/lb), and 157,800 as yearlings from October 20 through December 28, at sizes ranging from 45 to 57 g/fish (8-10/lb) (Appendix Table 1).

Fall-run (Nimbus)

1970 Brood Year

A total of 2,334,090 eyed eggs was received from Nimbus Hatchery. In March and April, 1971 we planted the resulting 2,276,020 fish, ranging in size from 0.3 to 1.5 g (300-1,550/lb). Total loss from eggs to fish planted was 58,070 (2%).

1969 Brood Year

We had 650,600 Nimbus origin (shipped from Nimbus Hatchery as fry) king salmon yearlings on hand on July 1, 1970. A total of 631,250 was planted between July 1, 1970 and January 28, 1971. Of these, 40,650 were marked An-LP and with coded wire tags, as part of a program to compare Feather River releases with releases at Rio Vista (Appendix Table 1).

Fall-run (Coleman)

We had an estimated 945,730 1969 brood year fall-run Coleman king salmon on hand July 1, 1970. They had been shipped as eyed eggs from Coleman Hatchery in April, 1970. A total of 912,200 of these (96%) survived until they were planted, September 16-December 24, 1970, at an average size of 5.3 g (85/lb) (Appendix Table 1). The fish were relatively small because the eggs had been taken in March or April--about 4 months later than normal for fall-run fish.

Winter-run (Sacramento River)

We had 59,450 winter-run eggs on hand July 1, 1970, taken from the 1969-70 run at Red Bluff Diversion Dam. The entire lot died of coagulated yolk-sac, probably because water temperatures were too high. Hatchery water temperatures were seldom less than 15.6 C (60 F) in July (Appendix Table 4).

Spawning Channel

We received 640 female and 486 male adult king salmon spawners from Nimbus Hatchery. These fish, along with 109 adult male king salmon from the Feather River, were placed in the spawning channel from November 30 to December 10, 1970, to spawn naturally. We later evaluated spawning success by examining carcasses, and categorizing each on the basis of the number of eggs retained. Results were as follows:

Completely unspawned	25% spawned	50% spawned	75% spawned	100% spawned	Total female carcasses recovered
384	1	27	8	200	620

We recovered 620 of the 640 females originally placed in the spawning channel. We estimated the spawning success rate at 35.4%. The cause of the excessive prespawning mortality is not known, but a possible cause is the stress of trucking the fish from Nimbus Hatchery. Fingerlings were allowed to leave the channel at will. The fingerling production was not estimated.

KING SALMON MARKING PROGRAM

Two groups of 1969 brood year king salmon from Nimbus Hatchery were released this year. The purpose was to compare the contribution to fisheries and hatchery returns of hatchery-released fish versus Rio Vista releases. A total of 40,650 marked king salmon was released as follows:

Dates of releases	Area released	Size at release	Number	Mark
February 16-18, 1971	Sacramento River at Rio Vista	61 g	20,025	An-LP + CWT
February 17	Feather River at Hatchery	61 g	20,625	An-LP + CWT

RECOVERY OF MARKED KING SALMON

All king salmon were examined for marks as they were sorted during spawning operations. All marked fish were measured to the nearest 0.6 cm ($\frac{1}{4}$ inch) (Appendix Table 3). A total of 435 marked fish bearing 10 combinations of fin clips was observed. Origins of the marked fish were determined when possible. A total of 426 originated at Feather River Hatchery, three were marked elsewhere, and the origin of the remaining six could not be determined (see following table).

Marked King Salmon Recovered

Mark	Brood year	Number recovered	Release data				Origin
			Area	Size	Date(s)	Number	
Ad-An	1967	106	Sacramento R. at Rio Vista	15 cm	1/69	50,000	Fall run, Feather R. Hatchery
Ad-RP	1967	293	Feather River	15 cm	1/69	50,000	Fall run, Feather R. Hatchery
Ad-RV	1968	2	Sacramento R. at Rio Vista	5 g	4-8/69	321,000	Fall run, Coleman Hatchery
Ad-LP	1969	1	Sacramento R. at Red Bluff	37 mm	9-10/69	302,000	Winter-run, Sacto. R. wild fish
Ad	1967	27	Possibly Ad-An, 1967 brood year, with regenerated anal fins.				
An	?	2	Origin unknown.				
LV-RM	?	1					
RV	?	1					
LP	?	1					
RM	?	1					

SILVER SALMON

Fifty-eight silver salmon (Oncorhynchus kisutch) entered the hatchery this season (23 males and 35 females). The dates of their arrival were not recorded. The 35 females were spawned, producing 100,900 eggs. Approximately 42,000 eventually hatched and were released as swim-up fry in February, 1970.

STEELHEAD MAINTENANCE PROGRAM

History of the 1971 Run

All steelhead entering the hatchery before October 15 were returned to the river uncounted. Beginning October 15, all steelhead trapped were counted, examined for marks, and held for spawning. The last steelhead entered the trap March 12, 1971. No marked fish were observed.

A total of 78 fish (36 males and 42 females) entered the trap after October 15, 1970. The 42 females were spawned, producing 121,950 eggs. We transferred 86,700 fry to the ponds, for an egg to fry survival rate of 71%. On hand June 30, 1971, were an estimated 85,800 fish. All were held for planting as yearlings.

1971 Brood Year from Broodstock (Domestic)

A total of 3,214,600 eggs were taken from 1,469 brood stock females. One thousand adult broodstock fish were returned to the river, and 1,050 were retained as brood stock for next year. Only 1,542,800 fry (48%) were transferred to the ponds. A mechanical failure, involving our ultra violet

water treatment system, shut off the water supply and caused a loss of about one-half the eggs. On June 30, 1971 there were an estimated 1,472,400 remaining in the ponds.

1970 Brood Year Steelhead

We had an estimated 1,423,415 1970 brood year steelhead on hand July 1, 1970. Of these, 637,000 were released as fingerlings from July 2 to August 6, at sizes ranging from 0.6-5.0 g/fish (800-90/lb).

In September, we received 149,460 additional fingerlings from Nimbus Hatchery averaging 16 g/fish (28/lb).

A total of 403,500 1970 brood year steelhead were planted as yearlings from August, 1970 through March, 1971 at 17-65 g/fish (7-27/lb) (Appendix Table 2).

1971 Brood Year Steelhead

We had an estimated 2,000 1971 brood year Feather River-strain steelhead on hand June 30, 1971. These fish were held for brood stock.

STEELHEAD MARKING PROGRAM

In February, 1971, 149,600 1970 brood year steelhead were marked and released to determine the effect of ultra violet light treatment of the pond water (see following table).

Mark	Number	Strain	Treatment
LV	49,500	Domestic Feather River	Raised in UV-treated water
RV	49,900	Domestic Feather River	Control
Ad	50,200	Wild Nimbus	Raised in UV-treated water

Appendix Table 1

King Salmon Planting Data 1970-71

Date	Area *	Number	Size(g)	Mark
<u>Spring Run, 1969 Brood Year</u>				
October 11, 1970	Feather River	8,000	45	
October 20-21, 1970	Feather River	17,000	45	
November 5-17, 1970	Feather River	<u>46,900</u>	50	
TOTAL		71,900		
<u>Fall Run, 1969 Brood Year</u>				
July 3, 1970	Feather River	183,000	11	
July 27-31, 1970	Sacramento River	261,500	8.7-14	
August 3-6, 1970	Sacramento River	85,800	14	
August 6, 1970	Feather River	5,200	14	
October 20, 1970	Feather River	45,000	45	
November 5, 1970	Feather River	30,000	45	
December 24-28, 1970	Feather River	<u>82,800</u>	57	
TOTAL		693,300		
<u>Fall Run, 1969 Brood Year (Nimbus Stock)</u>				
July 7-9, 1970	Feather River	240,000	5.7	
August 5-17, 1970	Sacramento River	216,000	7.6	
October 29, 1970	Feather River	40,000	45	
November 5, 18, 19, 1970	Feather River	64,000	45	
December 28, 1970	Feather River	30,600	50	
February 16-18, 1971	Sacramento	20,025	61	An-LP + cwt
February 17, 1971	Feather River	<u>20,625</u>	61	An-LP + cwt
TOTAL		631,250		
<u>Fall Run, 1969 Brood Year (Coleman)</u>				
September 16-23, 1970	Feather River	663,000	5.3	
December 21-24, 1970	Feather River	<u>249,200</u>	5.3	
TOTAL		912,200		
<u>Spring Run, 1970 Brood Year</u>				
January 6, 20, 1971	Feather River	<u>26,500</u>	1.0	
TOTAL		26,500		

(continued on next page)

* All Sacramento River releases were at Rio Vista.

Appendix Table I (continued)

Date	Area*	Number	Size(g)	Mark
<u>Fall Run, 1970 Brood Year</u>				
January 6, 20, 1971	Feather River	57,500	0.61-1.0	
March 18, 1971	Feather River	54,800	0.33	
April 21-28, 1971	Sacramento River	648,840	1.2-1.4	
April 27-29, 1971	Feather River	553,600	1.4	
May 16, 1971	Sacramento	61,200	5.3	
May 17, 1971	Feather River	110,500	5.5	
May 18-20, 1971	Sacramento	326,400	5.3	
May 19-21, 1971	Feather River	161,500	5.3	
May 21-24, 1971	Sacramento	159,800	5.3	
May 24-28, 1971	Feather River	780,680	5.3-6.5	
June 1-3, 1971	Feather River	73,450	7.0	
June 2-3, 1971	Sacramento	84,500	7.0	
June 4, 1971	Feather River	189,000	3.4	
June 7, 8, 1971	Sacramento	232,750	6.5	
June 8, 1971	Feather River	23,100	8.3	
June 14, 15, 1971	Sacramento	115,500	8.3	
June 15-21, 1971	Feather River	1,396,550	6.1-8.3	
June 22-25, 1971	Sacramento	<u>570,000</u>	6.1	
TOTAL		5,599,670		
<u>Fall Run, 1970 Brood Year (Nimbus)</u>				
March 18, 1971	Feather River	38,750	0.29	
April 14-22, 1971	Feather River	<u>2,237,270</u>	1.1-1.5	
TOTAL		2,276,020		
<u>GRAND TOTAL 1969 and 1970 Brood Years</u>		<u>10,210,840</u>		

* All Sacramento River releases were at Rio Vista.

Appendix Table 2
Steelhead Planting Data 1970-71

Date	Area	Number	Size (g)
<u>Domestic Fingerlings 1970 BY</u>			
July 2, 1970	Feather River	432,000	0.57-0.71
July 6, 1970	Feather River	<u>130,000</u>	0.57-0.91
TOTAL		562,000	
<u>Wild Fingerlings 1970 BY</u>			
July 7, 1970	Feather River	30,000	1.1
August 14, 1970	Feather River	<u>45,000</u>	5.0
TOTAL		75,000	
<u>Domestic Yearlings 1970 BY</u>			
March 10-15, 1971	Feather River	33,100	17-45
March 18-22, 1971	Feather River	60,200	30-57
March 23, 24, 1971	Feather River	<u>114,700*</u>	23-57
TOTAL		208,000	
<u>Wild Yearlings 1970 BY</u>			
March 3, 1971	Feather River	<u>48,000</u>	23
TOTAL		48,000	
<u>Nimbus Yearlings 1970 BY</u>			
March 10-22, 1971	Feather River	<u>147,500**</u>	57-65
TOTAL		147,500	
<u>Domestic Brood Stock 1967-68 BY</u>			
May 9, 1971	Feather River	<u>1,000</u>	0.45 kg
TOTAL		1,000	
<u>GRAND TOTAL</u>		<u>1,041,500</u>	

* Includes 49,500 fish marked LV only and 49,900 fish marked RV only.

** Includes 50,200 fish marked Ad only.

Appendix Table 3

Lengths of Marked King Salmon Recovered at
Feather River Hatchery, 1970-71 Season

Fork length Inches	Ad-An		Ad-RP		Ad		RM		Ad-RV		RV		LP		An		LV-RM		Ad-LP	
Cm	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
48.26			1																	
50.8	1		1																	
53.34									1											
55.88	2		5	2							1									
58.42	1		4																	
60.96	2	1	12	4	2				1											
63.5	3	2	9	2	1															
66.04	3	1	23	5	1										1					
68.58	5	1	33	7																
71.12	7	7	27	19	4															
73.66		13	29	18																
76.2	10	11	22	21	2	5							1							1
78.74	8	9	15	10	3	2									1					
81.28	5	3	7	2	1															
83.82	1	2	8	1	1															
86.36	1		2																	
88.9			3																	
91.44					1															
93.88																				
96.52		1																		
99.06																				
101.6																				
104.14																				
106.68																				
109.22																				
111.76																				
114.3																				
116.84																				
119.38																				
121.92																				
124.46																				
TOTALS	55	51	202	91	17	9	1	2			1		1		1	1	1			1

Appendix Table 4
Feather River Salmon and Steelhead Hatchery
Weather, Water, and Fish Data Report
July 1, 1970 through June 30, 1971

July	Temperature (C*)				Weather	Fish Trapped				Steelhead
	Air		Water			King Salmon				
	Maximum	Minimum	Maximum	Minimum		Fall Run	Spring Run			
						Adults	Grilse	Adults	Grilse	
1	35.0	15.6	16.7	16.1	Clear					
2	35.6	17.2	16.7	16.1	Clear					
3	25.6	16.7	16.7	15.6	Clear					
4	24.4	17.8	16.1	15.6	Clear					
5	38.3	17.8	15.6	15.0	Clear					
6	35.0	12.8	15.6	15.0	Clear					
7	37.8	13.9	15.6	15.0	Clear					
8	38.3	15.6	16.1	15.6	Clear					
9	35.0	15.6	15.6	15.0	Clear					
10	35.6	14.4	15.6	15.0	Clear					
11	35.0	15.6	16.1	15.6	Clear					
12	38.3	19.4	15.6	15.6	Clear					
13	40.5	12.8	16.1	15.0	Clear					
14	40.0	19.4	16.1	15.6	Clear					
15	35.6	18.9	16.1	15.6	Clear					
16	32.8	12.8	16.1	15.0	Clear					
17	38.3	15.0	16.7	15.6	Clear					
18	38.9	18.9	16.7	16.1	Clear					
19	41.7	18.3	16.7	16.1	Clear					
20	40.0	21.1	16.1	15.0	Clear					
21	36.1	16.7	16.1	15.6	Clear					
22	36.7	15.6	16.7	15.6	Clear					
23	37.8	17.2	16.7	15.0	Clear					
24	37.2	16.7	15.6	15.0	Clear					
25	35.0	14.4	15.6	15.6	Clear					
26	37.8	14.4	15.6	15.0	Clear					
27	36.1	16.7	16.1	15.0	Clear					
28	35.0	13.9	15.6	15.6	Clear					
29	35.6	13.3	16.1	15.0	Clear					
30	33.9	12.2	16.1	15.6	Clear					
31	35.0	12.2	16.1	16.1	Clear					
TOTAL										

* Temperatures measured in F and later converted to C.

Appendix Table 4 (Continued)

August	Temperature (C*)				Weather	Fish trapped				Steelhead
	Air		Water			King salmon		Spring run		
	Maximum	Minimum	Maximum	Minimum		Fall run	Adults		Grilse	
1	36.1	12.8	16.1	16.1	Clear					
2	37.8	15.6	16.7	15.6	Clear					
3	37.8	18.9	16.1	15.6	Clear					
4	32.2	15.0	16.1	16.1	Clear					
5	32.8	13.9	17.2	16.1	Clear					
6	34.4	16.7	17.2	16.1	Clear					
7	35.0	15.6	17.1	16.1	Clear					
8	38.9	14.4	17.2	16.1	Clear					
9	38.3	12.8	16.7	16.1	Clear					
10	40.5	17.8	16.7	15.0	Clear					
11	39.4	16.1	16.7	15.6	Clear					
12	40.0	16.7	16.7	15.6	Clear					
13	37.8	16.1	17.2	15.0	Clear			157		
14	37.8	17.8	15.6	14.4	Clear			25		
15	42.2	16.7	15.6	14.4	Clear			3		
16	36.7	15.6	15.6	14.4	Clear					
17	35.6	18.9	15.6	14.4	Clear					
18	35.0	17.8	15.6	15.0	Clear					
19	34.4	14.4	15.6	14.4	Clear					
20	32.2	12.8	15.6	14.4	Clear					
21	33.3	12.8	15.6	15.0	Clear					
22	32.2	14.4	16.1	15.6	Clear					
23	32.8	11.7	15.6	14.4	Clear					
24	34.4	13.3	16.1	15.0	Clear					
25	33.3	13.9	16.1	15.0	Clear			2		
26	32.2	11.7	16.7	15.6	Clear			3		
27	33.3	13.3	16.1	15.6	Clear					
28	33.3	13.9	16.7	15.6	Clear					
29	34.4	16.1	15.6	14.4	Clear					
30	29.4	13.3	15.0	15.0	Clear					
31	31.7	14.4	15.0	12.2	Clear			45		
August Total								235		

Appendix Table 4 (Continued)

September	Temperature (C°)					Fish trapped				Steelhead
	Air		Water		Weather	King salmon				
	Maximum	Minimum	Maximum	Minimum		Fall run	Spring run			
						Adults	Grilse		Adults	
1	33.3	13.3	12.2	11.7	Clear					
2	32.2	12.2	12.8	11.7	Clear					
3	33.3	13.3	12.8	12.2	Clear					
4	26.7	16.7	12.8	12.2	Cloudy					
5	27.8	10.0	13.3	12.2	Clear					
6	34.4	16.7	13.3	12.2	Clear					
7	36.7	18.9	12.2	11.7	Clear					
8	35.0	16.7	13.3	12.2	Clear					
9	36.7	16.1	13.3	12.8	Clear					
10	37.8	16.1	13.3	12.8	Clear					
11	36.7	16.7	13.3	12.8	Clear					
12	28.9	14.4	13.9	13.3	Clear					
13	24.4	9.4	13.3	11.7	Clear					
14	27.8	8.3	13.9	13.3	Clear					
15	30.0	10.0	14.4	13.3	Clear					
16	32.2	12.8	13.3	12.2	Clear					
17	34.4	14.4	13.3	11.1	Clear					
18	32.8	15.0	11.7	10.6	Clear					
19	23.3	15.6	11.1	11.1	Cloudy					
20	26.7	10.6	12.2	11.1	Clear					
21	28.3	11.1	12.2	11.1	Clear					
22	32.2	31.1	12.2	11.1	Clear					
23	31.1	14.4	12.2	11.1	Clear					
24	25.6	12.8	12.2	11.1	Clear					
25	32.2	13.3	12.8	11.7	Clear					
26	34.4	12.2	12.2	11.1	Clear					
27	33.3	14.4	12.8	11.1	Clear					
28	33.3	13.3	12.8	11.1	Clear					
29	32.2	13.3	11.1	10.6	Clear					
30	36.7	12.2	11.1	10.6	Clear					

Appendix Table 4 (Continued)

October	Temperature (C*)					Fish trapped				Steelhead
	Air		Water		Weather	King salmon				
	Maximum	Minimum	Maximum	Minimum		Fall run	Spring run			
						Adults	Grilse		Adults	
1	34.4	13.3	11.1	10.6	Clear	4				
2	36.7	14.4	11.1	10.6	Clear	4				
3	31.1	12.2	11.7	11.1	Clear	5				
4	28.9	13.3	12.2	12.2	Clear	6				
5	32.2	12.2	12.2	11.1	Clear	12				
6	23.3	9.4	11.1	11.1	Clear	33	24			
7	23.3	13.9	11.7	11.1	Clear	48	28			
8	27.8	10.0	12.2	11.7	Clear	21	11			
9	26.7	10.0	12.2	11.7	Clear	25	16			
10	30.0	11.1	12.2	11.7	Clear	33	13			
11	30.0	12.2	12.2	11.1	Clear	47	15			
12	28.3	11.1	12.8	11.7	Clear	26	23			
13	27.8	9.4	11.7	11.1	Clear	58	12			
14	25.6	8.3	11.7	11.1	Clear	21	15			
15	24.4	8.3	11.7	11.1	Clear	14	7		1	
16	25.6	8.9	11.7	11.1	Clear	30	4			
17	23.9	8.9	12.2	11.7	Cloudy	21	10		1	
18	20.0	13.3	12.2	11.7	Rain	73	39			
19	22.2	09.4	12.2	11.7	Cloudy	68	34		1	
20	18.3	11.1	12.2	11.1	Cloudy	105	45			
21	15.6	12.2	11.7	11.1	Cloudy	135	62			
22	17.8	11.1	12.2	11.1	Cloudy	68	22		1	
23	13.9	10.0	12.2	11.1	Rain	73	18			
24	15.6	6.7	12.2	11.7	Cloudy	94	33		2	
25	18.9	6.7	12.2	11.7	Clear	79	18			
26	16.7	5.0	12.2	11.7	Clear	25	11			
27	20.0	3.3	12.2	11.7	Cloudy	53	22			
28	21.1	6.1	12.2	11.7	Clear	63	12			
29	23.3	5.0	12.2	11.7	Cloudy	60	25		1	
30	17.8	8.3	12.2	12.2	Cloudy	64	21			
31	22.8	8.9	12.2	11.7	Clear	70	10		1	
October Totals						1,438	550		8	

Appendix Table 4 (Continued)

November	Temperature (C*)				Weather	Fish trapped				Steelhead
	Air		Water			King salmon		Adults	Grilse	
	Maximum	Minimum	Maximum	Minimum		Fall run	Spring run			
1	25.6	8.9	12.2	11.7	Clear	42	5			
2	25.6	12.2	12.2	11.7	Clear	55	16			1
3	22.2	8.9	11.7	11.1	Cloudy	73	28			
4	13.3	12.2	11.7	11.1	Rain	83	16			
5	16.7	12.8	11.7	11.1	Rain	24	5			
6	13.3	17.2	11.7	11.1	Rain	59	30			
7	16.7	11.1	12.2	12.2	Cloudy	105	38			
8	16.1	12.2	12.2	12.2	Cloudy	75	33			
9	17.8	13.3	12.2	11.7	Cloudy	36	38			
10	18.9	8.9	11.1	11.1	Clear	15	11			
11	17.2	11.1	11.1	11.1	Rain	48	20			
12	17.2	6.7	11.7	11.1	Clear	9	6			
13	19.4	4.4	11.7	11.1	Clear	19	2			
14	18.3	9.4	11.1	11.1	Cloudy	36	8			
15	20.0	13.3	11.1	11.1	Cloudy	16	6			1
16	18.9	6.7	11.1	11.1	Cloudy	34	8			
17	17.8	5.6	11.1	10.6	Clear	17	5			
18	19.4	5.6	11.1	11.1	Clear	12	6			
19	17.8	5.6	11.1	11.1	Clear	12	6			
20	16.7	5.6	11.1	11.1	Clear	8	11			
21	13.9	10.0	11.1	11.1	Cloudy	6	9			
22	12.2	10.0	11.1	11.1	Cloudy	8	14			
23	15.6	8.3	11.1	10.6	Cloudy	10	5			
24	15.6	8.9	10.6	10.6	Cloudy	7	5			
25	12.8	8.9	10.6	10.6	Rain	15	4			
26	11.1	8.9	10.6	10.0	Cloudy	16	9			
27	11.7	7.8	10.6	10.0	Rain	13	1			
28	10.0	8.9	10.0	10.0	Cloudy	10	6			
29	11.1	8.9	10.6	10.0	Rain	13	5			
30	10.0	4.4	10.0	10.0	Rain	7	2			
November Totals						883	358			2

Appendix Table 4 (Continued)

December	Temperature (C*)					Fish trapped				Steelhead
	Air		Water		King salmon					
	Maximum	Minimum	Maximum	Minimum	Fall run		Spring run			
					Adults	Grilse	Adults	Grilse		
1	11.1	6.7	9.4	8.9	Rain	15	7			
2	12.8	7.8	10.0	8.9	Rain	9	3			
3	8.9	6.7	10.0	9.4	Rain	12	1			
4	9.4	8.3	10.0	10.0	Rain		1			
5	10.6	9.4	10.6	10.0	Cloudy	9	20		1	
6	14.4	8.3	10.6	10.6	Cloudy					
7	12.2	9.4	10.6	10.6	Rain	9				
8	12.2	10.0	10.6	10.6	Rain	6				
9	12.2	10.0	10.6	10.0	Rain	3	1			
10	11.7	2.2	10.0	10.0	Clear	3				
11	16.7	3.3	10.0	10.0	Clear	4				
12	10.0	4.4	10.0	10.0	Cloudy				1	
13	10.0	6.1	10.0	10.0	Cloudy					
14	10.0	4.4	10.0	10.0	Cloudy	6	1			
15	10.6	7.8	10.0	10.0	Cloudy	4				
16	9.4	7.2	10.0	9.4	Rain	3				
17	10.0	5.6	9.4	8.9	Cloudy					
18	7.8	4.4	9.4	8.9	Rain				1	
19	11.1	-0.6	8.9	8.9	Clear					
20	8.3	2.2	9.4	9.4	Rain					
21	7.2	5.6	9.4	8.9	Rain					
22	8.9	1.7	8.9	8.9	Cloudy					
23	8.9	2.2	8.9	8.9	Cloudy					
24	10.0	-0.6	8.9	8.9	Clear					
25	9.4	-0.0	8.9	8.9	Clear					
26	6.1	3.3	8.9	8.9	Cloudy					
27	7.8	5.0	8.9	8.9	Rain					
28	10.0	-1.1	8.9	8.3	Rain					
29	11.7	7.8	8.9	8.3	Rain					
30	14.4	5.0	8.3	8.3	Clear					
31	10.6	5.0	8.3	8.3	Clear					
December Totals						83	34		3	

Appendix Table 4 (Continued)

January	Temperature (C*)				Weather	Fish trapped				Steelhead
	Air		Water			King salmon				
	Maximum	Minimum	Maximum	Minimum		Fall run	Spring run			
						Adults	Grilse		Adults	
1	7.8	3.3	8.3	8.3	Clear					
2	12.2	2.2	8.3	8.3	Clear					
3	9.4	0.0	8.3	8.3	Clear					
4	10.0	3.3	8.3	8.3	Clear					
5	12.2	1.7	8.3	8.3	Clear					
6	12.2	1.1	8.3	7.8	Clear					
7	10.0	0.6	0.6	7.8	Clear					
8	10.0	2.2	7.8	7.8	Cloudy					1
9	11.1	1.7	7.8	7.8	Clear					
10	9.4	2.2	7.8	7.8	Rain					
11	8.9	6.7	7.8	7.8	Rain					
12	7.2	3.3	7.8	7.2	Rain					
13	8.3	3.3	7.2	7.2	Rain					
14	10.6	6.7	7.2	7.2	Cloudy					
15	10.6	8.9	7.2	7.2	Rain					
16	10.6	7.8	7.2	7.2	Rain					
17	12.8	8.3	7.8	7.2	Cloudy					
18	15.6	8.3	7.8	7.8	Fog					17
19	11.7	8.9	7.8	7.8	Fog					4
20	17.2	7.8	7.8	7.8	Clear					
21	16.7	3.3	7.8	7.8	Clear					
22	16.1	1.7	7.8	7.8	Clear					
23	17.8	4.4	7.8	7.8	Clear					
24	16.1	6.7	7.8	7.8	Clear					
25	14.4	2.2	7.8	7.8	Clear					
26	16.1	4.4	7.8	7.8	Clear					
27	15.6	3.3	7.8	7.8	Clear					9
28	6.7	3.3	7.8	7.8	Fog					3
29	6.7	4.4	7.8	7.8	Fog					
30	6.7	3.3	7.8	7.8	Fog					
31	17.8	3.3	7.8	7.8	Fog					
January Total										
										34

Appendix Table 4 (Continued)

February	Temperature (C*)					Weather	Fish trapped				Steelhead	
	Air		Water		King salmon		Adults	Grilse	Adults	Grilse		
	Maximum	Minimum	Maximum	Minimum	Fall run							Spring run
1	6.1	3.9	7.8	7.8	Cloudy							
2	13.3	4.4	7.8	7.2	Cloudy							
3	14.4	-0.6	7.2	7.2	Clear						6	
4	15.6	3.9	7.2	7.2	Clear							
5	15.6	3.9	7.8	7.2	Clear							
6	17.8	3.3	7.8	7.2	Clear							
7	15.6	3.3	8.3	7.2	Clear							
8	17.8	1.1	7.8	7.8	Fog							
9	13.9	3.3	7.8	7.2	Fog							
10	18.9	5.6	7.8	7.2	Fog							
11	26.1	4.4	7.8	7.8	Clear							
12	17.2	5.0	7.8	7.8	Clear							
13	20.0	5.0	7.8	7.8	Clear							
14	17.8	6.7	8.3	7.8	Clear							
15	14.4	3.9	8.3	7.8	Cloudy							
16	15.6	0.6	8.3	7.8	Clear						12	
17	16.7	4.4	7.8	7.8	Cloudy							
18	15.0	3.3	7.8	7.8	Cloudy							
19	16.7	2.2	7.8	7.8	Clear							
20	13.9	1.7	7.8	7.8	Clear							
21	13.9	2.2	7.8	7.8	Cloudy							
22	13.9	2.2	7.8	7.8	Cloudy						1	
23	16.7	1.7	7.8	7.8	Clear							
24	18.3	4.4	7.8	7.8	Cloudy							
25	11.1	1.7	7.8	7.8	Clear							
26	12.2	0.0	7.8	7.8	Clear							
27	8.3	1.7	7.8	7.8	Rain							
28	13.3	1.1	7.8	7.2	Clear							
29												
30												
February Total												19

Appendix Table 4 (Continued)

March	Temperature (C*)					Fish trapped				Steelhead	
	Air		Water		King salmon						
	Maximum	Minimum	Maximum	Minimum	Fall run		Spring run				
					Adults	Grilse	Adults	Grilse			
1	17.8	0.0	7.8	7.2	Clear					3	
2	14.4	1.1	7.8	7.2	Clear						
3	14.4	8.3	7.2	7.2	Cloudy						
4	15.6	6.7	7.2	7.2	Cloudy						
5	14.4	0.0	7.8	7.2	Clear						
6	18.9	2.2	7.8	7.2	Clear						
7	16.1	5.6	7.8	7.2	Cloudy					4	
8	20.0	2.2	7.8	7.2	Cloudy						
9	15.0	3.9	7.2	7.2	Cloudy						
10	15.6	5.6	7.2	7.2	Cloudy						
11	13.9	10.0	7.2	7.2	Cloudy					2	
12	12.2	7.8	7.2	6.7	Rain					3	
13	15.6	4.4	7.2	7.2	Clear						
14	8.3	6.7	7.8	7.2	Rain						
15	15.6	7.8	7.8	7.8	Cloudy						
16	16.7	5.6	7.8	7.8	Cloudy						
17	20.0	3.3	7.8	7.8	Cloudy						
18	21.1	4.4	8.3	7.8	Clear						
19	24.4	3.9	8.3	7.8	Clear						
20	22.2	10.0	7.8	7.8	Clear						
21	23.9	6.1	7.8	7.2	Clear						
22	17.2	8.9	7.8	7.8	Cloudy						
23	15.6	10.0	7.8	7.8	Rain						
24	17.2	7.8	7.8	7.8	Fog						
25	13.3	10.0	7.8	7.8	Rain						
26	17.2	11.1	7.8	7.2	Cloudy						
27	15.6	6.1	7.8	7.2	Clear						
28	23.3	12.2	8.3	7.8	Clear						
29	8.9	4.4	8.3	8.3	Clear						
30	17.8	3.3	8.3	8.3	Cloudy						
31	24.4	4.4	8.3	8.3	Clear						
March total											12

Appendix Table 4 (Continued)

April	Temperature (C#)				Weather	Fish trapped				Steelhead
	Air		Water			King salmon				
	Maximum	Minimum	Maximum	Minimum		Fall run	Spring run			
						Adults	Grilse		Adults	
1	25.6	8.3	8.3	7.8	Clear					
2	25.6	8.3	8.3	7.8	Clear					
3	26.7	8.3	9.4	8.3	Clear					
4	27.2	11.1	9.4	9.4	Clear					
5	21.1	9.4	9.4	8.9	Clear					
6	16.7	10.0	8.9	8.9	Cloudy					
7	18.9	6.1	8.9	8.3	Cloudy					
8	20.0	5.6	8.9	8.3	Clear					
9	22.8	13.3	9.4	8.9	Cloudy					
10	23.9	15.6	8.3	7.8	Clear					
11	23.3	18.9	9.4	8.3	Clear					
12	23.3	10.6	9.4	9.4	Clear					
13	19.4	6.7	9.4	9.4	Cloudy					
14	25.0	8.3	10.0	9.4	Clear					
15	26.1	6.7	10.0	9.4	Clear					
16	16.7	5.0	10.0	8.9	Cloudy					
17	20.0	7.8	8.9	8.3	Cloudy					
18	23.9	12.2	10.6	8.9	Clear					
19	25.6	6.1	10.6	10.0	Clear					
20	13.3	0.0	10.0	8.9	Rain					
21	14.4	3.9	10.0	8.9	Clear					
22	15.6	7.2	10.0	9.4	Cloudy					
23	14.4	2.2	10.0	9.4	Cloudy					
24	15.6	5.6	10.0	10.0	Cloudy					
25	22.2	7.8	10.6	10.0	Clear					
26	23.9	10.0	11.1	10.0	Cloudy					
27	25.6	8.9	10.0	10.0	Clear					
28	23.9	8.3	10.0	10.0	Clear					
29	24.4	6.7	10.0	9.4	Clear					
30	28.3	6.7	10.0	9.4	Clear					
April Total										

Appendix Table 4 (Continued)

May	Temperature (C*)				Weather	Fish trapped				Steelhead
	Air		Water			King salmon				
	Maximum	Minimum	Maximum	Minimum		Fall run		Spring run		
						Adults	Grilse	Adults	Grilse	
1	18.3	10.0	10.6	10.0	Cloudy					
2	17.2	9.4	11.1	9.4	Cloudy					
3	18.9	16.1	10.6	10.0	Cloudy					
4	16.7	10.0	10.6	10.0	Rain					
5	21.1	14.4	10.6	10.0	Cloudy					
6	20.0	8.9	10.6	10.0	Cloudy					
7	20.6	7.8	10.6	10.0	Cloudy					
8	22.8	10.6	10.0	10.0	Rain					
9	24.4	9.4	10.0	9.4	Clear					
10	30.0	11.7	11.1	9.4	Clear					
11	29.4	11.1	10.6	10.6	Clear					
12	27.8	11.1	10.6	10.6	Clear					
13	26.1	14.4	10.6	10.0	Cloudy					
14	27.2	6.1	11.7	10.6	Clear					
15	25.6	10.0	11.7	11.1	Clear					
16	26.7	12.2	11.7	10.6	Clear					
17	21.1	10.0	12.2	10.6	Clear					
18	25.0	10.6	12.2	11.7	Clear					
19	26.1	12.8	11.7	11.7	Clear					
20	26.1	11.7	11.7	11.1	Clear					
21	25.0	8.3	12.8	11.1	Clear					
22	22.2	10.0	12.8	11.7	Clear					
23	29.4	13.9	12.8	12.2	Clear					
24	29.4	12.8	12.8	12.2	Clear					
25	30.0	12.8	12.2	11.7	Clear					
26	26.1	8.9	11.7	11.1	Clear					
27	21.1	10.6	12.2	11.7	Clear					
28	14.4	10.0	11.7	11.1	Rain					
29	12.8	10.0	12.2	11.7	Rain					
30	29.4	13.9	12.2	11.7	Rain					
31	16.7	7.8	12.2	11.7	Rain					

Appendix Table 4 (Continued)

June	Temperature (C*)				Weather	Fish trapped				Steelhead
	Air		Water			King salmon				
	Maximum	Minimum	Maximum	Minimum		Fall run		Spring run		
						Adults	Grilse	Adults	Grilse	
1	20.0	6.7	12.2	11.7	Cloudy					
2	26.1	8.3	12.2	11.7	Clear					
3	25.6	7.8	11.7	11.7	Clear					
4	30.0	12.8	11.7	11.1	Clear					
5	27.2	11.1	12.8	11.7	Clear					
6	30.0	13.3	12.8	11.7	Clear					
7	31.1	13.3	12.2	12.2	Clear					
8	28.9	12.8	12.2	12.2	Clear					
9	27.8	11.7	12.2	11.7	Clear					
10	23.3	12.2	12.2	11.7	Clear					
11	27.8	13.3	12.8	12.2	Clear					
12	31.1	15.6	12.8	12.2	Clear					
13	29.4	12.2	13.3	12.2	Clear					
14	28.3	11.1	13.3	12.8	Clear					
15	33.3	16.1	13.3	12.8	Clear					
16	37.2	20.0	13.9	13.3	Clear					
17	36.1	20.6	13.9	13.3	Clear					
18	35.0	18.9	13.9	12.8	Clear					
19	30.6	20.0	13.3	12.2	Clear					
20	30.0	18.3	13.3	13.3	Clear					
21	34.4	18.9	14.4	12.8	Clear					
22	36.1	18.9	14.4	13.9	Clear					
23	33.3	14.4	14.4	13.9	Clear					
24	30.6	13.9	14.4	13.9	Clear					
25	30.6	13.3	14.4	13.9	Cloudy					
26	29.4	16.1	14.4	13.9	Rain					
27	22.2	13.3	14.4	12.8	Clear					
28	26.7	12.2	14.4	13.9	Clear					
29	28.3	13.3	15.0	14.4	Clear					
30	32.8	13.9	15.0	14.4	Clear					
Grand Total, July 1, 1970 through June 30, 1971						2,404	942	235		78