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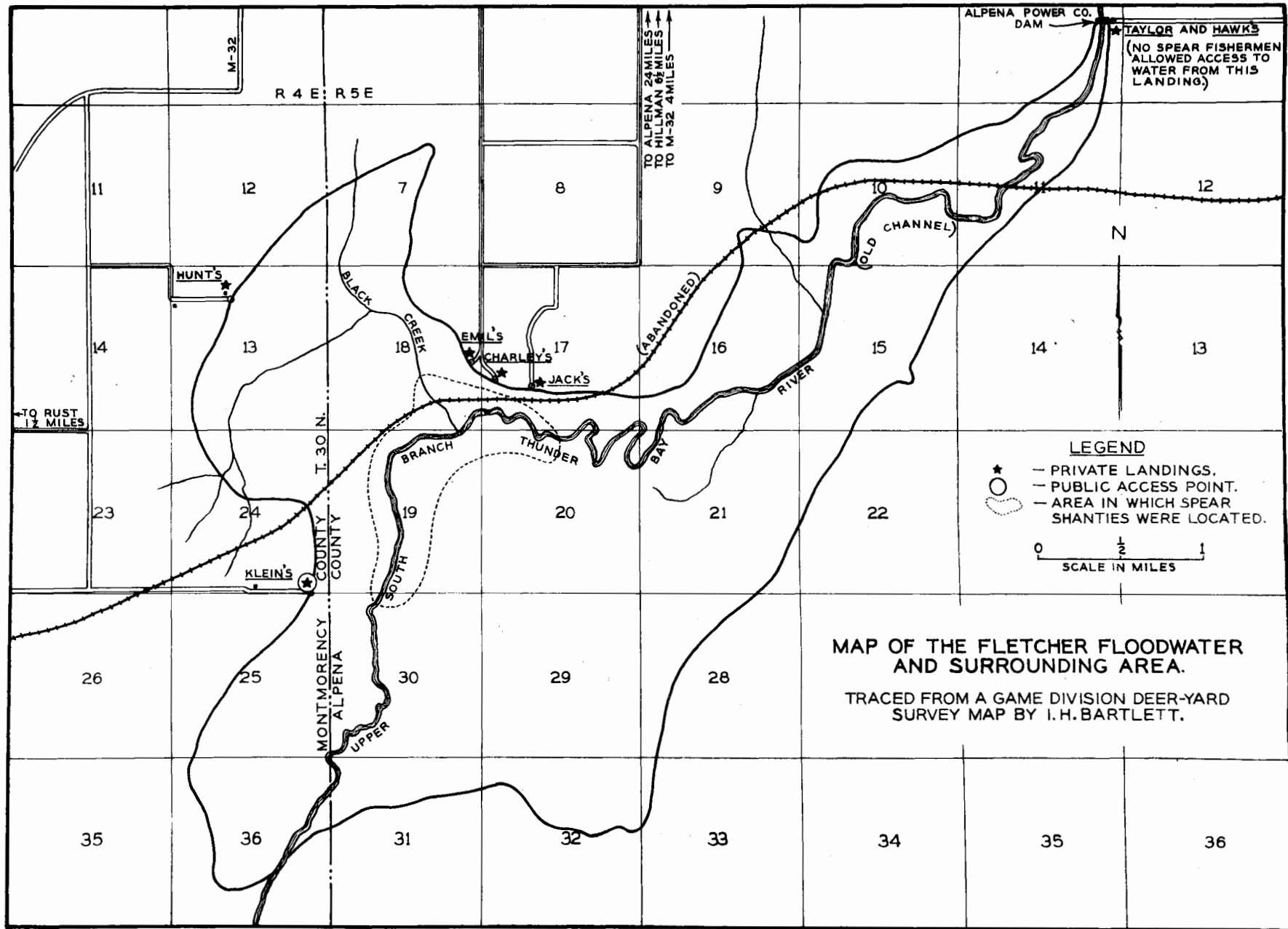
Report No. <sup>1205</sup>~~1204~~

CREEL CENSUS RESULTS FROM THE 1948 WINTER SPEARING SEASON ON  
THE FLETCHER FLOODWATER, ALPENA AND MONTMORENCY COUNTIES

By David S. Shetter and Henry J. Vondett

For the last decade the Fletcher Floodwater has been regarded as one of the better northern pike fishing areas in the Lower Peninsula of Michigan, and has been the favorite fishing ground for numerous pike fishermen from all over the Midwest. This impoundment, located in northeastern Michigan, lies in Alpena and Montmorency Counties on the upper reaches of the Upper South Branch of the Thunder Bay River, and floods approximately 10,000 acres. The reservoir is formed by a 12 1/2-foot head concrete dam owned by the Alpena Light and Power Company for the production of electrical power. The dam was completed in the fall of 1930, and the pond reached its present level in June, 1931.

With the exception of a section line road which ends at the shoreline in Montmorency County in Township 30 North, Range 4 East on the section line between sections 24 and 25 next to Klein's Landing (see Map, Figure 1), all of the shoreline around this impoundment is privately owned. In addition to Klein's Landing and the access from the section line road, there are five other landings operated by private individuals through which anglers may obtain access to the water. Some few individuals



TAYLOR AND HAWK'S  
(NO SPEAR FISHERMEN  
ALLOWED ACCESS TO  
WATER FROM THIS  
LANDING.)

**LEGEND**

- ★ - PRIVATE LANDINGS.
- - PUBLIC ACCESS POINT.
- (dashed line) - AREA IN WHICH SPEAR SHANTIES WERE LOCATED.

0 1/2 1  
SCALE IN MILES

**MAP OF THE FLETCHER FLOODWATER  
AND SURROUNDING AREA.**  
TRACED FROM A GAME DIVISION DEER-YARD  
SURVEY MAP BY I.H. BARTLETT.

rent boats and spear shanties which are kept at or put on at the public access point next to Klein's Landing, but the great majority of the fishermen reach the Floodwaters through one of the six major landings.

Although the northern pike is the dominant species in this impoundment and the piscatorial prize sought by the fishermen there, yellow perch of good size are present, as well as largemouthed black bass, bullheads, and common suckers. Under the present regulations it is legal to take northern pike, yellow perch, bullheads, and common suckers at any time of the year by hook and line fishing, and spearing of northern pike, bullheads and suckers is permitted during the months of January and February.

After the impoundment filled in 1931, excellent catches of northern pike were made both by the hook and line angler and the spear fisherman until about 1945. Following that time the hook and line catches began to fall off noticeably according to the livery operators, although there is little recorded evidence to support their statements.

The various livery operators, expressing some concern for the future of the fishery on which a large portion of their livelihood depends, circulated a petition during the fall of 1947 asking that the Conservation Commission close the Fletcher Floodwater to winter spearing. The petition was turned down because the Commission had no facts on which to base such a closing order. Instead, the Conservation Commission instructed the Institute for Fisheries Research through Mr. F. A. Westerman, Chief of the Fish Division, to conduct creel census operations during the winter and summer seasons of 1948 so that comparative data on the angling pressure and the catch during the spearing season and the open-water angling might be available.

Accordingly, the author and Henry J. Vondett met with several of the livery operators and Conservation Officers in December, 1947, to discuss ways and means of conducting a creel census on the Floodwater and the problems that would have to be met. The various livery operators agreed to keep daily records of the numbers of anglers using their landings during the spearing season, and to furnish a daily record of the number of boats rented during the spring, summer, and fall.

#### Method of Conducting the Creel Census and the Data Collected

It is not possible to contact every fisherman using the Fletcher Floodwater at any season because of the financial outlay that would be required to place a creel census clerk at the several landings for 10 to 16 hours daily. It appeared that a good sample of the winter fishing could be obtained by checking the angling on Saturdays, Sundays, holidays, and one day in mid-week. A different landing was visited on each trip, and the mid-week sampling day differed each week. On each visit Vondett checked all the anglers spearing or fishing from the landing visited on that date.

The usual creel census data were taken with the exception of the anglers' names. Date, residence, sex of angler, lengths and weights of northern pike taken, and length of time fished were recorded. In addition, a series of over 100 northern pike stomachs was preserved for a study of the food habits. These collections were distributed fairly well over the two-month spearing season. Scale samples for determination of age and rate of growth also were obtained from the latter fish, as well as from a small number of other northern pike obtained at other times.

The total number of fishermen using the Fletcher Floodwater during the winter spearing season, according to the livery operators' tally, was 9,690 ( Table 1). The figures obtained by the random sampling conducted by Vondett provide sufficient material from which the average length of the fishing day and the average catch per hour may be determined. If the average figures derived from the random sampling are applied to the total anglers recorded, a reasonably reliable estimate of the total hours of fishing, and of the total catch, is obtained. From weights and lengths taken, the average size of the catch may be calculated, and the total weight of the catch may be estimated also.

Under the sampling method adopted, all landings were visited once in from 10 to 13 days except for the last four days of the season. The intensive data collected by Vondett on five of those days were then applied to the totals listed by the livery operators to obtain estimates for the various periods. Season totals were obtained by adding the figures obtained for the six different periods. This method of calculation has the advantage of showing the change in angling quality that occurred during the course of the season. It is possible also to work up the estimates by individual landings for the entire season and total up all the landings, but no seasonal variation in the fishing quality can be observed if this method is used. The intensive data collected by Vondett are presented in Table 2; the average weights and lengths of the pike taken and the pounds per hour of fish speared are given in Table 3. The estimates for the total hours of fishing and the total catch for the various periods and for the entire season, which are based on data in the tables immediately preceding, are presented in Table 4.

Table 1

Daily Number of Fishermen, Fletcher Floodwater, 1948 Spear Season  
As Recorded by the Landing Owners  
Stars Indicate Days Vondett Checked Angling

Date	Daily Number of Fishermen at Landings					Totals, All Landings
	Jack's	Emil's	Charley's	Hunt's	Klein's	
January 1	61★	50	42	71	60	284
2	58	37	43	57	20	215
3	108	53	35	72★	55	323
4	108	48★	33	74	44	307
5	18	9	13	34	23★	97
6	20	25	17	57	18	137
7	26	16	25	49	20	136
8	12	19	22	54	25	132
9	20	14	10	64	28	136
10	56	33	31★	94	70	284
Period Totals	487	304	271	626	363	2,051
January 11	80★	37	25	92	80	314
12	31	9	14	37	40	131
13	44	13	19	67★	20	163
14	35	9	30	45	18	137
15	7	17	19	36	40	119
16	11	18	6	73	25	133
17	53	40★	27	79	45	244
18	72	35	23	48	87★	265
19	15	8	11	39	50	123
20	55	7	19	60	35	176
21	43	2	15★	69	20	149
Period Totals	446	195	208	645	460	1,954
January 22	28	--	8	59	18	113
23	32	6	12	36	20	106
24	58★	35	20	66	95	274
25	64	33	24	102★	90	313
26	22	5	7	52	6	92
27	14	3	5	69	8	99
28	25	7	8	39	10	89
29	44	12★	1	71	15	143
30	25	5	20	59	25	134
31	56	29	39	72	66★	262
February 1	77	32	33★	113	70	325
Period Totals	445	167	177	738	423	1,950
February 2	15	10	9	42	16	92
3	45	8	9	47	14	123
4	66	7	20	73	10	176
5	15	9	22	44	15	105
6	17★	9	9	49	16	100
7	51	34	33	103★	54	275
8	57	32★	35	99	45	268
9	13	6	25	33	6★	83
February 15	44★	28	23	59	10	164
16	8	3	20	38	4	73
17	16	8	25	28★	8	85
18	31	17	27	40	10	125
19	42	10	26	31	10	119
20	25	7	15	28	16	91
21	51	30★	27	62	23	193
22	60	39	30	59	51★	239
23	38	15	25	48	10	136
24	29	18	30	47	6	130
25	48	16	35★	28	--	127
Period Totals	392	191	283	468	148	1,482
February 26	40	15	30	27	2	114
27	29	18	20	23	--	90
28	46★	27	20	38	--	131
29	52	30	20	37★	--	139
Period Totals	167	90	90	125	2	474
Totals, 1948 Spearing Season	2,344	1,128	1,314	3,287	1,617	9,690

Table 2

Complete Angling Data from Various Landings on Various Days  
Fletcher Floodwater, 1948 Spear Season

Landing	Date 1948	Total Anglers Checked	Total Hours of Fishing	Average Length of Fishing Day (Hrs)	Northern Pike Taken		Number of	
					Total	Per Hour	Limit Catches	0 Fish
Jack's	Jan. 1	61	362.50	5.94	78	0.215	4	22
Hunt's	3	72	444.75	6.18	227	0.510	21	7
Emil's	4	48	216.00	4.50	106	0.491	9	7
Klein's	5	23	60.75	2.64	51	0.840	5	6
Charley's	10	31	204.00	6.58	56	0.276	4	10
Totals, Averages		235	1,288.00	5.48	518	0.402	43	52
Jack's	11	80	413.50	5.17	120	0.290	4	23
Hunt's	13	67	396.25	5.91	162	0.409	15	12
Emil's	17	40	284.50	7.11	21	0.074	0	25
Klein's	18	87	290.25	3.34	127	0.438	5	31
Charley's	21	15	83.00	5.53	14	0.169	0	5
Totals, Averages		289	1,467.50	5.08	444	0.303	24	96
Jack's	24	58	317.00	5.47	34	0.107	1	40
Hunt's	25	102	555.50	5.45	181	0.326	14	27
Emil's	29	12	45.00	3.75	3	0.067	0	9
Klein's	31	66	326.50	4.95	73	0.224	0	22
Charley's	Feb. 1	33	171.75	5.20	36	0.210	4	22
Totals, Averages		271	1,415.75	5.22	327	0.231	19	120
Jack's	6	17	131.50	7.74	41	0.312	2	2
Hunt's	7	103	548.50	5.33	104	0.190	1	41
Emil's	8	32	177.00	5.53	5	0.028	0	29
Klein's	9	6	27.50	4.58	14	0.509	2	1
Charley's	14	26	159.50	6.13	57	0.357	0	2
Totals, Averages		184	1,044.00	5.67	221	0.212	5	75
Jack's	15	44	297.50	6.76	35	0.118	2	23
Hunt's	17	28	127.75	4.56	33	0.258	1	8
Emil's	21	30	241.50	8.05	41	0.170	0	8
Klein's	22	51	304.00	5.96	8	0.026	0	43
Charley's	25	35	269.00	7.69	101	0.375	3	2
Totals, Averages		188	1,239.75	6.59	218	0.176	6	84
Jack's	28	46	235.50	5.12	41	0.174	1	21
Hunt's	29	37	183.50	4.96	21	0.114	0	22
Totals, Averages		83	419.00	5.05	62	0.148	1	43
Totals, Averages 1948 Spear Season		1,250	6,874.00	5.50	1,790	0.260	98	470

Table 3

The Average Size and the Total Weight of Northern Pike  
Speared on Various Days at Five Different Landings  
Fletcher Floodwater, 1948 Spear Season

Landing	Date 1948	Northern Pike Size Measurements				Weight of Pike Taken		
		Number Measured	Average Length (Inches)	Number Weighed	Average Weight (Pounds)	Total Pike Speared	Total Pounds Speared	Pounds Per Hour
Jack's	Jan. 1	78	20.5	78	2.02	78	157.56	
Hunt's	3	227	20.4	227	1.87	227	424.49	
Emil's	4	106	20.1	106	1.75	106	185.50	
Klein's	5	51	21.1	51	2.12	51	108.12	
Charley's	10	56	19.4	56	1.66	56	92.96	
Totals, Averages		<u>518</u>	<u>20.6</u>	<u>518</u>	<u>1.87</u>	<u>518</u>	<u>968.63</u>	0.752
Jack's	11	120	19.1	35	1.82	120	218.40	
Hunt's	13	162	20.2	162	1.94	162	314.28	
Emil's	17	21	19.1	21	1.58	21	33.18	
Klein's	18	114	20.0	114 ✓	1.73	127	219.71	
Charley's	21	14	20.9	14	2.02	14	28.28	
Totals, Averages		<u>431</u>	<u>19.8</u>	<u>346 ✓</u>	<u>1.83</u>	<u>444</u>	<u>813.85</u>	0.555
Jack's	24	31	19.6	30	1.60	34	54.40	
Hunt's	25	181	20.2	181	1.95	181	352.95	
Emil's	29	3	20.3	3	1.83	3	5.49	
Klein's	31	53	18.5	38	1.41	73	102.93	
Charley's	Feb. 1	36	20.5	36	1.20	36	43.20	
Totals, Averages		<u>304</u>	<u>19.8</u>	<u>288</u>	<u>1.75</u>	<u>327</u>	<u>558.97</u>	0.395
Jack's	6	41	19.9	33	1.93	41	79.13	
Hunt's	7	104	20.0	104	1.86	104	193.44	
Emil's	8	5	20.6	5	2.16	5	10.80	
Klein's	9	14	19.2	14	1.61	14	22.54	
Charley's	14	57	19.3	57	1.67	57	95.19	
Totals, Averages		<u>221</u>	<u>19.4</u>	<u>213</u>	<u>1.85</u>	<u>221</u>	<u>401.10</u>	0.384
Jack's	15	35	18.9	35	1.54	35	53.90	
Hunt's	17	33	19.3	33	1.65	33	54.45	
Emil's	21	29	20.1	12	1.88	41	77.08	
Klein's	22	2	23.0	2	1.95	8	15.60	
Charley's	25	101	21.1	101	2.10	101	212.10	
Totals, Averages		<u>200</u>	<u>20.5</u>	<u>183</u>	<u>1.82</u>	<u>218</u>	<u>413.13</u>	0.333
Jack's	28	40	20.0	40	2.02	41	82.82	
Hunt's	29	21	19.8	21	2.02	21	42.42	
Totals, Averages		<u>61</u>	<u>19.9</u>	<u>61</u>	<u>2.02</u>	<u>62</u>	<u>125.24</u>	0.299
Totals, Averages 1948 Spear Season		1,735	20.1	1,609 ✓	1.84	1,790	3,280.92	0.477

✓ The weights on this day were read from a length-weight curve made up from measurements and weights on Fletcher Floodwater northern pike. Severe cold and high winds made accurate weight measurements impossible on this date at this landing where no shelter was available.



Table 4

Estimates of Total Angling Pressure and Total Catch by Periods  
Fletcher Floodwater, 1948 Spear Season

Period	Total Anglers Checked	Average Length of Fishing Day (Hrs)	Average Catch Per Hour of Northern Pike	Average Pounds Per Hour of Pike Speared	Estimated Total of		
					Hours Fished	Northern Pike Speared	Pounds of Northern Pike Speared
Jan. 1-10	2,051	5.48	0.402	0.752	11,239	4,518	8,452
Jan. 11-21	1,954	5.08	0.303	0.555	9,926	3,008	5,509
Jan. 22-Feb.1	1,950	5.22	0.231	0.395	10,179	2,351	4,021
Feb. 2-14	1,779	5.67	0.212	0.384	10,087	2,138	3,873
Feb. 15-25	1,482	6.59	0.176	0.333	9,766	1,719	3,252
Feb. 26-29	474	5.05	0.148	0.299	2,394	354	716
Totals	9,690	...	...	...	53,591	14,088	25,823

Creel Census Results

Spearing was best during the period January 1 - January 10 when 2,051 fishermen-days of an average length of 5.48 hours yielded an estimated 4,518 northern pike whose total weight was estimated to be approximately 8,452 pounds. These fish were taken at the rate of 0.402 fish per hour of spearing, and the poundage per hour of spearing was 0.752 pounds.

From January 11 to January 21 the landing operators recorded 1,954 days of fishing. The intensive data collected at all of the landings on five different days indicated that the average length of the fishing day was 5.08 hours, and that 0.303 northern pike were speared per hour spent in the shanties, and that the weight of fish removed was 0.555 pounds per hour. It may thus be estimated that 3,008 northern pike weighing approximately 5,509 pounds were removed in 9,926 hours of fishing during this period.

In the next 11 days (January 22 - February 1) almost as many angling days were recorded by the livery operators, but the total catch and the angling quality continued to drop. Nineteen hundred and fifty (1,950) days of fishing of an average length of 5.22 hours yielded an estimated 2,351 northern pike weighing about 4,021 pounds. During this period in late January the catch per hour was 0.231 fish and the pounds of fish speared per hour were 0.395 pounds.

As the spearing season reached the half-way mark, interest apparently began to diminish, as the livery operators recorded only 1,779 angling days in the period February 2 - 14. The intensive data indicate that the average angling day, however, increased to 5.67 hours at this time, and

angling quality was slightly better than during the previous two periods (0.212 fish per hour, 0.384 pounds of fish per hour). It may be estimated that 10,087 hours of spearing were expended in capturing 2,138 northern pike weighing 3,873 pounds between February 2 and February 14.

Angler interest continued to drop, and the number of fishing days reported by the landing owners during February 15 - 25 was 1,482. Vondett's data for this same period indicated a longer fishing day of an average length of 6.59 hours, a catch per hour of 0.176 fish and 0.333 pounds. Based on the above figures, an estimate of 9,766 hours of spearing for a catch of 1,719 northern pike weighing 3,252 pounds may be derived for the period February 15 - 25.

The last four days of the season were not productive; four hundred and seventy-four (474) fishermen-days were listed by the livery owners and these fishermen speared an estimated 354 northern pike weighing 716 pounds (based on an average fishing day of 5.05 hours, an average catch per hour of 0.148 fish, and a pounds per hour catch of 0.299 pounds).

The totals for the season, obtained by adding the estimates for the several periods, indicate that 9,690 winter fishermen<sup>1</sup> fished approximately 53,591 hours. The total catch for this fishing effort is estimated to be 14,088 northern pike of legal size, whose total weight is estimated to be approximately 25,823 pounds, approaching 13 tons.

The progressive decrease in angling quality as the season progressed was reflected in the number of limit catches observed by Vondett in his creel census activities in the various periods, and also the number of

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<sup>1</sup>This does not mean 9,690 individuals, but represents fisherman days. Numerous local devotees of winter spearing were present one or more days weekly.

angler-days he recorded in which no northern pike were speared. During the period January 1 - 10, 18.3 per cent of the fishermen contacted by Vondett brought their limit of five northern pike off the ice, and 22.1 per cent of the fishermen were unsuccessful. Just before mid-season ( January 22 - February 1 ) only 7.0 per cent of the anglers checked speared their limit, and the percentage of unsuccessful spear-men had increased to 44.2 per cent. During the last four days of the season only 1.2 per cent of the fishermen contacted had prodded the limit and the unsuccessful fishermen had increased to 51.8 per cent of the total anglers observed. Of the 1,250 angling days checked by the clerk during the 1948 spear season, 98, or 7.8 per cent had the legal limit of five fish, and 470, or 37.6 per cent had speared no fish.

#### Average Size of Northern Pike Speared

Length and weight measurements were obtained from a majority of the northern pike taken on the days Vondett checked the Floodwater angling during the 1948 spear season. From the total observed catch of 1,790 fish, 1,735 specimens were measured, 1,609 were weighed, and 1,506 were both measured and weighed ( 84.1 per cent ). It was not possible to obtain individual weights and lengths on the entire catch for the following reasons: on very cold days the tails of some of the fish were broken off after freezing solid; under certain conditions snow and slime froze to the fish causing inaccurate weights; a small percentage of the fishermen would not wait long enough at the checking points to allow individual weights and measurements to be taken.

The average total length of the northern pike speared in the several

periods varied from 19.4 inches ( February 2 - 14 ) to 20.6 inches ( January 1 - 10 ). For the entire season the average total length of the 1,735 fish measured was 20.1 inches ( Table 3 ). The average weight of the northern pike varied between 1.75 pounds ( January 22 - February 1 ) and 2.02 pounds ( February 26 - 29 ). For the entire season the average weight of 1,609 fish on which weights were obtained was 1.84 pounds ( Table 3 ).

Comparison of the average length of the northern pike from the Fletcher Floodwater with the average sizes noted for Houghton Lake ( Roscommon County ) and Fife Lake ( Kalkaska County and Grand Traverse County ) indicate that the northern pike from the Floodwater are somewhat smaller than northern pike in these two lakes. Eschmeyer ( 1937 ) found the average size of the anglers' catch of northern pike during the winter of 1936 - 1937 on Houghton Lake to be 21.2 inches. The same writer ( 1939 ) gives the average size of the northern pike taken by angling from Fife Lake in 1934, 1935, 1936 and 1937 as 21.8 inches ( 48 fish ), 21.5 inches ( 53 fish ), 21.8 inches ( 172 fish ), and 20.9 inches ( 477 fish ) respectively. On the other hand, northern pike from the Floodwater during the 1948 spear season were larger than those reported by Hazzard and Eschmeyer ( 1938 ) taken by angling from Sugarloaf Lake ( Washtenaw County ) and Portage Lake ( Jackson County ) during 1936. Creel census data showed that northern pike from these more southern waters of Michigan averaged only 19.9 inches ( 202 specimens ) and 18.6 inches ( 165 specimens ) in total length, respectively.

Northern pike ranging in total length from 14.0 inches to 36.0 inches

were observed by Vondett in the Fletcher Floodwater catches. Individual weights varied between 0.5 pound and 11.38 pounds. The average weights of the specimens in the various one-inch size groups are given in Table 5. The data in the table also are portrayed in the length-frequency histogram of Figure 2, and the length-weight relationship curve of Figure 3.

If it is assumed that the sample observed was representative of the estimated catch of 14,088 northern pike, then 12.9 per cent of the catch consisted of fish between 14.0 and 17.9 inches, 63.1 per cent of the catch was made up of northern pike ranging from 18.0 to 21.9 inches in total length, 19.4 per cent of the catch fell into the 22.0 - 25.9 inch size group, and 4.1 per cent of the catch ranged from 26.0 to 29.9 inches in total length, while 0.5 per cent of the northern pike speared exceeded 30 inches in total length.

The length-weight relationship of the Fletcher Floodwater northern pike is tabulated in Table 3 and is shown graphically in Figure 3. The points plotted are averages of the weights observed for the several size groups. The curve was fitted by inspection. The weight of northern pike of various sizes may be read from the curve if the total length in inches is known or, conversely, the total length may be read from the curve if the weight is available. For example, a 2.25 pound northern pike from the Fletcher Floodwater during the spearing season will be approximately 22.5 inches long, and a 29-inch northern pike will weigh approximately 5.3 pounds.

Table 5

Length-Frequency Distribution  
 Average Weight of Northern Pike in Various Size Groups  
 and Percentage of Total Specimens Observed in Various Size Groups  
 Fletcher Floodwater, 1948 Spear Season

Size Range in Inches	Number of Northern Pike Weighed & Measured	Average Weight of Various Size Groups	Per Cent of Total Specimens in Size Group
14.0 - 14.9	6	0.64	0.4
15.0 - 15.9	13	0.78	0.9
16.0 - 16.9	43	1.11	2.8
17.0 - 17.9	135	1.12	8.8
18.0 - 18.9	295	1.31	19.6
19.0 - 19.9	312	1.54	20.7
20.0 - 20.9	238	1.74	15.8
21.0 - 21.9	105	1.98	7.0
22.0 - 22.9	92	2.24	6.1
23.0 - 23.9	94	2.26	6.2
24.0 - 24.9	71	3.01	4.7
25.0 - 25.9	36	3.47	2.4
26.0 - 26.9	25	4.01	1.7
27.0 - 27.9	24	4.28	1.6
28.0 - 28.9	9	4.88	0.6
29.0 - 29.9	3	5.50	0.2
30.0 - 30.9	3	6.16	0.2
31.0 - 31.9	3	7.66	0.2
32.0 - 32.9	--	----	----
33.0 - 33.9	--	----	----
34.0 - 34.9	--	----	----
35.0 - 35.9	--	----	----
36.0 - 36.9	1	11.38	0.1
Totals	1,506		100.0

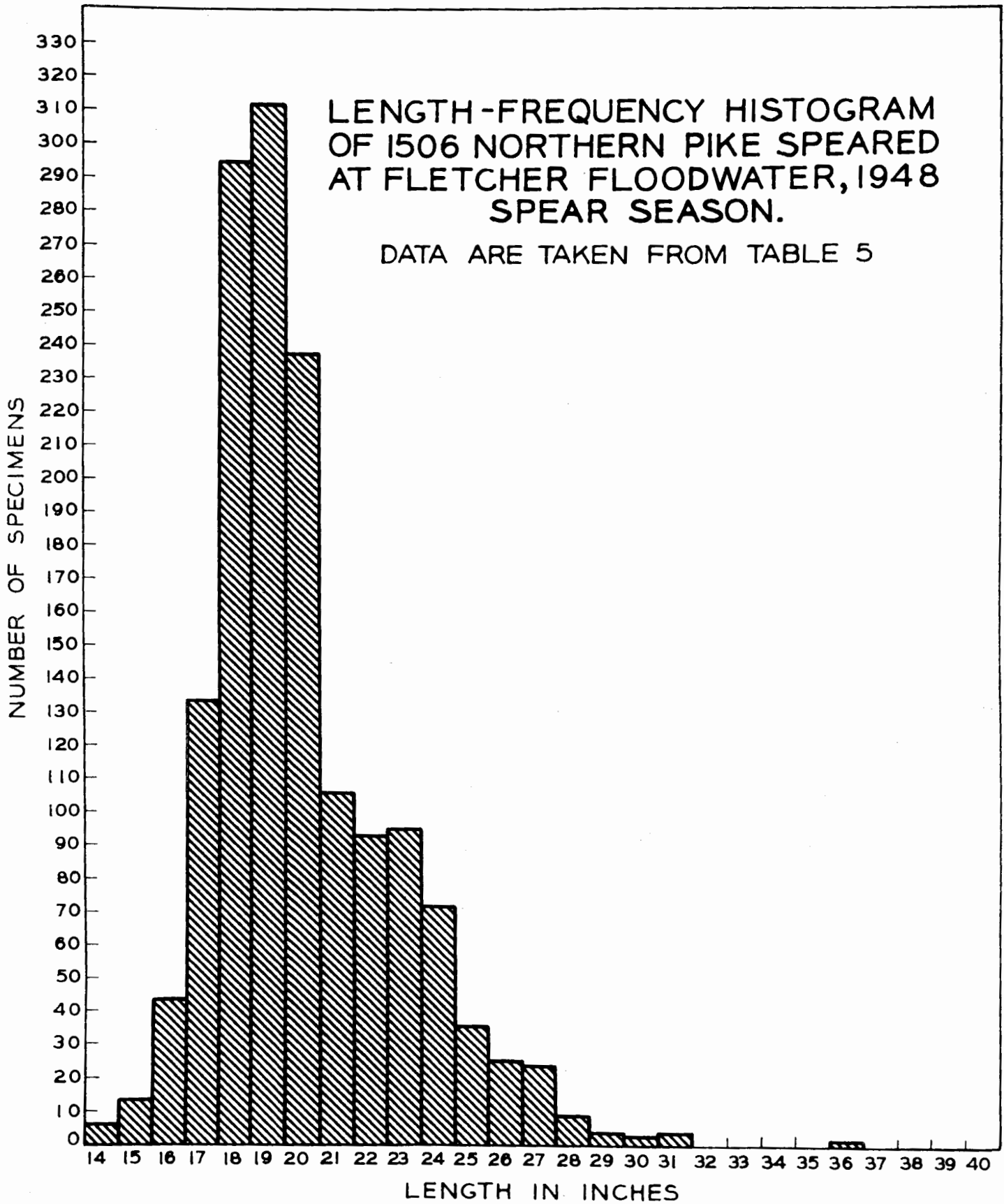


Figure 2



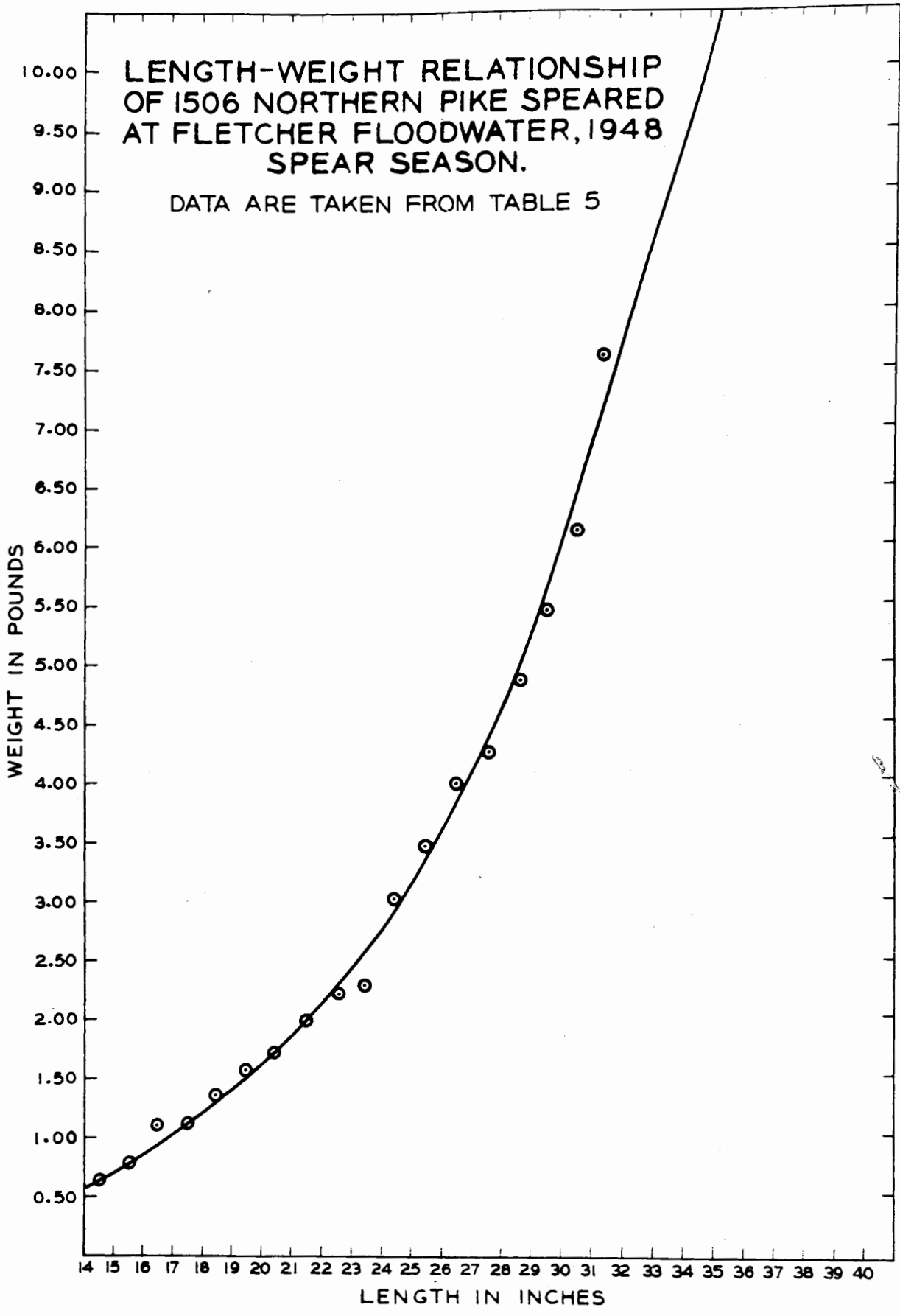


Figure 3

Residence of the Winter Fishermen

The residence of the fishermen who were involved in the 1,250 days of spearing recorded by Vondett is listed in Table 6. These devotees of the five-tine spear came from 40 counties in the Lower Peninsula of Michigan (mostly from the southern and eastern counties) and from the state of Ohio. The residence of ten fishermen was not learned. Almost 30 per cent of the fishing days observed were expended by residents of Montmorency County (245) and Alpena County (122), where the impoundment is located. Oscoda County residents accounted for 166 angling days, or approximately 13 per cent of the total. Wayne, Midland, and Genesee Counties were represented by 101, 93, and 82 days of angling respectively. If Vondett's observations were representative of the total fishing reported by the livery owners, almost two-thirds (809/1,250) of all the spearing was prosecuted by residents of the aforementioned six counties.

In addition to the 1,790 northern pike checked by Vondett, a total of six bullheads (species ?), 24 yellow perch, and six common suckers were observed. It may be estimated that the total fishing effort produced about 47 bullheads, 187 yellow perch, and about 47 common suckers in addition to the estimated take of northern pike.

Summary

1. Livery operators recorded a total of 9,690 spear fishermen during January and February of 1948 on the Fletcher Floodwater.
2. Creel census records on 27 days which covered 1,250 anglers (12.9 per cent of the total recorded) furnished data from which it is estimated that 53,591 hours of spearing took place during the 60 day

Table 6

Residence of 1,250 Anglers Spearing on Fletcher Floodwater  
1948 Spear Season

Numbers in Parentheses Indicate Order of Use by the  
Residents of the Six Counties Most Often Represented

County or State of Residence	Number of Angling Days Recorded
Alcona	15
Alpena	122 (3)
Bay	7
Calhoun	2
Cheboygan	1
Clare	14
Clinton	11
Genesee	82 (6)
Gladwin	6
Gratiot	4
Ingham	13
Iosco	2
Isabella	5
Jackson	10
Lapeer	29
Lenawee	12
Livingston	3
Kalamazoo	3
Macomb	5
Midland	93 (5)
Monroe	1
Montcalm	12
Montmorency	245 (1)
Muskegon	2
Oakland	54
Ogemaw	17
Osceola	2
Oscoda	166 (2)
Otsego	30
Ottawa	2
Presque Isle	26
Roscommon	12
Saginaw	56
Sanilac	5
St. Clair	18
Shiawassee	23
Tuscola	5
Washtenaw	14
Wayne	101 (4)
Van Buren	2
Ohio	8
Unknown	10
<b>Totals</b>	<b>1,250</b>

season. This effort yielded an estimated catch of 14,088 northern pike weighing approximately 25,823 pounds.

3. The angling quality, as measured by the number of pike speared per hour of fishing, was best during the first ten days of the season, when 0.402 fish per hour were captured. It declined steadily after that time, and at the close of the season angling quality had dropped to 0.148 fish per hour.

4. The size of the northern pike observed by the creel census clerk ranged from 14.0 to 36.0 inches, and the average size of all northern pike measured and weighed was 20.1 inches and 1.84 pounds. Fletcher Floodwater northern pike were larger than northern pike observed in anglers' catches in two southern Michigan lakes in 1936, but were somewhat smaller than recorded average lengths given for anglers' catches of northern pike in Houghton and Fife lakes in northern Michigan in the mid-1930's. The majority of the catch (63.1 per cent) consisted of specimens between 18 and 21.9 inches in total length. A length-weight curve was drafted from the 1,506 specimens which were both weighed and measured.

5. Winter fishermen using the Floodwater came from 40 Michigan counties in the Lower Peninsula and the state of Ohio. About 30 per cent of the spearing was done by Montmorency and Alpena County residents (where the impoundment is located), and approximately two-thirds of all fishermen came from Montmorency, Alpena, Oscoda, Wayne, Midland, and Genesee Counties.

### Acknowledgments

Thanks are due the various livery operators and their employees who kept daily records of the number of fishermen using the liveries, and who assisted in procuring stomach samples and scale samples of the northern pike at other times. Without their co-operation, it would not have been possible to make any estimates of the total fishing and the total catch.

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