Biological and Commercial Catch Statistics from the Chippewa Inter-Tribal Gill Net Fishery within Michigan Waters of Lake Superior During 2004

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ABSTRACT

The 2004 commercial inter-tribal fishery in the 1842 treaty-ceded waters of Michigan consisted of six (6) large boats and 15 small boats, representing 21 tribal licensees from the Keweenaw Bay, Bad River and Red Cliff Bands of Lake Superior Chippewa. Gill nets were the primary gear used in the fishery. Trap nets were not used in 2004 after having been fished for the three previous years.

The fishing season for whitefish and lake trout was closed from November 1 through November 27 and commercial fishing was prohibited during October in eight seasonal refuges. Target fishing for lean lake trout (fishing in water < 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 lake herring fishery through a quota system.

Fishermen reported fishing 4.4 million feet of gill net and harvesting 503,028 round pounds of fish. Whitefish was the primary target species, making up 73.7% of the total, followed by lake trout (24.0%), and lake herring (1.8%). The remaining 0.5% consisted of siscowet, salmon, walleye, rainbow trout, and northern pike.

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ACKNOWLEDGMENTS

The authors would like to thank all tribal commercial fishermen who fished in the 1842 ceded territory within Michigan waters of Lake Superior for submitting harvest and effort information and cooperating with monitors during biological surveys of catches. Appreciation goes to Edward Leoso of the Bad River Natural Resources Department for providing harvest data; Evelyn Ravindran of the Keweenaw Bay Natural Resources Department; Michelle Gurnoe and Bryan Bainbridge of the Red Cliff Fisheries Department; and Michael Plucinski, Nate Bigboy, Ben Michaels and Corinne Bradzil for their assistance in data collection, ageing fish and entering and proofing data. We would also thank Neil Kmiecik for editing this report.

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 managed their fishery within the guidelines of this inter-tribal agreement, while Keweenaw Bay manages their fishery through a 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 2004 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 commercial fishery consisted of six (6) large boats and 15 small boats, representing 21 tribal licenses from the Keweenaw Bay, Bad River and Red Cliff Bands. As in previous years, the area south of a line from the East Entry of Keweenaw Peninsula to Point Abbaye (Figure 1) was open only to Keweenaw Bay small boat fishermen. Gill nets were the primary gear used in the fishery.

The fishing season for whitefish and lake trout was closed from November 1 through November 27. 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. The Keweenaw Bay tribe employed a quota system for regulating lake herring harvest by its fishermen. The Bad River and Red Cliff tribes did not use this system for lake herring. Also, the three bands allowed fishing for lake herring year-round (i.e. no seasonal restriction).

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. In 1985 and 1986, each gill net tug was assigned a lake trout quota of 3,750 or 15,000 pounds depending on tribal affiliation. 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. A tribal fishing year began in November and ran through October of the next year. 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 and has a higher fat content than lean lake trout, was not regulated by quotas. TAC's and tribal quotas by management unit, and each fishing year within a 4-5 year period were as follows;

UNIT		YEARS			
		1987-1990[1]	1990-1994[2]	1995-1999[3]	2000-2004[4]
MI-2	TAC	19,800	10,400	9,700	6,606
	Tribal	9,900	5,200	4,850	3,303
MI-3	TAC	5,000	7,600	6,600	4,950
	Tribal	2,500	3,800	3,300	2,475
MI-4	TAC	20,600	53,400	46,920	40,440
	Tribal	10,300	26,700	23,460	20,220
MI-5	TAC	16,100	15,700	17,080	33,130
	Tribal	4,830	4,710	5,124	16,565
Total	TAC	61,500	87,100	80,300	85,126
	Tribal	27,530	40,410	36,734	42,563

[1] GLIFWC. 1987.
[2] Ebener et al. 1989.
[3] Mattes. 1994.
[4] Mattes. 2000.

METHODS

Effort and harvest data 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
Herring	1.20
Round whitefish (menominee)	1.15
Chub	1.20

Harvest of other species (walleye and northern pike) were reported by fishermen as round pounds.

Biological statistics were derived from biological monitoring data. Biological monitoring of catches occurred several times a month by the Keweenaw Bay Natural Resources Department, the Red Cliff Fisheries Department, and the Great Lakes Indian Fish and Wildlife Commission.

RESULTS AND DISCUSSION

Commercial Catch and Effort Statistics

Fishermen reported fishing 4.4 million feet of gill net and harvesting 503,028 round pounds of fish. Whitefish was the primary target species, making up 73.7% of the total, followed by lake trout (24.0%), and lake herring (1.8%). The remaining 0.5% consisted of siscowet, salmon, walleye, rainbow trout, and northern pike.

Unit MI-2

Harvest. Twenty percent of the overall harvest was taken in MI-2 (Table 1). Of the 102,213 round pounds harvested in MI-2, 92.7% were whitefish, 7% lake trout, and 0.3% walleye (Table 2). Lake trout harvest was highest in grid 1414 but less than 2,500 dressed pounds were taken in each of the six statistical grids fished (Figure 2). Whitefish harvest was greatest in grid 1414 (33,592 dressed pounds) and less than 15,000 pounds were taken in each of the other five grids fished (Figure 3).

Effort. Twelve percent of the overall gill-net effort occurred in MI-2 (Table 1) which was fished by two tribes (Table 3). Fishing effort in MI-2 was 543,300 feet with 44% (239,000 feet) occurring in grid 1414 (Figure 4). Gill-nets of 4 ½ inch mesh accounted for 481,000 feet or 89% of the unit's effort (Table 2 and Figure 5).

Target Effort and Harvest. The majority of fishing effort was targeted at whitefish and lake trout with 16,400 feet directed at walleye (Tables 4 and 5). Target effort (526,900 feet) and harvest of whitefish (80,959 dressed pounds) was greater than the 1985-2004 average (222,945 feet and 35,327 dressed pounds, respectively). Target lake trout harvest (5,745 dressed pounds) continued to remain low (1985-2005 average: 7,060 dressed pounds). Target harvest of walleye was 141 round pounds.

Catch Per Effort (CPE). Whitefish CPE (pounds harvested per 1,000 feet of gill-net) for targeted fishing in the six grids fished in MI-2 ranged from 109-290 pounds (Table 4). Whitefish CPE for the six grids combined was 154 and similar to the average CPE of 158 for this unit for the 20 year period 1985-2004 (Table 5). Lake trout CPE for targeted fishing ranged from 5-36 per grid and was 11 for all grids combined, identical to the unit CPE in 2003 but below the 1985-2004 average CPE of 32 pounds. CPE for fishing targeted at walleye was 9 pounds.

Unit MI-3

Harvest. Eighteen percent of the overall harvest was taken in MI-3 (Table 1). Of the 91,632 round pounds harvested in MI-3, 86.3% were whitefish, 13.6% lake trout, and 0.1% herring (Table 2). Harvest occurred in six statistical grids. Lake trout harvest was greater than 2,500 dressed pounds in two grids (1220 and 1023) and less than 2,500 pounds in each of the other four grids (Figure 2). Whitefish harvest was greatest in grid 1121 (26,617 dressed pounds) and less than 15,000 pounds in each of the other 5 grids fished (Figure 3).

Effort. Twenty-nine percent of the overall gill-net effort occurred in MI-3 (Table 1) which was fished by two tribes (Table 3). Fishing effort in MI-3 was 1,255,400 feet with 49% (612,000 feet) occurring in grid 1121 and over 250,000 feet fished in one other grid (1122) (Figure 4). Gill-nets of 4 ½ inch mesh accounted for 1,241,000 feet or 99% of the unit's effort (Table 2 and Figure 5).

Target Effort and Harvest. All fishing effort in MI-3 was targeted at whitefish and lake trout (Table 4). Target gill-net effort (1.3 million feet) was below the 1985-2004 average of 1.9 million feet (Table 5). Target harvest of whitefish (67,579 dressed pounds) was below the 1985-2004 average (156,163 dressed pounds). Target harvest of lake trout (9,973 dressed pounds) was also below the 1985-2004 average (20,384 dressed pounds).

Catch Per Effort (CPE). Whitefish CPE (pounds harvested per 1,000 feet of gill-net) for targeted fishing in the six grids fished ranged from 1-109 pounds (Table 4). Whitefish CPE for the six grids combined was 54 pounds and below the average CPE of 83 for this Unit for the 20 year period 1985-2004 (Table 5). Lake trout CPE for targeted fishing ranged from 1-320 pounds and was 8 for all grids combined, slightly below the 1985-2004 average CPE of 11 pounds.

Unit MI-4

Harvest. Forty-nine percent of the overall harvest was taken in MI-4 (Table 1). Of the 244,357 round pounds harvested, 70.7% were whitefish, 25.2% lake trout, 3.6% herring, 0.3% siscowet, and 0.3% for four other species combined (Table 2). Harvest occurred in nine statistical grids. Lake trout harvest was highest in grid 1224 (24,459 dressed pounds) and was greater than 2,500 pounds in three other grids (1423, 1323, and 1026) (Figure 2). Less than 2,500 dressed pounds were harvested in each of the other five grids fished. Whitefish harvest was also greatest in grid 1224 (91,265 dressed pounds) and exceeded 15,000 pounds in one other grid (1026) (Figure 3). Less than 15,000 dressed pounds were harvested in each of the other seven grids fished.

Effort. Forty-three percent of the overall gill-net effort occurred in MI-4 (Table 1) which was fished by three tribes (Table 3). Fishing effort in MI-4 was 1,888,050 feet with all but 20,000 feet being large mesh effort (Table 2). Effort was greatest in grid 1224 (921,800 feet or 49% of the Unit's effort) and exceeded 250,000 feet in two other grids (1423 and 1026) (Figure 4). Gill-nets of 4 ½ inch mesh accounted for 1,769,950 feet or 94% of the unit's effort (Figure 5).

Target Effort and Harvest. The majority of fishing effort (1,864,550 feet) was targeted at whitefish and lake trout with 18,000 feet directed at lake herring and 5,200 feet targeted at salmon (Table 4). Target effort for whitefish and lake trout (1.9 million feet) was higher than in 2003 (1.7 million feet) but below the 1985-2004 average of 3.5 million feet (Table 5). Target harvest of whitefish (147,536 dressed pounds) was below the 1985-2004 average (208,159 dressed pounds). Target harvest of lake trout (49,185 dressed pounds) was also below the 1985-2004 average (75,187 dressed pounds). Target harvest was 6,565 dressed pounds for herring and 90 pounds for salmon.

Catch Per Effort (CPE). Whitefish CPE (pounds harvested per 1,000 feet of gill-net) for targeted fishing in the nine grids fished ranged from 24-170 pounds (Table 4). Whitefish CPE for the nine grids combined was 79 pounds and above the average CPE of 60 for this unit for the 20 year period 1985-2004 (Table 5). Lake trout CPE for targeted fishing ranged from 1-82 pounds and was 26 for all grids combined, slightly above the 1985-2004 average CPE of 22 pounds. CPE for targeted effort was 365 dressed pounds for herring and 17 dressed pounds for salmon.

Unit MI-5

Harvest. Thirteen percent of the overall harvest was taken in MI-5 (Table 1). Of the 64,827 round pounds harvested in MI-5, 37.4% were whitefish, 61.4% lake trout, 0.9% siscowet, 0.2% salmon, and 0.1% herring (Table 2). Harvest occurred in four statistical grids. Lake trout harvest was highest in grid 1529 (27,797 dressed pounds) and exceeded 2,500 dressed pounds in one other grid (1428) (Figure 2). Whitefish harvest was also greatest in grid 1529 (16,999 dressed pounds) but less than 5,000 pounds in each of the three other grids fished (Figure 3).

Effort. Sixteen percent of the overall gill-net effort occurred in MI-5 (Table 1) which was fished by one tribe (Table 3). Fishing effort in MI-5 was 705,700 feet with 83% (586,300 feet) occurring in grid 1529 (Figure 4). Gill-nets of 4 ½ inch mesh accounted for 574,0505 feet or 81% of the unit's effort (Table 2 and Figure 5).

Target Effort and Harvest. All fishing effort in MI-5 was targeted at whitefish and lake trout (Table 4). Target gill-net effort (0.7 million feet) was nearly identical to effort in 1990, the highest reported and about two times higher than the 1986-2004 average of 0.36 million feet (Table 5). Target harvest of whitefish (20,742 dressed pounds) was below the 1985-2004 average (27,370 dressed pounds). Target harvest of lake trout (31,827 dressed pounds) was lower than in 2003 (37,706 dressed pounds) and higher than the 1985-2004 average (18,724 dressed pounds).

Catch Per Effort (CPE). Whitefish CPE (pounds harvested per 1,000 feet of gill-net) for targeted fishing in the four grids fished ranged from 15-29 pounds (Table 4). Whitefish CPE for the four grids combined was 29 pounds and below the average CPE of 76 for this unit for the 19 year period 1986-2004 (Table 5). Lake trout CPE for targeted fishing ranged from 32-47 pounds and was 45 for all grids combined, below the 1986-2004 average CPE of 52 pounds.

Biological Statistics

Lake Trout MI-2

No lake trout were sampled in MI-2 during 2004.

Lake Trout MI-3

Thirteen age groups of wild lake trout (6-17, and 26) and three age groups of hatchery fish (8-10) were represented in the 222 fish aged (Table 6). Mean age of 219 wild fish was 9.2 and mean age of 3 hatchery fish was 9.0. For wild fish mean length for the 238 fish measured was 23.2 inches and mean weight for the 222 fish weighed was 4.1 pounds round. For the hatchery fish mean length was 24.0 for four fish measured and 4.9 pounds for three fish weighed. Average size at age of 7-10 year old wild lake trout has decreased and become narrower since 1985 (Figure 6). Average length of 7-10 year old hatchery fish has fluctuated since 1990, probably due to low sample sizes.

Overall lamprey-marking rates were 2.5 wounds and 4.1 scars/100 fish, with fish greater than 29 inches exhibiting the highest scarring rate (Table 7). Annual total mortality rate for wild fish and for wild and hatchery fish combined for ages 8-17 was estimated at 32% (Z=0.39)(Table 8).

Lake Trout MI-4

Twelve age groups of hatchery fish (3-14) and thirteen year classes of wild trout (4-15, 24) were represented in a sample of 263 lake trout aged from MI-4 (Table 9). Mean age of hatchery and wild fish was 7.8 and 9.4 years, respectively. Fish ten years and older made up 44% of the wild component of the catch.

Mean length and weight of the 311 fish sampled was 22.4 inches and 3.7 round pounds (Table 11). The average size of wild fish (22.3 inches, 3.7 pounds) was similar to hatchery fish (22.4 inches, 3.9 pounds). Average length of wild and hatchery fish at ages 7-10 has been tracked since 1985 (Figure 6). The variation in the average length of wild fish at ages 7-10 has become narrower since 1985. Average length of hatchery fish has fluctuated greatly probably due to low numbers of fish sampled in some years.

Lamprey marking rates were 1.0 wounds and 0.3 scars/100 fish (Table 7). Annual total mortality was estimated to be 23% ($Z=0.26 \pm 0.04$) for wild fish ages 8-15 and 26% ($Z=0.30 \pm 0.04$) for wild and hatchery fish combined (Table 8).

Lake Trout MI-5

Three age groups of hatchery fish (9, 11, 14) and fifteen year classes of wild trout (5-16, 18, 23, 25) were represented in a sample of 85 lake trout aged from MI-5 (Table 10). Mean age of hatchery and wild fish was 10.8 and 8.9 years, respectively. Fish ten years and older made up 24% of the wild component of the catch.

Mean length and weight of the 93 fish sampled was 24.5 inches and 3.8 round pounds (Table 10). The average size of wild fish was 24.5 inches and 3.8 pounds; average size of hatchery fish was 23.8 inches and 4.4 pounds.

Lamprey marking rates were 3.2 wounds and 1.1 scars/100 fish, with the larger, older fish exhibiting a greater occurrence of both wounding and scarring (Table 7). Annual total mortality was estimated to be 37% ($Z=0.47 \pm 0.06$) for wild fish ages 8-15 and 36% ($Z=0.44 \pm 0.06$) for wild and hatchery fish combined (Table 8).

Lake Whitefish MI-2

Nine age groups (6-14) were represented in the 112 whitefish aged in MI-2 which had a mean age of 8.8 years (Table 11). Average length and weight of lake whitefish was 19.7 inches and 2.6 pounds. Annual total mortality was estimated at 46% ($Z=0.62$ +/-0.12) for ages 8-13.

Lake Whitefish MI-3

Thirteen age groups (5-17) were represented in the 1,318 whitefish aged in MI-3, which had a mean age of 8.8 years (Table 11). The 1990-93 year classes (age 11-14), which had been dominant since 1996, comprised only 14% of the sample, while 36% percent of the aged fish were from the 1994 and 1995 year classes (ages 9 and 10), and 44% were from the 1996 and 1997 year classes (ages 7 and 8). Average length of 1,431 lake whitefish measured was 19.5 inches and average weight of 1,337 lake whitefish weighed was 2.5 pounds. The average length of age 7 to 10 year old fish has generally been similar since 1995 (Figure 7). Annual total mortality was estimated at 43% ($Z=0.56$ +/-0.07) for ages 8-13.

Lake Whitefish MI-4

Twelve age groups (4-14, 16) were represented in the 943 whitefish aged in MI-4, which had a mean age of 8.3 years (Table 11). The 1990-93 year classes (age 11-14), which had been dominant since 1996, comprised only 11% of the sample. Fifty-seven percent of the aged fish were from the 1994-96 year classes (age 8-10), while 25% were from the 1997 year class (age 7). Average length of 979 lake whitefish measured was 20.2 inches and average weight of 951 lake whitefish weighed was 2.8 pounds. The average length of age 7 to 10 year old fish, which had increased from 1998-2002, remained low in 2004 (Figure 7). Annual total mortality was estimated at 54% ($Z=0.78$ +/-0.14) for ages 9-14.

Lake Whitefish MI-5

Nine age groups (5-11, 20, 22) were represented in the 17 whitefish aged in MI-5 (Table 11). Mean age was 9.5 years, mean length was 22.7 inches, and mean weight was 4.8 round pounds. Annual total mortality was not estimated due to low sample size.

Siscowet

There were seven age groups of siscowet in the 8 fish sampled in units MI-5 and MI-4 (Table 12). Small sample size prevented the calculation of mortality rates.

Lake Herring and Menominee Whitefish

In MI-4 eight age groups (5-12) were represented in 23 fish aged; mean age was 7.7, mean length was 15.9 inches and mean weight was 1.4 round pounds (Table 13). For the fifth year otoliths replaced scale samples as the aging structure used to assign age to individual fish. Total annual mortality was not calculated due to low sample size.

Eight menominee whitefish were sampled in 2004. Three year classes were represented (age 5, 6, and 10) for a mean age of 6.5. Average size was 13.6 inches and 0.8 round pounds (Table 14).

Coho and Chinook Salmon

One coho and one chinook salmon were sampled from MI-4 in 2004 (Tables 15 and 16). The coho was age 4, 23.6 inches and 4.7 round pounds, while the chinook was age 7, 17.3 inches and 4.2 pounds.

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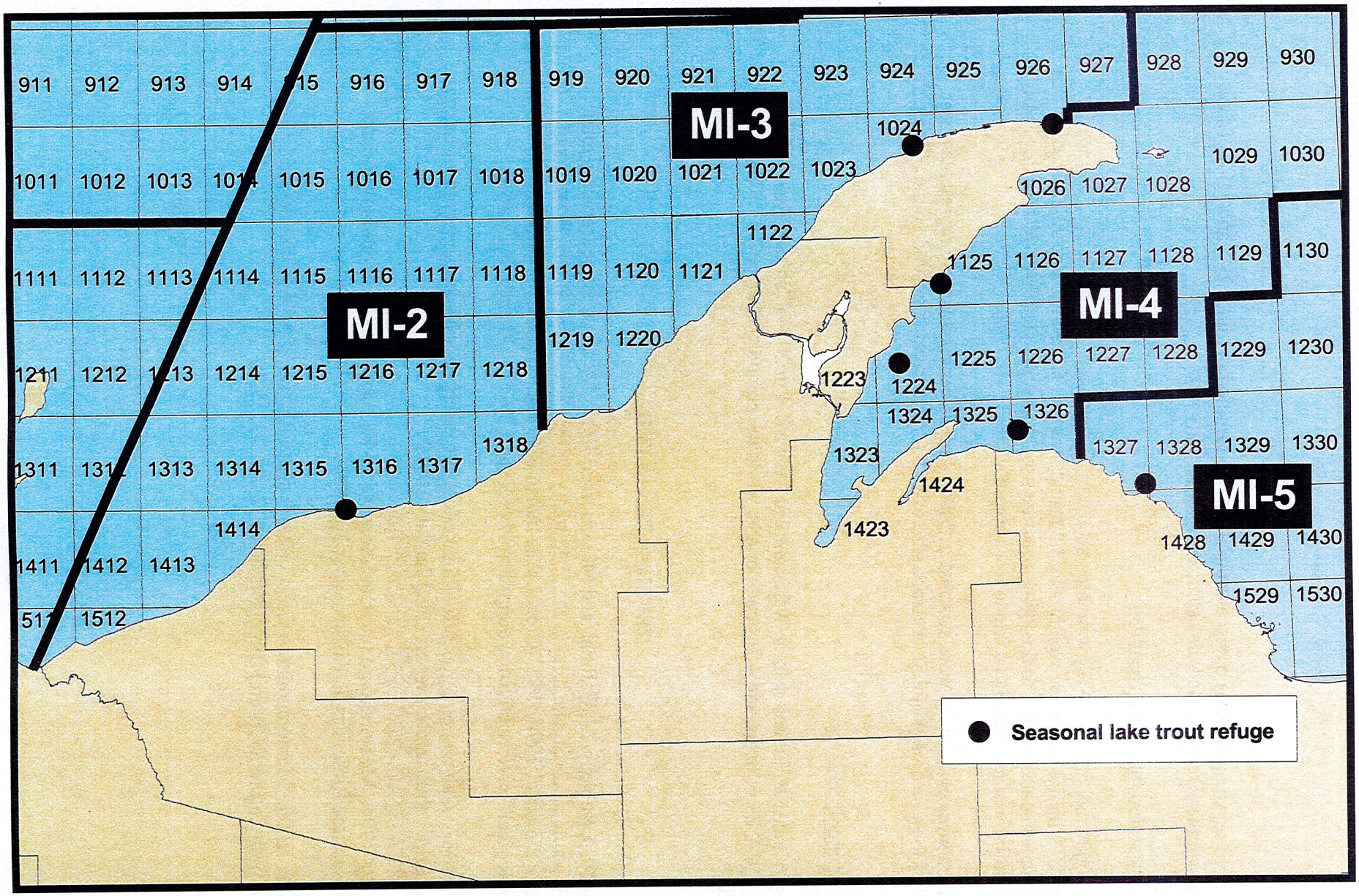


Figure 1. Management units and statistical grids in the 1842 treaty ceded area within Michigan waters of Lake Superior.

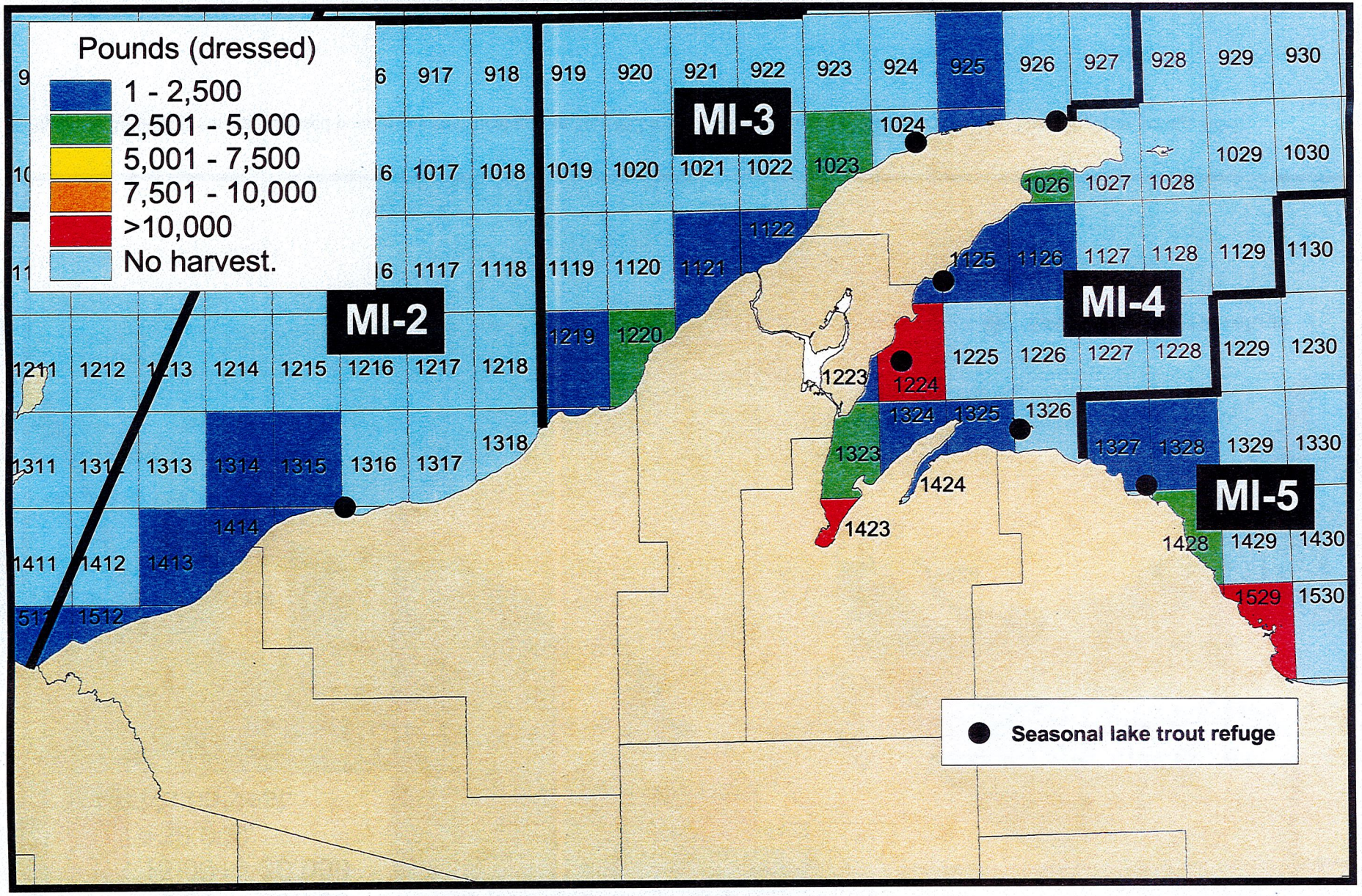


Figure 2. Lake trout harvest (dressed pounds) by statistical grid in the 1842 treaty ceded area within Michigan waters of Lake Superior during 2004.

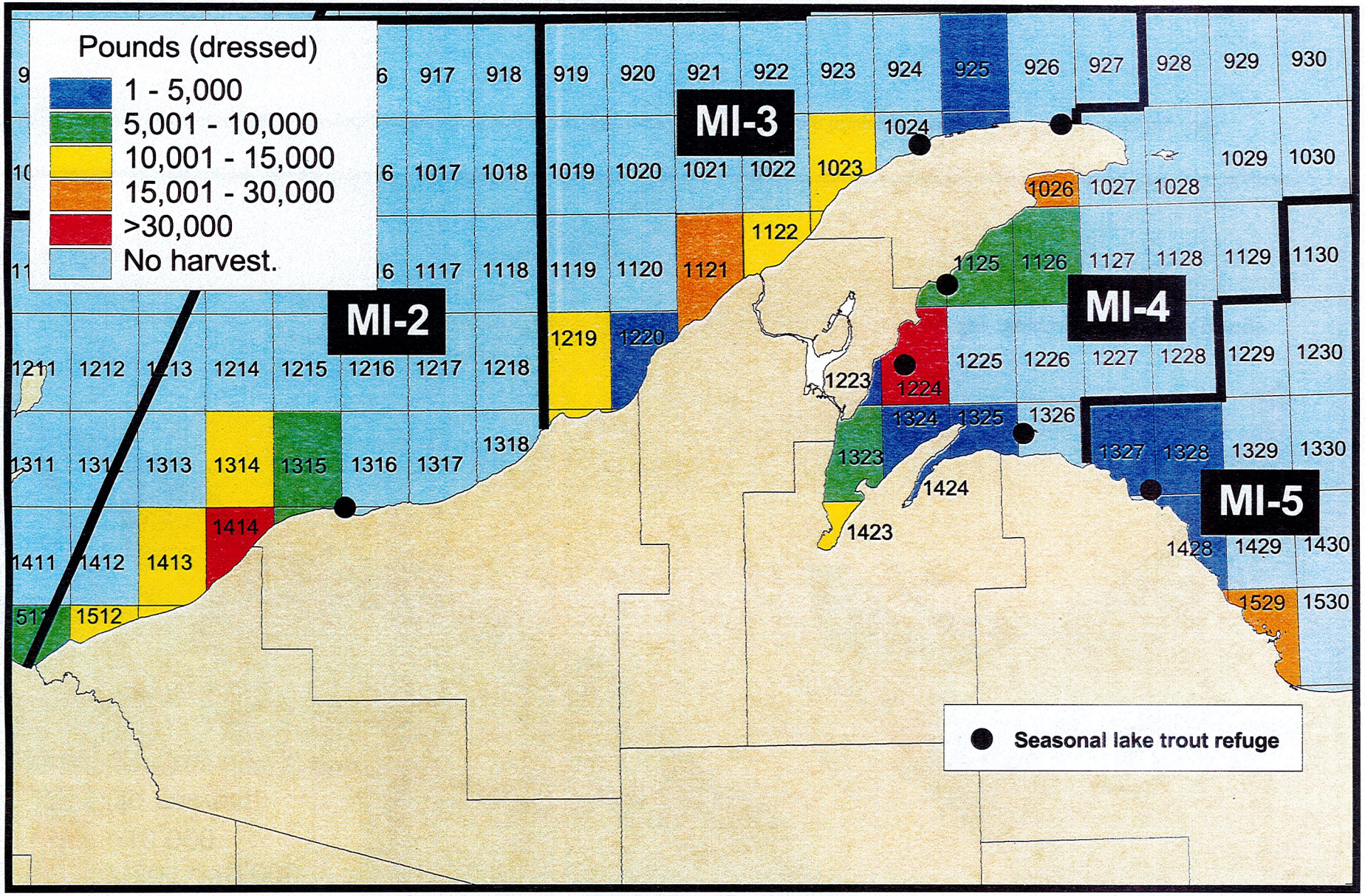


Figure 3. Whitefish harvest (dressed pounds) by statistical grid in the 1842 treaty ceded area within Michigan waters of Lake Superior during 2004.

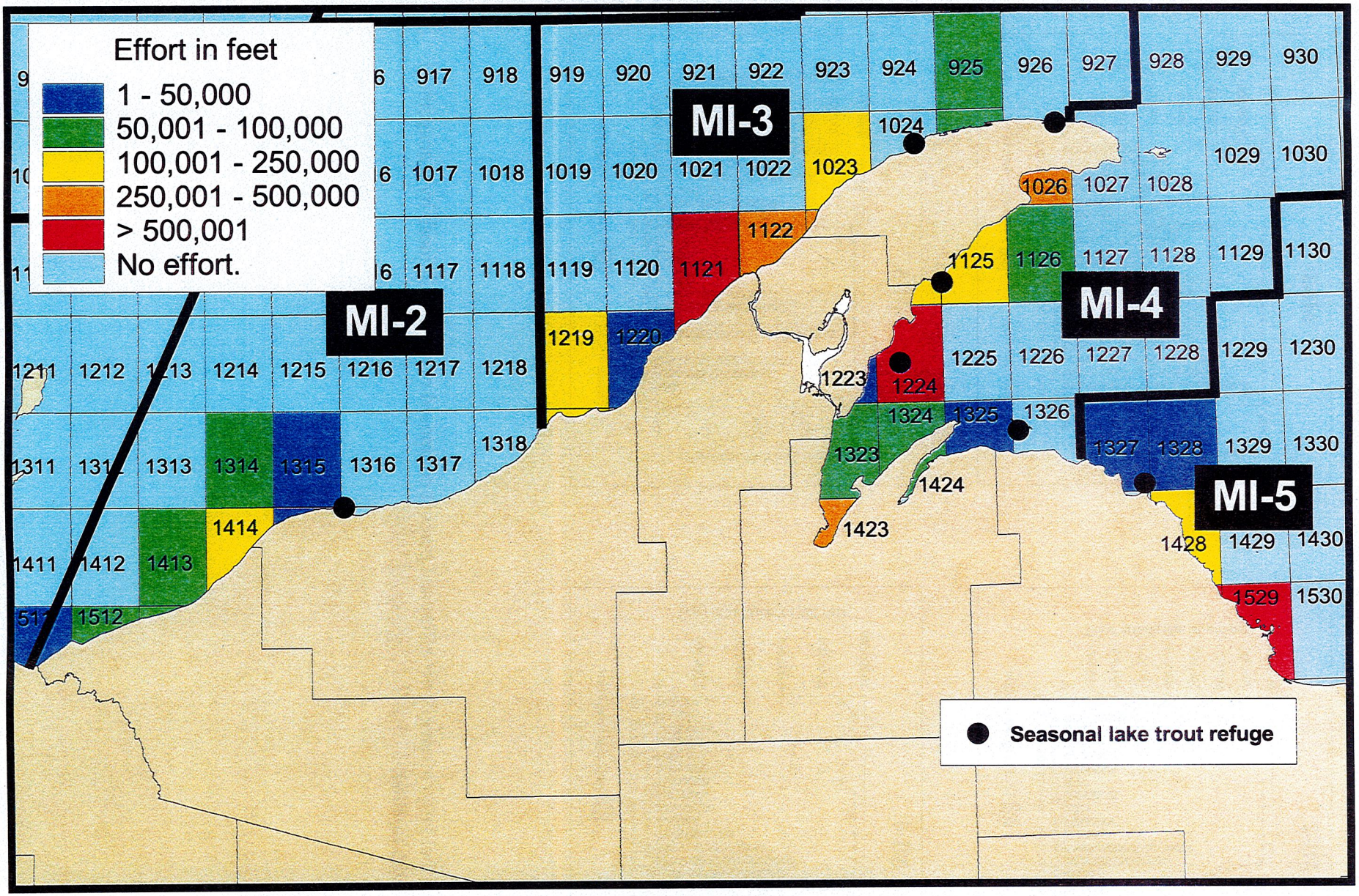
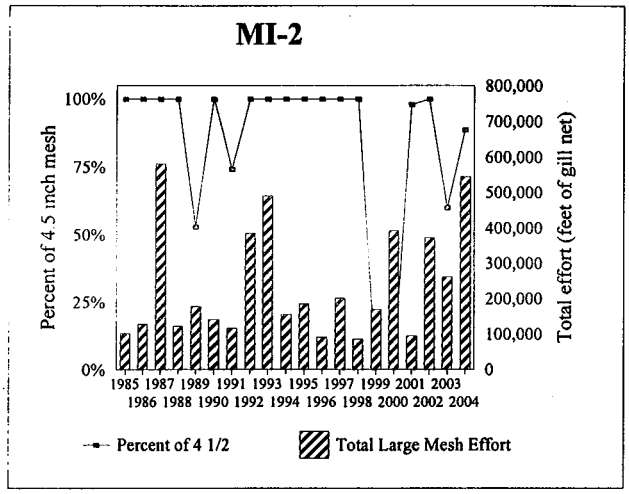
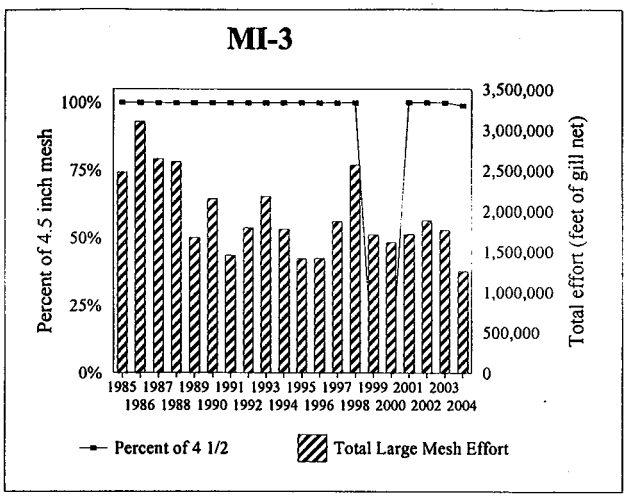
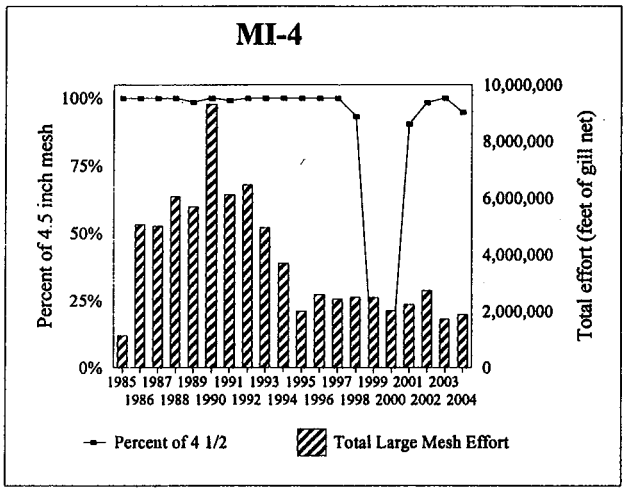


Figure 4. Effort in feet by statistical grid in the 1842 treaty ceded area within Michigan waters of Lake Superior during 2004.







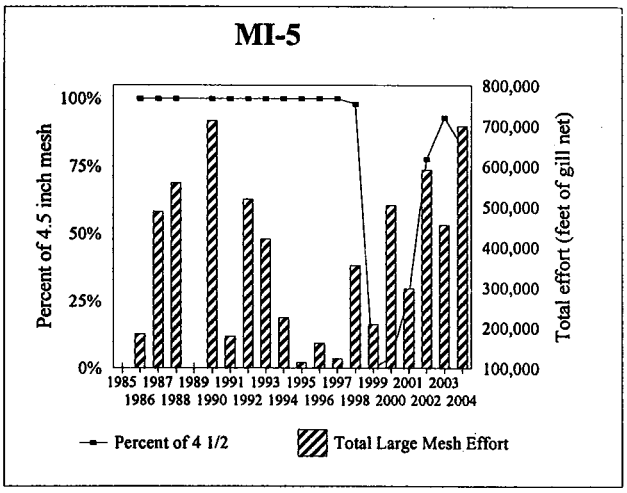


Figure 5. Total tribal large mesh gill net effort and percent composed of 4 1/2 inch mesh by management unit, 1986 to 2004.

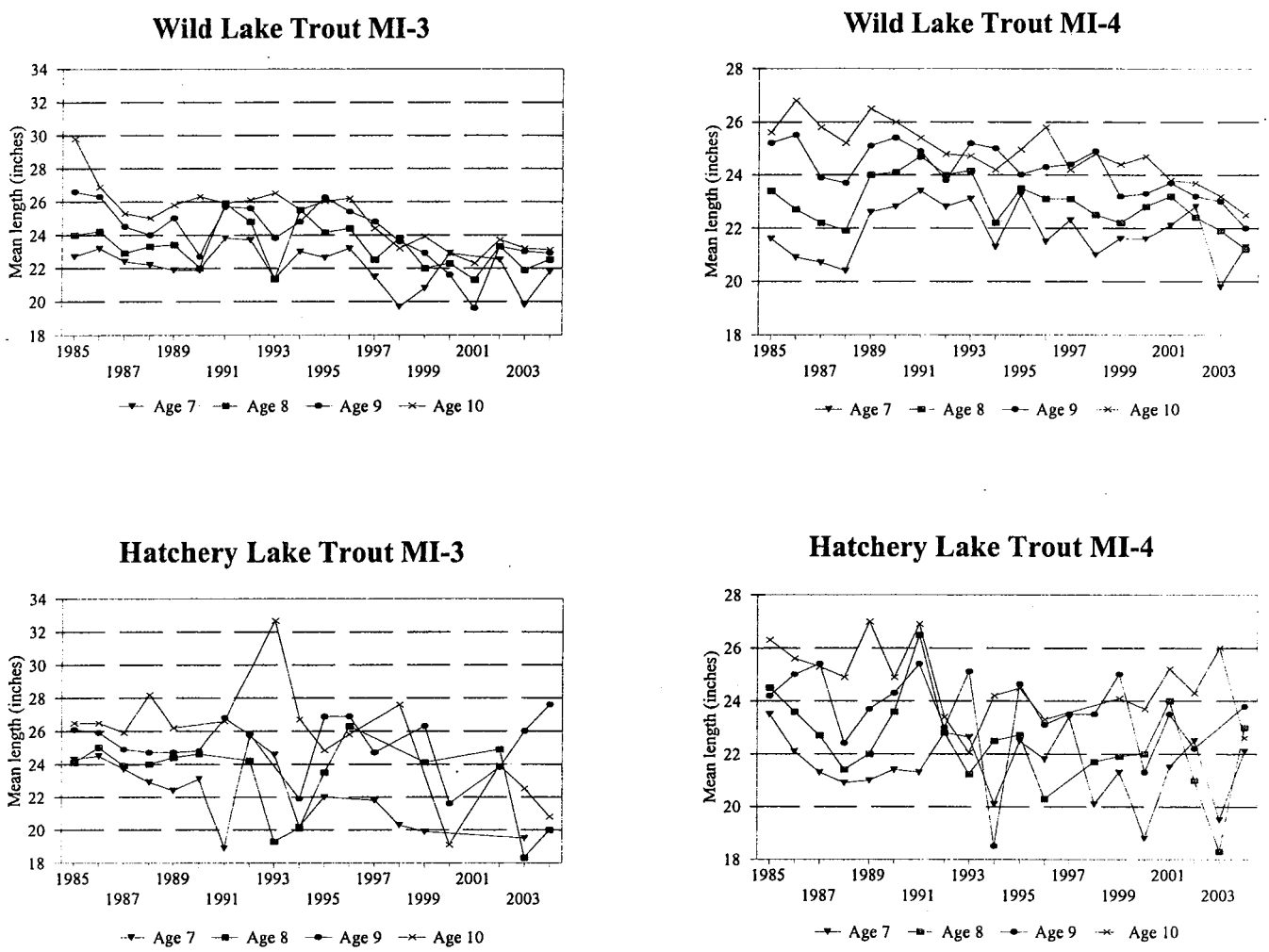
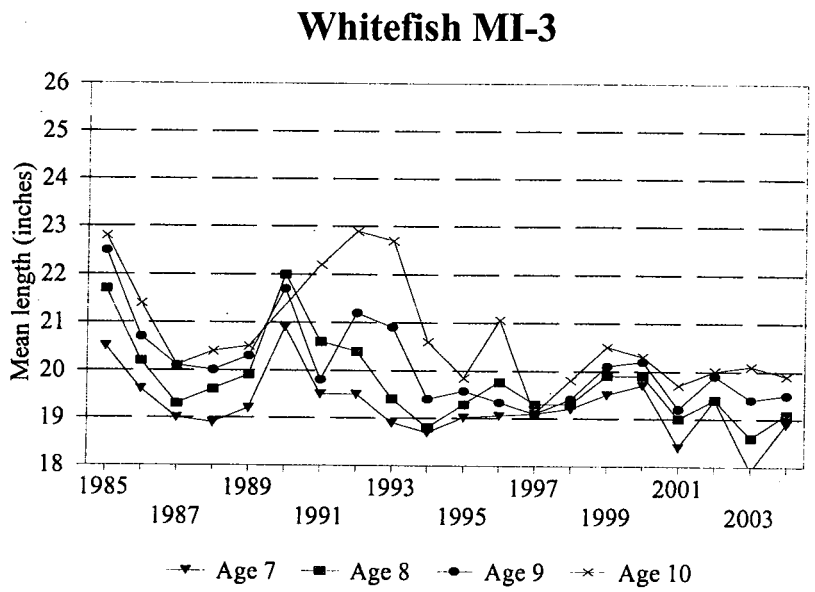


Figure 6. Trends in average length (inches) of hatchery and wild lake trout (ages 7-10) in Michigan management units MI-3 and MI-4, from 1985-2004.



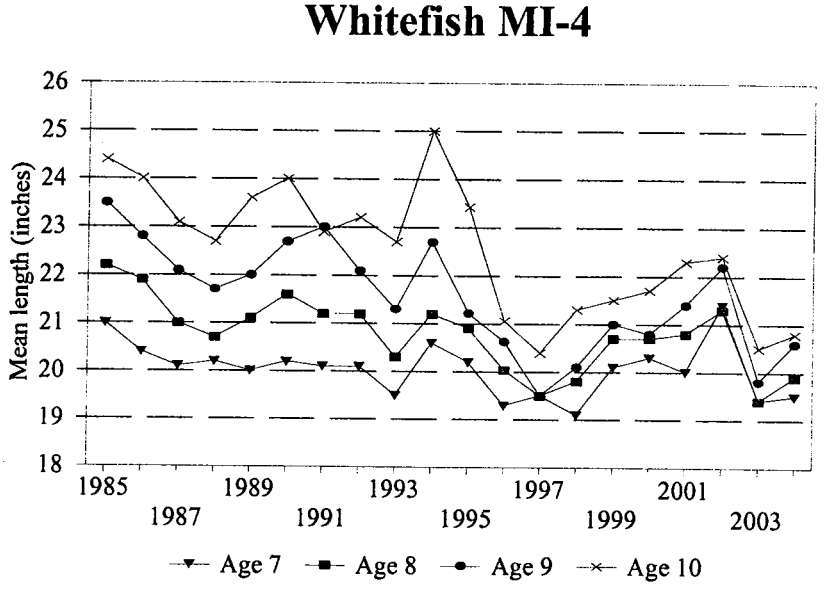


Figure 7. Trends in average length (inches) of whitefish (ages 7-10) in Michigan management units MI-3 and MI-4, from 1985-2004.

Table 1. 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 2004.

Management Unit	Grid	Effort	Percent of Total Effort*	Lake trout	Whitefish	Siscowet	Herring	Salmon	Rainbow Trout	Walleye	Northern Pike	Total Harvest Round Pounds	Percent of Total Harvest
MI-2	1314	60,000	11.0%	686	10,760	0	0	0	0	0	0		
	1315	30,000	5.5%	585	7,200	0	0	0	0	0	0		
	1413	92,800	17.1%	409	10,690	4	0	0	0	222	0		
	1414	239,000	44.0%	2,001	33,592	0	0	0	0	38	0		
	1511	30,000	5.5%	1,090	8,702	0	0	0	0	0	0		
	1512	91,500	16.8%	974	10,015	22	14	0	0	0	0		
Subtotals:	Effort:	543,300	12.4%										
	Dressed Pounds:			5,745	80,959	26	14	0	0				
	Round Pounds:			7,181.3	94,722.0	32.5	16.8	0.0	0.0	260	0	102,212.6	20.3%
MI-3	925	52,000	4.1%	145	3,675	0	0	0	0	0	0		
	1023	105,000	8.4%	4,285	11,438	0	0	0	0	0	0		
	1121	612,000	48.7%	613	26,617	0	0	0	0	0	0		
	1122	290,000	23.1%	166	13,455	0	0	0	0	0	0		
	1219	182,000	14.5%	157	12,375	0	0	0	0	0	0		
	1220	14,400	1.1%	4,607	19	0	82	0	0	0	0		
Subtotals:	Effort:	1,255,400	28.6%										
	Dressed Pounds:			9,973	67,579	0	82	0	0				
	Round Pounds:			12,466.3	79,067.4	0.0	98.4	0.0	0.0	0	0	91,632.1	18.2%
MI-4	1026	252,000	13.3%	3,358	20,693	150	245	0	0	0	0		
	1125	186,000	9.9%	1,404	7,855	0	6,565	0	0	11	0		
	1126	51,000	2.7%	63	6,094	0	0	0	0	31	0		
	1223	20,000	1.1%	1,645	2,575	0	0	0	0	0	0		
	1224	921,800	48.8%	24,459	91,265	0	0	0	0	52	0		
	1323	97,400	5.2%	4,746	5,031	464	114	34	0	10	5		
	1324	72,000	3.8%	2,147	1,729	0	0	0	0	0	0		
	1325	4,400	0.2%	170	750	0	0	0	0	0	0		
	1423	283,450	15.0%	11,216	11,602	50	308	282	110	12	0		
Subtotals:	Effort:	1,888,050	43.0%										
	Dressed Pounds:			49,208	147,594	664	7,232	316	110				
	Round Pounds:			61,510.0	172,685.0	830.0	8,678.4	395.0	137.5	116	5	244,356.9	48.6%
MI-5	1327	10,500	1.5%	486	278	0	0	0	0	0	0		
	1328	3,500	0.5%	121	54	0	0	0	0	0	0		
	1428	105,400	14.9%	3,423	3,411	62	0	70	0	0	0		
	1529	586,300	83.1%	27,797	16,999	418	52	20	0	0	0		
Subtotals:	Effort:	705,700	16.1%										
	Dressed Pounds:			31,827	20,742	480	52	90	0				
	Round Pounds:			39,783.8	24,268.1	600.0	62.4	112.5	0.0	0	0	64,826.8	12.9%
Grand Totals:	Effort:	4,392,450											
	Dressed Pounds:			96,753	316,874	1,170	7,380	406	110				
	Round Pounds:			120,941.3	370,742.6	1,462.5	8,856.0	507.5	137.5	376	5	503,028.3	

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

Table 2. Tribal commercial gill net effort (feet) harvest (pounds) by management unit, gill net mesh size, and species from the 1842 ceded area within Michigan waters of Lake Superior in 2004.

Unit	Mesh	Effort	Percent of Total Effort	Lake trout	Whitefish	Siscowet	Herring	Salmon	Rainbow Trout	Walleye	Northern Pike	Total Harvest Round Pounds
MI-2	4.5	481,100	88.6%	2,914	70,931	6	0	0	0	222	0	
	5	58,400	10.7%	2,731	9,748	20	14	0	0	38	0	
	5.5	3,800	0.7%	100	280	0	0	0	0	0	0	
Subtotals:	Effort:	543,300										
	Dressed Pounds:			5,745	80,959	26	14	0	0			
	Round Pounds:			7,181.3	94,722.0	32.5	16.8	0.0	0.0	260.0	0.0	102,212.6
Percent of Unit Harvest:				7.0%	92.7%	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	
MI-3	4.5	1,241,000	98.9%	5,366	67,560	0	0	0	0	0	0	
	5	14,400	1.1%	4,607	19	0	82	0	0	0	0	
Subtotals:	Effort:	1,255,400										
	Dressed Pounds:			9,973	67,579	0	82	0	0			
	Round Pounds:			12,466.3	79,067.4	0.0	98.4	0.0	0.0	0.0	0.0	91,632.1
Percent of Unit Harvest:				13.6%	86.3%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	
MI-4	2.87	18,000	1.0%	0	0	0	6,565	0	0		0	
	3.0	2,000	0.1%	134	130	0	12	5	0	0	0	
	4.5	1,769,950	93.7%	48,197	142,019	664	649	243	110	33	0	
	5.0	95,200	5.0%	706	5,290	0	6	68	0	83	5	
	5.5	2,900	0.2%	96	87	0	0	0	0	0	0	
	Hook	0	0.0%	75	68	0	0	0	0	0	0	
Subtotals:	Effort:	1,888,050										
	Dressed Pounds:			49,208	147,594	664	7,232	316	110			
	Round Pounds:			61,510.0	172,685.0	830.0	8,678.4	395.0	137.5	116.0	5.0	244,356.9
Percent of Unit Harvest:				25.2%	70.7%	0.3%	3.6%	0.2%	0.1%	0.0%	0.0%	
MI-5	3.0	6,600	0.9%	318	13	0	52	0	0	0	0	
	4.5	574,050	81.3%	25,486	15,687	419	0	0	0	0	0	
	5.0	123,250	17.5%	6,023	5,020	61	0	90	0	0	0	
	5.5	1,800	0.3%	0	22	0	0	0	0	0	0	
Subtotals:	Effort:	705,700										
	Dressed Pounds:			31,827	20,742	480	52	90	0			
	Round Pounds:			39,783.8	24,268.1	600.0	62.4	112.5	0.0	0.0	0.0	64,826.8
Percent of Unit Harvest:				61.4%	37.4%	0.9%	0.1%	0.2%	0.0%	0.0%	0.0%	
Totals:	Effort:	4,392,450										
	Dressed Pounds:			96,753	316,874	1,170	7,380	406	110			
	Round Pounds:			120,941.3	370,742.6	1,462.5	8,856.0	507.5	137.5	376.0	5.0	503,028.3
Percent of Total Harvest:				24.0%	73.7%	0.3%	1.8%	0.1%	0.0%	0.1%	0.0%	

Table 3. Total and target harvest, effort, and CPE by management unit and tribe for lake trout, whitefish, and siscowet in Michigan waters of Lake Superior in 2004.*

		TOTAL HARVEST							TARGET HARVEST							
			Whitefish		Lake trout		Siscowet			Whitefish		Lake trout			Siscowet	
Unit	Tribe	Effort	pounds	CPE	pounds	CPE	pounds	CPE	Effort	pounds	CPE	pounds	CPE	Effort	pounds	CPE
MI-2	Bad River	169,300	19,253	114	3,620	21	26	0	152,900	19,253	126	3,620	24			0
	Keweenaw Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red Cliff	374,000	61,706	165	2,125	6	0	0	374,000	61,706	165	2,125	6	0	0	0
	subtotal	543,300	80,959	149	5,745	11	26	0	526,900	80,959	154	5,745	11	0	0	0
MI-3	Bad River	119,400	11,457	96	8,892	74	0	0	119,400	11,457	96	8,892	74	0	0	0
	Keweenaw Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red Cliff	1,136,000	56,122	49	1,081	1	0	0	1,136,000	56,122	49	1,081	1	0	0	0
	subtotal	1,255,400	67,579	54	9,973	8	0	0	1,255,400	67,579	54	9,973	8	0	0	0
MI-4	Bad River	641,800	60,930	95	16,485	26	0	0	641,800	60,930	95	16,485	26	0	0	0
	Keweenaw Bay	549,250	31,737	58	27,474	50	514	1	543,750	31,679	58	27,451	50	0	0	0
	Red Cliff	697,000	54,927	79	5,249	8	150	0	679,000	54,927	81	5,249	8	0	0	0
	subtotal	1,888,050	147,594	78	49,208	26	664	0	1,864,550	147,536	79	49,185	26	0	0	0
MI-5	Bad River	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Keweenaw Bay	705,700	20,742	29	31,827	45	480	1	705,700	20,742	29	31,827	45	0	0	0
	Red Cliff	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	subtotal	705,700	20,742	29	31,827	45	480	1	705,700	20,742	29	31,827	45	0	0	0
Total	Bad River	930,500	91,640	98	28,997	31	26	0	914,100	91,640	100	28,997	32	0	0	0
	Keweenaw Bay	1,254,950	52,479	42	59,301	47	994	1	1,249,450	52,421	42	59,278	47	0	0	0
	Red Cliff	2,207,000	172,755	78	8,455	4	150	0	2,189,000	172,755	79	8,455	4	0	0	0
	All Tribes	4,392,450	316,874	72	96,753	22	1,170	0	4,352,550	316,816	73	96,730	22	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 4. Gill net harvest, effort, and CPE for target species by management unit and grid in Michigan waters of Lake Superior in 2004.*

		Whitefish			Lake trout			Walleye			Herring			Salmon		
Unit	Grid	Effort	pounds	CPE	Effort	pounds	CPE	Effort	pounds	CPE	Effort	pounds	CPE	Effort	pounds	CPE
MI-2	1314	60,000	10,760	179	60,000	686	11									
	1315	30,000	7,200	240	30,000	585	20									
	1413	76,400	10,690	140	76,400	409	5	16,400	141	9						
	1414	239,000	33,592	141	239,000	2,001	8									
	1511	30,000	8,702	290	30,000	1,090	36									
	1512	91,500	10,015	109	91,500	974	11									
	subtotal	526,900	80,959	154	526,900	5,745	11	16,400	141	9	0	0	0	0	0	0
MI-3	925	52,000	3,675	71	52,000	145	3									
	1023	105,000	11,438	109	105,000	4,285	41									
	1121	612,000	26,617	43	612,000	613	1									
	1122	290,000	13,455	46	290,000	166	1									
	1219	182,000	12,375	68	182,000	157	1									
	1220	14,400	19	1	14,400	4,607	320									
	subtotal	1,255,400	67,579	54	1,255,400	9,973	8	0	0	0	0	0	0	0	0	0
MI-4	1026	252,000	20,693	82	252,000	3,358	13									
	1125	168,000	7,855	47	168,000	1,404	8				18,000	6,565	365			
	1126	51,000	6,094	119	51,000	63	1									
	1223	20,000	2,575	129	20,000	1,645	82									
	1224	921,800	91,265	99	921,800	24,459	27									
	1323	97,100	4,973	51	97,100	4,723	49									
	1324	72,000	1,729	24	72,000	2,147	30									
	1325	4,400	750	170	4,400	170	39									
	1423	278,250	11,602	42	278,250	11,216	40							5,200	90	17
	subtotal	1,864,550	147,536	79	1,864,550	49,185	26	0	0	0	18,000	6,565	365	5,200	90	17
MI-5	1327	10,500	278	26	10,500	486	46									
	1328	3,500	54	15	3,500	121	35									
	1428	105,400	3,411	32	105,400	3,423	32									
	1529	586,300	16,999	29	586,300	27,797	47									
	subtotal	705,700	20,742	29	705,700	31,827	45	0	0	0	0	0	0	0	0	0
Grand Total		4,352,550	316,816	73	4,352,550	96,730	22	16,400	141	9	18,000	6,565	365	5,200	90	17

*Pounds are in dressed weight (except for walleye is round 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 5. Tribal commercial gill net effort (feet), harvest (dressed pounds), and catch per unit effort (CPE, pounds/1,000 feet) for whitefish, lake trout and siscowet by management unit and year from the 1842 ceded area within Michigan waters of Lake Superior from 1985-2004. Target effort for whitefish and lake trout was combined.

		Whitefish				Lake trout				Siscowet			
Unit	Year	Target effort	Target harvest	CPE	Total Harvest	Target effort	Target harvest	CPE	Total Harvest	Target effort	Target harvest	CPE	Total Harvest
MI-2	1985	101,100	5,664	56	5,664	101,100	9,238	91	9,238	0	0	0	45
	1986	128,000	16,234	127	16,234	128,000	7,550	59	7,550	0	0	0	63
	1987	576,200	80,246	139	80,246	576,200	18,568	32	18,633	3,200	0	0	2,059
	1988	98,000	2,809	29	2,809	98,000	17,374	177	17,374	24,000	4,945	206	5,377
	1989	178,000	33,511	188	33,511	178,000	13,488	76	13,488	0	0	0	4,181
	1990	113,000	22,867	202	24,012	113,000	2,789	25	3,269	28,000	8,145	291	13,308
	1991	136,800	32,003	234	32,003	136,800	5,273	39	5,273	0	0	0	812
	1992	217,000	44,814	207	45,377	217,000	2,290	11	2,332	166,000	25,946	156	27,476
	1993	419,100	74,220	177	74,473	419,100	7,780	19	8,263	52,400	10,029	191	18,680
	1994	148,200	17,629	119	17,629	148,200	7,790	53	7,790	5,000	747	149	1,990
	1995	155,000	11,236	73	12,160	155,000	9,729	63	10,104	15,000	3,307	221	6,682
	1996	89,600	4,418	49	4,418	89,600	7,777	87	7,777	1,200	3	3	189
	1997	196,300	19,512	99	19,512	196,300	10,675	54	11,302	5,000	1,608	322	2,311
	1998	85,400	10,250	120	10,250	85,400	3,125	37	3,125	0	0	0	250
	1999	170,100	31,466	185	31,466	170,100	1,130	7	1,130	0	0	0	3,628
	2000	391,800	120,494	308	120,494	391,800	3,925	10	3,925	0	0	0	3,911
	2001	95,000	16,944	178	16,944	95,000	463	5	463	0	0	0	1,483
	2002	371,800	43,377	117	43,377	371,800	3,582	10	3,582	0	0	0	6,667
	2003	261,600	37,887	145	37,887	261,600	2,910	11	2,910	0	0	0	1,700
	2004	526,900	80,959	154	80,959	526,900	5,745	11	5,745				26
Average:		222,945	35,327	158	35,471	222,945	7,060	32	7,164	15,779	2,881	183	5,042
MI-3	1985	2,475,200	309,525	125	309,525	2,475,200	31,501	13	31,501	0	0	0	6,098
	1986	2,936,200	265,269	90	266,919	2,936,200	39,682	14	39,888	161,000	26,172	163	44,384
	1987	2,098,900	136,353	65	145,245	2,098,900	36,409	17	37,340	538,800	58,797	109	78,320
	1988	2,427,300	222,321	92	225,440	2,427,300	32,677	14	33,158	176,400	21,934	124	34,289
	1989	1,596,000	134,078	84	134,182	1,596,000	28,215	18	28,224	68,000	10,660	157	22,461
	1990	2,127,500	110,615	52	110,615	2,127,500	28,361	13	28,361	20,000	2,967	148	28,771
	1991	1,329,900	62,714	47	65,264	1,329,900	22,507	17	23,790	123,400	14,458	117	30,005
	1992	1,675,200	119,291	71	120,176	1,675,200	19,537	12	19,912	84,600	8,272	98	27,350
	1993	2,100,100	172,270	82	172,488	2,100,100	16,958	8	17,255	63,700	5,933	93	22,052
	1994	1,703,800	73,556	43	74,632	1,703,800	12,651	7	13,433	71,000	5,053	71	22,099
	1995	1,408,400	91,358	65	91,358	1,408,400	8,013	6	8,013	0	0	0	9,774
	1996	1,359,700	135,822	100	136,622	1,359,700	9,843	7	10,798	56,000	2,750	49	6,277
	1997	1,854,100	136,221	74	136,971	1,854,100	15,954	9	16,435	18,000	1,546	86	13,270
	1998	2,556,700	267,336	105	267,411	2,556,700	24,629	10	24,759	9,500	400	42	11,706
	1999	1,706,300	178,485	105	178,485	1,706,300	12,430	7	12,430	0	0	0	11,455
	2000	1,609,300	204,065	127	204,065	1,609,300	8,951	6	8,951	0	0	0	3,389
	2001	1,711,600	154,154	90	154,154	1,711,600	17,246	10	17,246	0	0	0	7,819
	2002	1,879,000	85,980	46	85,980	1,879,000	19,558	10	19,558	0	0	0	8,986
	2003	1,759,000	196,274	112	196,274	1,759,000	12,585	7	12,585	0	0	0	0
	2004	1,255,400	67,579	54	67,579	1,255,400	9,973	8	9,973				0
Average:		1,878,480	156,163	83	157,169	1,878,480	20,384	11	20,681	73,179	8,365	114	19,425
MI-4	1985	1,083,275	218,666	202	219,376	1,083,275	43,118	40	44,289	0	0	0	241
	1986	4,864,900	526,710	108	527,148	4,864,900	129,258	27	129,565	105,800	25,924	245	32,038
	1987	4,110,190	300,332	73	301,898	4,110,190	71,863	18	72,864	768,200	136,596	178	160,297
	1988	5,547,065	245,246	44	246,854	5,547,065	117,982	21	119,281	266,000	34,653	130	53,689
	1989	6,781,675	371,247	55	372,637	6,781,675	112,829	17	114,353	70,000	21,781	311	58,127
	1990	8,557,900	377,190	44	382,839	8,557,900	133,645	16	139,272	600,500	38,606	64	81,902
	1991	5,945,200	278,295	47	286,046	5,945,200	94,581	16	104,481	789,300	55,800	71	96,699
	1992	5,152,100	299,967	58	313,370	5,152,100	74,849	15	86,074	950,750	46,489	49	96,550
	1993	3,939,425	165,440	42	176,357	3,939,425	65,184	17	76,105	747,500	55,090	74	92,518
	1994	2,801,325	88,866	32	95,085	2,801,325	53,075	19	62,290	559,050	38,703	69	60,395
	1995	1,529,225	74,466	49	84,682	1,529,225	47,471	31	61,986	376,000	35,363	94	51,510
	1996	2,096,400	101,931	49	108,219	2,096,400	43,737	21	50,828	336,900	23,662	70	38,361
	1997	2,238,988	127,998	57	129,103	2,238,988	54,929	25	56,302	137,986	41,753	303	65,555
	1998	2,202,700	136,100	62	139,384	2,202,700	60,014	27	63,419	196,870	19,377	98	33,038
	1999	2,338,100	141,873	61	143,432	2,338,100	69,671	30	70,896	79,400	14,920	188	25,154
	2000	1,922,025	128,261	67	129,288	1,922,025	78,318	41	79,097	43,700	6,616	151	17,851
	2001	2,193,800	114,051	52	114,867	2,193,800	66,726	30	67,347	22,800	6,949	305	34,091
	2002	2,735,450	160,561	59	160,564	2,735,450	91,897	34	91,897	0	0	0	19,050
	2003	1,714,600	158,437	92	158,437	1,714,600	45,406	27	45,406	0	0	0	500
	2004	1,864,550	147,536	79	147,594	1,864,550	49,185	26	49,208				664
Average:		3,480,945	208,159	60	211,859	3,480,945	75,187	22	79,248	318,461	31,699	100	50,912

Table 5. Continued.

		Whitefish				Lake trout				Siscowet			
Unit	Year	Target effort	Target harvest	CPE	Total Harvest	Target effort	Target harvest	CPE	Total Harvest	Target effort	Target harvest	CPE	Total Harvest
MI-5	1986	180,000	25,205	140	25,205	180,000	10,667	59	10,667	4,000	750	188	1,772
	1987	440,000	32,095	73	33,126	440,000	13,509	31	13,509	48,000	2,502	52	6,269
	1988	551,900	47,233	86	47,363	551,900	32,105	58	32,105	6,000	333	56	5,449
	1989	225,500	42,809	190	42,809	225,500	12,661	56	12,661	0	0	0	2,785
	1990	706,000	80,394	114	80,394	706,000	18,490	26	18,490	0	0	0	10,026
	1991	305,500	24,355	80	24,540	305,500	7,789	26	7,899	36,000	405	11	9,787
	1992	426,000	35,827	84	37,169	426,000	8,042	19	8,977	72,000	2,970	41	8,672
	1993	416,000	21,375	51	21,522	416,000	25,555	61	25,597	4,500	206	46	2,833
	1994	211,000	5,318	25	5,388	211,000	24,974	118	24,974	14,000	290	21	2,878
	1995	113,400	9,288	82	9,288	113,400	8,445	75	8,445	0	0	0	1,839
	1996	161,400	7,672	48	7,672	161,400	8,040	50	8,040	0	0	0	1,033
	1997	102,300	17,997	176	18,831	102,300	5,249	51	6,105	8,000	200	25	1,855
	1998	280,300	23,950	85	24,452	280,300	14,942	53	16,247	74,000	1,989	27	4,023
	1999	178,000	12,213	69	12,813	178,000	18,342	103	19,824	15,500	1,222	79	4,038
	2000	481,800	44,454	92	44,842	481,800	48,030	100	48,479	7,500	578	77	3,073
	2001	292,700	22,949	78	22,949	292,700	6,377	22	7,321	0	0	0	0
	2002	576,600	31,159	54	31,329	576,600	23,010	40	23,010	0	0	0	1,849
	2003	454,500	14,988	33	14,988	454,500	37,706	83	37,706	0	0	0	5
	2004	705,700	20,742	29	20,742	705,700	31,827	45	31,827				480
Average:		358,347	27,370	76	27,654	358,347	18,724	52	19,046	16,083	636	40	3,614
All units	1985	3,659,575	533,855	146	534,565	3,659,575	83,857	23	85,028	0	0	0	6,384
	1986	8,109,100	833,418	103	835,506	8,109,100	187,157	23	187,670	270,800	52,846	195	78,257
	1987	7,225,290	549,026	76	560,515	7,225,290	140,349	19	142,346	1,358,200	197,895	146	246,945
	1988	8,624,265	517,609	60	522,466	8,624,265	200,138	23	201,918	472,400	61,865	131	98,804
	1989	8,781,175	581,645	66	583,139	8,781,175	167,193	19	168,726	138,000	32,441	235	87,554
	1990	11,504,400	591,066	51	597,860	11,504,400	183,285	16	189,392	648,500	49,718	77	134,007
	1991	7,717,400	397,367	51	407,853	7,717,400	130,150	17	141,443	948,700	70,663	74	137,303
	1992	7,470,300	499,899	67	516,092	7,470,300	104,718	14	117,295	1,273,350	83,677	66	160,048
	1993	6,874,625	433,305	63	444,840	6,874,625	115,477	17	127,220	868,100	71,258	82	136,083
	1994	4,864,325	185,369	38	192,734	4,864,325	98,490	20	108,487	649,050	44,793	69	87,362
	1995	3,206,025	186,348	58	197,488	3,206,025	73,658	23	88,548	391,000	38,670	99	69,805
	1996	3,707,100	249,843	67	256,931	3,707,100	69,397	19	77,443	394,100	26,415	67	45,860
	1997	4,391,688	301,728	69	304,417	4,391,688	86,807	20	90,144	168,986	45,107	267	82,991
	1998	5,125,100	437,636	85	441,497	5,125,100	102,710	20	107,550	280,370	21,766	78	49,017
	1999	4,392,500	364,037	83	366,196	4,392,500	101,573	23	104,280	94,900	16,142	170	44,275
	2000	4,404,925	497,274	113	498,689	4,404,925	139,224	32	140,452	51,200	7,194	141	28,224
	2001	4,293,100	308,098	72	308,914	4,293,100	90,812	21	92,377	22,800	6,949	305	43,393
	2002	5,562,850	321,077	58	321,250	5,562,850	138,047	25	138,047	0	0	0	36,552
	2003	4,189,700	407,586	97	407,586	4,189,700	98,607	24	98,607	0	0	0	2,205
	2004	4,352,550	316,816	73	316,874	4,352,550	96,730	22	96,753	0	0	0	1,170
Average:		5,922,800	425,650	72	430,771	5,922,800	120,419	20	125,186	401,523	41,370	103	78,812

Table 6. Age and size composition of hatchery (H) and wild (N) lake trout in tribal commercial harvests from unit MI-3 during 2004. Weight is in round pounds, length is in inches, and sd=standard deviation.

Unit	Origin	Age	Number Aged	Number Measured	Length (in.) mean	Length (in.) sd	Number Weighed	Weight (lbs) mean	Weight (lbs) sd
MI-3									
	H								
			0	1	27.7		1	5.0	
		8	1	1	20.0		0		
		9	1	1	27.6		1	6.9	
		10	1	1	20.8		1	2.8	
Sample Size:			3	4			3		
Means:		9.0			24.0	4.2		4.9	2.1
	N								
			0	19	23.8	3.4	19	4.6	2.2
		6	21	21	21.1	1.4	21	3.0	0.7
		7	33	33	21.8	1.8	32	3.4	0.9
		8	51	51	22.5	1.9	48	3.8	1.1
		9	40	40	22.9	2.6	38	4.0	1.2
		10	27	27	23.1	4.8	23	4.2	1.3
		11	21	21	24.3	3.2	21	4.9	2.4
		12	8	8	24.6	2.6	7	4.6	1.3
		13	4	4	25.0	1.0	4	5.0	0.7
		14	5	5	29.5	5.0	3	6.8	2.9
		15	2	2	25.6	0.7	1	5.2	
		16	2	2	26.0	1.8	2	6.0	1.6
		17	3	3	29.0	4.5	2	6.3	1.2
		26	2	2	34.4	2.3	1	16.5	
Sample Size:			219	238			222		
Means:		9.2			23.2	3.3		4.1	1.8
Sample Size:			222	242			225		
Means:		9.2			23.2	3.3		4.1	1.8

Table 7. Lamprey wounding and scarring rates (marks/100 fish) on lake trout, per Lake Superior Technical Committee protocol, captured in the tribal commercial harvests from management units in the 1842 ceded area within Michigan waters of Lake Superior during 2004.

Unit	Length Category (Inches)	Fish Examined	Type AI, AII, AIII Wounds	Wounds per 100 fish	Scars	Scars per 100 fish
MI-3						
	1: < 17	1	0	0.0	0	0.0
	2: 17-20.9	54	0	0.0	0	0.0
	3: 21-24.9	125	2	1.6	8	6.4
	4: 25-28.9	52	2	3.8	1	1.9
	5: > 29	10	2	20.0	1	10.0
	Total:	242	6	2.5	10	4.1
MI-4						
	1: < 17	5	0	0.0	0	0.0
	2: 17-20.9	84	0	0.0	0	0.0
	3: 21-24.9	173	1	0.6	0	0.0
	4: 25-28.9	43	1	2.3	1	2.3
	5: > 29	5	0	0.0	0	0.0
	Total:	310	2	0.6	1	0.3
MI-5						
	2: 17-20.9	29	1	3.4	0	0.0
	3: 21-24.9	52	1	1.9	0	0.0
	4: 25-28.9	9	1	11.1	1	11.1
	5: > 29	3	0	0.0	0	0.0
	Total:	93	3	3.2	1	1.1

Table 8. Catch curve mortality and survival rates on lake trout from management units in the 1842 ceded area within Michigan waters of Lake Superior for data collected January-December 1988-2004.

Management Unit	Year	Ages	Instantaneous total mortality Z	95% confidence limit for Z	Annual total mortality A	Annual Survival S
				Wild Lake Trout		
MI-2	2002	9-11	0.46	+/- 0.03	0.37	0.63
	2001	9-15	0.33	+/- 0.10	0.28	0.72
	2000	9-13	0.22	+/- 0.34	0.20	0.80
	1999	7-13	0.26	+/- 0.16	0.23	0.77
	1998	7-13	0.39	+/- 0.11	0.32	0.68
	1990	8-11	0.75	+/- 0.42	0.53	0.47
	1988	9-13	0.41	+/- 0.31	0.33	0.67
MI-3	2004	8-17	0.39	+/- 0.04	0.32	0.68
	2003	7-14	0.28	+/- 0.08	0.24	0.87
	2002	7-20	0.31	+/- 0.04	0.27	0.73
	2000	7-11	0.20	+/- 0.45	0.18	0.81
	1999	7-16	0.22	+/- 0.10	0.20	0.80
	1997	7-11	0.18	+/- 0.21	0.17	0.84
	1996	8-13	0.24	+/- 0.27	0.21	0.79
	1995	8-11	0.52	+/- 0.33	0.41	0.60
	1991	8-11	0.47	+/- 0.35	0.38	0.63
	1989	8-12	0.72	+/- 0.08	0.51	0.49
	1988	9-13	0.65	+/- 0.40	0.48	0.52
MI-4	2004	8-15	0.26	+/- 0.04	0.23	0.88
	2003	8-17	0.26	+/- 0.05	0.23	0.88
	2002	7-12	0.23	+/- 0.07	0.21	0.79
	2001	7-15	0.36	+/- 0.05	0.30	0.70
	2000	6-13	0.32	+/- 0.59	0.28	0.72
	1999	7-12	0.20	+/- 0.07	0.18	0.82
	1998	7-12	0.22	+/- 0.17	0.20	0.80
	1997	7-12	0.46	+/- 0.18	0.37	0.63
	1996	7-12	0.56	+/- 0.16	0.43	0.57
	1995	7-12	0.20	+/- 0.23	0.18	0.82
	1994	7-12	0.28	+/- 0.10	0.24	0.76
	1993	6-11	0.35	+/- 0.33	0.30	0.71
	1992	5-11	0.43	+/- 0.11	0.35	0.65
	1991	6-11	0.59	+/- 0.13	0.45	0.55
	1990	6-11	0.72	+/- 0.15	0.51	0.49
	1989	7-11	0.79	+/- 0.40	0.55	0.45
	1988	9-13	0.91	+/- 0.13	0.60	0.40
MI-5	2004	8-15	0.47	+/- 0.06	0.37	0.63
	2003	12-22	0.26	+/- 0.05	0.23	0.88
	2001	7-15	0.27	+/- 0.07	0.24	0.76
	2000	10-16	0.19	+/- 0.34	0.17	0.83
	1991	5-8	0.74	+/- 0.56	0.52	0.48
				Wild and Hatchery Lake Trout Combined		
MI-2	2002	9-11	0.46	+/- 0.03	0.37	0.63
	2001	9-15	0.34	+/- 0.10	0.29	0.71
	2000	9-13	0.22	+/- 0.30	0.20	0.80
	1999	7-13	0.29	+/- 0.16	0.25	0.75
	1998	7-13	0.39	+/- 0.11	0.32	0.68
	1990	8-12	0.71	+/- 0.25	0.51	0.49
MI-3	2004	8-17	0.39	+/- 0.05	0.32	0.68
	2003	7-14	0.29	+/- 0.07	0.25	0.87
	2002	7-20	0.31	+/- 0.04	0.27	0.73
	2000	7-11	0.20	+/- 0,45	0.18	0.82
	1999	7-16	0.04	+/- 0.09	0.20	0.80
	1997	7-11	0.21	+/- 0.20	0.19	0.81
	1996	8-13	0.28	+/- 0.19	0.24	0.76
	1995	8-11	0.56	+/- 0.33	0.43	0.57
	1992	7-13	0.37	+/- 0.36	0.31	0.69
	1991	8-11	0.40	+/- 0.33	0.33	0.67
	1989	8-11	0.64	+/- 0.09	0.47	0.53
	1988	11-13	0.78	+/- 0.45	0.54	0.46
MI-4	2004	8-15	0.30	+/- 0.04	0.26	0.74
	2003	8-17	0.27	+/- 0.04	0.24	0.88
	2002	7-12	0.27	+/- 0.06	0.24	0.76
	2001	7-15	0.37	+/- 0.06	0.31	0.69
	2000	5-13	0.27	+/- 0.52	0.24	0.76
	1999	7-12	0.25	+/- 0.03	0.22	0.78
	1998	7-12	0.30	+/- 0.13	0.26	0.74
	1997	7-12	0.34	+/- 0.12	0.29	0.71
	1996	7-12	0.57	+/- 0.15	0.43	0.57
	1995	7-12	0.25	+/- 0.17	0.22	0.78
	1994	7-12	0.31	+/- 0.09	0.27	0.73
	1993	6-11	0.30	+/- 0.24	0.26	0.74
	1992	5-11	0.45	+/- 0.08	0.36	0.64
	1991	6-11	0.58	+/- 0.10	0.44	0.56
	1990	6-11	0.59	+/- 0.09	0.45	0.55
	1989	7-11	0.71	+/- 0.22	0.51	0.49
	1988	8-13	0.54	+/- 0.28	0.42	0.58
MI-5	2004	8-15	0.44	+/- 0.06	0.36	0.64
	2003	12-22	0.27	+/- 0.05	0.24	0.88
	2001	7-15	0.28	+/- 0.07	0.24	0.76
	2000	10-16	0.17	+/- 0.26	0.16	0.84
	1991	5-8	0.60	+/- 0.45	0.45	0.55

Table 9. Age and size composition of hatchery (H) and wild (N) lake trout in tribal commercial harvests from unit MI-4 during 2004. Weight is in round pounds, length is in inches, and sd=standard deviation.

Unit	Origin	Age	Number Aged	Number Measured	Length (in.) mean	Length (in.) sd	Number Weighed	Weight (lbs) mean	Weight (lbs) sd
MI-4									
	H								
			0	16	23.1	3.3	16	4.1	2.2
		3	1	1	19.1		1	2.5	
		4	8	8	16.6	3.6	8	1.8	0.9
		5	5	5	22.2	2.3	5	3.7	1.1
		6	11	11	21.5	1.8	11	3.5	1.1
		7	6	6	22.1	2.8	6	4.0	1.6
		8	9	9	23.0	2.5	9	4.4	1.4
		9	16	16	23.8	2.9	16	4.5	1.8
		10	5	5	22.6	1.1	5	3.6	0.7
		11	2	2	25.9	2.9	2	5.8	2.3
		12	5	5	23.9	2.2	5	4.2	1.0
		13	2	2	24.8	2.1	2	4.5	1.0
		14	1	1	28.8		1	7.2	
Sample Size:			71	87			87		
Means:		7.8			22.4	3.4		3.9	1.7
	N								
			0	31	22.6	1.4	31	3.7	0.7
		4	2	2	20.5	1.1	2	3.1	0.3
		5	9	9	20.9	1.9	9	3.1	0.8
		6	15	15	20.5	1.7	15	2.8	0.8
		7	21	21	21.3	1.5	21	3.2	0.8
		8	35	35	21.2	1.9	35	3.0	0.9
		9	26	26	22.0	1.8	26	3.2	0.8
		10	19	19	22.5	1.4	19	3.6	0.9
		11	21	21	22.7	1.2	21	3.8	0.6
		12	17	17	24.2	1.7	17	4.3	0.7
		13	12	12	24.4	1.6	12	4.4	0.8
		14	10	10	25.6	1.2	10	4.8	0.8
		15	4	4	26.4	3.1	4	5.9	2.4
		24	1	1	35.0		1	14.3	
Sample Size:			192	223			223		
Means:		9.4			22.4	2.3		3.6	1.2
Sample Size:			263	310			310		
Means:		9.0			22.4	2.6		3.7	1.4

Table 10. Age and size composition of hatchery (H) and wild (N) lake trout in tribal commercial harvests from unit MI-5 during 2004. Weight is in round pounds, length is in inches, and sd=standard deviation.

Unit	Origin	Age	Number Aged	Number Measured	Length (in.) mean	Length (in.) sd	Number Weighed	Weight (lbs) mean	Weight (lbs) sd
MI-5									
	H								
		9	2	2	24.5	1.8	2	4.5	0.7
		11	2	2	24.8	1.1	2	5.1	0.6
		14	1	1	20.3		1	2.9	
Sample Size:			5	5			5		
Means:		10.8			23.8	2.2		4.4	1.0
	N								
			0	8	24.0	2.8	8	4.5	1.6
		5	4	4	19.8	1.2	4	2.7	0.4
		6	7	7	20.1	1.8	7	2.7	0.6
		7	17	17	21.3	1.1	17	3.3	0.6
		8	22	22	21.9	1.6	22	3.6	0.8
		9	11	11	41.3	62.3	11	4.0	0.9
		10	7	7	23.0	2.3	7	4.2	1.3
		11	2	2	22.6	1.1	2	3.9	1.0
		12	3	3	25.3	2.3	3	5.8	1.4
		13	1	1	22.7		1	3.6	
		14	1	1	21.0		1	3.2	
		15	1	1	20.6		1	3.3	
		16	1	1	20.4		1	3.2	
		18	1	1	29.7		1	8.8	
		23	1	1	24.9		1	4.8	
		25	1	1	26.5		1	4.5	
Sample Size:			80	88			88		
Means:		8.9			24.5	22.2		3.8	1.2
Sample Size:			85	93			93		
Means:		9.0			24.5	21.6		3.8	1.2

Table 11. 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 2004. Weight is in round pounds, length is in inches, and sd=standard deviation.

Unit	Age	Number Aged	Number Measured	Length (in.) mean	sd	Number Weighed	Weight (lbs) mean	sd
MI-2								
	6	5	5	18.4	1.0	5	2.0	0.5
	7	20	20	18.9	0.8	20	2.3	0.4
	8	30	30	19.3	1.5	30	2.5	0.7
	9	26	26	19.9	1.7	26	2.7	0.8
	10	14	14	19.5	1.3	14	2.4	0.7
	11	9	9	21.4	2.4	9	3.3	1.3
	12	6	6	20.7	2.2	6	3.0	1.0
	13	1	1	23.0		1	3.9	
	14	1	1	22.0		1	3.2	
Sample Size:		112	112			112		
Means:	8.8			19.7	1.7		2.6	0.8
MI-3								
		0	113	19.8	0.8	19	2.4	0.2
	5	2	2	16.9	0.1	2	1.6	0.1
	6	67	67	18.5	0.9	67	2.1	0.4
	7	247	247	18.9	1.0	247	2.2	0.4
	8	333	333	19.1	1.1	333	2.3	0.5
	9	294	294	19.5	1.3	294	2.4	0.5
	10	180	180	19.9	1.2	180	2.6	0.5
	11	103	103	20.7	1.7	103	2.9	0.9
	12	58	58	21.0	1.6	58	3.1	1.0
	13	20	20	22.1	1.9	20	3.5	1.0
	14	9	9	21.8	2.2	9	3.5	1.1
	15	1	1	21.2		1	3.2	
	16	3	3	25.0	1.0	3	5.2	0.7
	17	1	1	22.8		1	3.9	
Sample Size:		1,318	1,431			1,337		
Means:	8.8			19.5	1.4		2.5	0.6

Table 11. Continued.

Unit	Age	Number Aged	Number Measured	Length (in.) mean	sd	Number Weighed	Weight (lbs) mean	sd
MI-4								
		0	36	20.4	0.9	8	2.8	0.5
	4	1	1	15.8		1	1.2	
	5	10	10	19.3	1.4	10	2.6	0.5
	6	58	58	19.5	1.8	58	2.7	0.7
	7	240	240	19.5	1.1	240	2.5	0.5
	8	295	295	19.9	1.3	295	2.7	0.8
	9	157	157	20.6	1.2	157	2.9	0.6
	10	81	81	20.8	1.3	81	3.0	0.7
	11	44	44	21.2	1.1	44	3.1	0.5
	12	41	41	22.3	1.4	41	3.7	1.1
	13	13	13	23.2	2.0	13	4.3	1.4
	14	2	2	23.6	4.5	2	4.3	2.2
	16	1	1	27.2		1	6.2	
Sample Size:		943	979			951		
Means:	8.3			20.2	1.5		2.8	0.8
MI-5								
	5	1	1	20.7		1	3.1	
	6	1	1	19.7		1	2.6	
	7	3	3	20.8	1.6	3	3.5	1.0
	8	6	6	21.5	1.2	6	3.2	1.7
	9	1	1	24.8		1	6.0	
	10	2	2	21.8	2.4	2	3.9	0.9
	11	1	1	25.2		1	7.1	
	20	1	1	30.3		1	12.3	
	22	1	1	30.7		1	13.0	
Sample Size:		17	17			17		
Means:	9.5			22.7	3.4		4.8	3.3

Table 12. Age and size composition of siscowet in tribal commercial harvests from management units in the 1842 ceded area within Michigan waters of Lake Superior during 2004. Weight is in round pounds, length is in inches, and sd=standard deviation.

		Number	Number	Length (in.)		Number	Weight (lbs)	
Unit	Age	Aged	Measured	mean	sd	Weighed	mean	sd
MI-4								
	7	1	1	19.3		1	2.2	
	10	1	1	18.5		1	2.2	
	12	1	1	36.2		1	5.1	
	15	1	1	19.9		1	2.9	
	20	2	2	28.3	5.7	2	5.3	0.4
Sample Size:		6	6			6		
Means:	14.0			25.1	7.5		3.8	1.6
MI-5								
	9	1	1	19.1		1	1.9	
	21	1	1	21.5		1	3.7	
Sample Size:		2	2			2		
Means:	15.0			20.3	1.7		2.8	1.3

Table 13. Age and size composition of lake herring in tribal commercial harvests from management units in the 1842 ceded area within Michigan waters of Lake Superior during 2004. Weight is in round pounds, length is in inches, and sd=standard deviation.

		Number	Number	Length (in.)		Number	Weight (lbs)	
Unit	Age	Aged	Measured	mean	sd	Weighed	mean	sd
MI-3								
	6	1	1	13.9		1	0.9	
	7	2	2	14.0	0.0	2	3.8	4.4
Sample Size:		3	3			3		
Means:	6.7			14.0	0.1		2.8	3.5
MI-4								
	5	1	1	19.6		1	2.8	
	6	5	5	14.3	2.5	5	1.8	1.8
	7	6	6	15.7	1.4	6	1.2	0.2
	8	5	5	15.9	1.2	5	1.2	0.2
	9	3	3	16.3	1.6	3	1.2	0.4
	10	1	1	16.4		1	1.3	
	11	1	1	16.5		1	1.4	
	12	1	1	17.9		1	1.6	
Sample Size:		23	23			23		
Means:	7.7			15.9	1.9		1.4	0.9

Table 14. Age and size composition of menominee in tribal commercial harvests from management units in the 1842 ceded area within Michigan waters of Lake Superior during 2004. Weight is in round pounds, length is in inches, and sd=standard deviation.

Unit	Age	Number Aged	Number Measured	Length (in.) mean	sd	Number Weighed	Weight (lbs) mean	sd
MI-4								
	5	4	4	12.4	1.2	4	0.6	0.2
	6	2	2	15.0	0.0	2	0.9	0.1
	10	2	2	14.8	0.0	2	1.0	0.1
Sample Size:		8	8			8		
Means:	6.5			13.6	1.6		0.8	0.2

Table 15. Age and size composition of coho salmon in tribal commercial harvests during 2004. Weight is in round pounds, length is in inches, and sd=standard deviation.

Unit	Age	Number Aged	Number Measured	Length (in.) mean	sd	Number Weighed	Weight (lbs) mean	sd
MI-4								
	4	1	1	23.6		1	4.7	
Sample Size:		1	1			1		
Means:	4.0			23.6			4.7	

Table 16. Age and size composition of chinook salmon in tribal commercial harvests during 2004. Weight is in round pounds (rlbs), length is in inches (in), and sd=standard deviation.

Unit	Age	N(Age)	N(length)	Length mean(in.)	sd(in.)	N(weight)	Weight mean(lb.)	sd(lb.)
MI-4								
	7	1	1	17.3		1	4.2	
Sample Size:		1	1			1		
Means:	7.0			17.3			4.2	