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A FISHERIES SURVEY OF MARTEN LAKE,

IRON COUNTY

by

Paul Eschmeyer

I. Introduction

A. Location and Accessibility

Marten Lake (also known as Round, Martin, Martin's, Marten's) is located in sections 8, 9 and 16 of T. 46 N., R. 35 W., in Bates Township, Iron County. It is situated about 8 miles south of the Village of Sidnaw, and about 20 miles north of the City of Iron River.

Marten Lake is reached by following a graveled road south from Highway M-28 in Sidnaw, for a distance of 7 miles. At this point a poor dirt road turns left and terminates 2 miles east of this point on the north shore of Marten Lake.

The Duluth, South Shore and Atlantic is the nearest railroad, and passes through Sidnaw.

Marten Lake is one of a series of lakes in the Sidnaw sector of Iron County, some of the nearer waters being Kidney, Norway, Petrow, and Perch Lakes. The lake lies near the upper end of the Sturgeon River drainage. Marten Creek, the lake's only outlet, enters Dead Stream about 2 miles east and north of the lake. Dead Stream flows into the Perch Lake River, which

in turn enters the Sturgeon River a few miles north of Highway M-28, and almost due north of Marten Lake. The Sturgeon River in turn enters Portage Lake, near Chassell, toward the upper end of Houghton County.

B. Map and Survey

The map of Marten Lake was supplied by the United States Forest Service, the physical survey having been made by the C.C.C. under the supervision of the Ottawa National Forest, within the boundaries of which the lake lies.

The biological survey of Marten Lake was made by Dr. A. S. Hazzard and the writer during the period extending from August 21 to 23, 1941.

C. History and Recreational Development of Marten Lake.

Marten Lake appears never to have been of any particular importance as an industrial or town site. The area in the vicinity of the lake has been logged in the past and probably logging camps have been set up on its shores, or nearby. Pulpwood is at the present time being removed from a portion of the surrounding area.

Past fishing in Marten Lake has apparently always been at least fair, and during some years, excellent catches of pike and perch have been reported. Walleyes and bass are said to have been stocked years ago, but none were ever reported caught. Good catches of pike weighing up to 5 or 6 pounds have been reported in recent years, and in general the fishing in the lake at the present time is considered good. During past years northern pike have been speared frequently by ice fishermen.

Only a single cottage is found on Marten Lake, on the southeast shore, occupied by a pulpwood cutter at the time of the survey, and there are no hotels, resorts or boat liveries. The brown waters of the rather small, weedy and mucky lake have little to offer that would be likely to induce

increased recreational or real estate development, and very probably the position of the lake will in the future, as in the past, be that of a water which is lightly fished for northern pike and perch, and which has little further recreational possibilities.

II. Physical Characters of Marten Lake

A. General Physical Characters.

Marten Lake is a roughly circular body of water with a surface area of 176 acres, an average diameter of about 3000 feet, and a maximum depth of slightly over 6 feet. The lake has a shoreline development of 1.17, which means that it has 1.17 times as much shoreline as would have a perfectly circular lake of the same area. The entire lake is a shallow, weedy, shoal area with bottom types of sand (along the north and southeast shores) and pulpy peat mixed with muck (in the remainder of the lake). The water is brown (bog-stained) and a Secchi disk (a white metal disk about 6 inches in diameter, used to measure transparency of the water) disappears from view at a depth of 5 feet.

The proximity of Marten Lake to a number of other lakes, as previously mentioned, together with the rolling, glaciated topography, suggests that the basin of Marten Lake was formed by glacial action.

The area surrounding Marten Lake is largely rolling and has essentially sand and gravel soils. Most of it is densely wooded with second-growth timber. A spruce swamp extends about $\frac{2}{3}$ of the way around the immediate lake shore.

B. Drainage and Water Fluctuation.

The drainage of Marten Lake is limited to the immediately adjacent areas. The lake has no inlet streams, and entering water is apparently restricted to direct runoff from nearby hills.

Fluctuation of the water in Marten Lake is very slight and does not appear to be detrimental to the fishery there. The lake has a single outlet, Marten Creek, which is a small stream leaving the southeast end of the lake. No dam is present in the outlet.

III. Temperature and Chemical Characters of Marten Lake.

A. Significance of Temperature and Chemical Data.

Temperature and chemical data are important in assisting the fisheries worker to predict the suitability of a given water for various fish species. Optimum requirements, with respect to temperatures as well as dissolved gases and other chemical factors, differ among various fish species as well as among fish food organisms, plants, etc. Temperature and chemical data frequently offer important clues concerning the reasons for the presence of existing fish populations, and sometimes suggest means for improving the water's production of desirable game fishes.

B. Temperatures of Marten Lake.

Temperatures were taken in Marten Lake on August 22nd. Temperature of the water at a depth of $2\frac{1}{2}$ feet was found to be 66.6°F . Air temperature on the same date, at 3 P.M. was 59.7°F . The temperature of water of shallow lakes such as Marten Lake fluctuates rather readily with changes in air temperature. The temperature as observed is about what might be expected in a shallow lake in northern Michigan in late August. The temperature is normally identical or nearly so at the surface and bottom.

C. Chemical Characters of Marten Lake.

Oxygen present at a depth of $2\frac{1}{2}$ feet was found to be 8.4 parts per million. No further oxygen tests were made. In a lake such as Marten, the constant circulation of the iso-thermal waters by wind action insures a thorough distribution of ample quantities of oxygen throughout the waters of the lake.

No carbon dioxide was found to be present in the lake.

A Methyl Orange Alkalinity test (a test designed to show the amount of certain minerals and buffer salts in the water) showed the water in the lake to be quite "soft". A Methyl Orange Alkalinity of 21 parts per million was found. Moderately hard waters (with a Methyl Orange Alkalinity of 100 to 200 parts per million) are generally more productive than soft waters.

The water of Marten Lake was found to be alkaline, with a pH of 7.9 (pH is an expression of acidity or alkalinity. Seven is the neutral point and smaller and larger numbers are progressively more acid and alkaline respectively, in direct proportion to the extent of their deviation from this neutral point). Slightly alkaline waters, such as Marten Lake, are normally more productive than are those which are acid or highly alkaline.

No pollution was found in Marten Lake. This absence of pollution would be expected, in view of the lake's far removal from sources of domestic or industrial wastes.

IV. Biological Characters of Marten Lake

A. Vegetation.

Submerged aquatic vegetation is abundant in almost all parts of Marten Lake, and large beds of floating plants (such as yellow water lilies) are present in some sections. Emergent water weeds are also present, particularly along the north shore of the lake. A list of the species of plants present in the lake, with an indication of their abundance, is shown in Table I.

Table I
Aquatic Vegetation Found in Marten Lake*

Species	Abundance
Sedge (<u>Carex rostrata</u>)	Common
Sedge (<u>Eleocharis Smallii</u>)	Common
Quillwort (<u>Isoetes Braunii</u>)	Common
Water lobelia (<u>Lobelia Dortmanna</u>)	Common
Yellow water lily (<u>Nuphar variegatum</u>)	Abundant
Large-leaf pondweed (<u>Potamogeton amplifolius</u>)	Abundant
Pondweed (<u>Potamogeton epihydrus</u>)	Common
Variable pondweed (<u>Potamogeton gramineus</u>)	Common
Pondweed (<u>Potamogeton panormitanus</u>)	Common
Wild rice (<u>Zizania aquatica</u> var. <u>angustifolia</u>)	Sparse (possibly planted)

* Identifications by Miss Betty Robertson, Department of Botany, University of Michigan

B. Fish Foods.

Plankton (microscopic free-swimming plant and animal life) at Marten Lake is of average abundance. The shallow depth and abundant vegetation interfered with the collection of plankton, and only a single sample was taken, near the northeast end of the lake. A 9-foot horizontal haul with a plankton net yielded .2 cc. of organisms, among which crustaceans were dominant.

No bottom food was found in a bottom sample taken several hundred feet from shore, in the northeast section of the lake. Large numbers of empty midge cases were found in the deeper waters, however, and large numbers of them appeared with plant samples on the plant hook.

Observations made along a sand and gravel shoreline near the northeast end of the lake revealed large numbers of aquatic organisms. Leeches and pelycypods were abundant, and gastropods, amphipods, water mites, and mayfly nymphs were common.

The quantity of bottom food present in Marten Lake appears to be adequate to sustain the existing perch and forage population. The northern pike present would not be expected to feed on bottom organisms as adults.

C. Fish Present in Marten Lake.

The fish species present in Marten Lake, together with a record of artificial stocking during the 5 years previous to the survey, are given in Table II.

Table II.
Fish Present in Marten Lake With An Estimate
of Abundance and a Record of Artificial Stocking

Species	Abundance	Stocking
GAME FISH		
Northern pike	Common	...
Yellow perch	Abundant	...
Largemouth bass	Rare	8,240
Smallmouth bass	Absent or rare	300
Bluegills	Absent or rare	7,000
FORAGE FISH		
Golden shiner	Common	...
Fathead minnow	Rare	...
Iowa darter	Common	...
COARSE FISH		
Common sucker	Common	...

Of the fish indicated as having been stocked, the United States Forest Service stocked 8,140 largemouth bass and 200 smallmouth bass. The remainder was planted by the Department of Conservation.

No obnoxious species were found in the lake and no smallmouth bass or bluegills were taken by the survey party. A single largemouth bass fingerling was collected.

Species listed in creel census records add no new fish to the above list. The few records which have been taken by Conservation Officers indicate that only northern pike and perch have been caught. Two excellent catches of perch have been recorded for September and October, 1938. On September 13, 2 fishermen fished with one line each, for 4 hours, and caught 50 perch. On October 18, 3 fishermen fished for 4 hours each, with one line apiece, and landed 65 perch. In both cases the fish averaged 12 inches in length.

In January, 1939, ten fishermen fished with minnows or wielded a spear for a total of $40\frac{1}{2}$ hours to take 22 northern pike averaging 18 inches in length and ranging in size from 17 to 24 inches. During February, March, and December of the same year, 7 fishermen fished with minnows through the ice for $29\frac{1}{2}$ hours without taking fish. No further creel census records are available.

D. Growth Rate of Fish of Marten Lake.

The average rate of growth of northern pike and perch in Marten Lake is shown in Table III, also the number of individuals used to obtain each average.

Table III
Rate of Growth of Fish of Martan Lake*

Age Group	Number of individuals	Average length in inches	Average weight in ounces
Northern Pike			
I	4	12 $\frac{7}{8}$	6 $\frac{1}{2}$
II	6	18 $\frac{5}{8}$	23 $\frac{2}{5}$
III	2	22 $\frac{3}{4}$	39
Perch			
II	4	6 $\frac{1}{4}$	1.1
III	4	7 $\frac{3}{8}$	2.6
IV	4	7 $\frac{5}{8}$	3.2
V	1	9 $\frac{3}{4}$	6.2
VI	2	10 $\frac{1}{2}$	8.3
VII	1	10	8.0

* Growth determinations made by W. C. Beckman

Growth of common suckers appeared to be average or better in the lake.

All specimens taken were very fat and apparently in excellent condition.

In a report on the growth rate of some Michigan game fishes, now in the process of preparation by Dr. W. C. Beckman of the Institute staff, the relationship between the length and weight of northern pike in Michigan has been calculated. According to Dr. Beckman's figures, a 12 $\frac{7}{8}$ -inch long northern pike should weigh 6.7 ounces, an 18 $\frac{5}{8}$ -inch pike should weigh about 21.2 ounces, and a 22 $\frac{3}{4}$ -inch pike should weigh about 39 ounces.

These are average figures for the state as a whole, and figures for the Upper Peninsula alone might be somewhat less. Reference to these figures and to Table III makes it become evident that pike in Marten Lake have an average weight which corresponds quite well with their average length, i.e., the fish are in normal, average condition. The rate of growth in length is about average for northern Michigan. It has been suggested in the past that northern pike were overpopulated in Marten Lake, and that stunting or starvation was occurring. Removal of some of the fish to other waters has been proposed. The results of the survey indicate that the pike are not stunted, but are in good condition. No removal of pike from Marten Lake needs to be undertaken.

Perch in Marten Lake are growing at about an average rate. Legal size (6 inches) is reached early in the third summer of growth. Table III would seem to indicate little growth between the third and fourth years of life. However, the small number of individuals used to obtain the averages, and the considerable gap between 3 and 5-year old fish would suggest that the figures are perhaps not representative. No reason can be given as to why the fish should grow slowly between their third and fourth year of life. Reference again to the previously mentioned weight-length relationship tables of Dr. Beckman indicates that the average weight of the perch for each length group shown in the table, except for the first one shown (age group II), is greater than the average for the State as a whole. In other words, the perch are in better than average condition.

E. Spawning Facilities.

Spawning facilities at Marten Lake seem ideal for both the major game species in the lake. The perch have large quantities of vegetation upon which to lay their eggs, and the northern pike have extensive swampy

areas in which they successfully spawn. Heavy vegetative cover protects a goodly portion of the young fish each year from their predaceous parents.

Spawning facilities would be adequate for Centrarchids, also, in Marten Lake, but the encouragement of these species would be difficult, and not of any particular advantage.

V. Management Suggestions

A. General Considerations.

Marten Lake at the present time appears to have a nicely balanced pike and perch population, with enough perch and minnows present to keep the pike adequately supplied with food, and enough pike present to keep the perch from becoming overpopulated and stunted. Adequate spawning facilities are present to meet the needs of both species. Abundant vegetation assists the young of both species to escape predation and thus helps guarantee the perpetuation of a pike-perch relationship which will probably suffer only normal fluctuations over a period of years.

B. Designation of Lake

Marten Lake is now designated as a pike lake. This designation is consistent with the findings of the survey party, and no change is recommended.

C. Stocking.

Both northern pike and perch reproduce naturally in Marten Lake in adequate numbers to sustain themselves. The introduction of a third game fish species would probably be unsuccessful and would be ill-advised. All stocking should be discontinued.

D. Predator Control.

The only predators observed at Marten Lake at the time of the survey were a few kingfishers. No predators which might occur at the lake would be likely to adversely affect the fishery there, so no control measures are recommended.

E. Parasites.

No parasites were observed in the northern pike, but a few scattered yellow grubs were found in the perch. One perch with a liver infested with flukes was seen. The fish parasites in Marten Lake have not been observed to exert a harmful influence on the fishery there, and no control measures are recommended.

A fish loss occurred in May, 1941, which was reported to be quite severe. An investigation by the writer, however, showed that only a few northern pike had died. The fish were partially decomposed at the time the observations were made, and the cause of the mortality could not be ascertained. More dead pike were seen by a local woodcutter in August of the same year. He passed along a rumor that the lake had been dynamited, but this information could not be substantiated and must not be seriously regarded. The cause for the repeated slight pike mortality deserves further investigation, however, if its occurrence continues.

E. Cover

Cover present in Marten Lake includes the abundant, well distributed vegetation, and a few logs, deadheads and branches along the shoreline. The cover seems adequate to meet the needs of the fish species present, and no additions are recommended.

F. Water Level and Spawning Facilities.

Marten Lake apparently has proper water levels to meet the needs of the fish species present, and no advantage could be achieved by a change in the level.

Spawning facilities are likewise adequate for the species of fish in the lake, and no changes or improvements seem necessary.

INSTITUTE FOR FISHERIES RESEARCH

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