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**STATUS OF THE NORTHERN PIKE POPULATION IN FLETCHER FLOODWATER,
ALPENA AND MONTMORENCY COUNTIES, 1948 AND 1955-1956**

By K. E. Christensen and J. E. Williams

Fletcher Floodwater (Fletcher Pond) is a shallow, 9,000-acre impoundment on the Upper South Branch of the Thunder Bay River, formed in 1931 by the construction of a concrete dam (12.5-foot head) owned by the Alpena Light and Power Company. The reservoir furnished excellent northern pike fishing for a number of years after impoundment. By 1947, however, declining fishing quality and a decrease in the average size of pike caught led to complaints and a petition to the Conservation Commission to close the water to winter fishing. The Department developed a public fishing site on the Floodwater in 1953; this led to subsequent further complaints by resort and landing operators, who reported that the access afforded by the fishing site had increased fishing pressure and that pike were being overexploited. A continuing decline in the size of pike being caught was cited in support of the claim.

The sport fishery in Fletcher Floodwater has been the subject of a series of studies by the Institute. An intensive creel census was conducted in 1948 (Shetter and Vondett, 1948; 1949); the growth rate of northern pike was studied by Williams (1954); a winter creel census and further age and food studies of northern pike followed in 1955 (Christensen, Simonis, and Williams, 1956); and a creel census and population study were carried out in 1956. The present account briefly summarizes the creel census for the several years of study and the growth rate of pike, and reports on the 1956 population study.

Creel census and length-frequency
distribution of pike

Annual and seasonal estimates of fishing pressure and harvest indicated that a considerable change took place in both winter and open-water fishing at Fletcher Floodwater between 1948 and 1955 (Table 1). The estimated hours of winter fishing rose from 53,640 in 1948 to 74,200 in 1955 (38% increase). The catch of northern pike increased from 14,000 in the winter of 1948 to 23,500 in the winter of 1955 (68% increase). The estimated poundage of northern pike harvested in the winter of 1955 exceeded the poundage from the winter of 1948 by only 4 percent, however, due to a decrease in the average length of northern pike taken, from 20.1 inches to 17.5 inches (Table 2). The winter harvest comprised less than 30 percent of the year's catch of northern pike in 1948 (this led to the conclusion that the elimination of the winter fishery was not a desirable management measure--see Shetter and Vondett, 1949), but in 1955 the winter catch comprised over 60 percent of the total catch for the year.

The fishing pressure during the open-water fishing season declined from 204,900 hours in 1948 to 171,500 hours in 1955 and the catch of northern pike dropped from 34,470 to 15,280 (16% decline in fishing pressure and 56% decline in number of pike). Yellow perch also declined in the catch, from 19,240 to 6,150 (68% decrease). The most dramatic change in the fishery was the greatly increased catch of largemouth bass (670 in 1948; 7,670 in 1955) and pumpkinseeds (1,170 in 1948; 83,780 in 1955).

Fishing pressure and harvest decreased about 16 percent in the winter of 1956, as compared with 1955. The average length of northern pike was 17.7 inches (as compared to 17.5 in the winter of 1955). The number of angling trips in the open-water season was 6 percent greater in 1956 than in 1955 but the estimate of angling hours decreased by 22 percent, due to much shorter fishing trips in 1956. In spite of the decline in fishing hours, the estimated catch of northern

Table 1.--Estimated annual fishing pressure, and harvest at Fletcher Floodwater, 1948, 1955, and 1956

Item	1948			1955			1956		
	Winter	Spring-Fall	Totals	Winter	Spring-Fall	Totals	Winter	Spring-Fall	Totals
Angler-trips	9,700	37,900	47,600	15,200	33,900	49,100	12,750	36,100	48,850
Angling hours	53,640	204,900	258,540	74,200	171,500	245,700	63,230	133,300	196,530
Total catch	14,000	69,910	83,910	23,500	124,260	147,760	19,500	↓109,770	129,270
Catch per hour	0.26	0.34	0.32	0.36	0.72	0.60	0.31	0.82	0.66
Northern pike									
Number	14,000	34,470	48,500	23,500	15,280	38,780	19,500	17,930	37,430
Average length (inches)	20.1	19.7	19.8	17.5	16.8	17.2	17.7	17.2	17.5
Total weight (pounds)	25,800	61,000	86,800	26,900	15,000	41,900	25,700	18,600	44,300
Catch per hour	0.261	0.168		0.317	0.089		0.308	0.135	
Largemouth bass									
Number	.....	670	670	.....	7,670	7,670	.....	8,590	8,590
Catch per hour		0.003			0.045			0.064	
Pumpkinseed									
Number	.....	1,170	1,170	.....	83,780	83,780	.....	66,760	66,760
Catch per hour		0.006			0.489			0.501	
Yellow perch									
Number	.....	19,240	19,240	.....	6,150	6,150	.....	5,610	5,610
Catch per hour		0.094			0.036			0.042	
Rock bass									
Number	.....	2,010	2,010	.....	3,020	3,020	.....	3,720	3,720
Catch per hour		0.010			0.018			0.028	
Bullhead									
Number	.....	12,350	12,350	.....	8,360	8,360	.....	7,160	7,160
Catch per hour		0.060			0.049			0.054	

↓ Plus 110 bluegill.

Table 2.--Length-frequency distribution (percentage) of northern pike from
Fletcher Floodwater, 1948, 1955, and 1956

Length (inches)	1948		1955		1956		
	Winter	Summer	Winter	Summer	Winter	Summer	Spring ¹
14.0-14.9	0.4	1.1	2.1	15.4	0.7	13.7	4.0
15.0-15.9	0.9	2.8	15.2	26.5	11.8	14.5	14.9
16.0-16.9	2.8	6.5	30.5	21.7	31.1	19.8	30.2
17.0-17.9	8.8	11.8	24.7	18.7	31.5	26.7	27.6
18.0-18.9	19.6	14.1	13.6	9.8	13.4	14.5	12.4
19.0-19.9	20.7	17.6	6.2	3.7	3.9	4.6	3.0
20.0-20.9	15.8	14.4	3.0	1.6	2.4	2.3	0.7
21.0-21.9	7.0	11.6	1.0	1.2	1.2	0.8	0.5
22.0-22.9	6.1	7.5	0.4	...	0.4	0.8	0.4
23.0-23.9	6.2	4.9	0.7	0.6	...	1.5	0.2
24.0-24.9	4.7	3.9	0.6	0.2	...	...	0.2
25.0-25.9	2.4	1.6	0.3	...	...	...	...
26.0-26.9	1.7	0.9	...	0.6	0.4	...	0.1
27.0-27.9	1.6	0.7	...	...	0.4	...	0.1
28.0-28.9	0.6	0.3	0.3	...	...	...	0.1
29.0-29.9	0.2	0.2	0.3	...	0.4	...	0.1
30.0-30.9	0.2	0.1	0.4	...	0.4	...	...
31.0-31.9	0.2	trace	0.4	...	...	...	...
32.0-32.9	...	...	0.3	...	0.4	0.8	...
33.0-33.9	...	...	...	...	...	...	0.1
34.0-34.9	...	...	...	...	0.4	...	...
35.0-35.9	...	...	...	...	0.4	...	...
36.0-36.9	0.1	...	...	...	...	...	...
41.0-41.9	...	...	...	...	0.4	...	...
Average length	20.1	19.7	17.5	16.5	17.7	17.2	16.8
Number of fish	1,506	1,690	693	488	254	131	1,010

¹ Northern pike taken in gill nets or trap nets (5.4% of the fish caught were less than 14 inches long). Data for other years and seasons were from fish measured during the creel census.

pike rose from 15,280 to 17,930 (17% increase). The catch of largemouth bass increased by 12 percent, and the catch of pumpkinseeds decreased by 20 percent.

The estimated total catches (numbers; data for all seasons combined) of northern pike in 1955 and 1956 were over 20 percent less than the harvest in 1948; the total weight of pike caught decreased 50 percent due to the decrease in the average size of the fish.

Growth rate of northern pike

Scale samples were collected from 146 and 729 northern pike speared in the winters of 1948 and 1955, respectively, and 488 caught by anglers in the summer of 1955. A decrease in average length of more than 2 inches was observed for age groups II, III, and IV between the winters of 1948 and 1955 (Table 3). The decrease in growth rate was assumed to be a normal factor in the ecological succession of an impoundment. Age groups II and III made up 65 percent of the catch in the winter of 1948, but this percentage was 94 in the winter of 1955; age groups V through VIII constituted 25 percent of the 1948 collection whereas less than 3 percent of the 1955 collection were over 4 years old (V's and VI's). In 1955 (winter and open-water data combined) only 10 percent of the pike caught or speared in Fletcher Floodwater were over 3 years of age and only 6 percent were over 20 inches in length, indicating a heavy rate of exploitation of the northern pike. In 1956, only 7 percent of the pike were over 20 inches in length.

Fish population study, 1956

A population study was begun by capturing a large number of northern pike and largemouth bass in trap nets and gill nets on April 10-May 1, 1956, and marking them before release. The netting was started in the Upper South Branch of the Thunder Bay River (Area A, Fig. 1), above the Floodwater, before the pond was free of ice. On April 17 the trap nets were moved into the impoundment

Table 3.--Average length and age-group composition of northern pike from Fletcher Floodwater
in 1948 and 1955

Age group	Jan.-Feb. 1948			Jan.-Feb. 1955			May-June 1955		
	Average length	Number of fish	Percent-age	Average length	Number of fish	Percent-age	Average length	Number of fish	Percent-age
I	15.3	2	1.4	11.9	2	0.3	14.9	43	15.7
II	19.1	86	58.9	16.5	474	65.0	16.7	162	59.1
III	20.9	9	6.2	18.3	208	28.5	17.6	60	21.9
IV	24.7	12	8.2	22.3	26	3.6	21.4	8	2.9
V	25.6	18	12.3	28.0	16	2.2	23.2	1	0.4
VI	27.7	11	7.5	31.0	3	0.4	....	...	....
VII	32.8	7	4.8	....	...	....	....	...	....
VIII	29.0	1	0.7	....	...	....	....	...	....
Average or total	21.8	146	100.0	17.5	729	100.0	16.8	274	100.0

Figure 1.--Sketch of Fletcher Floodwater, Alpena and Montmorency counties, showing location of Area A, where pike were marked and released, and of Area B, where both bass and pike were marked and released, April 10 to May 1, 1956; and the boat liveries in operation during the 1956 season.

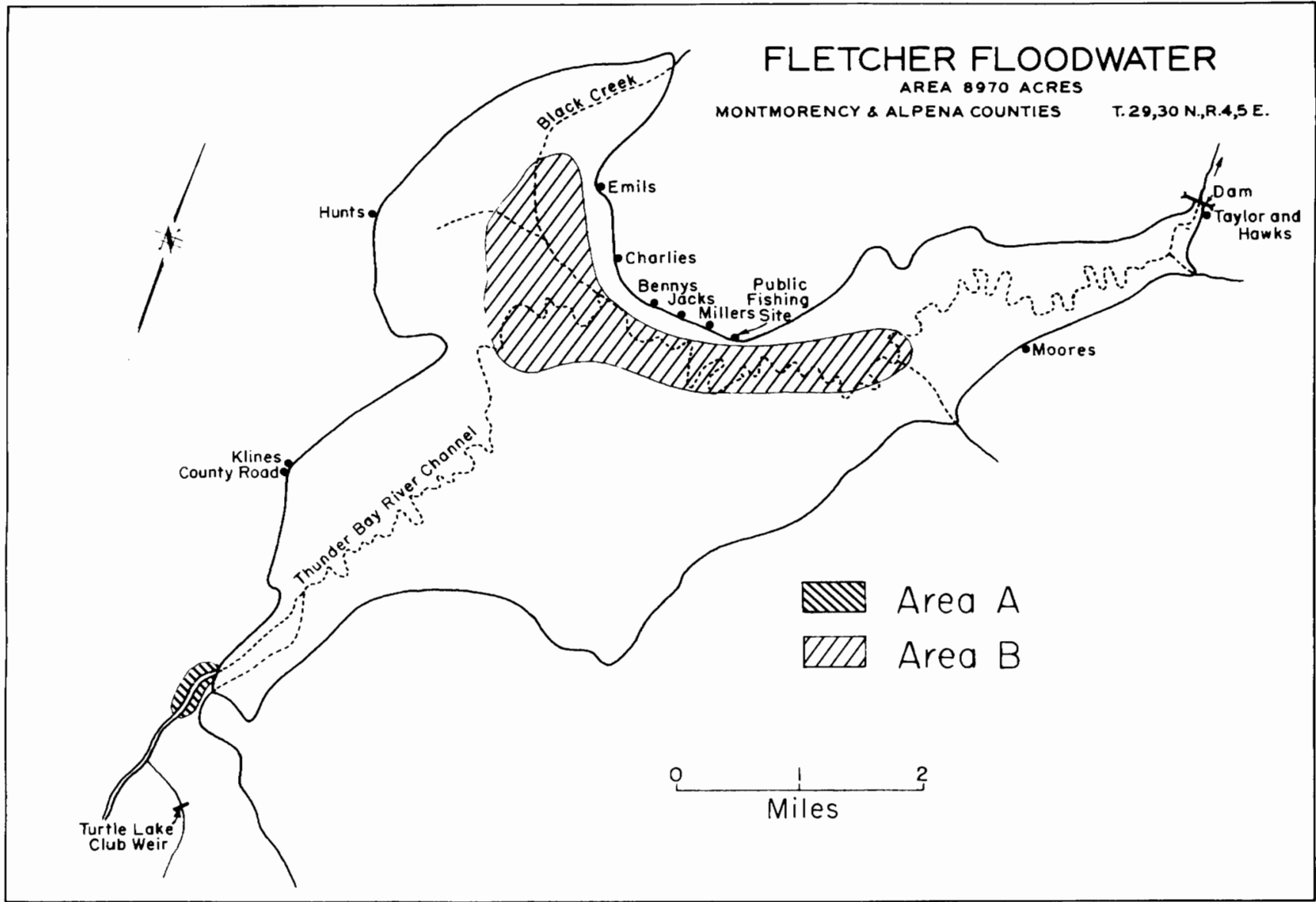


Figure 1

(Area B, Fig. 1) for the remainder of the netting period. Experimental gill nets were used in both areas to augment the trap-net catches and to determine the abundance of northern pike of less than legal size (12 percent of the pike caught in gill nets in each of the two areas were under 14 inches long).

The legal-size northern pike were marked by the removal of the left pectoral fin in Area A and the right pectoral fin in Area B. The anal fin of 12- to 14-inch fish and the dorsal fin of 10- to 12-inch fish were removed for later recognition if the fish became legal size during the open-water season. The largemouth bass caught were marked by removal of the left pectoral fin. (Legal-size largemouth bass comprised 85 percent of the netted bass and over 47 percent of these were more than 15 inches long, attesting to the excellent condition of the largemouth bass population.) In addition to the northern pike and largemouth bass, 4,331 bullheads, 492 pumpkinseed sunfish, 271 perch, 213 rock bass, 7 suckers, 2 bluegills, and 1 brook trout were caught and released.

A total of 323 northern pike (124 from Area A and 199 from Area B) were caught by gill nets, which captured an average of 6.4 pike per net day (Table 4). The trap nets, which caught pike at the rate of 3.8 per net day, took 687 northern pike (390 in Area A, and 297 in Area B). A total of 863 pike (458 from Area A and 405 from Area B) were marked and released, as were 193 largemouth bass captured in the trap nets in Area B. A total of 147 northern pike which were unavoidably killed in the nets were used for studies of food habits and growth rate.

The ratio of marked to unmarked fish in the anglers' catches, throughout the open-water season, was used to estimate the populations of northern pike and largemouth bass. The examination of 1,805 northern pike by the creel census clerk or by personnel of the Hastings Fisheries Research Station, during the period May 1-October 31, 1956, resulted in records of 5 northern pike which

Table 4.--Size frequency of northern pike and largemouth bass taken in trap and gill nets at Fletcher Floodwater, 1956

Size group (inches)	Northern pike									Largemouth bass			
	Area A ¹				Area B ²				Total		Size group (inches)	Area B	
	Gill net		Trap net		Gill net		Trap net		Gill and trap nets			Trap net	
	Num- ber	Percent- age	Num- ber	Percent- age	Num- ber	Percent- age	Num- ber	Percent- age	Num- ber	Percent- age	Num- ber	Percent- age	
7.0-13.9	15	12.1	3	0.8	24	12.1	13	4.4	55	5.4	7.0-9.9	30	15.5
14.0-19.9	109	87.9	380	97.4	172	86.4	269	90.6	930	92.1	10.0-14.9	86	44.6
20.0-33.9	...	0.0	7	1.8	3	1.5	15	5.0	25	2.5	15.0-19.9	77	39.9
Totals	124	100.0	390	100.0	199	100.0	297	100.0	1,010	100.0	Totals	193	100.0
	(514)				(496)								

¹Area A fish were netted in the Upper South Branch of the Thunder Bay River (T. 29 N., R. 4 E., Sec. 1), Montmorency County (see Fig. 1).

²Area B fish were netted in Fletcher Floodwater, Alpena and Montmorency counties (see Fig. 1).

had been marked in Area A, and 11 marked in Area B (Table 5). Although separate estimates of populations in Area A and Area B were 165,000 and 66,000 northern pike, respectively, 5 of the northern pike marked in the river were recaptured in the impoundment, indicating that the population is homogeneous. The single estimate of 97,000 pike, based on 16 recaptures among 1,805 fish, was probably the best estimate of the number of northern pike in Fletcher Floodwater in the spring of 1956. (The estimate for largemouth bass was 63,000--a very rough estimate based on 2 recaptures among 771 fish observed.)

The estimated catch of 37,000 northern pike from a spring population of 97,000 indicated a harvest of 38 percent of the population. This high rate of capture, combined with the low incidence of pike over 20 inches long or more than 3 years old, strongly suggests overexploitation of the pike population in the floodwater.

The 20-inch size limit on pike (up from 14 inches), which will be in effect on a state-wide basis by 1960, obviously will greatly reduce the harvest of northern pike at Fletcher Floodwater during the first year or two. Over 90 percent of the northern pike speared during the winters of 1955 and 1956 were less than 20 inches long and only 2 or 3 years old. Giving these young pike more protection should result in a markedly better fishery for larger pike within a few years. A larger population of big pike also should be of value as predators to maintain control of the pan-fish population.

Table 5.--Fish examined, marked fish observed, and estimates of population of northern pike and largemouth bass in Fletcher Floodwater, 1956

Date (1956)	Northern pike									Largemouth bass		
	Area A ¹			Area B ²			Total			Area B		
	Fish seen	Number marked	Population estimate	Fish seen	Number marked	Population estimate	Fish seen	Number marked	Population estimate	Fish seen	Number marked	Population estimate
May 1-31 ³	69	0	...	69	1	28,000	69	1	60,000	...	...	...
June 1-27 ³	354	1	193,000	354	3	43,000	354	4	73,000	341	1	56,000
June 28- July 31 ³	125	0	251,000	125	0	53,000	125	0	95,000	47	0	63,000
July 7-8	147	0	318,000	147	1	54,000	147	1	100,000	50	1	36,000
July 14-15	166	1	197,000	166	0	68,000	166	1	106,000	47	0	40,000
July 28-29	59	1	140,000	59	1	60,000	59	2	88,000	32	0	42,000
Aug. 4-5	120	0	170,000	120	0	69,000	120	0	100,000	51	0	46,000
Aug. 1-31 ³	175	0	185,000	175	1	70,000	175	1	105,000	67	0	52,000
Sept. 1-30 ³	270	1	170,000	270	1	75,000	270	2	107,000	57	0	56,000
Sept. 1-2	215	1	156,000	215	2	69,000	215	3	98,000	60	0	61,000
Sept. 15-16	33	0	159,000	33	0	70,000	33	0	100,000	4	0	62,000
Oct. 1-31 ³	72	0	165,000	72	1	66,000	72	1	97,000	15	0	63,000
Totals	1,805	5	165,000	1,805	11	66,000	1,805	16	97,000	771	2	63,000

¹ "Area A" fish were marked in the Upper South Branch of the Thunder Bay River (T. 29N., R. 4E., Sec. 1), Montmorency County and recaptured in Fletcher Floodwater (see Fig. 1).

² "Area B" fish were marked and recaptured in Fletcher Floodwater (see Fig. 1).

³ Fish seen in regular creel census by Floyd E. Simonis. Other fish were seen in week-end creel census by Joseph Hunn, Charles Steinmetz and Henry J. Vondett.

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