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# KLAMATH RIVER 1956 KING SALMON COUNT, KLAMATHON RACKS, SISKIYOU COUNTY

MILLARD COOTS  
Region I, Inland Fisheries

KL-VI



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INTRODUCTION

The fish counting racks at Klamathon are situated on the Klamath River approximately 187 miles upstream from the mouth of the river. Since 1925, periodic counts of the fall runs of king salmon, Oncorhynchus tshawytscha, have been made at this installation (Table 1).

The principal king salmon spawning areas in the river are located between the mouth of the Shasta River, about seven miles downstream from Klamathon, and the California Oregon Power Company No. 2 Dam, which blocks further upstream migration. The dam is approximately 14½ miles upstream from Klamathon. Based on aerial and ground surveys, the bulk or major portion of the fall run migrates past Klamathon. Three comparatively small tributary streams above Klamathon, Bogus, Jenny, and Fall creeks, are also utilized by salmon. If early fall rains occur, adult king salmon also enter Camp Creek, an intermittent stream.

THE COUNT

The fish counting racks were installed on August 5, 1956. King salmon were counted upstream until October 29, when the counting racks were removed. The first adult king salmon were observed below the racks on August 17, and began moving through the counting weir on September 13. The total count was 6,770 fish, composed of 270 grilse, 2816 males, and 3,684 females. A total of 475 adult steelhead, Salmo gairdnerii, were also counted upstream during this period. The daily counts are shown in Table 2.

NOTES AND OBSERVATIONS

The 1956 king salmon count was well below the average of the escapements past Klamathon for the past nine years (Figure 1).

As in 1954 and 1955, extensive carcass surveys were carried out along the upper Klamath River and tributary streams. This work was done under the able supervision of Mr. George Weber, Marine Resources Operations, with assistance from regional inland fisheries personnel. One of the main purposes of these surveys was the search for five-year-old marked salmon returning to the Klamath River as a result of hatchery plants of marked fingerlings in 1952. This work also provided information on the principal king salmon spawning areas, sex ratios, lengths, and spawning success. A complete report of these surveys will be submitted by Mr. Weber. Only five marked hatchery salmon were noted, and they were all recovered at Fall Creek Egg-collecting Station.

Since 1950, dead female king salmon in the upper Klamath River have been examined to determine if they had spawned. Some 89 females were checked after drifting down on the Klamathon Racks in 1956, and 16 fish (18.0 percent) had not spawned. Table 3 provides a summary of previous years' examinations. This table indicates that large king salmon counts at Klamathon are generally associated with large numbers of dead, unspawned females, assuming that these carcass samples are random. The majority of

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TABLE 1

King Salmon Counts at Klamathon Racks

Year	Number	Year	Number
1925	10,420	1941	11,204
1926	9,387	1942	13,038
1927	No Count	1943	No Count
1928	No Count	1944	No Count
1929	4,031	1945	No Count
1930	2,392	1946	No Count
1931	12,611	1947	No Count
1932	13,740	1948	5,821
1933	No Count	1949	11,504
1934	10,340	1950	21,584
1935	14,051	1951	17,857
1936	10,398	1952	6,591
1937	33,144	1953	6,267
1938	16,340	1954	2,042
1939	No Count	1955	14,946
1940	14,965	1956	6,770

TABLE 2

Daily King Salmon Counts at the Klamathon Racks, 1956

Date	Females	Males	Grilse	Date	Females	Males	Grilse
Sept. 13	6	2	2	Oct. 6	82	63	6
14	59	60	8	7	32	33	2
15	109	83	22	8	39	35	3
16	68	47	9	9	69	52	2
17	352	249	32	10	8	11	1
18	143	94	18	11	67	66	4
19	165	106	10	12	20	18	-
20	215	124	10	13	49	38	2
21	215	123	12	14	30	23	1
22	118	89	7	15	22	16	3
23	116	110	7	16	11	9	-
24	180	147	19	17	25	28	1
25	229	200	16	18	7	4	-
26	157	132	12	19	18	20	1
27	174	112	8	20	6	8	-
28	145	129	10	21	14	10	-
29	98	65	7	22	2	2	-
30	44	21	2	23	6	2	-
Oct. 1	168	141	16	24	4	5	-
2	218	180	11	25	2	1	-
3	64	54	2	26	2	3	-
4	78	55	2	27	-	-	-
5	47	43	2	28	1	3	-
				Totals	3,684	2,816	270

Combined total 6,770

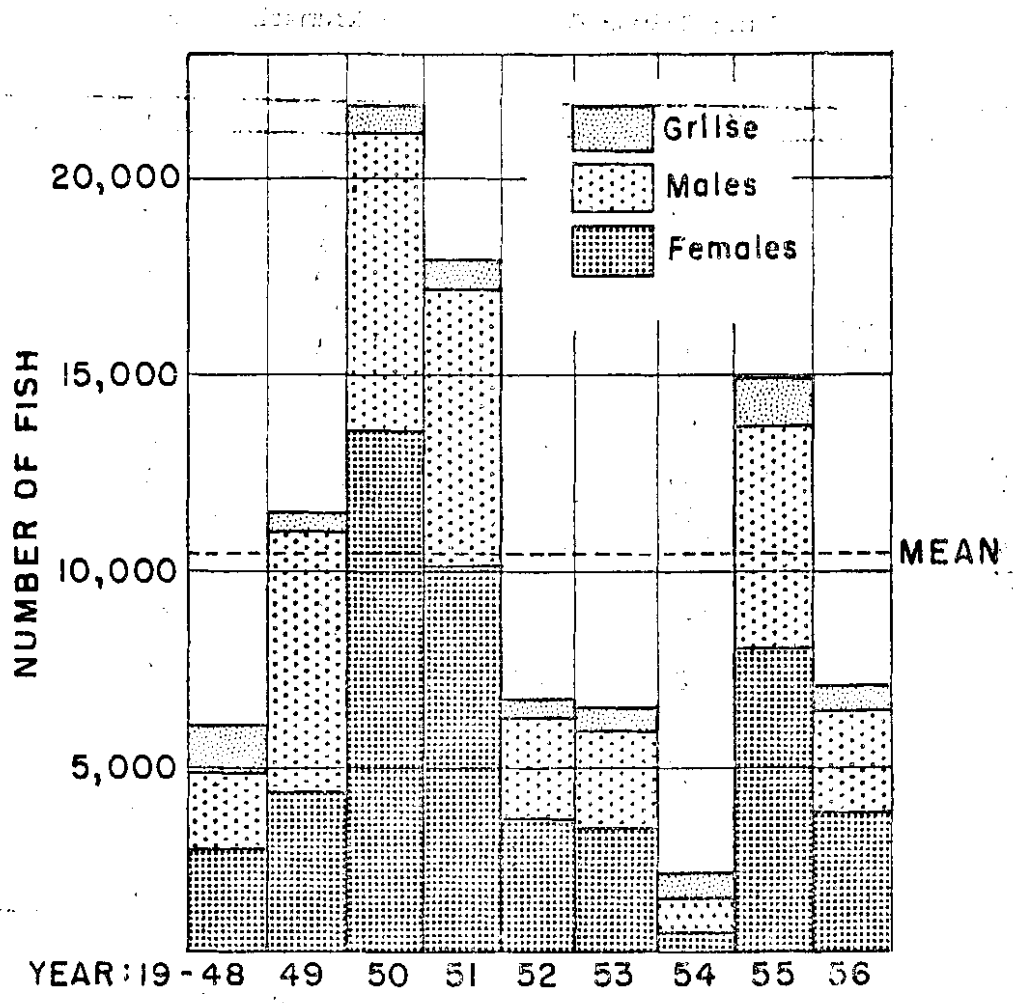


Figure I. KLAMATH RIVER KING SALMON COUNTS, KLAMATHON, 1948 - 56

the unspawned salmon apparently are those that did not enter the tributary streams above Klamathon. Carcass surveys in these streams have recovered very few unspawned females. Apparently the main causes for unsuccessful spawning are the lack of suitable spawning areas and the fluctuations in flow releases by the California Oregon Power Company's power generating plants immediately above the uppermost salmon spawning areas. Figure 2 is a graphic presentation of these flow releases. The data were taken from the stream-flow gaging station located just below the mouth of Fall Creek. During September and early October, fluctuations of considerable magnitude were almost a daily occurrence. This condition must have detrimental effects on successful spawning activity such as excavation of redds and deposition of eggs, especially in areas exposed during periods of low water. In the past, salmon have been observed engaged in spawning activities in these critical areas. Subsequent searches for deposited eggs in these areas have yielded negative results.

Based on surveys and actual counts, the distribution of the king salmon escapement above the Klamathon Racks was as follows:

Fall Creek	1,162
Jenny Creek	50
Bogus Creek	2,800
Klamath River	2,758

The 1,162 king salmon entering the Fall Creek racks were composed of 664 females, 469 males, and 29 grilse. Of these, 157 females and 151 males were permitted to pass through the racks to spawn naturally in Fall Creek. The remaining fish, with the exception of the grilse, were spawned artificially.

Five marked fish, composed of four males 32 to 38 inches fork length and one 33-inch female, were recovered from Fall Creek. These five-year-old fish, with the adipose and right ventral fins excised, resulted from the stocking in the spring of 1952 of 213,608 marked fingerlings in the Klamath River just above Klamathon. They represent the only marked fish recoveries in the upper Klamath drainage in 1956. Table 4 does not indicate significant differences between the lengths of the marked fish measured in 1955 and 1956. Scales from two of the 1956 marked males were read. The nuclei were typically stream type, indicating that both of the fish spent a prolonged period in the river before entering the sea. Slower growth during their freshwater existence might have contributed to the length similarities of the 1955 and 1956 recoveries.

During egg-collecting operations at Fall Creek, one 20-inch female was noted by hatchery personnel. It was their opinion that this fish was a "female grilse".

Jenny Creek was examined for salmon spawning activity and very few fish were observed. Suitable spawning areas are very limited in the available section of stream. The stream bottom is generally composed of large lava boulders and rubble.

Several carcass counts were made in Bogus Creek from the mouth upstream to the falls, a distance of about three miles. Based on these surveys, approximately 2,800 salmon entered the creek, with heavy utilization of the available spawning areas. Superimposition, displacement, and loss of previously deposited eggs were observed. A fish pass over Bogus Creek Falls would greatly augment the spawning potential of this stream for both salmon and steelhead.

The majority of the salmon examined bore evidences of attacks by the Pacific lamprey, Entosphenus tridentatus. Attacks on fish by the freshwater parasitic stage of this lamprey appear to be quite widespread in the upper Klamath drainage. In contrast, few, if any, such attacks on fish have been noted in the Trinity River, a major tributary stream.

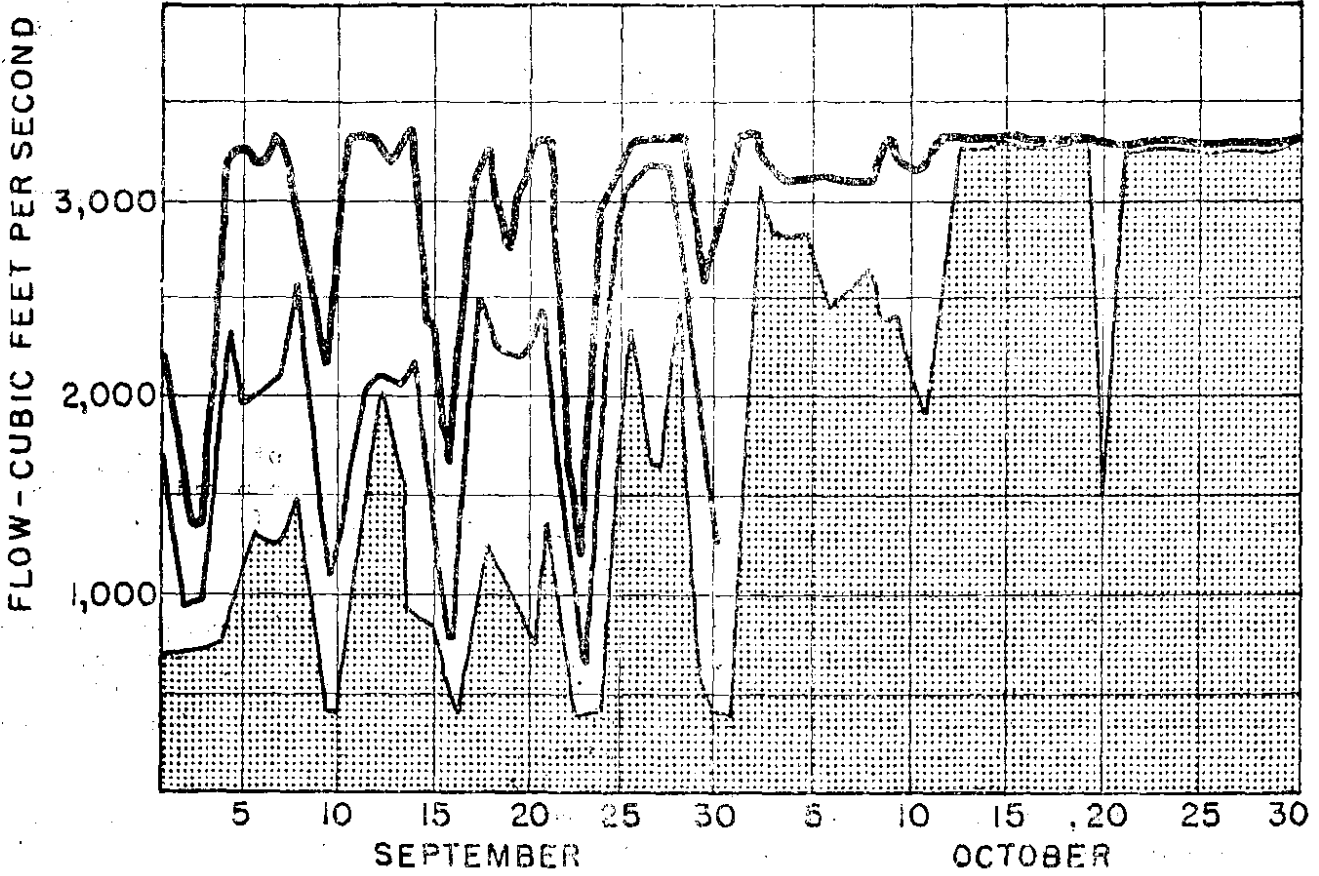


Figure 2. APPROXIMATE DAILY MAXIMUM, MEAN, AND MINIMUM  
KLAMATH RIVER FLOWS, 1956, COPCO, CALIFORNIA.  
(October means not available)

TABLE 3

Summary of Dead, Unspawned Female King Salmon Recovered from the Klamath River

Year	Number of females examined	Number unspawned	Percentage unspawned	95 percent confidence level (percent)	Klamathon fish counts <sup>1/</sup>
1950	205	66	32.2	25.8-38.5	21,584 (13,278)
1951	618	236	38.2	34.4-42.0	17,857 (11,144)
1952	286	91	31.8	26.4-37.2	6,591 (3,551)
1953	93	24	25.8	16.9-34.7	6,257 (3,327)
1954	39	3	7.7	0.0-16.0	2,036 (876)
1955	476	94	19.7	16.2-23.3	14,946 (7,980)
1956	89	16	18.0	10.0-26.6	6,770 (3,684)

Formula:  $a = \sqrt{bc(1-c)}$

$d = 1.96 \pm e$

Where: a = Standard deviation  
 b = Number of females examined  
 c = Percentage of unspawned females  
 d = Range with a probability of .05  
 e = Number of unspawned females examined

<sup>1/</sup> Number of females in parentheses.

TABLE 4

Length of Marked Hatchery-reared Salmon Recovered in the Upper Klamath Drainage, 1955 and 1956

Fork length (inches)	1955		1956	
	Female	Male	Female	Male
29	1	-	-	-
30	2	-	-	-
31	1	1	-	-
32	7	3	-	1
33	3	3	1	-
34	19	10	-	-
35	9	8	-	1
36	9	7	-	1
37	5	9	-	-
38	1	2	-	1
39	-	3	-	-
Mean length	34.2	35.3	33.0	35.3



#### ACKNOWLEDGMENTS

Personnel from Mt. Shasta Hatchery and the Yreka Screen Shop installed and dismantled the Klamathon Racks.

The enumerators at Klamathon were Messrs. Clyde Peck, James Howarth, and Ernest Adams. Mr. Robert Will counted and checked fish at Fall Creek.

The surveys and searches for marked adult king salmon, resulting from the plants of marked hatchery fingerlings in the Klamath River, were suggested by the Salmon and Steelhead Guiding Committee. Mr. George Weber, Marine Resources Operations, supervised the 1955 and 1956 surveys on the Klamath River.

#### SUMMARY

The 6,770 salmon counted at the Klamathon Racks on the Klamath River in 1956 were composed of 270 grilse, 2,816 males, and 3,684 females. Five marked five-year-old hatchery-reared salmon were recovered at Fall Creek.