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SUMMARY OF FISHING IN POTAGANISSING BAY 40

FROM 1937 - 1945 AS DETERMINED

BY GENERAL CREEL CENSUS DATA

by

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Introduction

Institute Reports No. 668 by L. A. Krumholz and No. 743 by the writer summarize for the years 1937 - 1941 the general creel census data from the connecting waters between Lake Superior and Lake Huron and also from certain waters in the two lakes immediately adjacent to the connecting waters. This report is concerned only with the waters in the Potagannissing Bay area.

For the purpose of this report, Potagannissing Bay is defined as those waters within the following boundaries: beginning at a point where the north line of Town 41 North intersects the shore of the mainland south of the village of Detour, in Chippewa County; then due east to Drummond Island; then northerly and easterly along the shore of Drummond Island to Chippewa Point; thence due north to the international boundary line; thence westerly along said international boundary line to a point where it intersects a line drawn due east through the most southerly point of Little Lime Island;

then due west from said point to the mainland; thence following the shore of the mainland southeasterly to the point of beginning. This definition is used in the commercial fishing laws of the Department of Conservation of Michigan. So defined, it includes such fishing areas as Maud Bay, Spring Bay Dock, Sturgeon Bay, Scott Bay and Pigeon Cove as well as the more open waters normally known as Potagannissing Bay. These waters were closed to commercial fishing in September, 1939.

This report contains a summary of the information from the previous reports, which covered the period from 1937 to 1941, and additional records from the general creel census from 1942 to 1945 inclusive.

#### Analysis of Data

The data are presented in Tables I to III. It will be noted that the data are divided into two periods: (1) 1937 - 1939, years during which commercial fishing was allowed; and (2) 1940 - 1945, a period in which commercial fishing was prohibited.

#### Catch per Hour

During the years prior to closing these waters to commercial fishing, the average catch per hour of all species was 1.32 as compared with 1.63 for the years following the prohibition of commercial fishing (Table I). Considerable variation has occurred during both periods. In 1939, for example, the figure is only one-half that of the previous year. In the second period it will be noted that the first three years, 1940 to 1942, showed some improvement in fishing quality over the previous three years, 1937 to 1939, but the last three years, 1943 to 1945, indicate a noticeable decline. The number of creel census records during the last three years is rather limited and in themselves may not represent a true picture of fishing quality, but reports from certain sportsmen during recent years tend to substantiate the creel census data.

Catch per hour figures per se do not always give a reliable indication of fishing quality, since other factors, notably the type of fishing and the composition of the catch, influence the catch per hour figure. For example, still-fishing for perch is generally much more productive than casting or trolling for pike or bass. Then in order to evaluate the catch per hour we must consider the composition of the catch and the type of fishing represented in the creel census returns.

#### Composition of the Catch

Table II shows the relative abundance of various fish species taken. Again, considerable variation is shown. Before closing the waters, a yearly average of 85.1 per cent of the fish reported were perch. This species also predominated in the first three years following closure. But during the last three years the percentage of perch in the catch decreased noticeably (0.0 per cent in 1945). This may not necessarily indicate poorer perch fishing, but may be due to increased emphasis by fishermen on pike and bass fishing, and/or the fact that few perch fishermen were contacted in the census work. The latter happens to be the case in 1945.

It will be noted that northern pike have become more prevalent in the catch since closing the bay to commercial fishing, walleyes have become prominent in the last three years while smallmouth bass show a decrease. These observations too may result from varying types of fishing and/or differences in contacts made by the census men and do not necessarily reflect differences in fishing quality for any given species.

Table II also shows that in 1943 and 1944, miscellaneous species (in this case chiefly rock bass and sunfish) accounted for one-third to one half the catch. This may point to poorer perch fishing in those years, since these species are undoubtedly taken by still-fishermen who presumably might be perch fishing.

### Type of Fishing

Table III shows the type of fishing represented in the creel census reports for certain years. There is considerable fluctuation in the type of fishing from year to year. Perhaps these data demonstrate best the fact that in the years 1943 and 1944, over one-half the fishermen were still-fishing but perch constituted only 12.3 to 26.7 per cent of the total catch, while nearly half the catch consisted of miscellaneous species previously mentioned. This adds evidence to the last statement in the preceding paragraph, namely that the quality perch fishing has declined in recent years.

### Fishing in Chippewa County

The catch per hour figures from Potagannissing Bay are compared with those from the inland non-trout lakes of Chippewa County in Table IV. This was done in an effort to determine how much yearly fluctuation there is in fishing quality in waters which have not been subject to changes in fishing regulations. It is noted that fishing quality in the inland waters has had "ups and downs" as large as those in Potagannissing Bay. More interesting, however, is the fact that, during the first seven years, 1937 to 1943, while these fluctuations have not been of the same magnitude, they have been in the same direction from year to year in both areas. This complicates the problem of studying the effect of regulative changes and demonstrates that "ups and downs" in fishing occur regardless of regulations or other types of management. The results of such management may sometimes be obscured by the influence of other factors (climate, unknown "fish-cycles," etc.).

### Discussion

It is difficult to state definitely what effect closing Potagannissing Bay to commercial fishing has had on sport fishing. The creel census data

indicate some trends, but the small number of creel census returns during the last three years may not represent a true picture of fishing quality during that period. The fact that fewer creel census reports were provided in the last three years may result from less time spent on this phase of the Conservation Officer's activities, or may actually indicate a lower fishing intensity, which in itself often points to poorer fishing. For example, a lake with a reputation for good fishing will attract many more fishermen than a lake reputed to provide poor fishing. But when this same "good" lake begins to show a downward trend in fishing quality, fishing intensity will also decrease. In Potagannissing Bay, then, the limited amount of data supplied in the general creel census may also point to poor fishing, although the travel restrictions of the war years may also have caused an appreciable decline in fishing intensity.

The trends indicated by the data (a slight increase in fishing quality for three years, followed by poor fishing through 1945) are, however, somewhat substantiated by reports from the sportsmen themselves. They report considerably better fishing following the closure. The relation between the actual increase and the psychological increase in fishing quality is not known. During the last year, conflicting reports have been received from sportsmen but a few reliable individuals have complained of poor fishing and incidentally a large sucker and carp population. This adds emphasis to the validity of the data.

While the data and the reports from sportsmen may not prove these trends conclusively, such changes seem very possible.

It is statistically sound to state that during a given year, the taking of legal-size game fish by commercial gear decreases a sportsman's chance of catching these species. This decrease may be small but nevertheless real. If, then, commercial fishing is discontinued, a fisherman's chance

of catching legal fish is increased by the same amount. But, when a large crop of suckers (the principal species commercially taken) and carp remains unharvested, these fish may reproduce to such an extent as to become too numerous. The relationship between coarse fish and game fish is not fully understood, but it is reasonable to suppose that through food-chain, spawning, and spacial relationships, a tremendous sucker population might affect a game population adversely. Then whatever small advantage in quality of sport fishing is gained through closing such waters to commercial fishing soon disappears and poorer fishing ultimately results.

The advisability of closing Potagannissing Bay to commercial fishing may therefore be questioned, and it is believed that the opening of these waters to commercial fishing, at least for suckers and carp, may assist in the recovery of sport fishing and at least should do no harm if only coarse fish are taken.

It is also recommended that, in order to gather more information on the quality of sport fishing, a rather intensive creel census be made of these waters during 1946 and possibly 1947. At the same time it might be of considerable value to know what the status of the coarse fish population is, and this could be determined by permitting a commercial fisherman to fish these waters for suckers and carp.

If the bay is opened to commercial fishing, it is urged that reliable creel census data be obtained for at least several years following.

INSTITUTE FOR FISHERIES RESEARCH

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TABLE I

## GENERAL INFORMATION ON POTAGANNISSING

## BAY CREEL CENSUS, 1937 - 1945

Year	Number of anglers	Hours	Fish	Catch per hour	Taking no fish	
					Number	Per cent
1937	56	170.50	237	1.4	17	30.4
1938	180	584.75	1001	1.7	36	20.0
1939	96	386.00	269	0.7	54	56.3
$\bar{x}$ or Average	332	1141.25	1507	1.32	107	32.2
1940	181	647.00	1240	1.9	19	10.5
1941	227	640.25	1044	1.6	54	23.8
1942	70	248.25	627	2.5	?	?
1943	19	64.00	73	1.1	2	10.5
1944	46	233.00	76	0.3	13	28.3
1945	14	70.50	39	0.6	6	42.9
$\bar{x}$ or Average	557	1903.00	3099	1.63	94	19.3 <sup>†</sup>
Grand $\bar{x}$ or Average	889	3044.25	4606	1.51	201	24.5 <sup>†</sup>

<sup>†</sup> Number of anglers in 1942 omitted from these calculations.

TABLE II

## COMPOSITION OF CATCH 1937 - 1945

Year	Smallmouth Bass		Yellow Perch		Walleyed Pike		Northern Pike		Miscellaneous <sup>⚡</sup>		Total Number
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	
1937	27	11.4	205	86.5	...	...	3	1.3	2	0.8	237
1938	23	2.3	877	87.6	12	1.2	47	4.7	42	4.2	1001
1939	27	10.0	201	74.7	...	...	23	8.6	18	6.7	269
Σ or Average	77	5.1	1283	85.1	12	0.8	73	4.9	62	4.1	1507
1940	152	12.3	741	59.7	...	...	171	13.8	176	14.2	1240
1941	90	8.6	647	62.0	...	...	226	21.6	81	7.8	1044
1942	49	7.8	478	76.2	17	2.7	65	10.4	18	2.9	627
1943	10	13.7	9	12.3	15	20.6	7	9.6	32	43.8	73
1944	...	...	21	26.7	19	25.0	6	7.9	30	39.5	76
1945	...	....	...	...	35	89.7	4	10.3	...	...	39
Σ or Average	301	9.7	1896	61.2	86	2.8	479	15.4	337	10.9	3099
Grand Σ Σ or Average	378	8.2	3179	69.0	98	2.1	552	12.0	399	8.7	4606

<sup>⚡</sup> Includes rock bass, bullhead, pumpkinseed, muskellunge, largemouth bass, lake trout, and whitefish.



TABLE III

TYPE OF FISHING DONE IN POTAGANNISSING  
BAY DURING CERTAIN YEARS

Year	Still fishing		Still fishing and casting or trolling		Casting or trolling		Total
	No. anglers	Per cent	No. anglers	Per cent	No. anglers	Per cent	
1938	106	60.6	33	18.8	36	20.6	175
1939	36	37.5	49	51.0	11	11.5	96
1940	43	24.7	66	37.9	65	37.4	174
1943	10	52.6	...	...	9	47.4	19
1944	27	58.7	11	23.9	8	17.4	46
1945	...	...	3	21.4	11	78.6	14

TABLE IV

CATCH PER HOUR IN NON-TROUT WATERS (INLAND)  
OF CHIPPEWA COUNTY, 1937-1944, AS COMPARED  
WITH POTAGANNISSING BAY

Year	Hours	Fish	Catch per hour	Potagannissing Bay Catch per hour <sup>†</sup>
1937	1236.00	1830	1.5	1.4
1938	1897.50	3380	1.8	1.7
1939	1263.00	1838	1.5	0.7
Σ or Average	4396.50	7048	1.60	1.32
1940	2150.00	4606	2.1	1.9
1941	443.25	491	1.1	1.6
1942	521.50	887	1.7	2.5
1943	781.75	452	0.6	1.1
1944	104.50	116	1.1	0.3
1945	21.00	67	3.2	0.6
Σ or Average	4022.00	6619	1.65	1.63
Grand Σ or Average	8418.50	13667	1.62	1.51

† From Table I