Original: Fish Division
cc: Education-Game
Mr. Stanley Shust
Dr. J. Van Oosten

INSTITUTE FOR FISHERIES RESEARCH
DIVISION OF FISHERIES
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UNIVERSITY OF MICHIGAN

Institute for Fisheries Res.

ALBERT S. HAZZARD, PH.D.
DIRECTOR

ADDRESS
UNIVERSITY MUSEUMS ANNEX
ANN ARBOR, MICHIGAN

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A REVIEW OF COMMERCIAL FISHING IN LITTLE BAY DE NOC, WITH COMMENTS ON ITS RELATION TO SPORT FISHING

by

Eugene W. Roelofs

Introduction

On April 3, 1941, a public hearing of representative sportsmen and commercial fishermen was held in Gladstone to discuss the reported decline in sport fishing in Little Bay De Noc. The sportsmen attributed poorer fishing to several causes. Some felt that it was due to pollution; some held that the lower water level of Lake Michigan, accompanied by a filling in of Little Bay De Noc by sediment from the several entering streams, was responsible; and others claimed that perch and walleyes fed extensively on smelt and therefore refused bait offered by the angler.

In addition to the above, several witnesses were of the opinion that the commercial fishing in the lower part of the Bay was so intensive that fish movement into the upper part of the Bay was adversely affected. As a remedy, it was suggested that commercial fishing either be restricted to one side of the Bay in order to allow fish free passage along on the other side, or be discontinued entirely in Little Bay De Noc.

As a final agreement, however, a resolution was passed asking the Department of Conservation to undertake a study of Little Bay De Noc in order to determine the cause or causes of the decline of sport fishing quality (if a decline existed) and what steps seemed appropriate to remedy the situation.

It is necessary to point out at this time that practically all of the sport fishing in Little Bay De Noc is done in the upper end of the Bay--from the mouth of Whitefish River down to the vicinity of Gladstone, while commercial fishing has been restricted, since the passage of the legislature's Public Acts No. 84 in 1929, to those waters south of a line drawn from the extreme end of Saunders Point on the west shore to the extreme end of Squaw Point on the east shore, except for a provision allowing the taking of suckers north of that line by trap nets from December 15 to April 15, inclusive. The two fisheries, then, are not operating in the same waters.

This report is the result of a study of the commercial fishing in Little Bay De Noc from 1929 to 1944, inclusive, and a study of the creel census of sport fishing from 1937 to 1945, inclusive. For the purpose of the report, Little Bay De Noc is defined as those waters north of a line drawn from the extreme end of Fishery Point on the west shore to the extreme end of Peninsula Point on the east shore.

Commercial Fishing

Each commercial fisherman is required by law to submit to the Department of Conservation a report of his fishing activities. These reports contain for each day information concerning the type and amount of gear used, dates on which nets are lifted, and the total weight of each species of fish taken. The reports are kept on file and served as the source of information for this study.

The weight (in pounds) of fish taken each year from 1929 to 1944, inclusive, from Little Bay De Noc is presented in Table 1. It will be noted that perch and walleyes (yellow pike), the two species principally sought by anglers, have constituted only 16.8 per cent of the commercial take during the 16-year period, while herring, suckers, and smelt have provided the commercial men with 72.1 per cent of their catch. Northern pike, a species which interests the angler in Little Bay De Noc to only a limited extent, constitutes only 0.9 per cent of the total catch. The capture and sale of northern pike by commercial fishermen became illegal in 1940.

An attempt was made to determine the fluctuation in abundance of fish on the commercial fishing grounds of Little Bay De Noc over a 10-year period. This determination is made on the basis of the "catch per unit effort" derived from the reports of the commercial fishermen. The number of pounds of each species of fish taken per unit of fishing effort with each type of gear has been calculated. Each species is normally taken principally by two or three types of gear. An average of the catch per unit effortfor a particular gear and a given species can be used to represent average fishing during the 10-year period for that species with the particular gear. During years when the catch per unit effort is above the determined average, it seems reasonable to believe this is due to a larger number of fish on the fishing grounds; and when the catch per unit

effort is lower than the average, it is assumed that fewer fish are on the grounds. Obviously other factors such as weather conditions and fishing pressure affect the catch per unit effort, but covering a period of years this method is believed to give a fairly accurate picture of fluctuations in abundance. These fluctuations are expressed as percentages of the average. The data are so treated as to yield a figure of 100 for the 10-year average, and the fluctuations can easily be measured by the subtraction of 100 from the figure for any given year.

These "fluctuations in abundance" are given in Table 2 for four species: namely, herring, yellow pike, perch, and sucker. For purposes of comparison, similar figures for Green Bay waters of Michigan (including Little Bay De Noc) are also given. These figures were provided by Dr. Ralph Hile of the United States Fish and Wildlife Service.

It is noted that sizable fluctuations in abundance of the four species have occurred in Little Bay De Noc during the 10-year period. Similar fluctuations also occur in the Green Bay waters, and except for a few very noticeable exceptions (herring in 1935 and 1944, yellow pike in 1936), there is a rather close agreement between the fluctuations in the two areas. While it is not the purpose of this report to discuss fully the factors involved in population increases, decreases, and distribution, a few observations will be included. The close agreement between the "ups and downs" in the two areas suggests that the fish which move into Little Bay De Noc are a part of a larger population inhabiting the Green Bay area. Local conditions in Little Bay De Noc undoubtedly determine the relative numbers of fish that move in, how far they move in, and how long they remain on the fishing grounds, and may account for differences in fluctuations of abundance between the two areas. These same conditions may well affect the sport fishing in the upper end of the Bay to a greater

extent since the upper waters are shallower and therefore subject to relatively greater changes in temperature, water level, and wave action due to heavy winds. The fluctuations in the whole area may result from a variety or combination of factors, among which may be listed actual population increases and decreases in the whole of Lake Michigan, or more probably of Green Bay, climatic conditions in the general area of Green Bay, and large-scale fish movements. None of these phenomena is fully understood and no attempt will be made to evaluate their relative importance in determining fishing success.

The ratio between the amount of fish taken from Little Bay De Noc and the Green Bay area was also determined. It was found that during the 16-year period, 1929-1944, 14.1 per cent of the herring taken in Green Bay, which includes Little Bay De Noc, were taken in the smaller Bay. The percentages for other species were as follows: yellow pike, 78.9 per cent; perch, 45.3 per cent; and suckers, 28.2 per cent. These ratios might give some indication as to the effect legal restrictions on commercial fishing might have on the quality of sport fishing in Little Bay De Noc, and will be discussed later.

Sport Fishing

Creel-census records from Little Bay De Noc are available from 1937 through 1945. For the first five years, these records are taken from the general creel census and represent only a relatively small portion of the sport fishing; but beginning in 1942, a special census was conducted at the suggestion of the writer and with the splendid cooperation of Mr. Allen Tweedy, Conservation Officer at Rapid River, and Messrs. William Nelson and Joe Meltz, boat-livery operators at Masonville and Rapid River, respectively. A special census form was used and it is believed that at least 85 per cent of the fishermen were contacted.

A summary of the fishing quality is given in Table 3, and a summary of the yearly composition of the catch is found in Table 4.

The catch per hour, our best indication of fishing quality, varied considerably from year to year. These variations may not be highly dependable in certain years due to the small amount of data. In 1937, for example, the catch per hour is calculated as 3.05, but it should be noted that only 57 anglers were contacted. Of this number, only one man was reported as having taken no fish. It is obvious that this figure is out of line with the percentage of "skunked" fishermen in succeeding years and it is believed that as a general practice, only those anglers who caught fish were recorded. In spite of these obvious deficiencies in the data for the earlier years, the figures perhaps do represent trends.

Table 4 shows clearly that perch and walleyes constitute the bulk of the sportsmen's catch. During the nine years, 87.2 per cent of the total catch consisted of these two species. Individual yearly percentages for the combined species range from 69.4 per cent in 1945 to 98.2 per cent in 1944.

Problems Concerning the Improvement of Sport Fishing

In as much as during a period of years it is found that 87.2 per cent of the sportsmens' catch consists of perch and walleyes and that approximately one-half of the perch and three-fourths of the walleyes taken in the Michigan waters of the Green Bay area are taken in Little Bay De Noc, one's first impression might be that the discontinuing of commercial fishing in the lower part of the Bay would tremendously increase the number of fish available to the angler in the upper Bay. The problem in Little Bay De Noc is somewhat different from other previous and current controversies

between sport and commercial interests since in this case the two interests are not operating on the same fishing grounds. In other words, the competition is not direct. The cessation of commercial fishing, then, would not render the total population of walleyes and perch available to the angler because there is no reason to suppose that all fish caught commercially in the lower Bay would otherwise migrate into the small area in the upper Bay. Undoubtedly a certain percentage of these fish would move up, but spacial limitations and local conditions would preclude the movement of the total population.

A comparison between the fluctuations of abundance of fish on the commercial grounds (based on catch per unit effort, and shown in Table 2) and the catch per sportsmens' hour (Table 3) shows that there is neither a direct nor inverse correlation between the successes of the sportsmen and the commercial fishermen. If there were direct competition, it would be expected that during years when the commercial take is low, sports fishing would improve since more fish would be available; and when a large crop was removed commercially, fewer fish would remain for the angler and the catch per hour would decrease. But such is not the case, and neither is it true that as commercial success increases there is a corresponding increase in the quality of sport fishing. It is therefore probable that if the number of fish in the upper Bay is influenced by the commercial take below, it is chiefly determined by other conditions referred to previously.

While there seems to be a conflict between the sport and commercial interests for the same species of fish, it appears to the writer that much greater interest should be shown in the economics of the situation. Even if it were known that due to closing these waters to commercial fishing,

sport fishing would improve substantially, it would be unwise economics to prevent the commercial taking of nearly 700,000 pounds of fish annually to permit a possible increase of only a few hundred pounds in the take of perch and walleyes by anglers.

Protection of these two species can not be accomplished by legalizing only special types of gear since other species such as suckers, herring, and smelt are taken by the same gear and often in the same localities as are perch and walleyes.

From the foregoing discussion, it seems that closing Little Bay De Noc offers no "sure-cure" for sport fishing ills and unquestionably would represent an uneconomical utilization of our fishery resources.

INSTITUTE FOR FISHERIES RESEARCH

by Eugene W. Roelofs

Report approved by A. S. Hazzard

Report typed by E. F. Livingston

TABLE 1 TOTAL CATCH IN POUNDS OF EACH SPECIES TAKEN COMMERCIALLY FROM LITTLE BAY DE NOC DURING 1929-1944

	Lake trout	Whitefish	Lake herring	Yellow pike (Walleyes)	Yellow perch	White and redhorse suckers	Smelt	Northern pike	Carp	Pilotfish	Red sucker	Burbot	Rock bass	Bullheads	Catfish	Saugers	Sheepshead	White bass	Dogfish	Chubs	Σ
1929	3,386	116,212	38,296	13,943	60,529	92,879	...	7,016	399	2,133	2,156	39	14	3	...	244	...	...	...	...	337,249
1930	3,417	161,556	42,631	18,350	91,273	141,220	...	16,204	1,393	1,422	4,796	724	273	221	35	574	7	...	...	...	484,096
1931	6,642	221,723	61,112	29,855	61,347	161,307	...	11,039	621	1,544	5,573	116	69	461	50	21	...	...	22	18	561,520
1932	2,727	205,925	43,085	78,548	61,238	170,818	15,231	9,645	4,249	5,655	6,949	152	48	344	70	446	...	...	3	...	605,133
1933	5,089	59,899	29,529	102,610	41,814	168,150	422	7,618	4,842	1,099	3,897	343	385	121	54	333	8	60	40	35	426,348
1934	5,520	79,994	61,228	100,835	46,907	274,080	2,222	8,020	1,155	866	10,584	799	92	120	18	10	4	...	...	...	592,454
1935	1,983	28,240	77,393	47,273	49,242	271,153	4,814	4,418	1,212	472	5,674	495	17	43	23	367	8	...	8	...	492,835
1936	2,526	12,971	166,995	36,027	51,127	269,155	870	5,507	1,444	359	1,110	29	57	47	2	2	1	...	...	...	548,229
1937	344	6,375	199,479	39,367	131,110	283,549	2,103	8,729	1,864	122	392	18	140	204	34	1,378	...	...	...	...	675,208
1938	2,162	19,704	205,532	29,512	154,274	236,535	14,788	8,961	2,836	200	...	21	286	148	40	...	18	...	26	...	675,043
1939	466	14,907	145,672	24,473	121,321	235,622	117,916	11,278	2,008	76	502	67	273	361	253	21	39	28	101	...	675,384
1940	464	10,693	163,293	21,433	91,494	275,988	616,629	159	2,447	119	2	259	71	115	120	...	50	13	18	...	1,183,367
1941	2,959	17,162	64,139	17,056	92,847	205,607	864,932	...	2,197	123	...	52	241	573	362	2	78	...	124	245	1,268,699
1942	1,758	9,402	110,213	11,351	86,246	190,152	902,392	...	1,154	97	52	...	128	331	349	...	218	...	46	93	1,313,982
1943	63	8,419	41,861	28,942	43,421	136,632	563,338	...	1,793	27	12	11	583	343	417	...	608	...	47	6	826,523
1944	105	3,630	121,463	35,043	31,314	142,435	3	26	1,094	120	...	78	196	892	584	...	839	...	41	149	338,012
Σ	39,611	976,812	1,571,921	634,618	1,215,504	3,255,282	3,105,660	98,620	30,708	14,434	41,699	3,203	2,873	4,327	2,411	3,398	1,878	101	476	546	11,004,082
Average	2,476	61,051	98,245	39,664	75,969	203,455	194,104	6,164	1,919	902	2,606	200	180	270	151	212	117	6	30	34	687,755
Per cent	0.4	8.9	14.3	5.8	11.0	29.6	28.2	0.9	0.3	0.1	0.4					0.1					100.0

TABLE II

RELATIVE ABUNDANCE OF CERTAIN SPECIES OF FISH IN LITTLE BAY DE NOC AND GREEN BAY, 1935 - 1944

("Normal" abundance is 100.)

	Lake herring		Yellow pike (Walleyes)		Yellow perch		White and redhorse suckers	
Year	Little Bay De Noc	Green Bay	Little Bay De Noc	Green Bay	Little Bay De Noc	Green Bay	Little Bay De Noc	Green Bay
1935	87	167	102	109	93	103	129	125
1936	163	150	69	118	88	85	93	97
1937	122	135	102	108	124	118	136	123
1938	108	103	82	59	132	113	102	82
1939	97	94	69	56	106	102	86	68
1940	120	102	92	89	113	116	98	95
1941	56	53	82	111	122	114	88	103
1942	59	52	166	168	87	114	100	115
1943	59	64	168	123	68	70	86	94
1944	129	80	168	159	67	65	82	98

TABLE III

SUMMARY OF FISHING QUALITY

LITTLE BAY DE NOC

1937 - 1945

Year	Number of anglers	Hours fished	Number of fish caught	Catch per hour	Catch per angler	Anglers taking no fish	Percentage taking no fish
1937	57	203.0	619	3.05	10.86	1	1.8
1938	319	1110.5	1460	1.31	3.28	97	30.4
1939	285	972.5	712	0.73	2.50	60	21.1
1940	77	164.0	215	1.31	2.79	24	31.2
1941	95	314.0	313	1.00	3.29	17	17.9
1942	825	2942.0	2494	0.85	3.02	287	34.8
1943	998	3989.5	3567	0.89	3.57	64	6.4
1944	485	1771.0	1831	1.03	3.78	45	9.3
1945	267	1351.0	1059	0.78	3.97	7	2.6
Total	3408	12,817.5	12,270	...	...	602	...
Average	...	...	...	0.96	3.63	...	17.7

TABLE IV

SUMMARY OF CATCH BY SPECIES

LITTLE BAY DE NOC

1937 - 1945

(Figures in parentheses indicate per cent of total catch for given year)

Year	Yellow perch	Yellow pike (Walleyes)	Northern pike	Black bass	Rock bass	Other species[+]	Total
1937	462 (74.7)	138 (22.3)	5 (0.8)	2 (0.3)	...	12 (1.9)	619 (100.0)
1938	1069 (73.2)	159 (10.9)	30 (2.0)	93 (6.4)	83 (5.7)	26 (1.8)	1460 (100.0)
1939	426 (59.8)	166 (23.3)	26 (3.7)	1 (0.1)	89 (12.5)	4 (0.6)	712 (100.0)
1940	119 (55.4)	59 (27.4)	9 (4.2)	5 (2.3)	23 (10.7)	...	215 (100.0)
1941	224 (71.6)	29 (9.3)	19 (6.1)	8 (2.5)	17 (5.4)	16 (5.1)	313 (100.0)
1942	1757 (70.5)	357 (14.3)	135 (5.4)	200 (8.0)	36 (1.4)	9 (0.4)	2494 (100.0)
1943	1324 (37.1)	1881 (52.8)	173 (4.8)	156 (4.4)	32 (0.9)	1 (0.0)	3567 (100.0)
1944	512 (28.0)	1286 (70.2)	31 (1.7)	2 (0.1)	...	...	1831 (100.0)
1945	472 (44.6)	263 (24.8)	185 (17.5)	95 (9.0)	28 (2.6)	16 (1.5)	1059 (100.0)
Total	6365	4338	613	562	308	84	12,270
	51.9	35.3	5.0	4.6	2.5	0.7	

[+] Includes: bluegills, pumpkinseeds, bullheads, sucker, carp and dogfish.