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### NOTES ON THE 1930 CATCH OF KING SALMON IN KLAMATH RIVER

By JOHN O. SNYDER

The migration of King Salmon into Klamath River in 1930 presented an unusual departure from what was previously regarded as a normal size and age group representation. Very small fish were so out of proportion in numbers as to attract the attention of even casual observers. The small fish referred to are known to anglers and market fishermen as grilse or chubs. As a matter of fact they are males, two or three years of age and sexually mature. Grilse will grow no larger, but die after spawning as do all salmon. Three-year females occur in numbers in the Klamath catch, but they are much larger than the males, often comparing favorably in size with the smaller four-year fish.

For several years prior to 1930, the Klamath migrations had been rather carefully observed, mainly through the commercial catches, and we had come to regard the age group representations as fairly constant.\* It was found that while three-year fish contribute 11 to 15 per cent of the catch, four-year fish constitute the bulk, 63 to 78 per cent. Five-year fish are much less numerous, 10 per cent or more, while there is a small scattering of six-year individuals.

The Commission had an observer, Carleton Rogers, stationed at the mouth of Klamath River during the season of 1930. He examined 1872 fish, so chosen from day to day as to be typical of the catch. They were measured, recorded as to sex, and scales from each were preserved. Later, the writer determined the respective ages of these fishes and reported on the same.†

It appeared that approximately 9 per cent of the catch were two-year fish; 49 per cent were three-year fish; 39 per cent, four-year and but 3 per cent were five-year fish.

In casting about for some explanation for the seeming peculiarity of this particular migration, four assumptions presented themselves:

1. Resulting from an increased demand, smaller fish have been accepted by the dealers, and fishermen have employed nets of a smaller mesh in an effort to take them.
2. A swing in the pendulum of variation for which we are unable to assign a probable cause, and which will eventually right itself.
3. The presence of small fish (third-year class) is the result of a particularly successful breeding season in 1927 and as a result a phenomenal harvest of four-year fish may be expected in 1931.
4. A tendency to mature at a certain age is inherited, and consequently when selective nets deplete the older age groups, those which mature early are left to propagate in undue proportion; a possible result of depletion which in the end will be deleterious to the stock.

\* Fish Bulletin No. 34, 1931, Division of Fish and Game of California.

† Fish Bulletin No. 34, 1931, Division of Fish and Game of California, page 125.

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The first assumption was dismissed at the time as no changes in methods of fishing were adopted in 1930. No evidence has appeared in support of assumption 4, and furthermore, that possible danger has now passed with the cessation of net fishing.

Observations since 1930 point definitely to 3 as the explanation and indicate that, when viewed in the proper light, there was really nothing very unusual in the migration of that year, for the season of 1934 was the occasion of a relatively huge migration into the Klamath, thus demonstrating beyond doubt that the large number of grilse of the year before resulted from a particularly successful start in 1927.

In 1930 a rack was placed in Shasta River a tributary of the Klamath, and provided with a valve in such a way as to facilitate the counting of all fish that pass through. A census of each migration for six years is presented, and the relation of the grilse population of a particular year to that of the total migration of a following year is indicated. It appears that due to the predominance of four-year fish in a migration, there exists a more or less definite relation between the abundance of grilse of one year with that of the entire number of the following year.

Assuming that the migration in the Shasta is numerically similar to that of the main river, the prospect for a relatively large migration into the Klamath for 1936 is not very good.

Migration of King Salmon into Shasta River

Year	Large fish	*Grilse	Total	Per cent of Grilse
1930.....	7,279	12,059	19,338	62.3%
1931.....	61,807	20,037	81,844	24.4%
1932.....	29,631	5,058	34,689	17.0%
1933.....	4,678	6,892	11,570	59.5%
1934.....	26,873	21,795	48,668	44.7%
1935.....	64,721	9,816	74,537	15.2%

\* Neither in this case nor in the report of the 1930 fish, is the stated proportion of Grilse, i.e., 2 and 3 year fish, accurate. Here, the evidence is visual only, and it follows that many 3 year fish, especially females, are included with "large fish." Also, in the fishing of 1930, many small Grilse escaped through the nets.