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INSTITUTE FOR FISHERIES RESEARCH
UNIVERSITY MUSEUMS
UNIVERSITY OF MICHIGAN
ANN ARBOR, MICHIGAN

REPORT NO. 371 A

July 2, 1936

PART I

REPORT ON GENERAL CENSUS, 1935

Introduction

The data on which this report is based were taken primarily by the various conservation officers and represent a "sampling" of Michigan fishing in 1935. Data have been collected similarily since 1928 (a few in 1927) when the general creel census was initiated by the Department of Conservation.

This report differs considerably from reports submitted for census during previous years; however, the difference lies primarily in the inclusion of more data in the current report rather than in omission of kinds of data used previously. Since the general census has now been in progress for a period of years and therefore becomes increasingly important because of the possibility of noting the trend of fishing over a period of time, it is desirable that the 1935 data be recorded in such a manner that comparisons may be made with fishing during previous years.

The change in recording the census is due primarily to a change in the method of tabulating. Formerly all data were compiled and recorded by hand or by use of a calculating machine; the 1935 material was analyzed with the aid of sorting and tabulating machinery used by the Department of Mathematics of the University of Michigan. This new method permits utilization of many data which could not be compiled in the past because the great amount of time which would be required to make the tabulations was not available.

Districts

In the past the state was divided, for analysis of fishing, into three sections with Town line 20 and the Straits of Mackinac serving as the two dividing lines. In the present report the state is divided into 8 districts, so divided that the figures for the former 3 districts may be obtained by adding the data for several of the new districts. The districts are shown in Fig. 1. District No. 1 consists of the two lower tiers of counties except for the two most eastern counties in the tiers. Districts No. 2, 3, 4 and 5 are consecutively farther north in the Lower Peninsula, District 5 including the upper two tiers of counties. District 6 includes a group of counties on the east side of the state which are primarily former lake bottom and which now contain very few inland lakes. District 7 consists of the eastern half of the Upper Peninsula (limestone) and District 8 includes the western half of the Upper Peninsula (igneous rock). It is believed that this arrangement of districts will add to the value of the data. It was suggested that the hatchery districts might be used as units but they are more artificial than the present arrangement and therefore appear to be less suitable than those used.

The state is divided into sections to indicate differences in species of fish and in the catch per hour and other characteristics of the fishing in various parts of the state. Also the data for districts are more reliable than the data for individual counties since figures for the larger area are probably more representative.

The counties in each district are:

District 1	District 2	District 3	District 4	District 5
Berrien	Allegan	Muskegon	Manistee	Antrim
Cass	Berry	Newaygo	Wexford	Otsego
St. Joseph	Eaton	Montcalm	Missaukee	Montmorency
Branch	Ingham	Mecosta	Roscommon	Alpena
Hillsdale	Livingston	Oceana	Ogemaw	Charlevoix
Lenawee	Oakland	Mason	Iosco	Emmet
Van Buren	Ottawa	Lake	Benzie	Cheboygan
Kalamazoo	Kent	Osceola	Leelanau	Presque Isle
Calhoun	Ionia	Clare	Grand Traverse	
Jackson	Clinton	Gladwin	Kalkaska	
Washtenaw	Shiawassee		Crawford	
	Genesee		Oscoda	
	Lapeer		Alcona	

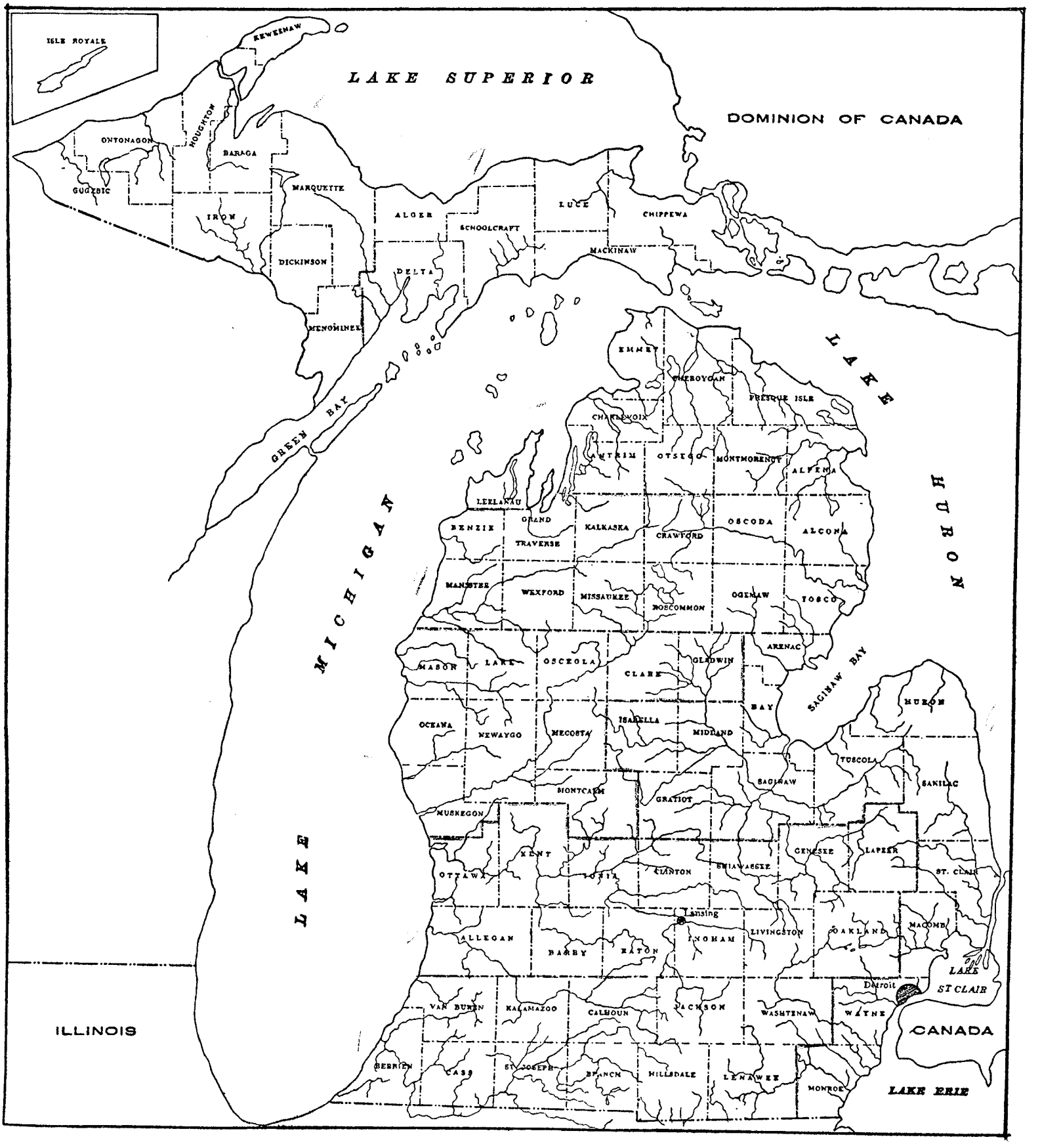
ISLE ROYALE
KEWEENAW
LAKE SUPERIOR
DOMINION OF CANADA
ONTONAGON
HOUGHTON
BARAGA
GOGEBIC
MARQUETTE
IRON
ALGER
SCHOOLCRAFT
LUCE
CHIPPEWA
MACKINAW
DICKINSON
DELTA
MENOMINEE
GREEN BAY
LAKE MICHIGAN
LAKE HURON
EMMET
CHEBOYGAN
PRESQUE ISLE
CHARLEVOIX
ANTRIM
OTSEGO
MONTMORENCY
ALPENA
LEELANAU
GRAND TRAVERSE
BENZIE
KALKASKA
CRAWFORD
OSCODA
ALCONA
MANISTEE
WEXFORD
MISSAUKEE
ROSCOMMON
OGEMAW
IOSCO
MASON
LAKE
OSCEOLA
CLARE
GLADWIN
ARENAC
SAGINAW BAY
OCEANA
NEWAYGO
MECOSTA
ISABELLA
MIDLAND
BAY
HURON
TUSCOLA
SANILAC
MONTCALM
GRATIOT
SAGINAW
MUSKEGON
KENT
OTTAWA
IONIA
CLINTON
SHIAWASSEE
GENESEE
LAPEER
ST. CLAIR
Lansing
ALLEGAN
BARRY
EATON
INGHAM
LIVINGSTON
OAKLAND
MACOMB
LAKE ST CLAIR
Detroit
VAN BUREN
KALAMAZOO
CALHOUN
JACKSON
WASHTENAW
WAYNE
CANADA
ILLINOIS
BERRIEN
CASS
ST. JOSEPH
BRANCH
HILLSDALE
LENAWEE
MONROE
LAKE ERIE

Fig. 1

District 6	District 7	District 8
Monroe	Alger	Menominee
Wayne	Delta	Dickinson
Macomb	Schoolcraft	Marquette
St. Clair	Luce	Iron
Sanilac	Mackinac	Baraga
Huron	Chippewa	Houghton
Tuscola		Keweenaw
Saginaw		Ontonagon
Bay		Gogebic
Arenac		
Midland		
Gratiot		
Isabella		

Reliability of Data

The value of the data is limited by the extent to which the census was representative. Obtaining a representative sample for a county is difficult; it involves consideration of many factors: if the fishing in a county is 75% lake fishing, then only 25% of the data should be for stream fishing; if 20% of the fishermen are women, an equal percentage of reports should be for their fishing; if 10% of all fishing is night fishing, an equal percentage of the reports should be for night fishing. Sheets submitted each month should be in proportion to the percentage of the year's fishing carried on each month. Obviously, it is not to the discredit of the Conservation officers to indicate that in many counties the census data collected were not a true sample of the actual fishing. The officers had many other duties to perform and could not always give first consideration to the creel census.

It is also probable that in the past the need for representative sampling was not stressed and that the officers did not know that representative sampling was desirable. In a county in the extreme southern part of the state, an officer provided data for trout fishing only. He chose to show the nature of the unusual fishing rather than the usual, and, in the absence of definite instructions, was entirely justified in doing so.

It should be repeated that data for individual counties are not, in many cases, representative and that figures for the districts or for counties having many returns are the more dependable. In the analysis of the data in this report, it should be implied that, in many of the statements, the expression "if the data are representative" is added to the statement.

Detailed instructions have been issued for census taking in 1936 and a better sampling will probably result.

Intensive Census

An intensive census was taken by crews of C.C.C. men in 1935 on a number of lakes. These data were not included in this report because the census returns from one small lake were often greater than the returns from the remainder of the county and the figures would therefore not have been representative. Figures for the intensive census are being submitted in other reports.

Correlation with Other Information

To be of most value the data given here should be correlated with data for previous years. Such correlation would tend to show the trend of fishing for each species in each of the 3 major divisions.

The census should also be correlated with stocking records. If, for instance, an area had been planted heavily with bluegills for several years and if later the census failed to show an increase in the bluegill catch in the area, there would be some question as to the effectiveness of the stocking and as to the desirability of continuing it.

These several correlations are not made in this report but it is anticipated that they may be made at some later time.

Extent of the Data

The number of fishermen contacted in each county are listed in the first colum of figures of Table 1. Isle Royal is treated as part of Keweenaw County rather than separately as in the past reports. The number of returns are indicated briefly below:

Number of returns:	Number of Counties
0 - 100	42
100 - 200	13
200 - 300	12
300 - 400	4
400 - 500	2
500 - 600	0
600 - 700	3
700 - 800	1
800 - 900	1
900 - 1000	1
1000 - 1100	2
1100 - 1200	0

Number of returns	Number of Counties
1200 - 1300	0
1300 - 1400	0
1400 - 1500	1
1500 - 1600	1

Table 1

Number of fishermen contacted, hours fished, number of legal-sized fish caught, and catch per hour, all fishing, by counties

County	No. fishermen	Hours fished	Legal-sized fish caught	Catch per hour
1. Alcona	13	51.0	70	1.4
2. Alger	10	43.0	62	1.4
3. Allegan	295	936.8	2274	2.4
4. Alpena	14	38.0	32	0.8
5. Antrim	131	499.7	390	0.8
6. Arenac	99	506.5	118	0.2
7. Barry	164	728.5	1619	2.2
8. Baraga	417	1539.4	847	0.6
9. Bay	0	...	...	...
10. Benzie	828	2322.6	2200	0.9
11. Berrien	21	64.0	250	3.9
12. Branch	209	854.8	3683	4.3
13. Calhoun	0	...	...	...
14. Cass	23	104.5	235	2.2
15. Charlevoix	82	253	917	3.6
16. Cheboygan	316	1130.9	1593	1.4
17. Chippewa	0	...	...	...
18. Clare	298	1304.1	1593	1.2
19. Clinton	135	317.1	367	1.2
20. Crawford	23	92.0	58	0.6
21. Delta	7	22.0	41	1.9
22. Dickinson	51	161.5	117	0.7
23. Eaton	198	736.0	662	0.9
24. Emmet	153	501.4	827	1.6
25. Genesee	143	514.5	1249	2.4
26. Gladwin	688	1652.7	1650	1.0
27. Gogebic	247	780.8	1038	1.3
28. Grand Traverse	326	840.7	1083	1.3
29. Gratiot	71	215.5	249	1.2
30. Hillsdale	245	907.6	1375	1.5
31. Houghton	215	753.0	921	1.2
32. Huron	7	17.0	40	2.4
33. Ingham	1	1.0	...	...
34. Iosco	37	136.0	269	2.0
35. Ionia	39	58.4	55	0.9
36. Iron	174	706.4	1143	1.6
37. Isabella	292	821.5	1310	1.6
38. Jackson	132	462.1	804	1.7
39. Kalamazoo	137	266.9	817	3.1
40. Kalkaska	1	1.0	...	...

Table 1 (Continued)

County	No. fishermen	Hours fished	Legal-sized fish caught	Catch per hour
41. Kent	659	2142.3	2101	1.0
42. Keweenaw	134	606.9	669	1.1
43. Lake	1432	4722.8	5627	1.2
44. Lapeer	202	1077.7	1446	1.3
45. Leelanau	464	1255.6	2448	1.9
46. Lenawee	61	392.9	215	0.5
47. Livingston	0	...	...	...
48. Luce	84	309.1	565	1.8
49. Mackinaw	2	7.0	10	1.4
50. Macomb	0	...	...	...
51. Manistee	97	347.0	1399	4.0
52. Marquette	2	5.0	9	1.8
53. Mason	349	1241.6	2083	1.7
54. Mecosta	707	2073.4	4477	2.2
55. Menominee	115	290.5	311	1.1
56. Midland	71	197.0	288	1.5
57. Missaukee	1	7.0	15	2.1
58. Monroe	198	446.8	1132	2.5
59. Montcalm	265	1200.5	1967	1.6
60. Montmorency	51	164.8	184	1.1
61. Muskegon	1033	4094.3	10705	2.6
62. Newaygo	954	3143.1	2784	0.9
63. Oakland	41	244.0	409	1.7
64. Oceana	606	2548.2	7370	2.9
65. Ogemaw	266	870.0	1751	2.0
66. Ontonagon	77	150.5	204	1.4
67. Otsego	2	5.0	0	...
68. Ottawa	27	117.5	408	3.5
69. Osceola	1093	3555.1	5461	1.5
70. Oscoda	210	738.7	737	1.0
71. Presque Isle	8	36.0	21	0.6
72. Roscommon	1568	4088.0	4552	1.1
73. Saginaw	0	...	...	...
74. St. Clair	0	...	...	...
75. St. Joseph	0	...	...	...
76. Sanilac	0	...	...	...
77. Schoolcraft	5	12.7	21	1.7
78. Shiawassee	55	261.0	481	1.8
79. Tuscola	84	285.5	649	1.3
80. Van Buren	216	721.9	1586	2.2
81. Washtenaw	127	310.3	569	1.8
82. Wayne	326	1060.1	989	0.9
83. Wexford	71	370.5	366	1.0

Half the counties had fewer than 100 returns, nine counties had no returns, 19 counties had fewer than 10 returns. The 4 outstanding counties (over 1000 returns each) were Roscommon (1568), Lake (1432), Osceola (1093), and Muskegon (1033).

The number of hours of fishing recorded for each county are shown in the second column of figures in Table 1. The number of hours were proportional, of course, to the number of fishermen contacted. Since the fishermen were contacted at any time in their day's fishing rather than at the end of their fishing (as in the intensive census) the number of fish caught by the fishermen in their day's fishing and the average length of their fishing day could not be determined.

The number of fish caught are shown in the third colum of figures in Table 1. These represent, of course, the number of fish (legal-sized only) taken by the number of fishermen in the number of hours indicated in the other columns.

The data by districts are:

District	No. of fishermen	Hours fished	Legal-sized fish caught
1	1171	4085.0	9534
2	1959	7133.0	11071
3	7415	25535.8	43717
4	3905	11120.1	14948
5	757	2596.4	3964
6	1148	3549.9	4775
7	108	393.8	699
8	1432	4994.0	5259
Total	17895	59408.0	93967

It will be noted that a total of 17895 fishermen were contacted in 1935. They had fished a total of 59408 hours when contacted and had caught a total of 93967 fish in that time. On the average, the fishermen had fished about 3 and one-third hours when contacted by the officers.

District 7, comprising the eastern half of the Upper Peninsula was very poorly represented. A more extensive census in this area would be especially desirable. District 5 was also quite poorly represented. About 40% of the information was obtained in District 3. Only 1148 fishermen were contacted in District 6, but in proportion to the amount of fishing in the district, the percentage contacted is probably relatively high.

Catch per Hour - All Fishing

The catch per hour for each county is listed in the last column in Table 1. The degree to which these figures are dependable is dependent on the number of hours of fishing listed. Where fewer than 200-300 hours of fishing are recorded, the figures are probably relatively insignificant.

The catch per hour, by districts, was:

District	Catch per hour
1	2.3
2	1.6
3	1.7
4	1.3
5	1.5
6	1.3
7	1.8
8	1.1
Average for state	1.5

If numbers of fish only are considered, fishing in District 1 was decidedly better than in the other districts. The fishing in this area was largely lake fishing and the catch was dominantly Bluegills. The lakes in this region are relatively productive and it is not surprising that the catch there was higher than in other general areas.

Fishing in Districts 2 and 3 was slightly above average, while fishing in District 5 was almost exactly average. The relatively low catch in District 4 cannot be explained with certainty, but a possible explanation may be that data for Houghton Lake fishing (which represented almost half of the fishing reported for the district) showed fishing in this lake to be relatively poor in terms of catch per hour (about 1.1 fish per hour) and that it lowered the average for the rest of the district. However, since the average size of the fish taken in this lake is greater than in most, the statement should not be considered as a reflection on the fishing in Houghton Lake. The average would have been almost 1.5 fish per hour had the Roscommon County data (almost entirely for Houghton Lake) been excluded. District 6 comprises, primarily, the former lake bottom and contains relatively few lakes. Districts 7 and 8 are quite different in character; the first is a limestone region, while the second is in an area of igneous rock. Acid waters are more common to the western half of the Upper Peninsula and are, in general, considered less productive than alkaline waters.

Whether or not the large percentage of acid waters was the actual reason for poorer production in District 8 is not known, but certainly it is a plausible explanation for the difference in the catch between the two areas in the Upper Peninsula.

Catch per Hour - Trout Waters

All waters were divided, for the compilation of the data, into trout and non-trout waters. Generally this could be done without difficulty, at times, however, it was not easy to decide whether or not a lake or stream was primarily a trout water. A very small percentage of the waters may have been incorrectly designated, but, with few exceptions, the designations were probably correct. Trout waters, as the term is used here, include both lakes and streams, any water which is primarily trout water.

The number of fishermen contacted, number of hours fishing recorded, number of fish caught, and catch per hour for fishing in trout waters are listed by counties in Table 2. Some figures are obviously not dependable because of paucity of data.

The figures for trout waters by districts are:

District	No. of fishermen	Hours fished	Legal-sized fish caught	Catch per hour
1	25	95.5	91	1.0
2	65	189.0	68	0.4
3	2467	8706.9	6218	0.7
4	542	1737.4	883	0.5
5	289	1015.1	982	0.9
6	227	767.5	385	0.5
7	61	192.7	378	2.0
8	654	2700.6	3316	1.2
Totals	4330	15404.7	12321	0.8

Table 2

Number of fishermen contacted, hours fished,
number of legal-sized fish caught, and catch per hour,
trout waters, by counties

County	No. fishermen	Hours fished	Legal-sized fish caught	Catch per hour
1. Alcona	5	16.5	0	0
2. Alger	10	33	62	1.9
3. Allegan	12	43	4	0.1
4. Alpena	...	...	...	...
5. Antrim	62	252.5	189	0.7
6. Arenac	95	472.5	106	0.2
7. Barry	...	...	...	...
8. Baraga	160	834.5	502	0.6
9. Bay	...	...	...	...
10. Benzie	163	475.4	300	0.6
11. Berrien	...	...	...	...
12. Branch	...	...	...	...
13. Calhoun	...	...	...	...
14. Cass	16	77	73	0.9
15. Charlevoix	3	6	17	2.8
16. Cheboygan	190	628.6	683	1.1
17. Chippewa	...	...	...	...
18. Clare	91	470.2	215	0.5
19. Clinton	...	...	...	...
20. Crawford	19	70	43	0.6
21. Delta	5	16	35	2.2
22. Dickinson	34	112.5	67	0.6
23. Eaton	...	...	...	...
24. Emmet	25	96	76	0.8
25. Genesee	...	...	...	...
26. Gladwin	92	332.6	169	0.5
27. Gogebic	39	117	313	2.7
28. Grand Traverse	97	198.5	103	0.5
29. Gratiot	22	45.5	24	0.5
30. Hillsdale	...	...	...	...
31. Houghton	173	644.5	842	1.3
32. Huron	7	17	40	2.3
33. Ingham	1	1	0	0
34. Iosco	17	60.5	65	1.1
35. Ionia	1	6	5	0.8
36. Iron	126	524.9	908	1.7
37. Isabella	103	232.5	215	0.9
38. Jackson	...	...	...	...
39. Kalamazoo	9	12.5	16	1.3
40. Kalkaska	1	1	0	0
41. Kent	50	136	45	0.3
42. Keweenaw	89	365.2	520	1.4
43. Lake	815	3009.9	1987	0.7
44. Lapeer	...	...	...	...
45. Leelanau	42	168	56	0.3
46. Lenawee	1	6	2	0.3
47. Livingston	...	...	...	...

Table 2 (Continued)

County	No. fishermen	Hours fished	Legal-sized fish caught	Catch per hour
48. Luce	41	130	260	2.0
49. Mackinaw	...	...	...	...
50. Macomb	...	...	...	...
51. Manistee	...	...	...	...
52. Marquette	1	3	6	2.0
53. Mason	223	497.1	611	1.2
54. Mecosta	127	321.6	516	1.7
55. Menominee	23	68	113	1.6
56. Midland	...	...	...	...
57. Missaukee	1	7	15	2.1
58. Monroe	...	...	...	...
59. Montcalm	...	...	...	...
60. Montmorency	9	32	17	0.5
61. Muskegon	79	338.5	227	0.7
62. Newaygo	641	1977	1388	0.7
63. Oakland	39	332	383	1.2
64. Oceana	107	533.5	431	0.8
65. Ogemaw	38	132	56	0.4
66. Ontonagon	9	31	45	1.5
67. Otsego	...	...	...	...
68. Ottawa	...	...	...	...
69. Osceola	292	1226.5	684	0.5
70. Oscoda	123	414	177	0.4
71. Presque Isle	...	...	...	...
72. Roscommon	9	13.5	28	2.0
73. Saginaw	...	...	...	...
74. St. Clair	...	...	...	...
75. St. Joseph	...	...	...	...
76. Sanilac	...	...	...	...
77. Schoolcraft	5	13.7	21	1.5
78. Shiawassee	...	...	...	...
79. Tuscola	...	...	...	...
80. Van Buren	...	...	...	...
81. Washtenaw	...	...	...	...
82. Wayne	...	...	...	...
83. Wexford	27	181	40	0.2

The 4330 fishermen who were contacted fishing in trout waters caught 12321 fish in 15404.7 hours, an average catch of about 0.8 fish per hour. Most of the fish taken in trout waters, naturally, were trout.

Most of the records for District 1 were from one county (Cass) and the catch per hour was therefore probably not representative for the entire area. The catch for the other districts in the Lower Peninsula varied from 0.4 to 0.9 fish per hour. Fishing in trout waters was decidedly better in the Upper Peninsula than in the Lower Peninsula

and was best in the eastern half of the Upper Peninsula (District 7) where the average catch was 2 fish per hour. Since the records were few for this district, however, the figure may not be representative of fishing in trout waters in this area.

Catch per Hour - Non-trout Waters

Data on the catch in non-trout waters, by counties, are shown in Table 3.

Table 3

Number of fishermen contacted, hours fished, number of legal-sized fish caught, and catch per hour, non-trout waters, by counties

County	No. of fishermen	No. of hrs.	No. of legal-sized fish	Catch per hour
1. Alcona	8	34.5	70	2.0
2. Alger	...	...	...	...
3. Allegan	281	885.8	2270	2.6
4. Alpena	14	38	32	0.8
5. Antrim	68	243.2	192	0.8
6. Arenac	4	34	12	0.4
7. Barry	164	728.5	1619	2.2
8. Baraga	245	953.4	321	0.3
9. Bay	...	...	...	...
10. Benzie	654	1817.7	1818	1.0
11. Berrien	21	64	250	3.9
12. Branch	209	854.8	3683	4.3
13. Calhoun	...	...	...	...
14. Cass	7	27.5	162	5.9
15. Charlevoix	79	247	900	3.6
16. Cheboygan	120	478.8	873	1.8
17. Chippewa	...	...	...	...
18. Clare	201	813.9	1361	1.7
19. Clinton	135	317.1	368	1.2
20. Crawford	4	22	15	0.7
21. Delta	2	6	6	1.0
22. Dickinson	17	49	77	1.6
23. Eaton	198	736	662	0.9
24. Emmet	126	408.4	735	1.8
25. Genesee	143	514.5	1249	2.4
26. Gladwin	596	1329.1	1491	1.1
27. Gogebic	208	663.8	815	1.2
28. Grand Traverse	217	617.7	935	1.6
29. Gratiot	49	170	225	1.3
30. Hillsdale	238	880.8	1372	1.6
31. Houghton	39	104.5	74	0.7
32. Huron	...	...	...	...
33. Ingham	...	...	...	...
34. Iosco	20	75.5	204	2.7
35. Ionia	38	52.4	5	0.1
36. Iron	48	181.5	235	1.3
37. Isabella	187	583	1093	1.9
38. Jackson	132	462.1	804	1.7

Table 3 (Continued)

County	No. of fishermen	No. of hrs.	No. of legal-sized fish	Catch per hour
39. Kalamazoo	129	254.4	801	3.1
40. Kalkaska	...	...	...	...
41. Kent	606	1993.3	2050	1.0
42. Keweenaw	45	241.7	149	0.6
43. Lake	610	1681.4	3620	2.1
44. Lapeer	202	1077.7	1446	1.3
45. Leelanau	422	1087.6	2392	2.2
46. Lenawee	60	386.9	213	0.5
47. Livingston	...	...	...	...
48. Luce	43	179.1	305	1.7
49. Mackinaw	2	7	10	1.4
50. Macomb	...	...	...	...
51. Manistee	97	347	1399	4.0
52. Marquette	1	2	3	1.5
53. Mason	216	744.5	1472	2.0
54. Mecosta	580	1751.8	3961	2.3
55. Menominee	92	222.5	198	0.9
56. Midland	71	197	288	1.5
57. Missaukee	...	...	...	...
58. Monroe	189	432.3	1120	2.6
59. Montcalm	265	1200.5	1967	1.6
60. Montmorency	42	132.8	167	1.3
61. Muskegon	954	3755.8	10478	2.8
62. Newaygo	313	1056.1	1396	1.3
63. Oakland	40	241	395	1.4
64. Oceana	499	2014.7	6939	3.4
65. Ogemaw	206	670	1519	2.3
66. Ontonagon	68	119.5	159	1.3
67. Otsego	2	5	0	0
68. Ottawa	27	117.5	408	3.5
69. Osceola	798	2311.6	4769	2.1
70. Oscoda	86	319.7	560	1.7
71. Presque Isle	8	36	21	0.6
72. Roscommon	1559	4074.5	5524	1.3
73. Saginaw	...	...	...	...
74. St. Clair	...	...	...	...
75. St. Joseph	...	...	...	...
76. Sanilac	...	...	...	...
77. Schoolcraft	...	...	...	...
78. Shiawassee	55	261	481	1.8
79. Tuscola	84	285.5	649	2.3
80. Van Buren	215	719.9	1580	2.2
81. Washtenaw	127	310.3	569	1.8
82. Wayne	326	1060.1	989	0.9
83. Wexford	44	225.5	326	1.4

By districts the figures are:

District	No. of fishermen	Hrs. fished	Legal-sized fish caught	Catch per hour
1	1138	3960.7	9440	2.4
2	1889	6924.8	10997	1.6
3	5032	16659.4	37454	2.2
4	3317	9291.7	13762	1.5
5	459	1584.7	2920	1.8
6	910	2761.9	4376	1.6
7	47	192.1	321	1.6
8	763	2537.9	2031	0.8
Total	13555	43913.2	81288	1.9

A total of 13555 fishermen (fishing in non-trout waters) caught a total of 81288 fish in 43913.2 hours, an average of about 1.9 fish per hour. Fishing in non-trout waters was best in District 1 and poorest in District 8, twice as poor in this district as in the next poorest.

Comparison of Trout and Non-trout Waters

In comparing the several data below for trout and non-trout waters, it should be remembered that some of the statements made apply only if the sampling was representative. It is believed that the figures given at least are fairly representative when used for the districts only rather than for individual counties.

The proportion of trout fishing to non-trout fishing in each district, determined from the number of returns obtained from each kind of fishing in each district, are:

District	No. trout-water fishermen	% of total returns	No. non-trout-water fishermen	% of total returns
1	25	2.0	1138	98.0
2	65	3.3	1889	96.7
3	2467	42.7	5032	57.3
4	542	14.1	3317	85.9
5	269	38.6	459	61.4
6	227	20.0	910	80.0
7	61	56.5	47	43.5
8	654	46.8	763	53.2
Total	4330	24.2	13555	75.8

It appears from the above figures that, for the state as a whole, one-fourth of the fishing is trout fishing. District 3, in which trout fishing was extensive, had over half the records for trout waters and over a third the records for non-trout waters.

Figures for this district decidedly over-balanced the figures for the state as a whole; undoubtedly the percentage of trout fishing in Michigan is lower than 25% of the total fishing, perhaps the actual proportion of trout fishermen is less than 10%.

A better estimate of the extent of trout fishing as compared with non-trout fishing could be obtained by comparing the average number of licenses sold when these were needed only for trout fishing with the number of licenses sold now for all fishing.

The figures show 20% of the fishing in District 1 to be trout fishing. Sixteen (over half) of all trout records were for Cass County compared with 7 records for non-trout waters, over emphasizing trout fishing in the county and in the district. The actual trout fishing in District 1 is surely less than one per cent of all fishing in the area. Fishing in District 2 was almost entirely non-trout fishing. Trout fishing represented 42.7% of the fishing in District 3. While trout fishing is extensive in this district, it is probably not as high, in proportion to non-trout fishing, as the figures indicate. The figures show 14.1% trout fishing in District 4, 38.6% in District 5, and 20.0% in District 6.

Data for District 7 show more trout fishing than non-trout fishing and for District 8 show about an equal percentage of each. In proportion to non-trout fishing, the trout fishing is undoubtedly more prominent in the Upper Peninsula than in the Lower Peninsula. This does not necessarily indicate, of course, that the total amount of trout fishing is greater in the Upper Peninsula than in the Lower Peninsula.

A comparison of trout and non-trout fishing in terms of catch per hour indicates that, in most districts, non-trout fishing produces the more fish per hour. The catch-per-hour figures by districts are:

District	Catch per Hour: Trout Waters	Non-trout Waters	Both
1	1.0	2.4	2.3
2	0.4	1.6	1.6
3	0.7	2.2	1.7
4	0.5	1.5	1.3
5	0.9	1.8	1.5
6	0.5	1.6	1.3
7	2.0	1.6	1.8
8	1.2	0.8	1.1
Average	0.8	1.9	1.5

For the entire state non-trout fishing produced decidedly the better fishing in terms of catch per hour, in fact it was over twice as good as trout fishing. The Upper Peninsula differs decidedly from the Lower, however, in this respect since trout fishing was better than non-trout fishing in both of the Upper Peninsula districts.

Stream Fishing

Over most of the state stream fishing and trout fishing are probably almost identical. There are notable exceptions however: in the southern part of the state, and to some degree also in the northern part, there is considerable stream fishing for Smallmouthed Bass. In some southern streams carp fishing is moderately extensive, especially by the colored residents. Northern Pike and Walleyes are commonly taken in some of the streams. On the other hand, some lakes in the northern part of the state are trout lakes.

Figures for stream fishing, by districts are:

District	No. of fishermen	Hrs. fished	Legal-sized fish caught	Catch per hr.
1	37	133.0	157	1.2
2	320	1135.0	1019	0.9
3	2875	10064.2	7293	0.7
4	507	1738.3	980	0.6
5	335	1579.8	1375	0.9
6	700	2070.7	1185	0.6
7	44	163.7	256	1.6
8	675	2392.6	2819	1.2
Total	5493	19277.3	15084	0.8

By comparison of these figures with figures for trout fishing, it will be noted that stream fishing was more extensive than trout fishing, especially in Districts 2 and 6. In Districts 4 and 7 trout fishing was more extensive than stream fishing, indicating that some of the trout fishing at least was in lakes, possibly largely in mill ponds and in lakes formed in the streams by power dams. These impounded waters are considered as lakes in this report.

Lake Fishing

Figures for lake fishing correspond rather closely with figures for non-trout waters. Data for lake fishing, by districts, are:

District	No. of fishermen	Hrs. fished	Legal-sized fish caught	Catch per hr.
1	1126	3903.2	9368	2.4
2	1628	5945.3	9969	1.7
3	4511	15248.4	35878	2.4
4	3276	9372.8	13970	1.5
5	413	1424.5	2527	1.8
6	373	1212.2	2162	1.8
7	64	229.1	442	1.9
8	659	2463.4	1988	0.8
Total	12050	39798.9	76304	1.9

Lake fishing was rather good in all areas except in District 8.

Comparison of Lake and Stream Fishing

Lake fishing comprised about 69% or a little over two-thirds of the fishing. It produced twice as many fish per hour as stream fishing. In District 7 however, it was only slightly better than stream fishing; in District 8 it was much less productive than stream fishing. The percentage of lake fishing and stream fishing and the catch per hour on each are given below, by districts:

District	Per Cent of Fishing		Catch per Hour	
	Lakes	Streams	Lakes	Streams
1	97	3	2.4	1.2
2	84	16	1.7	0.9
3	61	39	2.4	0.7
4	87	13	1.5	0.6
5	55	45	1.8	0.9
6	35	65	1.8	0.6
7	59	41	1.9	1.6
8	49	51	0.8	1.2
Average	69	31	1.9	0.8

In two of the districts (6 and 8) returns for stream fishing exceeded those for lake fishing. District 6 has very few lakes and District 8, though it has many lakes, has relatively poor lake fishing.

Residents and Non-residents

The extent of non-resident fishing has not, to our knowledge, ever been analyzed except by a study of the number of resident and non-resident licenses sold. The total

amount of resident and non-resident fishing for Michigan cannot be determined from this census, but the relative amount of fishing by each and the ability of each to catch fish can be estimated, provided, of course, that the returns are representative. The data, listed below by districts, are available also for each county but are not included here. Because of the importance of the tourist and resort industry in Michigan, a relatively detailed study of the relation between resident and non-resident fishing appears desirable.

The data below are divided into stream fishing, lake fishing, fishing in connecting waters, and all fishing.

Stream Fishing — Comparative data for resident and non-resident stream fishing are given below by districts:

District	No. fishermen		Hours fished		No. legal-sized fish caught		Catch per h	
	Res.	Non-res.	Res.	Non-res.	Res.	Non-res.	Res.	Non-res
1	35	2	126.0	7.0	146	11	1.2	1.6
2	308	8	1105.5	16.5	1003	2	0.9	0.1
3	2598	146	9073.8	478.5	6589	277	0.7	0.6
4	431	67	1463.6	234.7	794	167	0.5	0.7
5	189	130	1037.1	488.7	724	591	0.7	1.2
6	598	41	1833.8	74.4	1482	131	0.8	1.8
7	32	5	120.7	23.0	188	29	1.6	1.3
8	499	74	1747.1	273.0	2090	550	1.2	2.0
Total	4690	473	16507.6	1595.8	13016	1758	0.8	1.1

Nine per cent of the stream fishermen were non-residents. By districts the percentages of non-resident stream fishermen were:

District	% non-residents
1	5
2	3
3	6
4	13
5	41
6	6
7	14
8	13
Average	9

The greatest percentage of non-resident stream fishermen was 41 in District 5. The smallest percentages were in the more southern districts (1, 2, 3 and 6).

Figures for the catch per hour by residents and non-residents show a rather surprising situation--non-residents caught more fish per hour than residents. For the state the figures were 1.1 and 0.8 respectively. In three of the eight districts (2, 3 and 7) the residents got the best results, in terms of catch per hour. The reason for this apparent superiority of non-residents as stream fishermen cannot be given. Those who come a long distance to fish are probably very much interested in the sport and, as a rule, are probably relatively good fishermen.

Lake Fishing

The number of resident and non-resident lake fishermen in each district together with the catch taken, per hour, by each are listed below:

District	No. fishermen		Hours fished		No. legal-sized fish caught		Catch per hour	
	Res.	Non-res.	Res.	Non-res.	Res.	Non-res.	Res.	Non-res.
1	961	145	3208.1	624.7	8265	964	2.6	1.5
2	1555	50	5725.2	133.1	9563	284	1.7	2.1
3	3824	519	12866.8	1984.7	30114	4001	2.3	2.0
4	2512	741	7166.2	1879.0	10960	2418	1.5	1.3
5	301	50	1062.0	165.0	1965	331	1.9	2.0
6	341	12	1119.7	32.5	1910	101	1.7	3.1
7	30	24	102.5	102.1	219	180	2.1	1.8
8	340	345	1095.8	1291.6	1179	718	1.1	0.6
Total	9864	1886	32346.3	6212.7	64175	8997	2.0	1.4

Sixteen per cent of the lake fishermen were non-residents as compared with nine per cent non-residents for stream fishing. Lakes are obviously a greater attraction than streams for the non-residents; in proportion the lakes are used almost twice as much as streams for fishing by non-residents as compared with fishing by residents.

There were records for 1886 non-resident lake fishermen and 473 non-resident stream fishermen, a proportion of about 4 to 1.

By districts the percentage of non-resident lake fishermen were:

District	% non-residents
1	13
2	3
3	12
4	23
5	14
6	3
7	44
8	51
Average	16

Connecting Waters — Data for fishing in connecting waters and bays of the Great Lakes were available for only 78 residents and 5 non-residents. Because of the small number of records, this information was not used.

All Fishing — Figures for all fishing include the data for the three classes of fishing above and information for waters for which these designations could not be made. Data for resident and non-resident fishing in all waters are listed below:

District	No. of fishermen		Hours fished		No. of legal-sized fish caught		Catch per hour	
	Res.	Non-res.	Res.	Non-res.	Res.	Non-res.	Res.	Non-res.
1	996	147	3334.1	631.7	8411	975	2.5	1.5
2	1868	58	6854.2	149.6	9629	286	1.4	1.9
3	6422	655	19940.6	2363.2	36703	4431	1.8	1.9
4	3043	807	8631.8	2109.2	11754	2577	1.4	1.2
5	490	180	2099.1	653.7	2689	922	1.3	1.4
6	979	57	3149.5	123.9	3904	326	1.2	1.6
7	62	29	216.2	125.1	407	209	1.9	1.7
8	862	421	2923.9	1576.6	3345	1271	1.1	0.8
Total	14722	2354	47149.4	7733.0	76842	10977	1.6	1.4

The data for resident and non-resident fishing may be summarized as follows:

1. Non-resident stream fishermen caught more fish per hour (for the entire state) than resident stream fishermen.
2. Non-resident lake fishermen caught fewer fish per hour (for the entire state) than resident lake fishermen.
3. For all fishing the catch per hour was slightly higher for residents than for non-residents.
4. Non-resident stream fishermen varied from 3% of all stream fishermen in District 2 to 41% of all stream fishermen in District 5.
5. Non-resident lake fishermen varied from 3% of all lake fishermen in Districts 2 and 6 to 51% of all lake fishermen in District 8.
6. Variations in the percentage of non-resident fishermen for all waters are shown below:

District	% non-residents
1	13
2	3
3	9
4	21
5	27
6	6
7	32
8	33
	Average 14

7. Nine per cent of all stream fishermen were non-residents.

8. Sixteen per cent of all lake fishermen were non-residents.

9. Fourteen per cent of all fishermen were non-residents.

10. Almost a third of the fishermen in the Upper Peninsula were non-residents.

11. Lake fishing was more attractive to non-residents than stream fishing.

12. The greater number of non-residents in District 1 compared with District 2 may be explained by the proximity of District 1 to northern Ohio and Indiana, permitting many non-residents to reach the district in a very few hours from northern Ohio, northern Indiana and even part of Illinois.

13. Districts 2 and 6 attracted in proportion the fewest non-residents.

14. The residence of the non-residents was not determined. However, a study of the intensive creel census shows non-residents to come chiefly from Ohio, Indiana and Illinois, Ohio ranking first.

Male and Female Fishermen

A study of the proportion of male and female fishermen and of their relative ability as fishermen has been made in connection with the compilation of the census data. This study is, of course, primarily of popular interest, but it has some value in helping to determine the advisability of having wives pay license fees and will help give some indication of the amount of revenue which might be obtained from that source.

Stream Fishing — From the figures below, it will be noted that, in general, female stream fishermen are only half as effective in taking fish as are the male stream fishermen. Since most of the stream fishing was trout fishing (and visa verse) it may also be concluded that the women in general are not as good as the males at trout fishing. Females fished almost as well as males in District 4 and better than males in District 6 (stream fishing in District 6 was probably primarily "warm-water" stream fishing), in all other districts the males took decidedly more fish than the females. About 4⅓% of all stream fishermen were women.

The data by districts for stream fishing by males and females are given below:

District	No. of fishermen		Hours fished		No. of legal-sized fish caught (by)		Catch per hour	
	Male	Female.	Male	Female	Male	Female	Male	Female
1	37	0	133.0	0	157	0	1.2	0
2	308	6	1084.0	20.0	1007	6	0.9	0.3
3	2681	124	9407.0	360.2	6919	118	0.7	0.3
4	456	23	1586.1	74.0	907	34	0.6	0.5
5	261	26	953.5	104.2	1019	65	1.1	0.6
6	555	34	1671.8	88.7	1464	98	0.9	1.1
7	41	2	156.7	7.0	257	0	1.6	0
8	625	16	2206.6	51.5	2946	32	1.3	0.6
Totals	4964	231	17198.7	705.6	14676	353	0.9	0.5

Lake Fishing

Data by districts for lake fishing by males and females are shown below. The number of records appear to be adequate only in Districts 3 and 4; the other districts had records for fewer than 40 female fishermen each.

District	Number of fishermen		Hours fished		No. of legal-sized fish caught (by)		Catch per hour	
	Male	Female	Male	Female	Male	Female	Male	Female
1	1038	32	3551.5	91.5	8603	269	2.4	2.9
2	1297	38	4689.3	160.4	8020	242	1.7	1.5
3	3198	404	10235.2	1113.4	22470	2000	2.2	1.8
4	2507	149	7074.4	393.2	10589	645	1.5	1.6
5	371	21	1277.3	64.5	2324	101	1.8	1.6
6	338	14	1111.7	30.0	1907	77	1.7	2.6
7	55	6	181.9	28.7	393	32	2.2	1.1
8	480	37	1545.5	106.4	1710	75	1.1	0.7
Totals	9284	701	29666.8	1988.1	56016	3441	1.9	1.7

Seven per cent of all lake fishermen were women. In three districts they caught more fish per hour, on the average, than did the men; for the state as a whole they took almost as many fish per hour (males 1.9, females 1.7).

Connecting Waters

There were only 75 records for males and one record for females for fishing in connecting waters and in bays of the Great Lakes. The data are therefore too few to be significant.

All Waters

Data for all waters are listed below. The difference in the catch per hour between male and female fishermen is negligible (1.5 and 1.4 respectively). There is less difference in their catch for all fishing than for either lake fishing or stream fishing. For example, in District 3 males caught 0.7 fish per hour in streams, females 0.4; males caught 2.2 per hour in lakes,

females 1.8; however, for all fishing each caught 1.5 fish per hour. Since females caught fewer by each method, it does not appear possible, at first sight, that they caught the same number (per hour) as males in a combination of the two. The explanation lies in the fact that fewer women, in proportion to males, stream fished than lake fished and lake fishing produced much the better returns in catch per hour. Had the proportion of male and female fishermen been similar for lake and for stream fishing, the males would have shown the higher catch per hour.

Females constituted 6% of all fishermen.

District	No. of fishermen		Hours fished		No. of legal-sized fish caught (by)		Catch per hour	
	Male	Female	Male	Female	Male	Female	Male	Female
1	1075	32	3684.5	91.5	8760	269	2.4	2.9
2	1610	44	5796.8	180.4	9090	198	1.6	1.1
3	5884	528	19642.8	1442.1	29073	2118	1.5	1.5
4	2961	172	8560.5	467.2	11496	679	1.3	1.5
5	632	47	2230.8	168.7	3343	166	1.5	1.0
6	939	49	2919.0	124.7	3889	203	1.7	1.6
7	96	8	338.6	35.7	650	32	1.9	0.9
8	1129	53	3839.1	157.9	4732	107	1.2	0.7
Totals	14326	933	47176.1	2668.2	71033	3772	1.5	1.4

The data for the relative extent and ability of the two sexes as fishermen may be summarized as follows:

1. Female stream fishermen caught only about half the fish per hour caught by male stream fishermen.
2. Female lake fishermen were almost as successful as male lake fishermen in catching fish.
3. Female fishermen, for all fishing combined, were almost as successful as male fishermen in catching fish.
4. Of all stream fishermen 4½% were women.
5. Of all lake fishermen, 7% were women.
6. Of all fishermen, 6% were women.
7. The percentage of female fishermen in each district was:

District	% female fishermen
1	3
2	3
3	8
4	5½
5	7
6	5
7	8
8	4½
Average	6

8. The fewest women, in proportion to men fish in the lower part of the state (Districts 1 and 2).

9. Women in general apparently preferred lake fishing to stream fishing.

INSTITUTE FOR FISHERIES RESEARCH

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Part II of the general census will be submitted in the near future.
