

## THE FISHES OF THE LAKE OF THE WOODS AND CONNECTING WATERS.

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The fish fauna of the Lake of the Woods and its tributary waters is but little known. Very little faunal work has been done on those waters. In 1894 Prof. Albert J. Woolman, then of Duluth, Minnesota, now of Urbana, Illinois, and Prof. Ulysses O. Cox, then of the State Normal School at Mankato, Minnesota, now of the Indiana State Normal School at Terre Haute, Indiana, spent several days on Lake of the Woods, where they made the only considerable collections of fishes that have ever been obtained in that region. These collections were made under the direction of the Rathbun-Wakeham Joint Commission relative to the Preservation of the Fisheries in waters contiguous to Canada and the United States. No formal report of the work done by Woolman and Cox has been published. No list of the fishes occurring in the Lake of the Woods has ever been printed.

In August, 1908, and again in 1909, the International Fisheries Commission visited Rainy Lake and Lake of the Woods and obtained specimens of some of the food fishes as well as much valuable data concerning the fisheries of those waters.

In October, 1908, Dr. S. E. Meek, of the Field Museum of Natural History, Chicago, visited Lake of the Woods and Rainy Lake in connection with the work of the International Fisheries Commission. He collected a considerable number of specimens of the food fishes and some information concerning the fisheries of those waters. These collections and notes have been examined by the present writers, who have also studied the Woolman and Cox collections (now in the U. S. National Museum) and all other available material from that region.

Our grateful thanks are due to Mr. Paul Marschalk, of Warroad, and Capt. Arthur Johnson, of Kenora, for valuable data regarding the commercial fisheries of the Lake of the Woods. To their courtesy we are indebted for most of the statistics of the fisheries, given in this paper.



In the present paper is given an annotated list of all the species of fishes known to the writers as occurring in the Lake of the Woods, Rainy River, Rainy Lake, and their tributary waters.

The interest now attaching to the fish faunas of the boundary waters of the United States and Canada because of the treaty between the United States and Great Britain, which provides for federal control of the fisheries in those waters, makes the publication of this list of special importance and value at this time.

The fisheries of the Lake of the Woods are carried on almost exclusively by means of gill-nets and pound-nets, the former being used only on the Canadian side, while pound-nets are used in both Canadian and American waters. All the gill-net fishery grounds lie north of Little Traverse. The nets are placed in 6- to 90-foot water and the fishing season usually extends from about the middle of May to the end of October, which is practically the entire time that the lake is open.

The pound-net fishery in Canadian waters is chiefly on the east shore, about Big and Bigsby islands. The pounds are set in depths of 16 to 28 feet, and the season is the same as for gill-nets. On the American side the pound-net fisheries are on the south shore, about Buffalo Bay, Sandy Beach, Garden Island, and Oak Island, in water 10 to 24 feet deep. In the gill-net fishery meshes of 4 and 5 inches are used for yellow pike, of 5½ inches for whitefish and tullibee, and 4½ inches for jackfish.

The pound-nets are pretty uniform in construction and dimensions, the mesh being 8 inches in the leader, 4½ in the heart, and 3½ in the crib.

On the Canadian side a few fyke-nets are used for taking bull-heads. This fishery is conducted chiefly in October in 6- to 8-foot water around the edges of the marshes.

Only approximately complete statistics of the fisheries of Lake of the Woods are available; apparently complete records have never been kept. From an examination of such published records as are available and from data kindly furnished us by Mr. Paul Marschalk, of Warroad, Minnesota, and Capt. Arthur Johnson, of Kenora, Ontario, we are able to present the following tables, which, though in some cases far from complete, are of interest and value:

*Pound-net catch, in pounds, of fish in American waters of Lake of the Woods.*

Year.	Yellow pike.	Whitefish.	Jackfish.	Sturgeon.	Total pounds.
1905.....	173,451	65,560	43,887	72,770	355,668
1906.....	129,214	78,041	88,785	34,710	330,750
1907.....	193,079	258,534	96,135	80,123	627,871
1908.....	403,256	207,195	246,993	87,182	944,626



Oak Island pound-net catch, in pounds.

Year.	Yellow pike.	Whitefish.	Jackfish.	Sturgeon.	Total pounds.
1900.....	54,386	21,795	21,685	26,696	124,562
1902.....	60,545	51,469	30,203	50,943	193,160
1907.....	48,050	169,135	32,710	32,678	282,573
1908.....	110,905	101,005	59,465	34,385	305,760

Pound-net catch of whitefish, yellow pike, jackfish, and sturgeon in Lake of the Woods from 1888 to 1909.

Year.	United States.		Canada.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
1888.....	95,000	\$2,375	.....	.....	95,000	\$2,375
1889.....	265,000	6,625	.....	.....	265,000	6,625
1890.....	470,000	7,050	.....	.....	470,000	7,050
1891.....	960,000	19,200	.....	.....	960,000	19,200
1892.....	1,521,000	37,481	115,000	\$2,850	1,636,000	40,331
1893.....	2,250,000	61,750	429,300	12,432	2,679,300	74,182
1894.....	2,106,554	58,898	570,000	16,600	2,676,554	75,498
1895.....	2,023,272	59,437	740,000	21,900	2,763,272	81,337
1896.....	1,580,000	46,600	665,000	19,800	2,245,000	66,400
1897.....	768,802	25,136	307,994	10,169	1,076,796	35,305
1898.....	591,514	23,777	395,900	17,695	987,414	41,472
1899.....	541,468	21,771	228,084	10,821	769,552	32,592
1900.....	325,000	14,465	102,334	5,313	427,334	23,584
1901.....	395,000	16,825	86,142	4,220	481,142	21,045
1902.....	460,000	19,700	123,174	5,752	583,174	25,452
1903.....	423,331	15,969	83,000	3,840	506,331	19,809
1904.....	360,000	14,945	107,910	4,775	467,910	19,720
1905.....	355,668	14,553	140,100	7,033	495,768	21,586
1906.....	330,750	11,696	57,700	2,744	388,450	14,440
1907.....	627,871	32,017	266,162	16,726	894,032	48,743
1908.....	944,626	44,467	354,798	18,389	1,299,424	62,856
1909.....	483,451	28,051	240,767	14,142	724,218	42,193
Total.....	17,878,306	582,788	5,013,365	195,201	22,891,671	781,795

Value f. o. b. barge, shipping point.

Gill-net catch of whitefish, yellow pike, and jackfish in Canadian waters of Lake of the Woods from 1892 to 1909.

Year.	Pounds.	Value.	Year.	Pounds.	Value.
1892.....	41,000	\$1,000	1902.....	235,000	\$7,625
1893.....	350,000	8,600	1903.....	160,000	5,300
1894.....	449,280	12,727	1904.....	220,000	7,500
1895.....	150,000	4,400	1905.....	240,650	7,823
1896.....	145,000	4,200	1906.....	193,100	6,277
1897.....	180,000	5,200	1907.....	179,338	7,776
1898.....	150,500	2,950	1908.....	167,757	6,978
1899.....	145,000	4,200	1909.....	366,588	18,948
1900.....	120,181	3,806	Total.....	3,663,394	120,760
1901.....	170,000	5,450			

Value f. o. b. shipping point.



Total pound-net and gill-net catch of sturgeon, yellow pike, whitefish, and jackfish in Lake of the Woods from 1888 to 1909.

Year.	United States.		Canada.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
1888.....	95,000	\$2,375				
1889.....	265,000	6,625				
1890.....	470,000	7,050				
1891.....	960,000	19,200				
1892.....	1,521,000	37,481	156,000	\$3,850	1,677,000	\$41,331
1893.....	2,250,000	61,750	779,300	21,032	3,029,300	82,782
1894.....	2,106,554	58,898	1,019,280	29,327	3,125,834	88,225
1895.....	2,023,272	59,437	890,000	26,300	2,913,272	85,737
1896.....	1,580,000	46,600	810,000	24,000	2,390,000	70,600
1897.....	768,802	25,136	487,994	15,369	1,256,796	40,505
1898.....	591,514	23,777	546,400	22,005	1,137,914	45,782
1899.....	541,468	21,771	373,084	15,021	914,552	36,792
1900.....	325,000	14,465	222,515	9,119	547,515	23,584
1901.....	395,000	16,825	256,142	9,670	651,142	26,495
1902.....	460,000	19,700	358,174	13,377	818,174	31,077
1903.....	423,331	15,969	243,000	9,140	666,331	25,109
1904.....	360,000	14,945	327,910	12,275	687,910	27,220
1905.....	355,668	14,553	380,750	14,856	736,418	29,409
1906.....	330,750	11,696	250,800	9,021	581,550	20,717
1907.....	627,870	32,017	445,500	24,502	1,073,370	56,519
1908.....	944,626	44,467	522,555	25,367	1,467,181	69,834
1909.....	483,451	28,051	607,355	33,090	1,090,806	61,141
Total.....	17,878,306	582,788	8,676,759	317,321	24,765,065	864,850

Value f. o. b. barge, shipping point. All totals, 26,555,065 pounds, \$900,109.

Fishing gear used in Lake of the Woods (Canadian waters).

Year.	Gill nets.			Pound nets.		Hoop nets.	
	Number.	Yards.	Value.	Number.	Value.	Number.	Value.
1893.....		28,220	\$2,640	2	\$350		
1894.....		27,700	3,436	14	1,750	2	\$45
1895.....		30,860	1,320	76	12,690	10	400
1896.....	151	48,000	1,620	127	30,150		
1897.....	65	28,000	1,200	60	9,000	15	500
1898.....	35	14,000	1,250	28	3,300		
1899.....		10,000	955	34	3,500		
1900.....		22,200	2,200	30	3,500		
1901.....		4,000	1,000	24	1,800		
1902.....		13,500	1,900				
1903.....		22,000	3,080	12	2,500		
1904.....		22,000	3,025	12	3,500		
1905.....		55,200	9,255	12	3,500		
1906.....		16,000	1,950	14	4,000		
1907.....		12,000	1,625	14	2,000		
1908.....		12,000	1,755	14	3,000	3	75



Number and value of pound-nets in Lake of the Woods from 1888 to 1910.

Year.	American waters.		Canadian waters.		Total.	
	Nets.	Value.	Nets.	Value.	Nets.	Value.
1888.....	4	\$400			4	\$400
1889.....	10	1,000			10	1,000
1890.....	17	1,700			17	1,700
1891.....	21	2,100			21	2,100
1892.....	52	5,200	2	\$200	54	5,400
1893.....	91	9,100	4	400	95	9,500
1894.....	146	14,600	20	2,000	166	16,600
1895.....	193	19,300	100	10,000	293	29,300
1896.....	193	19,300	127	12,700	320	32,000
1897.....	145	14,500	70	7,000	215	21,500
1898.....	107	10,700	40	4,000	147	14,700
1899.....	107	10,700	34	3,400	141	14,100
1900.....	81	8,100	30	3,000	111	11,100
1901.....	74	7,400	24	2,400	98	9,800
1902.....	68	6,800	14	1,400	82	8,200
1903.....	68	6,800	12	1,200	80	8,000
1904.....	62	6,200	12	1,200	74	7,400
1905.....	66	6,600	12	1,200	78	7,800
1906.....	56	5,600	14	1,400	70	7,000
1907.....	50	5,000	14	1,400	64	6,400
1908.....	54	5,400	14	1,400	68	6,800
1909.....	79	7,900	14	1,400	93	9,300
1910.....	90	9,000	14	1,400	104	10,400

Number and value of boats on Lake of the Woods (Canadian side).

Year.	Vessels or tugs.				Boats.		
	Number.	Tonnage.	Value.	Men.	Number.	Value.	Men.
1893.....	1	25	\$1,200	4	21	\$700	41
1894.....	1	48	4,000	6	50	1,350	100
1895.....	6	110	16,200	19	66	4,430	119
1896.....	11	714	17,050	38	81	8,760	151
1897.....	10	304	13,300	27	34	2,650	90
1898.....	4	54	5,800	14	24	2,450	48
1899.....	3	38	4,500	10	20	950	49
1900.....	6	62	4,250	13	13	625	26
1901.....	4	30	5,050	10	11	580	21
1902.....					15	1,300	36
1903.....	4	100	8,000	10	13	1,350	46
1904.....	4	100	8,000	12	19	3,675	40
1905.....	5	165	8,500	14	43	7,775	86
1906.....	4	160	6,000	12	13	2,450	26
1907.....	4	300	6,000	12	9	1,950	19
1908.....	2	150	5,100	6	9	2,225	22

Rainy Lake catch for 1908.

Species.	Catch in pounds.	Value.
Pike.....	20,000	\$900
Whitefish.....	40,000	1,800
Jackfish.....	55,000	825
Suckers.....	41,000	205
Sturgeon.....	4,000	320
Total.....	160,000	4,050



## LIST OF SPECIES.

In the following list we include only those species of which we have seen specimens from the Lake of the Woods, Rainy River, Rainy Lake, or their connecting waters.

1. *ICHTHYOMYZON CONCOLOR* (Kirtland).

## SILVERY LAMPREY.

Two specimens obtained August 10 by Woolman and Cox at Garden Island, Lake of the Woods. Numerous specimens obtained in 1894 by the Minnesota Natural History Survey. Doubtless abundant; often parasitic on the sturgeon.

Infraoral cusps 7.

2. *ACIPENSER RUBICUNDUS* Le Sueur.

## GREAT LAKES STURGEON.

Lake of the Woods is the greatest sturgeon pond in the world. Up to about 1892 sturgeon swarmed in this lake in almost incredible numbers. In that year the sturgeon fishery began to assume considerable proportions. By 1893 to 1896 it had become of great importance. In 1893 the catch in American waters amounted to 1,300,000 pounds, valued at \$26,000. The yield of caviar in the same year amounted to 97,500 pounds, valued at \$19,500; and the amount of sturgeon sounds was 5,830 pounds, valued at \$5,830. Thus the total for 1893 was 1,403,330 pounds, valued at \$51,330. By 1903 the sturgeon catch had dwindled to 45,239 pounds, worth \$2,714, and the caviar taken in that year amounted to only 1,550 pounds, valued at \$1,240. Since 1903 the catch of sturgeon has fluctuated somewhat, but has always been low. In 1908, in American waters, it amounted to 87,182 pounds, worth \$8,718.

According to local fishermen there has been a slight increase in the number of sturgeon within the last few years. They constitute a large part of the pound-net catch.

A 4-foot sturgeon will dress about 15 pounds, which is too small for a minimum size; it would be better to make 20 pounds dressed the minimum.

The spawning season is in the spring and is probably over by the end of May. The principal, if not the only, spawning ground is Rainy River.

The table following gives the statistics of the sturgeon fishery for the Lake of the Woods from 1893 to and including 1909, for both American and Canadian waters, as complete as can be compiled from available figures.



Yield of the sturgeon fishery of Lake of the Woods from 1888 to 1909.

Products.	United States.		Canada.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
1888.						
Sturgeon.....	40,000	\$400	.....	.....	40,000	\$400
Caviar.....	3,000	300	.....	.....	3,000	300
Sounds.....	160	160	.....	.....	160	160
1889.						
Sturgeon.....	100,000	1,000	.....	.....	100,000	1,000
Caviar.....	7,500	750	.....	.....	7,500	750
Sounds.....	313	313	.....	.....	313	313
1890.						
Sturgeon.....	200,000	2,000	.....	.....	200,000	2,000
Caviar.....	15,000	1,500	.....	.....	15,000	1,500
Sounds.....	630	630	.....	.....	630	630
1891.						
Sturgeon.....	500,000	5,000	.....	.....	500,000	5,000
Caviar.....	22,500	2,250	.....	.....	22,500	2,500
Sounds.....	1,575	1,575	.....	.....	1,575	1,575
1892.						
Sturgeon.....	800,000	12,000	80,000	\$1,200	880,000	13,200
Caviar.....	60,000	12,000	6,000	1,200	66,000	13,200
Sounds.....	3,300	3,300	330	330	3,630	3,630
1893.						
Sturgeon.....	1,300,000	26,000	350,000	7,000	1,650,000	33,000
Caviar.....	97,500	19,500	26,250	5,250	123,750	24,750
Sounds.....	5,830	5,830	1,450	1,450	7,280	7,280
1894.						
Sturgeon.....	1,059,267	21,185	400,000	8,000	1,459,267	29,185
Caviar.....	79,350	15,870	30,000	6,000	109,350	21,870
Sounds.....	4,413	4,413	1,660	1,660	6,079	6,079
1895.						
Sturgeon.....	1,143,072	22,861	500,000	10,000	1,643,072	32,861
Caviar.....	85,650	25,695	37,500	8,250	123,150	33,945
Sounds.....	4,763	4,763	2,083	2,083	6,846	6,846
1896.						
Sturgeon.....	1,000,000	20,000	500,000	10,000	1,500,000	30,000
Caviar.....	75,000	23,500	37,500	11,250	112,500	34,750
Sounds.....	4,166	4,166	2,083	2,083	6,249	6,249
1897.						
Sturgeon.....	511,159	12,779	214,154	5,353	725,313	18,132
Caviar.....	30,000	18,000	13,000	7,800	43,000	25,800
Sounds.....	1,703	1,703	714	714	2,417	2,417
1898.						
Sturgeon.....	330,033	13,201	295,900	11,836	625,933	25,037
Caviar.....	16,500	13,200	14,700	11,576	31,200	24,776
Sounds.....	1,375	1,375	1,232	1,232	2,607	2,607
1899.						
Sturgeon.....	197,601	9,880	135,984	6,799	333,585	16,679
Caviar.....	7,350	5,880	5,100	4,080	12,450	9,960
Sounds.....	823	823	566	566	1,389	1,389
1900.						
Sturgeon.....	100,000	6,000	52,334	3,140	152,334	9,140
Caviar.....	3,750	3,000	1,350	1,080	5,100	4,080
Sounds.....	416	416	218	218	634	634
1901.						
Sturgeon.....	100,000	6,000	37,367	2,241	137,367	8,241
Caviar.....	3,750	3,000	1,200	960	4,950	3,960
Sounds.....	416	416	155	155	571	571



*Yield of the sturgeon fishery of Lake of the Woods from 1888 to 1909—Continued.*

Products.	United States.		Canada.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
1902.						
Sturgeon.....	120,000	\$7,200	44,049	\$2,643	164,049	\$9,843
Caviar.....	4,300	3,440	1,500	1,200	5,500	4,660
Sounds.....	500	375	183	138	683	513
1903.						
Sturgeon.....	45,239	2,714	31,000	1,860	76,239	4,574
Caviar.....	1,550	1,240	850	680	2,230	1,920
Sounds.....	111	83	78	59	189	142
1904.						
Sturgeon.....	80,000	4,800	41,950	2,517	121,950	7,317
Caviar.....	2,300	1,840	650	520	2,950	2,490
Sounds.....	266	133	106	53	372	186
1905.						
Sturgeon.....	72,770	4,364	63,800	3,828	136,570	8,192
Caviar.....	1,100	880	480	384	1,580	1,264
Sounds.....	243	122	212	106	455	228
1906.						
Sturgeon.....	34,710	1,877	15,000	1,200	49,710	3,077
Caviar.....	750	750	300	300	1,050	1,050
Sounds.....	123	61	50	25	173	86
1907.						
Sturgeon.....	80,122	8,012	83,900	8,390	164,022	16,402
Caviar.....	700	700	900	900	1,600	1,600
Sounds.....	210	105	226	113	436	218
1908.						
Sturgeon.....	87,182	8,718	54,385	5,438	141,567	14,154
Caviar.....	630	787	580	725	1,210	1,512
Sounds.....	230	115	165	82	395	197
1909.						
Sturgeon.....	34,021	4,082	19,295	2,315	53,316	6,397
Caviar.....	346	519	383	574	729	1,093
Sounds.....	120	60	64	32	184	92
Total.....	8,745,688	385,611	2,608,936	167,588	11,593,860	553,603

Sounds given in pounds. Value figured as per prices paid to the fishermen at their fisheries.

The shallow waters of Lake of the Woods are peculiarly adapted to the habits of the sturgeon, which delights to frequent comparatively shoal water. Its food consists largely of crawfishes and the smaller gasteropods, such as the thin-shelled *Physa*, the equally fragile *Planorbis* and *Valvata*, and the more firm *Limnæa* and *Melantho*. Though primarily a bottom feeder, it by no means confines its menu to the food found thereon; for small fishes constitute no inconsiderable portion of its bill of fare. On August 9, 1894, Professor Woolman examined the stomach contents of 55 sturgeon at Garden Island, Lake of the Woods. Of these, 28 contained one or more crawfish, 6 had insect larvæ, 6 contained mollusks, and 22 were empty. Among the miscellaneous objects found were a fish egg of some sort in one, a fish vertebra in one, a hazelnut in another, and gravel in eight.



The senior author in September, 1894, examined the stomach contents of several Oregon sturgeon (a related species) in Snake River near Weiser, Idaho. A young individual 25 inches long contained 11 minnows. In the stomachs of larger examples were found several suckers (*Catostomus macrocheilus*), each about a foot in length. In the lower Columbia the Oregon sturgeon is said to feed largely on sardines, smelts, and other small fishes, and lamprey eels are regarded as excellent sturgeon bait.

The great decrease in the sturgeon catch of the Lake of the Woods is without doubt chiefly due to overfishing, although it is claimed by local interests that recent years show a slight increase in the catch, and the statistics sustain this contention. There is no evidence that the sturgeon have actually increased in abundance. This increased catch is more likely due to closer fishing rather than to an actual increase in the abundance of the species. The International Fisheries Commission is of the opinion that all sturgeon fishing in these waters should cease for a period of four years.

3. *AMIA CALVA* Linnaeus.

DOGFISH; BOWFIN.

Probably not uncommon; of no value as food.

4. *AMEIURUS MELAS* (Rafinesque).

BLACK BULLHEAD.

One specimen from Rapid River, August 9. Probably common.

5. *CARPIODES THOMPSONI* Agassiz.

CARP SUCKER.

One specimen from Stevens Point.

Common; one of the most abundant fishes in this lake. Reaches a large size, and is of some value as a food fish.

An example taken in Lake Champlain about April 23, 21 inches long, weighed 7 pounds. It was a nearly ripe female and the roe alone weighed 2.5 pounds.

6. *CATOSTOMUS CATOSTOMUS* (Forster).

NORTHERN SUCKER; RED SUCKER; MEETHQUAMAYPATH OF THE CREES.

Thirty-two specimens,  $1\frac{1}{2}$  to  $3\frac{1}{2}$  inches long, from Falls River, August 8, and one,  $1\frac{7}{8}$  inches long, from mouth of Rapid River, August 9.

Abundant, and of some value as a food fish.

7. *CATOSTOMUS COMMERSONII* (Lacépède).

WHITE SUCKER; FINE-SCALED SUCKER; CARPE BLANCHE; NAMAYPEETH OF THE CREES.

One specimen,  $1\frac{3}{4}$  inches long, from Rapid River, August 9, and others obtained in Lake of the Woods.

Less abundant than the preceding.



## 8. CATOSTOMUS NIGRICANS Le Sueur.

## BLACK SUCKER; HOG SUCKER.

Two specimens from Oak Island, August 10; eight from Stevens Point, August 6; and two from Rat Portage, off Coney Island, August 3.

## 9. MOXOSTOMA ANISURUM (Rafinesque)

## REDHORSE.

One specimen from the mouth of Rainy River, August 8, and one,  $3\frac{3}{8}$  inches long, from Rapid River, August 9.

Not uncommon.

## 10. MOXOSTOMA AUREOLUM (Le Sueur).

## REDHORSE.

One specimen,  $3\frac{3}{4}$  inches long, from the mouth of Rainy River, August 7; two,  $1\frac{3}{8}$  and  $2\frac{1}{8}$  inches long, from Rapid River, August 9; one,  $2\frac{3}{4}$  inches long, from Garden Island, August 10; and one from Oak Island, August 10.

Abundant, and of considerable value as a food fish.

## 11. PIMEPHALES PROMELAS Rafinesque.

## BULLHEAD MINNOW.

Probably abundant, as it is in most waters of northern Minnesota.

## 12. PIMEPHALES NOTATUS (Rafinesque).

## BLUNT-NOSED MINNOW.

Common; often associated with the preceding.

## 13. SEMOTILUS ATROMACULATUS (Mitchill).

## CREEK CHUB.

Common.

## 14. NOTROPIS CAYUGA Meek.

Two specimens,  $2\frac{1}{8}$  and  $2\frac{1}{4}$  inches long, from the mouth of Warroad Creek, Lake of the Woods, August 8, and two,  $2\frac{1}{8}$  and  $2\frac{1}{4}$  inches long, from Rat Portage, August 3.

Common.

## 15. NOTROPIS BLENNIUS (Girard).

## STRAW-COLORED MINNOW.

Three specimens from Garden Island, August 10, and seven from Oak Island, August 10.

## 16. NOTROPIS HUDSONIUS (De Witt Clinton).

## SHINER; SPAWN-EATER.

Twelve specimens,  $1\frac{7}{8}$  to  $3\frac{1}{2}$  inches long, from Rat Portage, August 3; five,  $1\frac{1}{8}$  to  $3\frac{7}{8}$  inches long, from Stevens Point, August 6; seven,  $2\frac{3}{8}$  to



$3\frac{3}{8}$  inches long, from the mouth of Rainy River, August 7; four,  $1\frac{1}{8}$  to  $1\frac{1}{4}$  inches long, from the Rainy River, August 8; twelve,  $2\frac{3}{4}$  to  $3\frac{1}{2}$  inches long, from Rapid River; two,  $3\frac{1}{2}$  inches long, from Garden Island, August 10; ten,  $1\frac{1}{4}$  to  $3\frac{5}{8}$  inches long, from Oak Island, August 10; and one from mouth of Rainy River, August 7.

Perhaps the most abundant minnow in these waters; doubtless constitutes a large part of the food of the carnivorous species.

17. *NOTROPIS CORNUTUS* (Mitchill).

SILVERSIDE.

Fifteen specimens,  $2\frac{1}{8}$  to  $2\frac{7}{8}$  inches long, from Stevens Point, August 6.

Common, and of importance as food for other fishes.

18. *NOTROPIS JEJUNUS* (Forbes).

Eleven specimens,  $2\frac{1}{4}$  to  $2\frac{3}{4}$  inches long, from Stevens Point, August 6; ten,  $2\frac{1}{2}$  to  $3\frac{3}{4}$  inches long, from the mouth of Rainy River, August 7; eight from Garden Island, August 10; sixteen from Oak Island, August 10; four from Asmus Point, August 7; and sixteen from mouth of Rainy River, August 7 and 8.

Apparently abundant.

19. *NOTROPIS ATHERINOIDES* Rafinesque.

Five specimens from Oak Island; ten,  $2\frac{1}{4}$  to  $3\frac{1}{2}$  inches long, from Stevens Point, August 6; and five,  $2\frac{3}{4}$  to  $2\frac{7}{8}$  inches long, from Asmus Point.

Common.

20. *NOTROPIS RUBRIFRONS* (Cope).

Four specimens from Rapid River, August 9, and twenty-four, from Asmus Point, August 7.

Common.

21. *NOTROPIS UMBRATILIS CYANOCEPHALUS* (Copeland).

One specimen,  $1\frac{3}{4}$  inches long, from Rat Portage, August 3, and fifty-three,  $1\frac{1}{2}$  to  $3\frac{5}{8}$  inches long, from Rapid River, August 9.

22. *RHINICHTHYS CATARACTÆ* (Cuvier and Valenciennes).

NIAGARA DACE.

Three specimens,  $2\frac{1}{8}$  to  $2\frac{1}{2}$  inches long, from Rapid River, August 9. Not abundant.

23. *RHINICHTHYS ATRONASUS* (Mitchill).

BLACK-NOSED DACE.

One specimen  $1\frac{7}{8}$  inches long from Falls River, August 8, and four  $1\frac{1}{2}$  to  $2\frac{1}{8}$  inches long, from Rapid River, August 9.

More common than preceding.



## 24. AMPHIODON ALOSOIDES Rafinesque.

## GOLDEYE.

The goldeye is common in Lake of the Woods where numerous specimens were obtained by Doctor Meek. Although an excellent food fish and extensively utilized at Winnipeg it is not much used at this lake. Occasionally shipments are made to Winnipeg. Smoked, it is really delicious, and as a pan fish it is excellent. Sir John Richardson says: "The flesh is white, resembling that of the perch in flavor, but excelling it in richness."

There is no good reason why the fishery for this interesting species should not be developed and become of considerable importance.

## 25. HIODON TERGISUS Le Sueur.

## MOONEYE; TOOTHED HERRING.

Three small specimens from Oak Island, August 10; one from mouth of Rainy River, and one from Stevens Point.

Probably less common than the preceding. This species is not valued as a food fish.

## 26. COREGONUS CLUPEAFORMIS (Mitchill).

## LABRADOR WHITEFISH.

Abundant, and a valued food fish. The common whitefish (*Coregonus albus*) of Lake Erie apparently does not occur in the Lake of the Woods nor in any of its connecting waters.

*Catch of whitefish in Lake of the Woods from 1888 to 1909.*

Year.	United States.		Canada.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
1888.....	20,000	\$200	.....	.....	20,000	\$200
1889.....	60,000	600	.....	.....	60,000	600
1890.....	100,000	1,000	.....	.....	100,000	1,000
1891.....	175,000	1,750	.....	.....	175,000	1,750
1892.....	250,000	3,750	30,000	\$450	280,000	4,200
1893.....	350,000	5,250	309,300	4,639	659,300	9,889
1894.....	411,018	8,220	449,280	8,985	860,298	17,205
1895.....	280,563	5,611	230,000	4,600	510,563	10,211
1896.....	200,000	4,000	180,000	3,600	380,000	7,600
1897.....	71,907	1,438	160,000	3,200	231,987	4,638
1898.....	112,624	2,252	100,000	2,000	212,624	4,252
1899.....	179,242	3,584	80,000	1,600	259,242	5,184
1900.....	85,000	2,115	50,000	1,250	135,000	3,365
1901.....	115,000	2,875	60,000	1,500	175,000	4,375
1902.....	130,000	3,250	85,000	2,125	215,000	5,375
1903.....	110,048	2,751	80,000	2,000	190,048	4,751
1904.....	65,000	1,625	93,000	2,325	158,000	3,950
1905.....	65,560	1,639	115,000	2,885	180,560	4,524
1906.....	78,041	1,951	85,000	2,125	163,041	4,076
1907.....	258,534	9,048	165,000	5,775	423,534	14,823
1908.....	207,195	7,251	180,000	6,300	387,195	13,551
1909.....	140,642	7,031	220,000	11,000	360,642	18,031
Total.....	3,465,374	77,391	2,671,580	56,359	6,137,034	143,630

Value as per prices paid fishermen at their fisheries.



27. LEUCICHTHYS TULLIBEE (Richardson).

TULLIBEE.

Five specimens, 2¼ to 5⅔ inches long, from Kettle Falls, Rainy Lake, Minnesota, July 26, 1895; also obtained by Doctor Meek in October, 1908.

Abundant; less valued as a food fish than the preceding species.

28. CRISTIVOMER NAMAYCUSH (Walbaum).

LAKE TROUT.

Said to be very rare; perhaps most frequent in Whitefish Bay.

29. LUCIUS LUCIUS (Linnæus).

COMMON PIKE; PICKEREL; JACKFISH.

This fish is variously known in the Lake of the Woods district as jack, jackfish, grass pike, or pickerel, where it is an abundant and important food fish. In the American waters of the Lake of the Woods this fish is taken in pound nets set in 10 to 24 feet of water at Buffalo Bay, Sandy Beach, Garden Island, and Oak Island. The nets are the same as those used for whitefish. The jackfish average 2 feet in length and 5 pounds in weight. Their spawning season is in April, in marshy and grassy places in shallow water. They are voracious fish and feed largely on other fishes. The usual price received by the fishermen is 2½ cents a pound; the wholesale price 3½ cents.

*Catch of jackfish in Lake of the Woods from 1888 to 1909.*

Year.	United States.		Canada.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
1888.....	10,000	\$100	.....	.....	10,000	\$100
1889.....	30,000	300	.....	.....	30,000	300
1890.....	50,000	500	.....	.....	50,000	500
1891.....	85,000	850	.....	.....	85,000	850
1892.....	115,000	1,150	10,000	\$100	125,000	1,250
1893.....	200,000	2,000	40,000	400	240,000	2,400
1894.....	231,165	2,311	80,000	800	311,165	3,111
1895.....	125,861	1,258	40,000	400	165,861	1,658
1896.....	80,000	800	30,000	300	110,000	1,100
1897.....	48,275	482	33,760	337	82,035	819
1898.....	56,676	566	30,500	305	87,176	871
1899.....	39,903	399	25,000	250	64,903	649
1900.....	40,000	600	50,000	750	90,000	1,350
1901.....	50,000	750	60,000	900	110,000	1,650
1902.....	60,000	900	70,000	1,050	130,000	1,950
1903.....	42,963	644	44,900	673	87,863	1,317
1904.....	45,000	670	66,900	1,003	111,900	1,673
1905.....	43,887	658	71,300	1,069	115,187	1,727
1906.....	88,785	1,331	58,100	871	146,885	2,202
1907.....	96,135	1,922	66,600	1,332	162,735	3,254
1908.....	246,993	4,939	111,889	2,237	358,882	7,176
1909.....	133,354	3,333	188,060	4,701	321,414	8,034
Total.....	1,918,997	26,463	1,077,009	17,478	2,996,006	43,941

Value as per prices paid to fishermen at their fisheries.



30. *EUCALIA INCONSTANS* (Kirtland).

## BROOK STICKLEBACK.

One specimen  $1\frac{7}{8}$  inches long, from Rapid River, August 9.  
Probably common.

31. *PERCOPSIS GUTTATUS* Agassiz.

## TROUT PERCH.

Two specimens from Stevens Point, August 6; five from Rapid River, August 9, and three from Rat Portage, August 3.

32. *POMOXIS SPAROIDES* (Lacépède).

## CALICO BASS.

One specimen from the mouth of Rainy River, August 8; eight,  $1\frac{7}{8}$  to  $2\frac{1}{4}$  inches long, from Rapid River, August 9; four,  $1\frac{5}{8}$  to 2 inches long, from Oak Island, August 10; one,  $2\frac{1}{4}$  inches long, from Garden Island, August 10, and three,  $\frac{7}{8}$  to 2 inches long, from Rat Portage, August 3.

33. *AMBLOPLITES RUPESTRIS* (Rafinesque).

## ROCK BASS.

Apparently not common; one specimen obtained by Doctor Meek at Baudette, on Rainy River.

34. *STIZOSTEDION VITREUM* (Mitchill).

## WALLEYED PIKE; YELLOW PIKE; DORÉ.

Numerous specimens from Stevens Point, Asmus Point, Oak Island, Rat Portage, Rapid River, and mouth of Rainy River.

The walleyed pike is one of the most valuable fishes of Lake of the Woods, in which it occurs in abundance and in the dark but clear waters of which it reaches its highest development.

The yellow pike fishery in American waters of the Lake of the Woods is carried on at South Shore, Buffalo Bay, Sandy Beach, Garden Island, and Oak Island by means of pound nets set in 10 to 24 feet of water. The mesh of these nets is 8 inches in the leader,  $4\frac{1}{2}$  in the heart, and  $3\frac{1}{2}$  in the crib. The fishing season is normally from May 20 to the last of October. The average length of the fish taken is about 16 inches and the weight 3 pounds. The fishermen receive 5 cents a pound, and the average wholesale price is 6 to 7 cents.

The yellow pike spawns in these waters from the latter part of April to May 15, or perhaps as late as May 30, or soon after the ice goes out. The spawning grounds are near shore on gravel bottom, along whole shore line.



Catch of yellow pike in Lake of the Woods from 1888 to 1909.

Year.	United States.		Canada.		Total.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
1888.....	25,000	\$250	.....	.....	25,000	\$250
1889.....	75,000	750	.....	.....	75,000	750
1890.....	120,000	1,200	.....	.....	120,000	1,200
1891.....	200,000	2,000	.....	.....	200,000	2,000
1892.....	300,000	4,500	36,000	\$540	336,000	5,040
1893.....	400,000	6,000	80,000	1,200	480,000	7,200
1894.....	405,104	6,076	90,000	1,350	495,104	7,426
1895.....	473,776	9,475	120,000	2,400	593,776	11,875
1896.....	300,000	6,000	100,000	2,000	400,000	8,000
1897.....	137,461	2,749	80,000	1,600	217,461	4,349
1898.....	92,181	1,843	120,000	2,400	212,181	4,243
1899.....	124,722	2,494	132,100	2,642	256,822	5,136
1900.....	100,000	2,500	70,181	1,754	170,181	4,254
1901.....	130,000	3,250	98,775	2,468	228,775	5,718
1902.....	150,000	3,750	159,125	3,978	309,125	7,728
1903.....	225,081	5,627	87,100	2,177	312,181	7,804
1904.....	170,000	4,250	126,060	3,151	296,060	7,401
1905.....	173,451	4,336	130,650	3,266	304,101	7,602
1906.....	129,214	3,230	92,700	2,317	221,914	5,547
1907.....	193,079	6,757	130,000	4,550	323,079	11,307
1908.....	403,256	14,113	176,281	6,169	579,527	20,282
1909.....	175,434	8,771	180,000	9,000	355,434	17,771
Total.....	4,502,759	99,921	2,008,972	52,962	6,511,731	152,883

Vlue as per prices paid to fishermen at their fisheries.

35. STIZOSTEDION CANADENSE (Smith).

SAUGER; SAND PIKE.

Obtained by Doctor Meek at Baudette. Not common.  
The catch of saugers in the commercial fisheries is combined with that of yellow pike, all being sold as yellow pike.

36. PERCA FLAVESCENS (Mitchill).

YELLOW PERCH.

Ommon, especially in the lakes. Specimens are in the collections from Rat Portage, Oak Island, Garden Island, Asmus Point, Stevens Point, Rainy River, Falls River, and Rapid River, all taken in August. Doctor Meek saw none at Baudette when he was there in October.

37. PERCINA CAPRODES ZEBRA (Agassiz).

LOG PERCH.

Five specimens, 1¾ to 2 inches long, from Stevens Point, August 6, and two 1¼ and 1⅞ inches long, from Oak Island, August 10.

38. HADROPTERUS GUNTHERI (Eigenmann and Eigenmann).

Eight specimens, 1½ to 1½ inches long, from Rapid River, August 9; fourteen, 1¼ to 1⅞ inches long, from the mouth of Rainy River; and two, 1¼ and 2 inches long, from Stevens Point.



39. *BOLEOSOMA NIGRUM* (Rafinesque).

JOHNNY DARTER.

Forty-two specimens,  $1\frac{1}{2}$  to  $2\frac{1}{8}$  inches long, from Rat Portage, August 3; three,  $1\frac{1}{4}$  to  $1\frac{3}{4}$  inches long, from the mouth of Rainy River, August 8; and one,  $1\frac{1}{8}$  inches long, from White Oak Lake at Deer River, August 21.

40. *LOTA MACULOSA* (Le Sueur).

LING; LAWYER; EEL POUT.

One of the most abundant fishes in Lake of the Woods and one of the most useless. It is very destructive to other fishes, particularly whitefish, of which it will take examples of its own size or even larger.

Although there is no market for the ling and it is regarded as worthless at Lake of the Woods, it is in truth a very good food fish, and it ought to be possible to develop a market for it.





Evermann, Barton Warren and Latimer, Homer Barker. 1910. "The fishes of the Lake of the Woods and connecting waters." *Proceedings of the United States National Museum* 39(1778), 121–136.

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