

Original: Fish Division
cc: Education - Game
Institute for Fisheries
Research

INSTITUTE FOR FISHERIES RESEARCH

DIVISION OF FISHERIES

MICHIGAN DEPARTMENT OF CONSERVATION

COOPERATING WITH THE

UNIVERSITY OF MICHIGAN

August 3, 1949

Report No. 1230

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RESULTS OF CREEL CENSUS OPERATIONS ON THE FLETCHER FLOODWATER,
(ALPENA AND MONTMORENCY COUNTIES) DURING THE 1948 HOOK-AND-LINE SEASON

By

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Records on the total number of angling days, and estimates of the total fishing pressure and total catch of northern pike (Esox lucius) and other fish for the 1948 spearing season on Fletcher Floodwater, otherwise known as Fletcher Pond, have been presented in Institute for Fisheries Research Report No. 1205. The present report will describe the results obtained from creel census records taken in a random pattern from April 25 through November 21, 1948, when fishing was prosecuted by hook and line. The main purpose of the census work was to obtain data on the number of fishermen-days spent in open-water angling and to make an estimate of the catch by hook-and-line fishermen for comparison with the same data obtained during the 1948 spearing season. The comparison of the two sets of data, one taken during the spear season, the other obtained during the period of open-water fishing, is of value in determining whether or not spearing is detrimental to the northern pike fishery, which is the drawing card for the resort industry located on the shores of this body of impounded water.

Through the courtesy of the Alpena Power Company, which organization owns the flooding rights on this impoundment, the original survey map

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has been made available to the Institute for Fisheries Research. Careful measurements with planimeter indicate that the area of the Fletcher Floodwater at a 12.5-foot gage level reading at the dam (the normal maximum level at which the pond is carried) is 8,973 acres. When the pond is carried at a gage level reading of 10.0 feet the area is 7,754 acres; at a gage level reading of 7.5 feet the area is 3,170 acres.

Methods

From April 25-September 12, creel census was recorded by Henry J. Vondett, Fisheries Technician B. After that time and until November 21, records were taken by Lawrence H. Bush, Fisheries Technician A, O. M. Corbett, or R. F. Stinauer, both Fisheries Technician B's. The Floodwater was checked on two days each week, --either Saturday or Sunday, and one day in mid-week. An attempt was made in setting up the sampling schedule to arrange the days when the various landings were to be visited in as random a manner as possible. The number of times that the various landings were checked in the 211 days between April 25- November 21 is given in Table 1. A total of 61 days were spent in checking the Fletcher Floodwater during the hook-and-line fishing, one landing being visited each day, usually from 9 A.M. (before early morning fishermen had returned) in the morning until the last boat came in at night, which in mid-summer often was not until 10 P.M.

The distribution of the sampling days among the days of the week was as follows: Saturdays, 16; Sundays, 15; Mondays, Tuesdays, Wednesday, Thursdays, and Fridays, 6 each. The distribution of the sampling days among the various landings was Taylor and Hawks, 12; Jack's, 12; Charley's, 11; Emil's, 11; Hunt's, 8; and Klein's, 7. More sampling days were not spent

at Klein's and Hunt's because these landings had to close in the early fall because the drop in water level made navigation to and from their docks difficult or impossible (at Klein's by October 17, and at Hunt's by October 5). The one objection to the sampling schedule was that in order to keep it random with regard to days of the week, oftentimes the same landing was checked three successive days. ✓ Nevertheless, the schedule that was followed appears to have been the best one to operate under the circumstances and the results are considered to be representative.

On each day the Floodwater was visited, the results of all angling conducted at that particular landing on that day were recorded. As during the course of the winter spearing season of 1948, the landing operators tallied either the number of fishermen or the number of boats rented each day of the season. Reasonable estimates of the total hours of fishing prosecuted, the total catch of northern pike and their weights, and the total catch of other fish may be derived by applying the figures obtained from the random sampling to the data on the total numbers of boats and fishermen supplied by the landing operators.

The creel census clerk recorded the usual data except for names, - date, landing, residence, sex, lengths and weights of northern pike taken, and length of time fished. When not too many anglers checked in at once, stomach samples and scale samples were secured from the northern pike and a limited number of individual measurements in yellow perch, large-mouth black bass, black bullheads, and common sunfish also were taken.

✓ The difficulty was that there were six landings to be sampled in two days a week. If sampled in rotation this meant that three of the landings would be sampled only on week ends, three only in midweek.

The analysis of the stomach samples and the scale samples will be the subject of separate reports in the future.

In an attempt to determine if there were seasonal trends in the hook-and-line fishing (as were found to be present in the spearing season of 1948), the data were combined by calendar periods of various lengths. The length of the periods was determined by how many days elapsed between the beginning and ending of at least one sampling of each landing in the Floodwater. Both the records on the angling taken by the census clerks, and the daily boat or angler tallies kept by the landing operators have been combined by periods, starting with April 25. The average data derived from the landing checks made in each period have been applied to the total number of boats (from which the total number of anglers may be calculated) to obtain the estimates of the total pressure and total catch for that particular period. To determine the total catch by hook and line, the estimates for the various periods have been totalled.

The angling results listed in Table 2 were tabulated by the census clerks on their bi-weekly trips to various landings on the Floodwater. On each day they spent on this impoundment, they recorded all fishing done at that particular landing on that day.

During the 211 day-period when the hook-and-line fishing was under observation, the creel census clerks visited the Fletcher Floodwater in 61 different days and contacted a total of 2,391 anglers who had fished 12,380.25 hours from 1,060 boats and who had caught 2,363 northern pike, 1,186 yellow perch, 43 largemouthed black bass, 123 rock bass, 70 common sunfish and 688 bullheads. From these figures, the average number of anglers per boat, the average hours per angler,

and the numbers of fish taken per hour can be calculated. It is then possible to apply these average figures to the total numbers of boats or anglers as recorded by the landing operators to arrive at an estimate of the total angling hours and total catch for any period.

Some of the important facts to be noted in Table 2 are as follows: In the various periods, the average number of anglers per boat varied only slightly, ranging from 2.00 during November 18-21 to 2.38 during August 24-September 27. The average fishing time per angler was greatest early in the open-water fishing (5.62 hours per angler during April 25-June 13), least during the last period (3.19 hours per angler during November 18-21), and diminished more or less regularly as the season progressed. This difference very likely reflects the gradually lessening amount of daylight as the summer passes, and also the more uncomfortable air temperatures encountered in the fall fishing.

The best fishing, according to the data obtained by the creel census clerks, was encountered during the period October 30-November 17, when 0.558 northern pike were captured per hour. In the period immediately preceding (September 28-October 29), the catch per hour of northern pike was 0.379 fish. The opening period April 25-June 13 was relatively poor in quality (0.173 northern pike per hour), and from June 14 to September 28, the catch per hour varied from 0.114 to 0.128 northern pike per hour.

The average weights of the pike taken in the several periods ranged between 1.47 pounds and 1.92 pounds. Of the 2,363 pike noted, measurements and weights were obtained on 1,723 specimens or 72.9 per cent of the observed catch. The average total length of the pike ranged from 19.0 inches (October 30-November 17) to 20.6 inches (September 28-October 29)

as will be observed in Table 3, which lists the data concerning average sizes in more detail. The average length of the northern pike taken by hook-and-line fishermen, based on measurements of 77.9 per cent of all specimens observed, was 19.7 inches, and the average weight was 1.77 pounds.

The estimated angling pressure and the take of northern pike in the various periods are given in Table 4. The estimates are based on the average data to be found in Tables 2 and 3. The estimates were derived as follows: For each period, the estimated number of anglers was found by multiplying the number of boats recorded by the landing owners times the observed number of anglers per boat. The estimated number of hours of fishing was determined by multiplying the estimated number of anglers times the observed number of hours per angler. The estimated catch of northern pike taken was calculated by multiplying the observed catch per hours of northern pike times the estimated total hours of fishing, and the weight of northern pike taken was obtained by multiplying the estimated number of northern pike taken times the average weight of northern pike as determined from measurements made during the particular period. Grand totals were obtained by adding the results of the estimates made in the several periods.

In Table 4 it will be observed that the heaviest angling pressure on the Floodwater occurred during those periods that included one of the major holidays. The period June 14-July 23 of 40 days including July 4 had an estimated average daily angler count of 252; the period April 25-June 13 of 50 days including Memorial Day had recorded an estimated average daily number of anglers of 206; the period including Labor Day

(August 24-September 27, 35 days) had an estimated average daily angler count of 213. During the remaining periods estimated average daily angler counts ranged between 8 and 163. Over the entire period of observation (April 25-November 21), it is estimated that 37,909 angler-days were spent on the Floodwater. The number of hours expended in fishing follows closely to the pattern of the distribution of angler-days during the period of observation. From 40,000 to 57,000 hours were spent in the three periods of heaviest angling activity. For the total period of observation it is estimated that 204,938 hours of fishing were conducted.

The estimated catch in the several periods ranged between 2,026 northern pike and 9,991 northern pike. The estimated total take of northern pike during the hook-and-line season was 34,471 fish with an estimated total weight of 60,796 pounds, or almost 30½ tons of northern pike alone. The greatest poundage and the largest number of northern pike were taken during the period April 25-June 13 (9,991 northern pike, 16,285 pounds), followed by the period September 28-October 29, when 7,926 northern pike with an estimated weight of 15,218 pounds were caught. In the other periods the estimated poundages ranged between 32 and 6,388.

In addition to the catch of northern pike, the anglers also were observed by the census clerks to have removed a total of 1,186 yellow perch, 43 largemouthed black bass, 123 rock bass, 70 common sunfish and 688 bullheads or 0.164 fish per hour of fishing. Inasmuch as the total fishing time during which these fish were caught is known, estimates of the total take and total weight of these other species by the total estimated numbers of anglers also can be made. The catch data is presented

by periods in Table 5 for the various species. The average weights were determined from a relatively small series of each of the species. While it would have been desirable to have had a larger number of specimens, the weights available make some estimate possible. The data from Table 5 have been applied to the estimated number of hours to estimate the catch of fish other than northern pike and to estimate the weight of such fish removed, for which the figures are given in Table 6. From this table it will be noted that in addition to the northern pike removed it is estimated that 19,242 yellow perch of an estimated weight of 6,542 pounds, 668 largemouthed black bass of an estimated weight of 469 pounds, 2,014 rock bass whose total weight was estimated to be 363 pounds, 1,167 common sunfish of an estimated weight of 222 pounds and 12,350 bullheads whose weight was estimated to be 2,471 pounds were removed by the total angling effort. The estimated total weight of all fish other than pike removed by the hook-and-line anglers during the period of creel census operations was 10,067 pounds. Combined with the catch of northern pike the total catch of all species may be conservatively estimated to be 69,912 fish of an approximate weight of 70,863 pounds during the period April 25-November 21.

Size Distribution of Northern Pike

For comparative purposes, the northern pike observed have been sorted into three groups; the winter-caught fish taken by spearing, the spring-and-summer-caught fish taken by hook and line, and the fall-caught northern pike also removed by hook and line. The "winter" fish were taken during January and February, 1948, "spring and summer" fish were captured between April 25 and August 31, 1948, and "fall" fish were removed during the period September 1-November 21, 1948. For each of

these three periods, Table 7 shows the numbers of fish in the various one-inch size classes, also the average weight in pounds of the fish in the various size classes, and the percentage of the sample found in that size class. Figure 1 compares the size distribution of the "winter", "spring and summer", and "fall" samples in a graphic manner, using the percentage data from Table 7.

As indicated by the data already presented on average size, there appears to be little difference in the average size at any time of the year ("winter" fish were of an average length of 20.1 inches and 1.84 pounds, "spring and summer" and "fall" fish combined averaged 19.7 inches and 1.77 pounds). From Table 7 and Figure 1 it will be noted that the most prevalent size class in all three samples was 19.0-19.9 inches. Spearing removed a somewhat greater percentage of fish larger than 23 inches, and a slightly greater percentage of fish in the 18.0-18.9- and the 19.0-19.9-inch size classes. Hook-and-line fishing took a larger percentage of northern pike from 14.0 to 17.9 inches, and from 20.0 to 22.9 inches in size.

Percentage of unsuccessful fishermen-days and
percentage of angler-days catching limit of
5 northern pike.

Of more than passing interest is the proportion of unsuccessful fishermen-days on which no northern pike were caught, and also the proportion of fishermen-days on which the legal daily limit of 5 northern pike were captured. Data on these points will be found in Table 8. During the winter season it will be seen that as the season went on, the proportion of limit catches progressively decreased from

18.3 per cent of the total angler days observed during January 1-10 to 1.2 per cent of the observed total angler-days during February 28-29. Conversely, the percentage of unsuccessful angler-days increased from 22.1 per cent during January 1-10 to 51.8 per cent in the period February 28-29.

After hook-and-line fishing started on April 25, the percentage of unsuccessful pike-angler-days ranged from 42.1 per cent to 57.3 per cent of the total days observed until September 27. For the next two periods (September 28-October 29, October 30-November 17) the percentage of unsuccessful days of fishing decreased to 25.8 and 28.3 per cent respectively; during the last four days of fishing 50 per cent of the recorded fishing was unsuccessful.

Between April 25 and September 27, from 0.0 to 2.1 per cent of the hook-and-line fishing days caught 5 northern pike. In the two best fall periods which fell between September 29-November 17, 12.0 and 15.2 per cent of the fishermen-days caught 5 northern pike. For the spear fishing season, of 1,250 angling days observed, 37.6 per cent were unsuccessful and 7.8 per cent caught the limit; of the 2,391 hook-and-line fishing days checked, 56.3 per cent caught no pike, and 5.3 per cent took their limit of 5 fish. As might be expected the best periods as measured by the catch per hour were also those periods when there were the smallest proportion of unsuccessful anglers and the highest percentage of limit catches made.

Residence of Anglers

The residence of both spear fishermen and hook-and-line anglers is given in Table 9. Inspection and comparison of the residence of the anglers using the Floodwater at these two different times of the year indicates considerable difference between the two seasons, assuming that the observed data are representative of the estimated totals.

During the winter fishing, six counties (Montmorency, Alpena, Oscoda, Wayne, Midland and Genesee) of the Lower Peninsula of Michigan furnished almost 2/3 of the fishermen. Less than one per cent of the spear fishermen were non-residents from Ohio. In the open-water angling, 572 non-residents from 12 states made up 23.9 per cent of all the fishing days recorded. Wayne County fishermen were the most numerous of the resident anglers (638), and constituted 26.6 per cent of all fishery days observed, followed by 445 Ohio anglers. Oakland County fishermen were in third position, 204 residents from this downstate county furnishing 8.1 per cent of the total fishermen-days checked. Thus 58.6 per cent of the total hook-and-line fishing observed was done by non-residents, plus Wayne and Oakland County residents. During the open-water fishing periods observed, Montmorency, Alpena County residents (who constituted almost 30 per cent of the winter fishermen) made up only 5.3 per cent of the open-water fishermen tallied by the creel census clerks. Obviously the Floodwater draws an entirely different clientele during the spearing season and the open-water fishing season; local residents from the surrounding counties use the impoundment in the winter spearing season, while non-residents and downstate resident anglers constituted the majority of fishermen during the months of open-water fishing.

Comparison of winter spearing with
open-water fishing in spring, summer and fall.

P. 34 → In Table 10 the reader will find listed results of both winter ice fishing and open-water angling with hook and line. The winter

spearing season is proscribed by law during the months of January and February (either 59 or 60 days); northern pike, yellow perch, rock bass, and bullheads may be taken by angling at any time of the year, and the hook-and-line fishing is limited only by the clemency or inclemency of the weather. In 1948, almost all of the open-water fishing was done between April 25 and November 21, a period of 211 days. As mentioned in the section immediately preceding, local residents do most of the winter fishing, while downstate residents and non-residents are the chief patrons of the pond in the spring, summer, and fall.

Fishing pressure during the open-water season was slightly greater in 1948, according to the estimates made from the creel census clerks' observations and angler counts kept by the landing operators. During the winter spearing season, the average number of anglers per day was 161.5, while during the open-water fishing an average of 179.6 anglers per day were estimated to have used the Floodwater. Over the 60-day winter season, the catch per hour of northern pike was 0.260 fish per hour; for the 211 day-period of observation on the open-water fishing the catch per hour of northern pike amounted to 0.184 fish. However, the open-water fishermen were estimated to have removed an additional 35,441 yellow perch, rock bass, largemouthed black bass, common sunfish and black bullheads at the rate of 0.164 fish per hour. If these fish are included, the catch per hour of all fish taken during the open-water angling amounted to 0.348 fish per hour.

Based on the estimates made from the observations of the creel census clerks winter spearing by 9,690 fishermen removed 14,088 northern pike (or 1.44 fish per angler), while 37,909 hook-and-line

anglers removed 34,471 northern pike, or 0.91 pike per angler. About four times as many fishermen-days were spent during the hook-and-line fishing as in the spear season in a period about $3\frac{1}{2}$ times as long, and the hook-and-line anglers removed approximately $2\frac{1}{2}$ times more northern pike weighing approximately $2\frac{1}{2}$ times more than the take by the winter spear fishermen.

Although the catch per hour for spear fishing is higher than that observed for hook-and-line fishing it must be remembered that many more people are engaging in the latter method of angling over a longer period of time at seasons of the year when pike fishing is reputedly poor (i.e. late June, July and August). In 1948, despite the removal of some 14,000 northern pike by spear fishermen, almost 35,000 northern pike were taken during the remainder of the year.

The various landing-owners have petitioned to close the Fletcher Floodwater to the spear fishermen, asserting that winter fishing takes a disproportionate amount of the northern pike. From the figures on angling pressure which they furnished it can be demonstrated that there is a higher average daily angling pressure in the period of open-water fishing than in the winter season.

With a given stock of fish on January 1 of any year no one can expect to maintain as good fishing in July and August as is to be obtained in the early months of the year when the fishing pressure increases faster than the ability of the species to replace by growth specimens removed by earlier angling. Also pike do not strike as well during the heat of the summer as in spring and fall as is shown by the catch per hour figure for the various months. In this situation the landing-owners are the victims of their own glowing advertising, since

they have in past years figuratively, if not literally, promised their prospective clients a catch of pike every time they fished. Up to a certain angling pressure this was possible in view of the obvious productivity of the water, but apparently the limit has been reached in the past several years, when 40,000 or more angling days yearly were spent on the pond. Also it is possible that the productivity of the reservoir has declined as seems to be the case in most impoundments after the initial "boom" in production caused by flooding virgin soil.

To close the pond to spearing would deprive a large segment of the present users of the pond from legitimate sport, and would be adverse to the desires of many local residents. Such closure would not guarantee that all or even a majority of the northern pike not speared in the winter would be available for the hook-and-line anglers during the following open-water season. In the light of the estimates obtained during 1948, no biological reasons can be advanced for closing the Fletcher Floodwater to the spear fishing inasmuch as approximately $2\frac{1}{2}$ times as many northern pike were taken during the open-water season, which was about $3\frac{1}{2}$ times as long as the spear season. The species was obviously not endangered or depleted by the spearing operations. Judged on the basis of pounds per acre of northern pike removed during the spearing season and the hook-and-line season, it may be estimated that spearing removed approximately 3 pounds of northern pike per acre (roughly 25,000 pounds from an estimated 7800 acres) while hook-and-line fishing took about 60,000 pounds from an estimated average acreage of 8,000 acres, or about 7.5 pounds per acre.

Summary

1. A random sampling of the hook-and-line angling on Fletcher Floodwater, an 8,973 acre impoundment in Alpena and Montmorency Counties was conducted in 1948, following a similar sampling of the 1948 spearing season on the same body of water.

2. Creel census clerks, operating one day each week-end and one day in mid-week from April 25 to November 21 visited the Floodwater on 61 days and contacted 2,391 fishermen who fished 12,380.25 hours from 1,060 boats and caught 2,363 northern pike, 1,186 yellow perch, 43 largemouthed black bass, 120 rock bass, 70 common sunfish and 688 black bullheads.

3. From data furnished by the various landing operators on the numbers of boats rented or fishermen observed, and with the aid of the figures obtained from random sampling listed in (2) above, it may be estimated that 37,909 fisherman-days involving 204,938 hours of angling was prosecuted on the Floodwater during the period April 25-November 21, and that during this time a total of 34,471 northern pike weighing 60,796 pounds were removed. In addition to the northern pike, 35,441 panfish and black bullheads weighing 10,067 pounds also were caught. The catch per hour of northern pike in the hook-and-line season was 0.184 fish, of panfish and bullheads, 0.164 fish, or a total catch per hour of 0.348 fish per hour.

4. Comparison of a large series of measurements taken during the spear season and the hook-and-line season shows little difference in the average length and average weight of northern pike caught in either period. Winter-caught fish, taken by spear were of an average length of 20.1 inches and an average weight of 1.84 pounds. The average size of northern pike caught during the hook-and-line season was 19.7 inches and 1.77 pounds.

5. Records taken by creel census clerks indicate that on a relatively higher percentage of fishing days during the hook-and-line season (56.3 per cent) anglers fail to catch a northern pike, and on only 5.3 per cent of the fishing days observed in 1948 did anglers catch their limit of 5 northern pike. In the winter spear season 37.6 per cent of the fishing days were unsuccessful while on 7.8 per cent of the fisherman-days observed winter fishermen speared 5 northern pike.

6. Tabulation of the residence of the anglers using the Floodwater indicates that the winter spearing is largely followed by residents of the surrounding counties, whereas the hook-and-line angling is done mainly by downstate and non-resident fishermen from Ohio and Indiana.

7. Comparison of the winter spearing estimates with the estimates made from data obtained in the hook-and-line season indicates that in 1948 about 9700 angler days of winter spearing produced about 14,000 northern pike weighing approximately 25,000 pounds. Hook-and-line fishing of approximately 38,000 days yielded an estimated 34,000 northern pike and 35,000 other fish of an approximate total weight of 71,000 pounds. The average size of hook-and-line-caught northern pike was only slightly less than northern pike taken by spear. On the basis of the data at hand, it is not believed that winter spearing is endangering the northern pike population of this impoundment.

8. A detailed description of the method of estimating angling pressure is given. (Appendix).

9. The incidence of "red" sores was found to be about one fish in 35, or 2.9 per cent during the fall months. (Appendix)

10. Examination of water level data for the past 11 years indicates that 1948 was not an unusual year as regards pond levels. The data

suggest that it is unlikely that draw-down of the pond occurs at such times as to cause mortality among young pike. There is reasonable likelihood that there is some correlation between low water levels in the fall and excellent late fall fishing. (Appendix)

11. A summary of the pressure and catch for the year 1948 is presented. (Appendix)

Acknowledgments

Without the daily lists of fishermen and/or numbers of boats rented, we would have had no figures on which the estimates herein could have been made, and we wish to thank all of the landing operators for recording such data for us. At various times they or their staff aided the creel census clerks in their duties when large numbers of anglers came in from the pond, and assisted in securing stomach samples, weights and scale samples. We are also grateful to the Alpena Power Company for furnishing us with a map of the impoundment and for making their water level files available for study.

Appendix

Methods of estimation of angling pressure

The original instructions to the landing operators was to list the numbers of boats rented daily. However, in the April fishing, (and at Hunt's landing during May), records of the daily numbers of anglers were given by the landing operators. At Taylor and Hawks landing, a varying proportion of the fishing was done from shore. Accordingly they kept a record of the daily number of anglers, since boat rentals alone would not have been an accurate basis for estimating the total angling pressure. The data in Table A shows the numbers of boats rented or the numbers of anglers using the various landings as recorded by the operators.

To estimate the total fishermen days, the average number of anglers per boat as observed by the creel census clerks was multiplied by the number of boats listed for a given period. To this latter figure was added the additional anglers listed. It was then possible to estimate the total hours of fishing by multiplying the average hours per angler as observed on the bi-weekly checks by the estimated number of anglers. To arrive at the estimated totals given in Table 4, the data from Table 2, as observed by the creel census clerks in their random sampling have been applied to the boat and angler counts as listed by the landing operators in Table A. Inasmuch as the average number of anglers per boat and the average number of hours fished per angler fluctuated in the several time periods, the grand totals were obtained by adding the estimates of the various periods.

Incidence of northern pike with "red sores"

During the period January 1-October 25, 1948 creel census clerks reported seeing very few northern pike with "red sores", but no count of those infected was kept. From October 25 to November 13, however, 241 specimens were examined carefully, and three fish with large (of greater diameter than a dime) infections were noted, and four fish had smaller red spots or bruises. Thus it would appear that about one fish in 35 is infected, or 2.9 per cent, which is much less than the incidence of the infection reported several years ago.

Fletcher Floodwater Water Levels 1939-1948

Some concern was expressed by anglers over the apparent drop in water level in the impoundment in late summer and fall. Through the courtesy of the Alpena Power Company, water level records taken at the Upper South dam were made available to the author, and the gage records on the 1st and 15th day of each month for the past 11 years are given in Table B. Inspection of this table reveals that there was a variation of 4.5 feet between the highest and lowest gage levels recorded during 1948. In seven of the previous 10 years the variations between high and low water levels have ranged between 4.5 and 5.3 feet, while in the other three years the water level variations ran from 2.9 to 4.0 feet. It would not appear that 1948 was an unusual year as regards water levels.

Angling quality, as measured by the catch per hour (on the days the Floodwater was checked by the census clerks given in Table C) was plotted along with the water level data in Figure 2. It did not appear that water level had any influence on angling quality until the level reached 8.6 feet on October 1. The catch per hour ranged between 0.0

and 0.24 fish from April 25 to October 2. Between that date and November 21, the pond was checked on 14 days, and only on five of those days was the catch per hour below 0.30 northern pike. On nine of the days sampled the catch per hour varied from 0.31 fish to 1.60 fish per hour of fishing, despite the fact that the water level returned to 10.4 feet by November 1. The increased angling quality in this fall period of low water level may be at least partially explained by the fact that the pike population which originally occupied a vast water acreage was concentrated in a much more limited space relatively close to the old channel (note the reduction in area with reduction in water level on page 2) when the water level was reduced to 8.2 feet, and were more easily found by the anglers. Just why they continued to be relatively vulnerable in November after the water level returned to 10.4 feet cannot be explained on the basis of the data available. It is known, however, that pike feed more actively as the water cools in the fall. Possibly the improved catch during this period is entirely due to lower temperatures.

Inspection of the levels recorded from January through April indicates the newly-hatched young of the northern pike would, in most years, have adequate water levels in the shallower portions of the pond where they are reputed to spawn, since only in two of the 11 years have water levels been noticeably lower in April than in January, and almost without exception May and June water levels are at peak or near-peak yearly levels.

Brief summary of the angling pressure and the catch in 1948

Table D summarizes all of the available data for 1948 on the number of angler-days and the catch from Fletcher Floodwater. Angler-days during

January and February were tallied by the five landing operators who were open during the spearing season. The data for March represent hook-and-line fishing through the ice and which was all prosecuted from one landing between March 1-23. Open-water hook-and-line fishing began on April 10, as the ice did not break up until the first week in April. No creel census checks were made from March 1-April 24, but records of the number of anglers and the numbers of northern pike and other fish caught were kept by the landing owners. From April 25 to November 21, creel census clerks visited the impoundment in a reasonably random schedule twice weekly. After November 21 there was apparently little or no fishing, as now was reported by the landing owners, and so few anglers were appearing in the last few visits that the bi-weekly checks were discontinued.

Totalling the estimates for the year we find that approximately 47,794 fishermen-days were spent on Fletcher Floodwater in 1948 and removed some 48,684 northern pike of an estimated weight of 86,843 pounds. In addition, 35,950 yellow perch, common sunfish, rock bass, largemouthed black bass and black bullheads weighing about 10,245 pounds also were taken. The total weight of all fish removed amounted to slightly more than 97,000 pounds.

In closing, it should be pointed out that the landing owners could, with a minimum of extra effort on their part, keep a simple daily record of the number of anglers fishing and the number of northern pike and other fish captured. Since almost all fishing during the hook-and-line seasons is done from the six landings, and the majority of the winter spearing from five landings, the total of such proposed records would comprise reasonably accurate yearly catch data for the Floodwater. Inasmuch as their businesses depend upon the supply of northern pike, it

would appear an accumulation of such records on the angling pressure and the resultant take would be of value to them as well as to fisheries biologists and conservation officials.

INSTITUTE FOR FISHERIES RESEARCH

David S. Shetter and Henry J. Vondett

Report approved by A. S. Hazzard

Report typed by B. J. Bair

Table 1

Number of days sampled at the various landings on
Fletcher Floodwater, April 25-November 21, 1948

Day of Week	Landings						Totals
	Taylor and Hawks	Jack's	Charley's	Emil's	Hunt's ^W	Klein's ^W	
Saturday	4	2	3	3	2	2	16
Sunday	3	5	2	2	1	2	15
Monday	1	1	1	1	1	1	6
Tuesday	...	2	...	1	2	1	6
Wednesday	2	...	1	1	1	1	6
Thursday	1	1	1	2	1	...	6
Friday	1	1	3	1	...	...	6
Totals	12	12	11	11	8	7	61

^W Closed October 5, 1948

^W Closed October 17, 1948

TABLE 2

Summary of angling results for northern pike on Fletcher Floodwater during hook-and-line angling April 25-November 21, 1948
observed by creel census clerks on bi-weekly checks

Period 1948	Observed boats	Number of fishermen	Anglers per boat	Total hours of fishing	Av. Hrs. per Angler	Total N. Pike caught	Catch/hr. of N.pike	Total lbs. of N.pike weighed	Number of N. pike weighed	Av. wt. of N. pike (lbs.)
4/25-6/13	294	663	2.26	3,726.00	5.62	646	0.173	545.80	335	1.63
6/14-7/23	220	501	2.28	2,718.50	5.43	321	0.117	517.02	272	1.90
7/24-8/23	142	313	2.20	1,682.25	5.37	215	0.128	253.89	137	1.85
8/24-9/27	192	457	2.38	2,493.50	5.46	283	0.114	311.75	188	1.66
9/28-10/29	167	357	2.14	1,813.50	5.08	687	0.379	1,127.68	588	1.92
10/30-11/17	41	92	2.24	371.00	4.03	207	0.558	292.08	199	1.47
11/18-11/21	4	8	2.00	25.50	3.19	4	0.157	7.18	4	1.79
Totals and averages	1060	2,391	...	12,830.25	...	2,363	0.184	3,055.40	1,723	1.77

TABLE 3

Summary of northern pike catch, measurements, and numbers of anglers unsuccessful, numbers of anglers catching daily limit and total angler-days observed on the days Fletcher Floodwater was checked by creel census clerks.

Landing	Date 1948	Length and weight data on northern pike					Angler-days taking limit of 5 pike	Angler-days taking no pike	Total angler-days observed
		Number taken	Number Measured	Average length	Number weighed	Average Weight			
T&H	4/25	15	13	19.4	13	1.70	0	27	44
Charley's	4/30	2	2	18.1	2	1.25	0	1	3
T&H	5/1	95	30	19.4	23	2.13	2	33	87
Charley's	5/9	9	9	19.1	9	1.54	0	7	13
Emil's	5/11	0	...	....	...	...	...	...	0
Klein's	5/15	74	61	18.3	49	1.28	3	37	86
Charley's	5/19	0	...	....	...	...	0	3	3
Emil's	5/23	22	16	19.6	16	1.66	0	15	29
T&H	5/27	16	16	19.3	16	1.61	0	12	21
Jack's	5/29	165	49	20.3	35	1.94	8	66	151
Jack's	6/4	35	35	19.8	21	1.71	0	9	32
Klein's	6/6	98	82	18.9	64	1.56	1	28	88
Klein's	6/7	45	45	18.7	36	1.70	0	8	24
Hunt's	6/12	70	57	18.6	51	1.54	0	33	83
Totals, averages		646	415	19.1	335	1.63	14	279	663
Hunt's	6/14	6	6	20.0	6	2.33	0	7	16
Hunt's	6/15	21	21	19.9	21	2.18	0	9	19
Jack's	6/20	55	55	19.0	54	1.66	0	42	89
Emil's	6/23	23	23	19.4	21	1.78	0	2	16
Emil's	6/26	34	34	19.3	34	1.79	1	11	29
Charley's	7/1	7	7	19.2	6	1.71	0	14	21
Hunt's	7/4	58	32	19.5	32	1.78	0	106	148
T&H	7/9	26	22	19.5	22	1.93	0	30	49
Charley's	7/10	13	12	19.1	12	1.75	0	21	30
Jack's	7/12	67	56	20.2	56	2.04	3	24	57
Emil's	7/18	0	...	...	...	...	0	7	7
Klein's	7/20	11	8	22.6	8	3.01	0	14	20
Totals, averages		321	276	19.6	272	1.90	4	287	501
T&H	7/24	33	29	21.8	16	2.23	0	28	54
Hunt's	7/28	11	11	19.0	11	1.66	0	14	25
Charley's	8/1	12	12	19.1	12	1.62	0	12	22
Emil's	8/5	4	4	20.6	4	2.03	0	7	11
Klein's	8/7	21	21	20.4	21	2.04	0	16	29
Charley's	8/13	4	4	19.4	4	1.62	0	8	12
T&H	8/15	39	30	18.4	25	2.03	0	30	60
T&H	8/16	17	16	19.0	10	1.54	0	28	41
Jack's	8/21	74	37	20.0	34	1.67	0	18	59
Totals, averages		215	164	19.8	137	1.85	0	161	313
Jack's	8/24	25	17	20.8	11	2.00	0	29	49
Klein's	8/29	9	9	21.9	9	2.28	0	15	24
Klein's	9/1	22	22	18.9	22	1.51	0	8	25
Hunt's	9/4	90	46	19.5	46	1.64	0	92	161
Hunt's	9/9	8	8	19.3	8	1.63	0	0	5
Jack's	9/12	65	31	19.5	31	1.62	0	38	96
Emil's	9/17	0	...	...	...	...	0	2	2
Emil's	9/18	24	24	19.7	24	1.65	0	13	29
Charley's	9/20	2	2	21.4	2	1.38	0	5	11
T&H	9/26	38	37	18.5	35	1.58	2	29	55
Totals, averages		283	196	19.5	188	1.66	2	231	457
Hunt's	9/28	17	17	20.0	17	1.65	0	3	13
Charley's	10/2	13	13	21.6	13	1.99	0	24	36
T&H	10/6	72	72	19.3	72	1.51	1	5	39
Jack's	10/10	0	0	0	0	0	0	0	0
Jack's	10/14	65	54	21.2	54	1.98	2	13	49
T&H	10/16	143	90	18.7	90	1.45	9	16	70
Charley's	10/22	43	43	21.1	43	2.24	5	1	13
Jack's	10/24	284	264	21.0	264	2.03	18	30	129
Emil's	10/25	50	35	22.9	35	2.70	8	0	8
Totals, averages		687	588	20.6	588	1.92	43	92	357
T&H	10/30	115	110	18.4	110	1.33	7	15	51
Jack's	11/2	61	60	18.9	60	1.41	5	3	22
Emil's	11/7	6	6	20.8	6	1.85	0	3	6
T&H	11/10	3	2	22.9	2	2.65	0	3	4
Charley's	11/13	22	21	21.2	21	2.13	2	2	9
Totals, averages		207	199	19.0	199	1.47	14	26	92
Emil's	11/18	3	3	20.1	3	1.83	0	1	4
Jack's	11/21	1	1	19.8	1	1.68	0	3	4
Totals, averages		4	4	20.0	4	1.78	0	4	8
Grand totals and averages		2,363	1,842	19.7	1,723	1.77	77	1,080	2,391

Table 4

Estimates of total anglers, total hours fished, total northern pike caught and total weight of northern pike removed,
Fletcher Floodwater, April 25 - November 21, 1948

Period	Numbers of anglers at landing in period						Estimated total anglers	Estimated total hours of fishing	Estimated catch of northern pike	
	T&H	Jack's	Emil's	Charley's	Hunt's	Klein's			number	weight in pounds
4/25-6/13	3,767	2,726	752	409	1,726	896	10,276	57,751	9,991	16,285
6/14-7/23	4,691	2,371	787	472	1,206	570	10,097	54,827	6,415	12,189
7/24-8/23	1,523	1,789	449	339	598	326	5,024	26,979	3,453	6,388
8/24-9/27	1,498	3,161	807	519	964	509	7,458	40,721	4,642	7,706
9/28-10/29	860	2,129	409	496	75	148	4,117	20,914	7,926	15,218
10/30-11/17	104	515	76	206	...	...	901	3,631	2,026	2,978
11/18-11/21	...	28	4	4	...	...	36	115	18	32
Grand Totals	12,443	12,719	3,284	2,445	4,569	2,449	37,909	204,938	34,471	60,796

For Taylor and Hawk's Landing, actual angler counts were kept inasmuch as a varying number of fishermen fished from shore at the dam in addition to the boat fishermen. At the other landings almost no shore fishing was done. The numbers of anglers were estimated by multiplying the number of boats rented in any period by the average numbers of anglers per boat as determined from the bi-weekly observations of the creel census clerks for that period.

The record of boats rented or anglers recorded by the various landings in the various periods are given in Table A, Appendix.

Table 5

Summary of the observed catch of fish other than northern pike, Fletcher Floodwater, April 25-November 21, 1948
and average weights of the species involved

Period 1948	Total hours of fishing observed	Observed catch of					Total observed catch	Catch per hour of				
		Yellow perch	L. M. bass	Rock bass	Common sunfish	Bull- heads		Yellow perch	L.M. bass	Rock bass	Common sunfish	Bull- heads
4/25-6/13	3,726.00	579	...	101	...	27	707	0.155	...	0.027	...	0.007
6/14-7/23	2,718.50	278	4	21	14	323	640	0.102	0.001	0.008	0.005	0.119
7/24-8/23	1,682.25	65	5	...	35	194	299	0.039	0.003	...	0.021	0.115
8/24-9/27	2,493.50	121	24	1	21	136	303	0.049	0.010	0.000 ⁺	0.008	0.055
9/28-10/29	1,813.50	143	10	...	...	2	155	0.079	0.006	...	...	0.001
10/30-11/17	371.00	...	...	...	...	6	6	...	...	...	...	0.006
11/18-11/21	25.50	...	...	...	...	...	...	...	...	...	...	...
Totals, averages	12,830.25	1,186	43	123	70	688	2,110	0.092	0.003	0.009	0.005	0.054

Item	Y. perch	L. M. bass	Rock bass	C. Sunfish	Bl. Bullhead
Average weight of	0.34 lb.	0.70 lb.	0.18 lb.	0.19 lb.	0.20 lb.
Total lbs. measured	116.64	21.69	0.72	1.76	11.25
Number of specimens	345	31	4	9	55

Average catch per hour 4/25-11/21 = 0.164

TABLE 6

Summary of the estimated catch of fish other than northern pike, Fletcher Floodwater, 1948

Period 1948	Estimated hours of angling	Estimated total catch of					Estimated Total catch	Estimated weight in pounds of the catch of					Estimated total pounds taken
		Yellow perch	L.M. bass	Rock bass	Common sunfish	Bull- heads		Yellow perch	L.M. bass	Rock bass	Common sunfish	Bull- heads	
4/25-6/13	57,751	8,951		1,559	...	404	10,914	3,043	...	281	...	81	3,405
6/14-7/23	54,827	5,592	55	439	274	6,524	12,884	1,901	39	79	52	1,305	3,376
7/24-8/23	26,979	1,052	81	...	567	3,103	4,803	358	57	...	108	621	1,144
8/24-9/27	40,721	1,995	407	16	326	2,240	4,984	678	285	3	62	448	1,476
9/28-10/29	20,914	1,652	125	...	...	21	1,798	562	88	...	...	4	654
10/30-11/17	3,631	...	...	...	...	58	58	...	...	...	...	12	12
11/18-11/21	115	...	...	...	...	...	...	...	...	...	...	...	...
Totals	204,938	19,242	668	2,014	1,167	12,350	35,441	6,542	469	363	222	2,471	10,067

Figure 1

Size distribution of northern pike, Fletcher Floodwater, 1948

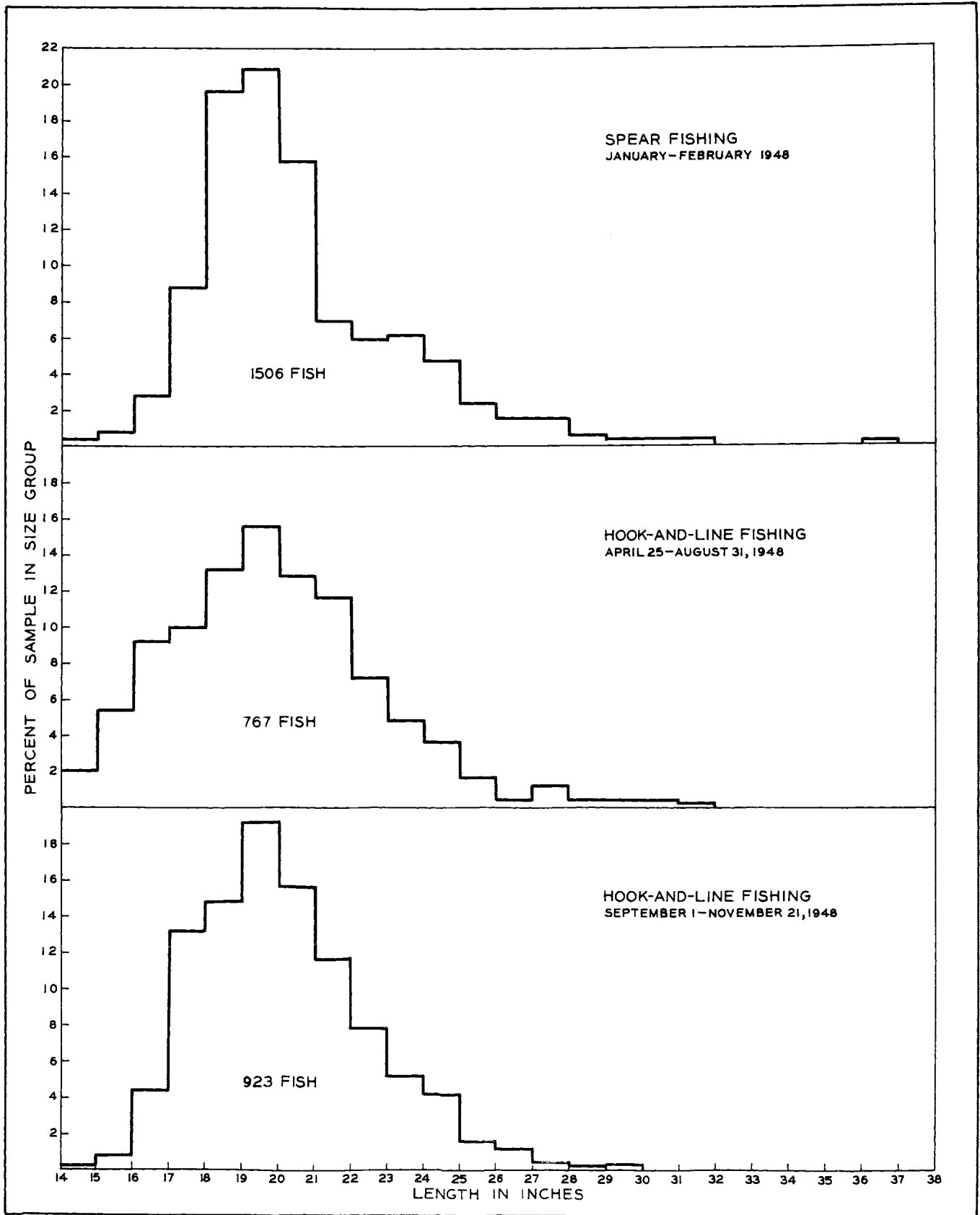


TABLE 7

Summary of length-weight relationship and size distribution of northern pike, Fletcher Floodwater, 1948
for winter-, spring- and summer-, and fall-caught fish

Size range in inches	Spearing season, Jan.-Feb. 1948			Hook-and-line fishing, Apr.25-Aug.31, 1948			Hook-and-line fishing, Sept.1 - Nov. 21, 1948		
	Number	Average Weight (lbs)	% in size class	Number	Average Weight (lbs)	% in size class	Number	Average Weight (lbs)	% in size class
14.0-14.9	6	0.64	0.4	16	0.72	2.1	2	0.75	0.2
15.0-15.9	13	0.78	0.9	41	0.86	5.4	6	0.74	0.7
16.0-16.9	43	1.11	2.8	71	0.97	9.2	40	0.94	4.3
17.0-17.9	133	1.12	8.8	77	1.16	10.0	122	1.10	13.2
18.0-18.9	295	1.31	19.6	102	1.35	13.3	136	1.31	14.8
19.0-19.9	312	1.54	20.7	120	1.60	15.6	177	1.60	19.2
20.0-20.9	238	1.74	15.8	99	1.85	12.9	144	1.81	15.6
21.0-21.9	105	1.98	7.0	89	2.11	11.6	107	2.03	11.6
22.0-22.9	92	2.24	6.1	55	2.43	7.2	72	2.34	7.8
23.0-23.9	94	2.26	6.2	36	2.71	4.7	47	2.66	5.1
24.0-24.9	71	3.01	4.7	27	3.07	3.5	39	2.98	4.2
25.0-25.9	36	3.47	2.4	12	3.14	1.6	15	3.28	1.6
26.0-26.9	25	4.01	1.7	4	4.25	0.5	11	3.95	1.2
27.0-27.9	24	4.28	1.6	9	4.40	1.2	3	4.50	0.3
28.0-28.9	9	4.88	0.6	4	4.81	0.5	1	4.50	0.1
29.0-29.9	3	5.50	0.2	2	5.13	0.3	1	6.06	0.1
30.0-30.9	3	6.16	0.2	2	6.13	0.3	...	...	...
31.0-31.9	3	7.66	0.2	1	6.50	0.1	...	...	...
36.0-36.9	1	11.38	0.1	...	...	...	...	...	...
Totals	1,506	...	100.0	767	...	100.0	923	...	100.0

TABLE 8

Comparison of percentage of angler-days on which no pike were taken and on which 5 pike were taken for spear season and hook-and-line fishing, Fletcher Floodwater, 1948.

(Percentages are given in parentheses)

Winter spearing				Hook-and-line fishing			
Period	Total angler days observed	Number of days 0 pike	Number of days 5 pike	Period	Total angler days observed	Number of days 0 pike	Number of days 5 pike
1/1-1/10	235	52 (22.1)	43 (18.3)	4/25-6/13	663	279 (42.1)	14 (2.1)
1/11-1/23	289	96 (33.2)	24 (8.3)	6/14-7/23	501	287 (57.3)	4 (0.8)
1/24-2/5	271	120 (44.3)	19 (7.0)	7/24-8/23	313	161 (51.4)	0 (0.0)
2/6-2/14	184	75 (40.8)	5 (2.7)	8/24-9/27	457	231 (50.5)	2 (0.4)
2/15-2/27	188	84 (44.7)	6 (3.2)	9/28-10/29	357	92 (25.8)	43 (12.0)
2/28-2/29	83	43 (51.8)	1 (1.2)	10/30-11/17	92	26 (28.3)	14 (15.2)
...	...	...	...	11/18-11/21	8	4 (50.0)	0 (0.0)
Totals	1,250	470 (37.6)	98 (7.8)		2,391	1,345 (56.3)	126 (5.3)

TABLE 9

Residence of anglers interviewed, Fletcher Floodwater, 1948

Counties of Residence	Angler-days observed, 1948		States of Residence	Angler-days observed, 1948		Unknown	
	Spear fishing	Hook-and-line fishing		Spear fishing	Hook-and-line fishing	Spear fishing	Hook-&-line fishing
Alcona	15	4	Florida	...	1	10	39
Alpena	122	80	Indiana	...	97		
Arenac	...	3	Kentucky	...	5		
Bay	7	17	Louisiana	...	2		
Berrien	...	3	Missouri	...	3		
Calhoun	2	7	New Jersey	...	2		
Cheboygan	1	8	New York	...	3		
Clare	14	1	Ohio	8	445		
Clinton	11	4	Tennessee	...	2		
Genesee	82	163	Texas	...	3		
Gladwin	6	10	West Virginia	...	7		
Gratiot	4	34	Wisconsin	...	2		
Huron	...	3	Non-Resident				
Ingham	13	53	Total	8	572		
Iosco	2	8					
Isabella	5	4					
Jackson	10	26					
Kalamazoo	3	6					
Kent	...	10					
Lapeer	29	13					
Lenawee	12	62					
Livingston	3	18					
Macomb	5	19					
Midland	93	86					
Monroe	1	41					
Montcalm	12	...					
Montmorency	245	47					
Muskegon	2	...					
Oakland	54	204					
Ogemaw	17	...					
Oscoda	2	6					
Oscoda	166	19					
Otsego	30	...					
Ottawa	2	...					
Presque Isle	26	15					
Roscommon	12	3					
Saginaw	56	63					
St. Clair	18	4					
Sanilac	5	10					
Shiawassee	23	34					
Tuscola	5	19					
Van Buren	2	...					
Washtenaw	14	35					
Wayne	101	638					
Resident Total	1,232	1,780					
			Resident Total	1,232	1,780		
			Non-Resident Total	8	572		
			Unknown	10	39		
			Total Interviewed	1,250	2,391		

TABLE 10

Comparison of winter spearing and open-water hook-and-line fishing data, Fletcher Floodwater, 1948

Item	Winter Season	Open-water Season
Main method of fishing	Spear	Hook and line
Length of season	60	211
Number of angler-days	9,690	37,909
Av. anglers per day	161.5	179.6
Northern pike taken	14,088	34,471
Other fish taken	281	35,441
Total fish taken	14,369	69,912
Lbs. of northern pike taken	25,823	60,796
Lbs. of other fish taken	100	10,067
Lbs. removed - all fish	25,923	70,863
Size of northern pike		
Av. length (inches)	20.1	19.7
Av. weight (lbs.)	1.84	1.77
Catch/hr. northern pike	0.260	0.184
Catch/hr. other fish	0.005	0.164
Catch/hr. all fish	0.265	0.348
Residence of majority of anglers	Local	Downstate and outstate
% taking 5 northern pike	7.8	5.3
% taking no northern pike	37.6	56.3

Figure 2

Water level (in feet) and catch per hour of northern pike,
Fletcher Floodwater, 1948

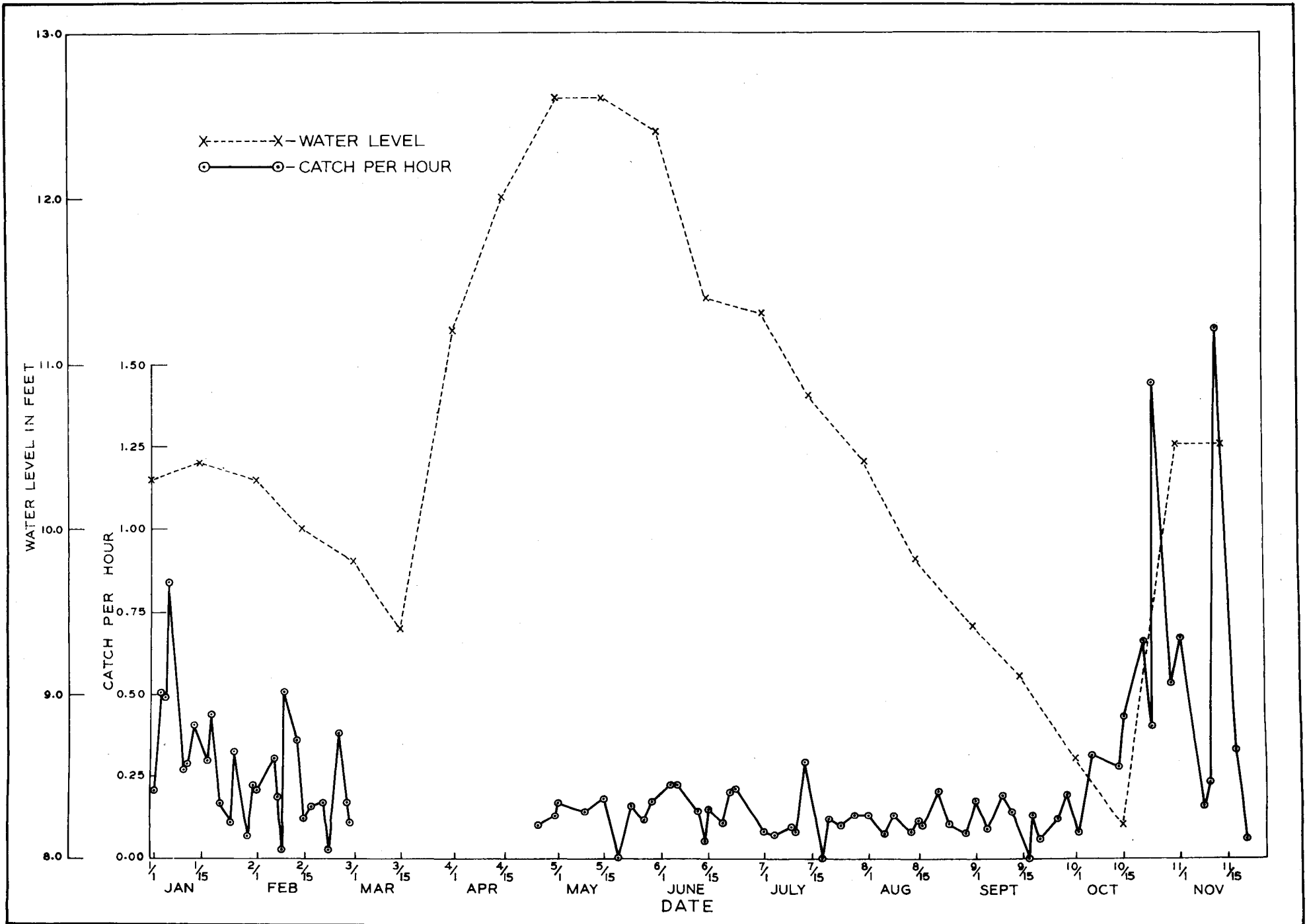


TABLE A

Numbers of boats (or anglers) registered by the various
landing owners, Fletcher Floodwater, April 25-Nov. 21,
1948

Period	Number of boats (or anglers) registered by						Totals boats (or people)
	T + H	Jack's	Emil's	Charley's	Hunt's	Klein's	
4/25-6/13	(3,767)	1,193 (+30)	314 (+42)	176 (+11)	186(+1307)	392(+10)	2,261(+5,167)
6/14-7/23	(4,691)	1,040	345	207	529	250	2,371(+4,691)
7/24-8/23	(1,523)	813	204	154	272	148	1,591(+1,523)
8/24-9/27	(1,498)	1,328	339	218	405	214	2,504(+1,498)
9/28-10/29	(860)	995	191	232	35	69	1,522(+860)
10/30-11/17	(104)	230	34	92	...	...	356(+104)
11/18-11/21	...	14	2	2	18
Totals	(12,443)	5,613(+30)	1,429(+42)	1,081(+11)	1,427(+1307)	1073(+10)	10,623(+13,843)

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TABLE B

Gage levels, Fletcher Floodwater, on the 1st and 15th of each month, 1938-1948, given to the nearest 0.1 foot. Readings taken at the Upper Smith Dam. Readings represent number of feet of water above the bottom of the original channel.

Date	Year											
	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	
Jan. 1	10.7	8.6	9.2	11.0	12.0	7.5	7.3	9.1	11.3	8.9	10.3	
15	10.7	9.2	8.5	11.0	11.9	7.9	7.3	8.0	11.4	8.7	10.4	
Feb. 1	10.7	9.2	8.0	10.6	11.9	7.8	7.7	7.6	11.2	9.2	10.3	
15	10.9	9.2	7.7	10.1	12.0	7.7	7.9	7.4	10.8	9.4	10.0	
Mar. 1	10.6	9.1	7.6	9.1	11.7	8.4	8.1	7.4	10.3	8.7	9.8	
15	10.4	9.2	7.1	8.4	11.3	8.9	8.4	8.2	10.7	8.2	9.5	
Apr. 1	11.9	9.7	7.5	7.7	11.1	...	9.1	10.0	11.1	8.9	11.2	
15	12.0	10.2	9.1	9.9	12.0	11.9	9.8	10.4	11.4	10.9	12.0	
May 1	12.1	11.2	9.6	11.1	12.0	12.5	10.7	10.9	11.5	11.9	12.6	
15	12.2	11.8	9.8	11.5	12.2	12.6	11.3	11.3	11.4	12.6	12.7	
June 1	12.2	12.3	10.3	11.9	12.5	12.6	11.6	12.0	11.8	12.6	12.4	
15	12.2	12.3	10.4	12.1	12.5	12.6	12.0	12.3	11.5	12.7	11.4	
July 1	11.9	12.4	10.2	12.1	12.3	12.7	12.4	12.3	12.0	12.4	11.3	
15	11.4	12.0	9.6	11.7	11.8	12.6	11.9	12.0	12.0	12.0	10.8	
Aug. 1	10.6	10.7	9.2	11.4	10.9	12.4	11.1	11.0	10.9	11.2	10.4	
15	10.0	10.3	8.9	11.4	10.4	11.6	10.5	12.2	9.8	11.3	9.8	
Sept. 1	9.5	10.3	9.6	10.7	9.6	10.6	9.6	9.7	9.3	9.3	9.4	
15	9.5	9.9	10.3	11.1	9.0	10.1	9.4	9.5	9.4	9.1	9.1	
Oct. 1	8.8	9.5	10.7	11.0	8.8	8.9	9.5	9.7	9.6	9.4	8.6	
15	7.9	8.9	10.8	11.4	8.1	7.9	9.9	10.5	9.3	9.0	8.2	
Nov. 1	7.7	8.5	10.5	11.8	7.8	7.6	9.9	10.9	9.1	9.0	10.5	
15	7.6	9.1	10.5	12.0	7.8	8.1	9.6	11.6	9.3	9.3	10.5	
Dec. 1	8.2	9.2	10.5	11.9	7.2	7.9	10.0	12.0	9.2	9.6	10.5	
15	8.9	9.3	10.7	11.9	6.9	7.7	10.1	12.1	9.4	10.0	10.7	
Difference between high and low level	4.6	4.0	3.7	4.5	5.3	5.3	5.1	4.9	2.9	4.5	4.5	

TABLE C

Hours of fishing, number of northern pike caught and catch per hour on the days the Fletcher Floodwater was checked by creel census clerks, 1948

Date	Hours of fishing observed	Northern pike caught	Catch per Hour	Date	Hours of fishing observed	Northern pike caught	Catch per Hour
January 1	362.50	78	0.22	July 9	305.75	26	0.09
3	444.75	227	0.51	10	153.50	13	0.08
4	216.00	106	0.49	12	228.50	67	0.29
5	60.75	51	0.84	18	22.00	0	0.00
10	204.00	56	0.28	20	88.50	11	0.12
11	413.50	120	0.29	24	324.50	33	0.10
13	396.25	162	0.41	28	84.25	11	0.13
17	284.50	21	0.30	Aug. 1	95.00	12	0.13
18	290.25	127	0.44	5	54.75	4	0.07
21	83.00	14	0.17	7	161.00	21	0.13
24	317.00	34	0.11	13	51.00	4	0.08
25	555.50	181	0.33	15	370.75	39	0.11
29	45.00	3	0.07	16	166.25	17	0.10
31	326.50	73	0.22	21	374.75	74	0.20
February 1	171.75	36	0.21	24	241.25	25	0.10
6	131.50	41	0.31	29	115.00	9	0.08
7	548.50	104	0.19	Sept. 1	132.50	22	0.17
8	177.00	5	0.03	4	982.00	90	0.09
9	27.50	14	0.51	9	42.00	8	0.19
14	159.50	57	0.36	12	478.25	65	0.14
15	297.50	35	0.12	17	5.00	0	0.00
17	127.75	33	0.16	18	135.50	24	0.13
21	241.50	41	0.17	20	34.50	2	0.06
22	304.00	8	0.03	26	327.25	38	0.12
25	269.00	101	0.38	28	69.75	17	0.19
28	235.50	41	0.17	Oct. 2	155.00	13	0.08
29	183.50	21	0.11	6	229.00	72	0.31
				10	0	...	...
April 25	152.25	15	0.10	14	232.75	65	0.27
30	15.00	2	0.13	16	332.25	143	0.43
May 1	575.00	95	0.17	22	53.25	43	0.81
9	66.00	9	0.14	24	706.75	284	0.40
11	0	...	...	25	34.75	50	1.44
15	400.75	74	0.18	30	215.25	115	0.53
19	8.50	0	0.00	Nov. 2	90.75	61	0.67
23	134.00	22	0.16	7	38.00	6	0.16
27	123.75	16	0.12	10	13.25	3	0.23
29	935.25	161	0.17	13	13.75	22	1.70
June 4	158.25	35	0.22	18	9.00	3	0.33
6	447.00	98	0.22	21	16.50	1	0.06
7	103.50	45	0.43				
12	510.75	70	0.14				
14	115.00	6	0.05				
15	142.50	21	0.15				
20	481.75	55	0.11				
23	112.50	23	0.21				
26	161.50	34	0.20				
July 1	84.00	7	0.08				
4	823.00	58	0.07				

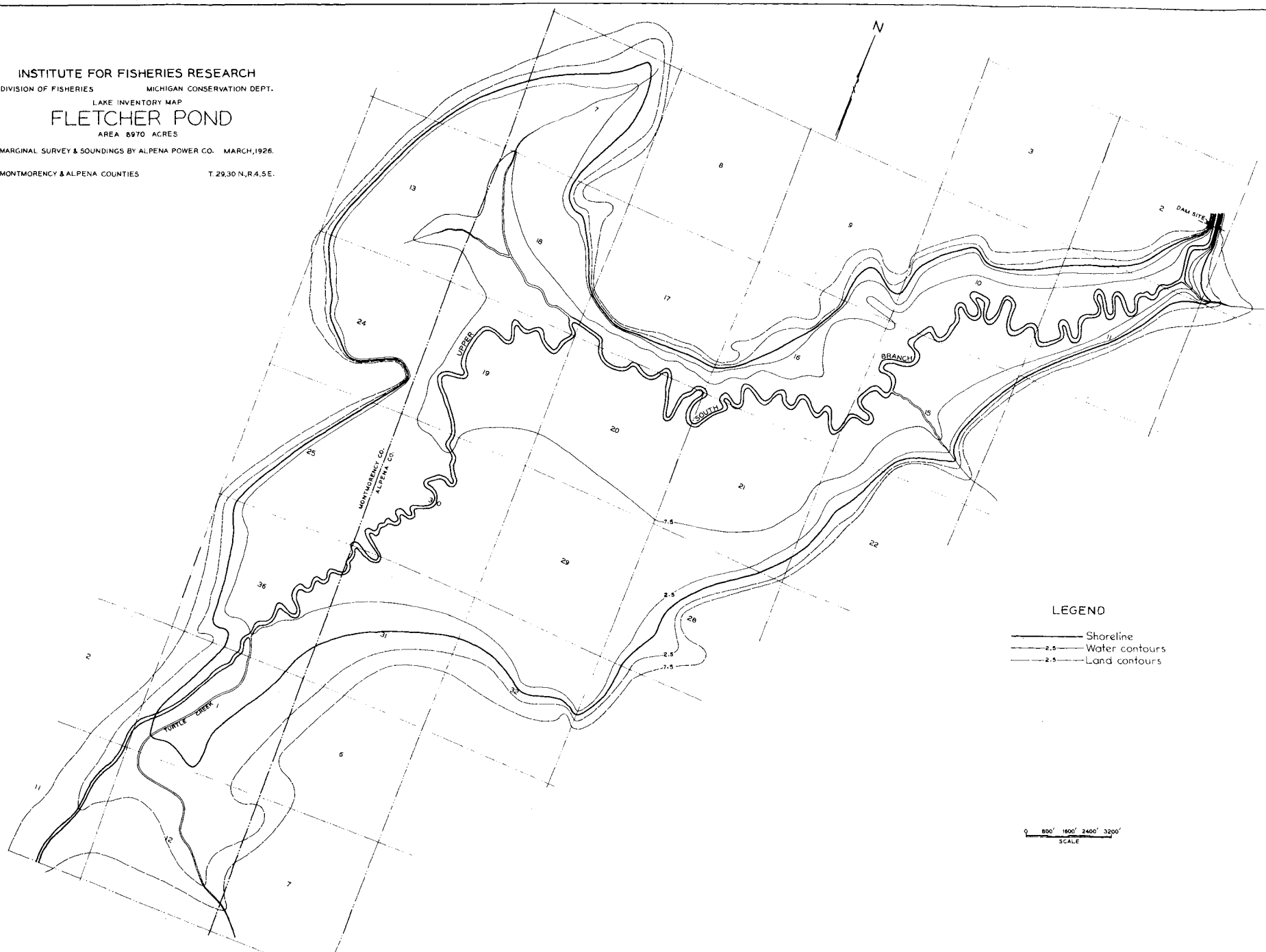
TABLE D

Summary of estimated angling pressure and fish catch
Fletcher Floodwater, 1948

Time Period 1948	Total Angler- days	Northern pike taken		Other fish taken		Estimated total poundage removed	
		Number	Weight	Number	Weight		
January 1-10	2,051	4,518	8,452)			
11-21	1,954	3,008	5,509				
22-Feb. 1	1,950	2,351	4,021				
February 2-14	1,779	2,138	3,873	)	--	281	
15-25	1,482	1,719	3,252				
26-29	474	354	716				
						100	
March 1-31	29	28	52		214	73	125
April 1-24	166	97	172		14	5	177
April 25-June 13	10,276	9,991	16,285		10,914	3,405	19,690
June 14-July 23	10,097	6,415	12,189		12,884	3,376	15,565
July 24-Aug. 23	5,024	3,453	6,388		4,803	1,144	7,532
August 24-Sept. 27	7,458	4,642	7,706		4,984	1,476	9,182
Sept. 27-Oct. 29	4,117	7,926	15,218		1,798	654	15,872
October 30-Nov. 17	901	2,026	2,978		58	12	2,990
November 18 - 21	36	18	32		...	...	32
Totals	47,794	48,684	86,843		35,950	10,245	97,088

INSTITUTE FOR FISHERIES RESEARCH
 DIVISION OF FISHERIES MICHIGAN CONSERVATION DEPT.
 LAKE INVENTORY MAP
FLETCHER POND
 AREA 8970 ACRES

MARGINAL SURVEY & SOUNDINGS BY ALPENA POWER CO. MARCH, 1926.
 MONTMORENCY & ALPENA COUNTIES T. 29.30 N., R. 4.5 E.



LEGEND

- Shoreline
- 2.5 — Water contours
- 2.5 — Land contours

0 800' 1600' 2400' 3200'
 SCALE