1952-D

DEPARTMENT OF MINES AND NATURAL RESOURCES

GAME AND FISHERIES BRANCH

AN INVESTIGATION OF CERTAIN WATERS IN THE PORCUPINE MOUNTAINS

SECTION "A" - GENERAL PREAMBLE
SECTION "E" - NORTH STEEPROCK LAKE

SUMMER 1952

by

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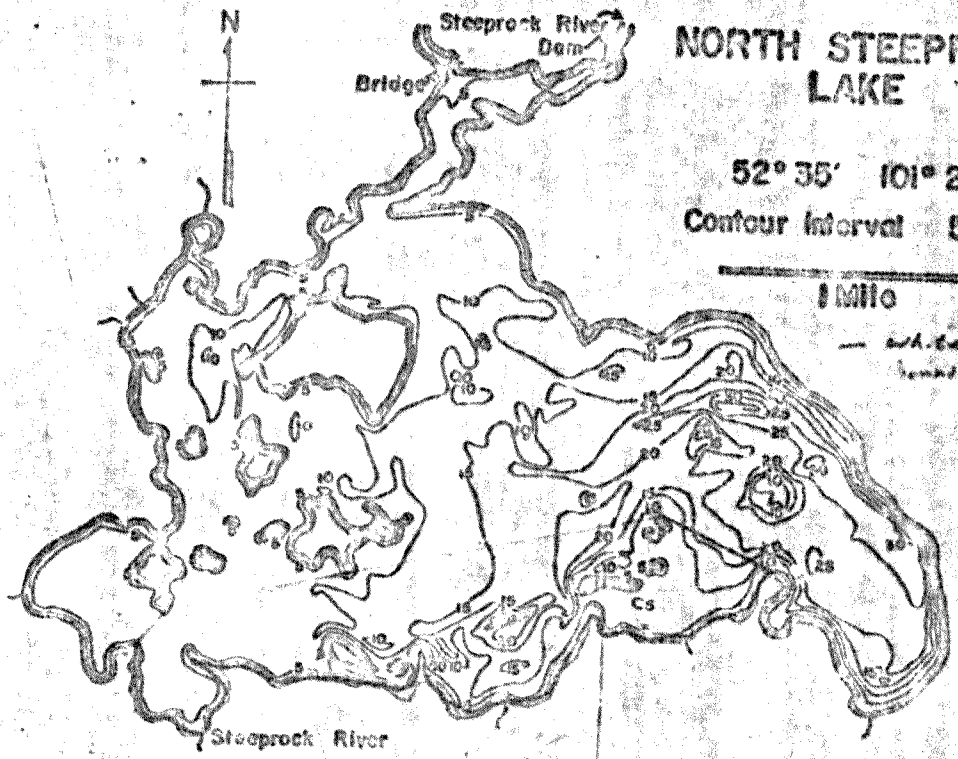

NORTH STEEPROCK LAKE

52° 35' 101° 22'

Contour Interval 5 feet

1 Mile

GENERAL PREAMBLE ON THE PORCUPINE MOUNTAINS

The Porcupine 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 16,00 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 grey and greenish-grey 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 anoxther. 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 up-rooted 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 rasberry, 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 plenti-ful about the lakes 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. Wolfe, 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 unpleasing 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 July18, 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 hilltops 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 pot-holes in most cases, with the exception of Whitefish Lake.

Accordingly, full biological investigation was carried out upon Armit, North Steeprock, South Steeprock, Pickerel 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 much improvement, with the possible exception of Pickerel 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.

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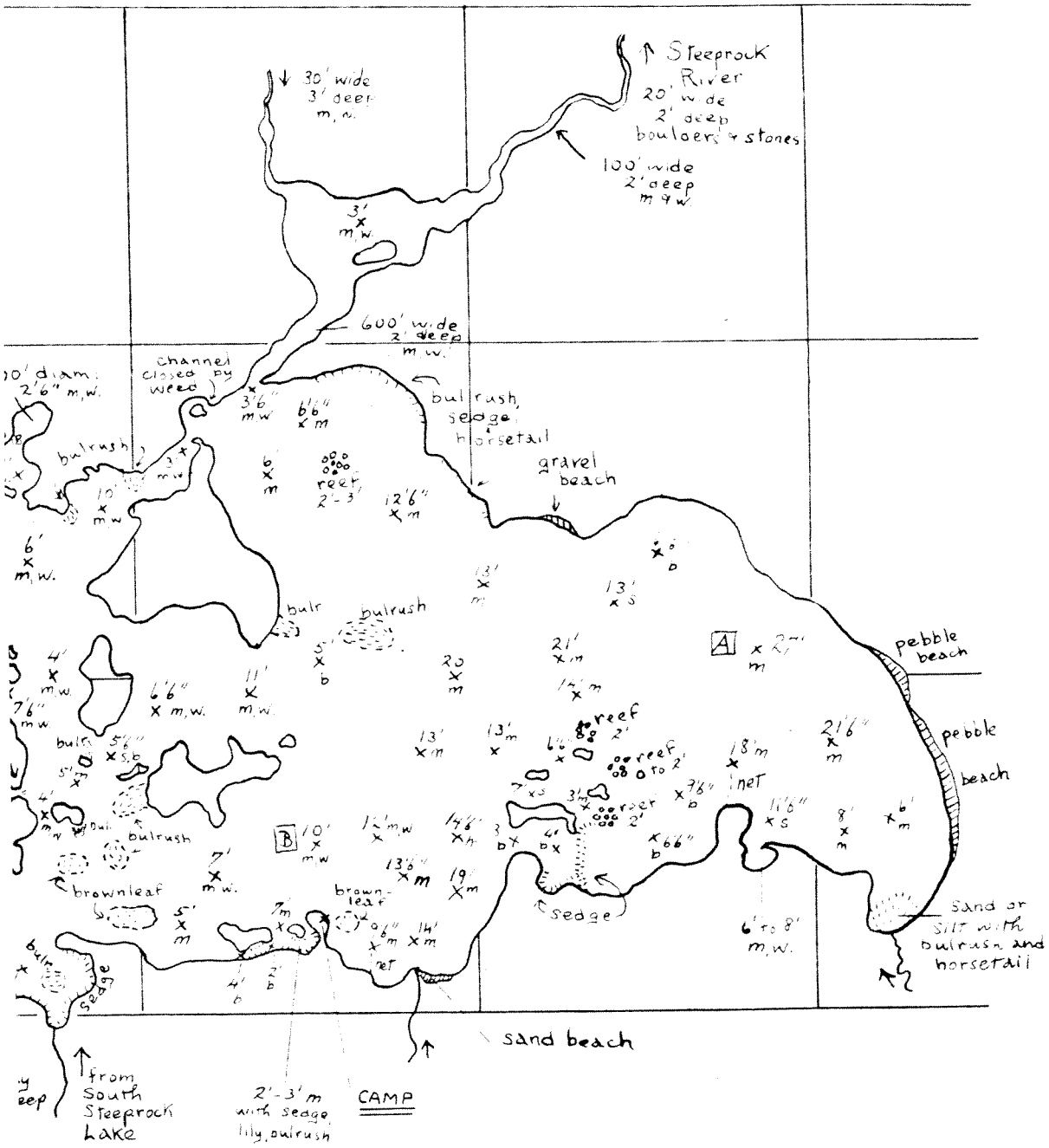
The writer is glad to acknowledge the cheerful cooperation and unflagging energy shown by Mr. Harold H. Harvey in assisting him in these investigations. His help was of very great value.

rth Steeprock Lake

es to the mile : each square = 1 mile



n feet and inches

s sand

n

b boulders

A BIOLOGICAL SURVEY OF NORTH STEEPROCK LAKE, PORCUPINE MOUNTAINS

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GENERAL

North Steeprock Lake is a fairly small lake in the north centre of the Porcupine Mountains Forest Reserve, lying at 52° 36' North Latitude, 101° 23' West longitude, in the southeastern corner of Township 42, Range 28 West. Very irregularly ovate in shape, it extends three and a quarter miles from east to west and two miles from north to south.

Transportation was by aircraft of the Manitoba Government Air Service. No roads or trails were seen at any point, although it was learned that some net-fishing had occurred in the past, a caterpillar tractor being used for transport. In confirmation, several net floats were found, one or two being obviously of fairly recent date. No other indications of the presence of man were found.

Biological investigations were carried out from June 26th to July 4th, 1952, hampered somewhat by frequent strong winds. Camp was established on the narrow-necked little peninsula near the middle of the southern shore.

TERRAIN AND LAND VEGETATION

The terrain is exactly similar to that of other nearby lakes; low rounded hills of no more than fifty feet in height entirely surround the lake and are densely covered with spruce, with smaller numbers of pine in some areas. These evergreens are thickly, sometimes very thickly planted, and while many reach 30 to 40 feet in height, few are over six inches in diameter. Around the lake the spruce march to the water's edge, mixed with alder brushes in the more marshy areas; poplar and pine are very rare, a nd but one birch was seen. There are no clearings, although one hilltop in the middle of the northern

shore showed a reduced number of trees and hence a certain amount of grass was present.

The shallow valleys between the hills are somewhat better drained than around Armit Lake, and hence Labrador tea, alder, marsh marigold and similar water-loving forms are less plentiful although still common.

The soil is thin and covered with a heavy layer of decaying organic material on which a profuse growth of spongy mosses occurs. Travel is greatly hampered by hung and fallen trees in all stages of decay. Any slight break in the continuity of the trees is marked by a low growth of herbs: Cornus canadensis, Linnea borealis and Mertensia sp. In addition to these, the shore area sometimes shows a sparse growth of wild rose (only a foot high), stunted raspberry, and occasional tufts of grass among the trees.

The underlying shale of the Riding Mtn. Formation is not visible at any point.

PHYSICAL AND CHEMICAL CHARACTERISTICS OF THE LAKE

(a) Size and Shape

The lake is roughly ovate, with the greater dimension extending east and west for three and a quarter miles. The greatest width, one and a half miles or slightly more, occurs in the central and western areas, while towards the east the distance narrows to a mile or less. An irregular Y-shaped extension runs north from the north central area. These features, and the numerous islands, are shown on the accompanying sketch map.

(b) Shores

Characteristically the land drops very sharply to the water through a vertical interval of six to twenty or more feet, requiring some degree of scrambling to effect a landing. The last eighteen inches of this drop is a boulder zone, largely granitic. These boulders, with cobbles, continue steeply into the water, so that depths of three feet or more are reached some four to six feet from the shoreline. These submerged stones are

are covered with a brown algal growth which makes them extremely slippery.

This picture is occasionally relieved in areas where the land is not quite so high, so that the drop-off is one to three feet high or less; such areas are few in number and are marked by the presence of beaches or small rivers in nearly all cases.

There are also protected areas - bays, island waters, etc. - where the descent into the water is gradual. Here the bottom is silt, or silt and sand, and supports emergent vegetation and a usually rich fauna.

These features are indicated on the sketch map.

(c) Beaches

A small sand beach occurs near the middle of the southern shore, extending for a hundred and fifty feet, with a maximum width of seven feet tapering to a width of one foot at the extremities. The sand is of good quality and extends a hundred yards into the water to a depth of six to eight feet. Occasional boulders here necessitate a careful approach to the shore. The western end of this beach is marked by a small river, beyond which there is a cobble beach for some twenty feet. The ground behind this beach is very low and marshy, due to the backwaters and sinuosities of the small river.

A beach of course gravel occurs slightly to the east of the midpoint of the northern shore. This is approximately a hundred and fifty feet long and some four feet wide, and slopes sharly into the water. The ground behind it is high and steep.

The contiguous beaches of pebbles occur at the far eastern end of the lake. These beaches extend slightly over a half mile total distance and vary from two to four feet in width over most of this stretch. The heaped pebbles are two to three inches in diameter, well-rounded, clean and bright, and of very varied mineral character. They extend into the water at a gentle slope for six to fifteen feet, becoming covered with brown algae

when the depth reaches twelve inches or more. Beyond the pebbles, the bottom changes abruptly to sand, which falls very steeply into the depths of the lake.

(d) Inflowing Streams

Three streams flow into the southern shore of the lake. The most westerly of these flows into a rounded bay at the west end of the lake and is the river that runs from South Steeprock Lake. Dark brown in colour, the water follows a sinuous course, six to eight feet wide and two and a half to five feet deep at a speed of one mile an hour. The bottom is silt and detritus, with frequent clumps of water-lily (Nymphaea) and occasional clumps of Potamogeton perfoliatus and Myriophyllum sp. On either side of this stream is an alder and sedge marsh averaging twenty feet wide; this, however, is not a floating mattress as at the other end of this river. A few spottail minnows were seen, but the biota was scant.

The second stream flows in at the sand beach, east of the midpoint of the southern shore: three feet wide and varying from 12 to 18 inches deep, it follows a heavily shaded sinuous course amond alder and evergreen at a rate of 2 m.p.h. The water is dark brown in colour, and flows over a silt and debris bottom relieved by occasional boulders and cobbles. Several alert schools of spottail minnow were observed.

The third stream enters the shallow weedy bay at the extreme east of the lake, its mouth being obscured by Scirpus and Equisetum. Six to seven feet wide and one foot deep, the brown water runs at a speed of 1 m.p.h. over a silt and debris bottom, planted with occasional clumps of water-lily and Sagittaria, with a few sprigs of Potamogeton perfoliatus. Alders and evergreens do not shade the river heavily, so that its course is marked by a gap in the trees, and sedges occur at intervals along the edges. Spottail minnows were common, and several darters were seen.

The Y-shaped northern extension of the lake has its western ramus formed by an entering river with a maximum width of 30 feet and a maximum depth of 3 feet, these dimensions frequently being less. It flows at a speed of 1 m.p.h. over a silt and debris bottom thickly grown with water weeds. The water is dark brown,

Examination failed to disclose any streams entering the western end of the lake, as shown on some maps.

(e) Outflowing Streams

The only outlet from the lake occurs at the Y-shaped northern extension. Here the eastern ramus, running without perceptible current for half a mile in an unbroken stretch approximately a hundred feet wide and two feet deep, abruptly narrows to twenty feet while still maintaining the depth of two feet. The junction is marked by a barrier of boulders and drift, and further boulders are a commonplace along the course of the river on the silt and debris bottom. Well shaded by trees, the water flows at three miles per hour. This is the origin of the Steeprock River.

(f) Water level and Depth of water

No evidence of flooding or submergence could be seen at any point. This, together with the character of the rivers and the marginal vegetation, suggests that the water level is at normal high with little annual variation.

The lake is essentially quite shallow, with most depths running from 4 to 15 feet. The east central region shows some depths in the twenty foot range, while the greatest depth found, 27 feet, was in a restricted area near the eastern shore.

(g) Nature of the bottom

The bottom is very largely mud, soft, grey-brown and glutinous, the shallower regions bearing heavy growths of water weeds. Sand, gravel and boulder were noted in a very few regions, while boulder reefs of small extent approach the surface in four areas.

(h) Temperature

As with other lakes in this area, water temperatures are but little below air temperatures, and there is no significant difference between surface and bottom values. Thus, when the air temperature was 17° C, the deepest area found had a reading of 15.25° C, while the

surface was at 16°C. In general, at the time of this investigation, the average water temperature was 16°C.

(i) Transparency

The water is gray-green and only moderately clear, due to fairly heavy plankton growth and to the combination of shallow water with mud bottom. The Secchi disc reading is 6 feet.

(j) Oxygen, pH, etc.

Surface oxygen determinations had a value of 8.68 parts per million, or 6.06 c.c. per liter, giving a saturation value of 87% when corrected for temperature. A bottom sample from 10 feet in depth was almost identical, with values of 8.72 parts per million or 6.1 c.c. per liter, with a saturation value of 88%. A bottom sample from 27 feet, the deepest found, was only a little less rich, with 7.3 parts per million or 5.1 c.c. per liter, giving a saturation value of 73% when corrected. These figures indicate a rapid turnover, and accord well with values secured from other lakes in the area.

The water is slightly alkaline, with surface values of pH 8.1. Bottom samples agree well with this, except that in the deepest area found the water was slightly less alkaline, with a value of pH 7.9. Phenolphthalein titration gave a calcium carbonate equivalent of 2.4 parts per million, with no further change for methyl orange, indicating a very soft water. Subjectively the water was palatable, with but little flavor. These figures also agree closely with those from other lakes in the region.

BIOTA

(a) Aquatic vegetation

Although the major portion of the shoreline is exposed and, therefore, bleak, emergent vegetation is fairly plentiful in protected waters, and in shallow areas of the open lake, particularly near islands. Thus the shallow bays of the northern shore are lined with sedges (Carex spp.) bulrush (Scirpus spp.) and horse-tail

(Equisetum sp.); the considerable sand flats off the mouth of the easternmost river bear a mixture of bulrush and horse-tail; sedges and bulrush are common about the islands near the southern shore; and sedges solidly line the bays of the south-west region. Bulrush clumps are frequently found off points and islands, and in the open water in several locations. Three clumps of floating brownleaf (Potamogeton natens) were noted near the southern shore, but water-lily (Nymphaea advena) was almost entirely restricted to the rivers, as noted above. The distribution of this vegetation is marked on the accompanying sketch map.

Submerged vegetation is quite abundant in this lake in all shallow muddy areas, in depths to at least twelve feet. In the very shallow bays, such as the Y-shaped northern extension, or the large areas at the extreme south-west, the dominant form is Potamogeton zosterifolius, usually in the form of a continuous carpet; elsewhere, in the more open and slighbly deeper areas, Potamogeton perfoliatus and Myriophyllum sp.are the chief forms, usually mixed together in large clumps. A scattering of Sagittaria is occasionally found with these submerged weeds, with other species of Potamogeton.

(b) Plankton

The plankton of this lake was fairly heavy and well diversified. Anabaena was the commonest constituent, with the rotifer Notholca second in abundance. Crustaceans were plentiful and diatoms well represented. The general picture was much like that of other lakes in the same area; a complete listing appears on a later page.

(c) Invertebrates

Annelida-The episitic oligochaete Bdellodrilus was found associated with its host Cambarus near the campsite.

Leech capsules of the family Herpobdellidae were moderately plentiful to common on the rocks of the exposed shores. Two specimens of Haemopis marmorata, 40 mm. and 60 mm. long, were collected along the southern

shore, the smaller being captured while eating a large mayfly. A small placobdellid leech and a specimen of Glossiphonia fusca were taken in the same region, while another G. fusca was removed from the pectoral fin of a pike. Leeches were, however, not numerous.

Gordiacea - A male Paragordius varius was taken in the water near the campsite.

Mollusca - Of lamellibranches, clams were represented by occasional shells and one live specimen of Anodonta grandis footiana taken in the sand beach area, near the middle of the southern shore. The valves measured from 50 to 73 mm. long. In addition, a single valve of the same species was found in a quarter-mile survey along the pebble beaches of the east end of the lake.

Pulmonate gastropods, although not common, were better represented. The sand-flat waters of the extreme south-east, and the protected waters between islands and shore, such as immediately west of the campsite peninsula, contained occasional specimens of Lymnaea stagnalis jugularis of large size (up to 45 mm. shell length) and marked fragility of shell, particularly in the former area. Similar specimens were found in the shore drift of the sand beach, near the middle of the south shore. Here too, and in the protected waters immediately west of the campsite were found smaller numbers of Helisoma trivolvis, again of very large size - up to 33 mm. shell diameter. In the latter area the shells of Gyraulus deflectus obliquus were fairly numerous, but were not noted elsewhere. Finally, but four specimens of Physa gyrina were noted: one on the pebble beach, one on the sand beach, one on the east side of the campsite peninsula, and one from the bottom in approximately eight feet of water off the tip of this peninsula.

Of lesser gastropods, Valvata tricarinata and Amnicola spp. were found in bottom samples and weed tangles, and were present in two of the whitefish taken, but are presumably not present in great numbers; their absence in the suckers is noticeable.

Crustacea - Crayfish remains were noted occasionally on the sand beach and in the neighbourhood

of the campsite peninsula, and two live specimens seen in the latter area. One of these was taken by dipnet and proved to be a male Cambarus affinis 55mm. in body length. Crayfish remains were also identified in five of thirteen pike examined.

The amphipod Hyalella azteca was present in small numbers in the protected area west of the campsite peninsula and in a dredge sample taken just off the tip of the peninsula in ten feet of water, but was not seen elsewhere, nor was it found in any fish.

The cladoceran Daphnia was present in great swarms in some protected areas, such as immediately west of the campsite peninsula, and in some areas of the rocky shore, such as immediately west of the sand beach, forming long brown bands in the water close to the shore line. A similar zone was present the whole length of the pebble beaches at the east end, but none was found in any very shallow sand or silt areas, nor off most of the exposed shores. No specimens were recovered from fish.

Arachnoidea - Red water mites (Hydrachnidae) were frequently seen among the Daphnia clouds (vide supra), and twelve were recovered from one whitefish examined.

Insecta - Ephemeroptera were represented by Hexagenia limbata occulta and related large forms on the wing, while nymphs were recovered from dredge samples and weed tangles, and were also found in two whitefish. Heptageniid nymphs of small size were occasionally found on cobbles of the exposed shores. Nowhere were mayflies common.

Of Odonata, both dragonflies and damselflies were frequently seen on the wing, and three Anisopteran nymphs of large size were collected among the boulders of the south shore.

Most common of Hemiptera were water-boatmen (Corixa), adults and nymphs of which were plentiful among the swarms of Daphnia; other specimens were found in dredge samples. Water-striders (Gerridae) were frequently seen over the submerged sand flat immediately west of the campsite peninsula, but not elsewhere. One specimen of backswimmer (Notonecta) was taken from the cobbles immediately east of the peninsula.

Of Trichoptera, the larvae of Helicopsyche borealis were only moderately plentiful on the rocks of the exposed shores. Limnephilid larvae in the same areas were also not very numerous. Both types were also found in more protected areas, such as west of the campsite peninsula, accompanied by occasional specimens of Phryganea. The characteristic egg-rings of the latter were collected on three occasions. Adult caddis flies were not often noted.

The most obvious Deptera were mosquitoes, the adults being plentiful and annoying at all times on the shore. Calliphoridae were also plentiful at times, especially when fish were being examined. Bloodworms (Chironomidae) were fairly plntiful in dredge samples from mud bottoms, and in weed tangles, while specimens were also found in whitefish and common suckers. No Tabanidae or Simuliidae were observed.

Coleoptera were infrequent. However, considerable numbers of whirligig beetles (Gyrinidae) were found among the emergent vegetation of the sand flats of the extreme south-east. Two small specimens of carnivorous water beetles (Dytiscidae) were collected west of the campsite, but no larvae were found.

(d) Vertebrates other than fish

Amphibia - Several specimens of wood frog (Rana sylvatica) and one swamp cricket frog (Pseudacris nigrita) were collected from a marginal marsh area at the neck of the campsite peninsula.

Aves - Common terns, white pelicans and great northern divers were almost constantly in sight during the daylight hours. A crow and a very few ducks were noted in the distance. Few passerine birds were present, being marked only by song.

Mammalia - Moose tracks were common in marshy areas near the lake, and two adult moose were seen at close range on one of the small islands in the south eastern area. Mice, chipmunks and squirrels were plentiful.

(e) Seine Fish

Minnows were very rare in the open lake;

two schools of four and six Notropis hudsonius were seen off the campsite peninsula, and their alertness and timidity was in marked contrast to similar fish at South Steeprock Lake. In this regard it should be noted that no minnows were found in any fish examined.

Small schools of Notropis hudsonius were, however, seen in some of the rivers. Specimens were collected from the small river near the midpoint of the southern shore by spreading the net across the mouth of the river and stampeding the fish into it; the catch was 98 spottails, all in excellent conditon and from 19 to 59 mm. long. Approximately 5% were infested with Ligula in the coelom. Similar schools of smaller size were noted in the river from South Steeprock Lake and in the river at the extreme southeast of the lake. Occasional specimens were seen over the sand flats near the mouth of this last-named river.

Darters were fairly common in the protected waters west of the campsite peninsula, and two were seen along the length of the pebble beaches. Specimens taken were found to be Boleosoma nigrum, of an average length of 35 mm. This species was sparingly present also over the sand flats and in the river of the far southeast, accompanied in the river by occasional specimens of Poecilichthys exilis of 45 to 50 mm. in length.

Perch (Perca flavescens) of small size were common over the sand flats of the south-east and in the protected waters west of the campsite. No larger specimens were taken, although one 9 inch specimen was briefly hooked.

Very small pike (Esox lucius) were seen on several occasions over the south-east sand flats, and specimens taken.

Sculpins were noted rarely on the exposed shores where boulder and cobble dip fairly sharply into the water under conditions rendering capture very difficult. A specimen finally taken proved to be a Cottus cognatus, 74 mm. long; most specimens seen were considerably less than this in length.

(f) Larger Fish

Two gill nets were set out into the lake

on the south side in depths from 6 to 18 feet, as indicated on the sketch map, for a total of 65 1/4 net-hours. The total catch was 39 pike (Esox lucius), 10 whitefish (Coregonus clupeaformis), 9 common sucker (Catostomus commersonii) and one American burbot (Lota lota maculosa), or 59 fish in all. Five more pike were taken by shore angling, of which two were released.

The pike ranged from 1 lb. 1/2 oz. to 4 lbs. 8 1/2 oz., with most ranging from 1 1/2 to 2 1/2 lbs. In condition they ranged from fair to excellent, and had been feeding on suckers, whitefish and crayfish.

The whitefish ranged from 1 lb. 12 1/2 oz. to 4 lbs. 7 1/2 oz. and were all in magnificent condition - most attractive fish. They had been feeding on bottom insects and molluscs almost exclusively. Six examined in detail were completely free of parasites.

The common sucker ranged from 12 oz. to 2 lbs. 12 1/2 oz. and were in very good to excellent condition. They had been feeding on algal mud and chironomid larvae.

The burbot weighed 2 lbs. 14 1/2 oz. and was in very good condition. The alimentary canal contained only a few pebbles.

Tabled accounts of these fish will be found later in this report.

(g) Parasites

The pike contained the usual large numbers of small and very small tapeworms, the vast majority too tiny for accurate identification; the general appearance was, however, quite characteristic of Proteocephalus pinguis. No Triaenophorus were seen, nor were their larvae present in the whitefish or other fish examined, but it would be injudicious to say the parasite is absent when it is recalled that this lake is in easy communication with South Steeprock Lake where Triaenophorus does occur. In addition to these tapeworms, a single specimen of Raphidascaris canadensis was found. Finally, the plerocercoids of Dibothriocephalus latus were found in 77% of the pike examined, varying in number from

1 to 17 per fish.

The whitefish examined were completely free of parasites.

Half the common sucker examined contained a few specimens of the thorny-headed worm Pomphorhynchus bulbocolli, with smaller numbers of the related Tanaorhynchus.

The burbot contained the usual large numbers of Eubothrium rugosum in the pyloric caeca.

(h) Predators

The only fish predators noted were the common terns, white pelicans and great northern divers listed previously.

FIELD NOTES

This lake is essentially a shallow, mud-bottomed type carrying a considerable amount of weed. The shores in general present a noticeably barren aspect, low even in such characteristic forms as Helicopsyche and Hentagenia: only in occasional stretches of favorable or protected waters is there anything like an abundant fauna. The paucity of small fish and their absence as articles of diet for pike is marked. Gill net productivity seems low, and the lake as a whole is unpromising in spite of the excellent quality of the whitefish.

North Steeprock Lake, June 30th, 1952.

STATION A

Time, 5:45 p.m. Weather, overcast with frequent rain.

Sun, nil Wind, south at 10 to 15 m.p.h. Temperature, 17° C.

Depth	27 feet
Bottom	soft, flocculent grey-brown mud
Surf.temp	16° C
Bottom temp...	15 1/4° C
O_2, surf	8.68 c.c.
O_2, bottom....	7.3 c.c.
pH, surf.....	8.1
pH, bottom....	7.9

STATION B

Time, 10:00 p.m. Weather, completely overcast.

Wind, south at 10 m.p.h. Temperature, 17° C.

Depth	10 feet
Bottom	soft mud as above, with much week
Surf. temp....	16° C
Bottom temp...	16° C
O_2, surf.....	8.7 c.c.
O_2, bottom ...	8.72 c.c.
pH, surf.....	8.1
pH, bottom....	8.2

STATION C

Time, 8 a.m. July 3. Weather, 50% cumulus

Wind, west at 12 m.p.h. Intervals of bright sun.

Secchi disc reading, average ..... 72 inches
Depth, 10 feet
Bottom, soft grey-green algal mud, loose and easily filtered; 1 Physa gyrina, 2 Hyalella azteca, 1 Amnicola, 1 Corixa, much Sagittaria.

PLANKTON ANALYSIS, NORTH STEEPROCK LAKE

Bacillariaceae	
Fragillaria	x
Asterionella	x
Tabellaria	x
Stephanodiscus	x
Navicula	x
Melosira	xx
Synedra	xx
Stauroneis	x
Cyanophyceae	
Anabaena	xxxx
Rivularia	x
Clathrocystis	x
Protococcales	
Pediastrum	x
Botryococcus	x
Conjugales	
Staurastrum	x
Protozoa	
Ceratium	x
Dinobryon	x
Vorticella	xx
Rotifera	
Keratella	x
Notholca	xxx
Synchaeta	x
Crustacea	
Daphnia	x
Bosmina	x
Diaptomus	x
Cyclops	xx
Nauplii	xx

xxxx Predominant forms xxx Very common xx Fairly numerous
x Occasional

DETAILS OF NET SETS, ETC.

1. Net set June 30th, 1952, at 11 a.m. in six to fourteen feet of water, off shore from a point immediately west of the sand-beach; raised 32 hours later; net 2 3/4" x 40 x 45 fathoms.

   Catch: 39 pike, 6 whitefish, 4 common suckers.

2. Net set June 30th, 1952, at 12 noon in eight to eighteen feet of water, off shore from the most salient point of the south-east shore; raised 33 1/4 hours later; net 4 1/4 x 40 x 45 fathoms.

   Catch: 5 common sucker, 4 whitefish, 1 American burbot.

3. Taken by angling: 3 pike (NS-1 to NS-3).

FISH RECORD, NORTH STEEPROCK LAKE

Ref.No.	Spinal Length, Inches	Weight. lb.-oz.	Age, Yrs.	Condition	Alimentary Contents	Parasites
Pike, Esox lucius						
NS-1	21 1/2	3-7 1/2	9	Excellent - very good fat	Slight quantity of fishmeal	12 very tiny tapeworms; 3 Diphylloboth.pleroc
NS-2	21	3-2	9	Excellent - fair fat	2 crayfish (1½"); some fishmeal	v.many tiny tw.; 3 Diphylloboth. pleroc.
NS-3	13 1/4	0-15	7	V.good-little fat	1 crayfish (1"); some fishmeal	Nil
NS-4	23 1/2	4-8 1/2	11	V.good-fair fat	1 sucker (9 1/8"); 9 1/2 oz.	9 Diphyll. pleroc.
NS-5	22 1/2	3-4 1/2	10	Excellent - v.good fat	Crayfish remains at rectum	10 v.tiny tw.; 1 Raphidascaris; 15 Diphyllob. pleroc.
NS-6	20 1/2	2-14	9	V.good-fat quite good	1 fish(4",coregonid?); fishmeal	30 sm.& med.tw.; 5 Diphyll. pleroc.
NS-7	15 1/4	1-5 1/2	7	V.good-fat excellent	Nil	V. many tiny tw.; 1 Diphyll. pleroc.
NS-8	19 3/4	2-8 1/2	9	Fair-no fat	1 sucker (5¾"); 1 fish (4"+);meal	50 sm. & med. tw.; 17 Diphyll.pleroc.
NS-9	18	2-0 1/2	8	V.good-fat only fair	Remains of 5 crayfish (1 1/2")	30 med. tw.; 2 Diphyll. plerocercoids
NS-10	19 1/2	2-10	9	Fair-v. fat	Nil	6 sm. & med.tw; 14 Diphyll. pleroc.
NS-11	14 5/8	1-1	7	Good-v.little fat	1 whitefish (6")	V.many sm.tw.; 1 Diphyl plerocercoid.
NS-12	14 7/8	1-3	7	Exc.-v.good f.	1 sucker (4½")	6 med. tapeworms.
NS-13	18 3/4	2-4½	8	v.good-only fair fat	Crayfish remains	c.200 sm. & med. tw.;
American burbot, Lota lota maculosa						
NS-14	22 1/8	2-14½	7	v.good-no fat	A few pebbles	Caeca choked w. Eubothrium
Whitefish, Coregonus clupeaformis						
NS-15	16 7/8	4-7½	12	Female, excell.; much fat	3 Chironom. pupae; 13 Hydrachnids	Nil
NS-16	16 3/4	3-15	11	Male; excellent much fat	3 Chironom. pupae;	Nil
NS-17	15 3/4	3-5½	10	As last	1 Chironom. pupae; 9 Hexagenid nymp. 3 Corixa	Nil
NS-18	14 1/8	2-5½	8	Fem.; excellent v.little fat	16 Amnicola & Valvata; 1 Corixa; much insect debris.	Nil
NS-19	14 1/8	2-5	9	Male; excellent v.little fat	Packed w.Valvata; 2 Corixa, 1 Hexagenia nymph	Nil
NS-20	16 7/8	4-0½	11	Fem; excellent; quite fair fat	Nil	Nil

NORTH STEEPROCK LAKE - (cont'd)

Ref.No.	Spinal Length, Inches.	Weight, lb.-oz.	Age, Yrs.	Condition	Alimentary Contents	Parasites
Common sucker, Catostomus commersonii						
NS-21	15 1/2	2-12½	4	Excellent - very fat	Filled with algal mud; few bloodworms	Nil
NS-22	10 1/4	0-12½	2	Quite good; slight fat	As last	14 Thornyheads
NS-23	15	2-6	3	Excell; v. fat	Filled algal mud	Nil
NS-24	15	2-7	3	Excell; v. fat	Filled algal mud	Nil
NS-25	13 3/4	2-0	3	Excell; v. fat	Filled algal mud	Nil

Other fish taken at North Steeprock Lake

Pike, Esox lucius

19 1/4 inches; 2 lb. - 2 oz.
18 3/4 "; 2 - 0
20 1/2 "; 2 - 9
17 1/2 "; 1 - 14
17 1/8 "; 1 - 4 1/2
18 3/4"; 2-0 1/2
14 1/2"; 1-0 1/2
19 1/4"; 2 - 0
20 3/4"; 2-14
18 3/4"; 2-3 1/2
17 1/4 "; 1 - 9
18 1/4 "; 1 - 12 1/2
19 1/4 "; 2 - 4 1/2
21 1/4 "; 2 - 12
17; 1 - 11
16"; 1 - 3 1/2
17"; 1 - 7 1/2
17"; 1 - 11 1/2
19 1/4"; 2-3
20 1/2"; 2-6 1/2
18"; 1 - 15
18 3/4"; 2-0½
19 3/4"; 1-14
20 1/8"; 2-0
17 1/2"; 1-10
20 3/4"; 2-12
20 1/8"; 2-8
20 5/8"; 2-11 1/2
20 3/4"; 2-9 1/2

Whitefish, Coregonus clupeaformis

13 3/4"; 2-1
14 5/8"; 2-11 1/2
13 "; 1 - 12 1/2
16"; 4 - 2 1/2

Common sucker, Catostomus commersonii

15; 2 - 7
10"; 0 - 12
12 1/2"; 1 - 8 1/2
11 1/4"; 1 - 2

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