

Original: Fish Division
cc: Education-Game
Mr. Stanley Shust 12-24-41
INSTITUTE FOR FISHERIES RESEARCH Dr. Roelofs

DIVISION OF FISHERIES
MICHIGAN DEPARTMENT OF CONSERVATION
COOPERATING WITH THE
UNIVERSITY OF MICHIGAN

ALBERT S. HAZZARD, PH.D.
DIRECTOR

December 16, 1941

ADDRESS
UNIVERSITY MUSEUMS ANNEX
ANN ARBOR, MICHIGAN

REPORT NO. 713

FISHERIES SURVEY OF LONG AND BASS LAKES, ALGER COUNTY;
AND ROUND AND STONER LAKES, ALGER AND DELTA COUNTIES

by

E. W. Roelofs

Introduction

These four lakes lie in a very sparsely settled section of the Upper Peninsula. The closest towns are Trenary, 10 miles to the west, and Nahma, 25 miles to the south. Two roads--Little Black River Truck Trail and Round Lake Truck Trail--intersect about a half mile south and west from Round Lake, which is the southernmost of the group. The others lie to the north-west within a radius of a mile and a half. The specific location of the four lakes is as follows.

Lake	County	Township	T.	R.	Sec.
Long	Alger	Mathias	44 N.	20 W.	23, 26, 27
Bass	Alger	Mathias	44 N.	20 W.	25, 26, 35, 36
Round	Delta and Alger	Nahma, Mathias Masonville	43, 44 N.	19, 20 W.	1, 6, 12, 36
Stoner	Delta and Alger	Mathias, Masonville	43, 44 N.	20 W.	2, 35, 36

The lakes lie in the watershed of the Sturgeon River. Long and Round Lakes contribute water to the drainage system through outlets into West Branch Lake, which connects directly with the Sturgeon River. Bass and Stoner Lakes have no surface outlets.

Maps showing the outline and depth contours were made by the United States Forest Service through the C.C.C. The Institute for Fisheries Research~~s~~ conducted a biological survey during the period from July 28 to August 5, 1937, adding to the maps the distribution of bottom types and vegetation.

Information concerning the early history of the lakes is incomplete. No records of their use in industry are available. Bass Lake has long been considered a good fishing lake; Long and Round Lakes are rated as fair; and Stoner Lake has a poor reputation as a fishing lake.

There was very little resort development on this group of lakes at the time of the survey. Round Lake had 6 - 8 cottages and one private lodge, while Long and Bass Lakes had one and 3 cottages respectively. Stoner Lake had a forest fire guard station on the east shore. None of the lakes was used appreciably for swimming; there were no boat liveries on any of the lakes. The lakes are too far from population centers to be of much recreational value but conditions are suitable for the development of private home sites. All of the lakes are open to public fishing but are fished very little; Bass Lake seems to be the most popular.

Physical Characters

The region in which these lakes lie is between the "lowland" area and the "highland" area of the Upper Peninsula. The surrounding country is rather hilly and heavily wooded. There are scattered farms in the vicinity.

Round Lake varies widely from the others in respect to basin shape. It has a very irregular basin, broken up by sharp knobs covered, in several cases, by less than 5 feet of water, and small depressions, the deepest of

*The survey party consisted of: H. Telford, leader; J. Bailey and L. Shettles, assistants.

which is 55 feet. The basins of the other lakes are uniform and shallow. With only local exceptions, there is a gently sloping shore with little or no drop-off.

The watershed of these lakes is limited. The Whitefish River system begins less than 3 miles west of Long Lake. The most extensive inlet to the lakes is a small stream originating 3 miles north of and flowing into Long Lake.

There is no appreciable fluctuation of the water level in this group of lakes. Long Lake has 3 small inlets and one outlet. Round Lake has no well defined inlet but has several springs about the margin. The outlet is obstructed by an old beaver dam which, if removed, would lower the lake level $1\frac{1}{2}$ feet. Bass and Stoner Lakes have neither inlets nor outlets.

Other physical characters of the lakes are summarized in the following table.

	Long Lake	Bass Lake	Round Lake	Stoner Lake
Area (acres)	314.5	35	455	72
Maximum depth (feet)	15	15	55	20
Per cent shoal	100	100	25	100
Bottom types				
Shoal	Sand, pulpy peat	Pulpy peat, sand	Sand	Sand, pulpy peat
Depths	...	...	Pulpy peat	...
Shore development ¹	1.8	1.4	1.3	1.6
Secchi Disc ² (feet)	8	9	7	5.5

¹This figure is obtained by dividing the circumference of the lake by the circumference of a circle which would have the same area as that of the lake.

²The Secchi disc is a black and white circular disc. It disappeared from view at the depths indicated.

The basins of Long, Bass, and Stoner Lakes, with respect to depth, are similar but they differ in the distribution of bottom types. Stoner Lake has a largely sand bottom with pulpy peat in the two depressions; Bass Lake has predominantly pulpy peat bottom with only scattered patches of sand; Long Lake has sand shores for the most part, with pulpy peat occupying the deeper parts (over 7 or 8 feet). These variations are reflected in the plant and animal life in the lake. The following table summarizes the variations and their relation to plant and animal life.

Lake	Size (acres)	Bottom type	Plants	Bottom food	Fish
Stoner	72	Largely sand	Few (14 species)	Rare	Few (6 species)
Bass	35	Largely pulpy peat	Common (16 species)	Rare	Common (11 species)
Long	314.5	Mixture of sand and pulpy peat	Abundant (26 species)	Common	Abundant (14 species)

This indicates a much higher productivity in Long Lake, coincident with a variety of combinations of bottom types. This variety results in a more luxuriant plant growth, a wider variety of plants, and suitable habitats for more species and numbers of fish and fish food organisms. Pure sand bottoms are often barren due chiefly to the inability of plants and bottom organisms to anchor themselves or to resist the grinding action of sand particles. Highly organic bottoms such as that in Bass Lake present the opposite extreme. The chief factor limiting productivity is the inability of bottom organisms and plants to anchor in the soft bottom. Pulpy peat makes a suitable bottom for plant growth when it is compact enough to allow roots to take hold.

This comparison serves to show that a wider variety of conditions in a lake favors the growth of larger numbers and more species of both plants and animals. These conditions are influenced by the size and shape of the lake, e.g. Long Lake is larger and has a more irregular shoreline than the other lakes.

The depth of lakes also influences the total productivity. In general, shallow lakes are more productive than deeper lakes. Most plants do not grow in water deeper than 25 feet so that in deeper lakes, the area below this depth offers little food and cover. Chemical conditions, which will be discussed later, also may become adverse in the bottom of deeper lakes.

The percentage of shoal is an expression of general depth--more shallow water means more area suitable for plant growth, spawning facilities, and habitats for young fish.

The degree and depth of light penetration influences plant and animal distribution and naturally is important in fisheries.

Temperature and Chemical Conditions

The temperature and chemical information gathered as of July 28 to August 5, 1937, are summarized below.

Lake	Surface					Thermocline										Bottom								
						Top					Bottom													
	Temp. (°F.)	O ₂ (p.p.m.)	CO ₂ (p.p.m.)	M.O. Alk. (p.p.m.)	pH	Depth (ft.)	Temp. (°F.)	O ₂ (p.p.m.)	CO ₂ (p.p.m.)	M. O. Alk. (p.p.m.)	pH	Depth (ft.)	Temp. (°F.)	O ₂ (p.p.m.)	CO ₂ (p.p.m.)	M.O. Alk. (p.p.m.)	pH							
Long	68	7.9	2	55	6.9	...	...	...	...	No thermocline					...	...	...	...	15	63	6.7	3	57	6.8
Bass	75	10.1	0	26	8.2	...	...	...	...	No thermocline					...	...	...	...	15	65	9.8	0.5	28	6.9
Round	Sta. 1	67	...	...	...	30	61	4.2	6	48	6.6	40	52	...	...	...	...	45	52	0.1	12	52	6.3	
	Sta. 2	70	8.0	1	47	6.9	25	63	5.8	...	...	30	57	...	...	...	...	33	56	0.5	13	52	6.6	
	Sta. 3	69	...	...	...	25	64	6.6	4	48	6.7	35	55	...	...	...	...	38	54	0.5	12	49	6.7	
Stoner		69	9.3	0.1	6	7.3	...	...	...	No thermocline					...	...	...	...	18	63	7.6	7.0	7	5.2

Chemical conditions in Long and Bass Lakes are suitable for abundant fish life. The thermocline formation (a zone in which the water temperature drops rapidly and which prevents mixing of surface waters with deeper waters) in Round Lake also prevents the use of the deeper waters by fish but the area affected is rather small. The water in Stoner Lake is extremely soft. This condition is unfavorable for the growth of plants and smaller animals because most of them require mineral salts in greater concentrations for their growth and development.

Biological Characters

The higher plants found in these lakes are listed in the following table.

Common name	Scientific name ✓	Long	Bass	Round	Stoner
Waterweed	(<u>Anacharis canadensis</u>)	Rare	...	...	...
Water shield	(<u>Brasenia Schreberi</u>)	...	Rare	...	...
Sedge	(<u>Carex sp.</u>)	Few	Few	Few	Rare
Water arum	(<u>Calla palustris</u>)	...	...	Rare	...
Musk grass	(<u>Chara sp.</u>)	Few	...	Rare	...
Twig rush	(<u>Cladium mariscoides</u>)	...	...	...	Rare
Loosestrife	(<u>Decodon verticillatus</u>)	...	...	Rare	...
Spikerush	(<u>Eleocharis calva</u>)	...	...	...	Rare
Spikerush	(<u>Eleocharis palustris</u>)	...	...	...	Few
Scouring rush	(<u>Equisetum limosum</u>)	Common	...	Few	...
Pipewort	(<u>Eriocaulon septangulare</u>)	...	Abundant	...	Few
Mud plantain	(<u>Heteranthera dubia</u>)	Rare	...	...	...
Mare's tail	(<u>Hippuris vulgaris</u>)	Rare	...	...	...
Blue flag	(<u>Iris versicolor</u>)	Rare	...	Rare	...
Quillwort	(<u>Isoetes sp.</u>)	...	Common	...	...
Water lobelia	(<u>Lobelia Dortmanna</u>)	...	...	Rare	Rare
Water lobelia	(<u>Lobelia Kalmii</u>)	Rare	...	...	...
Water lobelia	(<u>Lobelia sp.</u>)	...	Rare	...	...
Water milfoil	(<u>Myriophyllum spicatum</u>)	...	...	Few	...
Water milfoil	(<u>Myriophyllum sp.</u>)	Rare	...	...	...
Bushy pondweed	(<u>Najas flexilis</u>)	Abundant	...	Few	...
White water lily	(<u>Nymphaea odorata</u>)	Few	Few	Rare	...
Yellow water lily	(<u>Nuphar advena</u>)	Abundant	Few	Few	Rare
Smartweed	(<u>Polygonum sp.</u>)	...	...	Few	...
Pickeral weed	(<u>Pontederia cordata</u>)	...	...	Rare	...
Large-leaf pondweed	(<u>Potamogeton amplifolius</u>)	Generally Abundant	Generally Rare	Generally Abundant	...
Celery-leaved pondweed	(<u>Potamogeton epihydrus</u>)	"	"	"	Rare
Pondweed	(<u>Potamogeton Friesii</u>)	"	"	"	...
Pondweed	(<u>Potamogeton gramineus</u>)	"	"	"	...
Sago pondweed	(<u>Potamogeton pectinatus</u>)	"	"	"	...
Whitestem pondweed	(<u>Potamogeton praelongus</u>)	"	"	"	...
Pondweed	(<u>Potamogeton Richardsonii</u>)	"	"	"	...
Pondweed	(<u>Potamogeton Robbinsii</u>)	"	"	"	...
Flat-stemmed pondweed	(<u>Potamogeton zosteriformis</u>)	"	"	"	...
Duck potato	(<u>Sagittaria latifolia</u>)	Common	Few	Common	Abundant
Pitcher plant	(<u>Sarracenia purpurea</u>)	Rare	...	...	...
Giant bulrush	(<u>Scirpus acutus</u>) or (<u>Scirpus validus</u>)	Abundant	Abundant	Abundant	Abundant
Bulrush	(<u>Scirpus cyperinus</u>)	...	...	...	Rare
Bulrush	(<u>Scirpus subterminalis</u>)	Rare	...	...	...
Bur reed	(<u>Sparganium fluctuans</u>)	Rare	Few	Few	Common
Sphagnum moss	(<u>Sphagnum subsecundum</u>)**	...	...	...	Few
Cattail	(<u>Typha latifolia</u>)	Few	...	Rare	...
Bladderwort	(<u>Utricularia cornuta</u>)	...	...	...	Rare
Bladderwort	(<u>Utricularia vulgaris</u> var. <u>americana</u>)	Common	...	Rare	...
Wild celery	(<u>Vallisneria americana</u>)	Few	...	Rare	...
Leather leaf	(<u>Chamaedaphne calyculata</u>)	Rare	Few	Few	...

* Plants identified by C. O. Grassl

** Identified by Dr. Steere

Vegetation seems adequate in all but Stoner Lake. Here submerged plants, the type which supports most of the fish food organisms, are scarce. There is adequate cover for young fish in the emergent vegetation on the sandy, shallow water area, however.

Fish Foods

The supply of fish food seems to be fair in all of the lakes, except possibly Stoner. In Long, Bass, and Round Lakes, there is considerable vegetation to support food organisms. Plankton (microscopic and semi-microscopic plants and animals) is probably average. Bottom foods are scarce in Bass and Stoner Lakes. This was discussed in connection with bottom types. In Bass Lake, four sampling stations distributed at various depths failed to yield a single organism; three samples from Stoner Lake showed one midge larva. Long and Round Lakes had considerably more bottom food, mayfly nymphs predominating in the former and midge larvae being most plentiful in the latter.

Bottom foods are important in the food chain of most species of fish. While the older individuals of some fish (notably northern pike, yellow perch and bass) feed on other fish, their young rely on insects and other small invertebrates for their food supply. Other species, such as the bluegill and pumpkinseed, feed on this type of food throughout their entire life.

Fish

A list of the fish, their relative abundance as determined by the survey party, and the stocking records of the game fish for the years 1936-1940 are given in the following table.

Fish	Long Lake		Bass Lake		Round Lake		Stoner Lake	
		No. planted 1936-40		No. planted 1936-40		No. planted 1936-40		No. planted 1936-40
GAME FISH								
Northern pike	Abundant	...	Abundant	...	Abundant	...	Reported	...
Walleyed pike	...	720,000	...	...	...	120,000	...	...
Yellow perch	Common	...	Rare	...	Common	11,000	Abundant	7,000
Smallmouth bass	...	200	Reported	...	Rare	2,300 young 368 adults	...	...
Largemouth bass	Rare	...	?	...	Reported	2,000	...	...
Bluegill	Rare	32,050	Rare	11,900	Rare	179,600	Few	7,100
Pumpkinseed	Abundant	...	Common	...	Abundant	...	...	...
Rock bass	Common	...	...	...	Common	...	...	...
COARSE FISH								
Common sucker	Common		...		Rare		Rare	
Brown bullhead	Abundant		Common		Common		Common	
FORAGE FISH								
Common shiner	Abundant		Abundant		...		...
Golden shiner	Common		Abundant		Common		...	
Blunt-nosed minnow	Common		Common		Common		...	
Black-nosed minnow	...		Rare		Rare		...	
Black-chinned minnow	...		...		Common		...	
Mud minnow	Common		...		Common		Abundant	
Johnny darter	Common		...		Common		...	
Iowa darter	Common		Common		Common		...	
Brook stickleback	...		...		Rare (in inlet)		...	
Killifish	...		...		Abundant		...	

Game Fish Growth Rate

Growth studies were made by W. C. Beckman on the larger game fish to determine the relative rate of growth. The following table shows the results of this work.

Fish	Age ^{**} Group	Long Lake		Bass Lake		Round Lake		Stoner Lake	
		No. of speci- mens	Ave. length* (in.)	No. of speci- mens	Ave. length* (in.)	No. of speci- mens	Ave. length* (in.)	No. of speci- mens	Ave. length* (in.)
Northern pike	I	...	...	3	15.1	2	16.9	...	...
	II	2	13.8	1	17.9	2	18.4	...	...
	III	4	15.9	3	21.5	...	...	...	...
	IV	1	22.2	...	...	2	25.1	...	...
	VI	...	...	...	...	2	28.1	...	...
	Perch	IV	1	5.5	13	6.5
V		...	...	...	...	1	7.5	10	7.0
VI		...	...	...	...	...	...	1	7.1
Bluegill	II	...	...	...	...	2	4.7	...	...
Pumpkinseed	II	...	...	2	3.6	...	...	...	...
	III	...	...	1	4.4	...	...	...	...
	IV	3	6.3	2	5.0	...	...	...	...
	V	...	...	4	5.9	...	...	...	...
	VI	1	7.9	...	...	...	...	...	...
	Rock bass	II	1	3.6	...
VIII		1	10.4	...	...	...	...	...	...
X		1	10.6	...	...	...	...	...	...

* Total length.

** Age determinations by W. C. Beckman.

The data are not sufficient to warrant definite conclusions but several indications are suggested. Pike seem to be growing faster in Round Lake than in Long and Bass Lakes. Both Round and Stoner Lakes appear to have stunted perch populations. This is particularly significant in Stoner Lake because there are few other important game fish caught. Bluegills are present but few are taken. Pumpkinseeds in Bass Lake are growing slowly.

Walleye fry have been planted in Long and Round Lakes but no legal fish have been reported.

Spawning facilities are adequate in Long, Bass, and Round Lakes for pike, perch, bluegills, sunfish and largemouth bass. Stoner Lake provides

good facilities for bluegills and perch. Pike, reported in Stoner Lake, find limited spawning area.

Management Suggestions

All four of these lakes are classed under "all other lakes". It is noted, however, that two of them--Long and Round Lakes--have been stocked with walleyes. In Round Lake, plantings of perch, smallmouth bass, largemouth bass and bluegills have also been made. Long Lake has received smallmouths and bluegills as well as walleyes. This stocking policy should be modified.

Long Lake has an abundance of northern pike; perch are common; bass and bluegills are rare; pumpkinseeds are abundant but growing slowly; rock bass seem to be doing well; forage fish are abundant. Under these conditions, it is recommended that the designation be changed to a "pike" lake and plantings of bass and bluegills be discontinued. Walleye stocking should also be discontinued because a lake of this size could not support good fishing for both pike and walleyes since they are largely competitive even if walleyes could be established by fry planting, which is questionable.

Bass Lake should also be changed in designation from the "all other" to the "pike" lake class in view of its present northern pike population. No stocking appears to be needed as the proper species are present and are reproducing successfully. Also this lake has long had a good reputation for fishing.

Round Lake is similar to Bass Lake in that it has an abundance of northern pike as well as an abundance of slow-growing pan fish. The designation should therefore be changed to a "pike" lake. Stocking of all pan fish should be discontinued. Since pike are doing well and the lake is too small to support good fishing for both pike and walleyes, and since there is no

evidence that past walleye plantings have been successful, it is recommended that stocking with walleyes also be discontinued.

Stoner Lake contains a stunted perch population and very little else in the way of game fish. Perch and bluegills have been planted but perch are already too abundant and the lake lacks adequate food and cover for bluegills. Stocking of all species should be discontinued for the present.

Since the lake has a largely barren sand bottom, fertilizing experiments would be appropriate. In view of the extremely soft water (M. O. alkalinity was 6 p.p.m. at the time of survey), some form of limestone is suggested. Definite recommendations should await further investigation. A good growth study should be made of the fish in the lake; an accurate survey of the vegetation should be made; and the abundance of fish foods should be studied before and after fertilizers are added.

The management plan for Stoner Lake is suggested as an experiment, since it can be followed rather closely. There are probably a number of such lakes in the state which may be improved similarly, if this is found a satisfactory solution.

None of the four lakes require control or regulation of water levels.

Predators and parasites are not serious and require no control.

INSTITUTE FOR FISHERIES RESEARCH

By E. W. Roelofs

Report approved by A. S. Hazzard

Report typed by: R. Bauch