

Original: Fish Division

cc: Education-Game

Huron National Forest

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7-15-42

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INSTITUTE FOR FISHERIES RESEARCH

DIVISION OF FISHERIES

MICHIGAN DEPARTMENT OF CONSERVATION

COOPERATING WITH THE

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July 3, 1942

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REPORT NO. 800

A FISHERIES SURVEY OF CLEAR LAKE AND BYRAN LAKE,

ALCONA COUNTY

by

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Introduction

Location and Drainage

Clear Lake (T. 26 N., R. 6 E., Sec. 19, 20, 29, 32) and Byran Lake (T. 26 N., R. 5 E., Sec. 15) are two small landlocked lakes in the southwestern part of Alcona County. Byran Lake is about 5 miles north, and Clear Lake is 5 miles northeast of the Alcona Dam. It should be noted that the master plan map of the Department of Conservation names the lake in Section 15 (T. 26 N., R. 5 E.) as Penoyer. It is believed that this lake is Byran Lake and Island Lake in Section 14 is Penoyer Lake (sometimes spelled Penoria). The U. S. Forest Service map of Huron National Forest substantiates this opinion. Therefore Byran Lake is considered to be in Township 26 N. instead of 25 N. as formerly recorded.

These lakes lie nearly on the boundary between the drainage basins of the Au Sable River and the Pine River. They have no surface connections with either, however.

Clear Lake is five miles north of Glennie and may be reached by graveled road. Byran Lake is about ten miles northwest of Glennie and is accessible

only by dirt road. Both lakes are in the Huron National Forest.

Acknowledgments

Clear and Byran Lakes were mapped, sounded and given biological inventories in July, 1937, by a party of the Institute for Fisheries Research.*

Past and Present Use

Although privately owned, these lakes are available to public fishing. There is no evidence of their being of any industrial value and neither lake has been developed as a recreational center. Fishing is considered fair in Byran Lake and poor in Clear Lake; however, before the introduction of goldfish in Clear Lake, fishing is said to have been good.**

Because of greater accessibility Clear Lake assumes more importance as a potential fishing center than Byran Lake. It is easily available to all residents of this part of Alcona County and may sometime become valuable as a local recreation center.

Physical Characteristics

Geological Origin

These lakes were probably formed as pits in a glacier outwash plain. More definite information on the geological origin is lacking.

Shape of Basin and Extent of Drainage

Clear Lake has a shallow, bean-shaped basin with the long axis extending about one-fourth mile in a northeast-southwest direction. Its drainage is limited to the run-off from the immediately surrounding wooded terrain. Springs also provide a source of water.

*The survey party consisted of: Horace Telford, leader; Joseph Bailey and L. B. Shettles, assistants.

**A. S. Hazzard and R. W. Eschmeyer, Goldfish Are Nice to Look At, But---, in Michigan Conservation, July, 1938.

Byran Lake is pear-shaped. Its long axis extends about one-third mile in a north-south direction. A small bay protrudes from the west side. The immediate shore is pasture which gives way to wooded lanes a short distance away. The only drainage consists of runoff from this surrounding land.

Water Fluctuation

Clear Lake and Byran Lake suffer considerable fluctuation from year to year. In Byran Lake the level had lowered some eight or nine feet in the five or six years previous to the time of the survey. The level in both lakes was said to be dropping rapidly.

These lakes have neither inlets nor outlets and no control of the water level is possible.

Some physical features of these lakes are given in Table I.

Table I
Some Physical Characters of Clear Lake and Byran Lake

Lake	Area (acres)	Maximum depth (feet)	Shore development	Dominant bottom types	Color of water	Transparency (Secchi disc in feet)
Byran	13.75	10	1.8	Fibrous peat	Colorless	9
Clear	11.25	8	1.2	Fibrous peat	Light brown	6

Shore development expresses the number of times the lake shoreline is longer than that of a perfectly round lake of the same area; thus, the greater the number the greater the irregularity of the shore and the more bays and protected areas.

Discussion of Physical Factors in Relation to Fisheries

Clear Lake and Byran Lake are small and shallow with few protected areas and bays. The bottoms of both are composed of fibrous peat with a narrow band of sand and gravel around most of the shoreline. As already stated, they have neither inlets nor outlets and have experienced a considerable fluctuation of water level in the past.

While in general the physical factors are tolerable to most species of warm-water fish, they are far from being good.

Temperature and Chemical Characteristics

Temperature

Both Clear Lake and Byran Lake, when surveyed, were found to have more or less uniformly warm water from surface to bottom. The temperature of Clear Lake was about 74°F. and that of Byran Lake about 79°F.

Chemical Conditions

Oxygen was abundant at the time of the survey and probably persists in sufficient quantities throughout the summer. In Clear Lake, surface and bottom samples both showed 7.9 parts per million of dissolved oxygen. In Byran Lake there were 7.1 parts per million at the surface and 6.9 at the bottom.

Alkalinity and pH. The water in Clear Lake is hard (Methyl Orange Alkalinity--167-172 parts per million) and that of Byran Lake is moderately hard (M. O. Alkalinity--122-126 parts per million). Measurement of hydrogen ion concentration (pH) was not made but the above conditions show the water to be alkaline. Generally, alkaline lakes are more productive than acid waters.

Pollution

No evidence of pollution was found in these lakes.

Discussion of Temperature and Chemical Factors in Relation to Fisheries

Clear Lake and Byran Lake are warm-water lakes of uniform temperature throughout. The water is hard and alkaline and conducive to high productivity. Oxygen is probably present in sufficiently large amounts throughout the summer to support any fish in the lake; however, the temperature is suitable only to warm-water species.

Lakes of this type are subject to "winter kill" of fish. The volume of water is small and the bottom is mostly decomposing organic materials. During a long winter the oxygen supply may become low or exhausted by decomposition of the organic matter, and as a result many or all fish may die from suffocation. It is probably better to avoid a large population of fish in a lake which may be subject to winter kill.

Biological Characteristics

Vegetation

Neither Clear Lake nor Byran Lake had an abundance of vegetation. Thin, scattered beds of pond lilies, musk grass and pondweeds were found in both lakes. When Clear Lake was visited in May, 1942, by W. C. Beckman and L. A. Krumholz, the bottom was reported to be well covered with musk grass.

Generally an abundance of plants is considered a criterion of high productivity in a lake since they support fish food organisms and provide shelter and spawning facilities for fish. It is not believed necessary or practicable, however, to introduce additional vegetation to these lakes in order to increase the productivity.

Fish Foods

Plankton, the small, free-floating organisms in nearly all natural waters, was not found to be very abundant in either lake. It is known, however, that no single sample of plankton can be indicative of its general abundance because of the variation which exists from day to day and place to place. Plankton is a source of food for most young fish and some adults, such as the bluegill.

Bottom food organisms were moderately abundant in Clear Lake. These consisted mostly of midge larvae. In Byran Lake, no organisms were found

in two samples of peat bottom, but scuds (Amphipoda, sometimes called freshwater shrimps) and insect larvae were fairly abundant in one sample taken on sand along the shore. The abundance of food organisms on plants was not investigated but experience has shown that plants produce or harbor much of the fish food.

Forage fish were abundant in both lakes. The species are listed in Table II.

Fish Present

A list of the fish collected and their relative abundance is given in Table II. Stocking records are given for the period of 1934-1940.

Table II
Kinds, Relative Abundance and Stocking (1934-1940)
of Fish Collected in Clear Lake and Byran Lake

Species	Clear Lake		Byran Lake	
	Abundance	Stocking	Abundance	Stocking
GAME FISH				
Perch	...	...	Common	...
Largemouth bass	...	...	Common	...
Bluegill	Common	30,000 fingerlings (1937-1939)	...	...
Pumpkinseed	Abundant	...	Few	...
Long-eared sunfish	Few	...	...	...
Green sunfish	Few	...	...	...
Warmouth bass	Few	...	...	...
FORAGE FISH				
Blunt-nosed minnow	Abundant	...	Abundant	...
Golden shiner	Common	...	...	...
Black-nosed shiner	Few	...	...	...
COARSE FISH				
Goldfish	Common	...	...	...

Yellow perch and largemouth bass were found to be fairly common in Byran Lake and a few pumpkinseeds were collected. In Clear Lake, pumpkinseeds were very abundant and many bluegills were collected. Long-eared and green sunfishes and warmouth bass were present but found to be of minor importance.

Of significance in Clear Lake was the fairly large population of goldfish which will be discussed later.

Growth Rate of Game Species

The rate of growth of fish in Clear Lake and Byran Lake is shown in Table III. These data are taken from fish that were collected from the lakes in 1937 and are believed to be representative of the growth rate at that time.

Table III
Age, Length and Weight of Game Fish Collected
in Clear Lake and Byran Lake

Species	Age*	Clear Lake			Byran Lake			Tentative average for Michigan* Total length (inches)
		Number	Average total length (inches)	Average weight (ounces)	Number	Average total length (inches)	Average weight (ounces)	
Perch	III	...	...	...	2	10.0	7.4	7.1
	IV	...	...	...	6	10.4	9.3	7.8
	V	...	...	...	9	10.8	9.1	9.4
	VI	...	...	...	4	11.1	10.3	10.2
Bluegill	I	26	3.2	0.30	...	...	...	3.0
	II	34	5.0	1.10	...	...	...	4.3
	III	6	5.7	2.10	...	...	...	5.6
	IV	8	5.6	1.80	...	...	...	6.7
	V	1	5.5	1.60	...	...	...	7.4
Pumpkinseed	I	94	2.4	0.15	...	...	...	2.7
	II	21	3.6	0.50	...	...	...	4.4
	III	187	3.9	0.65	...	...	...	5.8

* Determined by W. C. Beckman

By comparing the length of fish in the lake with the tentative average for the State of Michigan, given in the last column, it may be seen that the perch in Byran Lake had fairly rapid growth. The legal limit of six inches was probably reached during the second summer of growth. No figures are available on the growth of the largemouth bass in Byran Lake.

In Clear Lake, the growth of both the bluegill and the pumpkinseed was slow. The early growth of the bluegill is about average, but there appears to be a marked "slow-up" of growth after the third year, resulting in very few large fish. The pumpkinseed has a near average size when one year old, but growth is slow thereafter, and it probably would not reach six inches before five or six years of age.

The slow growth of the bluegill and pumpkinseed in Clear Lake was probably due to overcrowding and increased competition caused by the goldfish.

Natural Propagation

The reported lowering of lake level has probably exposed much spawning ground in these lakes. However, the fact that Clear Lake has had a fairly large population of bluegills and pumpkinseeds through natural propagation is evidence that spawning facilities in this lake are sufficient for these two species and others of similar spawning habits. Byran Lake has also had a large population of fish without recent stocking. The largemouth bass probably utilize the few plant beds and the perch have sufficient submerged vegetation, logs and debris on which to spread their spawn.

Management Proposal

Shortly after these lakes were surveyed in 1937, it was decided to remove all the fish in Clear Lake by poisoning with rotenone. This would destroy the undesirable combination of goldfish and other fish in the lake and permit the introduction of a population of desirable species.

On August 26-27, 1937, the lake was poisoned by a party of the Institute for Fisheries Research. A separate report by John Greenbank (No. 551) has been written on the data obtained from this poisoning, and they will not be discussed here. However, it should be pointed out that the lake was found to be supporting about 194 pounds of fish per acre, of which only 40 pounds constituted game fish and 2 pounds forage fish. The remaining 152 pounds were goldfish which averaged nearly a pound apiece. From these figures it appears that the goldfish was an important factor in controlling the growth and abundance of the game fish.

Clear Lake was restocked, presumably, with 30,000 fingerling bluegills during the three-year period 1937-1939.

The success of this stocking has since been checked three times by members of the Institute staff. In October, 1939, John Greenbank and W. C. Beckman caught three bluegills in an overnight set of a gill net. In July, 1940, a similar overnight set by the same party yielded eleven bluegills and one green sunfish.✓ On May 21, 1942, four 125-foot experimental gill nets were set overnight in Clear Lake by W. C. Beckman and L. A. Krumholz. The catch was 99 green sunfish which averaged about 5 inches and ranged from 3 to 7 inches in length. The ages of 15 of these fish were determined by Beckman as follows:✓

Age I	3	individuals
II	3	"
III	5	"
IV	4	"

The four-year-old fish were hatched in 1937, the year of the first plant of bluegills in the lake, and the one-year-old fish were hatched since the last plant in 1939 and obviously were the result of natural propagation. It seems evident from this information that green sunfish were introduced into Clear Lake with the first planting of bluegills in 1937 and possibly again with later plantings.

Designation of Lakes

Clear and Byran Lakes are classed in the "all other lakes" category which is suitable to the findings of the present survey.

Stocking

Planting of 100 adult largemouth bass is recommended for Clear Lake just as soon as these fish can be secured. These bass should help to ✓ John Greenbank, Fish collections from O'Brien and Clear Lakes, Alcona County, July 3-4, 1940. Institute for Fisheries Research Report No. 606, July 9, 1940.

✓** This information was obtained by personal communication.

control the population of green sunfish. There are ample spawning facilities in the lake and the bass should reproduce by natural propagation. Later, if and when the green sunfish have been reduced in number, fingerling blue-gills should be stocked in an attempt to reestablish this species along with the largemouth bass.

No stocking is recommended for Byran Lake.

Predators and Parasites

No serious predation has been observed in these lakes. Predators found are probably of value in checking the over-abundant small fish. No parasites were found on fish in either lake by the survey party.

Shelter

No shelter improvements are advised. It is believed that the vegetation and logs in the water are sufficient.

Regulation of Water Level

Although a stabilized lake level is desirable in both Clear and Byran Lakes, there is, at present, no feasible way of controlling it.

Improvement of Spawning Facilities

No improvement is thought necessary.

Further Investigation

Clear Lake should be checked each year after the bass are planted to determine results of this experiment.

INSTITUTE FOR FISHERIES RESEARCH

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