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FISHERIES SURVEY OF BIG PLATTE LAKE AND ROUND LAKE WITH SOME OBSERVATIONS ON THE LOWER PLATTE RIVER, BENZIE COUNTY, MICHIGAN

by

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Big Platte and Round Lakes are located in the northwest part of Benzie County in Lake and Benzonia townships. A more complete description of their locations is as follows:

Big Platte Lake - T. 26, 27 N., R. 15 W., Sec. 1, 2, 3, 12, 26, 27, 33, 34, 35, 36.
Round Lake - T. 27 N., R. 15 W., Sec. 28.

They are both "river lakes" in that the Platte River flows directly through them. The Platte River enters Big Platte Lake at the southeast end and leaves at the northwest end. It is about 1¼ miles by stream from Big Platte to Round Lake. Here the river enters the lake from the north and leaves from the northwest, traveling about 2½ miles to enter Lake Michigan.

Maps of these lakes were prepared by the Institute* during the winter

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*Personnel of the mapping party was as follows: Richard Bohland, leader; Frank Lydell and William Mason, assistants.

of 1939-40, and these were used as bases for plotting other information relative to the fisheries survey* which was conducted during June and July, 1940.

We wish to acknowledge aid and accommodations received from Messrs. H. I. Galvin, William Reynell, Amidon and William Beidler during the survey on these lakes.

Both Big Platte and Round Lakes were extensively used for log transport during the lumbering days. Many deadheads still remain in these lakes and are important as cover for fish. At present there are no industrial establishments of any kind in this vicinity. About 165 cottages and residences are found on the immediate shores of Big Platte Lake and many more a short distance away. There are no hotels, but at least six resorts have cottages and boats for rent. Round Lake has no cottages and only one boat livery, but Benzie State Park and a resort at Edgewater are only about a mile up the river. Both lakes are readily accessible. Big Platte Lake has an excellent road going all the way around it and Round Lake is accessible from this same main road, as well as by boats from the river.

The waters of the lower Platte River and the two lakes under consideration here have enjoyed a good fishing reputation, but according to reports both the number and size of the fish caught have been gradually decreasing.

Regarding the geological origin of the Platte Lakes, Dr. I. D. Scott in his book "Inland Lakes of Michigan" writes as follows:

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*Personnel of the fisheries survey party was as follows: John Funk, leader; David Anderson, William Reavley and Michael Meyer, assistants.

"The writer attempts no explanation of the origin of the lake basins in this flat because the area was covered by one of the predecessors of Lake Michigan and is, therefore, masked by sand. Whatever the type of basin, it is known that this area was once flooded, with the exception of a group of high morainic hills on the north shore of Big Platte, and furthermore was connected with Crystal Lake through the Round Lake depression which is followed by the road. The narrow connection between the two lakes was closed by a bar along the Crystal Lake shore and the main depression at least partially separated from the main lake in a similar manner."

The basin of Big Platte Lake is oblong in shape with a maximum length of 3.4 miles and a maximum width of 1.6 miles. Its main axis runs in a northwest-southeast direction. The only prominent irregularity in the shoreline is Birch Point, which projects out from the western end of the south shore and forms a deep bay to the eastward. Round Lake is also oblong in shape with its long axis extending in the same general direction as Platte Lake. It has a maximum length of 0.7 mile and a maximum width of 0.3 mile.

The surrounding country is more or less hilly with the immediate shore somewhat low and swampy. This low area around Round Lake is quite heavily wooded. To the east and west of Big Platte Lake the valley of the Platte River appears as a flat, swampy depression. This extends also to the north to include Little Platte Lake, which is separated from Big Platte by a low sandy ridge.

As already mentioned above, Big Platte and Round lakes are part of

the Platte River drainage, which originates in Lake Ann and drains most of Almira and Platte townships, as well as the northern part of Island, Homestead and Benzonia townships. The soil in this area is generally sandy. Large tracts have been cleared for agricultural purposes, but the poor soil makes farming rather unproductive. Fruit is the principal crop.

A summary of the physical characteristics of these lakes is given in the following table.

Lake	Area, acres	Maximum depth, ft.	Shore develop-ment	Approx. per cent shoal	Bottom Type — Shoal Depths		Water color	Secchi disc, ft.
Big Platte	2,516	90	1.9	35	Sand, marl, rubble	Marl, muck	Colorless	11
Round	95	66	1.5	20	Sand, marl	Marl, muck	Colorless	14

The basin of Big Platte Lake is fairly regular with the major depression in the northwest end. This depression, however, extends as a long arm well up past the center of the lake. The deepest point is about one-half mile due south of the outlet. In Round Lake the depression is located in the southeast end, but extends about 3/4 the length of the lake. The deepest point is about 750 feet northwest of the point where the road touches the lake. The drop-off is very gradual in Big Platte Lake, except at the extreme northwest end. In Round Lake the slope is rather abrupt.

The Platte River where it enters Big Platte Lake is approximately 20-30 feet wide and 5-6 feet deep in the deepest part. The current is moderately

swift. The margins are low and marshy and in many cases encroaching. A delta of considerable extent has been formed at the mouth (indicated on the map). Where the water spreads out on entering the lake, a fan-shaped area is formed over which the water is less than a foot in depth. A few drainage ditches also enter the lake, but their volume is insignificant. At the outlet the river is 40-50 feet wide and one to two feet deep. Its current is moderate. There is no dam in the outlet. Local residents report some fluctuation in the level of the lake, as might be expected with the large inlet and a fairly large drainage basin. However, the fluctuation apparently does not exceed a foot or so, and this does not appear to seriously affect the productivity of the lake.

Where the river enters Round Lake, it is from 30-40 feet wide and about five feet in the deepest part. It has a moderate rate of flow. The margins are low and marshy. It has formed a delta of considerable extent at its mouth -- a fan-shaped area of shallow water about two feet deep. The outlet is 50 or more feet wide and four to six feet deep in the deepest part. The rate of flow is moderate. There is no dam in the outlet. The water fluctuation is about the same as that of Big Platte Lake.

The physical factors operating in these two lakes are favorable, for the most part, to high productivity. Even though their long axes are parallel to the prevailing winds, there is sufficient shore irregularity and protection to limit the effect of wave action. Big Platte has a shore development of 1.9, and Round Lake, of 1.5. This means that Big Platte Lake has approximately twice as much shoreline as it would have if the lake were perfectly round. Round Lake has $1\frac{1}{2}$ times more shoreline than if the lake were round as indicated by its name.

In Big Platte Lake a considerable part of the shoal is swept clean by the waves, but large weed beds have established themselves in the bays and protected places. Practically all of the shoal in Round Lake is suitable for plant growth. The shoals are predominantly sand and marl, but also contain considerable quantities of organic materials. The bottom of the deeper areas is predominantly marl and muck.

The water in these lakes is colorless and relatively clear. The secchi disc readings are about average for Lower Peninsula lakes.

The temperature and chemical conditions found in these lakes are summarized below.

Temperature and Chemical Conditions

Big Platte Lake

Station number	1			2			3		4	
Location	Deepest part ½ mile south of inlet			Center of bay to east of Birch Point			Outlet of Platte River		Inlet of Platte R.	
Date	7-3-40			7-3-40			7-3-40		7-4-40	
	Depth ft.	Temp. °F.	Oxygen p.p.m.	Depth ft.	Temp. °F.	Oxygen p.p.m.	Temp. °F.	Oxygen p.p.m.	Temp. °F.	Oxygen p.p.m.
Surface	..	66	8.3	..	68	8.5	68	8.8	52	9.1
Bottom	83	50	3.1	54	53	5.9	..	...	..	...
Thermocline										
Top	30	64	8.3	33	63	8.3	..	...	..	...
Bottom	42	54	6.6	39	56	7.0	..	...	..	...
CO_2 - range	0.0 - 7.5			0.0 - 4.0			0.0		3.0	
M.O. alkalinity - range	147.0 - 156.0			141.0 - 148.0			129.0		156.0	
pH range	8.2 - 7.4			8.2 - 7.7			8.1		8.0	

Round Lake

Station number	1		2			3	
Location	Inlet, mouth of Platte River		Deepest part, 250 yds. N.W. of Beidler Dock			Outlet, head of Platte River	
Date	7-9-40		7-9-40			7-9-40	
	Temp. °F.	Oxygen p.p.m.	Depth ft.	Temp. °F.	Oxygen p.p.m.	Temp. °F.	Oxygen p.p.m.
Surface	74	10.2	..	74	9.1	75	9.6
Bottom	..	...	65	47	0.4	..	...
Thermocline							
Top	..	...	24	66	9.6	..	...
Bottom	..	...	39	50	6.1	..	...
CO_2 - range	0.0		0.0 - 8.0			0.0	
M.O. alkalinity - range	142.0		139.0 - 150.0			145.0	
pH range	8.0		7.4 - 8.2			8.2	

Both Big Platte and Round Lakes showed marked thermal and chemical stratification at the time of the survey. Over the major depression in Big Platte Lake, the thermocline (zone of rapid changing temperature) was between 30-42 feet. In Round Lake this zone was between 24 and 39 feet, with a drop in temperature of 24° F. The bottom water had a temperature of 50° F. in Big Platte and 47° F. in Round Lake.

Dissolved oxygen was abundant at the surface (8.3-10.2 p.p.m.) in both these lakes. This was reduced to 3.1 p.p.m. at 83 feet in Big Platte and 0.4 p.p.m. at 65 feet in Round Lake. It is very probable that all the deeper water in both lakes becomes untenantable for fish during the late summer. However, the layer of water including the thermocline and immediately below very probably retains enough oxygen for fish life even through the stagnation period of late summer. This is significant

because in this zone the temperatures are near the optimum for cold-water fishes such as trout and whitefish.

Carbon dioxide varied from 0.0 p.p.m. at the surface to 8.0 p.p.m. at the bottom of these lakes. The water is distinctly alkaline from the surface to the bottom as indicated by a pH of 7.4-8.2. It is also moderately hard -- Methyl Orange alkalinity range 139-156 p.p.m.

The water flowing into Big Platte Lake from the Platte River was found to be colder, to have more oxygen (9.1 p.p.m.), more carbon dioxide (3.0 p.p.m.) and a higher Methyl Orange alkalinity (156.0) than the general surface water of the lake.

The general temperature and chemical conditions found in these two lakes are, for the most part, favorable to good fish production. The surface layer of water is warm, permitting satisfactory growth of warm-water fish. The intermediate layer remains cold enough to support cold-water fish and the bottom (depths) layer, while suitable for cold-water fishes during spring, early summer and fall, becomes unsuitable during mid-summer and possibly late winter due to the depletion of oxygen by the decomposition of organic deposits present in the lake. The other chemical factors such as pH, Methyl Orange alkalinity, and carbon dioxide are favorable for good fish production.

An abundance of aquatic vegetation is very essential to high fish productivity. Big Platte Lake has many plant beds. Bulrushes (Scirpus occidentalis) are emergent along the shoal all around the lake, but particularly in the east end and along the shallow north shore. Pond-weeds (Potamogeton), milfoil (Myriophyllum), etc., are abundant along

the drop-off all around the lake. Muskgrass (Chara) is common in all parts of the lake. The shallow water at the east end in the vicinity of the mouth of the Platte River is completely covered with bulrushes, pondweeds, etc. Several large beds of reeds (Phragmites) are found here and on the broad shoal off Birch Point.

Round Lake is also very rich in plant life. As was mentioned above, the physical conditions are almost ideal for maximum plant production and that maximum is almost realized. All along the shoal to a depth of 14-15 feet plants were abundant. Frequently the shores were encroaching with sweet gale (Myrica Gale) and water willow (Decodon verticillatum). Bulrushes (Scirpus) and some reeds (Phragmites), cattail (Typha) and bur-reed (Sparganium) were emergent all the way around the lake. Submerged, pondweeds (Potamogeton) and milfoil (Myriophyllum) are abundant, while practically the entire bottom is covered with musk grass (Chara).

Thirty-two species of plants were collected from these lakes. A summary showing the different kinds, their general abundance, depth of their growth and kind of bottom used is given in the following table.

Plants* from Round Lake and Big Platte Lake

Common name	Scientific name	Round Lake				Big Platte Lake			
		Station	Abundance	Range depth ft.	Bottom type	Station	Abundance	Range depth ft.	Bottom type
Waterweed	Anarchis canadensis	1, 5	over entire area	3-15	M, Mk	1,8,9	sparse	1-15	M
Sedge	Carex substricta	3	abundant	0-½	M, Mk	...	...	...	...
Coontail	Ceratophyllum demersum	...	...	...	..	8, 9	abundant	1-3	M
Swamp loosestrife	Decodon verticillatus	5, 6	common	0-1	M, Mk	9	abundant	0-1	M
Mud Plantain	Heteranthera dubia	5	abundant	½-1	M, Mk	9	sparse	1-2	M
Sweet gale	Myrica Gale	...	...	...	..	8	abundant	0-1	Mk
Water milfoil	Myriophyllum sp.	1,3,4,5,6	common	0-15	M, Mk	1,2,5,8,9	common	1-15	S,R,Mk
Water lily	Nymphaea odorata	6	abundant	1-3	M, Mk	...	...	...	...
Yellow water lily	Nuphar advenum	3, 5	abundant	1-5	M, Mk	5,8,9	abundant	1-3	M, S
Reed grass	Phragmites communis	3	common	0	M, Mk	1	abundant	2-3	S
Large-leaf pondweed	Potamogeton amplifolius	1, 6	common	3-10	M, Mk	3,4,5	sparse	5-20	M,R,S
Pondweed	Potamogeton angustifolius	4	common	3-15	M, Mk	6,7,8,9	common	2-20	Mk
Pondweed	Potamogeton Friesii	2, 5	sparse	0-10	M, Mk	...	...	...	...
Pondweed	Potamogeton gramineus var. graminifolius f. myriophyllus	2, 3	sparse	0-3	M, Mk	5,8	common	2-10	Mk, S
Variable pondweed	Potamogeton gramineus	3, 4	sparse	3-15	M, Mk	...	...	...	...
Floating-leaf pondweed	Potamogeton natans	2,3,4,5,6	common	0-15	M, Mk	4,5,8,9	common	1-15	Mk, R
Sago pondweed	Potamogeton pectinatus	2,3,4,6	common	0-10	M, Mk	...	...	...	...
Whitestem pondweed	Potamogeton praelongus	...	...	...	..	6	common	10-20	S, R
Pondweed	Potamogeton pulcher	...	...	...	..	2	sparse	10-20	M
Clasping-leaf pondweed	Potamogeton Richardsonii	1,2,3,4,5,6	common	3-15	M, Mk	5,6,8,9	common	1-15	S, D
Robbins pondweed	Potamogeton Robbinsii	4,5,6	common	3-15	M, Mk	1,2,4,8,9	common	1-20	M,R,Mk
Flat-stemmed pondweed	Potamogeton zosteriformis	1	common	3-10	M, Mk	2,8,9	common	1-20	Mk
Stiff water crowfoot	Ranunculus longirostris	5	sparse	½-2	M, Mk	...	...	...	...
Hardstem bulrush	Scirpus acutus	2,3,5,6	abundant	0-5	M, Mk	1,4,5,7,8	common	0-10	S
Bulrush	Scirpus americanus	...	...	...	..	7	abundant	0-2	S
Bur reed	Sparganium eurycarpum	...	...	...	..	8, 9	abundant	0-3	S
Bur reed	Sparganium sp.	5	common	2-5	M, Mk	...	...	...	...
Big duckweed	Spirodela polyrhiza	...	...	...	..	8, 9	abundant	surface	S
Cattail	Typha latifolia	5, 6	common	0-2	M, Mk	8, 9	abundant	0-2	S
Bladderwort	Utricularia vulgaris var. americana	6	sparse	5	M, Mk	...	...	...	...
Wild celery	Vallisneria americana	5	sparse	1	M, Mk	2,5,8,9	common	1-20	S
Muskgrass	Chara fragilis	1,2,3,5,6	abundant	0-15	M, Mk	5,8,9	abundant	0-15	S

*Plant determinations made by John Funk and Betty Robertson.

Symbols: S = sand M = marl Mk = muck R = rubble D = detritus

A preliminary study was made of the fish food organisms found in these lakes. Plankton (small microscopic plants and animals) was relatively abundant in Big Platte Lake with an average of 1.36 c.c. per cubic meter of water, and rather scarce in Round Lake with an average of 0.64 c.c. per cubic meter. Phytoplankton, or plant organisms, predominated in the collections made. These figures, however, are very apt not to represent average conditions throughout the year. It is known that plankton may vary greatly from day to day and place to place in a given lake. It follows, therefore, that a single set of samples taken at one time and one place can give nothing more than a very general indication of plankton species or abundance.

In Big Platte Lake, fish food organisms such as immature insects, amphipods and other invertebrates were abundant. The organism most commonly found in the region of submergent vegetation was the amphipod (fresh-water shrimp). Three pounds of plants (wet weight) consisting chiefly of pondweeds and milfoil yielded 139 amphipods. Other organisms commonly found in the weed beds were midge larvae and pupae, caddis larvae, mayfly larvae and aquatic worms. Crayfish, snails and clams seemed to be rather common. Several local emergences of stoneflies were observed along the shoals and shores, although few immature forms were obtained.

Samples taken with the Ekman dredge in deep water showed midge larvae to be very common. Although few mayflies were found in the deeper waters, cast skins were rather abundant on the surface. At least one emergence of the large, deep-water mayflies was observed.

In Round Lake the sandy shoals supporting only bulrushes are comparatively barren of insect life. In that region the shrimps, midge larvae, and snails were the most common. The zone which supported a more varied selection of plants of the submergent type proved to be more productive. This region makes up a large part of the area. Midge larvae were the most common group, with scuds coming next in order. Dragonfly larvae were found quite frequently. Many adults were observed flying over the surface of the water. The deep water samples contained an abundance of midges. Aquatic worms were fairly common.

An attempt was made to determine the kinds and abundance of fish found in these lakes. A summary of the fish collected and reported, as well as the stocking records for the past six years, is given in the table below.

In Big Platte Lake yellow perch were the most abundant, while rock bass and great northern pike were common. A few smallmouth bass and rainbow trout were collected. No bluegills were taken, although they have been reliably reported as common.

The most abundant forage fishes were the straw-colored shiner, mimic shiner and blunt-nose minnow. The common shiner, log perch and johnny darter were also common. The common sucker was frequently taken. The long-nosed gar was the only obnoxious fish taken, but the dogfish (Amia calva) was reported.

Species	Big Platte Lake		Round Lake	
	Abundance	Plantings 1934-1939	Abundance	Plantings 1934-1939
Game Fish				
Perch (Perca flavescens)	abundant	20,000	abundant	...
Northern pike (Esox lucius)	common	...	common	...
Walleye pike (Stizostedion vitreum)	none taken or reported	1,320,000	...	...
Rock bass (Ambloplites rupestrus)	common	...	abundant	...
Smallmouth bass (Micropterus dolomieu)	common to rare	1,500	rare	100
Largemouth bass (Huro salmoides)	reported very rare	2,800	rare	...
Bluegill (Lepomis macrochirus)	reported common	45,000	reported rare	...
Pumpkinseed (Lepomis gibbosus)	very rare	...	...	...
Long-eared sunfish (Lepomis megalotis peltastes)	...	...	very abundant	...
Rainbow trout (Salmo gairdnerii irideus)	common to rare	...	...	...
Cisco (Leucichthys sp.)	rare	...	...	...
Smelt (Osmerus mordax)	reported rare	...	reported rare	...
Forage Fish				
Straw-colored shiner (Notropis deliciosus)	abundant	...	common	...
Blunt-nose minnow (Hyborhynchus notatus)	abundant	...	abundant	...
Log perch (Percina caprodes semifasciata)	common	...	common	...
Johnny darter (Boleosoma nigrum)	common	...	common	...
Rosy-faced shiner (Notropis rubellus)	rare	...	rare	...
Common shiner (Notropis cornutus)	common	...	common	...
Mimic shiner (Notropis volucellus volucellus)	abundant	...	...	...
Spot-tail shiner (Notropis hudsonius hudsonius)	rare	...	...	...
Black-nosed minnow (Notropis heterolepis heterolepis	rare	...	rare	...
Iowa darter (Poecilichthys exilis)	rare	...	...	...
Horny-headed chub (Nocomis biguttatus)	...	...	rare	...
Trout-perch (Percopsis omescomaycus)	very rare	...	...	...
Menona killifish (Fundalus diaphanus menona)	...	...	common	...
Creek chub (Semotilus atromaculatus)	...	...	rare	...
Coarse Fish				
Silver mullet (Moxostoma anisurium)	...	...	rare	...
Common sucker (Catastomus commersonii)	abundant	...	common	...
Brown bullhead (Ameiurus nebulosus)	reported rare	...	rare	...
Obnoxious Fish				
Long-nose gar (Lepisosteus osseus oxyurus)	common	...	...	...
Dog-fish (Amia calva)	reported common	...	reported	...

In Round Lake the long-eared sunfish (which seldom if ever reaches a length of six inches in Michigan) was very abundant. Rock bass and yellow perch were fairly abundant, while smallmouth bass and northern pike were common. The most abundant forage fish was the blunt-nose minnow. The menona killifish, straw-colored shiner, log perch and johnny darter were common at most of the seining stations. The common sucker was the only abundant coarse fish taken. The dogfish is reported to be present, but no obnoxious species were seen by the survey party.

Both Big Platte and Round lakes have abundant areas of sand and gravel suitable for the spawning of smallmouth bass, bluegills, etc. There is also a considerable amount of weedy, marshy areas which are very probably used for spawning by northern pike. The weedy shoals are extensive and give abundant space for perch reproduction. The deadheads and trash along the shoal areas offer ideal spawning places for many of the forage fish. On the whole, the means for natural reproduction is good in both these lakes.

A growth rate study was made on the game fish collected. A summary of the age groups, along with average lengths and weights, is given below.

Lake	Species	Age group*	No. of specimens	Av. total length in inches	Av. weight in ounces
Big Platte	Perch	I	4	3.0	0.17
	"	II	7	3.8	0.28
	"	III	14	5.2	0.9
	"	IV	16	6.1	1.5
	"	V	11	7.1	3.0
	"	VI	8	7.8	3.2
	"	VII	6	8.5	4.5
	"	VIII	2	9.6	6.6
	"	IX	1	7.7	3.8
	Great northern pike	IV	1	30.1	101.0
	" " "	V	1	30.7	99.0
	" " "	VI	1	26.7	73.0
	" " "	VII	1	27.7	70.5
	" " "	VIII	1	27.0	72.5
	" " "	IX	1	30.9	96.5
	" " "	XI	1	32.2	140.0
	Smallmouth bass	II	3	8.4	4.9
	" "	III	3	11.3	11.1
	" "	V	1	16.5	32.5
	" "	VI	1	16.2	37.5
	" "	IX	1	18.0	48.0
	Rock bass	II	6	2.8	0.3
	" "	III	2	5.6	2.3
	" "	IV	5	6.3	3.5
	" "	V	1	7.0	4.5
	" "	VI	2	7.6	5.4
	" "	VII	2	7.6	5.5
	" "	VIII	1	10.2	11.5
	" "	IX	1	10.8	15.2
	Pumpkinseed	II	1	3.7	0.6
	Rainbow trout	II	3	8.9	5.5
	" "	III	1	11.1	7.7
	Cisco	IX	1	14.7	20.0
		X	1	14.2	22.5
Platte River (near Round L.)	Smallmouth bass	I	2	5.0	1.1
	Rock bass	IV	1	5.6	2.4
	" "	VI	2	7.0	4.2
	" "	VII	1	7.8	6.4
Round Lake	Perch	IV	4	6.5	1.6
	"	V	1	6.1	1.3
	Great northern pike	I	1	14.9	11.5
	" " "	III	1	22.3	38.0
	" " "	VII	1	25.0	48.5
	Rock bass	III	1	3.8	0.79
	" "	IV	1	3.8	0.70
	" "	VI	2	7.6	5.6
	" "	VIII	1	7.8	6.6
	Long-eared sunfish	III	10	2.9	0.4
	" "	IV	11	3.4	0.7
	" "	V	1	3.6	0.7
	" "	VII	1	4.2	1.2
	Smelt	II	1	9.5	3.0

*Age determinations made by W. C. Beckman.

The perch in these lakes reach legal length early in their fifth summer. The rock bass also grow very slowly, reaching legal length in about the same length of time. These two species certainly are below the average for Lower Peninsula lakes. Northern pike reached legal length in their second summer in Round Lake. The seven specimens studied from Big Platte Lake varied in age from 4 to 11 years and in total length from 26.7 to 32.2 inches. Smallmouth bass reached 10 inches in length late in their third or early in their fourth summer. The two rainbow trout collected were in their third and fourth summer of life and had lengths of approximately 9 and 11 inches respectively.

These studies, while based on far too few specimens to have much significance, show slow growth for perch and rock bass, fair growth for smallmouth bass and rainbow trout, and good growth for northern pike.

A summary of the creel census information on Big Platte and Round lakes collected since 1928 is given in the following tables.

Big Platte Lake - Creel Census

General

Year	No. of fishermen	No. of hours fished	No. of legal fish caught	Catch per hour	Catch per fisherman	Average hours per fisherman-day
1928	29	69.00	33	0.5	1.1	2.4
1929	30	87.00	37	0.4	1.2	2.9
1930	65	161.00	93	0.6	1.4	2.5
1931	67	204.00	149	0.7	2.2	3.0
1932	21	45.00	27	0.6	1.3	2.1
1934	48	117.00	79	0.7	1.6	2.4
1935	138	309.00	180	0.6	1.3	2.2
1937	258	598.00	140	0.2	0.5	2.3
1938	41	110.00	206	1.9	5.0	2.7
1939	125	187.00	100	0.5	0.8	1.5
Total and average	822	1,887.00	1,044	0.6	1.3	2.3

Number of each species

Year	L.M. bass	S.M. bass	Blue-gill	Sun-fish	Yellow perch	Rock bass	Wall-eye	North. pike	Bull-head	Smelt	Sucker	Red-horse	Muskel-lunge	Total
1928	1	3	..	..	17	11	..	1	..	..	..	..	..	33
1929	1	3	1	..	11	20	..	..	1	..	..	..	..	37
1930	2	9	4	..	43	25	..	7	1	..	1	..	1	93
1931	2	6	..	..	26	100	..	11	..	..	1	3	..	149
1932	..	..	..	..	9	18	..	..	..	..	..	..	..	27
1934	2	25	1	1	16	33	..	1	..	..	..	..	..	79
1935	1	25	6	22	69	49	1	5	2	..	..	..	..	180
1937	1	9	6	4	45	75	..	..	..	..	..	..	..	140
1938	..	1	5	9	95	47	..	..	..	..	..	..	..	157
1939	1	12	2	7	35	40	..	3	..	..	..	..	..	100
Total	11	93	25	43	366	418	1	28	4	..	2	3	1	995

Round Lake - Creel Census

General

Year	No. of fisherman	No. of hours fished	No. of legal fish caught	Catch per hour	Catch per fisherman	Average hours per fisherman-day
1928	9	38.00	29	0.8	3.2	4.2
1929	14	48.00	17	0.4	1.2	3.4
1930	5	19.00	37	1.9	7.4	3.8
1931	8	34.50	37	1.1	4.6	4.3
1934	19	63.50	336	5.3	17.8	3.3
1935	16	15.50	7	0.5	0.4	1.0
1938	16	51.00	71	1.4	4.4	3.2
1939	6	13.50	6	0.4	1.0	2.3
Total or average	93	283.00	540	1.9	5.8	3.0

Number of each species

Year	L.M. bass	S.M. bass	Blue-gill	Yellow perch	Rock bass	Northern pike	Smelt	Red-horse	Muskel-lunge	Total
1928	1	..	..	..	27	1	..	..	..	29
1929	..	..	..	7	9	1	..	..	..	17
1930	..	..	..	12	20	5	..	..	..	37
1931	..	7	..	5	22	3	2	..	..	39
1934	..	..	..	334	..	..	..	..	..	334
1935	..	2	2	3	..	..	..	..	..	7
1938	..	..	..	70	..	..	..	1	..	71
1939	..	..	..	6	..	..	..	..	..	6
Total	1	9	2	437	78	10	2	1	..	540

Records were secured from 822 fishermen on Big Platte Lake during the eleven-year period from 1928-1939. The catch per hour was 0.6 fish. Approximately 42 per cent of the total fish taken by these fishermen were rock bass, 37 per cent yellow perch, 10 per cent smallmouth bass, four per cent sunfish, three per cent northern pike and three per cent bluegills. There was no significant change in the ratio between the species, except sunfish were not reported until 1934.

In Round Lake 93 catch records were reported for the same period. The catch per hour was 1.9 fish. Approximately 80 per cent of all the fish taken were yellow perch, 15 per cent rock bass, and two per cent each of bluegills and bullheads.

Creel census records of this character, however, are not complete enough to give much reliable information when applied to individual lakes, but do show general trends when averaged for many different waters. They may, however, indicate the general abundance of game fishes and give some information on how good the fishing really is.

Lower Platte River

The lower Platte River was scouted by the survey party at the time of the fisheries survey of Big Platte Lake. It is slightly over a mile by river from Big Platte to Round Lake. The general direction of flow is west. From Round Lake the river flows in a northwesterly direction about two miles to Lake Michigan.

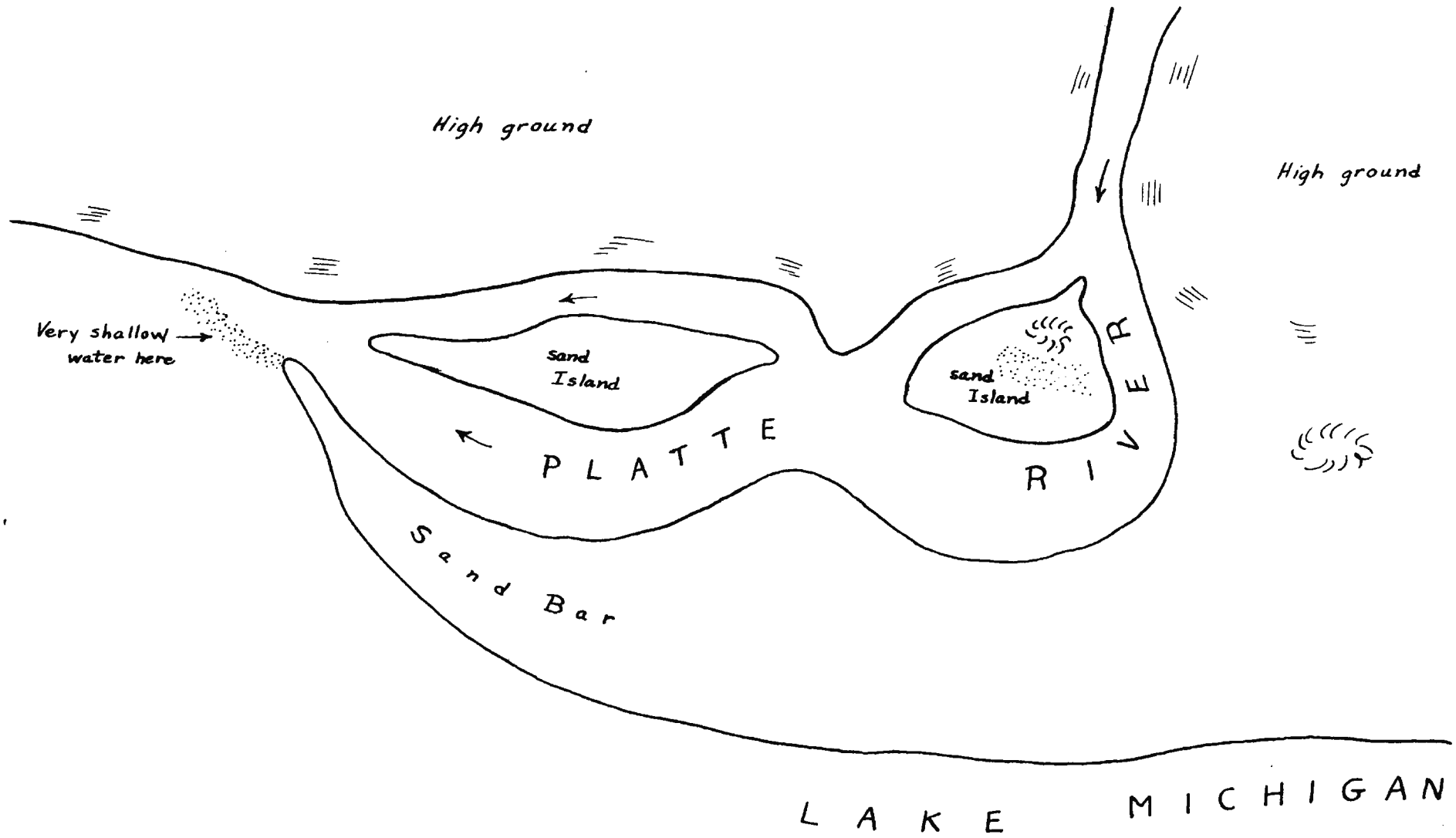
Both sections are extremely beautiful stretches of water. The shores are almost entirely wooded, the margin is bordered with water lilies, cattails and iris, and the bottom in many places supports a heavy

growth of pondweeds, milfoil and musk grass. There are numerous cut banks, deadheads, stumps and deep pools to furnish cover for fish. The stream varies from about 30 to 50 feet in width, and the depth in the deepest parts of an average cross-section would probably be between three and four feet. With care the entire distance can be negotiated with an outboard motor. In general, the upper part is more shallow and of more uniform depth, while the lower part has many deep holes.

The temperature in the lower Platte River is too high for trout during the summer. However, smallmouth bass, perch and rock bass are numerous. In the lower portion, many smallmouth bass a foot or more in length were observed.

The mouth of the river at Lake Michigan is partially blocked by a sand bar. This is best explained by the accompanying sketch (p. 21). The water is very shallow at the actual outlet, being little over ankle deep.

This condition at the mouth of the river has been the basis for much agitation. Many people believe that the fish are unable to get into the river to come up and spawn. It is almost certain that the rainbow trout cross the bar and enter the river, because of the number appearing at the weir upstream. Just how much this obstruction affects the movement of smallmouth bass can only be tested by experimentation. In other places along the Great Lakes, smallmouth bass use the lake shoals for spawning in the vicinity of river mouths, apparently attracted there by the current, but at the same time fail to migrate into the river proper. It is very probable that if smallmouth bass had the urge to migrate into the Platte River, the sand bar would not turn them away. This problem needs more study, however, if definite information is required on this point.


High ground
High ground
Very shallow water here
sand Island
sand Island
PLATTE RIVER
Sand Bar
LAKE MICHIGAN

Management Suggestions

At the present time, Big Platte and Round lakes are in the "all other lakes" classification. The fisheries survey has given no information that would make a change to another classification seem urgent. However, either of two distinct management policies is suggested. One of these should be followed in accordance with the best interests of the people concerned.

Policy No. I

These lakes should be kept in their present classification. Black bass and bluegills should be the species to be encouraged. It is extremely doubtful that future plantings of these species would increase the fish production, since spawning facilities and shelter are good for largemouth bass, smallmouth bass and bluegills, and the number of young produced is almost surely greater than the carrying capacity of the lakes. Perch and pike also find conditions suitable here for natural propagation. In the case of perch, it would seem wise to reduce the number as much as possible in order to increase their growth rate, which at the present time is very slow as compared to many other lakes in the state.

Although these waters are suitable for a limited number of trout, it would not seem advisable to encourage them by stocking. The open season on lakes in the "all other" class does not permit fishing early in the season when trout are most available. It is a well known fact that trout are extremely difficult to catch after the surface water warms up. Late rainbow fishing is permitted in these lakes, which we believe is proper and which allows rainbowsto be taken at the time of year when they are in

the best condition.

All efforts to establish walleyed pike in these waters have failed. We do not know the reason. Our knowledge of the requirements of this species is limited, but conditions in Big Platte Lake seem to be good for walleyes. The failure to establish this species by planting eyed eggs and fry may have been the result of predation rather than other unfavorable conditions existing in the lake proper. The experimental plantings of larger fish would test the validity of this method and give information applicable to other lakes. Experimental plantings of larger walleye pike are recommended even though these lakes might be changed to another classification.

A number of local people have requested the planting of black crappies. We do not favor this procedure, since black crappies are known to grow very slowly in cold water lakes. This would very probably aggravate conditions existing in the perch and bass populations, since crappies, perch and bass compete for the same food.

Policy No. 2

These lakes should be changed to the pike classification. Rainbow and possibly brown trout should be encouraged. This policy would allow an earlier open season and thereby perhaps help to reduce the perch population, and allow fishing for trout early enough to make the removal of these fish possible. Doubtless, good fishing for large rainbows could be had starting May 15, as these fish are known to descend the Platte River after spawning and would probably remain in Big Platte and Round lakes for at least several weeks before going to Lake Michigan (as we believe the majority do), during which time they should be feeding freely. This has been found to occur in Lake Charlevoix and in Seneca Lake in New York state. Exceptional fishing is enjoyed near the stream mouths in these lakes at this time of year.

The retantion of the present late open season on trout should also be continued. The stocking of rainbow trout should not be necessary, because of heavy spawning in the Platte River, although later observations might prove this wrong.

Of course, under this policy it would not be possible to continue planting of bass and bluegills. We feel certain, however, that these species will maintain themselves regardless of stocking.

A number of predators were reported by the survey party. These include loons, snakes, turtles, gars and dogfish. No control measures are suggested, however, in the light of recent investigations. Predators seem to occupy an important place in removing sick and diseased fish from our lakes and only in rare instances have they done more damage than good.

The bass collected showed a moderate infestation of bass tapeworm. Many pike, perch and rock bass had black spot (Neascus) to a moderate degree. No practical means of control are known for these parasites. They are not of any serious consequence to the fish, except when extremely heavy infestations occur and are in no way harmful to man.

Cover is abundant in both these lakes and no additional improvement is suggested at this time.

The controversial problem concerning the effect of the sand bar at the mouth of Platte River on the migration of Lake Michigan trout and bass has no solution in this investigation. Our observations, however, lead us to believe that this so-called barrier is not as great an impediment as it is generally represented. There is no doubt but that rainbow trout negotiate it and probably some perch and bass. How feasible it would be to attempt seining the reported concentrations of fish at the mouth for removal upstream is a question to be decided by the ~~hatchery superintendent~~ Fisheries Supervisor

of that district. Dredging operations are too costly and impractical in situations of this kind. It would have to be an almost continuous process unless extensive barriers were built out into Lake Michigan. An expense of this kind certainly could not be justified.

INSTITUTE FOR FISHERIES RESEARCH

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