

DEPARTMENT OF MINES



AND NATURAL RESOURCES

GAME AND FISHERIES BRANCH

AN INVESTIGATION OF
CERTAIN WATERS IN
THE PORCUPINE MOUNTAINS

SECTION "A" - GENERAL PREAMBLE
SECTION "D" - PICKEREL LAKE

SUMMER 1952

by

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GENERAL PREAMBLE ON THE FORCUNINE MOUNTAINS

The Forcunine Mountains lie on the Manitoba-Saskatchewan border between 52° and 52° 45' North latitude, some 264 miles north-west of Winnipeg. Attaining a height of 2,300 to 2,600 feet above sea level, they thus rise somewhat abruptly 1,300 to 1,600 feet above the surrounding level to the east. The Manitoba portion of this range extends 45 miles north and south, and 22 miles east and west, with an estimated surface area of 742 square miles.

Geologically this region is a part of the Manitoba escarpment, consisting basically of gray and greenish-gray shales with numerous clay ironstone deposits, characteristic of the Riding Mountain formation. This underlying structure was however not evident on the surface of the ground at any point visited. It represents a Cretaceous deposit sloping very gently to the south-west, uplifted at the end of the Cretaceous, with a secondary uplift in early Cenozoic times.

Although thus geologically identical with the Duck Mountains and the Riding Mountains, and appearing exactly the same when viewed from the east, physically the country is somewhat different. The mountain crests or peaks are of quite moderate height, so much so that from the air the terrain looks all but flat, while from the ground the horizon is formed of low rolling hills merging into one another. Few of these hills rise more than a hundred feet, most are considerably less. Drainage is very poor, and the pockets between the hills hold the waters well. The country therefore is exceedingly wet, and from the air shows a marked similarity to the areas about The Pas - muskeg, sloughs, potholes and lakes in profusion, linked by small water courses, most of which are obscured by dense plant growth, and separated by slight rises. The accompanying photograph taken by H. H. Harvey en route to Armit Lake from The Pas shows well the characteristic flat appearance and the numerous bodies of water as seen from the air.

Necessarily the flora reflects the general character of the country. Heavily treed, evergreens occur in profusion, chiefly black and white spruce, with lesser areas of jackpine, balsam, and some tamarack. Most commonly such stands are dense, sometimes very dense, so that the trees tend to be tall and spindling, and in most areas seen those over eight inches in

diameter were rare; further from the lakes, however, larger specimens are met. Due to the shallow nature of the light soil, they are commonly uprooted by winds or other agencies on reaching a moderate size, and thus passage through the woods is very greatly hampered by the leaning and fallen trees in all stages of decay. The holes left by the uprooted trees form, incidentally, excellent breeding grounds for mosquitoes, so that these abound in all areas, accompanied by lesser numbers of such pests as blackfly, punkies, deerfly and horsefly, to such an extent that the evening hours in particular become intolerable without the use of a considerable amount of protection against them.

The coniferous woods are mixed with deciduous trees about the margins of the lakes to a variable extent. These may form anything from less than 10% to more than 90% of the fringing tree growth. Almost invariably these deciduous forms are species of poplar; occasionally a few birch occur.

The lesser vegetation away from the water is relatively little varied. Mosses abound, covering the ground, fallen logs, and stumps generally, forming a soft moist layer ankle deep. Lichens similarly are common on the standing trees, live and dead. Small openings in the forest are characteristically paved with bunchberry or wild sarsaparilla, while similar open areas at lake shores are marked in addition by raspberry, current, strawberry, wintergreen, highbush cranberry, etc. Low areas between the hills are commonly waterlogged, and here are found, in addition to conifers, thickets of alder, Labrador tea, marsh grasses, sedges, and marsh marigold in quantity.

Streams are small and most generally very slow running. Nearly always they are marked by marginal growths of varied nature, in which sedges predominate. Frequently such streams are choked and all but obliterated by the growth of the sedges which may form a continuous mat, firm enough in some cases to support the weight of a man, floating over a foot or more of water. In addition, seeps or mere trickles of water are plentiful about the lake shores.

The lakes are in general shallow and weedy, with very few beach areas and these of small size. Temperatures are relatively high in summer and very similar for top and bottom, indicating an absence of springs. The bottom is characteristically soft organic ooze.

Turning to the fauna, moose are quite common. Not only are they frequently seen, but their trails and droppings are found about all lakes, their tracks are on all sand beaches and across most shallow bottoms. Deer on the other hand are scarce, indications of their presence being noted only sparingly at Whitefish Lake. Wolf, bear, muskrat and beaver were seen on but one or two occasions, nor are indications of their presence common. Red squirrels and chipmunks abound, with a variety of smaller rodents. Rabbits, however, are very rare. Aquatic birds most commonly met are loons, terns and pelicans; gulls, ducks and grebes were noted only occasionally. Fish most commonly found were pike, suckers and perch, as might be expected from the general picture given above. In addition, pikeperch, whitefish and tullibee were taken from the deeper lakes. Forage fish are common, but were not taken in great quantity at any point.

The somewhat unpleasant conditions outlined here are considerably alleviated in the southern portion of the reserve. Here the hills are considerably higher, drainage is far better, and the marshy areas correspondingly reduced, so that the terrain in the region of, say, Whitefish Lake is very similar to that of the Duck Mountains. This is clearly indicated on survey and topographical maps of the area, the reduction in waters being a very obvious feature. In this regard it might be pointed out that those lakes found worthy of investigation were those that had received names on the maps, while of the various unnamed bodies of water none was found suitable for study.

Investigations were carried out from June 3 to July 18, 1952, transportation being arranged with the Manitoba Government Air Service at The Pas by radio through the Mafeking station of the Forestry Service.

The larger lakes in Township 42, Range 28 West, other than North Steeprock, were observed from the air. Few were as much as a mile in the greatest dimension, and all showed one half or more of the bottom readily from the air, indicating, in this area, less than eight feet of water. Low marsh shores encircled most lakes entirely again an indication of shallow water away from the centres. These features so severely limited the areas of deeper water that it was judged profitless to investigate these small bodies more closely. Local reports speak of pike in these lakes in some cases, and there is no reason to doubt that they, and suckers, may be present; nevertheless the lakes

are so small and available waters so reduced that the application of fish culture methods would be pointless.

The somewhat larger lake in the north-east area of Township 42, Range 27 West, some six miles west-south-west of Mafeking, is merely a shallow pothole, so shallow indeed that Air Service pilots would not consider landing either Fisheries or Forest Survey parties on it. The same thing holds for the small lake two miles south-east of this point, and for the lake two miles north-east of Bell Lake. Still another of the same type is the lake between Armit and South Steeprock Lakes, in Township 41 on the border of Ranges 28 and 29 West.

The two mile long lake west of Hart Mountain, in the north-east quadrant of Township 40, Range 29 West, is but little better. Every part of the bottom is easily visible from the air, the shores are marshy, and emergent vegetation is plentifully scattered. In addition, frequent moose trails across from side to side indicate very clearly a completely unsatisfactory lake for fish.

Restricted size and the presence of islands prevented landing on the two lakes of Armit River and on Cross Lake. In the case of the former, little damage was done, for these lakes are small in size, partially obscured with islands, and have considerable shallow areas. Cross Lake, neatly divided by a large island, could be landed upon in emergency, but pilots were reluctant to land otherwise. Nearly a mile and a half long, it presented some shallow areas, but also contained good stretches of deeper waters. Although there is no reason to suppose it would be markedly different from other Porcupine Mountain lakes, it could be surveyed through the use of the road leading to the well-established wood camp present on the shore. This road, a branch of the Whitefish Lake Road, is passable for trucks and tractors but is definitely not recommended for passenger cars at the present time.

The lake at the south-east corner of Township 39, Range 29 West, one and one-half miles west of Cross Lake, presents a similar appearance to Cross, and could also be investigated by road. It is, however, quite small, measuring but half a mile each way, and is too small for aircraft to land with safety. Landing of course is not so much a matter of the water surface available as the necessity for clearing the treed hill-tops surrounding such lakes; and as noted above, the hills are of greater height in this southern region.

The remaining lakes in Township 39, Ranges 28 and 29 West, are all quite small and little more than potholes in most cases, with the exception of Whitefish Lake.

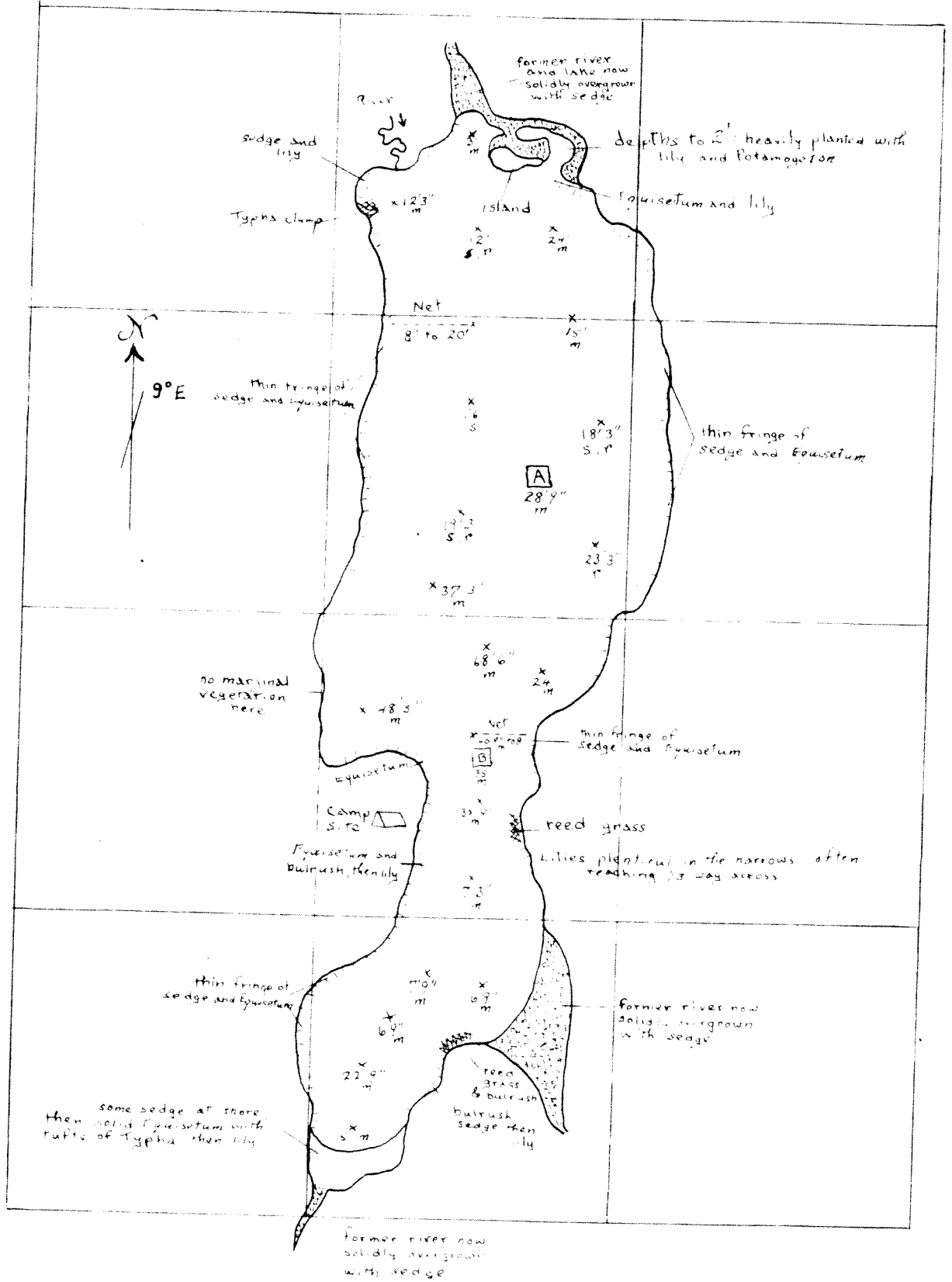
Accordingly, full biological investigation was carried out upon Armit, North Steeprock, South Steeprock, Pickarel and Bell Lakes. In addition, a check on the fish present in Whitefish Lake, previously surveyed, was also made. Details of these surveys follow.

It will be seen from this introduction and from the surveys that, apart from the southern area about Whitefish Lake, the country is not of a type to appeal to the angler or camper. The difficulty of land travel, the high cost of road-making, the water-soaked terrain, and the numerous blood-sucking insects are all unsatisfactory features. The character of the lakes is such that angling presents little of a spectacular nature, nor are the lakes capable of such improvement, with the possible exception of Pickarel Lake, which however is likely to prove difficult of access for a long time to come. In all, the country has very little of the appeal of the Duck or Riding Mountains, and it seems most unlikely to become a popular resort or angling territory.

The writer is glad to acknowledge the cheerful cooperation and unflagging energy shown by Mr. Harold E. Harvey in assisting him in these investigations. His help was of very great value.

PICKEREL LAKE

4 inches to the mile : each square = 1/2 mile



m = soft flocculent brown mud
 r = cobble stones
 S = sand

A = station
 = emergent vegetation

A BIOLOGICAL SURVEY OF PICKEREL LAKE,
PORCUPINE MOUNTAINS

by

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GENERAL

Pickeral Lake is a small lake lying on the Manitoba-Saskatchewan boundary in the Porcupine Mountains Forest Reserve, on the western edge of Township 40, Range 29 West, at 52° 26 1/2' North Latitude, 101° 37 1/2' West Longitude. Elongated in a north-south direction, it is slightly less than two miles long, and no more than half a mile at the widest.

Transportation to the lake was by Manitoba Government Air Service aircraft and camp was established in the only satisfactory area, on the lower west side. The presence of boards, rusted tin cans, a part of an iron stove, and in the water near the shore, a wolf trap, all indicated previous use of this site, but no roads or trails leading to the lake were observed at any point, nor do any navigable streams enter it.

Biological investigations were carried out from June 14 to June 20, 1952.

TERRAIN AND LAND VEGETATION

Lying but five miles south of Armit Lake, the terrain about Pickeral Lake is naturally very like that of Armit (q.v.). The low rounded hills, rising to some fifty feet all around the lake, are a little steeper and, therefore, better drained, so that the soft peaty soil is drier, with fewer swamp areas. The soil is generally deeper, also, so that trees attain a larger size than at Armit, and windfalls are not so common. The general picture is, however, much the same; a dense growth of medium sized black spruce with some white spruce covering all areas down to the lake. At no point is the underlying shale of the Riding Mountain Formation visible.

At the lake the land slopes abruptly one to two feet down to the water, then slants down fairly steeply into the

water. No boulders mark this junction, nor were any seen at any point. Evergreens are in a minority near the water, so that from a short distance the lake seems rimmed entirely with deciduous trees. These are mainly black poplar, six to eight inches in diameter, with some aspen poplar of similar size. Close to the water these are replaced by a dense tangle of alder, with some willow, to a height of eight to ten feet, so that landing in most areas is a matter of some difficulty.

A lesser vegetation occurs in the deciduous tree zone, consisting of dense growths of wild sarsaparilla (ginseng, Aralia), raspberry, currant, and a dwarfed high-bush cranberry which reaches no more than twelve inches high. Below these again are bunchberry (Cornus canadensis) and a wide variety of smaller herbs.

The area selected for the campsite, on the western side of the narrows, is slightly higher than elsewhere, reaching two to three feet above water level. The ground is somewhat more open here, although no natural clearings occur anywhere about the lake, and the vegetation consequently somewhat more varied. Among the deciduous trees are scattered spruce which here may reach a diameter of twelve inches, while one on shore leaning over the water was a good twenty-four inches in diameter. Small balsams (Abies balsamea), six to eight feet high, occur here, while below, besides the forms mentioned above, are wild rose, Mertensia paniculata, blue columbine, blueberry, and mosses of many varieties.

PHYSICAL AND CHEMICAL CHARACTERISTICS OF THE LAKE

(a) Size and shape

The lake is roughly an elongate oval, in the north and south direction, with a length of slightly less than two miles and a width of half a mile; in the southern third, however, the width is reduced to one quarter of a mile through an encroachment of the western shore. These features are easily seen on the accompanying sketch map.

(b) Shores

There are no beaches of any type. As noted

above, the land slopes sharply into the water through a vertical interval of one to two feet, then slopes more gently down under the water, forming a narrow fringing zone. This zone is typically of a soft brown flocculent silt and bears a continuous growth of emergent vegetation, so that the whole lake presents a rim of aquatic plants, backed by a tangle of alder and willow.

This picture is very slightly different at the camp site area. Here the western shore drops as suddenly to the water, but the bottom then slopes more gently, so that there is no more than three feet of water twenty feet from land. This shallow area is paved with a very silty sand, with occasional areas of pebbles, also covered with silt and algae; such pebbles are more plentiful near the shore line. At intervals a few cobble-stones can be noted, especially towards the north end of this narrows region. Emergent vegetation is, of course, plentiful.

(b) Streams

A small stream enters the north-west angle of the lake after following a very tortuous course through grasses and sedges, with numerous alder and willow, all of which shade it greatly. This stream is only three feet across and no more than a foot deep, with the water flowing at about two miles per hour over a soft silt bottom. Moderately sized pikeperch and pike were frequent here, and large numbers of whirligig beetles (Gyrinidae) were seen.

At the extreme northend is a narrow bay, apparently the opening of another stream; bay and stream alike, however, are now solidly covered with sedges two feet high, so there is absolutely no open water nor sign of flow. This thick plant growth has extended to a mass of land immediately to the east, heavily treed and obviously an island at some former time.

At the southend are two wider bays similarly blocked by sedges, narrowing away into the bush. These probably also mark former rivers, but again there are no channels and no flow of water.

There are no emergent streams.

(c) Water level and depth of water

Examination of the shores and vegetation presented no indications of flooding or subsidence, and it seems clear that the water is now at normal high, with probably little in the way of annual variation.

Depths are moderate, with the main area showing fifteen to twenty feet of water. Greater depths occur near the northend of the narrows, with one reading of sixty-eight feet six inches being secured in a limited area. The southern third of the lake is much shallower, most readings running between seven and eight feet.

(d) Nature of the bottom

The bottom in most areas is a very soft flocculent brown organic silt. Sand and cobble were noted in several areas, however, and one or two findings of heavy glutinous brown mud were made in the southern end.

(e) Temperature

On days when the air temperature was 8.5° C and 11.5° C, surface water temperatures were 15° C while thirty foot temperatures were close to 14° C. There is consequently no thermocline and no indication of springs.

(f) Transparency

The water is a clear brown-green of only moderate intensity, with a Secchi disc reading of 10 feet 9 inches; the appearance then is very close to that of Armit Lake.

(g) Oxygen and pH

Surface samples from different areas of the lake gave oxygen concentrations very close to 8.6 parts per million or 6.c.c. per liter, which when corrected for temperature indicated a saturation of 85%. Readings down to 28 feet agreed closely with this, with saturation close to 81%. A sample from 35 feet was, however, obviously deficient in oxygen, and when analysed gave only 4.8 parts

per million, or a saturation of 44%. The water was alkaline, with pH values of 8.4; the low-oxygen sample was however, a little more acid, with a reading of 8.0. Phenolphthalein titration gave a calcium carbonate equivalent of 4 parts per million, with no further change for methyl orange, indicating a very soft water. Palatability is fair, with but slight flavor to the water.

BIOTA

(a) Aquatic vegetation

As noted above the entire lake is rimmed with emergent vegetation, forming a light green band very noticeable from the air; the only break occurs briefly on the western side immediately north of the narrows. This zone of vegetation is characteristically a thin fringe of sedges (Carex) with a slight admixture of horsetail (Equisetum) in the deeper water, the whole measuring no more than four feet in depth in most areas. In a few locations, notably the west side of the narrows, only horsetail was present.

In addition to the above characteristic forms, clumps of other emergent aquatics were noted. In the north-west angle of the lake was a small plantation of cat-tail (Typha), while a few tufts of this plant were also seen at the extreme south end. Bulrush (Scirpus) occurred sparingly among the horsetail on the west side of the narrows and at the south-east of the lake where it was backed by a stand of reed-grass (Phragmites). Another stand of reed-grass was seen on the east side of the narrows, opposite the campsite. Water-lily (Nymphaea) was noted in the north-east angle of the lake; in the lagoon-like region at the north end; commonly in the narrows, where it extended a third of the way across in spots; and in the extreme southern region.

Submerged vegetation was not common except in the southernmost bay, which ^{was} paved with bushy pondweed (Najas), with lesser amounts of water milfoil (Myriophyllum) and pondweed (Potamogeton perfoliatus), into depths of at least five feet. However, the northern lagoon-like area was heavily planted with P. perfoliatus and other clumps of the same plant were noted in the north-west angle, mixed with Myriophyllum. Finally, the northern gill-net contained a few tufts of

Myriophyllum and several duckweed (Lemna), while a strand of Potamogeton pectinatus was taken from the seine net in the shallows at the campsite.

Distribution of this flora is marked on the accompanying sketch map.

(b) Plankton

Plankton samples were moderately heavy and marked by the abundance of Tabellaria, Anabaena, Ceratium, Daphnia, and other crustaceans. The campsite shallows showed great numbers of Daphnia and the peculiar larva of the Dipteran Chaoborus, so that it is not surprising that schools of small perch and of minnows were a common sight, and that angling just beyond the shallows was highly successful.

Plankton analysis will be found on a later page.

(c) Invertebrates

Bryozoa - The characteristic statoblasts of the moss animal Cristatella were found in the dredge sample from Station A.

Annelida - Eight Tubificid oligochaetes were taken from the dredge at Station A. Of leeches, the egg capsules of Herpobdellidae were extremely numerous on the pebbles in the shallows at the narrows, while 2 Erpobdella punctata, 7 Glossiphonia complanata and 1 Haemopsis marmoratis were collected in a few minutes in the same area.

Mollusca - Not plentiful. A few shells of Helisoma antrosa sayi were seen, and occasional specimens of Helisoma trivolvis (large specimens) and Lymnaea stagnalis jugularis (medium to small) were also collected. Careful collecting in the shallows at the campsite revealed the presence also of Physa ancillaria, Valvata tricarinata, V. lewisi helicoidea, and Gyraulus deflectus obliquus.

Pelecypod molluscs were represented by a few medium sized valves of the clam Anodonta grandis footiana and a single valve of the tiny fingernail clam Pisidium, all from the shallows of the campsite area.

Crustacea - The presence of Daphnia in quantity

near the shoreline has been mentioned above; ephippia in thousands, and adults, were also found in dredge samples. Gammarus limnaeus was seen several times along the shore and was commonplace in fish. Hyalella azteca was occasionally found in shore collections. Crayfish (Cambarus immunis) were also seen from time to time and were plentiful in fish.

Insecta - Terrestrial insects occurred in variety much like those about Armit Lake (q.v.). Mosquitoes were particularly annoying, but blackfly (Simulium) and punkies (Culicoides) were only occasionally disturbing during the evenings.)

Of aquatic forms, mayflies were fairly abundant with adults of Hexagenia, Heptagenia and Ephemera being taken on the wing or in fish, while nymphal Hexageniids were common in fish and nymphal Heptageniids taken from the pebbles of the campsite shallows. The only Hemipteran noted was Corixa, occasionally seen in the shallows. Of Diptera, bloodworms (Chironomus) were taken in fish on several occasions, while larvae and pupae were found in shore collections; in addition, many larval head capsules were found in dredge samples. The larvae of the midge Chironomus were mentioned previously as being found off shore of the Daphnia zone in the campsite area. Caddis worms were well represented: Phryganeid and Limnephilid larvae were commonly seen in the shallows, while Helicopsyche borealis was extremely plentiful on the pebbles of the campsite shallows; and trichopteran adults and larvae were frequently noted in fish. Of beetles, two small Dytiscid adults were taken near the camp in the water, while whirligig beetles (Gyrinus) were plentiful in the small river at the north-west angle of the lake.

(d) Vertebrates other than fish

Of amphibians, two small wood frogs (Rana sylvatica) were taken near the camp. Birds were relatively scarce. Black terns were, however, common, and several great northern divers and grebes seen. Two nighthawks were also observed. Mammals also were scant, with few traces of moose or rabbits. Two bats were observed on the wing, and a moderate sized black bear proved to be a fearless nuisance for most of one day.

(e) Seine Fish

The only satisfactory seining area found was in

the shallows near the campsite. The first cast produced but one fish, a black-nose minnow (Notropis heterolepis). The second cast was more representative, resulting in the following:

302 Perch, Perca flavescens, 48 to 73 mm. long; nearly all containing Ergasilus on the gills and metacercariae in the skin.

82 Spot-tail minnow, Notropis hudsonius, 56 to 72 mm. long; one was found to contain Ligula in the coelom.

4 Black-nose minnow, Notropis heterolepis, 37 to 46 mm. long

3 Common sucker, Catostomus commersonii, 44 to 49 mm. long; one contained a metacercaria.

No other species were taken by seining; hand netting, however, resulted in the capture of a pike, Esox lucius, 32 mm. long, and a Johnny darter, Boleosoma nigrum, also 32 mm. long.

All these fish were in good physical condition, in spite of the parasite load carried by many. Repeated careful observation revealed the presence of no other species.

(f) Larger fish

Two gill-nets set in different areas of the lake in depths ranging from 8 feet to forty feet nine inches for twenty-eight hours resulted in a very disappointing catch - a total of three pike (Esox lucius) and two pike-perch (Stizostedion vitreum). Transportation arrangements not allowing further netting, emphasis was placed on angling in various areas, resulting in the capture of 17 more pike and 17 more pikeperch. The whole catch was examined in detail.

With the exception of the sole fish in the northern net (a pike weighing 7 lbs. 4 oz.), the pike were small, ranging from 14 oz. to 2 lbs. 9 oz. They were active and of bright colour, and in good general condition although few had much fat. The diet was chiefly Cambarus, Gammarus

and minnows, with some aquatic insect material.

The pikeperch were also small, ranging from 15 oz. to 1 lb. 13 1/2 oz. Although well colored and quite active on a line, these fish were in fair to poor condition, with very little or no fat. Four of them indeed were so wasted that the dorsal musculature in the shoulder region presented a definite concavity instead of the usual well-rounded form; no reason for this was apparent on examination. The diet was largely immature insects, with lesser quantities of crustacea.

It will be noted that forage fish played only a small part in the nutrition of the fish in this lake; and that perch and common sucker are present in addition to the above, although no adult specimens were taken.

Tabled accounts of the fish taken follow.

(g) Parasites

The pike contained the usual heavy intestinal load of the tapeworms Proteocephalus and Triaenophorus, and the nematode Raphidascaris, and in addition the plerocercoid larva of Diphyllbothrium was common in the flesh; of the twenty fish, thirteen contained from 1 to 27 of these pests.

The pikeperch as usual contained large numbers of Bothriocephalus cuspidatus, Proteocephalus luciopercae and Raphidascaris canadensis in the intestine, while one contained 40 thornyheaded worms of the genus Neoechinorhynchus. In these two, the plerocercoids of Diphyllbothrium were very common; of the nineteen fish, sixteen contained from 1 to more than 30 of the larval tapeworms.

Parasites of the forage fish have been mentioned under that heading.

(h) Predators

The only predators noted were the black terns, grebes and loons noted before.

FIELD NOTES

While not nearly as satisfactory a fishing lake as Whitefish Lake, Pickerel Lake presents perhaps the most

satisfactory lake in the whole Porcupine Mountains area for fisheries control. Fairly small and self-contained, it presents satisfactory depths of water, with plenty of shallows at the south end and at the narrows for forage fish. Food in the form of insect and crustacean life is plentiful, and the plankton very good. The very heavy parasite load, particularly of Diphyllobothrium, and the poor condition of the pikeperch, make this an unattractive lake at present, while the mosquitoes, the unsatisfactory terrain, and the isolation will probably prevent it from ever being popular.

Lake **PICKEREL**

Date **June 17, 1952**

Weather **Cloudy evening;
rain clouds, no clear sky**

Wind **SW @ 5** Sun **M11**
mph.

Aerial Temperature - **8.5° C**

Station **A**
 Depth **28 ft. 9 in.**
 Bottom **soft, brown, very flocculent mud**
 Turbidity -----
 Surface Temp. **15° C**
 Bottom Temp. **14.1° C.**
 Temp. break -----
 O2 bottom **8.42 c.c.**
 O2 Surface **8.7 c.c.**
 pH bottom **8.4**
 pH surface **8.4**
 Plankton surf. **Vert. haul, moderate**
 with Daphnia, etc.
 12-15 ft. -----
 bottom -----

Station -----
 Depth -----
 Bottom -----
 Turbidity -----
 Surface Temp. -----
 Bottom Temp. -----
 Temp. break -----
 O2 bottom -----
 O2 Surface -----
 pH bottom -----
 pH surface -----
 Plankton surf. -----
 12-15 ft. -----
 bottom -----

REMARKS **Bottom full of mud;**
 Daphnia, chironomids, plentiful;
 2 bloodworms, entire.

REMARKS -----

Weather at 10.30 a.m., **60% cumulus and cumulo-nimbus, but bright sun from time to time.** Wind, **WNW** at **10** mph. Aerial temperature, **11**

Date **June 18, 1952.**

Station **B**
 Depth **35 feet**
 Bottom **mud, as above**
 Turbidity **10 ft. 9 ins.**
 Surface temp. **15° C**
 Bottom temp. **13.75° C.**
 Temp. break -----
 O2 bottom **4.8 c.c.**
 O2 surface **8.57 c.c.**
 pH bottom **8.0**
 pH surface **8.4**
 Plankton surf. **Vert. haul, moderate**
 12-15 ft.
 bottom -----

Station -----
 Depth -----
 Bottom -----
 Turbidity -----
 Surface temp. -----
 Bottom temp. -----
 Temp. break -----
 O2 bottom -----
 O2 surface -----
 pH bottom -----
 pH surface -----
 Plankton surf. -----
 12-15 ft. -----
 bottom -----

REMARKS **Bottom, similar to A**

REMARKS -----

PLANKTON ANALYSIS - PICKEREL LAKE

<u>Genus</u>	<u>Vertical haul, Sta. A</u>	<u>Vert. haul, Sta. B</u>	<u>Horizontal haul yds., in narr</u>
<u>Bacillariaceae</u>			
Fragillaria	x	x	xx
Tabellaria	xxxx	xxxx	xxxx
Stephanodiscus	x	x	x
Diatoma	x		x
Synedra			x
Surirella			x
<u>Cyanophyceae</u>			
Anabaena	xx	xx	xxx
Rivularia	x		x
Clathrocystis	x		x
Oscillatoria	x		
Lyngbya	x	x	x
<u>Protococcales</u>			
Pediastrum			x
Botryococcus			x
<u>Conjugales</u>			
Staurastrum	x	x	x
<u>Protozoa</u>			
Ceratium	xx	xx	xxx
Vorticella	x	x	x
<u>Rotifera</u>			
Keratella	x	x	xx
Rattulus	x		x
Notholca	x	x	x
Stephanocera	x	x	x
Floscularia	x		
<u>Crustacea</u>			
Daphnia	xxxx	xxxx	xx
Bosmina	x	x	xxxx
Diaptomus	xx	xxx	xx
Cyclops	xx	xx	x
Nauplii	xx	xx	xx

xxxx = predominant forms
 xxx = very common
 xx = fairly numerous
 x = occasional

FISH ANALYSIS - PICKEREL LAKE

Ref. No.	Spinal length ins.	Weight lb.-oz.	Age years	Condition	Alimentary contents	Parasites
<u>Pikeperch - Stizostedion vitreum</u>						
PL-1	14 8/8	1 - 9	14	Fair, little fat	Mucus	5 Raphidasc 7 Diphyllob
PL-2	14 3/4	1 - 10 1/2	15	Poor-no fat	Trichoptes & other insects	30 / med. tw yll. larva
PL-3	15	1 - 7	14	Poor-no fat	Insect debris	c.100 med.t Diphyll.la
PL-4	14	1 - 8	13	Poor-no fat	Trichoptera & hexageniid pupae	6 med.tw.; Diphyll. 1
PL-5	14 1/2	1 - 8 1/2	14	Fair-no fat	Nil	3 small tw. 2 Diphyll.
PL-6	15 1/8	1 - 5 1/2	12	very poor; no fat, concave back	1 Gammarus	c.50 small
PL-22	14 1/4	1 - 9	12	only fair-very little fat	crammed Hexa- genia nymphs	c.40 tw.; sev nemas; 1 Dip
PL-23	14 1/4	1 - 7	11	only fair-prac. no fat	crammed Chir- onom.pupae, few larvae	18 s. & m. tw 2 Diphyll.
PL-24	13 1/4	1 - 3	11	only fair-no fat; female	crammed Chir- onom.pupae, Gammarus	50 s. tw.; 3 Diphyll 1
PL-25	13	0 - 15	11	v.thin, hollow back, lt. fat	2 1/2 in. crayfish, 8 Hexagen, nym.	30 tw.; 5 nem 12 Diphyll.
PL-26	13 3/4	1 - 6	11	only fair-sm. amt. fat; female	Many Hexag. 1 larv., 1 adult, trichopt.	6 small tap
PL-27	14 1/4	1 - 8	11	fair-little fat	Crammed nymph & adult Hexa.; 1 adult Trich.	29 large and tapeworm
PL-28	14 1/2	1 - 5	11	v.thin, hollow back, no fat	crammed adult & nymph. Hexagenia	40+ sm. tw.; 14 Diphyll.
PL-34	14 1/2	1 - 4 1/2	11	v.thin, hollow back, no fat	10 fish. 1-2 1/2 ins., prob. perch;	6 lg. tw.; 3 40 thornyhe
PL-35	15 1/2	1 - 2	12	only fair-no fat	1 Ephemera many Gammarus; fish remnant;	30+ Diphyll c.300 sm. tw 22 Diphyll.
PL-36	13 7/8	1 - 4	12	poor, thin; no fat; female	1 water tiger black mucus	c.30 s. & m. tw. s. & m. nemas; cysts; 26 Diph
PL-37	15	1 - 10	11	fair; some fat female	a few Gam- marus	c.30 s. tw.; 1 larva
PL-38	15 1/4	1 - 13 1/2	11	fair; no fat	2" crayfish; fishmeal	c.35 sm. tw.; nema; 4 Diphy.
PL-39	14 1/2	1 - 7	11	fair; no fat	insect debris	20 sm. & med. tw 3 Diphyll. la

FISH ANALYSIS - PICKEREL LAKE (cont'd)

Ref. No.	Spinal length	Weight lb.-oz.	Age, yrs.	Condition	Alimentary contents	Paras
<u>Pike - Esox lucius</u>						
PL-7	14	0 - 14	6	good-scant fat	spottail minn., 2.5 ins.	3 lge
PL-8	17	1 - 8	9	good-fair fat	nil	4 lge
PL-9	16½	1 - 7	8	good-fair fat	2 spottail ", 2½"	4 Dip
PL-10	16½	1 - 4	8	good-fair fat	crustacean remain.	1 Dip
PL-11	18½	1 - 8½	9	fair-little fat	nil	1 nema
PL-12	20	2 - 8	11	good-little fat	1 perch, 3"	11 lg tw., 6
PL-13	16½	1 - 4	8	good-little fat	1 crayfish, 1½"	5 sm. & sm. &
PL-14	15½	1 - 1	7	fair-fair fat	nil	4 nema 1 Dip
PL-15	27½	7 - 4	12	good-little fat	Nil	100+ Diphy
PL-16	18	1 - 11	8	good-no fat	4 crayfish (2"-3") 1 Gammarus, some fishmeal	3 nema Diphy
PL-17	15½	1 - 4	7	good-little fat	1 spottail, 3"; 4 Hexagenia nymph little fishmeal	3 large
PL-18	17½	1 - 5	8	good-no fat	1 crayfish, 1½"	4 nema 7 Dip
PL-19	13½	0 - 15	6	good- <u>very</u> little fat	crayfish, 2" 15 Gammarus	3 sm. & lar
PL-20	14½	1 - 2	7	good-a little fat	4 Hexagenia nymphs	7 nema 1 Dip
PL-21	15½	1 - 5	7	good-good fat	stom. packed with Gammarus	3 nema
PL-29	19½	2 - 9	9	good-fair fat	6 crayfish, 2½-3"	c. 15 m
PL-30	19½	1 - 15	7	good-good fat	1 crayfish, 3"	c. 20 m
PL-31	16½	1 - 4	6	good-fair fat	crayfish remains	c. 30 m
PL-32	17½	1 - 9	7	fair-fair fat	many Gammarus	nil
PL-33	18½	1 - 12	7	fair-no fat	1 crayfish, 3"; some fishmeal.	2 lge. tw.; plero

Net Settings, Etc.

1. Net set June 17, 1952, at 7.15 a.m. in 8 to 20 feet of water; from the northern part of the western shore, in an easterly direction; raised 8.30 p.m.; Net. $4\frac{1}{2}$ " x 40 mesh x 45 fathoms.
Catch - 1 pike, 7 lbs. 4 oz. (PL-15).
2. Net set June 17, 1952, at 7.40 a.m. in 8 to 40 feet 9 inches of water, from the eastern shore at the mouth of the narrows in a westerly direction; raised 10.20 p.m.; net $2\frac{3}{4}$ " x 40 x 45
Catch - 2 small pike, 2 small pikeperch.
3. Taken by angling: 17 pike, 17 pikeperch.