

Original: Fish Division  
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March 19, 1940

REPORT NO. 588

AN ANALYSIS OF THE ANNUAL FISH CATCH ON SEVERAL MICHIGAN LAKES  
WINTER OF 1938-1939 and SUMMER OF 1939

by

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The Institute for Fisheries Research of the Michigan Conservation Department has conducted an intensive creel census on eight southern Michigan lakes for the winter season of 1938-1939, and the summer season of 1939.

Purposes

Some of the important reasons for these intensive censuses have been to determine the relative importance of winter fishing and summer fishing, the number and kinds of fish taken, intensity of angling, catch per hour, residence of fishermen, etc.

The solving of these questions has become increasingly important. A number of petitions have been circulated and signed requesting the Department to close certain lakes to winter fishing, and to close certain lakes to the non-resident fisherman during the winter season.

It is a purpose of this report to present facts and figures accumulated by the Institute that have bearing on this issue.

### Selection of Lakes

A definite effort was made, with the help of local citizens, district supervisors of fisheries operations and conservation officers, to select lakes which were heavily fished both summer and winter.

Considerable information regarding the number of fish taken in winter and in summer on more northerly lakes is available as a result of previous studies made by the Institute.

More southerly lakes were selected for this 1938-39 census because it was argued that the more northerly lakes gave no true picture of lakes in the southern part of the state.

### Lakes Selected

The lakes on which the census was conducted are Bear Lake, Hillsdale County; Craig Lake, Branch County; Christiana Lake, Cass County; Paw Paw Lake, Berrien County; Stearns Bayou, Ottawa County; Clear Lake and Big Portage Lake, Jackson County; and Sugarloaf Lake, Washtenaw County. In addition, an intensive census was conducted on Hamlin Lake in Mason County for the summer season. For Clear, Big Portage, and Sugarloaf lakes and Bear Lake, comparable records are available for additional years.

### Supervision

These censuses have been under the direct supervision of Institute employees on all lakes except Clear, Big Portage, and Sugarloaf lakes of the Waterloo Project, where the censuses were conducted under the direct supervision of the National Parks Service.

The following men, regular or temporary employees of the Fish Division, were in charge on the respective lakes:

<u>Lake</u>	<u>Winter</u>	<u>Summer</u>
Bear	Hugh Case	Lawrence Bush
Craig	Ronald Myers	Paul Barrett and Clifford Smith
Christiana	Harold Bowditch	Harold Bowditch
Paw Paw	H. L. Thompson	Robert Matthews with assistants: James O'Brien, Robert Hirsch, Raymond Love. H. L. Thompson, in charge of the Benton Harbor Hatchery, gave volunteer assistance.
Stearns Bayou	Jack Brass, Jr.	Orville Falk
Hamlin	...	Gerald McCrimmon, direct- ing CCC groups.
Waterloo Project Lakes: Clear Big Portage Sugarloaf	Under the direction of Mr. Phillip Olin of the National Parks Service, with George Eder directing in the field.	

#### Periods of Censuses

Data were accumulated for the period from December 16, 1938 through March 31, 1939, with the exception of the three Waterloo Project lakes where the census was started January 1, 1939 and extended through March 25, 1939.

On all these lakes the census was resumed June 25th, the opening day of the season, and was continued through October 15, when fishing had diminished nearly to the vanishing point. On the three Waterloo lakes, the census was not conducted July 6, 7, 8 and 9.

#### Methods and Figures

The methods used in accumulating census material follow the plan outlined by Eschmeyer and Hazzard in earlier census work in the state.

After periods of careful checking, it is considered that the figures in this report represent between 85 and 90 per cent of the total fishing on these lakes over these specific periods.

It should be borne in mind that the quality of fishing, as well as species ratios and general conditions, probably vary widely from year to year. The figures herein presented apply only to the dated periods over which these censuses were conducted.

#### Records

For the eight lakes censused the winter of 1938-39, 11,748 records were obtained.

For the summer of 1939 through October 15th, the records from these same lakes totalled 27,319.

In addition, for the summer period, Hamlin Lake totalled 16,171 records.

During the winter season 65,394 legal fish were taken on the eight lakes.

In the summer season through October 15th, 93,988 legal fish were caught.

This indicates that the average winter fisherman finished the day with 2.21 fish more than did the summer angler.

It is necessary to hold in mind the fact that this report indicates the conditions for one particular year. This year may or may not be average.

In the writer's opinion the summer season of 1939 was, on the whole, below normal in southern Michigan. In addition, Craig Lake was fished very lightly in the summer. According to several of the local residents interviewed, this is a usual condition for the summer season. The wide discrepancy between the number of fish taken in the winter and the summer seasons on Craig Lake materially affects the averages for the eight lakes. Craig Lake is the northernmost of a chain of lakes lying north of Coldwater, Michigan. There are but two cottages on the lake, and just one small boat

livery. It carries the local reputation for being a poor bluegill lake in the summer season and an exceptionally good bluegill lake in the winter time. The local explanation for this is that there is a general movement of the bluegills during the warm period into Morrison Lake to the south. The public has access to Craig Lake in the summer time by only two lanes and a fee is charged at each of these. In the winter the public is permitted access to the north end of the lake over a frozen marsh, which results in a freer public use of the lake in the winter season.

#### Average Catch Per Hour

The average catch per hour on the eight lakes in the winter was 1.5 fish per hour, and in the summer 1.0. For the eight lakes, the average winter fisherman fared one-half of a fish better than did the summer angler. Again, Craig Lake materially affects the average. The catch per hour for the winter exclusive of Craig Lake was 1.3; for the summer the catch per hour exclusive of Craig Lake was 1.04.

#### Size of Fish

The average size of all fish caught on the eight lakes in the winter period was 7.8 inches in total length. In the summer period the average size was 7.9 inches in total length.

#### Fisherman-day

The average angler fished 3.8 hours in the winter fishing season, and 3.5 hours per day in the summer season, on these eight lakes.

The Percentage of Each of the Numerically Important Species (In Order  
Of Dominance) In the Total Legal Catch on the Eight Lakes -  
Winter and Summer

<u>Species</u>	<u>Winter</u>	<u>Species</u>	<u>Summer</u>
Bluegills	89%	Bluegills	69%
Black crappies	3.8	Yellow perch	9.4
Yellow perch	2.4	Black crappies	6.4
Warmouth bass	2.2	Largemouthed bass	3.9
Rock bass	0.96	Sunfish	3.2
Sunfish	0.6	Bullhead	3.0
Northern pike	0.33	Rock bass	1.5
Largemouthed bass	0.03	Smallmouthed bass	1.4 - identity questionable
Dogfish	0.015	Warmouth bass	1.2
Bullhead	0.005	Northern pike	0.52
		Dogfish	0.4
		Smallmouthed bass	0.14

Bluegills constitute 89% of the total legal catch in the winter season on these eight lakes, followed by 3.8% black crappies, 2.4% yellow perch, and 2.2% warmouth bass. All other species combined make up the remaining 2.6%

In summer there is a general shifting of percentage values, the greatest change occurring in the bluegill catch which dropped to 69% of the summer's legal catch.

All other important species of game and pan fish except the northern pike indicate a marked increase in percentage of the legal catch, as demonstrated by the above table.

Data - By Individual Lakes

Bear Lake

In the winter season 202 fishermen caught 547 legal fish at the rate of 0.98 fish per hour.

The average fisherman in winter fished 2.8 hours, catching 2.7 fish, which averaged 7.4 inches in total length.

A total of 2,681 fisherman-days were recorded for the summer season, with a catch of 6,370 legal fish at the rate of 0.8 fish per hour.

The average fisherman in summer fished 3 hours, catching 2.4 fish which averaged 7.8 inches in total length.

No Fish

In the winter season 36% of the anglers took no fish.

In the summer 40% were unrewarded at the end of the day.

Best Fishing

The periods of greatest success in the winter occurred January 15 to 28, and from February 19 to the close of the season.

Similarly, the latter half of the summer season, from August 6 on, was the most productive period on Bear Lake.

Species

In the winter season bluegills predominated in the catch, followed by warmouth bass and sunfish. The bluegills constituted 455 of the 547 legal fish taken.

Of the 6,370 legal fish caught in the summer period, 4,062 were bluegills. Next in numbers were yellow perch, largemouthed bass, bullheads, and rock bass.

Residence

Of the 202 winter fishermen, 189 were local residents, all being from Hillsdale County. There were 13 non-resident fishermen, all from Ohio.

In the summer, out of a total of 2,681 fishermen, 1,127 were from Hillsdale County, and 1,126 were from Ohio, 38 being from other states. The balance came from other counties in southern Michigan.

### Craig Lake

For the winter season 2,478 fishermen caught 22,215 legal fish, at the rate of 2.6 fish per hour.

The average fisherman fished 3.4 hours per day, catching 9 fish, which averaged 7.1 inches in total length.

In the summer 3,745 fishermen caught 8,918 legal fish at the rate of 0.7 fish per hour.

The average fisherman in summer fished 3.3 hours, catching 2.4 fish, which averaged 8.4 inches in total length.

### No Fish

In the winter season 15% of the anglers took no fish.

Forty-one per cent of the anglers took no fish in the summer period.

### Best Fishing

The period of greatest fishing success in the winter time occurred March 12 to 25.

In the summer season the best periods were June 25 to July 8, July 23 to 29, and August 20 to September 2.

### Species

Bluegills predominated in the winter catch, constituting 20,490 of the 22,215 total legal fish caught. Warmouth bass, yellow perch, and sunfish followed in order.

In the summer catch, there were 4,026 bluegills in the total legal catch of 8,918 fish. Yellow perch constituted 1,659, bullheads 1,230, and largemouth bass and sunfish followed.



Residence

For the winter season 2,078 of the total number of 2,474 fishermen were resident fishermen, of which number 1,638 were from Branch County. Of the 396 non-resident fishermen, 273 were from Indiana, and 121 from Ohio.

In the summer 972 of the 3,745 fishermen were resident, of which number 842 were from Branch County. There were 2,730 from out-state, 2,445 of whom were from Ohio. The residence of 43 was unknown.

General

Craig Lake has presented a special problem, as has been noted before, inasmuch as the lake is relatively inaccessible to the summer fishermen except by boat from the lakes to the south. Fees are charged by private property owners for access through the two lanes, and there is but one boat livery on the lake.

In the winter the lake can be reached over frozen marsh to the north of the lake.

Locally Craig Lake has a reputation for being a poor bluegill lake in the summer, and a good bluegill lake in the winter. The theory upon which this opinion is based is that in the summer the bluegills migrate to Morrison Lake to the south of Craig, and in the winter return to Craig Lake.

It is a marl bottom lake, and in the past considerable quantities of marl have been removed by dredging.

This lake exceeded all others censused in catch per hour, and in catch per fisherman-day for the winter season. It has the reputation locally for producing consistently good winter catches and for being the first lake in the state on which good winter bluegill catches were made. One local resident reports good winter fishing for bluegills for the past 40 years.

### Christiana Lake

For the winter season 1,295 fishermen caught 3,537 legal fish at the rate of 0.8 fish per hour.

The average fisherman in winter fished 3.4 hours per day, catching 2.7 fish which averaged 8.1 inches in total length.

In the summer, there were 6,373 legal fish caught by 3,540 fishermen at the rate of 0.6 fish per hour.

The average fisherman in summer fished 3 hours per day, catching 1.8 fish, which averaged 8.7 inches in total length.

### No Fish

In the winter season 44% of the anglers took no fish. Forty-eight per cent took no fish in the summer season.

### Best Fishing

The periods of greatest success in the winter were in the weeks from December 17 to January 7.

In the summer the most productive period was from June 25 to July 8.

### Species

In the winter season 2,979 out of the 3,537 legal fish caught were bluegills, followed by warmouth bass, black crappies, and yellow perch.

Bluegills in the summer constituted 2,627 of the 6,373 legal fish caught, followed by 1,316 yellow perch, 685 black crappies, 515 large-mouthed bass, and 452 bullheads.

### Residence

Two hundred ninety-seven of the 1,295 winter fishermen were resident, and 998 came from Indiana.

This preponderance of Indiana fishermen is explained by the proximity of Christiana Lake to South Bend and Elkhart, Indiana. Fishermen from these towns could be considered local<sup>residents</sup>. In the summer, out of 3,540 fishermen,

469 were resident. Two hundred eleven of these were from Cass County. Three thousand sixty fishermen were non-resident, of which number 2,711 were from Indiana. The residence of 11 was unknown.

### Paw Paw Lake

For the winter season 2,515 fishermen caught 14,444 legal fish at the rate of 1.6 per hour. The average fisherman fished 3.7 hours, catching 5.7 fish which averaged 7.6 inches in total length.

In the summer 9,279 fishermen caught 37,944 legal fish at the rate of 1.1 fish per hour. The average fisherman in summer fished 3.6 hours, catching 4.1 fish which averaged 8 inches in total length.

### No Fish

Forty-four per cent of the winter fishermen took no fish.

Thirty per cent of the summer fishermen took no fish.

### Best Fishing

The period of greatest success in the winter season occurred December 18 to 31.

In the summer period there was no outstanding production period, although the fishing was slightly better the latter half of the season.

### Species

Fourteen thousand eighty-one of the 14,444 legal fish taken in the winter were bluegills, followed by 232 black crappies.

In the summer period there were 27,240 bluegills in the total catch of 37,944 legal fish. Black crappies with 4,466, and yellow perch with 3,031, were followed by sunfish and largemouthed bass.

### Residence

The number of resident fishermen in the winter season was 2,459 out of the total of 2,515 fishermen. Of these resident fishermen, 2,305 were from Berrien County.

Of a total of 56 non-resident fishermen, 53 were from Indiana.

In the summer season, out of a total number of 9,279 fishermen, 7,117 were resident. Of this resident number, 6,748 were from Berrien County. The total number of out-state fishermen in summer was 2,134, of which number, 1,653 were from Illinois. There were 28 unknown.

#### General

Paw Paw Lake has a heavy resort population, there being more than 2,000 cottages on the lake. Many of these summer residents are not fishermen, and the lake has considerable, and at times excessive, speed boating. The lake has many commercial boat liveries. Much of the area adjacent to the cottage locations has been subdivided.

#### Stearns Bayou

For the winter season 3,342 fishermen caught 19,047 legal fish at the rate of 1.6 fish per hour. The average fishermen fished 3.3 hours, catching 5.2 fish which averaged 7.3 inches in total length.

In the summer season 3,336 fishermen caught 9,597 legal fish at the rate of 1.0 fish per hour. The average fisherman fished 3.2 hours, catching 2.9 fish which averaged 7.3 inches in total length.

#### No Fish

In the winter season 31% of the fishermen caught no fish.

Forty-three per cent of the summer fishermen took no fish.

#### Best Fishing

The period from March 5 to March 25 was the most productive in the winter.

Greatest success was attained from August 20 to October 15 in the summer season.

#### Species

Seventeen thousand eighty of the total 19,047 legal fish catch for the winter period were bluegills, followed by 1,661 black crappies, yellow perch, and northern pike.

In the summer, out of a total legal catch of 9,597, there were 7,696 bluegills. Yellow perch, largemouthed bass, and sunfish followed in order.

#### Residence

Of the 3,642 winter fishermen, 3,636 were resident, of which number 2,456 were from Kent County, and 1,145 from Ottawa County. There were 6 non-residents.

In the summer season, out of a total number of 3,336, there were 2,960 residents, of which number 1,401 were from Kent County and 1,382 from Ottawa County.

Non-residents numbered 347, with 241 coming from Illinois. Twenty-nine were unknown.

#### General

In the winter it was noted that during the periods of WPA lay-offs in Grand Rapids and in Grand Haven the number of fishermen increased.

There are few cottages on Stearns Bayou, and but one boat livery.

#### Clear Lake

For the winter season 401 fishermen caught 1,250 legal fish at the rate of 0.7 per hour. The average fisherman fished 4.4 hours, and caught 3.1 fish which averaged 7.9 inches in total length.

In the summer 1,876 fishermen caught 13,632 fish at the rate of 1.9 fish per hour. The average summer fisherman fished 3.8 hours, catching 7.1 fish which averaged 7.2 inches in total length.

#### No Fish

Forty-two per cent of the winter fishermen took no fish.

Twenty per cent of the summer fishermen took no fish.

#### Best Fishing

During the winter season the best fishing period was the week of January 8 to 14.

Fishing was consistently good throughout the summer season.

### Species

Of the total 1,250 legal fish caught in the winter season, 621 were yellow perch. Bluegills were second in numbers with a total of 390, and black crappies followed with 185.

In the summer bluegills led with 11,244 out of a total legal catch of 13,362, and were followed by 812 sunfish, 493 yellow perch, and 375 largemouthed bass.

### Residence

All of the winter fishermen were resident, 371 being from Jackson County.

Of the total 1,876 summer fishermen, 1,728 were resident, 1,228 coming from Jackson County.

One hundred fishermen were non-resident, 89 being from Ohio.

The residence of 48 was unknown.

### Big Portage Lake

In the winter season 588 fishermen caught 1,191 legal fish at the rate of 0.4 fish per hour. The average fisherman fished 4.5 hours, catching 2.0 fish which averaged 9.3 inches in total length.

During the summer season 1,635 fishermen caught 6,480 legal fish at the rate of 0.9 per hour. The average fished 4.6 hours, catching 4 fish which averaged 7.9 inches in total length.

### No Fish

Fifty-three per cent of the winter fishermen took no fish.

In the summer 36% of the fishermen took no fish.

### Best Fishing

The best winter fishing period was from February 12 to March 4.

In the summer, the fishing was slightly better the first half of the season--the period from June 25 to August 19.

Species

Five hundred seventy-two rock bass out of the 1,191 legal fish caught in the winter time were followed by 154 black crappies, 114 bluegills, and 101 northern pike.

Bluegills lead in the summer season, numbering 5,350 of the 6,480 legal fish caught, and were followed by 343 yellow perch, 226 sunfish, and 196 largemouthed bass, and black crappies.

Residence

All the winter fishermen were resident, 525 of the 588 coming from Jackson County.

In the summer 1,559 out of the total of 1,635 fishermen were resident, of which number 1,302 were from Jackson County. Sixty-one were non-resident, of which <sup>number</sup> ~~number~~ 51 were from Ohio.

Sugarloaf Lake

Six hundred twenty-seven winter fishermen caught 3,193 legal fish at the rate of 0.99 per hour. The average fisherman fished 5.1 hours, catching 5.1 fish which averaged 7.7 inches in total length.

In the summer 1,227 fishermen caught 4,944 fish at the rate of 1.1 per hour. The average fisherman fished 3.7 hours, catching 4.04 fish which averaged 8.0 inches in total length.

No Fish

Thirty-eight per cent of the winter fishermen caught no fish.

Thirty-seven per cent of the summer fishermen took no fish.

Best Fishing

The best winter fishing period was from February 12 to March 11.

The fishing maintained a comparatively even average throughout the summer.

### Species

For the winter season there were 2,771 bluegills out of the 3,193 legal fish caught, followed by 306 yellow perch, and northern pike.

In the summer season bluegills led with 2,837 out of the total legal catch of 4,944 fish. There were 659 yellow perch, 502 sunfish, followed by largemouthed bass and northern pike.

### Residence

In the winter season there were no non-resident fishermen. Of the total 627 fishermen, 429 were from Jackson County.

There were 22 non-resident summer fishermen, and 1,164 resident, 500 of which number were from Jackson County. Forty-one were unknown.

### General

In the winter of 1935-36 Sugarloaf Lake suffered a partial kill which resulted in reduced fishing pressure for the following two years.

In 1939 there was a considerable increase in the numbers of fishermen on the lake.

### Recommendations

With each additional year, it becomes increasingly apparent that the value of the creel census lies in the unbroken continuity of its records. Only by means of the accumulated records over a sufficient number of years in uninterrupted sequence do we obtain basic data that justify the formulation of policies upon which improvement, stocking and legal recommendations may be factually based. In addition, it is becoming more and more necessary for us to be able to evaluate the extent of non-resident fishing pressures, together with their geographical preferences, and the resulting effects upon fish populations.



Combining the intensive censuses with a fish marking program provides a method for determining total populations of legal fish on the lakes censused. These figures are of great value in estimating a safe harvestable crop and suggesting where and when remedial measures need be taken. It is hoped that population studies such as this may be incorporated in the future program.

INSTITUTE FOR FISHERIES RESEARCH

TABLE I

GENERAL DATA - SUMMER AND WINTER CENSUSES ON EIGHT MICHIGAN LAKES, 1938-39

Date	Lakes									Total (Except Hamlin)	
	Bear	Craig	Christiana	Paw Paw	Stearns Bayou	Clear	Big Portage	Sugar- loaf	Hamlin (Summer Census Only)		
Total number of fishermen											
Winter	202	2,478	1,295	2,515	3,642	401	588	627			11,748
Summer	2,681	3,745	3,540	9,279	3,336	1,876	1,635	1,227		16,171	27,319
Total number legal fish caught											
Winter	547	22,215	3,537	14,444	19,047	1,250	1,191	3,193			65,424
Summer	6,370	8,918	6,373	37,944	9,597	13,362	6,180	4,944		56,311	93,988
Catch per hour											
Winter	0.98	2.6	0.8	1.6	1.6	0.7	0.4	0.99			1.5
Summer	0.8	0.7	0.6	1.1	1.0	1.9	0.9	1.1		0.97	1.0
Catch per fisherman											
Winter	2.7	9.0	2.7	5.7	5.2	3.1	2.0	5.1			5.6
Summer	2.4	2.4	1.8	4.1	2.9	7.1	4.0	4.04		3.5	3.4
Average size all fish caught											
Winter	7.4	7.1	8.1	7.6	7.3	7.9	9.3	7.7			7.8
Summer	7.8	8.4	8.7	8.0	7.3	7.2	7.9	8.0		8.9	7.9
Average number hours per fisherman-day											
Winter	2.8	3.4	3.4	3.7	3.3	4.4	4.5	5.1			3.6
Summer	3.0	3.3	3.0	3.6	3.2	3.8	4.6	3.7		3.6	3.4
Per cent of fishermen catching no fish											
Winter	36	15	44	44	31	42	53	38			33%
Summer	40	41	48	30	40	20	36	37		24	36%
Number under- sized fish caught											
Winter	538	10,614	3,586	168	2,397	465	270	592			18,630
Summer	4,867	4,847	3,358	11,648	10,748	4,174	3,433	1,658		6,156	44,733
Number of male anglers											
Winter	194	2,328	1,210	2,458	3,519	388	574	596			11,267
Summer	2,034	2,981	2,777	7,940	2,791	1,557	1,379	1,078		12,798	22,537
Number of female anglers											
Winter	8	150	85	57	123	13	14	31			481
Summer	645	764	763	1,339	545	329	256	149		3,373	4,790



TABLE III. RESIDENCE OF FISHERMEN

Lake	Winter		Summer	
	No. of fishermen	Percentage non-resident	No. of fishermen	Percentage non-resident
Bear				
Resident	189		1,516	
Unknown	-	6 %	1	44.4%
Out-state	13		1,164	
Craig				
Resident	2,078		972	
Unknown	-	19	43	26
Out-state	396		2,730	
Christiana				
Resident	297		469	
Unknown	-	71	11	87
Out-state	998 - Indiana		3,060	
Paw Paw				
Resident	2,459		7,117	
Unknown	-	2.3	28	22
Out-state	56		2,134	
Stearns Bayou				
Resident	3,636		2,960	
Unknown	-	0.2	29	10.4
Out-state	6		347	
Clear				
Resident	401		1,728	
Unknown	-	0	48	5.3
Out-state	-		100	
Big Portage				
Resident	588		1,559	
Unknown	1	0	15	3.7
Out-state	-		61	
Sugarloaf				
Resident	627		1,164	
Unknown	2	0	41	12.8
Out-state	-		22	
Hamlin				
Resident	No census		6,239	
Unknown			-	62.8
Out-state			9,932	
Total		14.3%		35.0%

TABLE IV

THE PERCENTAGE OF THE NUMERICALLY IMPORTANT SPECIES IN  
THE LEGAL CATCH FOR THE SUMMER AND WINTER

S = Summer

W = Winter

Tr. = Trace

Species	Bear		Craig		Christiana		Paw Paw		Stearns Bayou		Clear		Big Portage		Sugarloaf		Average for eight lakes	
	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W
Bluegills	63.	83.	45.	92.	41.	85.	72.	98.	70.	89.	84.	31.	82.	9.9	57.	86.	69.	89.
Yellow perch	12.	2.3	18.	1.0	20.5	2.2	8.0	0.5	6.3	1.3	3.7	4.9	5.3	0.7	13.	9.6	9.4	2.4
Black crappie	1.2	1.3	1.4	0.5	1.9	2.3	0	0	2.3	8.6	1.3	14	2.2	13.	2.1	1.0	6.4	3.8
C. sunfish	2.3	4.2	7.8	0.9	3.1	0.3	2.9	0.2	2.4	0	0.6	2.2	3.5	0.5	12.	0.3	3.2	0.6
Warmouth	1.2	7.7	0.9	4.4	1.1	9.0	1.6	Tr.	1.0	0	Tr.	0	0	0	Tr.	0	1.2	2.2
Bullhead	6.1	Tr.	13.	Tr.	7.1	0.3	0.6	0	0.8	0	1.1	Tr.	0.3	Tr.	4.9	0.2	3.0	Tr.
Rock bass	3.5	0	Tr.	Tr.	5.	Tr.	1.2	Tr.	0.5	Tr.	1.0	Tr.	1.1	4.8	2.4	0.3	1.5	0.96
Largemouthed bass	6.5	0	9.5	Tr.	8.1	Tr.	2.8	0	4.3	Tr.	2.0	Tr.	3.0	Tr.	3.7	0	3.9	.03
Northern pike	0	0	1.4	0	0.7	Tr.	Tr.	0	0.7	0.2	Tr.	1.6	0.9	8.0	3.9	1.6	.5	.3
Dogfish	1.1	0	0	0	1.3	0.7	Tr.	Tr.	0.3	0	Tr.	Tr.	0.3	6.5	Tr.	0	.4	Tr.