

MISCELLANEOUS PUBLICATIONS  
MUSEUM OF ZOOLOGY, UNIVERSITY OF MICHIGAN, NO. 87

**Records of Fishes  
in the John N. Lowe Collection  
from the Upper Peninsula of Michigan**

BY

WILLIAM RALPH TAYLOR

ANN ARBOR  
UNIVERSITY OF MICHIGAN PRESS  
November 9, 1954

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RECORDS OF FISHES IN THE JOHN N. LOWE COLLECTION  
FROM THE UPPER PENINSULA OF MICHIGAN\*

ONE of the most extensive collections of Michigan fishes was that accumulated by the late John Nicholas Lowe. It was obtained by him during the years 1920 through 1938 and is of distributional, and perhaps historical, interest. The material is chiefly from the waters of the Upper Peninsula. The units from the inland waters of that area have been examined by me and are the basis of this report.<sup>1</sup>

Lowe<sup>2</sup> was a general biologist who in 1919 accepted a position to teach biology at Northern State Teachers College (now Northern Michigan College of Education), Marquette, Michigan. Shortly after arriving at Marquette, he started assembling random fish collections and soon expressed an interest in determining the fish fauna of that region. During the years 1920-24 he took occasional collections from scattered points in the Upper Peninsula of Michigan. In addition, in 1923 he made a survey of the Boardman River system and adjacent waters in the Lower Peninsula. A report of his activities for 1925 and 1926 is given in the *Biennial Report*, Michigan Department of Conservation (1927:126-27). He initiated an investigation of the grayling in the Otter River system in 1925. That same year he made a trip to Isle Royale; however, the fishes obtained add little to the information presented by Hubbs and Lagler (1949). Extensive surveys of Keweenaw County were started and largely completed in 1926. In 1927 a detailed survey of Menominee County was made in conjunction with the Land Economic Survey of the Michigan Department of Conservation (Mich. Dept. Cons., 1929:108-9). In 1928 and 1929 many collections were secured from random points in the Upper Peninsula and considerable work was again done on the grayling in 1929. A few collections were taken between 1930 and 1938. Lowe died on July 27, 1938. As a result of his activity, several areas of the Upper Peninsula were well sampled, and most of the species of fishes known from the region were obtained.

Lowe acted as a Biological Adviser to the Michigan Department of Conservation. On request by the Department he made recommendations or provided information on the management of certain waters. Some collections were secured in the course of the necessary examinations.

Much of the collecting appears to have been done on his own initiative, perhaps with local help; some was undertaken by his classes. Coregonids, salmonids, cottids, and gasterosteids, chiefly from the offshore waters of Lake Superior, were secured in co-operation with commercial fishermen.

\* Accepted for publication September 9, 1953.

<sup>1</sup>The work was undertaken for the Institute for Fisheries Research, Michigan Department of Conservation, with Federal Aid to Fish Restoration funds under Dingell-Johnson Project No. F-2-R-1.

<sup>2</sup>A brief biography of Lowe is to be found in *American Men of Science* (6th ed., 1938: 875).

Lowe's notes, when taken during extensive or organized surveys, contain much information on the biology and physical condition of the bodies of water examined; otherwise they are generally no more than a statement of locality and date. Also, many margins in his notebooks give lists of birds and mammals observed at a particular locality or along highways. His records show that he collected extensively and sent insects, mollusks, crayfish, leeches, and other organisms to various workers and institutions. Records of some of these are already in the literature. Many are from the same localities as the fish collections listed in this paper, but in most cases he probably gave different field numbers to them.

For permission to examine their collection and for courtesies rendered by the officials of Northern Michigan College of Education, I wish to express my sincere appreciation. Also, I wish to thank Merle G. Galbraith, Jr., for his extensive help to me in sorting and identifying that collection. Especial thanks are due Dr. Reeve M. Bailey and Dr. Gerald P. Cooper, who have aided in the accumulation and preparation of the information given here, to William L. Cristanelli for drafting the map, and to others for copying the manuscript.

#### THE MATERIAL

Lowe's collection of fishes and notes has been dispersed. Part of the collection remains at Northern Michigan College of Education; some material (chiefly coregonids and salmonids from Lake Superior) has been turned over to the Great Lakes office of the United States Fish and Wildlife Service; the bulk is now in the Museum of Zoology, University of Michigan. A few lots (possibly only grayling) were sent by Lowe to other institutions.

Material at Northern Michigan College of Education consists of many collections taken in Menominee County (a considerable part duplicated in the Museum of Zoology), a few miscellaneous lots from scattered points in and about the Upper Peninsula, and nearly all of the collection from the Boardman River Survey in the Lower Peninsula.

The collections in the Museum of Zoology include those from Isle Royale, some from Lake Superior (chiefly coregonids that were reported on by Koelz), a few from the Boardman River system of the Lower Peninsula, and most of the material from the inland waters of the Upper Peninsula.

No itinerary of Lowe's collecting is available. His collections taken before 1925 were partly catalogued in one or another of his notebooks about the year 1925. From that time through 1931, he kept miscellaneous notes on his activities in several hardbacked notebooks. Thirteen of these are on file in the Museum of Zoology. Some have only brief entries concerning the localities; others give detailed geographical and biological information.

Lowe's maps, which are available in the Museum of Zoology, are usually marked to indicate his collecting sites. Unfortunately, they are only of about half the counties of the Upper Peninsula.

While working with the Michigan Department of Conservation, Lowe filled out lake and stream inventory forms. These cover the complete surveys made in Menominee, Keweenaw, and Luce counties and some other scattered localities and contain detailed geographical and biological information. They are on file at the Institute for Fisheries Research, Ann Arbor, Michigan.

#### THE DATA

Certain explanatory comments about the data presented in the following list of localities are given here.

*Collection numbers.* — The numbers assigned by Lowe to his collections have been retained, but for duplicated samples or those taken from the same locality at different times only one of the numbers is given. Multiple dates indicate that more than a single collection was taken.

Numbers have been assigned arbitrarily by me to some collections obtained prior to 1926 and to most collections taken after 1930. For collections taken up to 1925, a number has usually been found in one of the early notebooks. Numbers above 713, with a few exceptions, are assigned by me.

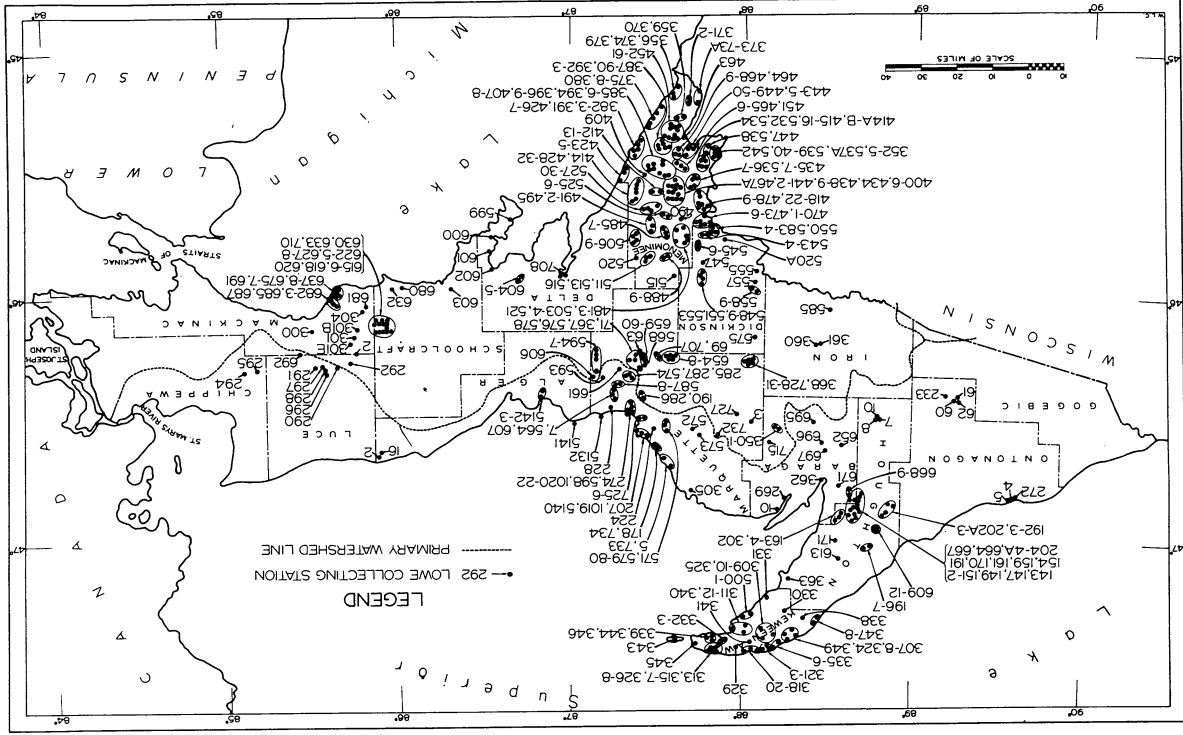
*Locality data.* — The information on location of collecting sites is mostly as originally indicated by Lowe in his records. Simple errors have been corrected without indication. Additional information of a more precise nature than that quotable from the original notes and changes in statement of locality are given by me in brackets. All stream and lake names from Lowe's records are given, along with others in current usage. Those not known to be in common use (some apparently employed only by Lowe) are given in parentheses. Names and localities from Lowe's data and maps have been checked against *County Maps* (Mich. Dept. Cons., 1950).

*Date.* — All known dates of collecting at a locality are included. Some were apparently reconstructed from memory by Lowe and differ from those given in his notes and those noted on his labels. These, however, involve an error of no more than a few days, and most have been resolved by following the chronological order of collections as recorded in his notebooks.

*Collector.* — Lowe apparently collected or helped in the collection of nearly all the lots, because the field notes are almost always in his handwriting. He seldom indicated by name those who assisted him. Thus collectors' names are not listed.

The species obtained at each locality are indicated by numbers following the collection data in the accompanying list of localities. The numbers refer to those given in the annotated list of fishes.

The localities listed below are indicated on the map of the Upper Peninsula of Michigan (Map 1).



LIST OF LOCALITIES IN THE LOWE FISH COLLECTION  
FROM THE UPPER PENINSULA OF MICHIGAN

For Each Station the Species Obtained Are Indicated  
by Numbers That Refer to the Annotated List.

## Alger County

The collections obtained in this county by Lowe have no data other than those accompanying the specimens.

2. Sucker River, [near] Grand Marais [T. 49 N., R. 13 W.], Aug. 20-27, 1921. Species: 4, 9, 10, 20, 30, 42, 66.
16. Grand Marais Lake [sec. 10-11, T. 49 N., R. 13 W.], Aug. 20, 1921. Species: 66, 69.
5141. Lake Superior, at Laughing (White) Fish Point [T. 48 N., R. 22 W.], 15 fathoms, May 14, 1938. Species: 3.
5142. Au Train River, at mouth [sec. 28 and 32-33, T. 47 N., R. 20 W.], July 27, 1936. Species: 20, 35, 50, 55, 59, 61, 62A.
5143. Au Train Lake [T. 46 N., R. 20 W.], July 27, 1936. Species: 14, 20, 37, 39, 41, 50, 59, 61, 62A.

## Baraga County

Localities have been determined entirely from the data given on the collection labels and brief notes recorded in Lowe's notebooks.

10. Huron River [Bay], at Skanee, Aug. 20-23, 1920. Species: 23, 33.
147. Otter River,  $2\frac{1}{2}$  mi. below camp [probably just in Baraga County, sec. 6-7, T. 51 N., R. 34 W.], Aug. 31, 1925. Species: 1, 9, 10, 12, 20, 23, 27A, 29, 30, 36, 61, 62A, 66, 67.
269. Slate River, mouth to first falls [sec. 8-9, T. 51 N., R. 31 W.], Aug. 12, 1925. Species: 9, 10, 20, 29, 30, 61, 62B, 66, 69.
350. Three Lakes [Lake George, sec. 16-17 and 20-21, T. 48 N., R. 31 W.], Sept. 7, 1926. Species: 20, 23, 33, 41, 50, 51, 59, 63, 66.
351. Beaufort River, outlet of Three Lakes [sec. 21, T. 48 N., R. 31 W.], Sept. 7, 1926. Species: 20, 41, 43, 50, 51, 53, 59, 66.
362. L'Anse Bay, mouth of L'Anse Creek [T. 50 N., R. 33 W.], Sept. 18, 1926. Species: 30, 35, 62A, 66, 69, 70.
652. Big Lake [sec. 28-29], T. 49 N., R. 34 W., July 9, 1929. Species: 59.
667. Otter River (old bed),  $1\frac{1}{2}$  mi. north of Pelkie [sec. 8-9, T. 51 N., R. 34 W.], July 20, 1929. Species: 20, 23, 36, 42, 62A, 69.
668. West Branch Sturgeon River, below Pelkie [sec. 20-21, T. 51 N., R. 34 W.], July 20, 1929. Species: 20, 30.
669. Silver River, near Pelkie, at bridge [sec. 20-21, T. 51 N., R. 34 W.], July 20, 1929. Species: 1, 20, 27A, 29, 30, 36, 62A, 66.
671. Carp River [T. 51 N., R. 34 W.], July 20, 1929. Species: 10, 13, 69.

695. King Lake [T. 48 N., R. 33 W.], Aug. 31, 1929. Species: 14, 20, 22, 41, 42, 50, 55, 59, 63, 66.
696. Pelkie River, at highway [sec. 34, T. 49 N., R. 33 W.], Aug. 31, 1929. Species: 10, 25, 26, 29, 30, 33.
697. Plumbago Creek, at highway [sec. 18, T. 49 N., R. 33 W.], Aug. 31, 1929. Species: 10, 23, 66, 69.
715. Crooked Lake [T. 49 N., R. 31 W.], Aug. 10, 1937. Species: 26, 44.

#### Chippewa County

294. Hulbert Lake [T. 45 N., R. 6-7 W.], July 3-4, 1926. Species: 6 (type of *Leucichthys artedi lowei* Koelz), 11, 20.
295. Hendrie River, 2 mi. west of Hulbert, at M-25 highway [T. 45 N., R. 7 W.], July 3, 1926. Species: 13, 14, 69.

#### Delta County

The collection stations in Delta County were recorded on two maps and are itemized in Lowe's notebooks.

599. "Puffy Creek,"  $1\frac{1}{4}$  mi. south of Fayette [T. 38 N., R. 19 W., not to be confused with the Puffy Creek located  $2\frac{1}{2}$  miles southwest of Garden], July 14, 1928. Species: 20, 25, 25 x 26, 26, 27A, 30, 33, 35, 37, 39, 61, 62A x 62B, 66, 69.
600. Garden Brook, at Garden [sec. 17, T. 39 N., R. 18 W.], July 14, 1928. Species: 13, 20, 33, 38, 41, 55, 62A x 62B, 63, 69.
601. "Nameless Brook" [Valentine Creek, sec. 28, T. 40 N., R. 18 W.], July 14, 1928. Species: 20, 30, 61, 66.
602. Little Fish Dam Creek [sec. 33, T. 41 N., R. 18 W.], July 14, 1928. Species: 62A, 66.
604. Sturgeon River, at Ten Mile Rapids, about 10 mi. above Nahma [T. 41 N., R. 19 W.], July 15, 1928. Species: 20, 30, 33, 38, 60, 61, 62A.
605. Mormon Creek, about 9 mi. above Nahma, near Sturgeon River [T. 41 N., R. 19 W.], July 15, 1928. Species: 30, 48, 66.
708. Rapid River, at Rapid River [T. 41 N., R. 21 W.], Aug. 19, 1930. Species: 20, 23, 24, 29, 30, 33, 50, 60, 61, 62A x 62B, 63.

#### Dickinson County

Most of the collections were obtained in the fall of 1927 following the completion of the Menominee County survey. Available records for collections taken during 1927 from this county are similar to those retained for Menominee County. Localities are indicated on two maps used by Lowe.

- 520A. Hanbury Lake, at Vulcan [sec. 9-10 and 15-16, T. 39 N., R. 29 W.], 1922. Species: 51.

543. Hamilton Creek (tributary), sec. 16, T. 39 N., R. 28 W., Sept. 9, 1927. Species: 10, 20, 24, 29, 66.
544. Slaughter House Creek, sec. 20, T. 39 N., R. 28 W., Sept. 9, 1927. Species: 10, 66.
545. Beaver Creek, sec. 2, T. 39 N., R. 28 W., Sept. 10, 1927. Species: 10, 13, 20, 23, 24, 25, 26, 29, 66, 69.
546. Lost Creek, sec. 35, T. 40 N., R. 28 W., Sept. 10, 1927. Species: 10, 13, 23, 24, 26, 29, 63, 66, 69.
547. Breen Creek, sec. 9-10, T. 40 N., R. 28 W., Sept. 10, 1927. Species: 10, 13, 20, 23, 24, 26, 40 (paratypes), 50, 60, 62A, 66, 69.
548. Hancock Creek, sec. 25, T. 41 N., R. 28 W., Sept. 10, 1927. Species: 20, 23, 29, 30, 33, 41, 60, 62A.
549. Pocans Creek, sec. 13, T. 41 N., R. 28 W., Sept. 10, 1927. Species: 10.
550. Turner Creek, sec. 30-31, T. 39 N., R. 28 W., Sept. 11, 1927. Species: 13, 14, 20, 23, 24, 25, 32, 32 x 33, 33, 34, 38, 40 (paratype), 41, 42, 43, 50, 51, 59, 62A, 65, 66, 69.
551. Crow Creek, sec. 24, T. 41 N., R. 28 W., Sept. 12, 1927. Species: 10.
553. East Branch of Sturgeon River, at dam, sec. 12, T. 41 N., R. 28 W., Sept. 12, 1927. Species: 10, 17, 19, 20, 23, 24, 29, 30, 33, 41, 50, 59, 60.
555. Bad Water Creek, sec. 33, T. 41 N., R. 30 W., Sept. 13, 1927. Species: 10, 20, 23, 24, 26, 29, 66, 69.
557. Bad Water Creek, sec. 9, T. 41 N., R. 30 W., Sept. 13, 1927. Species: 13, 20, 23, 24, 25, 26, 29, 40, 69.
558. Tom Kings Creek, sec. 4, T. 41 N., R. 30 W., Sept. 13, 1927. Species: 10, 13, 29, 66, 69.
559. West Branch of the West Branch of Sturgeon River, sec. 33, T. 42 N., R. 30 W., Sept. 13, 1927. Species: 10, 19, 20, 22, 23, 24, 29, 33, 63, 66.
575. Sawyer Lake [sec. 27-28, T. 44 N., R. 30 W.], June 16, 1928. Species: 59, 63.
583. Lake Louise [sec. 19 and 30, T. 39 N., R. 28 W.], June 30, 1928. Species: 50.
584. Outlet of Lake Mary [sec. 30, T. 39 N., R. 28 W.], June 30, 1928. Species: 13, 20, 22, 23, 23 x 33, 25, 26, 29, 30, 32, 32 x 33, 33, 34, 38, 40, 41, 42, 50, 59, 63, 66, 69.

#### Houghton County

Data for collections obtained in this county are often vague or even inadequate. Some of the collections have been omitted because the body of water could not be located. None of Lowe's maps is available; the locality information is entirely from notebooks and labels and has been correlated with recent maps and an old undated ownership map.

In regard to his Otter River collections, Lowe commented in a letter written just before his death:

"I am also sending you the Otter River collection which of course includes the Grayling. . . . Otter River is in Houghton County. . . . The stations are all along the river from Hanchettes Bridge to the mouth or rather the forks of the Otter River where the East [apparently Lowe intended North, since there is no East Branch] and West branches of the Otter come together."

Some of Lowe's landmarks are:

Hanchettes Bridge.— This is assumed to be the bridge (between sec. 7 and 18, T. 52 N., R. 34 W.) that crosses the North Branch of the Otter River below Hanchette's property. Lowe also mentioned another bridge that is above this place.

Camp or clubhouse.— Lowe frequently stayed here, but he generally gave it no further identification. It appears to have been the Houghton Rod and Gun Club Camp, which was located, approximately, in sec. 31, T. 52 N., R. 34 W. ("Petersen Creek about 1/8 mile above camp.")

Petersen Creek.— This is the outlet of Peterson Lake. It is shown on most recent maps as either Peters Creek or Ebers Creek and on the Michigan Department of Conservation map as Ebers Creek. I have retained Lowe's name, Petersen Creek, for it.

Mouth.— "Mouth of Otter" had two meanings to Lowe: (a) Mouth of Otter River in Otter Lake — This locality is definitely indicated in his records as the mouth at Otter Lake. (b) Mouth of Otter River — Lowe used this expression loosely to denote the junction (sec. 1, T. 51 N., R. 35 W.) of the North and West branches of the Otter River. Just why he regarded this junction as the mouth is not apparent.

Main Branch.— As used by Lowe this meant the North Branch of the Otter River (recent maps) as well as the main stream from the junction of the North and West branches to Otter Lake. Lowe also refers to this entire section of the stream as Otter River.

West Branch of Otter River.— That part of the Otter River flowing in a direction slightly north of east through Houghton County and meeting the southerly flowing North Branch of the Otter River in sec. 1, T. 51 N., R. 35 W. The West Branch is known simply as Otter River on the Michigan Department of Conservation map.

Hankinson (1916a: 13-24) reported on several of the waters of this county, and two of his localities are now known to have been examined by Lowe (Nos. 192-193). In addition, both men examined some "Stonington Lakes." Those surveyed by Hankinson (1916a: 13-14), however, are not certainly identifiable with the ones that Lowe visited (Nos. 609-612), and lists of the species obtained by each are hardly comparable.

7. Smith Creek, 1 mi. below Sidnaw Hatchery [sec. 3-4, T. 47 N., R. 36 W.], May 3, 1925. Species: 10.
8. Burns Lake, near Sidnaw Hatchery [sec. 2, T. 47 N., R. 36 W.], May 3, 1925. Species: 26, 42, 69.
10. [Lake] Thirteen Creek, near Sidnaw Hatchery [sec. 2 and 11, T. 47 N., R. 36 W.], May 2, 1925. Species: 10.
143. [North Branch of] Otter River, at or near camp or clubhouse [sec. 31 and 36, T. 52 N., R. 34-35 W.], June 26, 1925, Sept. 1, 5, 6, and



- 8, 1925, Aug. 21, 1927, Aug. 10, 1928, July 3, 5, and 18, 1929. Species: 1, 2, 9, 10, 12, 20, 21, 23, 27A, 29, 30, 48, 61, 62A, 66, 67.
144. Petersen Creek (mouth) [sec. 31, T. 52 N., R. 34 W.], July 27, 1925. Species: 20, 23, 27A, 29, 66.
149. [North Branch of] Otter River, between Bear Creek and camp [sec. 25, 31, and 36, T. 52 N., R. 34-35 W.], Aug. 29 and Sept. 1, 1925, and July 16 and 18, 1929. Species: 1, 9, 10, 12, 20, 23, 26, 27A, 29, 30, 36, 61, 62A, 66, 67, 69.
151. Bear Creek, from mouth to about  $\frac{1}{2}$  mi. upstream [sec. 25, T. 52 N., R. 35 W.], Sept. 2, 1925. Species: 9, 10, 66, 67.
152. [North Branch of] Otter River, near mouth of Bear Creek [sec. 25, T. 52 N., R. 35 W.], Sept. 4, 1925. Species: 12.
154. Petersen Creek, mouth to . . . [distance unspecified, probably nearly 2 mi.] upstream [sec. 19-20 and 30-31, T. 52 N., R. 34 W.], Sept. 5-6, 1925. Species: 10, 20, 23, 25, 27A, 29, 30, 36, 42, 62A, 66, 69.
159. [North Branch of] Otter River, "Hanchette's down" [sec. 7 and vicinity, T. 52 N., R. 34 W.], Sept. 8, 1925. Species: 9, 10, 20, 23, 27A, 30, 66, 67, 69.
161. (West Branch of) Otter River, from mouth to  $2\frac{1}{2}$  mi. upstream [sec. 1 and 12-14, T. 51 N., R. 35 W.], Sept. 9 and 14, 1925, and July 7, 1929. Species: 9, 10, 12, 20, 23, 27A, 29, 30, 36, 61, 62A, 66.
163. Otter River (mouth), at Otter Lake [sec. 14, T. 52 N., R. 34 W.], Sept. 11, 1925. Species: 20, 36, 41.
164. Sturgeon River (mouth), at Otter Lake [sec. 12, T. 52 N., R. 34 W.], Sept. 12, 1925. Species: 16, 17, 20, 30, 36, 39, 61, 62A.
170. Petersen Creek, on county road south of Otter Lake School [sec. 9, T. 52 N., R. 34 W.], Sept. 13, 1925. Species: 23, 69.
171. Pike River, from 1 mi. from mouth to 3 mi. upstream [sec. 7, 12-13, and 23-24, T. 53 N., R. 33-34 W.], Sept. 13, 1925. Species: 1, 10, 20, 30, 66.
191. [North Branch of] Otter River, at junction with West Branch of Otter River [sec. 1, T. 51 N., R. 35 W.], Sept. 14, 1925. Species: 20, 23, 27A, 29, 30, 36, 62A, 66, 67.
192. Lake Gerald [sec. 13-14 and 23-24, T. 52 N., R. 36 W.], Sept. 14, 1925. Species: 50, 51, 59. This is the North Twin Lake of Hankinson (1916a: 19-20). He listed other species.
193. Lake Roland [sec. 14-15, 22-23, and 27, T. 52 N., R. 36 W.], Sept. 15, 1925. Species: 50, 51, 59. This lake is the South Twin Lake of Hankinson (1916a: 14-19). He listed more species than were obtained by Lowe.
196. Perrault Lake [sec. 34, T. 54 N., R. 35 W.], Sept. 16, 1925. Species: 13, 25.
197. Lake Eva [sec. 4-5, T. 53 N., R. 35 W.], Sept. 16, 1925. Species: 50, 59.
202. Maple Siding Creek, 21 mi. south [southwest] of Houghton, near Twin Lakes [T. 52 N., R. 36 W.], Sept. 17, 1925. Species: 10, 13, 23, 24, 51, 52, 52 x 53, 53.

- 202A. Winona Lake [sec. 32], T. 52 N., R. 36 W., Sept. 17, 1925. Species: 13, 69.
203. Sandy Lake [sec. 3-4 and 33-34, T. 51-52 N., R. 36 W.], Sept. 17, 1925. Species: 52, 59.
204. [North Branch of] Otter River, below Bart (Bark) Creek [sec. 19, T. 52 N., R. 34 W.], Sept. 10, 1925. Species: 9, 10, 12, 20, 30, 61, 62A, 66, 67.
- 204A. Bart (Bark) Creek, mouth to  $\frac{1}{2}$  mi. upstream [sec. 13 and 19, T. 52 N., R. 34-35 W.], Sept. 10, 1925. Species: 9, 66, 67.
302. Otter Lake [T. 52 N., R. 34 W.], July 21 and Aug. 8, 1921, and Sept. 11-12, 1925. Species: 1, 5, 6, 16, 17, 20, 21, 22, 35, 36, 37, 38, 39, 41, 48, 50, 55, 57, 59, 61, 62A, 63.
363. Rice Lake [T. 55 N., R. 31 W.], Sept. 19, 1926. Species: 22, 34, 38, 39, 41, 59, 62A, 63.
609. North Stonington Lake [Lake Ongie, sec. 19-20 and 29-30, T. 53 N., R. 35 W.], Aug. 9, 1928. Species: 20, 50, 51, 59.
610. South Stonington Lake [sec. 30, T. 53 N., R. 35 W.], Aug. 9, 1928. Species: 51.
611. Elm River, above and below junction with Stonington Brook [sec. 19 and 30, T. 53 N., R. 35 W.], Aug. 9, 1928. Species: 10, 29.
612. Stonington Creek, tributary to South Stonington Lake [sec. 29, T. 53 N., R. 35 W.], Aug. 9, 1928. Species: 10, 69.
613. Pilgrim River, "On old road past Isle Royal Mine" [approximately sec. 22-23, T. 54 N., R. 34 W.], Aug. 10, 1928. Species: 9, 10, 67.
664. [North Branch of] Otter River, near camp to "mouth" [sec. 1 and 31, T. 51-52 N., R. 34-35 W.], July 16-17, 1929. Species: 9, 10, 12, 20, 23, 27A, 29, 30, 61, 62A, 66, 67.

#### Iron County

Detailed locality data are given in Lowe's notes for collections 360-61. No map used by Lowe is available.

360. Gilbert Lake, sec. 15 and 22, T. 44 N., R. 33 W., Sept. 18, 1926. Species: 20, 23, 24, 51, 59.
361. Gibson (Lost) Lake, sec. 21, T. 44 N., R. 33 W., Sept. 18, 1926. Species: 50.
585. Chicagon Lake [T. 42-43 N., R. 33-34 W.], July 1, 1928. Species: 7, 63.

#### Keweenaw County

In addition to two maps showing collecting points, Lowe provided detailed records that give descriptions and locations of the waters visited in this county. These are found in his notebooks and on Department of Conservation lake and stream survey forms.

307. Eagle River, at Phoenix, sec. 29-30, T. 58 N., R. 31 W., July 27, 1926. Species: 27B, 69.

308. Silver Creek, at mouth, sec. 26-27, T. 58 N., R. 32 W., July 27, 1926. Species: 9, 10, 27A, 30, 48, 67.
309. Gratiot Lake (north and west sides), T. 57 N., R. 30 W., July 28 and Aug. 17, 1926. Species: 14, 20, 41, 49, 50, 55, 59, 61, 62A, 63, 66, 69, 70.
310. Eagle River, near Central, sec. 26, T. 58 N., R. 31 W., July 28, 1926. Species: 27B.
311. Lac La Belle (west shore), T. 57-58 N., R. 29 W., July 29, 1926. Species: 20, 21, 30, 59, 61, 63, 66.
312. Deer Lake, sec. 6-7, T. 57 N., R. 29 W., July 29, 1926. Species: 22, 59, *Micropterus* sp. (young).
313. Manganese Lake and tributary, sec. 5, T. 58 N., R. 28 W., July 31, 1926. Species: 10, 25, 26, 27B, 40, 63, 69.
315. Lily Lake [Mud Lake], sec. 34-35, T. 59 N., R. 28 W., Aug. 1, 1926. Species: 14, 38.
316. Perch Lake [Lily Lake], sec. 34, T. 59 N., R. 28 W., Aug. 1, 1926. Species: 14, 38, 41, 55, 59, 62A, 63.
317. Copper Harbor (Lake Superior), near outlet of Perch Lake, sec. 34, T. 59 N., R. 28 W., Aug. 1, 1926. Species: 20, 27A, 30, 33, 59, 61, 62A, 66.
318. Lake Bailey, T. 58-59 N., R. 30 W., Aug. 2, 1926. Species: 22, 34, 35, 38, 59, 62A, 63, 66.
319. Upson (Beaver) Creek or Silver River, sec. 35-36, T. 59 N., R. 30 W., Aug. 2 and 18, 1926. Species: 9, 10, 30, 34, 38, 61, 66, 67.
320. Lake Upson (Beaver), (north shore), sec. 31 and 36, T. 59 N., R. 29-30 W., Aug. 2, 1926. Species: 26, 34, 38.
321. Lake Eliza, sec. 6, T. 58 N., R. 30 W., Aug. 3, 1926. Species: 20, 23, 25, 25 x 26, 26, 69.
322. Eliza Creek, sec. 6-7, T. 58 N., R. 30 W., Aug. 3, 1926. Species: 20, 25, 26, 27 x 30, 27A, 30, 31, 35, 38, 41, 59, 61, 66, 69.
323. Cedar (Saw Mill) Creek, sec. 5 and 8-9, T. 58 N., R. 30 W., Aug. 3, 1926. Species: 9, 10, 27A, 30, 59, 66, 67, 69.
324. Eagle River, at mouth, sec. 19 and 24, T. 58 N., R. 31-32 W., July 27 and Aug. 3 and 17, 1926. Species: 21, 25, 27 x 30, 27A, 27B, 30, 31, 35, 50, 59, 67, 69.
325. Montreal River, sec. 19-21, T. 58 N., R. 30 W., Aug. 10 and 23, 1926. Species: 10, 20, 21, 23, 25, 25 x 26, 26, 27B, 66, 69.
326. Outlet of Manganese Lake (French Annies Creek), sec. 32, T. 59 N., R. 28 W., July 31 and Aug. 11, 1926. Species: 10, 20, 59, 61, 62A, 66.
327. Lake Fanny Hooe, at east end and inlet from Mud Lake, sec. 34, T. 59 N., R. 28 W., Aug. 12, 1926. Species: 6, 20, 33, 39, 50, 59, 61, 62A, 66.
328. Outlet of Lake Fanny Hooe, sec. 33, T. 59 N., R. 28 W., Aug. 11, 1926. Species: 20, 22, 27A, 30, 33, 38, 39, 50, 55, 59, 61, 62A, 66, 67.
329. Lake Medora (Mosquito Lake), T. 58 N., R. 29 W., Aug. 12, 1926, and Aug. 19-20, 1927. Species: 7 (type of *Coregonus clupeaformis medorae* Koelz), 20, 50, 59.

330. Thayers Lake and outlet, sec. 5 and 32, T. 56-57 N., R. 31 W., Aug. 13, 1926. Species: 13, 20, 22, 23, 23 × 33, 29, 33, 38, 50, 53, 59, 63, 69.
331. Tobacco River, about  $\frac{1}{2}$  mi. above mouth, sec. 19, T. 56 N., R. 30 W., Aug. 13, 1926. Species: 13, 20, 23, 29, 30, 33, 66, 69.
332. Lake Addie, sec. 19, T. 58 N., R. 28 W., Aug. 14, 1926. Species: 22, 38, 63.
333. Breakfast Lake, sec. 17, T. 58 N., R. 28 W., Aug. 15, 1926. Species: 38, 63.
335. Jacobs Creek, sec. 15-16, T. 58 N., R. 31 W., Aug. 17, 1926. Species: 30, 67.
336. Owl (Copper Falls) Creek, below Copper Falls, sec. 2 and 10-11, T. 58 N., R. 31 W., Aug. 17, 1926. Species: 69.
338. Seneca Lake, sec. 21 and 28, T. 57 N., R. 32 W., Aug. 21, 1926. Species: 25, 26, 29, 42, 43, 63, 69.
339. Copper Lake, sec. 23, T. 58 N., R. 28 W., Aug. 23, 1926. Species: 14, 20, 59, 63.
340. Bete Grise Bay (Lake Superior), about mouth of ship canal, T. 57-58 N., R. 29 W., Aug. 24, 1926. Species: 14, 20, 22, 38, 50, 55, 57, 59, 62A, 63, 66.
341. Montreal River, sec. 13-16, T. 58 N., R. 30 W. and sec. 18, T. 58 N., R. 29 W., Aug. 23 and 27, 1926. Species: 10, 20, 21, 23, 27B, 67.
343. Manitou Lake, on Manitou Island, T. 58 N., R. 26 W., Aug. 25, 1926. Species: 22, 55, 59, 63, 67, 69.
344. Hoar Lake, sec. 24, T. 58 N., R. 28 W., Aug. 25, 1926. Species: 22, 34, 38, 41, 59.
345. Schlatter Lake, sec. 9 and 16-17, T. 58 N., R. 27 W., Aug. 26, 1926. Species: 14, 38, 59, 63, 69.
346. Montreal River, at mouth, sec. 26-27 [T. 58 N., R. 28 W.], Aug. 26, 1926. Species: 20, 21, 22, 23, 27A, 30, 49, 62A, 63, 66, 67, 69.
347. Gratiot River, at mouth, sec. 11 and 14, T. 57 N., R. 33 W., Aug. 27, 1926. Species: 9, 10, 27A, 29, 30, 61, 66, 67.
348. Black Creek, at mouth (tributary to Mills Creek), sec. 14 and 22-23, T. 57 N., R. 33 W., Aug. 27, 1926. Species: 10, 27A, 30, 67, 69.
349. Cliff Creek, at Cliff Dam, sec. 1-2, T. 57 N., R. 32 W., Aug. 27, 1926. Species: 10, 27B, 69.
500. Little Betsy River, sec. 29, T. 57 N., R. 29 W., Aug. 18, 1927. Species: 10.
501. Big Betsy River, sec. 36, T. 57 N., R. 30 W., Aug. 18, 1927. Species: 10, 59, 66, 69.

#### Luce County

Lowe provided detailed locality data in his notebooks and on Department of Conservation lake and stream survey forms for all the Luce County collections.

290. East Lake, sec. 10-11 and 14, T. 45 N., R. 11 W., June 30, 1926. Species: 38, 59, 63.
291. Twin Lakes, sec. 10-11, T. 45 N., R. 10 W., June 30, 1926. Species: 33, 39, 41, 55, 59, 62A.
292. North Manistique (Round) Lake, T. 45 N., R. 11-12 W., July 1-2, 1926. Species: 6, 20, 37, 41, 59, 62A, 63, 66.
296. Teaspoon River, sec. 2-6, 31, and 36, T. 45-46 N., R. 10-11 W., July 5, 1926. Species: 20, 23, 24, 33, 55, 59, 66.
297. Kak's (Kecks) Lake, sec. 8-9 and 16-17, T. 45 N., R. 10 W., July 5, 1926. Species: 13, 22, 33, 38, 39, 51, 59, 62A, 63.
298. Carlson Creek, sec. 6 and 8-9, T. 45 N., R. 10 W., July 5, 1926. Species: 10, 13, 20, 23, 29, 33, 38, 55, 62A, 69.

#### Luce and Mackinac Counties

These lakes straddle the county line between Luce and Mackinac counties.

2. (Big) Manistique Lake, T. 44-45 N., R. 11-12 W., July 21, 1922, and July 2 and 8, 1926. Species: 14, 20, 33, 35, 37, 39, 41, 50, 54, 55, 58, 59, 61, 62A, 63, 66, 69.
692. Pullup Lake [sec. 3-5 and 32-33, T. 44-45 N., R. 9 W.], Aug. 20, 1929. Species: 25, 26, 42, 43, 69.

#### Mackinac County

Some of the larger lakes were examined several times by Lowe. There are detailed notes for these lakes and their tributaries. Smaller and less important bodies of water in the "Simmons Wood" area (Nos. 637-77, 682-91) are described briefly in his notebooks; their locations are indicated on his maps.

300. Millecoquins Lake, T. 43-44 N., R. 10 W., July 6, 1926, and Aug. 21, 1929. Species: 20, 22, 23, 33, 41, 43, 51, 53, 55, 59, 61, 62B, 66, 69.
301. South Manistique (Whitefish) Lake, T. 43-44 N., R. 11-12 W., July 1, 1923, and July 7-9, 1926. Species: 6 (type of *Leucichthys artedi atikamek* Koelz), 14, 20, 22, 33, 35, 37, 39, 41, 43, 50, 53, 54, 55, 58, 59, 61, 62A x 62B, 63, 66, 69.
- 301B. Taylor (Stevens) Creek (mouth), sec. 2, T. 43 N., R. 12 W., July 7, 1926. Species: 10, 14, 20, 33, 62A x 62B.
- 301E. Portage Creek, as it leaves "Whitefish" Lake, sec. 18, T. 44 N., R. 11 W., July 8, 1926. Species: 14, 33, 39, 41, 54, 55, 58, 59, 61, 62A x 62B, 66, 69.
303. Wolf Creek, tributary to "Whitefish" Lake, T. 44 N., R. 12 W., July 9, 1926. Species: 13, 63.
304. Milakokia (Pike) Lake, T. 42-43 N., R. 12 W., July 9, 1926, and Aug. 24, 1930. Species: 33, 35, 37, 39, 41, 42, 55, 59, 61, 62A, 63.

637. Duel Lake [sec. 22-23 and 26-27, T. 42 N., R. 11 W.], Sept. 13, 1928, and Aug. 2, 1929. Species: 13, 14, 20, 22, 38, 41, 43, 47, 59, 63.
638. Browns (Round) Lake [sec. 26, T. 42 N., R. 11 W.], Sept. 13, 1928. Species: 22, 24, 26, 38, 41, 42, 47, 63.
675. Stone Lake (Big Rock Pond) [sec. 34], T. 42 N., R. 11 W., July 31, 1929. Species: 13, 24, 25, 26, 29, 40, 42, 63, 69.
676. Burnt Pond, tributary to Cataract River [sec. 34, T. 42 N., R. 11 W.], July 31, 1929. Species: 10, 13, 24, 25, 25 x 26, 26, 29, 38, 69.
677. Mud Lake, sec. 27, T. 42 N., R. 11 W., July 31, 1929, and Aug. 21, 1930. Species: 13, 20, 24, 25, 26, 29, 38, 63, 69.
681. Milakokia (Pike) Creek [sec. 4-5, T. 42 N., R. 12 W.], Aug. 4, 1929. Species: 13, 14, 55, 66.
682. Crow River [sec. 13, T. 42 N., R. 11 W.], Aug. 5, 1929. Species: 13, 20, 25, 26, 29, 38, 40, 62A, 63, 66, 69.
683. Scrams Creek [sec. 11, T. 42 N., R. 11 W.], Aug. 6, 1929. Species: 9, 10, 29, 69.
685. Scrams Creek [sec. 10, T. 42 N., R. 11 W.], Aug. 6, 1929. Species: 10, 13, 25, 26, 29, 38, 40, 63, 69.
687. Crow River (mouth) [sec. 18-19, T. 42 N., R. 10 W.], Aug. 8, 1929. Species: 20, 26, 27A, 29, 30, 31, 35, 37, 47, 59, 61, 62A, 66, 69.
691. Cataract River [sec. 34-35, T. 42 N., R. 11 W.], Aug. 26, 1930, and July 18, 1936. Species: 10, 20, 24, 27A, 29, 30, 35, 37, 38, 41, 61, 63, 66, 68, 69.

#### Marquette County

The data recorded by Lowe for collections obtained in this county are perhaps the most incomplete of those for any county. His notebooks contain scattered and frequently only brief records. In most cases, however, the approximate location in addition to the name of the body of water has made it possible to determine collecting sites, but collections with inadequate or confusing data were discarded. For example, there are several Perch and Bass lakes in the county, and collections not more explicitly identified are omitted. Some of the collecting localities (numbers between 568 and 707) are indicated on a map used by Lowe. Numbers above 707 have been assigned by me.

3. Michigamme Lake [T. 47-48 N., R. 30 W.], July 13, 1923. Species: 14, 20, 22, 33, 41, 50, 51, 59, 63, 66.
5. Saux Head Lake [sec. 20-21, T. 50 N., R. 26 W.], July 22, 1923. Species: 20.
7. Chocoday River, [at] bridge on main [road], near Yalmer [sec. 1, T. 46 N., R. 24 W.], July 15, 1923. Species: 9, 10, 30.
63. Rice Lake, [near] Gwinn [sec. 35, T. 45 N., R. 25 W.], June 8, 1923. Species: 42.
69. Shag Lake, near Gwinn [sec. 25-26, T. 45 N., R. 26 W.], Sept. 14, 1924, and June 5, 1926. Species: 20, 22, 26, 38, 39, 59, 63.

71. Little Lake, Forsythe Township [sec. 19-20 and 29-30, T. 45 N., R. 24 W.], July 5, 1925. Species: 24, 41, 51, 59, 62A, 63, 66.
178. Harlow (Pickerel) Lake, near "Sugar Loaf," sec. 19 and 24, T. 49 N., R. 25-26 W., Aug. 1, 1925, June 3, 1927, July 19, 1930, May 28 and Aug. 6, 1935, and July 24, 1936. Species: 14, 20, 21, 22, 33, 34, 35, 38, 39, 55, 59, 62A, 63, 66, 69.
190. Strawberry Lake [sec. 33, T. 47 N., R. 25 W.], April 29, 1925. Species: 50, 59.
207. Campeau Creek, in Marquette [sec. 3-6, T. 48 N., R. 25 W.], July 1, 1923, and Aug. 2, 1925. Species: 8, 10, 20, 26.
224. Dead River, between McClure Dam and power plant at Forrestville [sec. 7, 13-14, and 18, T. 48 N., R. 25-26 W.], July 14, 1923. Species: 9, 10, 20, 22, 23, 27A, 29, 30, 33, 42, 50, 53, 63, 66, 69.
228. Kawbawgam (Pickerel or Mangum) Lake [sec. 18, T. 47 N., R. 23 W.], July 21, 1923, and June 3, 1935. Species: 13, 14, 20, 22, 38, 55, 59, 63.
274. Cherry Creek, at fish hatchery and at M-15 [sec. 8 and 17-18, T. 47 N., R. 24 W.], Aug. 6, 1924, and June 13, 1925. Species: 10, 67.
285. Silver Lead Lake, headwaters [West Branch] of Chocolay River [locality given in Mich. Dept. Cons., 1927:103, as sec. 32, T. 46 N., R. 24 W.], June 4 [or 5], 1926. Species: 20, 22, 23, 24, 25, 26, 29, 38, 40, 42, 59, 63, 66, 69.
286. Uncle Toms Pond and Creek, "3½ mi. west of Sands Station" [sec. 16, T. 46 N., R. 25 W.], June 5, 1926. Species: 66, 69.
287. Wilson (Trout) Lake, a headwaters of West Branch of Chocolay River [sec. 29 and 31-32, T. 46 N., R. 24 W.], June 9, 1926. Species: 20, 22, 38, 42, 59, 63.
305. Independence Lake [sec. 13-15 and 22-24, T. 51 N., R. 27 W.], July 17, 1926, and July 26, 1936. Species: 14, 20, 35, 39, 48, 50, 55, 58, 59, 61, 62A, 66.
367. Halfway Creek [sec. 11], T. 45 N., R. 25 W., June 27, 1927. Species: 13, 20, 23, 24, 25, 26, 33, 63, 69.
368. Witch Lake, [near] Witch Lake Depot, sec. 23-24 [T. 45 N., R. 30 W.], June 29, 1927. Species: 20, 24, 29, 33, 41, 59, 63, 66.
369. Witch Creek (outlet of Witch Lake) [T. 45 N., R. 30 W.], June 29, 1927. Species: 23, 26, 29, 63.
564. Foster Creek, near M-15 [sec. 35, T. 47 N., R. 24 W.], May 21, 1928. Species: 13.
568. Escanaba River, at Gwinn [sec. 21, T. 45 N., R. 25 W.], May 23, 1928, and June 4, 1933. Species: 10, 20, 23, 24, 30, 33, 42, 66, 69.
571. Dead River, Hoist Dam [sec. 8-9 and 16-17, T. 48 N., R. 26 W.], June 16, 1928. Species: 20, 23, 24, 26, 29, 33, 42, 59.
572. Little Dead River, sec. 17, T. 48 N., R. 27 W., July 25, 1926, and June 16, 1928. Species: 10, 20, 23, 23 x 33, 24, 26, 29, 33, 38, 40, 42, 50, 53, 59, 66, 69.
573. Barnhart Creek, sec. 1 and 12, T. 48 N., R. 28 W., July 25, 1926, and June 16, 1928. Species: 8, 10, 20, 23, 24, 25, 27A, 29, 33, 38, 40, 53, 59, 63, 66, 69.

574. Silver Lead Creek, outlet of Silver Lead Lake [see No. 285] and the headwaters of West Branch Chocoday River [sec. 32, T. 46 N., R. 24 W.], June 5, 1926, June 27, 1927, and June 19, 1928. Species: 10, 20, 23, 24, 26, 29, 42, 59, 63, 65, 66, 69.
576. Bass Lake, Gwinn, sec. 25, 30-31, and 36, T. 45 N., R. 24-25 W., Sept. 13, 1924, June 22, 1928, and Aug. 29, 1935. Species: 13, 38, 41, 42, 50, 51, 53, 54, 59, 62A, 63.
578. Mehl (Meal) Lake, sec. 24-25, T. 45 N., R. 25 W., June 22, 1928, and June 16, 1936. Species: 41, 59, 62A, 63, 66.
579. Horseshoe Lake, near Negaunee [sec. 27, T. 48 N., R. 26 W.], June 15, 1923, and June 27, 1928. Species: 25, 26, 69.
580. Stream near Horseshoe Lake, on M-25, sec. 22 [and 27], T. 48 N., [R. 26 W.], June 27, 1928. Species: 10.
587. East Branch Chocoday River [sec. 14 and 23, T. 46 N., R. 24 W.], July 6, 1928. Species: 9, 10, 30.
588. West Branch Chocoday River [sec. 22-23, T. 46 N., R. 24 W.], June 6, 1928. Species: 10, 13, 66.
593. Nelson Creek, on M-28, sec. 28 [and 33], T. 46 N., R. 23 W., July 8, 1928, and July 21, 1936. Species: 13, 20, 23, 24, 25, 26, 29, 40, 42, 66, 69.
594. McMaster (Dukes) Creek, sec. 10-11, T. 45 N., R. 23 W., July 8, 1928, and July 22, 1930. Species: 13, 20, 23, 24, 29, 69.
595. Huber Creek, sec. 27, T. 45 N., R. 23 W., July 8, 1928, and June 16, 1936. Species: 10, 13, 20, 23, 24, 26, 29, 33, 69.
596. [Sucker Creek], sec. 34-35, T. 45 N., R. 23 W., July 8, 1928. Species: 10, 13, 20, 23, 24, 29, 66, 69.
597. Werners (Warner) Creek, sec. 2-3, T. 44 N., R. 23 W., July 8, 1928, July 22, 1930, and June 16, 1936. Species: 10, 20, 23, 29, 30, 33, 66.
598. Lakewood Bayou [sec. 5], T. 47 N., R. 24 W., July 10, 1922, July 20, 1924, July 16, 1925, July 9, 1928, and July 16, 1930. Species: 13, 25, 26, 42, 63, 69.
606. Stream, at forest experiment station, sec. 26 and 36, T. 46 N., R. 23 W., July 23, 1928. Species: 10, 23, 24, 29, 30, 69.
607. Nelson Creek, at highway, sec. 12, T. 46 N., R. 24 W., July 23, 1928, and Aug. 29, 1935. Species: 9, 10, 20, 22, 23, 24, 26, 29, 30, 33, 42.
654. Crooked Lake, [tributary to] Bass or Anderson Lake [sec. 29-30, T. 45 N., R. 26 W.], July 12, 1929. Species: 41, 63, 65, 69.
655. Bass (Anderson) Lake [sec. 29-30, T. 45 N., R. 26 W.], July 12, 1929. Species: 41, 51, 59, 63, 65, 69.
656. Pike (Maitland) Lake, a headwaters of Chandler Brook [sec. 28-29, T. 45 N., R. 26 W.], July 12, 1929. Species: 20, 24, 25, 29, 38, 41, 51, 59, 62A, 63, 66, 69.
657. Pratt Lake, tributary to Pike Lake [sec. 29, T. 45 N., R. 26 W.], July 12, 1929. Species: 23, 24, 29, 41, 51, 59, 62A, 63, 69.
658. Spring Lake, headwaters of Pratt and Pike lakes [sec. 29, T. 45 N., R. 26 W.], July 12, 1929. Species: 23.



659. Johnson Lake,  $\frac{3}{4}$  mi. south of New Swanzy [sec. 27, T. 45 N., R. 25 W.], July 13, 1929. Species: 20, 24, 26, 38, 50, 59, 63.
660. Stream, southeast of Johnson Lake, Gwinn [sec. 27, T. 45 N., R. 25 W.], July 13, 1929. Species: 24, 26, 38, 42.
661. [East Branch of Chocoday River], " $3\frac{1}{2}$  mi. N. [northeast] of Little Lake on Carls [h]end Road" [sec. 11, T. 45 N., R. 24 W.], July 13, 1929. Species: 10.
707. Little Shag Lake [sec. 31 and 36], T. 45 N., R. 25-26 W., Aug. 2, 1930. Species: 51, 59.
725. Carp River, at prison water plant [sec. 36, T. 48 N., R. 25 W.], May 12, 1928. Species: 9, 66.
726. Carp River, on Sands road back of county poor farm [sec. 34, T. 48 N., R. 25 W.], July 25, 1923, and July 9, 1936. Species: 9, 10, 20.
727. Fish (Hattie) Lake [sec. 5-6 and 8, T. 47 N., R. 29 W.], June 24, 1936. Species: 22, 33, 41, 44, 50, 59, 63, 66.
728. Hogans Lake [sec. 26, T. 45 N., R. 30 W.], July 11, 1936. Species: 22, 59.
729. Horseshoe Lake, sec. 22, T. 45 N., R. 30 W., July 11, 1936. Species: 20, 41, 51.
730. Bat Lake, sec. 23, T. 45 N., R. 30 W., July 11, 1936. Species: 20, 39, 41, 51, 52, 53, 54, 59, 63, 66.
731. Island Lake, sec. [22 and] 27, T. 45 N., R. 30 W., July 11, 1936. Species: 41, 51, 59.
732. Brocky Lake [sec. 6-7, T. 48 N., R. 28 W.], June 23, 1938. Species: 23, 25 x 26, 29, 33, 41.
733. Little Garlic River [sec. 2-3, T. 49 N., R. 26 W.], Aug. 6, 1935. Species: 9, 10, 30, 66.
734. Harlow Creek [sec. 24, T. 49 N., R. 26 W.], Aug. 12, 1922. Species: 9, 10.
1019. Picqua Pond, in Marquette, June 1929. Species: 69.
1020. Chocoday River, below main road south of Marquette [sec. 5-6, T. 47 N., R. 24 W.], July 15, 1923. Species: 20, 30, 66.
1021. Lake Superior, at Lakewood [sec. 5, T. 47 N., R. 24 W.], July 16, 1925. Species: 70.
1022. Cedar Creek, near hatchery [approximately in sec. 19, T. 47 N., R. 24 W.], March 30, 1926. Species: 67.
5132. Lake Superior, Shot Point [sec. 3, T. 47 N., R. 23 W.], Nov. 28, 1930. Species: 57.
5140. Lake Superior, Marquette Bay [T. 48 N., R. 25 W.], Sept. 20, 1921, May 3, 1925, Dec. 23, 1929, and Dec. 12, 1930. Species: 31, 49, 66, 67.

#### Menominee County

The fish survey of this county was very extensive. Most of the collections were made in 1927 in conjunction with the Michigan Land Economic Survey, and for nearly all these, detailed notes and locality data were kept

by Lowe in notebooks and on Department of Conservation survey forms. In addition, two maps are available that indicate most sites of the stations for 1927.

352. Resort (Big Club House) Lake, sec. 13, 24, and 18-19, T. 35 N., R. 28-29 W., Sept. 16, 1926. Species: 14, 33, 34, 38, 41, 51, 53, 54, 59, 62A.
353. Long Lake, sec. 24, T. 35 N., R. 29 W., Sept. 16, 1926. Species: 19, 20, 33, 34, 37, 39, 41, 51, 55, 56, 62A, 63, 65, 66.
354. Bass Lake, sec. 19, T. 35 N., R. 28 W., Sept. 16, 1926, and Sept. 2, 1927. Species: 13, 20, 23, 33, 34, 38, 41, 43, 45, 46, 47, 51, 53, 54, 55, 59, 62A, 63, 65.
355. Bakers Lake, sec. 19, T. 35 N., R. 28 W., Sept. 16, 1926. Species: 53, 53 x 54, 54, 63.
356. [Springer Creek], sec. 1 and 12, T. 32 N., R. 27 W., Sept. 17, 1926, and July 3, 1927. Species: 13, 20, 23, 27A, 30, 33, 35, 38, 41, 47.
359. Little River, sec. 2 and 11, T. 33 N., R. 27 W., Sept. 17, 1926, and July 6, 1927. Species: 13, 14, 20, 22, 33, 38, 41, 43, 60, 62A, 66.
370. Kelley Creek, sec. 9, T. 33 N., R. 27 W., July 1, 1927. Species: 13, 29, 62A, 63.
371. Kelley Creek, sec. 32, T. 33 N., R. 27 W., July 1, 1927. Species: 13, 18, 20, 22, 23, 29, 33, 38, 39, 41, 60, 62A.
372. Kelley Creek and Little River, sec. 5 and 32, T. 32-33 N., R. 27 W., July 1, 1927. Species: 13, 14, 20, 22, 33, 34, 38, 39, 41, 43, 55, 62A.
373. Menominee River, above Chappee Rapids, sec. 14, T. 32 N., R. 28 W., July 2, 1927. Species: 13, 14, 15, 17, 20, 23, 32, 33, 37, 39, 41, 50, 55, 58, 62A.
- 373A. Ostrango Creek, sec. 35, T. 33 N., R. 28 W., July 2, 1927. Species: 1, 13.
374. Birch Creek, sec. 7, T. 32 N., R. 26 W., July 3, 1927. Species: 13, 20, 27A, 33, 34, 35, 37, 38, 39, 41, 55, 59, 61, 66.
375. Beattie Creek, sec. 20-21 and 28, T. 33 N., R. 26 W., Sept. 17, 1926, and July 3, 1927. Species: 14, 20, 27A, 30, 33, 34, 37, 38, 41, 45, 55, 59, 66.
376. Arthur Bay Creek, sec. 30, T. 34 N., R. 25 W., July 4, 1927. Species: 20, 27A, 29, 30, 33, 41.
377. Fowler Creek, sec. 19-20, T. 34 N., R. 25 W., Sept. 17, 1926, and July 4, 1927. Species: 13, 20, 23, 27A, 30, 33, 41, 66, 69.
378. Bailey Creek, sec. 14, T. 33 N., R. 26 W., July 4, 1927. Species: 13, 20, 27A, 33, 35, 59, 66, 69.
379. Turtle Creek, sec. 23, T. 32 N., R. 27 W., July 5, 1927. Species: 20, 23, 27A, 30, 33, 35, 38, 59, 69.
380. Johnson Creek, sec. 1, T. 33 N., R. 26 W., July 6, 1927. Species: 20, 27A, 30, 33, 35, 59, 61, 66.
382. Sugar Creek, sec. 4, T. 34 N., R. 25 W., July 6, 1927. Species: 13, 20, 27A, 33, 59, 69.
383. Auger Creek, sec. 26-27, T. 35 N., R. 25 W., July 6, 1927. Species: 20, 24, 59.

385. Big Brook, sec. 9, T. 35 N., R. 26 W., July 7, 1927. Species: 13, 20, 23, 24, 25, 26, 28, 29, 33, 38, 59, 60, 62A x 62B, 63, 69.
386. Wagner (Mud or Liberty) Lake, sec. 4, T. 35 N., R. 26 W., July 7, 1927. Species: 24, 25, 38, 44, 53.
387. Big Brook, sec. 29, T. 35 N., R. 26 W., July 8, 1927. Species: 13, 20, 23, 23 x 33, 24, 25, 26, 28, 29, 33, 38, 42, 59, 60, 62A x 62B, 63, 69.
388. Grant Brook, sec. 28, T. 35 N., R. 26 W., July 8, 1927. Species: 13, 69.
389. Weary Brook, sec. 22, T. 35 N., R. 26 W., July 8, 1927. Species: 13, 69.
390. Crystal Brook, sec. 23 and 26, T. 35 N., R. 26 W., July 8, 1927. Species: 13, 33.
391. Walton (Little Cedar) River, sec. 22, T. 35 N., R. 25 W., July 8, 1927. Species: 14, 20, 22, 23, 28, 32, 33, 41, 60, 61, 62A x 62B.
392. Big Brook, sec. 28, T. 35 N., R. 26 W., July 8, 1927. Species: 13, 14, 20, 23, 24, 26, 28, 28 x 33, 29, 30, 33, 38, 42, 55, 60, 62A, 63, 64, 69.
393. Big Brook, sec. 33-34, T. 35 N., R. 26 W., July 11, 1927. Species: 13, 20, 23, 24, 25, 26, 29, 33, 38, 42, 59, 60, 62A x 62B, 63, 69.
394. Big Brook (headwaters), sec. 15 and 22, T. 36 N., R. 26 W., July 13, 1927. Species: 10, 13, 62A, 63, 69.
396. Dry Creek, sec. 24-25, T. 36 N., R. 26 W., July 13, 1927. Species: 13, 20, 23, 24, 25, 26, 29, 69.
397. Mill Creek, sec. 19, T. 36 N., R. 25 W., July 13, 1927. Species: 10, 13, 66, 69.
398. Elwood Creek, sec. 30, T. 36 N., R. 25 W., July 13, 1927. Species: 66, 69.
399. West Elwood Creek, sec. 1-2, T. 35 N., R. 26 W., July 13, 1927. Species: 10, 20, 23, 24, 29, 69.
400. Hays Creek, sec. 31, T. 37 N., R. 26 W., July 14, 1927. Species: 13, 69.
401. Porterfield Creek, sec. 7, T. 37 N., R. 26 W., July 14, 1927. Species: 13, 20, 22, 23, 24, 26, 29, 33, 38, 40 (paratype), 62A, 69.
402. Holmes Creek, sec. 12, T. 37 N., R. 27 W., July 14, 1927. Species: 13, 20, 22, 23, 26, 29, 32, 33, 38, 62A, 66, 69.
403. Laurin Creek, sec. 11, T. 37 N., R. 27 W., July 14, 1927. Species: 13, 23, 24, 25, 26, 29, 69.
404. Little Cedar River, sec. 10, T. 37 N., R. 27 W., July 14, 1927. Species: 19, 20, 22, 23, 28, 29, 32, 33, 41, 60, 62A.
405. Laurin Creek, sec. 15, T. 37 N., R. 27 W., July 14, 1927. Species: 10, 13, 20, 22, 24, 33, 62A, 66, 69.
406. Holmes Creek, sec. 24, T. 37 N., R. 27 W., July 14, 1927. Species: 10, 13, 20, 22, 23, 29, 33, 62A, 66, 69.
407. Hays Creek, sec. 17, T. 36 N., R. 26 W., July 15, 1927. Species: 13, 20, 22, 23, 26, 29, 33, 38, 41, 42, 44, 60, 62A, 66, 69.
408. Boyle Creek, sec. 17, T. 36 N., R. 26 W., July 15, 1927. Species: 13, 20, 22, 23, 33, 38, 63, 65.

409. Devils Creek, sec. 8 and 17, T. 36 N., R. 25 W., July 15, 1927. Species: 13, 20, 23, 24, 28, 29, 33, 38, 41, 60, 62A x 62B, 64, 65, 66.
412. Crooked Creek (headwaters), sec. 22, T. 37 N., R. 26 W., July 16, 1927. Species: 10, 29, 66.
413. Crooked Creek, sec. 24, T. 37 N., R. 26 W., July 16, 1927. Species: 10, 20, 23, 24, 29, 33, 60, 62A, 66.
414. Crooked Creek, sec. 22, T. 37 N., R. 25 W., July 16, 1927. Species: 20, 23, 24, 29, 33, 62A.
- 414A. Lake Ann (Deep Shaky Lake), sec. 3, T. 35 N., R. 28 W., July 19, 1927. Species: 13, 33, 34, 38, 41, 46, 51, 53, 55, 59, 62A, 65, 69.
- 414B. Lake Mary (Shallow Shaky Lake), sec. 3, T. 35 N., R. 28 W., July 19, 1927. Species: 46, 51, 53 x 54, 54, 59, 63.
415. Big Shaky River, sec. 33, T. 36 N., R. 28 W., July 19, 1927. Species: 8, 10, 20, 29, 33, 62A, 66.
416. Little Shaky River, sec. 10, T. 35 N., R. 28 W., July 19, 1927. Species: 29, 33, 55, 64, 65.
418. Blom Creek, sec. 34, T. 38 N., R. 28 W., July 20, 1927. Species: 66.
419. Bird Creek, sec. 2-3, T. 37 N., R. 28 W., July 20, 1927. Species: 10, 23, 29, 66.
420. Pemene Creek, sec. 2-3, T. 37 N., R. 28 W., July 20, 1927. Species: 10, 29, 66.
421. De Hass Creek, sec. 14, T. 37 N., R. 28 W., July 20, 1927. Species: 10, 13, 66.
422. Hammond Creek, sec. 23-24, T. 37 N., R. 28 W., July 20, 1927. Species: 66.
423. Olson Brook, sec. 4, T. 36 N., R. 24 W., July 26, 1927. Species: 20, 30.
424. Fox Creek, sec. 20, T. 36 N., R. 24 W., July 26, 1927. Species: 20, 23, 27A, 30, 39, 66, 69.
425. Deer Creek, sec. 29-30, T. 36 N., R. 24 W., July 26, 1927. Species: 14, 33, 35, 62A, 66.
426. Walton (Little Cedar) River, sec. 23, T. 35 N., R. 25 W., July 26, 1927. Species: 20, 22, 28, 33, 34, 38, 41, 50, 55, 62A x 62B.
427. Big Cedar River, sec. 11, T. 35 N., R. 25 W., July 26, 1927. Species: 20, 28, 29, 30, 33, 41, 50, 60, 62A.
428. Big Cedar River, sec. 3, T. 36 N., R. 25 W., July 27, 1927. Species: 20, 23, 29, 60, 62A x 62B.
429. Brill Brook, sec. 34, T. 37 N., R. 25 W., July 27, 1927. Species: 13, 69.
430. De Graves Creek, sec. 27, T. 37 N., R. 25 W., July 27, 1927. Species: 10, 13, 20, 24, 30, 66, 69.
431. De Pas Creek, sec. 2 and 11, T. 37 N., R. 25 W., July 27, 1927. Species: 10, 13, 20, 23, 24, 26, 29, 33, 66, 69.
432. Big Cedar River, at Jam Dam Bridge, sec. 10-11, T. 37 N., R. 25 W., July 27, 1927. Species: 13, 20, 23, 24, 26, 28, 29, 33, 60, 69.
434. Porterfield Creek, sec. 36, T. 37 N., R. 27 W., July 28, 1927. Species: 13, 20, 22, 23, 28, 29, 33, 41, 62A, 64, 66.

435. Little Shaky River, sec. 7 and 12, T. 36 N., R. 27-28 W., July 28, 1927. Species: 8, 10, 33.
436. Big Shaky River, sec. 1 and 36, T. 36-37 N., R. 28 W., July 28, 1927. Species: 13.
437. Big Shaky River, sec. 20 and 29, T. 37 N., R. 27 W., July 28, 1927. Species: 13, 69.
438. Holmes Creek, sec. 25 and 35-36, T. 37 N., R. 27 W., July 29, 1927. Species: 10, 20, 22, 23, 26, 29, 33, 38, 41, 62A, 66, 69.
439. Holmes and Porterfield creeks, sec. 35-36, T. 37 N., R. 27 W., July 29, 1927. Species: 20, 23, 29, 30, 33, 41, 62A, 64.
441. Little Cedar River, sec. 27 and 34, T. 37 N., R. 27 W., July 29, 1927. Species: 19, 20, 23, 28, 29, 33, 41, 60, 62A, 64.
442. Carney Creek [sec. 19, T. 37 N., R. 26 W.], July 29, 1927. Species: 20, 22, 24, 26, 33, 69.
443. Phillips (Hay) Creek, sec. 20 and 29, T. 35 N., R. 27 W., Aug. 2, 1927. Species: 13, 14, 20, 41, 66.
444. Phillips Creek, sec. 16, T. 35 N., R. 27 W., Aug. 2, 1927. Species: 10, 66.
445. Wood Brook, sec. 24 and 30, T. 35 N., R. 27-28 W., Aug. 2, 1927. Species: 14, 20.
447. Burke Creek, sec. 29, T. 35 N., R. 28 W., Aug. 2, 1927. Species: 10.
449. Koss Creek, sec. 36, T. 35 N., R. 28 W., Aug. 2, 1927. Species: 13.
450. Phillips Creek, sec. 32, T. 35 N., R. 27 W., Aug. 2, 1927. Species: 66.
451. Hays Creek, sec. 1, T. 35 N., R. 27 W., Aug. 3, 1927. Species: 13, 20, 22, 23, 28, 29, 33, 38, 41, 55, 60, 62A, 69.
452. Little River, sec. 12-13, T. 34 N., R. 27 W., Aug. 3, 1927. Species: 13, 20, 23, 29, 33, 38, 66.
453. Hayward Creek, sec. 8-9, T. 34 N., R. 26 W., Aug. 3, 1927. Species: 13, 63.
454. Hayward Creek, sec. 6-7, T. 34 N., R. 26 W., Aug. 3, 1927. Species: 13.
455. Lindberg Creek, sec. 1 and 12, T. 34 N., R. 27 W., Aug. 3, 1927. Species: 13, 38, 69.
456. Little River, sec. 1 and 12, T. 34 N., R. 27 W., Aug. 3, 1927. Species: 13, 23, 29, 38.
457. Little River, sec. 23, T. 34 N., R. 27 W., Aug. 5, 1927. Species: 10, 20, 23, 29, 33, 38, 62A, 66.
458. Little River, sec. 23 and 26, T. 34 N., R. 27 W., Aug. 5, 1927. Species: 13, 20, 23, 29, 33, 38, 62A, 63, 66.
459. Bad Water Creek, sec. 19, T. 34 N., R. 26 W., Aug. 5, 1927. Species: 13.
460. Little River, sec. 24-25, T. 34 N., R. 27 W., Aug. 5, 1927. Species: 13, 14, 20, 23, 33, 38, 41, 62A, 63, 66.
461. Hansen Creek, sec. 25 and 30, T. 34 N., R. 26-27 W., Aug. 5, 1927. Species: 13, 14, 23, 33, 62A, 63.
463. Menominee River, sec. 9, T. 34 N., R. 27 W., Aug. 6, 1927. Species: 18, 19, 20, 22, 30, 33, 37, 39, 43, 48, 50, 60, 61, 62A, 64.

464. Potter Creek, sec. 23, T. 35 N., R. 27 W., Aug. 6, 1927. Species: 13, 20, 22, 23, 29, 33, 50.
465. Ross Creek, sec. 28, T. 36 N., R. 27 W., Aug. 6, 1927. Species: 10, 20, 22, 23, 24, 25, 29, 33, 66, 69.
466. Ross Creek, sec. 34, T. 36 N., R. 27 W., Aug. 6, 1927. Species: 10, 20, 22, 23, 26, 28, 29, 30, 33, 62A, 64, 66.
467. Snow Creek, sec. 2, T. 36 N., R. 27 W., Aug. 6, 1927. Species: 13, 66.
- 467A. Little Cedar River, at and below mouth of Snow Creek [sec. 2 and 11, T. 36 N., R. 27 W.], Aug. 6, 1927. Species: 19, 23, 28, 29, 60, 64.
468. Hugo's Creek, sec. 14, T. 35 N., R. 27 W., Aug. 7, 1927. Species: 20, 22, 23, 24, 28, 29, 32 x 33, 33, 50, 60, 62A, 64.
469. Little Cedar River, sec. 14, T. 35 N., R. 27 W., Aug. 7, 1927. Species: 19, 20, 22, 23, 28, 29, 32, 33, 39, 41, 48, 50, 60, 62A.
470. Harter Creek, sec. 1-2, T. 38 N., R. 28 W., Aug. 9, 1927. Species: 10, 13, 26, 29, 33, 66.
471. Carlson Creek, sec. 2 and 11, T. 38 N., R. 28 W., Aug. 9, 1927. Species: 10.
473. Turner Creek, sec. 3, T. 38 N., R. 28 W., Aug. 9, 1927. Species: 10.
474. Hamilton Creek, sec. 4, T. 38 N., R. 28 W., Aug. 9, 1927. Species: 10, 13, 66, 69.
475. Harter (Hay) Creek, sec. 7, T. 38 N., R. 28 W., Aug. 9, 1927. Species: 10, 14, 20.
476. Faithorn (Holmes) Creek, sec. 16, T. 38 N., R. 28 W., Aug. 9, 1927. Species: 10, 13, 20, 23, 24, 38, 63, 66, 69.
478. Brandts Creek, sec. 28 and 33, T. 38 N., R. 28 W., Aug. 10, 1927. Species: 13.
479. Merryman Lake, sec. 32, T. 38 N., R. 28 W., Aug. 10, 1927. Species: 38, 42, 63, 69.
481. Little Cedar River, sec. 28 and 33, T. 39 N., R. 27 W., Aug. 10, 1927. Species: 10, 13, 20, 22, 24, 26, 29, 63, 66, 69.
482. Beaver Dam Creek, sec. 26, T. 39 N., R. 27 W., Aug. 10, 1927. Species: 69.
483. Vega Creek, sec. 11, T. 39 N., R. 27 W., Aug. 10, 1927. Species: 10, 24, 25, 66, 69.
485. Big Cedar River, sec. 33, T. 39 N., R. 26 W., Aug. 11, 1927. Species: 13, 20, 23, 26, 33, 60, 62A, 63, 69.
486. West Branch of Big Cedar River, sec. 20, T. 39 N., R. 26 W., Aug. 11, 1927. Species: 13, 19, 20, 23, 24, 26, 28, 29, 30, 33, 38, 60, 62A, 64, 66, 69.
487. Menard Creek (near mouth), sec. 20, T. 39 N., R. 26 W., Aug. 11, 1927. Species: 29.
488. Andrews Creek, sec. 17, T. 40 N., R. 26 W., Aug. 11, 1927. Species: 10.
489. Big Cedar River, sec. 17-18, T. 40 N., R. 26 W., Aug. 11, 1927. Species: 10, 20, 23, 24, 26, 29, 30, 33, 60, 62A, 66.

490. Camp Two Creek, sec. 10, T. 38 N., R. 27 W., Aug. 12, 1927. Species: 10, 13, 14, 20, 22, 23, 24, 29, 33, 63, 66, 69.
491. Wilson Creek, sec. 12, T. 38 N., R. 26 W., Aug. 12, 1927. Species: 19, 20, 23, 24, 26, 28, 29, 30, 33, 60, 62A, 64.
492. Wilson Creek, sec. 36, T. 39 N., R. 26 W., Aug. 12, 1927. Species: 10, 13, 20, 23, 24, 29, 30, 33, 60, 62A, 63, 66, 69.
495. Wilson Creek, sec. 25, T. 39 N., R. 26 W., Aug. 12, 1927. Species: 10, 23, 24, 29, 33, 38, 60, 62A, 63, 69.
503. Spruce Lake, sec. 7-8, T. 39 N., R. 27 W., Aug. 24, 1927. Species: 13, 26, 69.
504. Spruce Creek, sec. 8, T. 39 N., R. 27 W., Aug. 24, 1927. Species: 26, 40, 63, 69.
506. Forty Seven Mile Creek, sec. 22, T. 39 N., R. 25 W., Aug. 26, 1927. Species: 10, 20, 23, 29, 30, 33, 62A, 64, 66.
507. North Branch of Bergman Creek, sec. 23, T. 39 N., R. 25 W., Aug. 26, 1927. Species: 20, 23, 24, 25, 26, 29, 33, 69.
508. Forty Seven Mile Creek, sec. 10, T. 39 N., R. 25 W., Aug. 26, 1927. Species: 20, 29, 30, 62A, 64, 66.
509. Ten Mile Creek, sec. 2 and 11, T. 39 N., R. 25 W., Aug. 26, 1927. Species: 1, 10, 19, 20, 23, 28, 29, 30, 33, 55, 60, 61, 62A, 64, 66.
511. Ruggles Creek, sec. 8, T. 40 N., R. 25 W., Aug. 27, 1927. Species: 10, 13, 20, 23, 24, 26, 29, 33, 62A, 64, 66, 69.
513. Ten Mile Creek, sec. 18, T. 40 N., R. 25 W., Aug. 27, 1927. Species: 19, 20, 23, 28, 29, 30, 33, 60, 61, 62A, 64, 66, 69.
515. South Branch of West Branch of Ford River, sec. 20, T. 41 N., R. 26 W., Aug. 27, 1927. Species: 13, 20, 23, 24, 25, 26, 28, 29, 33, 40 (paratypes), 69.
516. Ten Mile Creek, sec. 13 and 18, T. 40 N., R. 25-26 W., Aug. 27, 1927. Species: 13, 20, 23, 24, 26, 28, 29, 33, 38, 40 (paratypes), 60, 61, 62A, 64, 69.
520. Beldon (Twenty Four Mile) Creek, sec. 15, T. 40 N., R. 25 W., Aug. 28, 1927. Species: 69.
521. Leaper's Lake, sec. 17, T. 39 N., R. 27 W., Aug. 29, 1927. Species: 26, 42, 63, 69.
525. Alder (Wheelers) Creek, sec. 17, T. 38 N., R. 26 W., Aug. 30, 1927. Species: 13, 20, 23, 25, 26, 33, 38, 69.
526. Reed Creek, sec. 21, T. 38 N., R. 26 W., Aug. 30, 1927. Species: 13, 20, 23, 24, 25, 26, 29, 38, 63, 66, 69.
527. Kitchners Lake, sec. 24-25, T. 38 N., R. 26 W., Aug. 30, 1927. Species: 26, 38, 42, 52, 59, 63.
528. Knapp (Kitchners) Creek, sec. 30, T. 38 N., R. 25 W., Aug. 30, 1927. Species: 10, 13, 20, 23, 25, 66.
529. Gordon Creek, sec. 29, T. 38 N., R. 25 W., Aug. 30, 1927. Species: 13, 20, 23, 24, 26, 29, 30, 33, 62A, 64, 66.
530. Gordon Creek (headwaters), sec. 34, T. 38 N., R. 26 W., Aug. 30, 1927. Species: 10, 66, 69.
532. Little Shaky River, sec. 34, T. 36 N., R. 28 W., Sept. 1, 1927. Species: 8, 10.

534. Swanson Creek, sec. 35, T. 36 N., R. 28 W., Sept. 1, 1927. Species: 13, 14, 20, 23, 33, 45, 69.
536. Shaky River, sec. 11, T. 36 N., R. 28 W., Sept. 1, 1927. Species: 2, 23, 29.
537. Little Shaky River, sec. 13, T. 36 N., R. 28 W., Sept. 1, 1927. Species: 8, 10, 13, 69.
- 537A. East Lake, sec. 18-19, T. 35 N., R. 28 W., Sept. 2, 1927. Species: 13, 22, 34, 41, 46, 51, 53, 54, 55, 59, 62A, 65.
538. Johnson (Rice) Lake, sec. 16, T. 35 N., R. 28 W., Sept. 1, 1927. Species: 13, 20, 22, 33, 34, 41, 43, 46, 51, 53, 55, 59, 62A.
539. Shaky River, sec. 23, T. 35 N., R. 29 W., Sept. 7, 1927. Species: 14, 19, 20, 22, 23, 33, 34, 37, 38, 39, 41, 43, 46, 51, 53, 53 x 54, 54, 55, 56, 59, 61, 62A, 65.
540. Spring Lake, sec. 18, T. 35 N., R. 28 W., Sept. 7, 1927. Species: 26, 42, 63, 69.
542. Becker's (Mud) Lake, sec. 18, T. 35 N., R. 28 W., Sept. 7, 1927. Species: 13.

#### Ontonagon County

The data for collections from this county are meager and consist only of information given on the collection labels and a few brief notes. Lowe's field map is not available.

4. Little Iron River, at mouth [sec. 11-12, T. 51 N., R. 42 W.], Aug. 9, 1923. Species: 20, 23, 28, 29, 30, 33, 62A, 66, 69.
5. Big Iron River, at mouth [sec. 12, T. 51 N., R. 42 W.], Aug. 9 and 12, 1923. Species: 20, 23, 28, 29, 30, 33, 59, 62A, 69.
60. Bluff Creek, just above Craigsmere [sec. 6 and 31, T. 46-47 N., R. 39 W.], Aug. 14, 1923. Species: 10, 20, 29, 66.
61. Sucker Creek, [near] Paulding [T. 46 N., R. 40 W.], Aug. 13 and 23, 1923. Species: 10, 20, 29, 30, 66.
62. Sucker Creek, below mouth Big Bluff Creek [sec. 36, T. 47 N., R. 40 W.], Aug. 14, 1923. Species: 10.
233. Little Bluff Creek, [near] Paulding [T. 46 N., R. 39 W.], Aug. 15, 1923. Species: 10.
272. Union River [sec. 15 and/or 22, T. 51 N., R. 42 W.], Aug. 8, 1923. Species: 10, 30, 37, 62A, 69.

#### Schoolcraft County

Locality data for collections from this county are given in detail by Lowe on labels or in notebooks or the locality is indicated on one of his maps. Two county maps and a map of the Blaney Park area (collections 615 through 630, 633 and 710) are available.

603. Indian Lake, T. 41-42 N., R. 16 W., July 15, 1928. Species: 20, 35, 37, 39, 41, 59, 60, 62B.



615. Midden (Laurel or Cassandra) Pond outlet, sec. 22, T. 43 N., R. 13 W., Aug. 24, 1928. Species: 13, 23, 24, 25, 26, 29, 38.
616. Bear Creek, below Lake Ann Louise, sec. 16, T. 43 N., R. 13 W., Aug. 24, 29, and 31, 1928, July 27 and Aug. 7, 1929, and Aug. 21, 1930. Species: 10, 13, 14, 20, 22, 23, 24, 29, 38, 41, 48, 59, 60, 62A, 63, 66, 69.
618. Chip Lake, sec. 4 and 9, T. 43 N., R. 13 W., Aug. 25, 1928. Species: 25, 26, 38, 42, 63, 69.
620. Ford Lake, sec. 2-3, T. 43 N., R. 13 W., Aug. 29, 1928. Species: 13, 22, 38, 42, 59, 63.
622. Tee (Three Bay) Lake, sec. 1-2 and 12, T. 43 N., R. 13 W., Aug. 30, 1928. Species: 59.
623. Ford Creek, sec. 3, T. 43 N., R. 13 W., Aug. 30, 1928, and Aug. 30, 1931. Species: 10, 13, 20, 24, 66.
624. Moon Lake, sec. 12-13, T. 43 N., R. 13 W., Aug. 31, 1928. Species: 22, 38, 47.
625. Lake Ann Louise, sec. 15-16, T. 43 N., R. 13 W., Aug. 31, 1928. Species: 22, 29, 38.
627. Chip Lake (outlet), sec. 4, T. 43 N., R. 13 W., Aug. 25, 1928. Species: 24, 26, 29.
628. Little Bear Creek, on Blaney Park Golf Course [sec. 21-22, T. 43 N., R. 13 W.], Sept. 11, 1928. Species: 10.
630. Mezik Creek, sec. 5-6, T. 43 N., R. 13 W., Sept. 1, 1928. Species: 13, 20, 24, 26, 38, 66, 69.
632. McDonald Lake [sec. 5-6 and 30-32, T. 41-42 N., R. 13 W.], Sept. 2, 1928, and July 28 and Aug. 12, 1929. Species: 14, 20, 22, 33, 37, 39, 41, 43, 51, 55, 59, 62A, 69.
633. Rose Creek, sec. 24, T. 43 N., R. 13 W., Sept. 11, 1928. Species: 10.
680. Gulliver Lake [sec. 1-3 and 34-36, T. 41-42 N., R. 14 W.], Aug. 4, 1928, and Aug. 12, 1929. Species: 20, 33, 37, 39, 41, 50, 59, 62A, 63.
710. Bear Creek, above Lake Ann Louise [sec. 14-15, T. 43 N., R. 13 W.], Aug. 22, 1930. Species: 20, 22, 23, 38, 60, 62A, 63, 66.

## THE FISHES

The Lowe material recorded here, except for a few shoreward collections from Lake Superior, came entirely from the inland waters of the Upper Peninsula of Michigan. It includes 69 species and is from 14 of the 15 counties. Lowe did not collect in Gogebic County.

Several species, not taken by Lowe in the Upper Peninsula, have recently become established in its inland waters through introductions or natural invasion or are known from the adjacent Great Lakes. In addition, an endemic cisco (*Coregonus hubbsi*) has been described from Ives Lake, Marquette County (Koelz, 1929); the bowfin (*Amia calva* Linnaeus) has been recorded (Hubbs and Lagler, 1947: 32) from the outlet of St. Marys River, Chippewa County, and is reported from Milleccoquins Lake, Mackinac

County (in a letter from Leland R. Anderson, fisheries supervisor, Michigan Department of Conservation), and the muskellunge (*Esox masquinongy* Mitchill) has been taken occasionally from widely scattered places in the peninsula.

Species of known introduction in the Upper Peninsula and represented in this collection are *Salmo trutta* and *Salmo gairdneri*. In addition, the following may be in the area solely as a result of introductions: *Ictalurus melas melas*, *Micropterus salmoides salmoides*, *Lepomis cyanellus*, *Lepomis macrochirus*, and *Pomoxis nigromaculatus*. The other species obtained by Lowe are believed to be native to at least some part of the region.

In the species list that follows, brief generalized statements of abundance and distribution are given. These are based on the Lowe collection, other Michigan material that I have examined, and interpretation of records and unpublished distribution maps in the Museum of Zoology. For their use, I wish to thank all those who have contributed toward keeping these maps up to date.

The station numbers at which each species was taken are given following the range statement. Hybrids (among the Cyprinidae and Centrarchidae) are listed under their respective family.

Most names are those in current use (Bailey, 1951; Legendre, 1953; Morton and Miller, 1954), with certain changes indicated here. Except for introduced species and salmonoids, trinomials are avoided wherever the available evidence does not justify their use or indicates other than subspecies.

## ANNOTATED LIST OF SPECIES

### PETROMYZONTIDAE

1. *Ichthyomyzon* species. The material listed here consists of ammocoetes that could not be identified to species; it probably contains both kinds of *Ichthyomyzon* known from the Upper Peninsula.  
Lowe records (by counties): Baraga 147, 669; Houghton 143, 149, 171, 302; Menominee 373A, 509.
2. *Ichthyomyzon fossor* Reighard and Cummins — Northern brook lamprey. There are few records, but they suggest that this nonparasitic lamprey is distributed over the Upper Peninsula.  
Lowe records (by counties): Houghton 143; Menominee 536.
3. *Ichthyomyzon unicuspis* Hubbs and Trautman — Silver lamprey. There are few specimens in collections, but this native and parasitic species is probably distributed throughout the Upper Peninsula.  
Lowe record: Alger County 5141.
4. *Lampetra lamottei* (LeSueur) — American brook lamprey. The peninsular distribution of this species is obscure. Recent collections made with electric shocking devices indicate that it is common in many streams of the eastern portion of the area.  
Lowe record: Alger County 2.

## ACIPENSERIDAE

5. *Acipenser fulvescens* Rafinesque — Lake sturgeon. Few sturgeon from Michigan waters are in museums; the specimens in the Museum of Zoology from the Upper Peninsula are from the Sturgeon River system. The history of the former distribution and abundance of this species in the region is yet to be described. This information is buried chiefly in records of commercial fisheries and in newspaper accounts.  
Lowe record: Houghton County 302.

## COREGONIDAE

6. *Coregonus artedii* LeSueur — Shallowwater cisco. Only a few of the inland lakes of the area are known to support populations of this species. Most of the records have been reported by Koelz.  
Lowe records (by counties): Chippewa 294 (type material of *Leucichthys artedi lowei* Koelz, 1931: 350-51); Houghton 302 (Lowe material reported as *Leucichthys artedi winnipegosis* Koelz, 1931:367); Keweenaw 327 (Lowe material reported as *Leucichthys artedi clemensi* Koelz, 1931:348); Luce 292; Mackinac 301 (type material of *Leucichthys artedi atikamek* Koelz, 1931:326-27).
7. *Coregonus clupeaformis* (Mitchill) — Lake whitefish. This species is found in very few of the inland lakes of the Upper Peninsula.  
Lowe records (by counties): Iron 585 (Lowe material reported as *Coregonus clupeaformis gulliveri* Koelz, 1931:381); Keweenaw 329 (type material of *Coregonus clupeaformis medorae* Koelz, 1931:378-79).

## SALMONIDAE

8. *Salmo trutta* Linnaeus — Brown trout. This introduced trout is spottily distributed throughout the Upper Peninsula.  
Lowe records (by counties): Marquette 207, 573; Menominee 415, 435, 532, 537.
9. *Salmo gairdneri* Richardson — Rainbow trout. The rainbow trout was introduced and is now found over most of the area. Records in the Museum of Zoology are from all counties of the peninsula except Dickinson and Menominee.  
Lowe records (by counties): Alger 2; Baraga 147, 269; Houghton 143, 149, 151, 159, 161, 204, 204A, 613, 664; Keweenaw 308, 319, 323, 347; Mackinac 683; Marquette 7, 224, 587, 607, 725, 726, 733, 734.
10. *Salvelinus fontinalis* (Mitchill) — Brook trout. All information suggests that the brook trout is native to the Upper Peninsula, but the original distribution is not known. Through extensive plantings it is now found in almost all the favorable habitats in the region, and data on file at the Institute for Fisheries Research and the Museum of Zoology indicate its presence in all counties.

Lowe records (by counties): Alger 2; Baraga 147, 269, 671, 696, 697; Dickinson 543-47, 549, 551, 553, 555, 558, 559; Houghton 7, 10, 143, 149, 151, 154, 159, 161, 171, 202, 204, 611-13, 664; Keweenaw 308, 313, 319, 323, 325, 326, 341, 347-49, 500, 501; Luce 298; Mackinac 301B, 676, 683, 685, 691; Marquette 7, 207, 224, 274, 568, 572-74, 580, 587, 588, 595-97, 606, 607, 661, 726, 733, 734; Menominee 394, 397, 399, 405, 406, 412, 413, 415, 419-21, 430, 431, 435, 438, 444, 447, 457, 465, 466, 470, 471, 473-76, 481, 483, 488-90, 492, 495, 506, 509, 511, 528, 530, 532, 537; Ontonagon 60, 62, 233, 272; Schoolcraft 616, 623, 628, 633.

11. *Salvelinus namaycush* (Walbaum)— Lake trout. This species is common only in a few scattered, large inland waters.  
Lowe record: Chippewa County 294.

#### THYMALLIDAE

12. *Thymallus signifer* (Richardson) — American grayling. The grayling commonly is believed to have occurred in the Upper Peninsula of Michigan only in the Otter River system (Mich. Dept. Cons., 1935: 118). However, Ruthven (1906:108) recorded having seen specimens from the Little Carp River, near Lake Superior, in Ontonagon County. Other reports are occasionally received from fishermen but most of these are believed to be based on misidentifications of salmonids or coregonids. In discussing the known Michigan distribution Goode (1884:506) remarked: "The Grayling is said to live also in Portage Lake, in the extreme northern part of the state." Lowe's manuscript notes state: "The grayling was discovered in the Otter River by Mr. Fred Kroll, a fur buyer, in 1884. An Indian had told the trader about a fish called the River Herring. The lumberjack for want of a better name called it the Bastard Whitefish." Jordan (1891:49-50) recorded and gave a brief description of specimens from "Otter Creek, in the Keweenaw Peninsula" and compared them with Montana grayling. Differences cited by him between Michigan and Montana grayling do not appear to be significant. Work of others has indicated relatively few differences between populations of American grayling.

In 1914 (Mich. Board Fish Comm., 1915:212), 25,000 fry, called Montana grayling in other reports, were introduced into Otter River, Houghton County. The actual source of this material is not clear, and the extent to which these fry survived is unknown. Since the Otter River population may have been contaminated by this introduction, there are few specimens in collections that are known to be native Michigan grayling.

Apparently abundant at one time, the Otter River population (the last in Michigan) underwent a sudden decline in the late 1920's until now it is extinct. The extermination of the grayling in Michigan has been attributed to various factors. Among these are: overfishing, egg destruction by logging, erosion and silting of streams, and

predation by brook trout. The cause in the Otter River probably was not overfishing, nor was the river used extensively for logging at the time of decline. Predation by brook trout is only a remote possibility. Although the brook trout is believed to be native to the Upper Peninsula, its status in the Otter River system is unknown. One can safely speculate that it was present at an early date in this system, however, as it was found to the west in Ontonagon County in 1904 (Ruthven, 1906:108) and was probably in all waters of the peninsula by that time. Further, Lowe recorded that it was present in the Otter River about 1903 (see below, notes for Sept. 8, 1925). This would have allowed at least 30 years of predation.

It is apparent that Lowe believed the decline to be partly a result of erosion. Removal of soil cover and deforestation followed by extensive hard rains resulted in the covering of the gravel stream bottom, or its replacement, with sand and silt. Some of his notes, quoted from his 1925 and 1929 notebooks, are given below.

June 26, 1925, "On the Otter. . . Moderate current. Much of the land has been cut over. . . The stream averages about 50 ft. in width and about 2-1/2 feet deep. [In his manuscript, the maximum width is indicated as 50 to 60 feet and the maximum depth as 12 feet with holes 5 or 6 feet deep not uncommon. The bottom is described as gravel, clay, and sand.] Many flat places where the water is shallow. Rocky, with many riffles. Snags are very numerous. Water somewhat straw colored."

Aug. 30, 1925, "We walked to West Branch of the Otter. . . Rained, all night, at intervals. . . The water was very roily. 100 cc. of water had about 1/2 cc. of silt. . . The West Branch had more sand silt. . . [than] the Main Branch, which caused the water at the juncture to turn a very murky gray. . ."

Aug. 30, 1925, "Main Otter. . . Grayling 2nd dominant [game] fish in stream. Rainbow [trout] first. Brook [trout] third. . ."

Aug. 31, 1925, "Below camp, 2-1/2 miles. . . Grayling found in every pool that could be seined. Rather abundant. Some of the holes were all grayling. The stream was somewhat clear. It was 6 inch[es] above the low water of the 28. . ."

Sept. 2, 1925, "Raining hard. . . A large amount of silt in the water. Bottom of stream invisible. Most of the silt comes in thru Petersen Creek, about 1/8 of a mile above camp. Petersen Creek drains thru a cleared region."

Sept. 8, 1925, "We worked at Hanchette's field. This is typical grayling field [?]. Bridge above Hanchettes is not grayling ground. The water is shallow. Many logs. Alders shade the stream. Bottom sandy and there were grayling here in the early days, but this was due to the sheer pressure of numbers that they occupied the region. . . [The following quoted by Lowe from a Mr. Geo. Williams] 200-300 brook trout taken. This was 22 years ago. In this lot there would be 15 to 25 grayling. . ."

Sept. 9, 1925, "At mouth, one brook trout was taken, several seen. Dominant [fish is] rainbow, [there are] few grayling."

Sept. 14, 1925, "Grayling extend 2-1/2 miles up the West Branch... to date there were taken by the State of Michigan 119 of which 4 came from [the] West Branch. We estimated that there were 1000 grayling in the river."

July 3, 1929, "Houghton Rod and Gun Club Camp... [downstream] to the bridge (log). The young grayling were taken on the gravel bars. Never on the sand beds.... The river bed from the club down to the first bend has changed very much in that gravel is cover[ed] with sand...."

July 16, 1929, "Otter River.... Many of the holes are spoiled because of the cutting away of the timber each year. The east side of the river is clear[ed] more and more...."

July 17, 1929, "West Branch of the Otter, 1/4 mile from mouth.... River bed changed somewhat, that is, it is full of sand on many of the bars. Otter River, at camp... to the mouth.... [temperatures taken at camp].

Air (temperature)	Water (temperature)	Time [PM]
86°	69-3/4°	12:00
78°	73°	4:30
78°	72-1/4°	6:00

.... [Grayling] are nowhere very abundant. The young are always taken wherever there [is] a shallow gravel bar. The adults are usually taken in the riffles or at the end of the riffles where the water whirls into the riffles... 1/4 mile south of camp. The two gravel beds examined had gravel from about the size of a walnut as the largest to smallest - about 1/2 of [a] pea."

The following material has been taken from Lowe's unpublished manuscript. I have altered it somewhat:

The distribution of the grayling in the Otter River is limited by food, aeration, and sunlight. The removal of forests is followed by a large amount of washing and the silting of the streams. The silt covers the rocks, destroying food and reducing aeration.

There are no grayling in the sandy parts of the stream where the number of caddisflies is greatly reduced. Grayling feed by preference on surface-inhabiting insects during bright sunlight, and when flyfishing became the custom they were destroyed.

Grayling live in the open water where they can enjoy the sunlight, occupying that portion of the Otter River which is rocky with high banks and deep holes. The mature grayling live in these holes and the young in the riffles at the head of the holes. Grayling do not seek dark holes or dart into or hide under snags or banks. They will stay for hours or even days in a favorite spot. One was observed for 15 minutes from a distance of less than six feet. It was easily picked up with a seine. When resting, the waving motion of the dorsal fin causes it to resemble the leaf of a pondweed.

The food of four specimens was found to be adult caddisflies, grasshoppers and an earthworm. Three young of the spring hatch ate Entomostraca.

Spawning occurs during April or early May after the ice goes out. There is a feeble attempt at nest building. The eggs are usually laid in open gravel beds at the head of riffles where the water is about a foot deep. They are small, 0.13 of an inch in diameter and amber in color. They stick to the rocks at first and probably hatch in about 10 days.

The young remain on the gravel beds or near them for the first year. On June 26, 1925, they were 31 mm. long. The growth is very rapid, especially when compared with the growth of trout from the same stream; 66 first-year individuals ranged in length from 94-116 mm., averaging 102.8 mm.

Grayling do not migrate any great distance. An unusually large one remained in the same hole for over two weeks.

Lowe took approximately 240 specimens of Grayling for study from 1925 until 1929. These (seen by the author) range in total length from 1.4" to 16.9". Young (1.4" long and longer) were present in collections taken during 1929 as well as in 1925.

Recorded water temperatures on the Otter were below 17° C. in 1925. These records are for a period in June, late August (during the warmest days) and September and were taken at several points throughout the range of the grayling during various times of the day. Daily fluctuations were great, and a considerable variation corresponded to change of locality. Temperatures recorded for 1929 were 69° F. or below with the exception quoted above.

Creaser and Creaser (1935:601-4) studied the age and growth of thirteen specimens of grayling from Michigan (all but one from the Otter River). They found that Michigan grayling grew slower than did grayling from Montana.

The range of the grayling in the Otter River system may have been very limited. Lowe secured specimens in many collections taken in the North Branch or "Main Stream" from below Bart Creek to 2-1/2 miles below camp (Houghton Rod and Gun Club Camp) and in the West Branch from the mouth to 2-1/2 miles upstream. These indicate that he knew the species as common from Bart Creek downstream to just inside Baraga County on the main Otter and in the lower 2-1/2 miles of the West Branch of the Otter. In addition, the Museum of Zoology has a specimen recorded as from the Otter River, at bridge north of Pelkie, Baraga County, taken Sept. 11, 1925. This is about one mile downstream from Lowe's localities. Lowe records (by counties): Baraga 147; Houghton 143, 149, 152, 161, 204, 664.

#### UMBRIDAE

13. *Umbra limi* (Kirtland) — Central mudminnow. Very common and distributed throughout most of the area, this species is apparently absent only from the extreme tip of the Keweenaw Peninsula. It is known from all the counties.

Lowe records (by counties): Baraga 671; Chippewa 295; Delta 600; Dickinson 545-47, 550, 557, 558, 584; Houghton 196, 202, 202A; Keweenaw 330, 331; Luce 297, 298; Mackinac 303, 637, 675-77, 681, 682, 685; Marquette 228, 367, 564, 576, 588, 593-96, 598; Menominee 354, 356, 359, 370-73, 373A, 374, 377, 378, 382, 385, 387-90, 392-94, 396, 397, 400-403, 405-9, 414A, 421, 429-32, 434, 436, 437, 443, 449, 451-56, 458-61, 464, 467, 470, 474, 476, 478, 481, 485, 486, 490, 492, 503, 511, 515, 516, 525, 526, 528, 529, 534, 537, 537A, 538, 542; Schoolcraft 615, 616, 620, 623, 630.

#### ESOCIDAE

14. *Esox lucius* Linnaeus — Northern pike. The pike is common and distributed throughout the Upper Peninsula. There are specimens or literature records from all the counties.  
Lowe records (by counties): Alger 5143; Baraga 695; Chippewa 295; Dickinson 550; Keweenaw 309, 315, 316, 339, 340, 345; Luce and Mackinac 2; Mackinac 301, 301B, 301E, 637, 681; Marquette 3, 178, 228, 305; Menominee 352, 359, 372, 373, 375, 391, 392, 425, 443, 445, 460, 461, 475, 490, 534, 539; Schoolcraft 616, 632.

#### CATOSTOMIDAE

15. *Moxostoma erythrurum* (Rafinesque) — Golden redhorse. This redhorse is known in the region from a single record obtained by Lowe.  
Lowe record: Menominee County 373.
16. *Moxostoma anisurum* (Rafinesque) — Silver redhorse. This sucker is generally rare in the Upper Peninsula of Michigan, but young were abundant in collections from the Otter River system.  
Lowe records: Houghton County 164, 302.
17. *Moxostoma aureolum* (LeSueur) — Northern shorthead redhorse. This fish is known from several collections that came from scattered points on the peninsula. It is probably rather common.  
Lowe records (by counties): Dickinson 553; Houghton 164, 302; Menominee 373.
18. *Moxostoma valenciennesi* Jordan — Greater redhorse. The greater redhorse is apparently uncommon in this area. The available specimens are from widely scattered localities. This is the species formerly known as *Moxostoma rubreques* Hubbs. Legendre (1953:v-vi) has indicated the change in name that is accepted here.  
Lowe records: Menominee County 371, 463.
19. *Hypentelium nigricans* (LeSueur) — Hog sucker. This sucker is known in the Upper Peninsula only from Menominee and Dickinson counties, where it appears to be common.  
Lowe records (by counties): Dickinson 553, 559; Menominee 353, 404, 441, 463, 467A, 469, 486, 491, 509, 513, 539.
20. *Catostomus commersoni commersoni* (Lacépède) — Common white sucker. To judge from its abundance in a high percentage of the



collections from the area, this is the most common and uniformly distributed fish in the Upper Peninsula. It is known from all of the counties.

Lowe records (by counties): Alger 2, 5142, 5143; Baraga 147, 269, 350, 351, 667-69, 695; Chippewa 294; Delta 599-601, 604, 708; Dickinson 543, 545, 547, 548, 550, 553, 555, 557, 559, 584; Houghton 143, 144, 149, 154, 159, 161, 163, 164, 171, 191, 204, 302, 609, 664; Iron 360; Keweenaw 309, 311, 317, 321, 322, 325-31, 339-41, 346; Luce 292, 296, 298; Luce and Mackinac 2; Mackinac 300, 301, 301B, 637, 677, 682, 687, 691; Marquette 3, 5, 69, 178, 207, 224, 228, 285, 287, 305, 367, 368, 568, 571-74, 593-97, 607, 656, 659, 726, 729, 730, 1020; Menominee 353, 354, 356, 359, 371-73, 374-80, 382, 383, 385, 387, 391-93, 396, 399, 401, 402, 404-9, 413, 414, 415, 423, 424, 426-28, 430-32, 434, 438, 439, 441-43, 445, 451, 452, 457, 458, 460, 463-66, 468, 469, 475, 476, 481, 485, 486, 489-92, 506-9, 511, 513, 515, 516, 525, 526, 528, 529, 534, 538, 539; Ontonagon 4, 5, 60, 61; Schoolcraft 603, 616, 623, 630, 632, 680, 710.

21. *Catostomus catostomus catostomus* (Forster) — Eastern longnose sucker. This species is a typical inhabitant of large cold bodies of water. It enters streams and lakes of the Keweenaw Peninsula extensively, but is found in only a few other scattered inland waters of the Upper Peninsula.

Lowe records (by counties): Houghton 143, 302; Keweenaw 311, 324, 325, 341, 346; Marquette 178.

#### CYPRINIDAE

22. *Notemigonus crysoleucas* (Mitchill) — Golden shiner. This fish is moderately common throughout the region. There are records from all of the counties except Ontonagon.

Lowe records (by counties): Baraga 695; Dickinson 559, 584; Houghton 302, 363; Keweenaw 312, 318, 328, 330, 332, 340, 343, 344, 346; Luce 297; Mackinac 300, 301, 637, 638; Marquette 3, 69, 178, 224, 228, 285, 287, 607, 727, 728; Menominee 359, 371, 372, 391, 401, 402, 404-8, 426, 434, 438, 442, 451, 463-66, 468, 469, 481, 490, 537A, 538, 539; Schoolcraft 616, 620, 624, 625, 632, 710.

23. *Semotilus atromaculatus atromaculatus* (Mitchill) — Northern creek chub. This minnow is extremely common throughout the area. There are specimens or literature records from all of the counties.

Lowe records (by counties): Baraga 10, 147, 350, 667, 697; Delta 708; Dickinson 545-48, 550, 553, 555, 557, 559, 584; Houghton 143, 144, 149, 154, 159, 161, 170, 191, 202, 664; Iron 360; Keweenaw 321, 325, 330, 331, 341, 346; Luce 296, 298; Mackinac 300; Marquette 224, 285, 367, 369, 568, 571-74, 593-97, 606, 607, 657, 658, 732; Menominee 354, 356, 371, 373, 377, 379, 385, 387, 391-93, 396, 399, 401-4, 406-9, 413, 414, 419, 424, 428, 431, 432, 434, 438, 439, 441, 451, 452, 456-58, 460, 461, 464-66, 467A, 468, 469, 476, 485, 486, 489-92, 495, 506, 507, 509, 511, 513, 515, 516, 525, 526, 528, 529, 534, 536, 539; Ontonagon 4, 5; Schoolcraft 615, 616, 710.

24. *Semotilus margarita nachtriebi* (Cox) — Northern pearl dace. This fish is common over most of the area, but is absent from Keweenaw County and from much of the rest of the Keweenaw Peninsula. There are records from all other counties.  
Lowe records (by counties): Delta 708; Dickinson 543, 545-47, 550, 553, 555, 557, 559; Houghton 202; Iron 360; Luce 296; Mackinac 638, 675-77, 691; Marquette 71, 285, 367, 368, 568, 571-74, 593-96, 606, 607, 656, 657, 659, 660; Menominee 383, 385-87, 392, 393, 396, 399, 401, 403, 405, 409, 413, 414, 430-32, 442, 465, 468, 476, 481, 483, 486, 489-92, 495, 507, 511, 515, 516, 526, 529; Schoolcraft 615, 616, 623, 627, 630.
25. *Chrosomus neogaeus* (Cope) — Finescale dace. This species is spottily distributed over the peninsula and is frequently found in association with the following species, with which it hybridizes. Specimens or literature records indicate its presence in all of the counties.  
Lowe records (by counties): Baraga 696; Delta 599; Dickinson 545, 550, 557, 584; Houghton 154, 196; Keweenaw 313, 321, 322, 324, 325, 338; Luce and Mackinac 692; Mackinac 675-77, 682, 685; Marquette 285, 367, 573, 579, 593, 598, 656; Menominee 385-87, 393, 396, 403, 465, 483, 507, 515, 525, 526, 528; Schoolcraft 615, 618.
26. *Chrosomus eos* Cope — Northern redbelly dace. This minnow is generally distributed over the area. There are records from all counties.  
Lowe records (by counties): Baraga 696, 715; Delta 599; Dickinson 545-47, 555, 557, 584; Houghton 8, 149; Keweenaw 313, 320-22, 325, 338; Luce and Mackinac 692; Mackinac 638, 675-77, 682, 685, 687; Marquette 69, 207, 285, 367, 369, 571, 572, 574, 579, 593, 595, 598, 607, 659, 660; Menominee 385, 387, 392, 393, 396, 401-3, 407, 431, 432, 438, 442, 466, 470, 481, 485, 486, 489, 491, 503, 504, 507, 511, 515, 516, 521, 525-27, 529, 540; Schoolcraft 615, 618, 627, 630.
- 27A. *Hybopsis plumbea plumbea* (Agassiz) — Eastern lake chub. This typical form of the Great Lakes shores has been found to ascend streams for a considerable distance only on the Keweenaw Peninsula. Nearly all other records are from near the mouths of streams.  
It was described as *Gobio plumbeus* by Agassiz (1850:366-68) from material taken in Lakes Superior and Huron. Some of the characteristics, quoted from Agassiz, are: "The body is elongated, subcylindrical, compressed; its greatest length is about seven inches . . . [the] diameter [of the eye] is one fourth of an inch."  
Another name was provided by Cope (1869:365-66 and PL. xi, Fig. 4), who described *Ceratichthys prosthemi* from specimens taken in Montreal River, Keweenaw Point, Lake Superior. This appears to be nearly identical with Agassiz' species. Cope indicated that "*Gobio plumbeus* Ag., has a much shorter head and smaller eye" [than does *Ceratichthys prosthemi*]. Finally, Jordan (1877:64) gave the name *Nocomis milneri* to this form.  
Lowe records (by counties): Baraga 147, 669; Delta 599; Houghton 143, 144, 149, 154, 159, 161, 191, 664; Keweenaw 308, 317, 322-24, 328, 346-48; Mackinac 687, 691; Marquette 224, 573; Menominee 356, 374-80, 382, 424.

- 27B. *Hybopsis plumbea greeni* (Jordan) — Western lake chub. This form has been called *Couesius plumbeus dissimilis* (Girard) by Hubbs and Lagler (1947:55 and 63), but that subspecific name when used in *Hybopsis* becomes a homonym of *Luxilus dissimilis* Kirtland, recently known as *Erimystax dissimilis*, also a species of *Hybopsis*. The name *Couesius greeni* Jordan seems to be applicable and is adopted here. *H. p. greeni* is a small eyed and relatively short-finned form that inhabits creeks. It is known in Michigan only from Keweenaw County on the Keweenaw Peninsula, where it occurs with *H. p. plumbea*. Most of Lowe's specimens of these two forms when taken together are half grown to adult. The similarities are striking and until their systematic status can be studied further, it seems best to retain their current treatment as subspecies.
- Lowe records: Keweenaw County 307, 310, 313, 324, 325, 341, 349.
28. *Hybopsis biguttata* (Kirtland) — Hornyhead chub. All records of this species are from Menominee and Ontonagon counties. They suggest that it may have worked its way northeastward along the shores of Lakes Michigan and Superior.
- Lowe records (by counties): Menominee 385, 387, 391, 392, 404, 409, 426, 427, 432, 434, 441, 451, 466, 467A, 468, 469, 486, 491, 509, 513, 515, 516; Ontonagon 4, 5.
29. *Rhinichthys atratulus meleagris* Agassiz — Western blacknose dace. This minnow is common throughout the area. Records of the blacknose dace are from all counties.
- Lowe records (by counties): Baraga 147, 269, 669, 696; Delta 708; Dickinson 543, 545, 546, 548, 553, 555, 557-59, 584; Houghton 143, 144, 149, 154, 161, 191, 611, 664; Keweenaw 330, 331, 338, 347; Luce 298; Mackinac 675-77, 682, 683, 685, 687, 691; Marquette 224, 285, 368, 369, 571-74, 593-97, 606, 607, 656, 657, 732; Menominee 370, 371, 376, 385, 387, 392, 393, 396, 399, 401-4, 406, 407, 409, 412-14, 415, 416, 419, 420, 427, 428, 431, 432, 434, 438, 439, 441, 451, 452, 456-58, 464-66, 467A, 468-70, 481, 486, 487, 489-92, 495, 506-9, 511, 513, 515, 516, 526, 529, 536; Ontonagon 4, 5, 60, 61; Schoolcraft 615, 616, 625, 627.
30. *Rhinichthys cataractae* (Valenciennes) — Longnose dace. This dace is fairly common throughout the Upper Peninsula. It is known from all of the counties.
- Lowe records (by counties): Alger 2; Baraga 147, 269, 362, 668, 669, 696; Delta 599, 601, 604, 605, 708; Dickinson 548, 553, 584; Houghton 143, 149, 154, 159, 161, 164, 171, 191, 204, 664; Keweenaw 308, 311, 317, 319, 322-24, 328, 331, 335, 346-48; Mackinac 687, 691; Marquette 7, 224, 568, 587, 597, 606, 607, 733, 1020; Menominee 356, 375-77, 379, 380, 392, 423, 424, 427, 430, 439, 463, 466, 486, 489, 491, 492, 506, 508, 509, 513, 529; Ontonagon 4, 5, 61, 272.
31. *Notropis atherinoides* Rafinesque — Emerald shiner. Except for a single (introduced ?) specimen from Big Manistique Lake, Luce County, all records are from the Great Lakes.
- Lowe records (by counties): Keweenaw 322, 324; Mackinac 687; Marquette 5140.

32. *Notropis rubellus* (Agassiz) — Rosyface shiner. The Upper Peninsula seems to be on the border of the range of this species. In addition to a population in the St. Marys River, whence Agassiz (1850:364) obtained his types of *Alburnus rubellus*, the species is known only from that portion of the peninsula draining into Green Bay.  
Lowe records (by counties): Dickinson 550, 584; Menominee 373, 391, 402, 404, 469.
33. *Notropis cornutus frontalis* (Agassiz) — Northern common shiner. This species is abundant and well distributed over the peninsula. There are records from all counties except Houghton. All of the specimens examined are typical of *frontalis*, the northern form, which is characterized by small, crowded predorsal scales.  
Lowe records (by counties): Baraga 10, 350, 696; Delta 599, 600, 604, 708; Dickinson 548, 550, 553, 559, 584; Keweenaw 317, 327, 328, 330, 331; Luce 291, 296-98; Luce and Mackinac 2; Mackinac 300, 301, 301B, 301E, 304; Marquette 3, 178, 224, 367, 368, 568, 571-73, 595, 597, 607, 727, 732; Menominee 352-54, 356, 359, 371-73, 374-80, 382, 385, 387, 390-93, 401, 402, 404-9, 413, 414, 414A, 415, 416, 425-27, 431, 432, 434, 435, 438, 439, 441, 442, 451, 452, 457, 458, 460, 461, 463-66, 468-70, 485, 486, 489-92, 495, 506, 507, 509, 511, 513, 515, 516, 525, 529, 534, 538, 539; Ontonagon 4, 5; Schoolcraft 632, 680.
34. *Notropis heterodon* (Cope) — Blackchin shiner. This minnow is less common in the area than might be presumed. Available records are from only about two-thirds of the counties.  
Lowe records (by counties): Dickinson 550, 584; Houghton 363; Keweenaw 318-20, 344; Marquette 178; Menominee 352-54, 372, 374, 375, 414A, 426, 537A, 538, 539.
35. *Notropis hudsonius hudsonius* (Clinton) — Spottail shiner. This fish is rather scattered and infrequent in occurrence, except in the larger inland waters and the Great Lakes.  
Lowe records (by counties): Alger 5142; Baraga 362; Delta 599; Houghton 302; Keweenaw 318, 322, 324; Luce and Mackinac 2; Mackinac 301, 304, 687, 691; Marquette 178, 305; Menominee 356, 374, 378-80, 425; Schoolcraft 603.
36. *Notropis dorsalis dorsalis* (Agassiz) — Central bigmouth shiner. This appears to be another species of localized distribution in the area. It is present in lakes in Baraga and Houghton counties and in the Sturgeon River system, all in the Lake Superior watershed. Hubbs and Lagler (1947:67) have reported its occurrence in the Manistique River system in the Lake Michigan drainage of the peninsula, and Greene (1935:102) plotted a single locality for Wisconsin in this drainage. Also, all the Michigan Lower Peninsula records are from the Lake Michigan basin.  
Lowe records (by counties): Baraga 147, 667, 669; Houghton 149, 154, 161, 163, 164, 191, 302.
37. *Notropis deliciosus stramineus* (Cope) — Northeastern sand shiner. The available records suggest that this species is moderately common only in the eastern portion of the area. Specimens are from scattered localities in about two-thirds of the counties.

Lowe records (by counties): Alger 5143; Delta 599; Houghton 302; Luce 292; Luce and Mackinac 2; Mackinac 301, 304, 687, 691; Menominee 353, 373, 374, 375, 463, 539; Ontonagon 272; Schoolcraft 603, 632, 680.

38. *Notropis heterolepis* Eigenmann and Eigenmann — Blacknose shiner. This species is moderately common and generally distributed throughout the Upper Peninsula. There are records from all counties.

Specimens from Bass Lake (576), Marquette County, are as large as any of the series, except for the holotype, described as *Notropis heterolepis regalis* from Harvey Lake, Isle Royale, Michigan, by Hubbs and Lagler (1949:119-23, Pl. II, Fig. 3). I do not perceive significant differences between these populations and those from farther south in Michigan.

Lowe records (by counties): Delta 600, 604; Dickinson 550, 584; Houghton 302, 363; Keweenaw 315, 316, 318-20, 322, 328, 330, 332, 333, 340, 344, 345; Luce 290, 297, 298; Mackinac 637, 638, 676, 677, 682, 685, 691; Marquette 69, 178, 228, 285, 287, 572, 573, 576, 656, 659, 660; Menominee 352, 354, 356, 359, 371, 372, 374, 375, 379, 385-87, 392, 393, 401, 402, 407-9, 414A, 426, 438, 451, 452, 455-58, 460, 476, 479, 486, 495, 516, 525-27, 539; Schoolcraft 615, 616, 618, 620, 624, 625, 630, 710.

39. *Notropis volucellus volucellus* (Cope) — Northern mimic shiner. This shiner is rather scattered in distribution and is apparently common only in larger bodies of water in the eastern part of the peninsula. It is found from Houghton and Keweenaw counties eastward in the Lake Superior drainage and from Menominee County eastward in the Lake Michigan drainage.

Lowe records (by counties): Alger 5143; Delta 599; Houghton 164, 302, 363; Keweenaw 327, 328; Luce 291, 297; Luce and Mackinac 2; Mackinac 301, 301E, 304; Marquette 69, 178, 305, 730; Menominee 353, 371-73, 374, 424, 463, 469, 539; Schoolcraft 603, 632, 680.

40. *Hybognathus hankinsoni* Hubbs — Brassy minnow. The brassy minnow is locally abundant but spotty in occurrence over the area. The records are from only about half of the counties.

Lowe records (by counties): Dickinson 547 (paratypes), 550 (paratype), 557, 584; Keweenaw 313; Mackinac 675, 682, 685; Marquette 285, 572, 573, 593; Menominee 401 (paratype), 504, 515 (paratypes), 516 (paratypes).

41. *Pimephales notatus* (Rafinesque) — Bluntnose minnow. This minnow is moderately common throughout the area, and records are from all counties but Ontonagon.

Lowe records (by counties): Alger 5143; Baraga 350, 351, 695; Delta 600; Dickinson 548, 550, 553, 584; Houghton 163, 302, 363; Keweenaw 309, 316, 322, 344; Luce 291, 292; Luce and Mackinac 2; Mackinac 300, 301, 301E, 304, 637, 638, 691; Marquette 3, 71, 368, 576, 578, 654-57, 727, 729-32; Menominee 352-54, 356, 359, 371-73, 374-77, 391, 404, 407, 409, 414A, 426, 427, 434, 438, 439, 441, 443, 451, 460, 469, 537A, 538, 539; Schoolcraft 603, 616, 632, 680.

42. *Pimephales promelas* Rafinesque — Fathead minnow. The fathead minnow is common only locally. There are records for all counties.

The three characters supposedly separating northern (north central United States) and southern (Texas and Oklahoma) populations of this species have been examined in detail by me. Using adult males and in some cases adult females, I have found that the mean angle of the mouth is highly variable, but on the average is not significantly greater in the northern than in the southern portions of the range; that the chin tubercles and some other head tubercles undergo a gradual increase in number from south to north; and that the length of the lateral line grades in relative incompleteness from south to north.

The mean number of lateral scale rows varies greatly between adjacent populations. In view of this variation, the Harvey Lake specimens (Hubbs and Lagler, 1949:123-25) are no more than high variants.

Lowe records (by counties): Alger 2; Baraga 667, 695; Dickinson 550, 584; Houghton 8, 154; Keweenaw 338; Luce and Mackinac 692; Mackinac 304, 638, 675; Marquette 63, 224, 285, 287, 568, 571, 572, 574, 576, 593, 598, 607, 660; Menominee 387, 392, 393, 407, 479, 521, 527, 540; Schoolcraft 618, 620.

#### HYBRIDS

- 23 × 33. *Notropis cornutus frontalis* (Agassiz) × *Semotilus atromaculatus atromaculatus* (Mitchill). This is a common hybrid combination among native cyprinids.  
Lowe records (by counties): Dickinson 584 ("outlet of Lake Mary"; 1 hybrid, 1480 *N. c. frontalis* and 37 *S. a. atromaculatus* and another hybrid combination); Keweenaw 330 (Thayers Lake; 1 hybrid, 2 *N. c. frontalis* and 31 *S. a. atromaculatus*); Marquette 572 (Little Dead River; 1 hybrid, 9 *N. c. frontalis* and 28 *S. a. atromaculatus*); Menominee 387 (Big Brook; 1 hybrid, 295 *N. c. frontalis* and 54 *S. a. atromaculatus*).
- 25 × 26. *Chrosomus eos* Cope × *Chrosomus neogaeus* (Cope). This relatively common hybrid seems to occur chiefly in small bodies of water. Hybrids taken by Lowe in five collections are more or less intermediate between the parent species in size of mouth, pigmentation and coiling of the intestine.  
Lowe records (by counties): Delta 599 ("a small stream"; 1 hybrid, 3 *C. eos* and 1 *C. neogaeus*); Keweenaw 321 ("Lake Eliza, mudhole dying up rapidly"; 2 hybrids, 52 *C. eos* and 86 *C. neogaeus*), 325 (Montreal River, meadows above a dam; 4 hybrids, 54 *C. eos* and 4 *C. neogaeus*); Mackinac 676 (Burnt Pond, a "series of small ponds"; 2 hybrids, 13 *C. eos* and 1 *C. neogaeus*); Marquette 732 (Brocky Lake; 1 hybrid, none of either parent species).
- 27 × 30. *Hybopsis plumbea* (Agassiz) × *Rhinichthys cataractae* (Valenciennes). This hybrid combination is uncommon. A single specimen was reported by Hubbs and Lagler (1949:114) from Isle Royale.

The Lowe collection contains two small specimens.

Lowe records: Keweenaw County 322 ("outlet of Lake Eliza"; 1 hybrid, 1086 *H. p. plumbea* and 38 *R. cataractae*), 324 ("mouth of Eagle River"; 1 hybrid, 321 *H. p. plumbea*, 9 *H. p. greeni* and 4 *R. cataractae*).

- 28 × 33. *Hybopsis biguttata* (Kirtland) × *Notropis cornutus frontalis* (Agassiz). Elsewhere a moderately common hybrid, it is restricted in distribution in the peninsula by the limited range of *H. biguttata*.

Lowe record: Menominee County 392 ("Big Brook or Oxbow"; 1 hybrid, 21 *H. biguttata* and 359 *N. c. frontalis*).

- 32 × 33. *Notropis cornutus frontalis* (Agassiz) × *Notropis rubellus* (Agassiz). A combination that is not uncommon in streams below barriers. It is restricted in distribution in the peninsula to the range of *N. rubellus*.

Lowe records (by counties): Dickinson 550 ("Red Dam Pond, Turner or Hamilton Creek"; 6 hybrids, 143 *N. c. frontalis* and 43 *N. rubellus*), 584 ("outlet of Lake Mary"; 13 hybrids, 1480 *N. c. frontalis*, 15 *N. rubellus* and another hybrid combination); Menominee 468 ("Hugo's Creek"; 1 hybrid and 28 *N. c. frontalis*).

#### ICTALURIDAE<sup>3</sup>

43. *Ictalurus*<sup>3</sup> *nebulosus nebulosus* (LeSueur) — Northern brown bullhead.

This species is probably native to both watersheds of the area, but perhaps not at all localities in which it is found today. These are known to be scattered through about two-thirds of the counties.

Agassiz (1850:281) described this species from Lake Superior as *Pimelodus felis*.

Lowe records (by counties): Baraga 351; Dickinson 550; Keweenaw 338; Luce and Mackinac 692; Mackinac 300, 301, 637; Menominee 354, 359, 372, 463, 538, 539; Schoolcraft 632.

<sup>3</sup>I am using the name *Ictalurus* to include *Ictalurus* and the bullheads, *Ameiurus* (auct.). Examination of the characters known to me and those proposed by others reveals that they break down in certain intermediate species. Both skeletons (kindly provided by Mr. William H. Massman, from Virginia) and preserved material of *Ictalurus catus* (Linnaeus), one of the intermediates, have been examined by me. Several of the characters are those of bullheads, others are of *Ictalurus* as recently defined. Furthermore, that species and others have been shifted between *Ameiurus* [sic.] and *Ictalurus* repeatedly, depending upon the emphasis given certain characters.

Since both of these groups as recently known contain species of considerable economic and experimental importance, the choice of a name for the combined assemblage must depend upon priority. *Ictalurus* (also formerly used to include all these species) is adopted; it was proposed by Rafinesque (1820a: 356 or 1820b: 61) who described it as a subgenus of *Pimelodus*. *Ameiurus* is described in the same papers as a subgroup of the subgenus *Ictalurus*, but that action did not make it available as a generic name. It was first made available and was spelled *Amiurus* by Gill (1861a: 44), who became its author. Furthermore, Gill (1861b: 49) first called this assemblage the "Group Ictaluri." In view of the confusion that has existed in the use and spelling of *Amiurus*, it is thought best to return to the older taxon, and employ the family name Ictaluridae.

44. *Ictalurus*<sup>4</sup> *melas melas* (Rafinesque) — Northern black bullhead. This species appears in widely scattered localities in the Lake Michigan drainage of the area. It is rare or absent in the Lake Superior basin of the peninsula, but Greene (1935:138) and Hubbs (1945:19) recorded it from that drainage in Wisconsin and Minnesota.  
Lowe records (by counties): Baraga 715; Marquette 727; Menominee 386, 407.
45. *Ictalurus*<sup>4</sup> *natalis* (LeSueur) — Yellow bullhead. This bullhead is known to occur in the Upper Peninsula only in Menominee County. I have examined populations of this species from various areas (Florida, Kansas, Michigan) and have not found significant differences between them.  
Lowe records: Menominee County 354, 375, 534.
46. *Noturus gyrinus* (Mitchill) — Tadpole madtom. As a result of an intensive study of the catfishes of the nominal genera *Noturus* Rafinesque, *Schilbeodes* Bleeker, *Rabida* Jordan and Evermann, and *Pimelodon* Vaillant, I conclude that all the included species should be referred to the genus *Noturus*.  
The name *Silurus mollis* Hermann has been identified with this species (Hubbs and Raney, 1944), an action which I feel is untenable because of the indefinite and confused original description. I agree with Fowler (1945:123) in rejecting *S. mollis* as unidentifiable, and reapply the long-familiar name *Silurus gyrinus* Mitchill to this species.  
Known only from Menominee County (Lake Michigan drainage) in the Upper Peninsula of Michigan, this madtom appears not to have extended onto the Peninsula. There is a record from the Lake Superior drainage basin (near mouth of Cloquet River, St. Louis County, Minnesota).  
Lowe records: Menominee County 354, 414A, 414B, 537A, 538, 539.

## CYPRINODONTIDAE

47. *Fundulus diaphanus menona* Jordan and Copeland — Western banded killifish. This species is not common in the region. All records are from the Lake Michigan and Huron drainage basin, with the exception of Whitefish Point material reported by Hankinson (1916 b:149).  
Lowe records (by counties): Mackinac 637, 638, 687; Menominee 354, 356; Schoolcraft 624.

## GADIDAE

48. *Lota lota lacustris* (Walbaum) — Eastern burbot. The burbot is widely distributed and perhaps more common on the peninsula than the few collections indicate.  
Lowe records (by counties): Delta 605; Houghton 143, 302; Keweenaw 308; Marquette 305; Menominee 463, 469; Schoolcraft 616.

<sup>4</sup>See footnote 3.



## PERCOPSIDAE

49. *Percopsis omiscomaycus* (Walbaum) — Troutperch. This is another sporadically distributed species, of which the actual distribution and abundance are poorly known. Although probably present, there are no records from tributaries of Lake Michigan in the Upper Peninsula; all are from the Lake Superior drainage basin.  
Lowe records (by counties): Keweenaw 309, 346; Marquette 5140.

## CENTRARCHIDAE

50. *Micropterus dolomieu dolomieu* Lacépède — Northern smallmouth bass. Although presumably native in the area, the smallmouth has been planted extensively. It is now generally distributed over the Upper Peninsula. There are records from all counties.  
Lowe records (by counties): Alger 5142, 5143; Baraga 350, 351, 695; Delta 708; Dickinson 547, 550, 553, 583, 584; Houghton 192, 193, 197, 302, 609; Iron 361; Keweenaw 309, 324, 327-30, 340; Luce and Mackinac 2; Mackinac 301; Marquette 3, 190, 224, 305, 572, 576, 659, 727; Menominee 373, 426, 427, 463, 464, 468, 469; Schoolcraft 680.
51. *Micropterus salmoides salmoides* (Lacépède) — Northern largemouth bass. The literature contains many reports of the introduction of the largemouth into waters of northern Michigan. This, with the absence of early reports and records and the fact that the Upper Peninsula is near the northern range limit, suggests that the largemouth bass may not be native to the peninsula. It is now known from all counties except Delta.  
Lowe records (by counties): Baraga 350, 351; Dickinson 520A, 550; Houghton 192, 193, 202, 609, 610; Iron 360; Luce 297; Mackinac 300; Marquette 3, 71, 576, 655-57, 707, 729-31; Menominee 352-54, 414A, 414B, 537A, 538, 539; Schoolcraft 632.
52. *Lepomis cyanellus* Rafinesque — Green sunfish. The known distribution of this species in the area, where it is found in relatively few but well-known waters, leaves little doubt that it has been introduced. Except for some specimens from Houghton County, all records are for the Lake Michigan drainage.  
Lowe records (by counties): Houghton 202, 203; Marquette 730; Menominee 527.
53. *Lepomis gibbosus* (Linnaeus) — Pumpkinseed. This is the only species of *Lepomis* native to the peninsula. It is known from all counties.  
Lowe records (by counties): Baraga 351; Houghton 202; Keweenaw 330; Mackinac 300, 301; Marquette 224, 572, 573, 576, 730; Menominee 352, 354, 355, 386, 414A, 537A, 538, 539.
54. *Lepomis macrochirus* Rafinesque — Bluegill. An important game fish, the bluegill has been introduced and is now distributed throughout the peninsula. It is in at least two-thirds of the counties.  
Lowe records (by counties): Luce and Mackinac 2; Mackinac 301, 301E; Marquette 576, 730; Menominee 352, 354, 355, 414B, 537A, 539.
55. *Ambloplites rupestris rupestris* (Rafinesque) — Northern rock bass. Although not especially abundant, the rock bass is presumed to be

native and is found in all the counties of the Upper Peninsula.

Lowe records (by counties): Alger 5142; Baraga 695; Delta 600; Houghton 302; Keweenaw 309, 316, 328, 340, 343; Luce 291, 296, 298; Luce and Mackinac 2; Mackinac 300, 301, 301E, 304, 681; Marquette 178, 228, 305; Menominee 353, 354, 372, 373, 374, 375, 392, 414A, 416, 426, 451, 509, 537A, 538, 539; Schoolcraft 632.

56. *Pomoxis nigramaculatus* (LeSueur) — Black crappie. Based on introductions, the records are few and are from the western portion of the peninsula.  
Lowe records: Menominee County 353, 539.

#### HYBRIDS

- 52 x 53. *Lepomis cyanellus* Rafinesque x *Lepomis gibbosus* (Linnaeus).  
The extensive hybridization indicated by these specimens from Maple Siding Creek probably took place in the Twin Lakes.  
Lowe record: Houghton County 202 (27 hybrids, 18 *L. cyanellus* and 33 *L. gibbosus*).
- 53 x 54. *Lepomis gibbosus* (Linnaeus) x *Lepomis macrochirus* Rafinesque.  
All of Lowe's specimens are from the lake region of Menominee County.  
Lowe records: Menominee County 355 (Baker Lake; 1 hybrid, 1 *L. gibbosus* and 2 *L. macrochirus*), 414B (Lake Mary; 6 hybrids and 1 *L. macrochirus*), 539 (Shaky River; 1 hybrid, 3 *L. gibbosus* and 5 *L. macrochirus*).

#### PERCIDAE

57. *Stizostedion canadense* (Smith) — Sauger. Extremely rare in collections from the area, the following constitute nearly all the records of the sauger that are available.  
Lowe records (by counties): Houghton 302; Keweenaw 340; Marquette 5132.
58. *Stizostedion vitreum vitreum* (Mitchill) — Yellow walleye. More common than collections indicate, this species is an important sport fish in the inland waters and is well distributed over the area. Reports or records are from all counties.  
Lowe records (by counties): Luce and Mackinac 2; Mackinac 301, 301E; Marquette 305; Menominee 373.
59. *Perca flavescens* (Mitchill) — Yellow perch. Typical of the lakes of the region, this species is rather uniformly distributed throughout the peninsula. There are records from all counties.  
Lowe records (by counties): Alger 5142, 5143; Baraga 350, 351, 652, 695; Dickinson 550, 553, 575, 584; Houghton 192, 193, 197, 203, 302, 363, 609; Iron 360; Keweenaw 309, 311, 312, 316-18, 322-24, 326-30, 339, 340, 343-45, 501; Luce 290-92, 296, 297; Luce and Mackinac 2; Mackinac 300, 301, 301E, 304, 637, 687; Marquette 3, 69, 71, 178, 190, 228, 285, 287, 305, 368, 571-74, 576, 578, 655-57, 659, 707, 727,

- 728, 730, 731; Menominee 352, 354, 374, 375, 378-80, 382, 383, 385, 387, 393, 414A, 414B, 527, 537A, 538, 539; Ontonagon 5; Schoolcraft 603, 616, 620, 622, 632, 680.
60. *Hadropterus maculatus* (Girard) — Blackside darter. The known Upper Peninsula distribution of this darter is about as indicated by the Lowe collection. It is confined to the Lake Michigan drainage. Lowe records (by counties): Delta 604, 708; Dickinson 547, 548, 553; Menominee 359, 371, 385, 387, 391-93, 404, 407, 409, 413, 427, 428, 432, 441, 451, 463, 467A, 468, 469, 485, 486, 489, 491, 492, 495, 509, 513, 516; Schoolcraft 603, 616, 710.
61. *Percina caprodes semifasciata* (DeKay) — Northern logperch. The logperch is distributed throughout the peninsula. The records are from all counties except Dickinson, Iron, and Ontonagon. Lowe records (by counties): Alger 5142, 5143; Baraga 147, 269; Delta 599, 601, 604, 708; Houghton 143, 149, 161, 164, 204, 302, 664; Keweenaw 309, 311, 317, 319, 322, 326-28, 347; Luce and Mackinac 2; Mackinac 300, 301, 301E, 304, 687, 691; Marquette 305; Menominee 374, 380, 391, 463, 509, 513, 516, 539.
- 62A. *Etheostoma nigrum nigrum* Rafinesque — Central johnny darter. This darter is uniformly distributed and common throughout the area. There are records from all counties except Iron. It is replaced in certain Lake Michigan tributaries by *Etheostoma nigrum eulepis* or by intergrades between the two subspecies. Lowe records (by counties): Alger 5142, 5143; Baraga 147, 362, 667, 669; Delta 602, 604; Dickinson 547, 548, 550; Houghton 143, 149, 154, 161, 164, 191, 204, 302, 363, 664; Keweenaw 309, 316-18, 326-28, 340, 346; Luce 291, 292, 297, 298; Luce and Mackinac 2; Mackinac 304, 682, 687; Marquette 71, 178, 305, 576, 578, 656, 657; Menominee 352-54, 359, 370-73, 392, 394, 401, 402, 404-7, 413, 414, 414A, 415, 425, 427, 434, 438, 439, 441, 451, 457, 458, 460, 461, 463, 466, 468, 469, 485, 486, 489, 491, 492, 495, 506, 508, 509, 511, 513, 516, 529, 537A, 538, 539; Ontonagon 4, 5, 272; Schoolcraft 616, 632, 680, 710.
- 62A x 62B. *Etheostoma nigrum: eulepis* x *nigrum*. These populations exhibit various degrees of intermediacy between the scaly johnny darter and the central johnny darter. The known areas of intergradation are about as indicated below. Lowe records (by counties): Delta 599, 600, 708; Mackinac 301, 301B, 301E; Menominee 385, 387, 391, 393, 409, 426, 428.
- 62B. *Etheostoma nigrum eulepis* (Hubbs and Greene) — Scaly johnny darter. Only a few local populations of this subspecies exist in the area. Most of those known are indicated here. The subspecies is an especially common and characteristic form in Indian Lake, Schoolcraft County. Lowe records (by counties): Baraga 269 (This record is included with some doubt, since it is the first from the Lake Superior basin. The two individuals in the collection may be the result of a transposition of specimens.); Mackinac 300; Schoolcraft 603.

63. *Etheostoma exile* (Girard) — Iowa darter. Fairly common throughout the area, there are distribution records of the Iowa darter from all counties except Alger.  
Lowe records (by counties): Baraga 350, 695; Delta 600, 703; Dickinson 546, 559, 575, 584; Houghton 302, 363; Iron 585; Keweenaw 309, 311, 313, 316, 318, 330, 332, 333, 338-40, 343, 345, 346; Luce 290, 292, 297; Luce and Mackinac 2; Mackinac 301, 303, 304, 637, 638, 675, 677, 682, 685, 691; Marquette 3, 69, 71, 178, 224, 228, 285, 287, 367-69, 573, 574, 576, 578, 598, 654-57, 659, 727, 730; Menominee 353-55, 370, 385, 387, 392-94, 408, 414B, 453, 458, 460, 461, 476, 479, 481, 485, 490, 492, 495, 504, 521, 526, 527, 540; Schoolcraft 616, 618, 620, 680, 710.
64. *Etheostoma flabellare lineolatum* (Agassiz) — Striped fantail darter. This darter is confined in Michigan to the Lake Michigan drainage, where it occurs in Menominee, Delta, and Schoolcraft counties.  
Lowe records: Menominee County 392, 409, 416, 434, 439, 441, 463, 466, 467A, 468, 486, 491, 506, 508, 509, 511, 513, 516, 529.
65. *Etheostoma microperca* Jordan and Gilbert — Least darter. Records of the least darter are from scattered localities in both drainages and from about half the counties.  
Lowe records (by counties): Dickinson 550; Marquette 574, 654, 655; Menominee 353, 354, 408, 409, 414A, 416, 537A, 539.

## COTTIDAE

66. *Cottus bairdi* Girard — Mottled sculpin. This very common sculpin is distributed throughout the peninsula. There are records from all counties. The subspecies of this species are not well understood. Populations of eastern North America are now being studied by C. Richard Robins.  
Lowe records (by counties): Alger 2, 16; Baraga 147, 269, 350, 351, 362, 669, 695, 697; Delta 599, 601, 602, 605; Dickinson 543-47, 550, 555, 558, 559, 584; Houghton 143, 144, 149, 151, 154, 159, 161, 171, 191, 204, 204A, 664; Keweenaw 309, 311, 317-19, 322, 323, 325-28, 331, 340, 346, 347, 501; Luce 292, 296; Luce and Mackinac 2; Mackinac 300, 301, 301E, 681, 682, 687, 691; Marquette 3, 71, 178, 224, 285, 286, 305, 368, 568, 572-74, 578, 588, 593, 596, 597, 656, 725, 727, 730, 733, 1020, 5140; Menominee 353, 359, 374, 375, 377, 378, 380, 397, 398, 402, 405-7, 409, 412, 413, 415, 418-22, 424, 425, 430, 431, 434, 438, 443, 444, 450, 452, 457, 458, 460, 465-67, 470, 474, 476, 481, 483, 486, 489, 490, 492, 506, 508, 509, 511, 513, 526, 528-30; Ontonagon 4, 60, 61; Schoolcraft 616, 623, 630, 710.
67. *Cottus cognatus gracilis* Heckel — Eastern slimy sculpin. This cool-water species is common in Lakes Superior and Michigan and in the Lake Superior drainage of the peninsula. In the Upper Peninsula, however, it is known from tributaries to Lake Michigan only in two streams in Mackinac County.  
Lowe records (by counties): Baraga 147; Houghton 143, 149, 151, 159, 191, 204, 204A, 613, 664; Keweenaw 308, 319, 323, 324, 328, 335, 341, 343, 346-48; Marquette 274, 1022, 5140.

68. *Cottus ricei* Nelson — Spoonhead sculpin. In the United States, this species is known only from the Great Lakes, their shorelines and associated bays.  
Lowe record: Mackinac County 691.

## GASTEROSTEIDAE

69. *Eucalia inconstans* (Kirtland) — Brook stickleback. This stickleback is very common and is distributed throughout the peninsula. There are records from all counties.  
Lowe records (by counties): Alger 16; Baraga 269, 362, 667, 671, 697; Chippewa 295; Delta 599, 600; Dickinson 545-47, 550, 555, 557, 558, 584; Houghton 8, 149, 154, 159, 170, 202A, 612; Keweenaw 307, 309, 313, 321-25, 330, 331, 336, 338, 343, 345, 346, 348, 349, 501; Luce 298; Luce and Mackinac 2, 692; Mackinac 300, 301, 301E, 675-77, 682, 683, 685, 687, 691; Marquette 178, 224, 285, 286, 367, 568, 572-74, 579, 593-96, 598, 606, 654-57, 1019; Menominee 377-79, 382, 385, 387-89, 392-94, 396-403, 405-7, 414A, 424, 429-32, 437, 438, 442, 451, 455, 465, 474, 476, 479, 481-83, 485, 486, 490, 492, 495, 503, 504, 507, 511, 513, 515, 516, 520, 521, 525, 526, 530, 534, 537, 540; Ontonagon 4, 5, 272; Schoolcraft 616, 618, 630, 632.
70. *Pungitius pungitius* (Linnaeus) — Ninespine stickleback. Another species that is known in the area chiefly from the Great Lakes. The single inland record obtained by Lowe is from a relatively large lake.  
Lowe records (by counties): Baraga 362; Keweenaw 309; Marquette 1021.

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