

Propagation Studies at Lakelse Lake.

Since attempts in 1944 and 1945 to obtain yearling sockeye at Lakelse Lake for marking purposes had been relatively unsuccessful, it was decided that in 1946 a fence should be constructed across the outlet stream by which not only the desired 100,000 yearlings for marking could be obtained but also a complete count of the seaward migrating young, thus making available data for a study of propagation efficiency.

One of the chief difficulties in previous efforts had been working in the swift water in the lower narrower section of the Lakelse river which is subject to rapid rises and peak spring currents of 5 to 6 miles per hour. A new location was chosen nearer the outlet from the lake where the water is shallow (3 to 5 feet), the stream much wider (ca. 800 feet), and the flow about  $\frac{1}{4}$  miles per hour.

The fence consisted of two 500 foot arms of  $\frac{1}{2}$  inch stretched mesh seine netting extending from bank to bank swinging down in a wide "V" to a central trap. The netting was held in place by attaching it at 15 foot intervals to a main guy rope by secondary guy ropes which extended at each point of attachment out from the cork line to the main guy, and back to the lead line. The cork and lead lines were separated by 8 ft. stakes which held the cork line well above the surface and the lead line tight on the soft mud bottom, even depressing it some inches below this level. Every effort was made to insure a complete seal.

The trap was built of two sections, bolted together after each had been floated into place and sunk to the bottom. The first section was a large funnel entrance joined directly to the two arms of netting with an opening 12 feet wide and 6 feet deep which narrowed down to two separate openings 2 feet wide leading directly into the second section by adjustable doors. This latter portion consisted of 4 pens, each 8 feet square and 6 feet deep, forming a complete 16 foot square, with the front two opening into the second two by a second pair of doors. These doors could be adjusted to either close or form a slit-like entrance operating in the fashion of the funnelled entrances of a minnow trap or fyke net. Thus a "trap" was obtained as well

as an increased current to attract the entrance of the fish.

To remove the captured fish each pen had a false bottom lifted by means of a small pulley system attached to a high scaffolding over the whole structure. The fish were then brailed out for enumeration and marking, these operations being conducted on a large float which was moored alongside the trap.

From May 1 to June 20, the migrants were weighed in water and a weighed sample of over 25%, taken randomly throughout the run, counted. The final calculated total was 557,400. The highest daily "count" occurred on May 23 when 89,100 sockeye yearlings were passed through the fence. The totals for coho and spring migrants were 72,000 and 50 respectively. The former species showed a rise and fall which spanned the same 7 week period as the sockeye while the latter species, being so few in number, has purely negative significance.

Seven other species of fish of varying sizes and ages also entered the trap and were enumerated along with the salmon. These included 232 outthroat, 196 rainbow, 26 dolly varden, 212 Rocky mountain whitefish, 84 squawfish, 234 peamouth and 2,024 Columbia river suckers.

The age of the migrants showed that they arose almost completely from the parent year of 1944. In that year the total adult sockeye salmon run to the Lakelse lake system was estimated at 25,000. By applying to this figure the sex ratio recorded from counts made on the spawning streams (46% males, 54% females) and utilizing the data on egg counts made on Williams creek, Lakelse lake, in 1939 by Dr. A. L. Pritchard and Mr. W. M. Cameron (3,888 eggs per female), the per cent survival from egg deposition to migrant can be calculated as approximately 1.06%.

This approximate reckoning may be compared with the results obtained by Dr. E. E. Foerster at Cultus lake, B. C. of percentage survivals of 1.13, 1.05 and 3.23, and by Mr. J. T. Barnaby for Karluk lake, Alaska, of from 0.45% to somewhat less than 1.0%.

This study in sockeye propagation at Lakelse lake is to be continued and expanded in subsequent years. An adult fence has been proposed for 1947 which will provide

a complete and accurate count of the mature sockeye, and, along with the information now available and further investigations contemplated on the biological relations of Lakelse lake, should prove of immense value in obtaining a better understanding of these affinities.