

KLAMATH RIVER SALMON AND STEELHEAD MANAGEMENT REPORT
FOR 1963-64 FISCAL YEAR

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California Department of Fish and Game

SUMMARY

This report covers the period from July 1, 1963 to June 30, 1964 and describes the management program on the Klamath and Shasta Rivers, Siskiyou County, for king salmon (*Oncorhynchus tshawytscha*), silver salmon (*O. kisutch*) and steelhead rainbow trout (*Salmo gairdnerii* gairdnerii). During this period 2,171 king salmon, 190 silver salmon, and 1,542 steelhead were trapped at Iron Gate Dam. These fish produced 3,564,000 king salmon and 522,000 steelhead eggs. No eggs were taken from silver salmon.

At Shasta River Counting Station 31,837 king salmon, 105 silver salmon, and 952 steelhead were counted on their upstream migration. Seven hundred pair of adult king salmon were released above the racks on Bogus Creek to spawn naturally. Prior fish counts for Fall Creek, Klamathon, Jenny Creek, Bogus Creek, Iron Gate and Shasta River are shown in this report.

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INTRODUCTION

This report covers the period from July 1, 1963 to June 30, 1964 and describes the management program on the Upper Klamath and Shasta Rivers, Siskiyou County, for king salmon (Oncorhynchus tshawytscha), silver salmon (O. kisutch), and steelhead rainbow trout (Salmo gairdnerii gairdnerii). Prior fish counts for Fall Creek, Klamathon, Jenny Creek, Bogus Creek, Iron Gate and Shasta River are shown in this report. (Table 1).

IRON GATE TRAPPING AND SPAWNING FACILITIES

The fish trapping facilities at Iron Gate Dam were completed by Pacific Power and Light Company in February of 1962. A fish ladder consisting of 20 pools leads from the tailrace of the powerhouse up into a trapping pond ~~(Figure A-1)~~. The ladder has a vertical rise of 17 feet and is supplied with up to 35 c.f.s. of water. In addition to the regular water supply for the fish ladder, there are three electric pumps, each capable of pumping 60 c.f.s. of water from the tailrace into the two lower pools of the ladder to serve as attraction water.

Fish are moved into a drug tank located inside the spawning house from the trapping pond by means of a gasoline-driven mechanical sweep which moves on a small gauge track placed on top of the trapping pond side walls. Connecting water flumes inside the spawning house lead to and interconnect with six outside circular holding ponds, each of which is 30 feet in diameter. Three ponds are located on each side of the spawning house.

The water supply for the installation is available from two intakes in the forebay above Iron Gate Dam, one at the surface and the other at the 70-foot level. Temperature control is possible by combining water from the two sources in different proportions. In addition, tailrace water can be pumped into the facilities after it has passed through the powerhouse generators when needed.

Operation of Facilities

During normal operation, fish ascend the ladder into the trapping pond. The mechanical sweep is activated which crowds the fish to the head end of the pond where they are mechanically lifted up through an opening into the spawning

house and dropped into a drug tank. An electrically operated lift raises the drugged fish to a waist-high working level for sorting. The fish are then placed in flumes and moved out into the circular holding ponds where they are held until ready for spawning.

Installation of a Temporary Water Supply

In the planning stage an aerator was not included in the facilities to aerate the water. During the reservoir's fall "overturn" which usually occurs between October 5 and 15 the dissolved oxygen at the 18 foot intake drops as low as 3 ppm. By pumping water from the tailrace back to the facilities D.O. is increased about 1 ppm. In an attempt to prevent a loss of salmon during this low oxygen period, the Pacific Power and Light Company installed a pump at the mouth of the bypass tunnel and pumped about 16 c.f.s. of water to four of the six circular holding ponds, trapping pool, and pool 20 of the ladder. This seepage water coming from about the 150-foot level was 44 degrees F. and could be blended with the tailrace water which was 66 degrees F.

With the arrival of the first salmon many tests were made at different temperatures. In straight tunnel water, salmon died within 12 hours. With a blend resulting in a temperature of 58 degrees, salmon died within 48 hours. D.O. varied from 5 to 8 ppm. The tunnel water contained a quantity of H₂S gas which could easily be detected throughout the facilities. During this period the reservoir was actually turning over, all salmon on hand were crowded into the trapping pond. About 1-1/2 c.f.s. pumped tailrace water entered each circular pond, and the ponds were filled to their maximum depth. The pond discharge entered the flume over a 12-inch fall, down the flume into the trap and into the fish ladder. In so doing, the pumped tailrace water D.O. content was raised from 3.6 to 5.1 ppm.

IRON GATE SALMON AND STEELHEAD HATCHERY

1963 - 1964 Fiscal Year

This third fiscal year report describes briefly the king salmon, Oncorhynchus tshawytscha, silver salmon, Oncorhynchus kisutch, and steelhead trout, Salmo gairdnerii gairdnerii, trapping program at Iron Gate Dam.

King Salmon

The ladder and trap were placed in operation on September 17, 1963 and the first salmon entered the trap on September 19. During the king salmon spawning period from September 17 through October 30, 697 males, 1,015 females and 448 grilse were trapped; 458 female king salmon were trucked from Bogus Creek to be spawned at Iron Gate. A total of 505 males and 421 females died while being held for spawning primarily from low D.O. Of the 1,473 females handled at this station 990 were spawned, producing 3,564,000 green eggs (averaging 3600 eggs per fish). Fertility ranged from 80 percent to 95.5 percent with a season's average of 88 percent. An additional 33 females were spawned that had died in the ponds. Some had been dead for periods varying from two to eight hours. Fertility within this group ranged from 30 to 90 percent. The average was 61 percent. All eggs spawned prior to October 28 were taken to the Mt. Shasta Hatchery for hatching. This included lots 1 through 7. Lots 8, 9, and 10 were hatched at Iron Gate. From a total of 3,682,800 green eggs taken, 2,974,111 fingerling were released into the Klamath River. The first release was made on January 20, 1964 and the last on April 8, 1964. The majority were released during the month of March.

Silver Salmon

From November 14 through November 18, 22 silver salmon trapped at Iron Gate were trucked to Bogus Creek and released at a point 400 yards from its con-

fluence with the Klamath River. Many of these salmon were leaving Bogus Creek and returning to the trap at Iron Gate. During the period from November 18 through December 9 when the ladder was shut down, 45 silver salmon were trucked to and released into upper Bogus Creek at its confluence with Cold Creek.

Steelhead Trout

On January 16, 1964 the fish ladder was activated. The first steelhead to be held for spawning was trapped on January 21. Through May 12, when steelhead trapping was terminated, a total of 723 fish were trapped. Not included in this total are 1,007 steelhead that entered the trap during the fall of 1963. These steelhead which were trapped and released during the months of September, October, November and December were marked by punching a small hole in their caudal fin. Those spawned and released during the spring months were marked by clipping their adipose fin.

Of the 347 females trapped and held for spawning, 306 were spawned and released, 21 died in the ponds and 20 were released on May 12. One hundred seventy eight males were spawned and released, 111 died in the ponds and 87 were released on May 12. Eleven lots of eggs were taken, the first on March 6 and the last on May 7. Females averaged 1,706 eggs per fish. Fertility varied from 69 to 97 percent. The season's average was 91 percent. The 521,979 green eggs taken resulted in a release of 391,569 fingerlings. When they reached the "swim-up" stage they were released into the Klamath River. The first lot was planted on May 15 and the last lot on June 15, 1964. During the last two weeks of November and the first two weeks of December, 89 steelhead were released into lower Bogus Creek (400 yards upstream from the mouth). Many of these drifted out of the creek and returned to the trap at Iron Gate. During the period from November 18

through December 9, 141 steelhead were trucked to and released into upper Bogus Creek at its confluence with Cold Creek, a distance of about 4-1/2 miles upstream from the Klamath River.

SHASTA RIVER COUNTING STATION

The racks were installed on August 27, 1963. The first salmon passed through the racks on September 4. The run peaked during the second week of October. Prior to November 1, the day the racks were removed, 8,959 male, 13,866 female, and 9,013 grilse had been counted, bringing the season's total to 31,837 fish, the largest run since 1940. In addition to the king salmon, 105 silver salmon and 952 steelhead were also counted. During the three-week period covering the peak of the run, salmon were counted from daylight to dark. Also, in an effort to reduce the degree of illegal fishing a man lived in a trailer house positioned some 200 feet from the racks.

BOGUS CREEK KING SALMON COUNTING STATION

These racks were installed 50 yards upstream from the confluence of Bogus Creek with the Klamath River for the purpose of limiting the number of adult salmon entering the stream. After a survey of the spawning area, it was decided that 700 pair could utilize the 20,000 square feet of spawning gravel in Bogus Creek with a minimum of superimposition of redds and eggs.

The first salmon was counted upstream on September 16. On October 25 700 females had been counted. The 700 male figure was reached on November 2, the run had almost ended. At this time 556 grilse had also been counted.

The Deadwood Conservation Camp completed the 21 pool fish ladder over the 21 foot falls during September 1963. Checks made by Fish and Game employees

found the salmon had moved up the ladder and distributed themselves upstream to the falls on Cold Creek. During the time king salmon are migrating there is not usually enough water in Bogus Creek above its confluence with Cold Creek to be utilized by salmon.

TABLE 1

KING SALMON COUNTS AND DISTRIBUTION ^{1/}
UPPER KLAMATH RIVER, SISKIYOU COUNTY _{2/}

<u>Year</u>	<u>Klamath River Klamathon</u>	<u>Fall Creek _{2/}</u>	<u>Jenny Creek _{2/}</u>	<u>Bogus Creek</u>	<u>Shasta River</u>	<u>Iron Gate</u>
1925	10,420	-	-	-	-	-
1926	9,387	-	-	-	-	-
1927	-	-	-	-	-	-
1928	-	-	-	-	-	-
1929	4,031	-	-	-	-	-
1930	2,392	-	-	-	19,338	-
1931	12,611	-	-	-	81,844	-
1932	13,740	-	-	-	34,689	-
1933	-	-	-	-	11,570	-
1934	10,340	-	-	-	48,668	-
1935	14,051	-	-	-	74,537	-
1936	10,398	-	-	-	46,115	-
1937	33,144	-	-	-	33,255	-
1938	16,340	-	-	-	9,090 _{3/}	-
1939	-	-	-	-	28,167	-
1940	14,965	-	-	-	55,155	-
1941	11,204	-	-	-	13,252	-
1942	13,038	-	-	-	11,425	-
1943	-	-	-	-	10,022	-
1944	-	-	-	-	11,498	-
1945	-	-	-	-	18,191	-
1946	-	-	-	-	7,590	-
1947	-	-	-	-	341	-
1948	5,821	-	-	-	37	-
1949	11,504	-	-	-	193	-
1950	21,584	2,325	-	-	248	-
1951	17,857	2,147	-	-	2,024	-
1952	6,591	1,600	-	-	1,666	-
1953	6,257	1,315	700	800	1,605	-
1954	2,042	466	50	800	2,625	-

<u>Year</u>	<u>Klamath River Klamathon</u>	<u>Fall Creek <u>2/</u></u>	<u>Jenny Creek <u>2/</u></u>	<u>Bogus Creek</u>	<u>Shasta River</u>	<u>Iron Gate</u>
1955	14,946	2,496	2,208	4,538	1,817	-
1956	6,770	1,162	50	2,800	-	-
1957	2,436	344	50	900	2,234 <u>4/</u>	-
1958	1,950	600	25	1,125	6,089	-
1959	3,568	1,117	300	800	9,875	-
1960	6,363	- <u>6/</u>	300	3,000	10,698	-
1961	9,041 <u>5/</u>	-	-	5,400	8,764	-
1962	-	-	-	4,700 <u>7/</u>	14,898	1,339
1963	-	-	-	1,400	31,837	2,171

1/ Based on rack counts, carcass counts and redd surveys.

2/ Within the Iron Gate Project area; included in the Klamathon counts.

3/ Counting Station moved seven miles upstream from the original location.
(This may account for some of the decrease in the counts.)

4/ Counting Station moved back to original location near mouth.

5/ Estimated. Racks not fish tight. Includes 2,041 fish that were
artificially spawned or died while being held.

6/ No count made; 427 females spawned.

7/ This total does not include grilse.

TABLE A-1
SHASTA RIVER COUNTING STATION
1963

<u>Date</u>	King Salmon				<u>Silver Salmon</u>	<u>Steelhead</u>	<u>Weather</u>	<u>River Flow</u>
	<u>Male</u>	<u>Female</u>	<u>Grilse</u>	<u>Total</u>				
9/4	1	1	3	5	0	0	Clear	
9/5	0	0	2	2	0	0	Clear	
9/6	0	0	0	0	0	0	Cloudy	
9/7	0	0	2	2	0	0	Clear	
9/8	4	4	5	13	0	0	Clear	
9/9	7	10	11	28	0	0	Clear	
9/10	1	1	1	3	0	0	Clear	
9/11	0	2	4	6	0	0	Cloudy	
9/12	0	1	12	13	0	0	Cloudy	
9/13	0	1	6	7	0	0	Cloudy	
9/14	0	1	1	2	0	0	Clear	
9/15	2	3	5	10	0	0	Cloudy	
9/16	2	7	18	27	0	0	Cloudy	
9/17	57	15	128	200	0	0	Cloudy	
9/18	7	5	24	36	0	6	Cloudy	
9/19	43	41	167	251	0	5	Cloudy	
9/20	57	35	272	364	0	6	Cloudy	
9/21	36	106	331	473	0	2	Clear	

TABLE A-1 (Cont.)
SHASTA RIVER COUNTING STATION
1963

<u>Date</u>	<u>King Salmon</u>				<u>Silver Salmon</u>	<u>Steelhead</u>	<u>Weather</u>	<u>River Flow</u>
	<u>Male</u>	<u>Female</u>	<u>Grilse</u>	<u>Total</u>				
9/22	12	44	107	163	0	1	Cloudy	
9/23	152	126	350	628	0	2	Clear	
9/24	156	114	311	581	0	4	Clear	
9/25	105	109	214	428	0	22	Clear	
9/26	84	130	148	362	0	100	Clear	
9/27	141	323	383	847	0	45	Overcast	
9/28	31	93	131	255	0	11	Clear	
9/29	10	32	55	97	0	2	Clear	
9/30	127	372	501	1000	0	19	Clear	
10/1	94	374	370	838	0	11	Clear	
10/2	123	217	388	728	0	17	Clear	
10/3	434	887	630	1951	0	12	Clear	
10/4	125	299	257	681	0	11	Cloudy	
10/5	136	193	154	483	0	12	Cloudy	
10/6	318	757	419	1494	0	25	Rain	
10/7	401	600	367	1368	0	21	Cloudy	
10/8	925	1164	963	3052	0	19	Cloudy	
10/9	584	844	803	2231	0	44	Cloudy	

TABLE A-1 (Cont.)
SHASTA RIVER COUNTING STATION
1963

<u>Date</u>	<u>King Salmon</u>			<u>Total</u>	<u>Silver Salmon</u>	<u>Steelhead</u>	<u>Weather</u>	<u>River Flow</u>
	<u>Male</u>	<u>Female</u>	<u>Grilse</u>					
10/10	890	1220	350	2460	0	50	Rain	
10/11	1175	2584	404	4163	0	36	Showers	
10/12	523	1149	156	1828	0	9	Clear	
10/13	436	593	68	1097	0	69	Clear	
10/14	811	588	128	1527	0	112	wind/cloudy	
10/15	415	378	44	837	0	59	Showers	
10/16	186	98	40	324	0	51	Clear	
10/17	109	74	40	223	0	24	Clear	
10/18	58	86	77	221	1	33	Clear	
10/19	29	30	27	86	5	16	Clear	
10/20	34	54	34	122	7	22	Cloudy	
10/21	28	48	24	100	13	16	wind/cloudy	
10/22	22	17	15	54	10	17	Rain	
10/23	24	21	28	73	11	12	Cloudy	
10/24	18	7	15	40	11	16	Cloudy	
10/25	12	3	14	29	8	4	Cloudy	
10/26	2	4	0	6	0	6	Clear	

TABLE A-1 (Cont.)
SHASTA RIVER COUNTING STATION
1963

<u>Date</u>	<u>King Salmon</u>				<u>Silver Salmon</u>	<u>Steelhead</u>	<u>Weather</u>	<u>River Flow</u>
	<u>Male</u>	<u>Female</u>	<u>Grilse</u>	<u>Total</u>				
10/27	2	0	1	3	6	0	Clear	
10/28	4	1	0	5	5	2	Rain	
10/29	2	0	3	5	1	0	Clear	
10/30	4	0	0	4	15	1	Clear	
10/31	0	0	1	1	6	0	Clear	
Totals	8,959	13,866	9,012	31,837	105	952		

TABLE 2
IRON GATE SALMON & STEELHEAD HATCHERY
Daily Fish Counts 1963-64

Date	King Salmon				Silver Salmon				Steelhead		
	Male	Female	Grilse	Total	Male	Female	Grilse	Total	Male	Female	Total
9/19	1	0	1	2				0			0
9/20	0	1	0	1				0			1
9/21	0	1	0	1				0			1
9/22	0	1	0	1				0			0
9/23	0	0	0	0				0			0
9/24	0	0	0	0				0			0
9/25	0	3	0	3				0			1
9/26	3	5	2	10				0			0
9/27	2	2	2	6				0			5
9/28	1	4	0	5				0			2
9/29	2	11	1	14				0			7
9/30	9	17	9	35				0			13
10/1	17	26	8	51				0			28
10/2	3	7	4	14				0			5
10/3	19	33	5	57				0			9
10/4	25	38	8	71				0			18
10/5	19	24	5	58				0			8
10/6	23	29	11	63				0			11
10/7	28	21	5	54				0			2
10/8	42	53	15	110				0			9
10/9	29	49	5	83				0			32
10/10	4	12	10	26				0			18
10/11	16	6	17	39				0			0
10/12	16	6	18	40				0			32
10/13	82	88	34	204				0			34
10/14	74	74	29	177				0			57
10/15	10	19	12	41				0			77
10/16	33	77	33	143				0			27
10/17	30	62	23	115	1	1	1	3			14
10/18	26	30	12	68	0	0	0	0			56
10/19	35	53	41	129	2	1	0	3			24
10/20	31	46	31	108	1	2	0	3			20
10/21	23	35	32	90	1	0	0	1			24
10/22	17	40	11	68	3	0	0	3			8
10/23	9	16	9	34	1	1	0	2			14
10/24	20	36	17	73	7	4	1	12			8
10/25	3	7	2	12	2	3	0	5			5

TABLE 2 (Cont.)
IRON GATE SALMON & STEELHEAD HATCHERY
Daily Fish Counts 1963-64

Date	King Salmon				Silver Salmon				Steelhead		
	Male	Female	Grilse	Total	Male	Female	Grilse	Total	Male	Female	Total
10/26	12	23	13	48	4	2	0	6			12
10/27	9	25	10	44	5	4	0	9			11
10/28	14	14	4	32	3	4	0	7			8
10/29	8	18	6	32	1	1	0	2			18
10/30	2	4	3	9	2	1	0	3			6
10/31	Closed Ladder										
11/13	Opened Ladder										
11/14				0	3	2	0	5			4
11/15				7	29	32	8	69			17
11/16				0	5	7	2	14			48
11/17				0	0	0	0	0			0
11/18				1	5	9	0	14			79
11/19				0	0	1	0	1			34
11/20				1	2	5	1	8			16
11/21				0	0	2	0	2			14
11/22				0	0	0	0	0			26
11/23				0	0	0	0	0			0
11/24				0	1	1	0	2			0
11/25				0	0	2	0	2			13
11/26				0	2	4	1	7			1
11/27				1	1	1	0	2			2
11/28				0	0	0	0	0			0
11/29				0	0	3	0	3			2
11/30				0	0	0	0	0			0
12/1				0	0	1	0	1			1
12/2				0	0	0	0	0			0
12/3				0	0	0	0	0			0
	Closed Ladder 12/9/63										
	Opened Ladder on 1/16/64										
1/21				0				0	1	0	1
1/23				0				0	1	0	1
2/3				0				0	2	0	2
2/4				0				0	1	0	1
2/11				0				0	1	0	1
2/24				0				0	3	2	5
2/27				0				0	5	5	10

TABLE 2 (Cont.)
IRON GATE SALMON AND STEELHEAD HATCHERY
Daily Fish Counts 1963-64

Date	King Salmon				Silver Salmon				Steelhead			
	Male	Female	Grilse	Total	Male	Female	Grilse	Total	Male	Female	Total	Marked SH
2/28				0				0	5	0	5	0
2/29				0				0	0	0	0	0
3/1				0				0	0	0	0	0
3/2				0				0	33	23	56	0
3/3				0				0	11	8	19	2
3/4				0				0	7	3	10	0
3/5				0				0	1	0	1	0
3/6				0				0	1	0	1	0
3/7				0				0	0	0	0	0
3/8				0				0	0	0	0	0
3/9				0				0	14	7	21	1
3/10				0				0	16	13	29	0
3/11				0				0	19	12	31	1
3/12				0				0	2	3	5	1
3/13				0				0	0	2	2	0
3/14				0				0	0	0	0	0
3/15				0				0	0	0	0	0
3/16				0				0	27	22	49	5
3/17				0				0	0	0	0	0
3/18				0				0	46	26	72	7
3/19				0				0	29	24	53	4
3/20				0				0	8	6	14	4
3/21				0				0	0	0	0	0
3/22				0				0	0	0	0	0
3/23				0				0	13	11	24	3
3/24				0				0	0	0	0	0
3/25				0				0	8	14	22	1
3/26				0				0	2	0	2	0
3/27				0				0	4	6	10	3
3/28				0				0	0	0	0	0
3/29				0				0	0	0	0	0
3/30				0				0	17	23	40	4
3/31				0				0	4	3	7	0

TABLE 2 (Cont.)
IRON GATE SALMON AND STEELHEAD HATCHERY
Daily Fish Counts 1963-64

Date	King Salmon				Silver Salmon				Steelhead			
	Male	Female	Grilse	Total	Male	Female	Grilse	Total	Male	Female	Total	Marked SH
4/1				0				0	6	1	7	0
4/2				0				0	14	21	35	3
4/3				0				0	5	9	14	5
4/4				0				0	0	0	0	0
4/5				0				0	0	0	0	0
4/6				0				0	7	5	12	1
4/7				0				0	5	10	15	4
4/8				0				0	2	8	10	1
4/9				0				0	0	0	0	0
4/10				0				0	2	5	7	1
4/11				0				0	0	0	0	0
4/12				0				0	0	0	0	0
4/13				0				0	5	9	14	2
4/14				0				0	9	10	19	1
4/15				0				0	0	0	0	0
4/16				0				0	9	8	17	2
4/17				0				0	0	3	3	1
4/18				0				0	0	0	0	0
4/19				0				0	0	0	0	0
4/20				0				0	5	7	12	2
4/21				0				0	3	4	7	0
4/22				0				0	0	4	4	0
4/23				0				0	1	3	4	0
4/24				0				0	0	2	2	1
4/25				0				0	0	0	0	0
4/26				0				0	0	0	0	0
4/27				0				0	3	2	5	1
4/28				0				0	2	8	10	2
4/29				0				0	6	5	11	0
4/30				0				0	6	2	8	0
5/1				0				0	0	3	3	1
5/2				0				0	0	0	0	0
5/3				0				0	0	0	0	0
5/4				0				0	1	2	3	0
5/5				0				0	0	0	0	0
5/6				0				0	1	1	2	0
5/11				0				0	1	1	2	0
5/12				0				0	1	1	2	0

Totals 697 1,016 448 2,171*
*Inc es 10 not sexed. **Included in daily total.

190 1,730 188**
- 188
1 542

FIGURE A-3

IRON GATE SALMON & STEELHEAD HATCHERY
Trapped King Salmon 1963-64

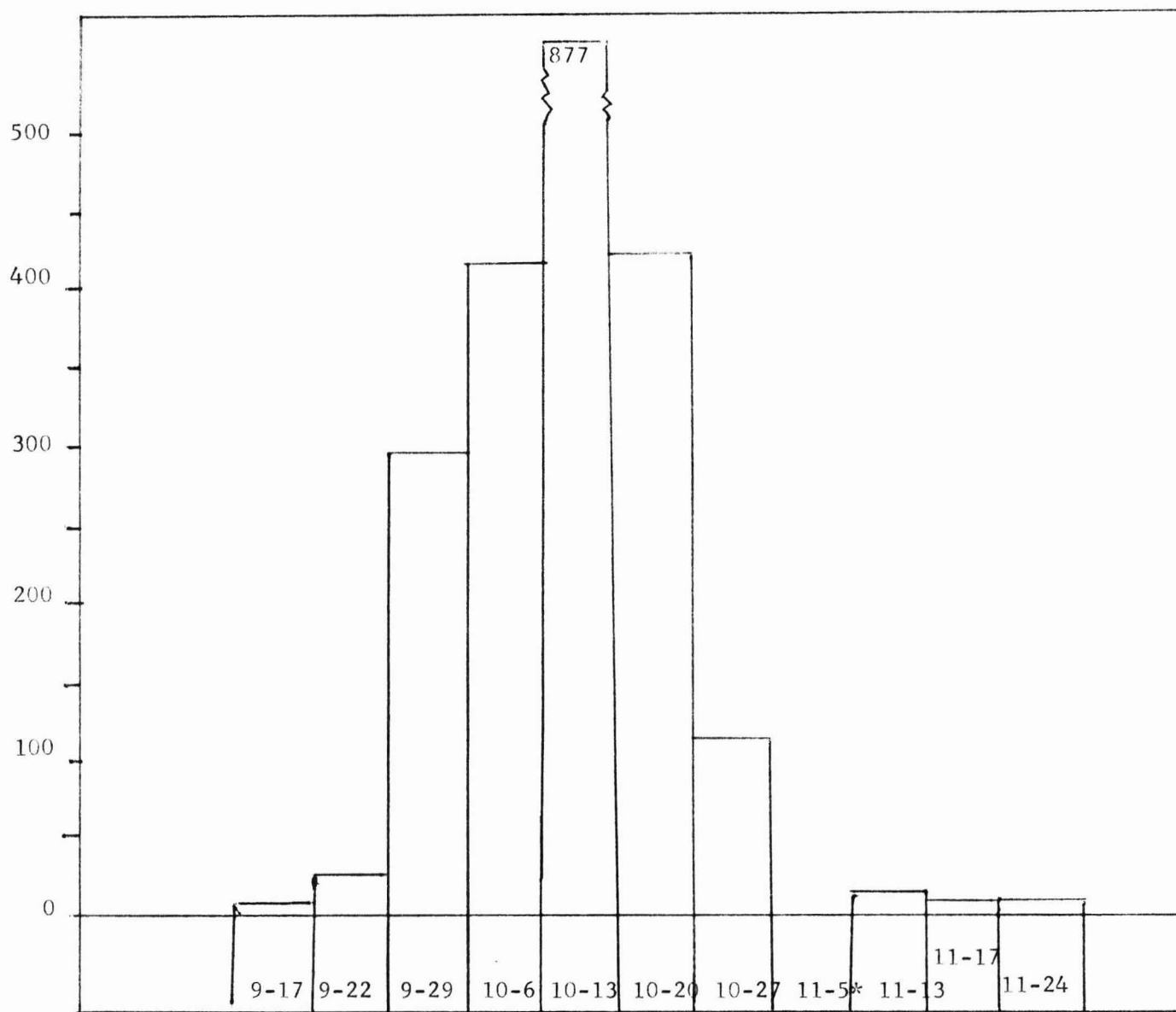


FIGURE A-5
IRON GATE SALMON & STEELHEAD HATCHERY
Trapped Silver Salmon 1963-64

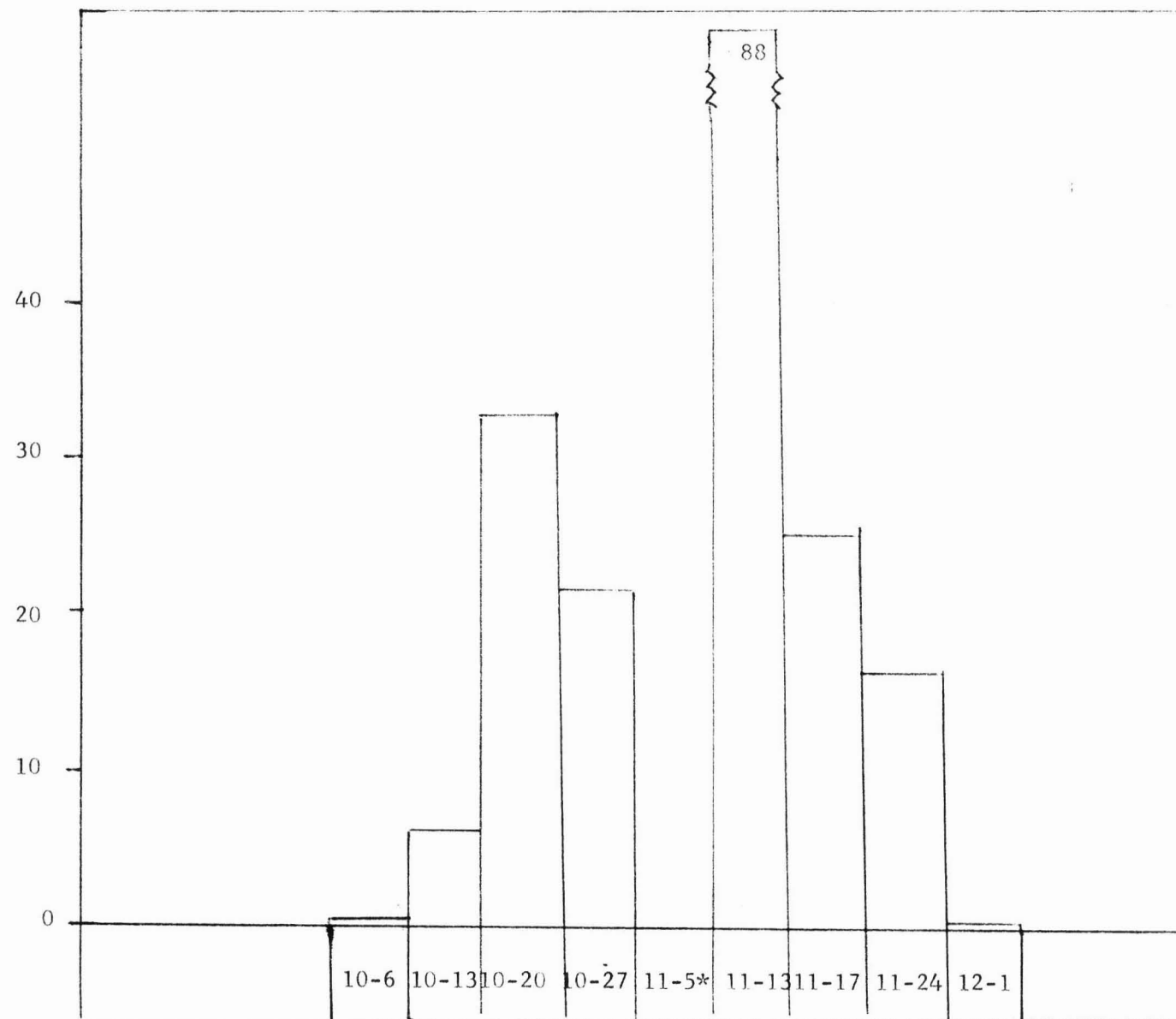


FIGURE B-1

SHASTA RIVER COUNTING STATION
King Salmon 1963

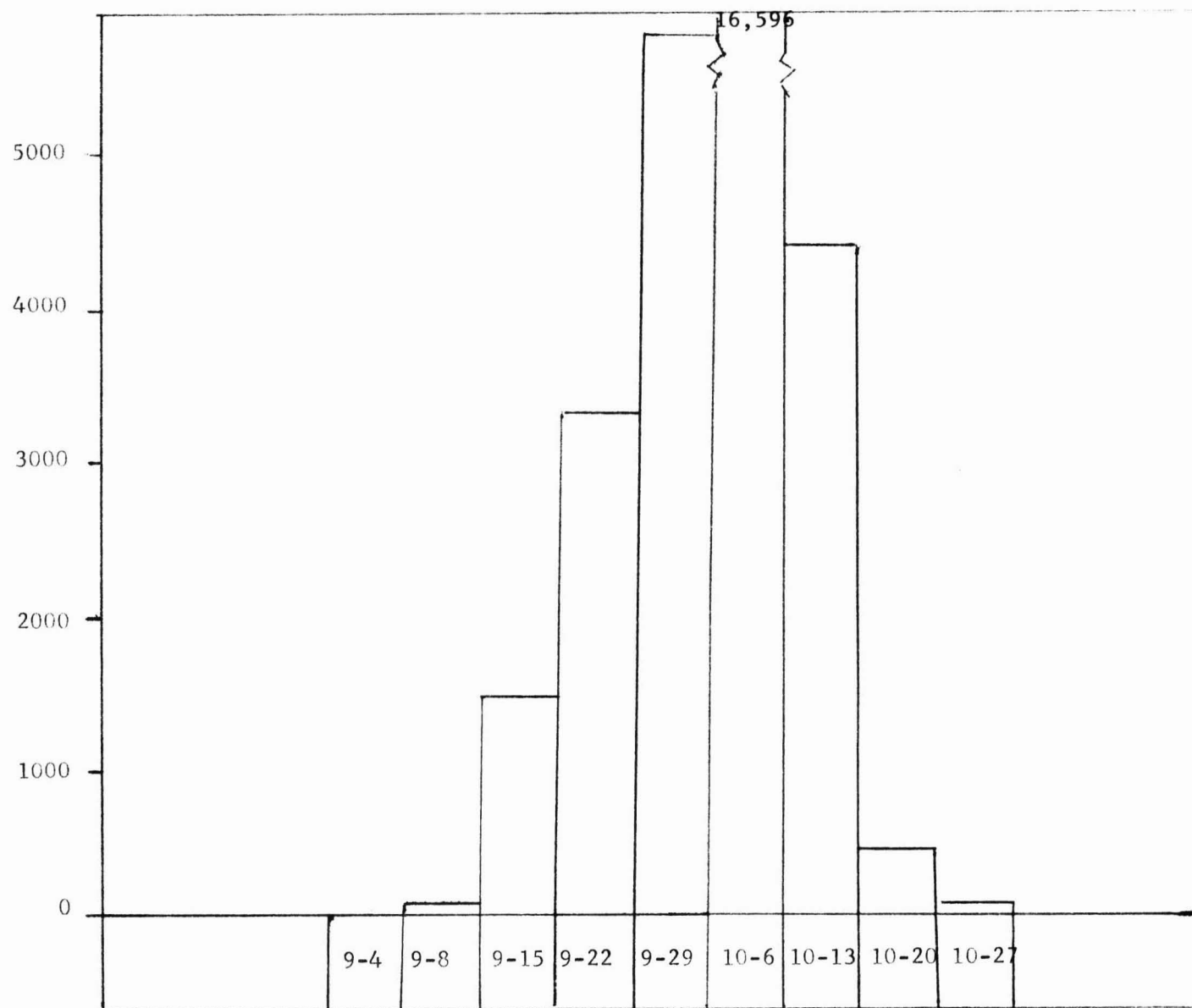


FIGURE B-3
SHASTA RIVER COUNTING STATION
River Temperatures 1963

