

# A PROGRESS REPORT OF THE CREEL CENSUS AT LAKES ST. MARYS AND LORAMIE, OHIO, 1946

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## INTRODUCTION

To manage anything properly, and to check progress, it is necessary to make inventories and to keep records of the turn-over of the products. Business-like methods to check progress must be applied to fisheries management so that errors in methods may be eliminated and possible mis-spent dollars can be saved. Over 70 years ago, Ohio began her first efforts toward conserving or protecting her fisheries resources. Yet, it was not until the spring of 1946 that a program was inaugurated to obtain some facts on fish taken by the anglers at Lakes St. Marys and Loramie. It is impossible to state with any degree of accuracy what returns have been derived from past conservation practices or what practices should be continued, because we have no past records of the crop harvested.

The Creel Census project at these lakes was a part of a state-wide program to place management on a business-like basis and to learn something about the effectiveness of legal lengths, bag limits and closed seasons. Legal lengths, bag limits, and closed seasons were removed from these lakes in preparation for the Creel Census.

## METHODS OF TAKING THE CENSUS

The census at both lakes was made by men employed especially for that purpose. Their work was supplemented by my help on holidays and Sundays. These Creel Census Takers were provided with prepared cards for recording the data, equipment for measuring and weighing the fish, for taking air and water temperatures, and for measuring transparency of the water. The censuses started on March 31 at Lake St. Marys and May 5 at Lake Loramie. Both censuses terminated on September 30, 1946. The census was conducted from 8:30 A. M. to 5:30 P. M. except on days when greater concentrations of fishermen occurred. On these days, the census was conducted from 8:00 A. M. until 7:00 P. M. Census returns were obtained for six days of the week, Fridays excepted, at Lake St. Marys and Tuesdays at Lake Loramie.

No attempts were made to contact the entire public. The Creel Census Taker at Lake St. Marys made one complete round of the lake daily, by auto, to visit all landings and areas at which fishermen concentrate. His contacts were random samples of all areas visited. At Lake Loramie, the Creel Census Taker confined the major portion of his activities to the lower end of the lake where most of the anglers are found. He traveled by boat. One trip was made each day, by auto, to the upper end of the lake to check anglers in that area.

The lengths of the fish were recorded to the nearest half inch and the weights of a majority of the specimens were determined by means of a Hansin scale and recorded in grams.

Information such as wind direction, wave action, air and water temperatures, transparencies, and type of weather were recorded daily.

Fishermen cooperation was solicited and creel census boxes, containing the necessary equipment for recording data, were provided at strategic points around the lake. Our results from voluntary returns were comparable to those obtained by Needham (Copeia No. 1, 1937) and described by him as, "very incomplete." No data from voluntary returns is included in this report.

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## PHYSIOGRAPHY

*Lake St. Marys:* Lake St. Marys lies in the eastern part of Mercer and the western part of Auglaize Counties, Ohio. It is an artificial body of water, 100 years of age, impounded by damming tributary streams of the St. Marys and Wabash Rivers and flooding the dividing area between them. The lake covers possibly 11,000 acres and is approximately 9 miles long and 4 miles wide in its greatest dimensions. The drainage area is approximately 72,640 surface acres (Sherman 1932: 132), including the lake itself. Howe (1902: 293) credited the lake with having an average depth of 10 feet, when first constructed; but it seems that erosion of shores and incoming silt have greatly reduced the average depth. The shoreline is rather regular and partially wooded with the major portion of the woodlands on the south side. The shallow water of the south side is chiefly a cat-tail marsh. Clay banks and sand beaches are characteristic of the north shore. The bottom is predominately blue-grey silt with patches of sand and gravel along the shoreline.

The lake lies in an East-West axis and is fully exposed to the prevailing southwest winds. "Wind" seiches, causing a 12-inch rise in the water level at the east end of the lake have been observed. Heavy wave action churns the water thus causing considerable variation in the transparency during the same day. Heavy wave action also prevents the use of the greater portion of the lake for many days during the fishing season. During the 1946 season, the water level fell 30 inches below the spillway level, due to lack of rainfall and normal evaporation.

*Lake Loramie:* Lake Loramie lies in the northwestern part of Shelby County. It was formed nearly 100 years ago by damming Loramie Creek. The lake has a surface acreage of approximately 1500 acres. It is approximately 5 miles long and 2 miles wide in its greatest dimensions. The drainage area is approximately 69,120 acres in extent. No accurate data is available on the depth but it probably would not exceed an average of 5 feet. The shoreline is rather regular but greatly altered in appearance by the emergent vegetation. Large areas are filled with American Lotus (*Nelumbo lutea* (Willd.) Pers.) and long stretches of the shallow waters are filled with willows (*Salix* spp.). In general, the immediate shoreline is timbered; although the drainage area is in a high state of cultivation. The bottom is composed largely of a soft blue-grey silt-like soil with considerable sand and gravel along the shore of exposed areas.

The lake lies in a Northeast-Southwest axis and is thus exposed to the prevailing southwest winds. However, due to the small size of the lake and its well wooded shoreline, the wave action, at few times, is dangerous for boating. The large drainage area, compared to the small size of the lake itself, results in rapid and numerous changes in water level and turbidity.

## ANALYSIS OF DATA

*Fishermen Contacted:* Creel census returns were obtained for a total of 7,740 fishermen at Lake St. Marys and 5,277 at Lake Loramie. This represents an average of 49.9 anglers contacted per day at Lake St. Marys and 34.5 per day at Lake Loramie. The most popular fishing months were May at Lake St. Marys and June at Lake Loramie. Approximately 31% of the fishermen who fished these lakes were present during these months. At both lakes the number of anglers gradually declined throughout the season. Anglers from 52 counties in Ohio, 5 other states and one foreign country were contacted at Lake St. Marys and anglers from 29 counties of Ohio and two other states at Lake Loramie. Approximately 31% of the anglers contacted at Lake St. Marys came from the counties in which the lake lies. At Lake Loramie, only 15.8% of the anglers came from Shelby County.

*Hours Fished:* Due to the large size of each lake it was impossible for one Creel Census Taker to contact the anglers at the end of their fishing day. The Census Takers, therefore, contacted fishermen in the act of fishing as well as those who had completed their day's fishing. The 7,840 anglers at Lake St. Marys had fished for a total of 21,937.37 hours or an average of 2.8 hours per individual. The 5,277 anglers at Lake Loramie fished a total of 16,358.7 hours or an average of 3.1 hours per individual. Yet, our records of those anglers who had completed their day's fishing show an average of 3.5 hours at Lake St. Marys and 3.7 hours at Lake Loramie. It is upon the average hours fished by those anglers who had completed their day's fishing that the following data has been based.

*Catch:* The anglers contacted at Lake St. Marys took 21,758 fish or an average of 2.77 fish per angler at the rate of .99 fish per hour of fishing. The fishermen contacted at Lake Loramie caught 10,119 fish or an average of 1.93 fish per angler at the rate of .65 fish per hour of fishing. The catch was composed of eleven species at Lake St. Marys and ten at Lake Loramie. Crappies, *Pomoxis annularis* Raf. and *nigo-maculatus* (Le Sueur), comprised the greater percentage of the fish taken at both lakes. The number of fish caught per hour of fishing was greatest in the month of September at Lake Loramie. It was almost identical for the months of June, July, and August at Lake St. Marys. On the basis of fish caught per hour of fishing, May was the least productive month at Lake Loramie and April at Lake St. Marys. Yet, these months ranked second in the number of anglers fishing at the respective lakes. At Lake St. Marys, 64% of the anglers contacted caught no fish and only 1.47% took more than the bag limit in force at other state waters. At Lake Loramie 34% of the anglers caught no fish and 9% took more than the bag limits effective at other state waters.

*Crappies:* At both lakes, crappies represented the major portion of the catch, 64.7% at Lake St. Marys and 40% at Lake Loramie. Crappie fishing began in late March at Lake St. Marys but not until early May at Lake Loramie. Crappie fishing was best at Lake Loramie during the week of June 10 to 16, but at Lake St. Marys became gradually better until it reached its peak in the middle of August. Crappies were again taken in increasingly greater numbers during September. The average length of the crappies checked at Lake St. Marys was 5.8 inches and weighed 1½ ounces. The average size of these checked at Lake Loramie was 6½ inches in length with a weight of 2½ ounces. Approximately 23% of the Lake Loramie crappies were over 7 inches in length but only 2.25% of those from Lake St. Marys were over 7 inches in length.

*Bluegills—Lepomis machrochirus* Raf.: Bluegills made up nearly 26% of the total catch at Lake Loramie but comprised only 2.69% at Lake St. Marys. Bluegill fishing reached its peak at both lakes during the latter part of June, and then dropped off during July and early August. Increasingly greater numbers of bluegills were taken at both lakes during the last few weeks of the census. The bluegills at Lake Loramie averaged 6½ inches in length and 2½ ounces in weight as compared with an average length of 5.55 inches and 2 ounces in weight at Lake St. Marys.

*Bullheads—Ameiurus melas melas* (Raf.) and *A. nebulosus nebulosus* (Le Sueur): Bullheads ranked third in number of fish caught at both lakes. They represented nearly 20% of the harvest at Lake Loramie and approximately 8.1% at Lake St. Marys. Most of the bullheads were brown bullheads locally known as "marble catfish." Bullhead fishing at Lake St. Marys was best in April and gradually but steadily decreased until the end of the census. At Lake Loramie, bullhead fishing improved steadily each month until it reached its peak in the middle of September. The average size of the bullheads caught at both lakes was approximately 8¾ inches; but those from Lake Loramie weighed 5½ ounces as compared with an average of 4¼ ounces at Lake St. Marys.

*Channel Catfish—*Ictalurus lacustris** (Walbaum): "Channels" ranked second in importance in the anglers catch at Lake St. Marys, comprising 19.86% of the total catch, but represented only 2.7% of the total catch at Lake Loramie. Channel catfish fishing at Lake St. Marys was best during June, but best in September at Lake Loramie. The average channel catfish checked at Lake St. Marys was 10¾ inches long and weighed 12 ounces as compared to an average length of 11¼ inches and 17 ounces at Lake Loramie.

*Largemouth Black Bass—*Huro salmoides** (Lacepede): Approximately 3.26% of the fish caught at Lake Loramie were largemouth bass but only 1.18% of those taken at Lake St. Marys were of this species. Bass fishing was fairly consistent throughout the season. In spite of the lack of legal lengths and bag limits, the sportsmen returned to the lake 7.77% of the bass taken at Lake St. Marys and 5.39% of those taken at Lake Loramie. The bass creel by the anglers ranged from 6½ inches in length to 21½ inches at Lake Loramie and 24 inches at Lake St. Marys. The average bass at Lake St. Marys was 14.6 inches in length and weighed 2 pounds and 14 ounces as compared with the average of 12 inches and 18 ounces at Lake Loramie.

TABLE I  
COMPARISON OF LAKES ON BASIS OF FISH CAUGHT PER HOUR OF FISHING

WATER AREA	STATE	FISH PER HOUR	DATE OF CENSUS	AUTHORITY
Mirror Lake....	Mich...	3.3	June 25-Nov. 30, 1936	(Hazzard & Eschmeyer 1938: 638)
Doyle Lake.....	Mich...	2.8	June 25-Nov. 30, 1936	(Hazzard & Eschmeyer 1938: 638)
Walsh Lake.....	Mich...	2.6	June 25-Nov. 30, 1936	(Hazzard & Eschmeyer 1938: 638)
Crooked Lake...	Mich...	2.5	June 25-Nov. 30, 1936	(Hazzard & Eschmeyer 1938: 638)
Cedar Lake.....	Mich...	2.2	June 25-Nov. 30, 1936	(Hazzard & Eschmeyer 1938: 638)
Cassidy Lake...	Mich...	2.0	June 25-Nov. 30, 1936	(Hazzard & Eschmeyer 1938: 638)
Greene Lake....	Mich...	1.7	June 25-Nov. 30, 1936	(Hazzard & Eschmeyer 1938: 638)
Waubesa Lake..	Wis.....	1.53	May 15-Sept. 25, 1939	(Frey & Vike 1941: 340)
Mill Lake.....	Mich...	1.2	June 25-Nov. 30, 1936	(Hazzard & Eschmeyer 1938: 638)
Fife Lake.....	Mich...	1.07	June 25-Sept. 30, 1934	(Eschmeyer 1939: 355)
Fife Lake.....	Mich...	1.0	June 25-Sept. 30, 1936	(Eschmeyer 1939: 355)
Fife Lake.....	Mich...	1.0	June 25-Sept. 30, 1937	(Eschmeyer 1939: 355)
Clear Lake.....	Mich...	1.0	June 25-Nov. 30, 1936	(Hazzard & Eschmeyer 1938: 638)
Lake St. Marys.	Ohio....	0.99	Mar. 31-Sept. 30, 1946	
Portage Lake...	Mich...	0.9	June 25-Nov. 30, 1936	(Hazzard & Eschmeyer 1938: 638)
Sugarloaf Lake..	Mich...	0.9	June 25-Nov. 30, 1936	(Hazzard & Eschmeyer 1938: 638)
Kegonsa Lake...	Wis.....	0.82	May 15-Sept. 25, 1939	(Frey & Vike 1941: 340)
Lake Loramie...	Ohio....	0.65	May 5-Sept. 30, 1946	
Chautauqua Lake.....	N. Y....	0.55	.....	(Moore 1937: )
Mud Lake.....	Mich...	0.5	June 25-Nov. 30, 1936	(Hazzard & Eschmeyer 1938: 638)
Waterloo Mill...	Mich...	0.4	June 25-Nov. 30, 1936	(Hazzard & Eschmeyer 1938: 638)
Foots Pond.....	Ind.....	0.28	June 25-Aug. 22, 1940	(Lagler & Lagler 1942: 112)

#### DISCUSSION

It is interesting to note that the counties, in which Lakes Loramie and St. Marys lie, supplied only a small percentage of the anglers contacted during the census. Montgomery County supplied the greatest number of anglers at Lake Loramie and ranked second at Lake St. Marys. The fact that 5% of the anglers contacted at Lake St. Marys were from other states does not speak ill of Ohio fishing.

The small size of Lake Loramie, and the concentration of the anglers at the lower end of the lake, enabled the Creel Census Taker to make a fairly accurate estimate of the daily total number of anglers using the lake. Practically all the

anglers could be counted by cruising around the lower end of the lake. All areas were visited at least three times per day.

The Creel Census Taker at Lake St. Marys estimated the number of anglers at each fishing area as he made his daily trip around the lake. Due to the fact that the average fishing time per angler was 3.5 hours, the Creel Census Taker could not have observed over one-third of the anglers fishing at any given point during the day. For this reason, his estimates have been multiplied by three to obtain the total number of anglers using the lake per day.

It is estimated that 136,311 or 13 anglers per acre of water, fished Lake St. Marys during the period of the census and that 17,701 or 12 anglers per acre of water fished Lake Loramie. Approximately 85% of the anglers at Lake St. Marys and 71% at Lake Loramie fished from the shore.

When compared on the basis of fish caught per hour of fishing, with other creel census reports, we find Lake St. Marys to be about average and Lake Loramie to rank rather low. (see table I)

The average number of fish caught per hour of fishing for the above 22 bodies of water is 1.26 or .3 above Lake St. Marys and nearly double that of Lake Loramie.

The estimated 136,311 anglers at Lake St. Marys fished a total of 377,088.5 hours. At .99 fish per hour of fishing, the anglers removed 472,317 fish from the lake during the period of the census. An idea as to the poundage of the fish caught is given by the following table.

TABLE II  
FISH HARVEST AT LAKE ST. MARYS DURING THE PERIOD OF THE CENSUS

SPECIES	PER CENT OF TOTAL	TOTAL NUMBER	AVERAGE WEIGHT, OUNCES	TOTAL WEIGHT, POUNDS	POUNDS PER ACRE
Crappies.....	64.64	305,352.9	1.5 oz.	28,626.2	2.66
Channel Catfish.....	19.86	93,802.15	12 oz.	70,351.61	6.39
Bullheads.....	8.09	38,210.44	4.5 oz.	10,746.68	.98
Bluegills.....	2.69	12,705.33	2.0 oz.	1,588.29	.14
Largemouth Bass.....	1.18	5,573.34	46 oz.	16,023.35	1.45
Carp.....	2.76	13,035.95	13 oz.	10,597.96	.96
	99.22%	468,680.15		137,934.09	12.58

The estimated 17,701 anglers fishing at Lake Loramie fished 65,494 hours. At .65 fish per hour of fishing, they caught 42,591 fish during the period of the census. An idea as to the poundage may be obtained from the following table.

TABLE III  
FISH HARVESTED AT LAKE LORAMIE DURING THE PERIOD OF THE CENSUS

SPECIES	PER CENT OF TOTAL	TOTAL NUMBER	AVERAGE WEIGHT, OUNCES	TOTAL WEIGHT, POUNDS	POUNDS PER ACRE
Crappies.....	39.93	17,007	2.5 oz.	2,657.3	1.78
Bluegills.....	25.9	10,971	3 oz.	2,057.1	1.37
Bullheads.....	20.14	8,578	5.7 oz.	3,055.9	2.04
Largemouth Bass.....	3.26	1,388	18 oz.	1,562.	1.04
Channel Catfish.....	2.71	1,194	14 oz.	1,044.9	.69
	91.94	41,136		10,377.2	6.92

When Lakes Loramie and St. Marys are compared to other bodies of water on the basis of pounds of fish caught per acre, we find they compare favorably with all but the well managed lakes checked by the Illinois Natural History Survey. The following compares the harvest in pounds per acre as shown by Creel Census reports on widely scattered bodies of water in the Middle West.

WATER AREA	STATE	POUNDS PER ACRE	AUTHORITY
Fork Lake.....	Illinois.....	162	(Bennett, Thompson & Parr)
Unnamed Lake.....	Illinois.....	98	(Thompson 1941: 211-212)
Unnamed Lake.....	Illinois.....	80	(Thompson 1941: 211-212)
Shoe Lake.....	Indiana.....	46	(Ricker 1942: 223)
Muskellunge Lake.....	Indiana.....	27.5	(Ricker 1945: 343)
Eight Crow Wing Lake.....	Minnesota.....	19.1	(Eddy 1941: 39)
Waukesa Lake.....	Wisconsin.....	13.5	(Frey & Vike 1941: 344)
Lake St. Marys.....	Ohio.....	12.58	
Yellowwood Lake.....	Indiana.....	10.0	(Ricker 1945: 343)
Fife Lake.....	Michigan.....	10.0	(Eschmeyer 1936: 222)
Richter Lake.....	Wisconsin.....	8.6	(Elkins 1937: 307-312)
Lake Loramie.....	Ohio.....	6.9	
Delta Lake.....	Wisconsin.....	4.6	(Elkins 1937: 306-312)
Anderson Lake.....	Wisconsin.....	3.9	(Elkins 1937: 306-312)
Pike and Round Lakes.....	Wisconsin.....	2.8	(Elkins 1937: 306-312)
Deer Lake.....	Minnesota.....	2.64	(Eddy 1941: 39)
Island Lake.....	Minnesota.....	2.56	(Eddy 1941: 39)

The lack of fishing intensity accounts to a great extent for the small number of pounds of fish removed per acre from Lakes St. Marys and Loramie. If the shore fishermen at Lake St. Marys fished a strip 100 feet wide around the entire shoreline, there would remain over 10,000 acres of water to be fished from the 1,598 boats on the lake. This means 1 boat to approximately 7 acres of water. At Lake Loramie approximately 500 boat licenses were sold in 1946 or 1 boat to each 3 acres of water of the lake.

Fish have been stocked annually in Lakes St. Marys and Loramie as a part of Ohio's fisheries conservation program. A comparison of the following tables depict the correlation between stocking and the harvest.

## LAKE ST. MARYS

<i>Species</i>	<i>Percentage of Fish Stocked</i>	<i>Percentage of Fish Caught</i>
Bluegills.....	58.61%	2.69%
Bullheads.....	25.04%	8.09%
Largemouth Bass.....	5.74%	1.18%
Crappies.....	4.43%	64.64%
Channel Catfish.....	3.77%	19.86%

## LAKE LORAMIE

<i>Species</i>	<i>Percentage of Fish Stocked</i>	<i>Percentage of Fish Caught</i>
Bluegills.....	59.81%	25.9%
Bullheads.....	28.04%	20.1%
Largemouth Bass.....	4.32%	3.26%
Crappies.....	2.82%	39.93%
Channel Catfish.....	2.55%	2.71%
Perch.....	1.72%	0.

From the above tables it might appear that stocking is somewhat correlated with the fish harvest at Lake Loramie, but has no correlation with the harvest

at Lake St. Marys. Yet, over one-third of all the fish taken at Lake Loramie and nearly two-thirds of those taken at Lake St. Marys were crappies in spite of the fact that this species comprised less than 5% of the fish stocked. Only one crappie was stocked to 14 bluegills at Lake St. Marys but 30 times as many crappies as bluegills were caught. Approximately 2% of the fish stocked in Lake Loramie were perch but none were observed during the census. At both lakes the take of carp exceeded 1% of the total catch but none have been stocked according to the records of the Ohio Division of Conservation and Natural Resources. According to the "old-timers," who commercially fished Lakes Loramie and St. Marys, there was a time when few crappies were found in these lakes. Had crappies been stocked at the time of their increase, these plantings would have received credit for their increase in numbers. A lack of stocking over a period of 10 years shows no decrease in the numbers of crappies in either lake. The elimination of all stocking from these waters for a period of years is needed to provide necessary "clincher" data on the efforts of stocking.

Test nets were operated in each lake in April, June, and August. In spite of relaxed regulations, the test nets took 31 fish per hour exclusive of the shad, at Lake Loramie and 44 at Lake St. Marys.

#### SUMMARY AND CONCLUSIONS

1. A Creel Census was conducted at Lake St. Marys from March 31 to September 30, 1946, and at Lake Loramie from May 5 to September 30, 1946.
2. Anglers averaged catching .99 fish per hour of fishing at Lake St. Marys and .65 fish per hour at Lake Loramie.
3. When compared on the basis of fish caught per hour of fishing, with other lakes in the Middle West, St. Marys ranks about average but Lake Loramie is low in production.
4. An estimated 477,088 hours of fishing at Lake St. Marys yielded 472,317 fish weighing 137,934 pounds or 12.58 pounds per surface acre of water.
5. An estimated 17,701 anglers at Lake Loramie fished 65,493.7 hours and caught 42,591 fish weighing 10,384.8 pounds or approximately 7 pounds per surface acre of water.
6. The catch per hour had no correlation with the number of anglers fishing.
7. Although some apparent correlation between stocking and harvest may be noted at Lake Loramie, the species taken in greatest numbers (crappies) is one stocked in smallest numbers.
8. No correlation can be seen between the catch and stocking at Lake St. Marys.
9. In spite of bluegills being stocked in great numbers at both lakes, crappies are the dominant fish.
10. Only 1.47% of the anglers at Lake St. Marys and 9% of those at Lake Loramie caught over the bag limits in force at other state waters.
11. A bag limit at Lake St. Marys would have affected only one in each 67 anglers and one in 10 at Lake Loramie.
12. Legal lengths on crappies at Lake St. Marys during the summer of 1946 would have prevented the taking of the average size crappies (5.8 inches) or practically closed fishing for the season.
13. A large catch of breeder fish at both lakes in test nets, together with the small catch per acre by the anglers, indicates a large population of breeders remaining after a season of relaxed regulations.

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