LAKES OF THE SKEENA RIVER DRAINAGE

II. MORICE LAKE*

For salmon which have migrated up the Skeena river as far as Hazelton, a division in the water course is presented. They may either swing north and continue along the Skeena, or proceed in a south-easterly direction up the Bulkley. Most of those which follow the latter route fight their way through the gorge at Hagwilget and continue their journey through the 20 to 25 miles of the Bulkley canyon to Moricetown falls. Here the pink salmon, *Oncorhynchus gorbuscha,* the weakest of the four species involved, is apparently stopped by the force of water pouring over the 25-foot cascades. About 80 miles inland from Moricetown just below the village of Houston, another choice in route is offered to those fish which remain. By far the largest number, in fact almost all, continue in and up through the cold, fast-flowing, grayish glacial waters of the Morice river even to Morice lake and its tributary streams lying 60 to 70 miles to the south-west. There is as yet no known definite reason why only very few move up the warm, slower-flowing, clear Upper Bulkley which winds through the relatively flat farm lands of the district to Bulkley lake about 40 miles eastward.

In all the long journey to the headwaters, the two most difficult natural obstacles to the migration of salmon are undoubtedly the turbulent waters at Hagwilget and the falls at Moricetown. No such serious hazards occur in the Morice river above its junction with the Upper Bulkley, but there is no denying the fact that the salmon which traverse it must expend considerable effort to navigate the fast white water, the many rapids, log jams, and canyons which characterize its entire length of 60 or 70 miles to the lake. In Morice lake an opportunity is afforded for a temporary halt in the fight to reach the spawning grounds. Some salmon, however, particularly the coho, *O. kisutch,* may already have branched off to enter streams tributary to the river itself. Others may have stopped to spawn in the upper reaches of the main Morice river. Still others, like the spring salmon, *O. tshawytscha,* may have entered the lake, and, when mature, have dropped back to utilize the deep gravel beds in the last few miles of the Morice river.

The sockeye, *O. nerka,* which enter the lake mainly during the latter part of July and the first two weeks in August, remain therein for two to three weeks during which time they become more mature, the dark red pigments of the skin becoming brighter and the elongated snout and hump on the back of the males getting more pronounced.

Morice lake, at an elevation of 2600 feet, extends in a south-westerly direction for about 30 miles, and is almost completely encircled by snow-capped mountains which drop steeply down to the shores from heights of 4000 to 5000 feet. Only the region in the north-eastern corner around McBride lake and the mouth of the Nanika river (see accompanying map) is relatively flat.

From *Progress Reports* of the Pacific Coast Stations of the Fisheries Research Board of Canada, No. 67, June, 1946, pp. 23-26; the second in a series presenting general information on the lakes of the Skeena river drainage particularly insofar as it affects salmon production.

In the high deep valleys between the mountains, immense snow fields and ice beds provide a reservoir from which the numerous cascading rivulets and waterfalls tumble down pouring cold silted water into the lake at many points. Thus the lake water is fairly opaque and exhibits a distinct blue-green tinge under direct sunlight.

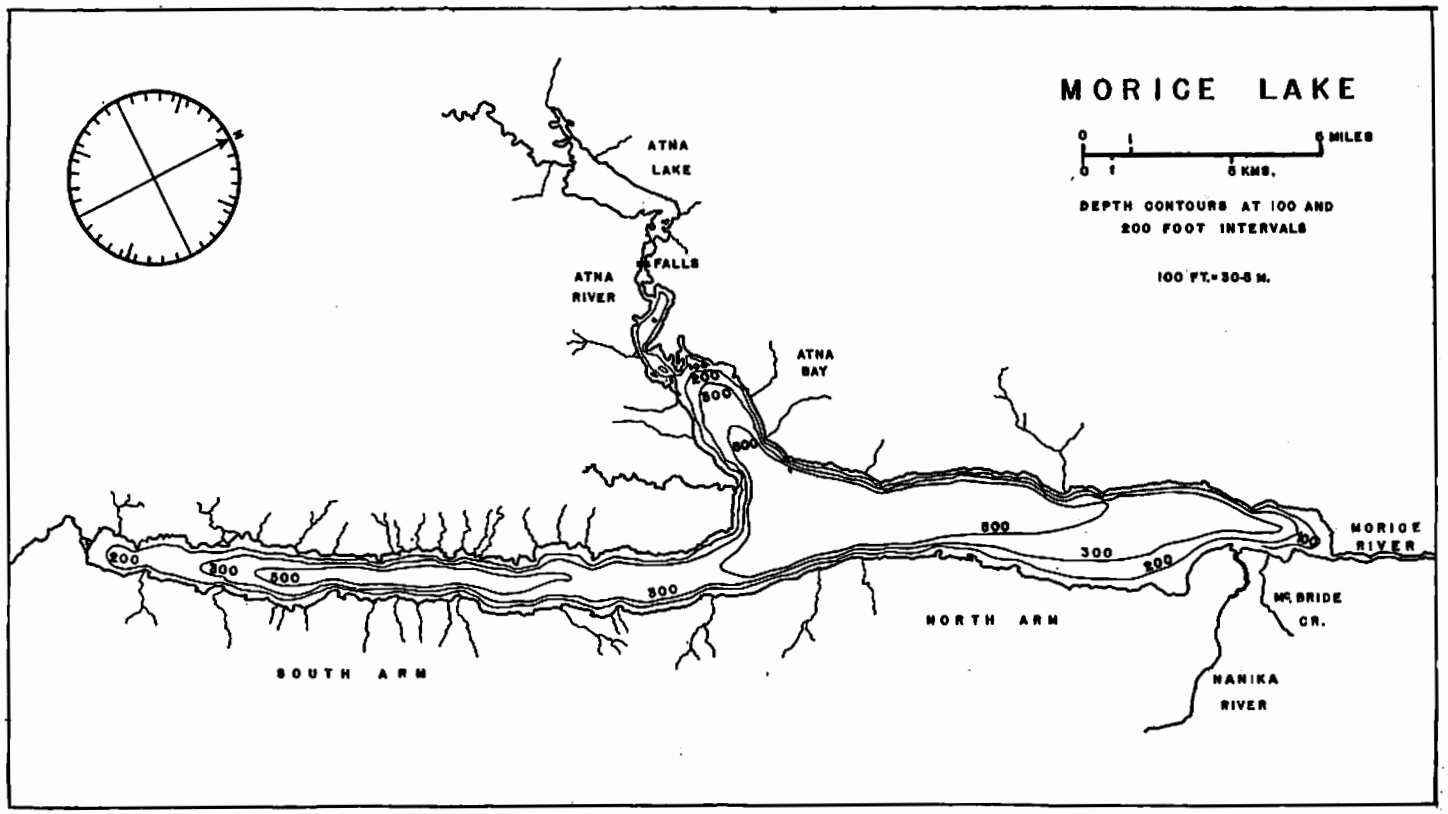
There are only two tributary streams of any volume or importance, the Nanika and the Atna. The Nanika river, arising in Kidprice lake and flowing in a northerly direction, actually provides the final outlet for two other moderately large bodies of water, Stepp and Nanika lakes. This chain in which Kidprice is centrally located, lies in a valley on the other side of a mountain ridge from Morice lake about 8 miles to the south-east. On the Nanika immediately below its point of outflow from Kidprice lake, is a falls 40 feet or more in height which completely blocks the movement of salmon upstream. The Atna river draining the mountainous area to the west, expands into a small lake a few miles before it enters Atna bay. Three-quarters of a mile from its outlet are two falls, one just above the other, respectively 13 and 10 feet in height. These certainly could not be considered a complete barrier to salmon, but they constitute a definite hazard to further upstream migration.

As might be expected from the topography of the area, the lake is very deep. In most of the area, the water reaches depths of at least 200 feet, while in the southern arm and central portion there are large basins over 500 feet in depth. The maximum depth has not yet been recorded. It is at least 775 feet and may possibly reach 1,000.

The shore line is irregular and rocky with little gravel or sand except in the regions of the outlet of the Nanika river and the outlet of Morice lake. Shallow waters are completely lacking with the exception of one small bay, Nanika bay, near the mouth of the stream of the same name. No humus or mud bottoms were discovered, only silt, sand and gravel. Conditions such as these have apparently resulted in a complete lack of rooted aquatic vegetation. In consequence, practically no ducks and geese frequent the area. With the exception of scattered mergansers and loons, the lake is singularly deficient in bird life.

Fed by glaciers and deep as it is, it is not surprising that even in mid-summer the surface temperature of the lake does not rise above 14°C. (57°F.). At the 200-foot depth, the maximum temperature is rarely above 5°C. (41°F.). Conditions such as these should certainly induce a body of water of low productivity. This is evidenced by the relative scarcity of both food organisms (plankton, bottom fauna, etc.) and fish.

Lake trout, *Cristivomer namaycush*, dolly varden char, *Salvelinus malma*, and rainbow trout, *Salmo gairdnerii*, are present, but nowhere in sufficient abundance to make worthwhile sport or commercial fishing. The lake trout are on the average very thin and contrast very strikingly in this regard with the Rocky mountain whitefish, *Prosopium williamsonii*, which in addition to being round and fat, are not nearly so scarce. The whitefish, a bottom feeder, apparently thrive on a small, low-spiralled snail with which their stomachs are jammed. Long-nosed or northern sucker, *Catostomus catostomus*, the most abundant fish, appear to be concentrated in the few shallow areas where they feed mainly on the same type of mollusc as the whitefish. Their condition is thus equally as good. Fair numbers of the prickly bullhead,



Map of Morice lake showing bottom contour lines and tributary streams.

Cottus asper (presumably), have been found along the gravel beaches amongst the rocks as well as being taken in the stomachs of certain lake trout. There is one record of what is accepted as the Columbia river sucker, *Catostomus macrocheilus.*

Over 50% of the stomach content for the lake trout examined was made up of sockeye salmon fry and yearlings. It is most probable that all these small fish resulted from the spawnings in the Nanika river since no other tributary was observed to carry sockeye.

Observation of adult salmon in any of the water courses in the area is exceedingly difficult because of the heavy glacial silt which obscures them almost completely. The estimation of the numbers which frequent the district is certainly equally difficult if not impossible. Such figures as are presented are the results of counts and observations made at Moricetown falls as the fish moved upstream. From these it is estimated that in 1945 some 80,000 sockeye moved into the Morice river and lake system. Of these perhaps some 40,000 spawned in the Nanika river. The most concentrated spawning in this tributary apparently takes place at the extreme upper end in the last few miles immediately below the high insurmountable falls mentioned previously.

Along the Nanika river in the sand and gravel are the footprints and tracks of different animals which have either passed that way, or come to feed on the salmon which could be caught in the river or found dead on the banks. Mink and martin, wolf and coyote, black bear and grizzly bear, moose, caribou and deer are all abundant. In places the hard-beaten paths down the mountain slopes tell of many years of constant unmolested travel by bear and moose. In regard to game, the whole country is strikingly virgin and rugged.

In the first article of this series the lakes of the Skeena drainage were classified into two groups. Morice fits without question into the first category, i.e. "deep, cold bodies of water almost opaque and gray from glacial silt."

The authors would like to extend their thanks to Messrs. D. F. Alderdice and D. K. Foerster who, in 1944, made the first exploratory trip of this investigation to Morice lake by pack train. Some of the information gathered on that expedition is used in this report.

Pacific Biological Station

J. R. Brett
A. L. Pritchard