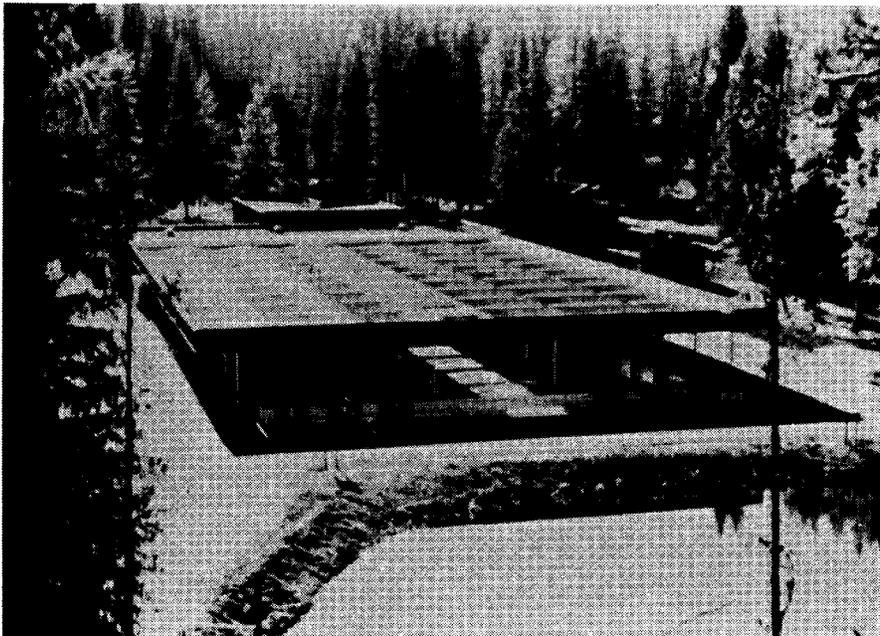




MCCALL FISH HATCHERY

Brood Year 1989 Production Report



by

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TABLE OF CONTENTS

	<u>Page</u>
ABSTRACT	1
INTRODUCTION	2
LOCATION	2
OBJECTIVES	2
FISH REARING FACILITIES	2
WATER SUPPLY	3
STAFFING	3
FISH PRODUCTION	3
EARLY REARING	3
FISH DISTRIBUTION	4
Fish Tagging	4
Fish Release Information	5
FISH HEALTH	6
SPECIAL STUDIES	6
PRODUCTION COSTS	6
APPENDICES	8

LIST OF TABLES

Table 1. Survival from green egg to release	4
Table 2. Tags and marks used	5
Table 3. Release numbers by mark group	5
Table 4. Fish releases	6
Table 5. Results of viral and bacteriological testing	6
Table 6. Production costs	7

LIST OF APPENDICES

Appendix 1. McCall Fish Hatchery summer chinook salmon rack returns	9
Appendix 2. Brood Year 1989 adult length frequency trapped at South Fork Salmon River trap	10

TABOFCON

LIST OF APPENDICES (cont.)

	<u>Page</u>
Appendix 3. Length frequency of adult fish trapped at South Fork Salmon River trap	11
Appendix 4. Brood Year 1989 jack length frequency trapped at South Fork Salmon River trap	12
Appendix 5. Length frequency of jacks trapped at South Fork Salmon River trap	13
Appendix 6. Brood Year 1989 run timing.....	14
Appendix 7. South Fork Salmon River run time in 1989.....	16

ABSTRACT

McCall Fish Hatchery was the first hatchery built to enhance the summer chinook salmon Oncorhynchus tshawytscha runs into Idaho under the Water Resources Development Act of 1976. The hatchery was built in 1979 with a production goal of 1,000,000 smolts for stocking into the South Fork Salmon River.

The adult chinook salmon trapping and spawning operation began on June 22, 1989 and concluded on September 12, 1989. A total of 938 fish were trapped measured and recorded during this period.

There were 151 female chinook salmon spawned producing 801,319 green eggs. There were 708,600 smolts released into the South Fork Salmon River at Knox Bridge.

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INTRODUCTION

Hydroelectric dams on the Columbia and Snake rivers have reduced Idaho's chinook salmon runs to critically low levels. In 1976, congress enacted the Water Resources Development Act, a portion of which is the Lower Snake River Fish and Wildlife Compensation Plan (LSRCP). The LSRCP compensated Idaho for losses of fish and wildlife caused by the Lower Snake River projects (Ice Harbor, Lower Monumental, Little Goose, and Lower Granite dams). The McCall Fish Hatchery was the first hatchery built as partial fulfillment of the LSRCP.

LOCATION

McCall Fish Hatchery was constructed in 1979 by the U.S. Army Corps of Engineers. Operational funds are provided by the U.S. Fish and Wildlife Service (USFWS), and the facility is staffed and operated by the Idaho Department of Fish and Game (IDFG). The hatchery is located within the city limits of McCall, Idaho, on the North Fork Payette River approximately 1/4 mi downstream from Payette Lake.

OBJECTIVES

The objectives of the McCall Fish Hatchery are:

1. Restore summer chinook salmon to the South Fork Salmon River, historically a major summer chinook stream in Idaho.
2. Trap and spawn adult chinook salmon returning to the South Fork Salmon River.
3. Rear up to 1,000,000 summer chinook smolts for release in the South Fork Salmon River.
4. Evaluate fish rearing capabilities of the McCall Fish Hatchery.

FISH REARING FACILITIES

Fish rearing facilities include:

1. 26 eight-tray stacks of Heath type incubators;
2. 14 concrete vats 4 ft x 40 ft x 2 ft (water depth);
3. 2 concrete rearing ponds 196 ft x 40.5 ft x 3 ft (water depth); and
4. 1 concrete collection basin 101 ft x 15 ft.

Designed capacity of the hatchery is 1,000,000 smolts averaging 17 fish/lb.

An adult trapping and spawning facility is located on the South Fork Salmon river near Warm Lake, approximately 26 mi east of Cascade, Idaho. This facility is equipped with a removable weir, fish ladder, trap, two adult holding ponds (10 ft x 90 ft), and a covered spawning area. Water is supplied from the South Fork Salmon River through a 33-in underground pipeline. Holding capacity for the facility is approximately 1,000 adults. Every third male and third female is passed above the weir for natural spawning. Eggs collected at the facility are transported "green" to McCall for incubation, hatching and rearing. Resulting smolts are transported back to the South Fork Salmon River for release.

WATER SUPPLY

Hatchery water is obtained from Payette Lake through a 36-in underground pipeline. Water may be taken from the surface or from a depth of 50 ft, thus providing the capability of obtaining the best water temperature available.

Through an agreement with the Payette Lake Reservoir Company, 20 ft³/s of water flow is available for hatchery use. Design criteria and production goals were established using this constraint, ensuring that the hatchery has enough water to meet its production goals.

Water quality analysis reveals a somewhat "distilled" system for rearing fish. Total hardness ranges from 6.3-7.06 mg CaCO₃/l, while pH stays about 6.8. There are no problems with heavy metals.

STAFFING

The hatchery is staffed with three permanent employees: a manager (Hatchery Superintendent III), an assistant manager (Hatchery Superintendent I), and a Fish Culturist. In addition, there are four temporary employees employed to assist during the busy field season. Also, there are two Youth Conservation Corps employees hired for the summer.

FISH PRODUCTION

The weir and trap on the South Fork Salmon River were put in operation on June 22, 1989 and concluded on September 12, 1989. During this period, 938 returning chinook salmon were trapped. Fork lengths were taken on all the chinook salmon that returned to the weir (Figure 1 & 2). There were 495 jacks (<67 cm) which represented 53% of the run this year. These fish are from the 1988 release of 1,060,400 smolts. The 443 adults that returned were from smolt releases of 970,348 and 958,300 in 1986 and 1987, respectively.

Of the returning fish, 217 had snouts removed as they were adipose clipped indicating coded wire tags (CWTs). These snouts were sent to the IDFG lab in Lewiston for tag recovery and code identification.

Spawntaking began on August 10, 1989 and concluded on September 9, 1989. During this period, 801,319 green eggs were taken from 150 females and fertilized with 65 males and 2 jacks. The mean fecundity was 5,342 eggs per female. There was one female discarded due to visual observation of Bacterial Kidney Disease (BKD) lesions during spawning, this fish was not included in the total spawned.

There were 52 male, 27 female, and 102 jack mortalities or 19.3% of the total trapped. These fish were buried or taken to the landfill for disposal. There were 302 jacks killed and given to the Shoshone-Bannock Tribe. All of the adults were injected with Erythromycin Phosphate to control BKD, and as a result, no carcasses were given to the public.

EARLY REARING

All of the eggs were water hardened immediately after fertilization in a 100 ppm titratable iodine solution for 1 h. The eggs were then rinsed in well water, iced down in coolers and transported to the hatchery. At the hatchery,

approximately 2,365 cc of eggs were placed in individual incubator trays supplied with a flow of 5 gal/min. The number of green eggs was estimated by using displacement. The eggs eyed after accumulating approximately 500 daily temperature units (DTUs) at which time the dead eggs were removed using an electric egg picker. From the 801,319 green eggs taken, 737,100 (91.9%) reached the eyed stage and were counted with an electric counter and put away in the incubators at 7,000 eggs per tray.

The surviving eggs hatched at approximately 900 DTUs and swim-up fry were transferred to the vats after accumulating approximately 1,700 DTUs. From the 737,100 eyed eggs, 729,845 fry survived (99%)(Table 1).

The fish were held in the indoor rearing units until they reached approximately 260 fish/lb around mid-May. They were then split as evenly as possible and ponded with each pond receiving a representative portion of the entire run. Pond 1 received 357,952 fish, and pond 2 received 357,554 fish. The survival rate from swim up fry to ponding is 98% (Table 1).

The swim-up fry were fed Bio-Diet starter of various sizes (up to 3/64 pellet) until they were transferred outside to the large rearing ponds where they were changed over to OMP OP-4 formula. The Bio-Diet starter feed already had the increased amount of pantothenic acid which the OMP feed did not. During the rearing cycle, both ponds were fed two feed treatments of Erythromycin Phosphate to combat BKD. Pond 1 received a TM-100 feed treatment to lay down a tetracycline mark (Special Studies).

Fish were inventoried on the first and middle of the month at the fry stage indoors. Length-weight relationships were determined, feed rates adjusted, and general health monitored. Hatchery vats were cleaned daily, and brushes and nets designated for each vat were disinfected in a 600 ppm Benzalkonium Chloride solution after each use. Mortalities were collected daily, recorded, and frozen for disposal. The outside rearing ponds were cleaned as needed by a vacuum system, with eventual discharge into a settling pond. Outside mortality was also collected daily, recorded, and frozen for disposal.

Table 1. Survival from green egg to release.

Green eggs	Eyed eggs	%	Swim-up	%	Release	%
801,319	737,100	91.9	729,845	99.0	708,600	97.1

FISH DISTRIBUTION

Fish Tagging

During the period November 5 to 17, 1990, the fish were coded wire tagged, fin clipped, freeze branded, and PIT tagged. Of the 325,078 fish marked, 21,241 received a Right Dorsal ">0" in position one (RD->0"-1), 22,628 received a Right Anterior ">0" position 1 (RA->0"-1), 20,816 received ">0" in the left anterior position 1 (LA->0"-1), and 400 were PIT tagged. A summary is given of tags used in Table 2 and release numbers by mark group in Table 3.

Table 2. Tags and marks used.

Data code / mark	No. marked
10/34/31	21,793
10/34/32	22,116
10/34/33	21,000
10/34/34	21,102
10/34/35 RD">O"-1	21,241
10/34/36 RA">O"-1	22,628
10/34/37	21,933
10/34/38	21,640
10/34/39	21,561
10/34/40	21,753
10/34/41	21,799
10/34/42	21,709
10/34/43	21,843
10/34/44	21,744
10/34/45 LA">O"-1	20,816
PIT	400
Total Marked	325,078

There were 353,771 fish in pond 1 marked with a TM-100 feed

treatment. Table 3. Release numbers by mark group.

Pond number	Fish/pound	mark	% Retention or readable	Effective release
1	23.18	TM-100	100	353,771*
2	23.9	CWT only	98.9	256,747*
2	23.9	CWT/RD->0-1	100	21,227
2	23.9	CWT/RA->0-1	100	22,600
2	23.9	CWT/LA->0-1	93.2	19,387
2	23.9	NONE		34,868
Total				708,600

- Includes 200 PIT tags/pond

Fish Release Information

Starting on March 18, 1991, the smolts were transported to Knox Bridge on the South Fork Salmon River. A total of 708,600 fish averaging 23.8 fish/lb and 4.68 in in length for a total weight of 29,740 lb was released (Table 4).

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Table 4. Fish releases.

Date	Number of fish	Weight	Location
3-18-91	197,502	8,450	Knox Bridge
3-19-91	194,763	8,200	Knox Bridge
3-20-91	207,162	8,600	Knox Bridge
3-21-91	109,173	4,540	Knox Bridge
Total	708,600	29,790	

FISH HEALTH

The pre-release assessment was conducted February 22, 1991 by Doug Munson. These fish appeared to be quite healthy at the time of release. Results are shown in Table 5. These fish were fed two feed treatments of Gallimycin at 4.5% medication level during the rearing cycle.

Table 5. Results of viral and bacteriological testing.

Pathogen	Sample size	Results
IHN	60	Negative
IPN	60	Negative
BKD	60	Negative

There was a 60 fish sample conducted on the adult chinook salmon at the trap during the spawning operation. One fish was discarded during spawning due to visual observation of BKD lesions. One fish showed low positive for IHN as it was in the tissue only.

SPECIAL STUDIES

The Brood Year 1989 fish are being studied in the "Marked vs No-Marked" experiment. The fish were ponded with equal numbers in each pond representative of the entire run. The mortality in pond 1 was 4,181 fish from ponding to release and 2,725 in pond 2. The higher number in pond 1 could be attributed to fish jumping on the ice and freezing, there was more mortality in pond 1 after the ice went off than in pond 2. The mortality in pond 1 was slightly higher all the way through the rearing cycle. Pond 1 was given an oral feed treatment of TM-100 for 15 d to give them a florescent mark on the vertebrae. Pond 2 received CWTs, freeze brands, and adipose clips. No conclusive results can be drawn from this group of fish. Additional monitoring will be done when these fish have returned as adults.

PRODUCTION COSTS

The cost of producing summer chinook eggs, fry, and smolts is summarized in Table 6. An over all feed conversion of 1.39 was achieved on this group of fish.

Table 6. Production costs.

Lb fish produced	Lb feed utilized	Feed cost	Conversion	Cost per lb produced
32,377	45,244	27,056	1.39	.84

Operating Budget: \$243,800 Cost estimate for 18 months excluding capitol Outlay.

APPENDICES

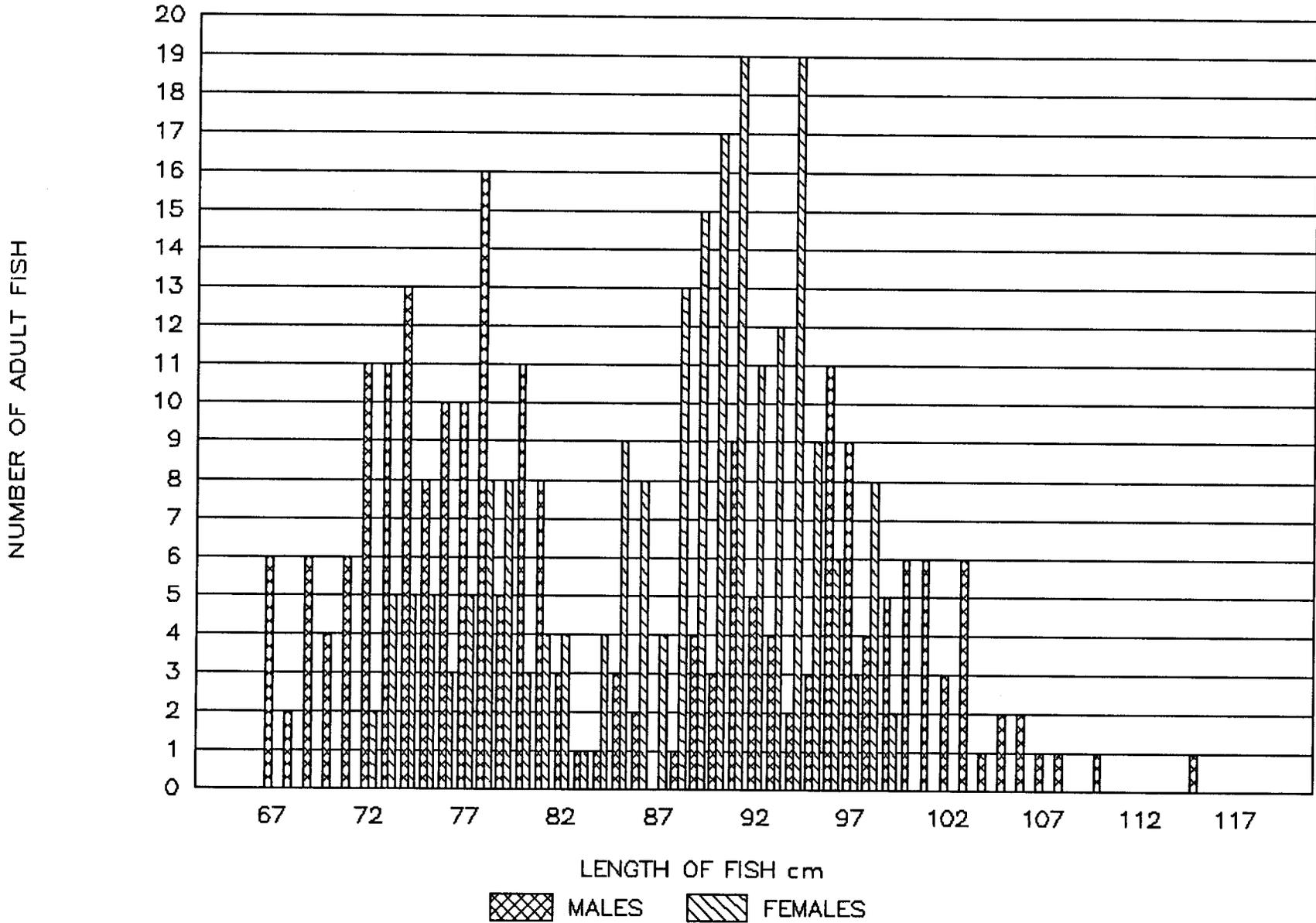
Appendix 1. McCall Fish Hatchery summer chinook salmon rack returns.

Run date	Jacks	Adults	Totals
1980	186	194	380
1981	124	400	524
1982	48	502	550
1983	504	433	937
1984	595	934	1,529
1985	828	1,410	2,238
1986	122	1,468	2,690
1987	386	2,319	2,705
1988	50	2,343	2,393
1989	495	443	938

Appendix 2. Brood Year 1989 adult length frequency trapped at South Fork Salmon River trap.

Fork Length	Males	Females
67	6	
68	2	
69	6	
70	4	
71	6	
72	11	2
73	11	5
74	13	5
75	8	5
76	10	3
77	10	5
78	16	8
79	5	8
80	11	3
81	8	4
82	3	4
83	1	1
84	1	4
85	3	9
86	2	8
87		4
88	1	13
89	4	15
90	3	17
91	9	19
92	5	11
93	4	12
94	2	19
95	3	9
96	11	6
97	9	3
98	4	8
99	5	2
100	6	
101	6	
102	3	
103	6	
104	1	
105	2	
106	2	
107	1	
108	1	
109		
110	1	
111		
112		
113		
114		
115	1	
116		
117		
Total measured:	228	212

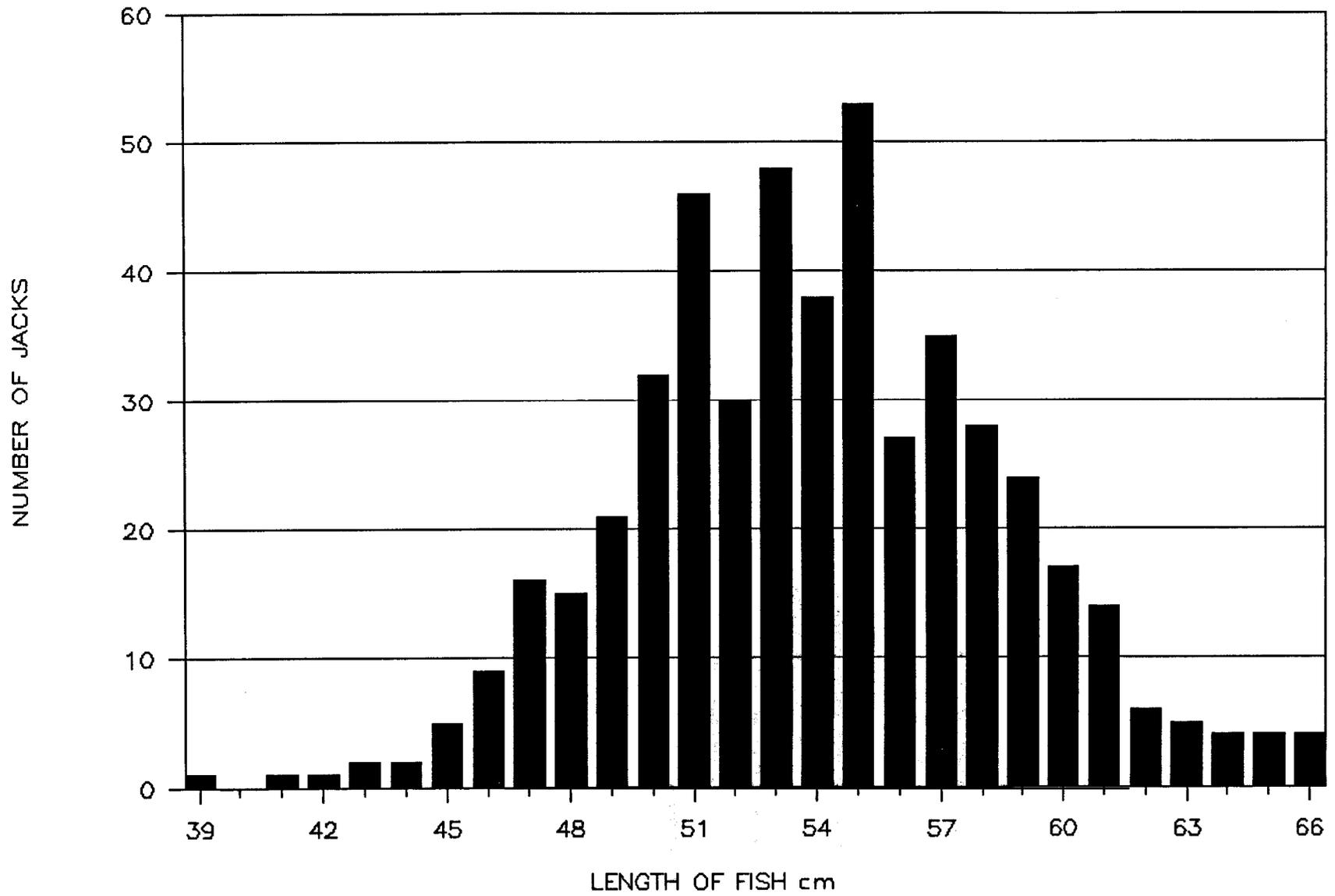
Appendix 3. Length frequency of adult fish trapped at South Fork Salmon River trap.



Appendix 4. Brood Year 1989 jack length frequency trapped at South Fork Salmon River trap.

Fork length (cm)	Fish
39	1
40	0
41	1
42	1
43	2
44	2
45	5
46	9
47	16
48	15
49	21
50	32
51	46
52	30
53	48
54	38
55	53
56	27
57	35
58	28
59	24
60	17
61	14
62	6
63	5
64	4
65	4
66	4
Total measured:	488

Appendix 5. Length frequency of jacks trapped at South Fork Salmon River trap.



Appendix 6. Brood Year 1989 run timing.

Date	Daily total	Males	Females	Jacks
June 22	0	0	0	0
June 23	0	0	0	0
June 24	0	0	0	0
June 25	0	0	0	0
June 26	0	0	0	0
June 27	0	0	0	0
June 28	11	4	7	0
June 29	3	1	2	0
June 30	8	2	5	1
July 1	14	6	6	2
July 2	13	9	3	1
July 3	18	7	10	1
July 4	25	14	7	4
July 5	41	13	11	17
July 6	49	11	20	18
July 7	39	10	13	16
July 8	67	18	10	39
July 9	47	13	15	19
July 10	35	9	9	17
July 11	18	3	6	9
July 12	19	1	2	16
July 13	16	1	4	11
July 14	34	8	6	20
July 15	26	6	5	15
July 16	39	9	7	23
July 17	15	1	2	12
July 18	25	6	8	11
July 19	15	3	1	11
July 20	23	5	5	13
July 21	18	5	1	12
July 22	36	10	7	19
July 23	17	2	3	12
July 24	24	2	3	19
July 25	12	0	2	10
July 26	7	0	1	6
July 27	6	0	1	5
July 28	10	0	1	9
July 29	9	2	2	5
July 30	13	1	2	10
July 31	10	0	1	9
August 1	2	0	0	2
August 2	4	0	0	4
August 3	3	0	0	3
August 4	3	0	1	2
August 5	6	0	0	6
August 6	5	0	0	5
August 7	1	0	0	1
August 8	5	0	1	4
August 9	5	1	0	4
August 10	11	2	1	8
August 11	1	0	0	1
August 12	4	1	1	2
August 13	6	3	0	3
August 14	4	2	1	1
August 15	2	0	0	2

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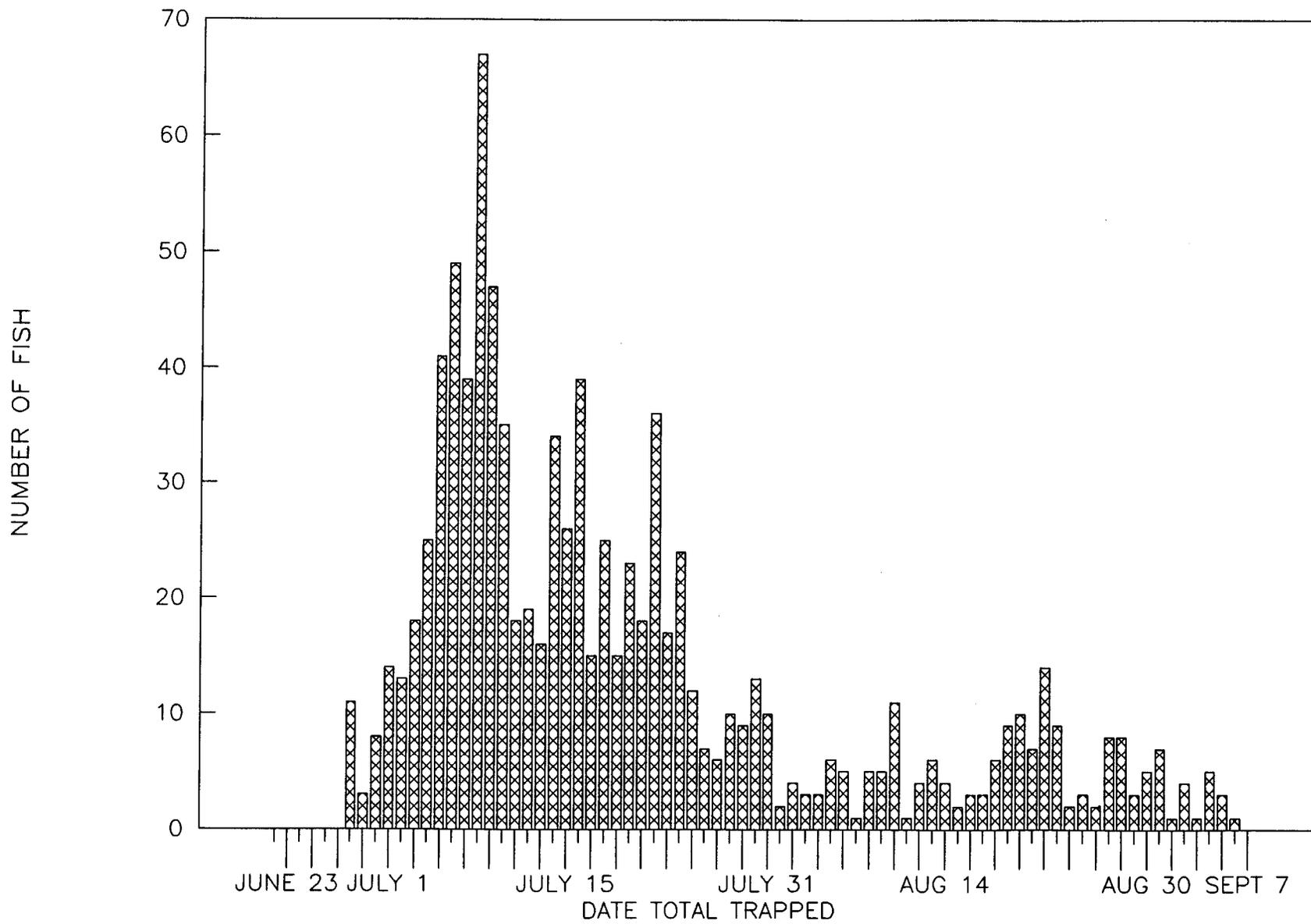
Appendix 6. (continued)

Date	Daily total	Males	Females	Jacks
August 16	3	1	0	2
August 17	3	2	0	1
August 18	6	3	1	2
August 19	9	5	0	4
August 20	10	5	1	4
August 21	7	3	0	4
August 22	14	2	3	9
August 23	9	4	2	3
August 24	2	1	1	0
August 25	3	2	0	1
August 26	2	0	1	1
August 27	8	0	3	5
August 28	8	2	3	3
August 29	3	0	2	1
August 30	5	0	1	4
August 31	7	2	2	3
September 1	1	0	0	1
September 2	4	1	0	3
September 3	1	1	0	0
September 4	5	0	1	4
September 5	3	3	0	0
September 6	1	1	0	0
September 7	0	0	0	0
Totals	938	229	214	495

Adult male and female total changed at first sort.

Appendix 7. South Fork Salmon River run time in 1989.

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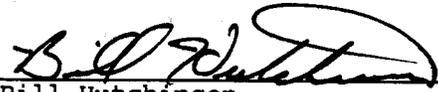
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