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June 23, 1942

REPORT NO. 796

A FISHERIES SURVEY OF GANGLE LAKE, MONTMORENCY COUNTY

by

L. E. Perry

Introduction

Location and Drainage

Gangle Lake, also known as Pot Hole Lake, is located in west central Montmorency County (T. 30 N., R. 1 E., Sec. 9), nine miles west of the City of Atlanta, and may be reached from this town by highway M-32 and the Gangle Lake Truck Trail. It is drained by the East Branch of Black River, a tributary of Cheboygan River.

Acknowledgments

Gangle Lake is a private lake, owned in 1936 by Mrs. Elma R. Johnson and William Bounard. It has since been purchased by another person and is posted as a private lake.

It was mapped, sounded and given a biological inventory by a party of the Institute for Fisheries Research on August 3, 1936.*

Past and Present Use

Gangle Lake was formerly owned by the Kneeland Bigelow Lumber Company which had its Camp No. 8 located nearby. The lake may have been used to some minor extent in logging activities. At present it serves no industrial purpose.

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* This survey party consisted of: D. E. Miller, leader; W. F. Carbine and A. Whiteley, assistants.

Recreational facilities are limited to a cleared camping area on one side. There is no boating, and the water is too cold and the beach is not suitable for swimming.

Gangle Lake has a comparatively large population of brook trout that are of small size. The lake has been open to public fishing in the past, but it is now understood that the present owner has withdrawn this privilege.

Physical Characteristics

Geological Origin

Gangle Lake has the appearance of a pot hole lake in a glacial plain; however, nothing definite has been written on its origin.

Shape of Basin and Extent of Drainage

Gangle Lake is oval in shape with no irregularities in the shoreline. It has a simple basin with a single depression that extends 40 feet deep. Its drainage is limited to the immediately surrounding wooded terrain.

Water Fluctuation

The fluctuation of the water level is slight. The lake receives water from many springs both below and above the surface. Two springs, one on the south and one on the west, are rather large in size.

The outlet of Gangle Lake is the East Branch of Black River; in fact, Gangle Lake might be called the extreme headwater of this river. At the time of the survey there were no dams or other obstructions at the outlet.

The physical features of Gangle Lake are outlined in Table I.

Table I
Some physical data of Gangle Lake, Montmorency County

Area in acres	Maximum depth in feet	Shore development	Dominant bottom types		Color of water	Transparency, in feet (Secchi disc)
			0-15 ft.	Over 15 ft.		
2.6	40	1 +	Marl	Pulpy peat	Dark bluish-green *	29

* Probably only apparent color, not true color.

Discussion of Physical Factors in Relation to Fisheries

Gangle Lake is a very small and comparatively deep lake with a constant supply of fresh water from cold springs. The bottom is marl and pulpy peat, which is usually conducive to high productivity. The water is very transparent and permits the penetration of light to great depths which should encourage the growth of plants. These features are not unfavorable to a good production of game fish.

Temperature and Chemical Characteristics

Temperature

The surface temperature of Gangle Lake was found to be 67° Fahrenheit on August 3, 1936. Below the surface the water became progressively colder. Three feet below it was 65°, at 7 feet it was 62°, and so on to a depth of 20 feet where the temperature was 55°. From there to the bottom it remained nearly the same, dropping only to 53°. While a thermocline apparently exists between the surface and the 20-foot level, this has no significance since there is no isolation of the water below and the whole lake is suitable for cold water fish.

Chemical Conditions

Water samples were taken at various depths for analysis of oxygen, hardness, and acidity. Oxygen was found in large quantities from top to bottom. There were 11.0 parts per million at the surface, 10.3 p.p.m. at 16 feet and 9.2 p.p.m. at 32 feet. This is certainly ample for any population of fish which might be in the lake.

Alkalinity and pH

The water in Gangle Lake is hard and alkaline. The methyl orange alkalinity test showed a range of 215-225 parts per million. Hydrogen ion concentrations ranged from pH 7.3-7.9. Generally, hard waters provide much needed minerals and are more productive for fish than soft waters. Alkaline

lakes are also much more favorable than acid lakes.

Pollution

No evidence of pollution has been reported in Gangle Lake.

A summary of the chemical and temperature data is given in Table II.

Table II

Chemical and temperature data of Gangle Lake, Montmorency County.

Date	Depth in feet	Temperature °F.	Oxygen, p.p.m.	Methyl orange alkalinity, p.p.m.	pH
8/3/36	0	67	11.0	215	7.9
	3	65	...	...	7.9
	7	62	...	...	7.8
	10	60	...	...	7.7
	13	58	...	...	...
	16	56	10.3	221	7.4
	20	55	...	...	...
	23	54	...	...	...
	26	54	...	...	...
	30	54	...	...	...
	33	53	9.2	225	7.3
	36	53	...	...	...
	38	53	...	...	...

Discussion of Temperature and Chemical Factors in Relation to Fisheries

Gangle Lake has cold water, even in mid-summer. Dissolved oxygen is present in large amounts. The water is hard and alkaline. All these features are favorable for trout or other species having similar requirements, except that it is believed temperatures are too low for satisfactory growth of trout and possibly of certain fish food organisms.

Biological Characteristics

Vegetation

A list of plants found in Gangle Lake is given in Table III.

Table III

The names and relative abundance of plants found in Gangle Lake, Montmorency County.

Common name	Scientific name	Abundance
Horsetail	(Equisetum arverse)	Few
Smartweed	(Polygonum amphibium)	Few
Variable pondweed	(Potamogeton gramineus)	Few
Floating-leaf pondweed	(P. natans)	Few
Sago pondweed	(P. pectinatus)	Few
Bur reed	(Sparganium minimum)	Few
Bladderwort	(Utricularia intermedia)	Few
Bladderwort	(U. vulgaris var. amer.)	Few
Yellow pond lily	(Nuphar advena)	Few
Moss	(Scorphidium scorpioides)	Common
Musk grass	(Chara)	Abundant

Chara is by far the most abundant plant found in Gangle Lake. It extends from the shore to depths as great as 30-35 feet. The other species are distributed more or less sparsely in the shallower water.

Fish Foods

A collection of plankton was made through a vertical column of water from the bottom to the surface of the lake with a very fine mesh net. Plankton consists of the minute organisms that float freely in most natural waters and provide food for very young fish, as well as the larger fish food organisms. In Gangle Lake plankton was found in moderate abundance, however. A single sample is only of general significance since it varies greatly in kind and number from time to time and even from place to place in a lake.

Dredged samples from the lake bottom at 35-40 feet showed the presence of fingernail clams, watermites, and many small fly larvae. No samples were taken in the weed beds where it is believed, from experience with other lakes, that the abundance of organisms would be much greater.

Brook sticklebacks were seined along the shores of the lake in fairly great abundance. These fish probably provide some part of the diet of brook trout in the lake. Also, they may prey on brook trout fry to some extent.

Fish Present

Brook trout were the only game fish found in Gangle Lake. They were collected in fairly large amounts by seine, gill net, and angling, but, in all cases, were found to be of small size. Many young-of-the-year were among the collections.

The only other fish in the lake were brook sticklebacks, which were rather abundant.

Growth Rate of Game Species

Scale samples were taken from the brook trout for a study of their age and growth; however, it was found in the laboratory that the scales were of such an uncertain nature that it was not possible to distinguish year marks on them. For this reason it is not definitely known how fast these fish grow. The fact that later angling attempts by Dr. A. S. Hazzard and others produced few legal-sized and many sub-legal fish lends to the opinion that growth of the brook trout in Gangle Lake is very slow. A sample of 61 fish taken in one day by fly fishing ranged from 3.9-7.8 inches in length and averaged 5.7 inches. Such a sample would be expected to contain a greater proportion of large fish than exists in the lake because of the method of capture.

An explanation for this slow growth cannot be given at present, but it is probably due to the unusually cold water, or an overcrowded condition, or both. When growth of game fish is slow for any reason at all angling will not control the population because few fish reach legal size. The result

is overpopulation and additional reason for slow growth.

Records since 1934 show no stocking of fish in Gangle Lake.

Natural Propagation

According to our present knowledge, good brook trout spawning beds are not present in Gangle Lake; however, young-of-the-year fish have been collected in the lake. Spawning must take place either in the lake itself or in the outlet (East Branch of Black River), which is a well-known brook trout stream. In the latter case the young trout must move into Gangle Lake to provide the rather large population existing there.

Management Proposals

Designation of Lake

Gangle Lake is designated as a trout lake which is proper, according to these investigations. Although Gangle Lake is privately owned and not open to public fishing, the following suggestions are made to conform with the present policy of organizing data obtained by lake inventory parties of the Institute for Fisheries Research. Public fishing was permitted on Gangle Lake at the time of the survey.

Stocking

No fish should be stocked in Gangle Lake. The lake is already well populated with brook trout and additional stocking will only make worse the present condition of slow growth. No game fish other than brook trout should be introduced or encouraged. The East Branch of the Black River is a brook trout stream and an introduction of other game fish in Gangle Lake would undoubtedly lead to their spread into Black River system which certainly should be avoided.

Predators and Parasites

No predators or parasites were observed in Gangle Lake.

Shelter

Sufficient shelter is found in Gangle Lake to protect the fish and other organisms now in the lake.

Regulation of Water Level

The fluctuation of water level in this lake is insignificant and no control is necessary.

Improvement of Spawning Facilities

Young brook trout were found in Gangle Lake but their exact origin is not known. No improvement of the present spawning facilities is necessary unless further investigations show a need for such.

Other Suggestions

The proper management of this lake hinges on the cause of slow growth in the brook trout. This should be investigated further. It would also be desirable to know if the brook trout population of this lake is maintained by propagation within the lake or from the outlet.

It is believed that a warming up of the lake water would be beneficial and probably aid in increasing the growth of the trout. This might be accomplished by diverting the cold water from a few of the largest springs around the shore by canal to the outlet. This would reduce the flow of cold water through the lake and permit a more stable body of water which could warm up with the atmosphere in the summer. In such case, part of the fish may be removed by fishing, poisoning or otherwise to reduce the population and remove the overcrowded condition which must now exist.

It is also possible that removing the size limit on trout in this lake, if this were possible, might result in sufficient reduction in population to permit better growth of the remaining fish.

INSTITUTE FOR FISHERIES RESEARCH

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