



**Biological and Commercial Catch Statistics
from the Ojibwe Inter-Tribal Gill Net Fishery
within Michigan Waters of Lake Superior
During 2018**

by
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ABSTRACT

The 2018 commercial inter-tribal fishery in the 1842 treaty-ceded waters of Michigan consisted of ten large boats and seven small boats, representing nineteen tribal licensees from the Keweenaw Bay, Bad River and Red Cliff Bands of Lake Superior Chippewa. Gill nets were the only gear used in the fishery.

The fishing season for whitefish and lake trout was closed from November 1 through November 27 for Bad River and Keweenaw Bay and from November 6 to November 27 for Red Cliff; commercial fishing was prohibited during October in seven seasonal refuges. Target fishing for lean lake trout (fishing in water less than 35 fathoms) in areas outside the refuges was prohibited during October to reduce the impact of fishing on spawning stocks of lake trout. The Keweenaw Bay tribe managed their cisco (lake herring) fishery through a quota system.

Fishermen reported fishing 3.8 million feet of gill net and harvesting 423,392 round pounds of fish. Whitefish was the primary target species, making up 81.3% of the total, followed by lake trout (16.7%) with the remaining 2% a mix of siscowet lake trout, cisco or lake herring, salmon and trout, walleye, sucker species, and other unspecified species.

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INTRODUCTION

The Red Cliff, Bad River and Keweenaw Bay Bands of Lake Superior Chippewa entered into an agreement to establish an inter-tribal off-reservation assessment fishery in the western Michigan waters of Lake Superior (from the Wisconsin- Michigan state line to the West Entry in the Keweenaw Peninsula) on 23 August 1984. In 1988 tribal off-reservation commercial fishing expanded to include more fishermen and fishing in waters east of the Keweenaw Peninsula. An inter-tribal agreement was developed to manage this expanded fishery. Since 1990 Bad River and Red Cliff have followed the lake trout quota allocation formula of this inter-tribal agreement, while Keweenaw Bay has managed its fishery through the tribes' fisheries management plan. Results of the early assessment fishery and the expanded commercial fishery have been reported annually as administrative reports of the Great Lakes Indian Fish and Wildlife Commission.

Biological and commercial fishery statistics were summarized for calendar year 2018 from the inter-tribal fishery in the 1842 treaty-ceded territory within Michigan waters of Lake Superior (Figure 1), and compared to those from previous years. Statistics were reported by management unit, grid, and gear type as indicated on individual catch reports.

Description of the Fishery

The 2018 commercial inter-tribal fishery in the 1842 treaty-ceded waters of Michigan consisted of nine large boats and seven small boats, representing sixteen tribal licensees from the Keweenaw Bay, Bad River, and Red Cliff Bands of Lake Superior Chippewa. As in previous years, the area south of a line from the East Entry of Keweenaw Peninsula to Point was open only to Keweenaw Bay small boat fishermen (Figure 1). Gill nets were the only gear used in the fishery during 2018.

The fishing season for whitefish and lake trout was closed from November 1 through November 27 for Bad River and Keweenaw Bay and from November 6 to November 27 for Red Cliff to reduce the impact of fishing on spawning stocks of whitefish. Fishing for siscowet was prohibited in water less than 35 fathoms during the closed season for lake trout and whitefish. Commercial fishing was prohibited during October in seasonal refuges, of which four were created in 1988, and three in 1989 (Figure 1). Target fishing for lean lake trout in other areas was prohibited during October to reduce the impact of fishing on spawning stocks of lake trout.

Quota Management System

Since 1985, the tribes have used a quota management system to regulate lake trout harvest and to limit mortality on lake trout stocks in the 1842 inter-tribal gill net fishery within Michigan waters of Lake Superior. Harvest quotas applied only to lean lake trout (referred to as “lake trout” in this report). Harvest of siscowet, a form of lake trout that generally inhabits deeper water than lean lake trout, was not regulated by quotas. The Keweenaw Bay Indian Community has also used a quota management system for regulating cisco (lake herring) harvest by its fishermen. For lake trout, each gill net tug was assigned a lake trout quota of 3,750 or 15,000 pounds depending on tribal affiliation in 1985 and 1986. Starting with the 1987-1990 time period and for each of the four management units, total allowable catch (TAC, expressed as number of fish) values were estimated for each year within the time period. The average TAC was then calculated and used as the TAC for each fishing year within the time period. TAC’s and tribal quotas were generated from stock assessment model outputs developed by an ad hoc modeling group consisting of tribal and state, and federal biologists. This group recommended TAC’s for each management unit and for each fishing year within a 1-6 year period (Table 1).

METHODS

Commercial catch and effort statistics were collected from mandatory daily catch reports filed bi-weekly by all fishermen who sold fish in their names, or by the boat captain who reported all effort and catch for his vessel. Gill net effort was reported as linear feet of gill net lifted. Harvest was reported in both dressed and round pounds. Species for which harvest was reported by fishermen as dressed pounds and conversion factors used to calculate round pounds are as follows:

Species	Conversion
Whitefish	1.17
Lake trout	1.25
Siscowet	1.25
Salmon and Trout	1.25
Cisco	1.20

Harvests of other species (walleye, suckers, burbot, northern pike, and menominee) are reported by fishermen as round pounds.

Biological statistics were derived from monitoring data collected via on-board and dock-side measurements of individual fish. Annual total mortality was estimated from the abundance of successive age groups (Ricker 1975). Biological monitoring of catches occurred through the cooperation of the Keweenaw Bay Natural Resources Department, the Red Cliff Fisheries Department, the Bad River Natural Resources Department, and the Great Lakes Indian Fish and Wildlife Commission.

RESULTS AND DISCUSSION

Commercial Catch and Effort Statistics

Fishermen reported fishing 3.8 million feet of gill net and harvesting 423,392 round pounds of fish (Table 2). Whitefish was the primary target species, making up 81.3% of the total, followed by lake trout (16.7%) with the remaining 2% a mix of siscowet lake trout (0.8%), other unspecified species (0.5%), suckers (0.4%), salmon and trout (0.2%), walleye (0.2%), and cisco or lake herring (<0.1%) (Tables 3 and 4).

Unit MI-2

Harvest. Twenty-two percent of the overall harvest was taken in MI-2, which was fished by two tribes (Tables 2 and 4). Of the 90,782 round pounds harvested in MI-2, 91.6% were whitefish, 7.4% lake trout, 0.7% suckers, and 0.3% a cisco and a mix of other unspecified species (Table 3). Harvest occurred in nine statistical grids (Table 5). Lake trout harvest was greatest in grid 1316 (2,684 dressed pounds) followed by grid 1315 (1,045 dressed pounds) and less than 1,000 dressed pounds in each of the remaining grids fished (Table 2). Whitefish harvest was greatest in grid 1316 (33,718 dressed pounds), followed by grids 1315 (16,828 dressed pounds) and 1413 (8,725 dressed pounds). Less than 3,500 dressed pounds were harvested in each of the remaining grids fished (Table 2).

Effort. Eighteen percent (18.3%) of the overall gill-net effort occurred in MI-2 (Tables 2 and 3). Fishing effort in MI-2 was 700,000 feet with 47.2% (330,400 feet) occurring in grid 1316, 19.9% (139,200 feet) occurring in grid 1315, 11.7% (81,600 feet) occurring in grid 1413, and 8.6% (60,000 feet) occurring in grid 1317. Less than 45,000 feet was fished in the remaining grids (Table 2). Gill-nets of 4 ½ inch mesh accounted for all of the unit's effort (Table 3).

Target Effort and Harvest. All fishing effort (700,000 feet) was targeted at whitefish and lake trout (Tables 5 and 6). Target effort (0.7 million feet) was below the 2004-2018 average (955,141 feet) as was target harvest of whitefish (71,058, Average: 157,862 dressed pounds) and lake trout (5,401, Average: 6,108 dressed pounds).

Catch Per Effort (CPE). Whitefish CPE (dressed pounds harvested per 1,000 feet of gill-net) for targeted fishing in the nine grids fished in MI-2 ranged from 35-335 pounds (Table 5). Whitefish CPE for the nine grids combined was 102 and was highest in grids 1313 followed by grid 1315 (CPE 121) (Tables 5 and 6). Lake trout CPE for targeted fishing ranged from 2-96 per grid, was 8 for all grids combined, and was highest in grid 1313 (CPE 96) followed by grid 1317 (CPE 13).

Unit MI-3

Harvest. Thirty-three percent of the overall harvest was taken in MI-3, which was fished by two tribes (Tables 2 and 4). Of the 140,987 round pounds harvested in MI-3, 94.9% were whitefish, 4.4% lake trout, 0.3% suckers, 0.2% siscowet, and 0.2% a mix of other unspecified species (Table 3). Harvest occurred in seven statistical grids (Table 2). Lake trout harvest was greatest in grid 1121 (1,534 dressed pounds), followed by grid 1023 (1,370) and grid 1219 (1,282). Harvest of lake trout was less than 650 dressed pounds in each of the other grids fished. Whitefish harvest was greatest in grids 1121 and 1122 (41,442 and 39,490 dressed pounds,

respectively) followed by grids 1220 and 1023 (12,910 and 12,645 dressed pounds, respectively). Less than 5,200 dressed pounds were taken in each of the remaining grids fished (Table 1).

Effort. Forty-three percent (42.8%) of the overall gill-net effort occurred in MI-3 (Tables 2 and 3). Fishing effort in MI-3 was 1,638,200 feet with 38.8% (634,900 feet) occurring in grid 1121 followed by 31.8% (521,000 feet) in grid 1122, 12.4% (203,000 feet) in grid 1220, and 8.8% (144,900 feet) in grid 1023. Effort was 91,000 feet or less in the remaining grids fished (Table 2). Gill-nets 4 ½ inch mesh accounted for all of the unit's effort (Table 3).

Target Effort and Harvest. All fishing effort (1,638,200 feet) was targeted at whitefish and lake trout (Tables 5 and 6). Target effort (1.6 million feet) was below the 2004-2018 average of 1,933,117. Target harvest of whitefish (114,414 dressed pounds) and lake trout (4,961 dressed pounds) were below the 2004-2018 averages (250,828 and 7,765 dressed pounds, respectively).

Catch Per Effort (CPE). Whitefish CPE (dressed pounds harvested per 1,000 feet of gill-net) for targeted fishing in the seven grids fished ranged from 56-125 pounds (Table 5). Whitefish CPE for the ten grids combined was 70 pounds and was highest in grid 925 (CPE 125) followed by grids 1023 and 1122 (CPE 87 and 76, respectively) (Tables 5 and 6). Lake trout CPE for targeted fishing ranged from 0-14 pounds, was 3 for all grids combined and was highest in grids 1219 and 1023 (CPE 14 and 9, respectively).

Unit MI-4

Harvest. Thirty-five percent of the overall harvest was taken in MI-4, which was fished by all three tribes (Tables 2 and 4). Of the 148,335 round pounds harvested, 71.1% were whitefish, 24.7% lake trout, 2.0% siscowet, 0.9% unspecified species, 0.6% salmon and trout, with the remaining 0.7% a mix of walleye, suckers, and cisco (Table 3). Harvest occurred in nine statistical grids (Table 5). Lake trout harvests were highest in grids 1224, 1125 and 1323 (11,063, 5,454 and 5,152 dressed pounds, respectively). Less than 5,000 dressed pounds were harvested in each of the other grids fished. Whitefish harvests were greatest in grids 1026 and 1125 (25,840 and 21,659 dressed pounds, respectively), followed by grids 1224 (15,019 dressed pounds) and 1126 (14,003 dressed pounds). Less than 7,300 dressed pounds of whitefish were harvested from the remaining grids fished (Table 2).

Effort. Thirty percent (29.9%) of the overall gill-net effort occurred in MI-4 (Tables 2 and 3). Fishing effort in MI-4 was 1,144,950 feet with 32.6% (373,600 feet) and 18.7% (214,000 feet) occurring in grids 1224 and 1125, respectively. This was followed by 13.2% (151,200 feet) in grid 1026 and 9.9% (113,000 feet) in grid 1126. Less than 85,500 feet were fished in each of the remaining grids fished (Table 2). Gill-nets of 4 ½ inch mesh accounted for 99.1%, 5 ½ inch mesh 0.4% and 2.75 inch mesh 0.5% of the unit's effort (Table 3).

Target Effort and Harvest. The majority of fishing effort (1,141,100 feet) was targeted at whitefish and lake trout with 1,600 feet directed at salmon and trout and 1,050 feet directed at unspecified species (Table 5). Target effort for whitefish and lake trout (1.1 million feet), target harvest of lake trout (29,287 dressed pounds) and target harvest of whitefish (90,185 dressed pounds) were below the 2004-2018 averages (Table 6). Target harvest was 347 dressed pounds for salmon and trout and 193 dressed pounds for unspecified species (Table 5).

Catch Per Effort (CPE). Whitefish CPE (dressed pounds harvested per 1,000 feet of gill-net)

for targeted fishing in the nine grids fished ranged from 20-173 pounds (Table 5). Whitefish CPE for all grids combined was 79 pounds and was greatest in grid 1026 (CPE 173) followed by grids 1126 and 1125 (CPE 124 and 101, respectively) (Tables 5 and 6). Lake trout CPE for targeted fishing ranged from 0-51 pounds, was 26 for all grids combined and was highest in grid 1323 (CPE 51) followed by grids 1326 (CPE 45), 1423 (CPE 35) and 1224 (CPE 30). CPE for targeted fishing of salmon and trout was 217 pounds and 184 pounds for unspecified fish (Table 5).

Unit MI-5

Harvest. Ten percent of the overall harvest was taken in MI-5, which was fished by two tribes (Tables 2 and 4). Of the 43,289 round pounds harvested in MI-5, 50.5% were whitefish, 48.6% lake trout, 0.5% unspecified species, and 0.4% siscowet and cisco (Table 3). Harvest occurred in two statistical grids (Table 5). Lake trout harvest was 15,414 dressed pounds in grid 1327 and 1,430 dressed pounds in grid 1428 (Table 2). Whitefish harvest was 18,330 dressed pounds in grid 1327 and 342 dressed pounds in grid 1428 (Table 2).

Effort. Nine percent (8.9%) of the overall gill-net effort occurred in MI-5 (Tables 2 and 3). Fishing effort was 342,000 feet with 91.2% (312,000 feet) occurring in grid 1327 and 8.8% (30,000 feet) occurring in grid 1428 (Table 2). Gill-nets of 4 ½ inch mesh accounted for all of the unit's effort (Table 3).

Target Effort and Harvest. All the fishing effort (342,000 feet) was targeted at whitefish and lake trout (Table 5). Target effort for whitefish and lake trout (0.34 million feet) was below the 2004-2018 average of 0.51 million feet (Table 6). Target harvests of whitefish (18,672 dressed pounds) and lake trout (16,844 dressed pounds) were below the 2004-2018 averages (20,774 and 20,116 dressed pounds, respectively).

Catch Per Effort (CPE). Whitefish CPE (dressed pounds harvested per 1,000 feet of gill-net) for targeted fishing was 59 in grid 1327 and 11 in grid 1428 (Table 5). Whitefish CPE for both grids combined was 55 pounds (Table 6). Lake trout CPE for targeted fishing was 49 in grid 1327 and 48 in grid 1428 (Table 5). Lake trout CPE for both grids combined was 49 pounds.

Biological Statistics

Lake Trout

MI-2. Thirteen year classes of lake trout (5-14, 16, 17, 23) were represented in a sample of 46 lake trout aged from MI-2 (Table 7). Mean age was 9.2 years. Mean length was 22.7 inches and mean weight was 4.3. Overall lamprey-marking rates were 0.0 wounds/100 fish (Table 8). Annual total mortality rate was 43% ($Z=0.56$, ± 0.10) for fish ages 8-12.

MI-3. Nine year classes of lake trout (5-11, 13, 20) were represented in a sample of 28 lake trout aged from MI-3 (Table 7). Mean age was 8.5 years. Fish ten years and older made up 29% of the sample. Mean length was 23.0 inches and mean weight was 4.1 round pounds. Overall lamprey-marking rates were 3.6 wounds/100 fish (Table 8). Annual total mortality rate was 67% ($Z=1.03$ ± 0.43) for fish ages 7-9.

MI-4. Twenty-one year classes of lake trout (4-17, 19-21, 24, 26, 27, 30) were represented in a sample of 619 lake trout aged from MI-4 (Table 7). Mean age was 9.2 years. Fish ten years and older made up 37% of the sample. Mean length was 22.5 inches and mean weight was 4.4 round. Overall lamprey-marking rates were 6.9 wounds/100 fish (Table 8). Annual total mortality rate was estimated at 31% ($Z=0.37$, ± 0.04) for fish ages 8-17.

MI-5. No lake trout were sampled from MI-5.

Whitefish

MI-2. Seven age groups (5-11) were represented in the 50 whitefish aged in MI-2, which had a mean age of 6.4 years (Table 9). Mean length of 19.4 inches and mean was 2.7 round pounds. Annual total mortality was estimated at 39% ($Z=0.49$ ± 0.08) for ages 5-11.

MI-3. Seven age groups (5-11) were represented in the 164 whitefish aged in MI-3, which had a mean age of 6.5 years (Table 9). Mean length was 19.3 inches and mean weight was 2.6 round pounds. Annual total mortality was estimated at 43% ($Z=0.56$ ± 0.13) for ages 5-11.

MI-4. Eight age groups (5-12) were represented in the 118 whitefish aged in MI-4, which had a mean age of 6.5 years (Table 9). Mean length was 19.3 inches and mean weight was 2.5 round pounds. Annual total mortality was estimated at 42% ($Z=0.55$ ± 0.08) for ages 5-11.

MI-5. No whitefish were sampled in MI-5.

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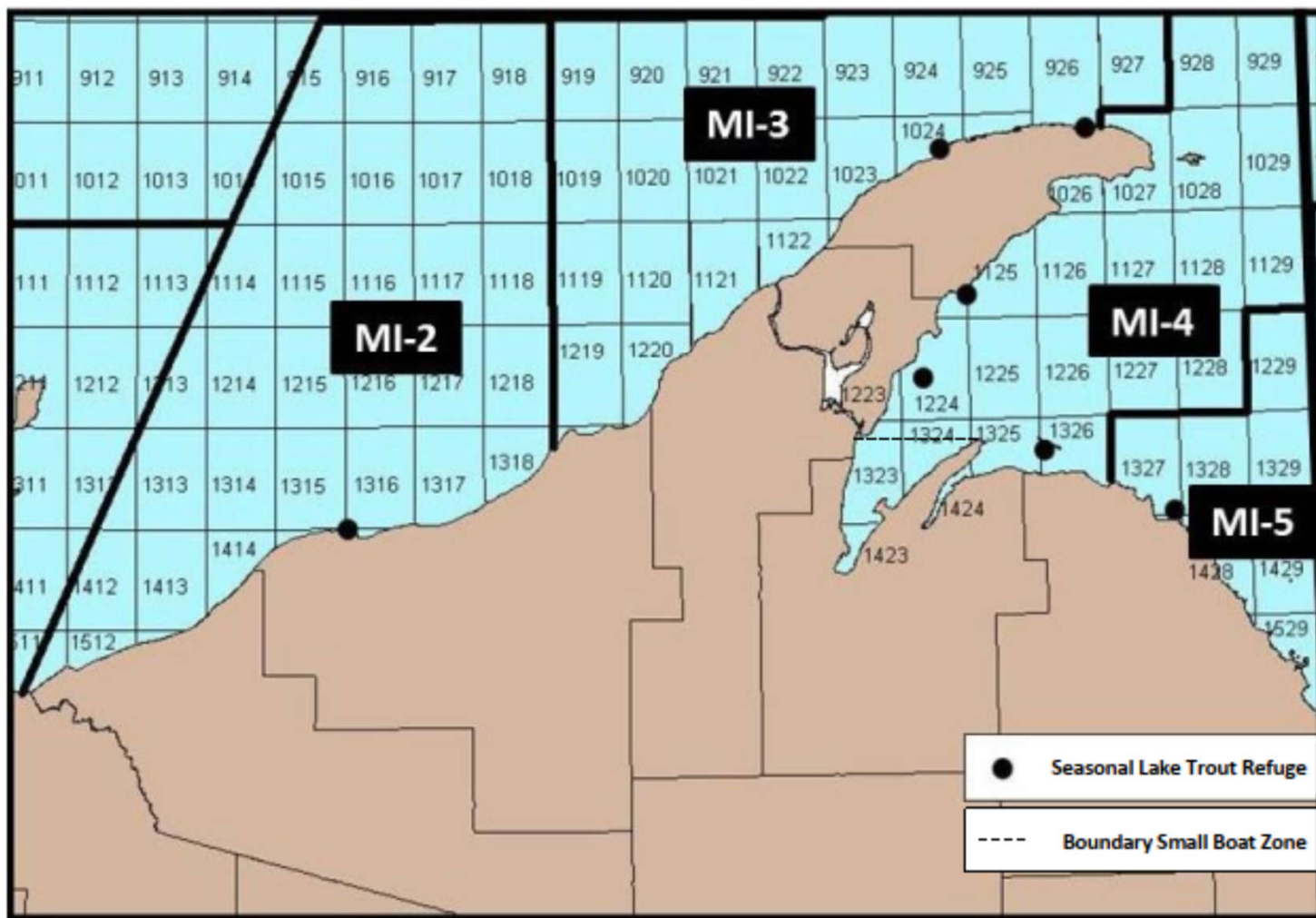


Figure 1. Management units and statistical grids in the 1842 treaty ceded area within Michigan waters of Lake Superior.

Table 1. Recommended total allowable catch (TAC) by fishing years and management unit for the Ojibwe Inter-Tribal Gill Net Fishery within Michigan Waters of Lake Superior.

UNIT		YEARS							Nov. 2017
		Nov. 1987 Oct. 1990	Nov. 1990 Oct. 1994	Nov. 1994 Oct. 1999	Nov. 1999 Oct. 2005	Nov. 2006 Oct. 2010	Nov. 2010 Oct. 2011	Nov. 2011 Oct. 2017	
MI-2	TAC	19,800	10,400	9,700	6,606	6,606	2,500	6,000	6,000
	Tribal	9,900	5,200	4,850	3,303	3,303	1,250	3,000	3,000
MI-3	TAC	5,000	7,600	6,600	4,950	4,950	5,000	5,000	7,000
	Tribal	2,500	3,800	3,300	2,475	2,475	2,500	2,500	2,500
MI-4	TAC	20,600	53,400	46,920	40,440	43,200	50,000	50,000	50,000
	Tribal	10,300	26,700	23,460	20,220	21,600	25,000	25,000	25,000
MI-5	TAC	16,100	15,700	17,080	33,130	33,130	34,000	34,000	34,000
	Tribal	4,830	4,710	5,124	16,565	16,565	17,000	17,000	17,000
Total	TAC	61,500	87,100	80,300	85,126	87,886	91,500	95,000	97,000
	Tribal	27,530	40,410	36,734	42,563	43,943	45,750	47,500	47,500

Table 2. Total tribal commercial gill net effort (feet) and harvest (pounds) by management unit, grid, and species from the 1842 ceded area within Michigan waters of Lake Superior in 2018.

Management Unit	Grid	Effort	Percent of Total Effort*	Whitefish	Lake trout	Siscowet	Cisco	Salmon Trout	Walleye	Suckers	Other	Total Harvest Round Pounds	Percent of Total Harvest	
MI-2	1313	4,800	0.7%	1,610	462	0	0	0	0	0	0			
	1314	12,000	1.7%	1,125	30	0	0	0	0	0	0			
	1315	139,200	19.9%	16,828	1,045	0	0	0	0	0	0			
	1316	330,400	47.2%	33,718	2,684	0	0	0	0	0	0			
	1317	60,000	8.6%	3,480	786	0	0	0	0	674	0			
	1412	24,000	3.4%	2,135	98	0	0	0	0	0	104			
	1413	81,600	11.7%	8,725	181	0	2	0	0	0	71			
	1414	43,200	6.2%	3,267	87	0	0	0	0	0	41			
	1512	4,800	0.7%	170	28	0	0	0	0	0	0			
Subtotals:	Effort:	700,000	18.3%											
	Dressed Pounds:			71,058	5,401	0	2	0						
	Round Pounds:			83,137.9	6,751.3	0.0	2.4	0.0	0	674	216	90,781.5	21.4%	
MI-3	925	5,600	0.3%	700	0	0	0	0	0	0	0			
	1023	144,900	8.8%	12,645	1,370	0	0	0	0	200	215			
	1024	37,800	2.3%	2,115	0	0	0	0	0	0	0			
	1121	634,900	38.8%	41,442	1,534	233	0	12	0	200	0			
	1122	521,000	31.8%	39,490	633	0	0	0	0	0	0			
	1219	91,000	5.6%	5,112	1,282	0	0	0	0	0	0			
	1220	203,000	12.4%	12,910	142	0	0	0	0	0	0			
	Subtotals:	Effort:	1,638,200	42.8%										
		Dressed Pounds:			114,414	4,961	233	0	12					
	Round Pounds:			133,864.4	6,201.3	291.3	0.0	15.0	0	400	215	140,986.9	33.3%	
MI-4	1026	151,200	13.2%	25,840	1,004	0	0	347	0	0	11			
	1027	6,000	0.5%	338	0	0	0	0	0	0	0			
	1125	214,000	18.7%	21,659	5,454	415	0	0	102	463	0			
	1126	113,000	9.9%	14,003	1,096	1,171	0	0	0	0	0			
	1224	373,600	32.6%	15,019	11,063	0	2	0	0	0	207			
	1225	74,000	6.5%	3,208	1,436	0	0	0	547	0	0			
	1323	102,950	9.0%	7,295	5,152	563	0	104	0	0	774			
	1326	25,000	2.2%	1,143	1,124	125	0	0	0	0	0			
	1423	85,200	7.4%	1,680	2,958	48	0	256	0	0	318			
Subtotals:	Effort:	1,144,950	29.9%											
	Dressed Pounds:			90,185	29,287	2,322	2	707						
	Round Pounds:			105,516.5	36,608.1	2,902.5	2.4	883.8	649	463	1,310	148,335.2	35.0%	
MI-5	1327	312,000	91.2%	18,330	15,414	125	13	0	0	0	216			
	1428	30,000	8.8%	342	1,430	0	0	0	0	0	0			
	Subtotals:	Effort:	342,000	8.9%										
	Dressed Pounds:			18,672	16,844	125	13	0						
	Round Pounds:			21,846.2	21,054.4	156.3	15.6	0.0	0	0	216	43,288.5	10.2%	
Grand Totals:	Effort:	3,825,150												
	Dressed Pounds:			294,329	56,492	2,680	17	719						
	Round Pounds:			344,364.9	70,615.0	3,350.0	20.4	898.8	649.0	1,537.0	1,957.0	423,392.1		

*For subtotals, percentage refers to percent of overall effort fished in unit.

Table 3. Tribal commercial gill net effort (feet) and harvest (pounds) by management unit, gill net mesh size, and species from the 1842 ceded area within Michigan waters of Lake Superior in 2018.

Unit	Mesh	Effort	Percent of		Salmon						Total Harvest Round Pounds
			Total Effort*	Whitefish	Lake trout	Siscowet	Cisco	Trout	Walleye	Suckers	
MI-2	4.5	700,000	100.0%	71,058	5,401	0	2	0	0	674	216
Subtotals:	Effort:	700,000	18.3%								
	Dressed Pounds:			71,058	5,401	0	2	0			
	Round Pounds:			83,137.9	6,751.3	0.0	2.4	0.0	0.0	674.0	216.0
	Percent of Unit Harvest:			91.6%	7.4%	0.0%	0.0%	0.0%	0.0%	0.7%	0.2%
MI-3	4.5	1,638,200	100.0%	114,414	4,961	233	0	12	0	400	215
Subtotals:	Effort:	1,638,200	42.8%								
	Dressed Pounds:			114,414	4,961	233	0	12			
	Round Pounds:			133,864.4	6,201.3	291.3	0.0	15.0	0.0	400.0	215.0
	Percent of Unit Harvest:			94.9%	4.4%	0.2%	0.0%	0.0%	0.0%	0.3%	0.2%
MI-4	2.75	5,200	0.5%	54	32	0	0	454	0	0	37
MI-4	4.5	1,134,950	99.1%	90,069	28,562	2,322	2	241	649	463	1,257
MI-4	5.5	4,800	0.4%	62	693	0	0	12	0	0	16
Subtotals:	Effort:	1,144,950	29.9%								
	Dressed Pounds:			90,185	29,287	2,322	2	707			
	Round Pounds:			105,516.5	36,608.1	2,902.5	2.4	883.8	649.0	463.0	1,310.0
	Percent of Unit Harvest:			71.1%	24.7%	2.0%	0.0%	0.6%	0.4%	0.3%	0.9%
MI-5	4.5	342,000	100.0%	18,672	16,844	125	13	0	0	0	216
Subtotals:	Effort:	342,000	8.9%								
	Dressed Pounds:			18,672	16,844	125	13	0			
	Round Pounds:			21,846.2	21,054.4	156.3	15.6	0.0	0.0	0.0	216.0
	Percent of Unit Harvest:			50.5%	48.6%	0.4%	0.0%	0.0%	0.0%	0.0%	0.5%
Totals:	Effort:	3,825,150									
	Dressed Pounds:			294,329	56,492	2,680	17	719			
	Round Pounds:			344,364.9	70,615.0	3,350.0	20.4	898.8	649.0	1,537.0	1,957.0
	Percent of Total Harvest:			81.3%	16.7%	0.8%	0.0%	0.2%	0.2%	0.4%	0.5%

*For subtotals, percentage refers to percent of overall effort fished in unit.

Table 4. Total and target gill net harvest and effort statistics by tribe for lake trout, whitefish, and siscowet in Michigan waters of Lake Superior in 2018.*

Unit	Tribe	TOTAL HARVEST							TARGET HARVEST							
		Effort	Whitefish		Lake trout		Siscowet		Effort	Whitefish		Lake trout		Siscowet		
			pounds	CPE	pounds	CPE	pounds	CPE		pounds	CPE	pounds	CPE	Effort	pounds	CPE
MI-2	Bad River	256,000	26,345	103	1,636	6	0	0	256,000	26,345	103	1,636	6	0	0	0
	Keweenaw Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red Cliff	444,000	44,713	101	3,765	8	0	0	444,000	44,713	101	3,765	8	0	0	0
	subtotal	700,000	71,058	102	5,401	8	0	0	700,000	71,058	102	5,401	8	0	0	0
MI-3	Bad River	430,200	33,736	78	1,452	3	233	1	430,200	33,736	78	1,452	3	0	0	0
	Keweenaw Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red Cliff	1,208,000	80,678	67	3,509	3	0	0	1,208,000	80,678	67	3,509	3	0	0	0
	subtotal	1,638,200	114,414	70	4,961	3	233	0	1,638,200	114,414	70	4,961	3	0	0	0
MI-4	Bad River	416,000	39,618	95	10,213	25	1,476	4	416,000	39,618	95	10,213	25	0	0	0
	Keweenaw Bay	195,350	9,014	46	8,204	42	611	3	191,500	9,014	47	8,204	43	0	0	0
	Red Cliff	533,600	41,553	78	10,870	20	235	0	533,600	41,553	78	10,870	20	0	0	0
	subtotal	1,144,950	90,185	79	29,287	26	2,322	2	1,141,100	90,185	79	29,287	26	0	0	0
MI-5	Bad River	272,000	16,975	62	13,607	50	0	0	272,000	16,975	62	13,607	50	0	0	0
	Keweenaw Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red Cliff	70,000	1,697	24	3,237	46	125	2	70,000	1,697	24	3,237	46	0	0	0
	subtotal	342,000	18,672	55	16,844	49	125	0	342,000	18,672	55	16,844	49	0	0	0
Total	Bad River	1,374,200	116,674	85	26,908	20	1,709	1	1,374,200	116,674	85	26,908	20	0	0	0
	Keweenaw Bay	195,350	9,014	46	8,204	42	611	3	191,500	9,014	47	8,204	43	0	0	0
	Red Cliff	2,255,600	168,641	75	21,380	9	360	0	2,255,600	168,641	75	21,380	9	0	0	0
	All Tribes	3,825,150	294,329	77	56,492	15	2,680	1	3,821,300	294,329	77	56,492	15	0	0	0

*Pounds are in dressed weight, effort is feet of net lifted and CPE is pounds/1000 ft of net lifted. Target species was assigned to each lift based on reported target species from individual catch reports. Target effort for whitefish and lake trout was combined.

Table 5. Gill net harvest and effort statistics for target species by grid and management unit in Michigan waters of Lake Superior in 2018.*

Unit	Grid	Whitefish			Lake trout			Salmon			Other		
		Effort	pounds	CPE	Effort	pounds	CPE	Effort	pounds	CPE	Effort	pounds	CPE
MI-2	1313	4,800	1,610	335	4,800	462	96						
	1314	12,000	1,125	94	12,000	30	3						
	1315	139,200	16,828	121	139,200	1,045	8						
	1316	330,400	33,718	102	330,400	2,684	8						
	1317	60,000	3,480	58	60,000	786	13						
	1412	24,000	2,135	89	24,000	98	4						
	1413	81,600	8,725	107	81,600	181	2						
	1414	43,200	3,267	76	43,200	87	2						
	1512	4,800	170	35	4,800	28	6						
	subtotal		700,000	71,058	102	700,000	5,401	8	0	0	0	0	0
MI-3	925	5,600	700	125	5,600	0	0						
	1023	144,900	12,645	87	144,900	1,370	9						
	1024	37,800	2,115	56	37,800	0	0						
	1121	634,900	41,442	65	634,900	1,534	2						
	1122	521,000	39,490	76	521,000	633	1						
	1219	91,000	5,112	56	91,000	1,282	14						
	1220	203,000	12,910	64	203,000	142	1						
	subtotal		1,638,200	114,414	70	1,638,200	4,961	3	0	0	0	0	0
MI-4	1026	149,600	25,840	173	149,600	1,004	7	1,600	347	217			
	1027	6,000	338	56	6,000	0	0						
	1125	214,000	21,659	101	214,000	5,454	25						
	1126	113,000	14,003	124	113,000	1,096	10						
	1224	373,600	15,019	40	373,600	11,063	30						
	1225	74,000	3,208	43	74,000	1,436	19						
	1323	101,900	7,295	72	101,900	5,152	51				1,050	193	184
	1326	25,000	1,143	46	25,000	1,124	45						
	1423	84,000	1,680	20	84,000	2,958	35						
	subtotal		1,141,100	90,185	79	1,141,100	29,287	26	1,600	347	217	1,050	193
MI-5	1327	312,000	18,330	59	312,000	15,414	49						
	1428	30,000	342	11	30,000	1,430	48						
	subtotal		342,000	18,672	55	342,000	16,844	49	0	0	0	0	0
Grand Total		3,821,300	294,329	77	3,821,300	56,492	15	1,600	347	0	1,050	193	184

*Pounds are in dressed weight, effort is feet of net lifted and CPE is pounds/1,000 ft of net lifted. Target species was assigned to each lift based on reported target species from individual catch reports. Target effort for whitefish and lake trout was combined.

Table 6. Tribal commercial gill net effort (feet), harvest (dressed pounds), and catch per unit effort (CPE, pounds/1,000 feet) statistics for whitefish, lake trout and siscowet by management unit and year from the 1842 ceded area within Michigan waters of Lake Superior from 2004-2018. Target effort for whitefish and lake trout was combined.

Unit	Year	Whitefish				Lake trout				Siscowet				
		Target effort	Target harvest	CPE	Total Harvest	Target effort	Target harvest	CPE	Total Harvest	Target effort	Target harvest	CPE	Total Harvest	
MI-2	2004	526,900	80,959	154	80,959	526,900	5,745	11	5,745	0	0	0	26	
	2005	577,600	129,062	223	129,062	577,600	7,103	12	7,103	0	0	0	280	
	2006	1,642,450	360,434	219	360,434	1,642,450	9,072	6	9,072	0	0	0	705	
	2007	1,171,600	207,745	177	207,745	1,171,600	11,582	10	11,582	0	0	0	1,339	
	2008	987,600	213,266	216	213,266	987,600	7,660	8	7,660	0	0	0	1,077	
	2009	475,900	112,789	237	112,789	475,900	1,830	4	1,830	0	0	0	561	
	2010	1,036,800	173,173	167	173,173	1,036,800	2,221	2	2,221	0	0	0	144	
	2011	448,800	84,596	188	84,596	448,800	1,919	4	1,919	0	0	0	0	
	2012	1,376,600	268,914	195	268,914	1,376,600	7,922	6	7,922	0	0	0	0	
	2013	748,800	155,816	208	155,816	748,800	8,117	11	8,117	0	0	0	0	
	2014	1,236,160	163,896	133	163,896	1,236,160	7,700	6	7,700	0	0	0	630	
	2015	1,429,300	168,408	118	168,408	1,429,300	5,265	4	5,265	0	0	0	446	
	2016	931,100	77,705	83	77,705	931,100	5,216	6	5,216	0	0	0	2,570	
	2017	1,037,500	100,108	97	100,108	1,037,500	4,868	5	4,868	0	0	0	515	
	2018	700,000	71,058	102	71,058	700,000	5,401	8	5,401	0	0	0	0	
	Average:		955,141	157,862	165	157,862	955,141	6,108	6	6,108	0	0	0	553
	MI-3	2004	1,255,400	67,579	54	67,579	1,255,400	9,973	8	9,973	0	0	0	0
		2005	1,246,000	118,185	95	118,185	1,246,000	4,738	4	4,738	0	0	0	0
2006		1,731,000	264,460	153	264,460	1,731,000	12,714	7	12,714	0	0	0	56	
2007		1,466,400	249,555	170	249,555	1,466,400	5,414	4	5,414	0	0	0	0	
2008		1,871,150	373,411	200	373,411	1,871,150	12,697	7	12,697	0	0	0	1,155	
2009		2,073,300	475,227	229	475,227	2,073,300	15,392	7	15,392	0	0	0	3,881	
2010		2,042,500	265,459	130	265,459	2,042,500	5,547	3	5,547	0	0	0	1,439	
2011		2,148,400	353,164	164	353,164	2,148,400	5,334	3	5,334	0	0	0	0	
2012		2,604,000	401,374	154	401,374	2,604,000	7,083	3	7,083	0	0	0	97	
2013		2,447,200	445,528	182	445,528	2,447,200	8,808	4	8,808	0	0	0	131	
2014		1,693,400	219,986	130	219,986	1,693,400	8,196	5	8,196	0	0	0	3,008	
2015		3,585,100	273,638	76	273,638	3,585,100	7,315	2	7,315	0	0	0	2,879	
2016		1,507,400	69,221	46	69,221	1,507,400	3,527	2	3,527	0	0	0	2,836	
2017		1,687,300	71,226	42	71,226	1,687,300	4,778	3	4,778	0	0	0	4,658	
2018		1,638,200	114,414	70	114,414	1,638,200	4,961	3	4,961	0	0	0	233	
Average:			1,933,117	250,828	130	250,828	1,933,117	7,765	4	7,765	0	0	0	1,358
MI-4		2004	1,864,550	147,536	79	147,594	1,864,550	49,185	26	49,208	0	0	0	664
		2005	1,660,670	142,676	86	142,676	1,660,670	41,026	25	41,026	0	0	0	123
	2006	1,601,855	90,777	57	90,833	1,601,855	52,758	33	52,857	3,375	165	49	1,538	
	2007	1,345,140	87,772	65	87,807	1,345,140	40,856	30	40,891	0	0	0	514	
	2008	1,465,750	113,059	77	113,059	1,465,750	46,669	32	46,669	0	0	0	2,480	
	2009	1,553,550	122,643	79	122,717	1,553,550	46,568	30	46,572	0	0	0	3,175	
	2010	1,211,300	72,394	60	72,832	1,211,300	33,990	28	34,428	2,400	82	34	1,569	
	2011	1,217,600	95,936	79	96,026	1,217,600	37,065	30	37,160	7,200	210	29	1,593	
	2012	1,750,850	98,882	57	98,882	1,750,850	62,018	35	62,018	0	0	0	52	
	2013	1,499,775	72,796	49	72,841	1,499,775	57,829	39	57,834	0	0	0	136	
	2014	1,463,200	109,432	75	109,435	1,463,200	47,399	32	47,399	0	0	0	1,365	
	2015	2,611,900	185,643	71	185,676	2,611,900	52,794	20	52,824	0	0	0	4,809	
	2016	3,141,150	137,106	44	137,237	3,141,150	66,381	21	66,517	0	0	0	5,458	
	2017	2,047,450	65,497	32	65,497	2,047,450	58,264	29	58,264	0	0	0	4,314	
	2018	1,141,100	90,185	79	90,185	1,141,100	29,287	26	29,287	0	0	0	2,322	
	Average:		1,705,056	108,822	64	108,886	1,705,056	48,139	28	48,197	865	30	35	2,007

Table 6. Continued.

Unit	Year	Whitefish				Lake trout				Siscowet			
		Target effort	Target harvest	CPE	Total Harvest	Target effort	Target harvest	CPE	Total Harvest	Target effort	Target harvest	CPE	Total Harvest
MI-5	2004	705,700	20,742	29	20,742	705,700	31,827	45	31,827	0	0	0	480
	2005	835,070	29,985	36	29,988	835,070	29,505	35	29,530	1,190	60	50	383
	2006	738,700	44,839	61	44,839	738,700	36,650	50	36,668	0	0	0	0
	2007	820,500	29,254	36	29,313	820,500	32,988	40	32,988	0	0	0	0
	2008	508,500	7,691	15	7,691	508,500	11,949	24	11,949	0	0	0	0
	2009	551,722	21,070	38	21,134	551,722	21,042	38	21,042	0	0	0	0
	2010	450,000	18,554	41	18,708	450,000	12,966	29	12,966	0	0	0	0
	2011	353,900	15,896	45	15,906	353,900	18,293	52	18,293	0	0	0	0
	2012	390,100	19,645	50	19,645	390,100	19,144	49	19,144	0	0	0	480
	2013	402,500	15,384	38	15,384	402,500	20,807	52	20,807	0	0	0	383
	2014	201,300	12,368	61	12,712	201,300	8,330	41	8,337	0	0	0	0
	2015	469,550	30,949	66	30,949	469,550	13,444	29	13,444	0	0	0	172
	2016	501,800	15,815	32	15,815	501,800	12,778	26	12,778	0	0	0	380
	2017	391,400	10,744	28	10,744	391,400	15,178	39	15,178	0	0	0	410
2018	342,000	18,672	55	18,672	342,000	16,844	49	16,844	0	0	0	125	
Average:		510,849	20,774	61	20,816	510,849	20,116	47	20,120	79	4	40	188
All units	2004	4,352,550	316,816	73	316,874	4,352,550	96,730	22	96,753	0	0	0	1,170
	2005	4,319,340	419,908	97	419,911	4,319,340	82,372	19	82,397	1,190	60	50	786
	2006	5,714,005	760,510	133	760,566	5,714,005	111,194	19	111,311	3,375	165	49	2,299
	2007	4,803,640	574,326	120	574,420	4,803,640	90,840	19	90,875	0	0	0	1,853
	2008	4,833,000	707,427	146	707,427	4,833,000	78,975	16	78,975	0	0	0	4,712
	2009	4,654,472	731,729	157	731,867	4,654,472	84,832	18	84,836	0	0	0	7,617
	2010	4,740,600	529,580	112	530,172	4,740,600	54,724	12	55,162	2,400	82	34	3,152
	2011	4,168,700	549,592	132	549,692	4,168,700	62,611	15	62,706	7,200	210	29	1,593
	2012	6,121,550	788,815	129	788,815	6,121,550	96,167	17	96,167	0	0	0	629
	2013	5,726,075	802,622	140	689,569	5,726,075	95,366	17	95,371	0	0	0	650
	2014	4,594,060	505,682	110	506,029	4,594,060	71,625	16	71,632	0	0	0	5,003
2015	8,095,850	658,638	81	658,671	8,095,850	78,818	10	78,848	0	0	0	8,306	
2016	6,081,450	299,847	49	299,978	6,081,450	87,902	14	88,038	0	0	0	11,244	
2017	5,163,650	247,575	48	247,575	5,163,650	83,088	16	83,088	0	0	0	9,897	
2018	3,821,300	294,329	77	294,329	3,821,300	56,492	15	56,492	0	0	0	2,680	
Average:		5,240,639	563,791	108	555,826	5,240,639	83,946	16	84,011	1,012	37	36	4,208

Table 7. Age and size composition of wild lake trout by unit from tribal commercial harvests reported during 2018. Weight is in round pounds, length is in inches, and

Unit	Age	Number		Length (in.)		Weight (lbs)		
		Aged	Measured	mean	sd	Weighed	mean	sd
MI-2								
	5	4	4	20.8	2.5	4	3.2	0.3
	6	5	5	22.4	2.4	5	3.7	1.1
	7	3	3	23.5	2.9	3	5.3	3.7
	8	11	11	22.5	1.9	11	4.3	1.2
	9	7	7	22.6	3.1	7	4.2	1.9
	10	6	6	23.1	1.0	6	3.9	0.4
	11	3	3	21.9	1.4	3	4.7	1.0
	12	1	1	21.9		1	4.0	
	13	1	1	21.5		1	4.0	
	14	2	2	21.5	5.7	2	2.3	0.6
	16	1	1	28.7		1	6.6	
	17	1	1	25.7		1	5.5	
	23	1	1	26.5		1	9.4	
Sample Size:		46	46			46		
Means:		9.2		22.7	2.5		4.3	1.7
MI-3								
	5	2	2	24.4	0.9	2	4.2	1.5
	6	3	3	23.8	0.8	3	4.8	0.6
	7	8	8	23.2	1.6	8	4.3	0.6
	8	6	6	22.3	2.2	6	3.2	0.9
	9	1	1	20.4		1	5.1	
	10	3	3	21.7	4.0	3	4.4	3.4
	11	3	3	22.5	2.5	3	3.7	0.8
	13	1	1	24.2		1	2.9	
	20	1	1	26.1		1	8.0	
Sample Size:		28	28			28		
Means:		8.5		23.0	2.1		4.1	1.5
MI-4								
	4	6	6	19.3	1.0	6	2.6	1.1
	5	26	26	22.2	1.8	26	4.3	1.9
	6	73	73	21.9	2.4	73	4.0	1.7
	7	89	89	21.7	1.9	89	3.9	1.5
	8	119	119	22.2	2.3	119	4.0	1.4
	9	80	80	22.0	2.6	80	4.1	1.8
	10	70	70	23.4	3.0	70	4.8	2.3
	11	46	46	22.3	2.7	46	4.0	1.5
	12	36	36	23.0	2.5	36	4.6	1.7
	13	15	15	23.7	1.7	15	4.3	1.0
	14	23	23	22.6	2.8	23	4.5	2.2
	15	14	14	22.9	2.6	14	4.7	2.2
	16	4	4	23.4	1.7	4	4.2	1.3
	17	5	5	27.7	3.8	5	7.2	2.5
	19	2	2	28.5	0.0	2	6.5	0.6
	20	6	6	28.5	2.4	6	16.8	19.7
	21	1	1	21.9		1	4.0	
	24	1	1	37.5		1	22.7	
	26	1	1	34.3		1	12.7	
	27	1	1	29.5		1	6.2	
	30	1	1	26.1		1	9.9	
Sample Size:		619	619			619		
Means:		9.2		22.5	2.8		4.4	2.9

Table 8. Lamprey wounding and scarring rates (marks/100 fish) on lake trout, per Lake Superior Technical Committee protocol, reported from the tribal commercial harvests from management units in the 1842 ceded area within Michigan waters of Lake Superior during 2018.

Unit	Length Category (Inches)	Fish Examined	Type AI, AII, AIII Wounds	Wounds per 100 fish	Scars	Scars per 100 fish
MI-2						
	2: 17-20.9	11	0	0.0	0	0.0
	3: 21-24.9	27	0	0.0	0	0.0
	4: 25-28.9	8	0	0.0	0	0.0
	Total:	46	0	0.0	0	0.0
MI-3						
	2: 17-20.9	7	0	0.0	0	0.0
	3: 21-24.9	15	2	13.3	1	6.7
	4: 25-28.9	6	0	0.0	0	0.0
	Total:	28	2	7.1	1	3.6
MI-4						
	1: < 17	5	0	0.0	0	0.0
	2: 17-20.9	185	0	0.0	0	0.0
	3: 21-24.9	329	8	2.4	10	3.0
	4: 25-28.9	85	5	5.9	24	28.2
	5: > 29	15	5	33.3	9	60.0
	Total:	619	18	2.9	43	6.9

Table 9. Age and size composition of whitefish in tribal commercial harvests from management units in the 1842 ceded area within Michigan waters of Lake Superior during 2018. Weight is in round pounds, length is in inches, and sd=standard deviation.

Unit	Age	Number	Number	Length (in.)		Number	Weight (lbs)	
		Aged	Measured	mean	sd	Weighed	mean	sd
MI-2								
	5	22	22	18.3	0.6	22	2.3	0.2
	6	9	9	19.5	0.4	9	2.6	0.2
	7	6	6	20.0	0.4	6	2.8	0.2
	8	6	6	20.3	0.3	6	3.1	0.2
	9	5	5	21.3	0.3	5	3.3	0.2
	10	1	1	22.0		1	3.9	
	11	1	1	22.7		1	4.0	
Sample Size:		50	50			50		
Means:		6.4		19.4	1.3		2.7	0.5
MI-3								
	5	30	30	18.2	0.3	30	2.3	0.1
	6	78	78	19.0	0.4	78	2.5	0.2
	7	18	18	19.7	0.2	18	2.6	0.2
	8	21	21	20.3	0.4	21	2.9	0.3
	9	13	13	20.7	0.6	13	3.0	0.4
	10	2	2	22.0	1.1	2	4.0	0.5
	11	2	2	23.0	0.7	2	4.2	0.5
Sample Size:		164	164			164		
Means:		6.5		19.3	1.0		2.6	0.4
MI-4								
	5	37	37	18.1	0.5	37	2.1	0.2
	6	36	36	19.1	0.5	36	2.4	0.2
	7	16	16	19.6	0.3	16	2.6	0.2
	8	14	14	20.4	0.3	14	2.9	0.2
	9	8	8	21.1	0.5	8	3.0	0.3
	10	5	5	21.6	0.5	5	3.2	0.4
	11	1	1	22.7		1	3.5	
	12	1	1	23.2		1	3.6	
Sample Size:		118	118			118		
Means:		6.5		19.3	1.2		2.5	0.4