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FISHERIES SURVEY OF ROUND LAKE, OTSEGO COUNTY

by

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Introduction

Location and drainage

Round Lake is located in the Pigeon River State Forest, Otsego County (T. 32 N., R. 1 W., Sec. 29). This small lake is landlocked and easily reached from the main road leading into the Pigeon River State Forest Headquarters from Vanderbilt.

Acknowledgments

The map of the lake (outline and soundings) was made by the Michigan Civilian Conservation Corps (Camp Pigeon River S-62) in the winter of 1939-40. The biological inventory including the mapping of the vegetation and bottom soils was made by the writer on July 21 and 23, 1942 and August 25 and 26, 1943.

Past and present use

There is no evidence that this lake has ever served any commercial purpose and there are no cottages or boat liveries. Since the lake is located in a state forest, public access is assured at all times. The Department of Conservation maintains a state forest camp ground on the east shore of the lake.

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No information was secured relative to the lake's past fishing history. Results of the survey and the extent of present use indicate that the lake will never support a great deal of fishing, but is at present furnishing a limited amount of fair fishing.

Physical Characteristics

Geological Origin

The lake's origin is probably the same as that of other small land-locked lakes in the immediate vicinity; i.e. a "pit" or "pot-hole" lake formed from an isolated block of ice imbedded in glacial material. The basin is oval in shape with the long axis running in a northeast-southwest direction. The drainage area is small and covered with jack pine, scrub oak, and aspen.

Water fluctuation

Water fluctuation is negligible since there are neither inlets nor outlets, and the water supply is from ground water and runoff. Physical characteristics of this lake are summarized in the following table (Table 1).

Table 1

Physical Characteristics of Round Lake, Otsego County

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Area in acres .....	6.8
Maximum depth .....	35 feet ?
Shore development .....	1.04
Bottom types	
Shallows .....	Sand, fibrous peat
Depths .....	Fibrous peat, pulpy peat
Color of water .....	Slightly stained
Transparency (Secchi disc) .....	7 feet

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Physical factors play an important role in the fisheries of a lake. Small lakes usually produce more fish per unit of area than do large lakes because they are more protected and have a greater proportion of their areas which are capable of producing fish foods. The shore development of Round Lake is only 1.04. This means that the shore line is only

slightly greater than the circumference of a circle having the same area. Generally speaking, a lake with a high shore development is more productive since this indicates the presence of bays where conditions are more likely to be suitable for spawning, plant growth, fish foods, etc. The shore line development of course is not so significant in a small lake which has essentially all the characteristics of a protected bay. The bottom in Round Lake consists largely of peat, except for a little sand at the margin. This bottom does not seem to be very productive of either fish foods or vegetation. The supply of vegetation is also limited to some extent possibly by the rather low transparency of the water. Physical features of Round Lake are only moderately favorable to fish production.

#### Temperature and Chemical Characteristics

##### Temperature

Round Lake was found to be thermally stratified. A thermally stratified lake is one in which a thermocline is present during at least part of the year. A thermocline is a layer of water in which the temperature drops one degree Centigrade with each meter of depth (0.55 degrees Fahrenheit per foot of depth). The water in the lower part of the thermocline and below the thermocline is always quite cold. If sufficient dissolved oxygen is present in the lower cold water layers, the whole lake may be habitable for fish throughout the year. If, however, the water below the thermocline is devoid of oxygen, then it cannot be utilized by fish during the period of oxygen deficiency (usually during late summer and early fall).

##### Chemical Conditions

In a thermally stratified lake the supply of oxygen in the deeper water may be used up by the oxidation of organic material on the bottom. This is the case in Round Lake, where only the upper waters carry sufficient oxygen in late summer to support fish life.

The water in Round Lake was found to be very soft (methyl-orange alkalinity 15-25 p.p.m.) and slightly acid to slightly alkaline (pH 6.2 - 7.2). These conditions are usually associated with low fish production.

There is no significant pollution in Round Lake. Chemical conditions are summarized in the following table (Table 2).

Table 2  
Temperatures and Chemical Characteristics of Round Lake,  
Otsego County, Michigan, August 25, 1943

Depth in feet <sup>✓</sup>	Temperature Degrees F.	Dissolved Oxygen	Carbon dioxide	ph-th	M.O.	pH
		p.p.m.	p.p.m.	alk.	alk.	
0	72	8.2	trace	0.0	13	7.2
5	70					
8	68	8.1	trace	0.0	15	7.2
11	64					
14	54	2.4	6.0	0.0	20	6.2
17	48					
20	44	0.0	14.0	0.0	25	6.2
25	42	0.5	18.0	0.0	25	6.2
30	42					

\* Thermocline between 8 and 20 feet.

Biological Characteristics

Vegetation

The vegetation in Round Lake was not very abundant. The following table (Table 3) gives a list of the plants collected.

Table 3  
List of Aquatic Plants Found in Round Lake, Otsego County

Water shield	<u>Brasenia shreberi</u>
Yellow water lily	<u>Nuphar variegatum</u>
White water lily	<u>Nymphaea odorata</u>
Smart-weed	<u>Polygonum coccineum</u>
Pondweed	<u>Potamogeton</u> sp.
Cat-tail	<u>Typha latifolia</u>

Vegetation in a lake is of course one of the primary sources of food for all fish present and as well harbors most of the fish-food organisms. It also serves as shelter for both young and adult fish. At times it contributes to the supply of oxygen, as under bare ice in winter. Certain species of fish, such as the northern pike and yellow perch, spawn in or upon the aquatic vegetation.

#### Fish Foods

Fish foods may be divided into three classes: plankton which is composed of microscopic free-floating plants and animals, e.g. water bloom, and water fleas; bottom food organisms such as fresh-water shrimp, immature aquatic insects, aquatic earthworms, small clams, snails, crayfish, etc.; and forage fish consisting of minnows and young of game species. Collections of all three types of food were made in Round Lake. Neither plankton nor bottom foods were abundant. About 0.05 cc. of plankton was secured from one vertical haul of 20 feet with a plankton net. However, since the abundance of plankton varies greatly throughout the season, and even from day to day, one sample has no great significance. The three square-foot food samples taken from <sup>pulpy peat,</sup> fibrous peat, and sand bottom failed to show the presence of any organisms at all. The situation with respect to forage fish is considerably better. The golden shiner was very abundant, and the blunt-nosed minnow common. Numerous young perch, bluegills and sunfish were seen.

#### Fish Present

The species of fish collected or reported are listed in the following table (Table 4).

Table 4

Game and Forage Fish in Round Lake, Otsego County, Michigan

Type	Species	Abundance	Stocking, 1938-1943
Game fish	Bluegills	Abundant	None
	Perch	Abundant	None
	Pumpkinseed	Common	None
	Walleye	Few	None
Coarse fish	Catfish ( <u>Ictalurus</u> )	Reported	None
Forage fish	Golden shiner	Abundant	None
	Blunt-nosed minnow	Common	None
	Menona killifish	Few	None
Obnoxious fish	None	None	None

No record of the introduction of the walleye can be found. Bluegills were last planted as three-month-old fingerlings in 1937, when 15,000 were introduced. The reported presence of the catfish is interesting, but it has never been confirmed although both in 1942 and 1943 fishermen reported having caught forked-tail catfish from this lake on cut bait at night. The writer tried this but with no results.

Creel Census

Very few creel census records are available for this lake, and so no information can be given on the catch by fishermen.

Growth Rate of Game Species

The following table (Table 5) summarizes the results obtained from the examination of scales secured from the fish in Round Lake.

Table 5

Age and Growth of Game Fish From Round Lake, Otsego County, Michigan

Species	Age	Average length inches	Average weight ounces	Number of specimens
Bluegill	II	4.8	1.0	13
	III	6.7	2.75	1
Perch	I	5.0	0.75	1
	II	6.1	1.2	5
	V	10.6	7.4	2

The above figures show that the game fish in Round Lake are growing at an average rate or slightly better.

#### Natural Propagation

Young-of-the-year perch, bluegills, pumpkinseeds, golden shiners, and blunt-nosed minnows were observed. Spawning areas with a suitably firm bottom are limited, but extensive enough so that bluegills and pumpkinseeds have no difficulty in spawning successfully. The perch undoubtedly spawn amongst the lily pads and cat-tails.

#### Management Proposals

##### Designation

At present the lake is in the "all other lakes" classification and should remain in that category.

##### Stocking

It is suggested that stocking be discontinued in this lake. Except for minnows, food is not abundant and as can be seen from the chemical data, most of the lake is uninhabitable through part of the summer season. The basin is filling rather rapidly, particularly at its northeast end and will eventually become a typical bog. At present the lake affords fair fishing for bluegills and perch, and as has been pointed out, these species are well able to maintain their numbers through natural reproduction. It does not appear likely that this lake will ever support a very heavy fishing load; the reasons have been mentioned above.

##### Predators and Parasites

The only predators observed were a few painted turtles and one great blue heron. None of the fish captured were heavily parasitized and no control measures are needed.

Shelter

Shelter is adequate in the form of the many dead-heads which line the shore, and vegetation also offers suitable cover.

Regulation of Water Level

Since the lake is landlocked, the fluctuations in water level are negligible.

Improvement of Spawning Facilities

As has been pointed out, the species present are able to spawn successfully, with the exception of the walleye which is not abundant, so that no improvements are necessary.

Other suggestions

It would be of interest to confirm the presence of the catfish (Ictalurus sp.), and also it would be well to know something more of the walleyes' abundance. Creel census records would help to answer these questions.

INSTITUTE FOR FISHERIES RESEARCH

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