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DIVISION OF FISHERIES
MICHIGAN DEPARTMENT OF CONSERVATION
COOPERATING WITH THE
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PARTIAL FISHERIES SURVEY OF PEET'S LAKE, WASHTENAW COUNTY

by

W. F. Carbine and G. N. Washburn

Peet's Lake (had no name prior to the survey) is a small private lake located in the northeastern part of Washtenaw County (T. 1 S., R. 6 E., Sec. 18, Northfield Township), approximately two miles south of the village of Whitmore Lake, and about a half mile south by west from Horseshoe Lake. The lake is reached by turning east from U.S. 23 onto Six Mile Road for about one-quarter mile, then taking the first farm lane (private dirt road) to the south for a few hundred yards. The lake is accessible only by a path about 150 yards long leading through a woods which connects with this farm lane.

The map of Peet's Lake was prepared by a regular Institute mapping party[1] on February 7, 1940. The partial survey was made by W. F. Carbine, George N. Washburn and Robert Beatty on September 15, 1944.

The lake is owned by Dr. Max M. Peet, Professor of Surgery at the University of Michigan Hospital. Dr. Peet has graciously offered the Institute the use of this lake for any type of scientific study. The survey on this lake was undertaken at the request of Dr. Peet, who wanted to know ~~whether~~ what the fish production possibilities were and also wanted us to determine whether the lake would be of any value to us for scientific investigations. Public fishing on this lake is not prohibited.

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[1] The mapping party included: G. F. Perry, leader; Oscar Jasmin and Clifford Long, assistants.

Peet's Lake has been privately owned for many years. It is seldom used for swimming or boating but is used a little by local residents for fishing. Dr. Peet claims that he has never seen any ducks on this lake. Local residents claim that winter fishing is good.

Physical Characteristics

It is evident that Peet's Lake was at one time connected with and was a part of Horseshoe Lake. All of the country between the two lakes is low and swampy, and the soil is composed of black muck. The lake is surrounded by a woods although some of the land nearby is farmed. A good share of the woods and some of the swamp is flooded during the spring, but all were dry at the time of the partial survey.

Peet's Lake has a surface area of 4.2 acres and a maximum depth (from map) of 19 feet. At the time of the partial survey we were unable to find any water deeper than 17 feet, but the lake was probably at a lower level than when it was mapped. Fluctuation in water level apparently varies each year, with the maximum being about 3-4 feet. The lake was rather low at the time of the survey.

This lake has no permanent inlet or outlet. During periods of extra high water level it is connected to Horseshoe Lake. We were told by several local residents that a small ditch has been dug part way between these two lakes to facilitate the spring run-off, the water flowing from Horseshoe to Peet's Lake, where formerly it was impounded by a cross road preventing this movement. Peet's Lake lies within the Huron River drainage area. The drainage area of the lake itself is relatively small.

Peet's Lake is surrounded by a floating bog mat composed of moss, Decadon and Typha. The drop-off from the edge of the mat toward the center of the lake is rather sharp. The lake bottom is composed of pulpy peat in the deeper water and fibrous peat in the shallower water. There is a

"false bottom" from about 13 feet to the bottom. The water in the lake is light brown in color. The degree of transparency of the water was approximately three feet. The extent of light penetration is closely correlated with the depth at which the higher aquatic plants will grow in lakes.

Temperature and Chemical Characteristics

A temperature series taken from top to bottom in Peet's Lake showed the presence of a thermocline (zone of rapid temperature change). The presence of a thermocline is important in lake biology because it acts as an insulator between the upper warmer water and the lower colder water. The thermocline extended from about 7 feet to the bottom. The temperature at the surface was 66°F., at the top of the thermocline 64°F., and at the bottom 47°F.

Oxygen analyses made on water samples from various depths were as follows: 7.0 parts per million at the surface, 6.6 p.p.m. at the top of the thermocline (7 feet), 0.9 p.p.m. at 10 feet, and 0.0 at 13 feet. Oxygen was found in sufficient quantities to support fish life to a depth of only about 8 feet. Further evidence of oxygen depletion at the bottom was indicated by the presence of H_2S (hydrogen sulfide), a gaseous compound associated with the oxidation of organic matter. Oxygen is seldom found in quantities sufficient to support fish life under these conditions.

The alkalinity (methyl orange) varied from 172 (surface) to 200 (13 feet), indicating that Peet's Lake is a "hard" water lake. The pH ranged from 7.9 at the surface to 6.7 at 13 feet. This indicates that the water is moderately alkaline. Usually moderately hard, alkaline waters are more productive than soft, acid waters.

We were unable to obtain water samples below 13 feet because of the presence of a "false bottom," composed of soft, flocculent pulpy peat in an almost colloidal suspension. Sounding weights, water samplers and

Biological Characteristics

No attempt was made to collect or list all of the aquatic plants in Peet's Lake. Casual observations that were made indicated that coontail (Ceratophyllum) and yellow water lily (Nuphar) were common. Duckweed was abundant and along the eastern edge of the encroaching mat wind action had piled it up to a depth of several feet and as much as ten feet wide. In fact it was so thick in places that it was difficult to force a boat through it. Phytoplankton was so abundant in some of the upper strata of water that the water appeared green in color and it was impossible to make an oxygen determination of this water.

At the time of the survey we were able to take bluegills (30 fish, 82 to 186 mm. in length), pumpkinseeds (20 fish, 139 to 163 mm. in length), bluegill x pumpkinseed hybrids (5 fish, 160 to 184 mm. in length), green sunfish (3 fish, 82 to 101 mm. in length), and one largemouth bass (75 mm. long). These fish were taken with hook and line, using artificial flies (both dry and wet), plugs, spinners and worms. Two experimental gill nets were set in water up to seven feet in depth but no fish were taken. Local residents report that perch are also taken in this lake. Seining was not attempted because of the tremendous quantity of duckweed present in the lake.

We have been unable to find any records of game fish ever having been planted in Peet's Lake.

Ages, and estimates of the growth rate of fishes is obtained by studying the scales. Scales taken from the bluegills and pumpkinseeds were examined but age determination of the pumpkinseeds was not considered to be accurate because of the crowded condition of the circuli. It was possible to age only 11 of the bluegills. The oldest bluegill taken was in its sixth year of life (5 annuli) and was 185 mm. (7.3 inches) in length.

Another bluegill 186 mm. (7.3 inches) was in its fifth year of life. This growth is not much slower than the growth of the average Michigan bluegill. The smaller bluegills were growing at a slightly faster rate; some attaining a length of 3 1/2 inches at the end of their second year and others attaining a length of just over 4 inches at the end of their third summer of life. Examination of the scales revealed that all fish made an excellent growth during the summer of 1943. Two possibilities to account for this good growth are as follows. Water tables were extremely high in the spring of 1943 because of heavy precipitation. It is known that Horseshoe Lake and Peet's Lake were connected at this time, and it is possible that a migration of fish from Horseshoe to Peet's Lake occurred, and if these migrants constituted the dominant population of Peet's Lake (providing "winter kill" had occurred), a rapid growth would be expected. A partial "winter kill" could also explain this good growth during the spring of 1943 because the fish that were not killed would be expected to grow faster because of more available food. In conclusion we might add that the growth of the bluegills at present is just below the average for Michigan.

Because of the poor visibility we were unable to find any spawning beds or for that matter any place in the lake where members of the bass and sunfish family could spawn. The only young-of-the-year fish taken was the one largemouth bass. The smallest bluegill (82 mm.) was in its second year of life. We were unable to read the scales of the pumpkinseed sunfish, but the smallest fish (139 mm.) was definitely not a young-of-the-year fish. Largemouth bass undoubtedly spawned in Peet's Lake in 1944, and if largemouths were able to spawn in the lake, certainly bluegills and pumpkinseeds could. We collected 5 bluegill-pumpkinseed hybrids (a total of 50 bluegills and pumpkinseeds was taken). It would be expected that a

large percentage (and 10 per cent is considered high) of these hybrids would be present in a lake of this type because there is probably a limited area available for spawning. Also, it would not be expected that such a large percentage of hybrids would be found in Horseshoe Lake. Therefore, we conclude that bluegills and pumpkinseeds could spawn in Peet's Lake, although it may not occur every year.

Management Proposals

Peet's lake is classified in with the "all other lakes."

No species of fish should be planted in Peet's Lake. The bass, bluegills and pumpkinseeds can maintain themselves in the lake. If winter kill occurs, the lake is probably restocked during periods of high water by fish from Horseshoe Lake.

The only predators observed about the lake were painted turtles.

Parasitic infestations were heavy, especially in the pumpkinseed sunfish. The yellow grub (Clinostomum) was found externally, in the gills, and in the body cavity. At least two species of Proteocephalus were found in the body cavity, on the viscera and on the peritoneum. The ovaries of some of the fish were covered by hundreds of these parasites and it is a possibility that some of these fish may be rendered sterile. Perhaps this might be one explanation for the apparent absence of young-of-the-year fish. Strigeiid cysts were found in the body cavity and on the viscera. Dr. George R. LaRue, Professor of Zoology of the University of Michigan, checked the identification of these parasites. Dr. LaRue said that in a small lake of this type (meaning limited area habitable for fish) the incidence of infection would be great because fish would be able to move around the entire lake and would be able to come in contact with other infected fish more often. The writers agree that the infestation of Proteocephalus on the fish from Peet's Lake was greater than on any other

fish we have examined. None of these parasites is harmful to man but such severe infestations render the fish unpalatable to most people.

It is felt that no recommendations are called for in regards to shelter, regulation of the water level or improvement of the spawning facilities.

Nothing can be done at present to improve conditions or to improve fishing at Peet's Lake. The lake could be poisoned to remove all species and if not stocked for several years, the heavy parasite infestation would be eliminated for a short time after restocking because one host would have been eliminated after the fish were removed. But this condition would probably just be of a temporary nature because birds would soon reinfest the lake with parasites. In order to make more of the lake habitable for fish it would be necessary to remove a good deal of the muck from the lake. This could be done with a sand sucker but would be very expensive considering the small body of water present and the severe infestation of parasites. Considering the small size of the lake, it would not be practical to make any of the suggested improvements.

INSTITUTE FOR FISHERIES RESEARCH

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