Biological and Commercial Catch Statistics from the Chippewa Inter-Tribal Gill Net Fishery within Michigan Waters of Lake Superior During 2001

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ABSTRACT

The 2001 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 also fished.

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 4.5 million feet of gill net, 17 nights of trap nets, and harvesting 475,878 dressed pounds (568,527 round pounds) of fish. Whitefish was the primary target species, making up 66% of the total, followed by lake trout (20%), siscowet (9%), and lake herring (5%). Other species harvested either incidentally or through targeting efforts included salmon, chubs, walleye, round whitefish (menominee), and brown trout.

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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 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 to the Great Lakes Indian Fish and Wildlife Commission Biological Services Division, titled "Biological and commercial catch statistics from the Chippewa inter-tribal gill net fishery within Michigan waters of Lake Superior".

Biological and commercial fishery statistics were summarized for calendar year 2002 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. For the second year, trap nets were also fished.

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, three in 1989, and one in 2000 (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 1984, the tribes have used a quota management system to regulate harvest of lake trout to limit mortality on recovering lake trout stocks (Ebener and Bronte 1986). Total Allowable Catch (TAC's, expressed as number of fish) was estimated annually for each management unit with the exception of 1985, when each gill net tug was assigned a lake trout quota of 3,750 or 15,000 pounds depending on tribal affiliation. TAC's are calculated for each *fishing year*, beginning in November and running through October of the next year. Tribal quotas and TAC's by management unit and fishing year were as follows;

UNIT		YEARS			
		pre-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.

Harvest quotas applied only to lean lake trout (referred to as "lake trout" in this report). Harvest of siscowet, a deep water form of lake trout, was not regulated by quotas.

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 and trap net effort was reported as equivalent to 1,000 linear feet of gill net for each night that a trap net was set. Harvest was reported in both round and dressed pounds. Species for which harvest was reported as dressed pounds and conversion factors used to calculate round pounds are given below. Harvest of burbot, walleye, and smelt was reported in round pounds.

Species	Conversion
Whitefish	1.17
Lake trout	1.25
Siscowet	1.25
Salmon	1.25
Herring	1.20
Round whitefish	1.15
Chub	1.20

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 4.5 million feet of gill net, 17 nights of trap nets, and harvesting 475,878 dressed pounds (568,527 round pounds) of fish. Whitefish was the primary target species, making up 66% of the total, followed by lake trout (20%), siscowet (9%), and lake herring (5%). Other species harvested either incidentally or through targeting efforts included salmon, chubs, walleye, round whitefish (menominee), and brown trout.

Unit MI-2

Effort. Two percent of the total gill net effort was expended in MI-2 (Table 1) by the two tribes fishing the area (Table 2). Fishing effort was 0.1 million feet with gill nets of 4 ½ inch mesh accounting for 98% (0.093 million feet) of effort in MI-2 (Table 3, Figure 2). The remaining 2% (2,000 feet) of the effort consisted of 5½ inch mesh. Fishing occurred in three grids grouped into two general areas: Union Bay (grid 1316) and Black River (grids 1413 and 1414) (Figure 1). Ninety-eight percent of the effort occurred at Black River and two percent at Union Bay.

Harvest. Four percent of the total harvest (18,890 dressed or 22,257 round pounds) was taken in MI-2 (Tables 1 and 3). Whitefish made up 90%, lake trout 2%, and siscowet 8% of this harvest. The majority of harvest occurred around Black River. For whitefish, 99% of the harvest was from grids near Black River, while only 1% was from Union Bay. For lake trout 59% of the harvest was from Black River and 41% from Union Bay. Siscowet were primarily harvested near Black River (92%) with the remainder from Union Bay (8%).

Target Effort and Harvest. All fishing effort in MI-2 was targeted for whitefish and lake trout (Tables 4 and 5). Target effort (95,000 feet) and whitefish harvest (16,944 pounds) decreased substantially compared to 2000 (391,800 feet and 120,494 pounds), while target lake trout harvest (463 pounds) continued to remain low. No target fishing was directed at siscowet or lake herring.

Catch per effort (CPE or pounds harvested per 1,000 feet of gill net) for targeted fishing in the three grids fished in MI-2 varied from 115-183 pounds for whitefish and averaged 178 pounds (Table 4), within the range of average CPE's (29-308) recorded over the past 17 years (1985-2001) (Table 5). Lake trout CPE ranged from 1-95, and averaged 5 pounds (Table 4), the lowest average lake trout CPE recorded over the last 17 years (Table 5). For whitefish, average CPE in the grids fished near Black River (180 pounds) were higher than those at Union Bay (115 pounds). For lake trout the opposite occurred, CPE was higher at Union Bay (95 pounds) than the average CPE at Black River (3 pounds).

Unit MI-3

Effort. Thirty-eight percent of the total gill net effort was expended in MI-3 (Table 1) by three tribes fishing the area (Table 2). Fishing effort was 1.7 million feet and all nets fished were 4 ½ inch mesh (Table 3, Figure 2). Fishing was confined within the area. Occurring in 6 grids compared to eleven grids in 2000 and three in 1999. These grids were grouped into three general areas: Redridge/West Entry (grids 1022, 1121 and 1122), 5 Mile Point (grid 1023), and Misery Bay (grids 1219 and 1220) (Figure 1). The percent of total MI-3 effort fished at Redridge/ West Entry was 57%, followed by 25% at Misery Bay and 18% at 5 Mile Point.

Harvest. Thirty-eight percent of the total harvest (179,219 dressed or 211,691 round pounds) was taken in MI-3 (Tables 1 and 3). Of harvest in this unit, whitefish made up 86%, lake trout 10%, and siscowet 4%. For whitefish 38% were taken from Misery Bay, 32% from Redridge/West Entry, and 30% from 5 Mile Point. For lake trout, 37% were taken from Misery Bay, another 37% from 5 Mile Point, and 26% from Redridge/West Entry. Siscowet were harvested from Redridge/West Entry (43%), followed by 5 Mile Point (41%) and Misery Bay (16%) (Table 1).

Target Effort and Harvest. All fishing effort in MI-3 was targeted at whitefish and lake trout (Table 4). Target effort in 2001 (1.7 million feet) was similar to that of 2000 (1.6 million feet) (Table 5). Compared to 2000, target harvest of whitefish (154,154 pounds) decreased by 49,911 pounds, while target harvest of lake trout (17,246 pounds) increased by 8,295 pounds.

Catch per effort. CPE for targeted fishing in MI-3 grids ranged from 46-153 pounds for whitefish and averaged 90 pounds, while CPE for lake trout ranged from 3-54 pounds and averaged 10 pounds (Table 4). For whitefish and lake trout respectively, CPE's were highest at 5 Mile Point (grid 1023) at 148 pounds and 20 pounds, followed by Misery Bay (grids 1219 and 1220) at 138 pounds and 15 pounds, and Redridge/West Entry (grids 1021, 1121, 1122) at 50 pounds and 5 pounds

Unit MI-4

Effort. Since 1986 this unit has received the majority of tribal effort (Table 5). In 2001, 52% percent of the total gill net effort (Tables 1 and 2) and 100% of the total trap net effort (Table 6) was fished in MI-4. Gill net effort was 2.3 million feet and continued to be stable since peaking in 1990 and then declining for the next 5 years (Table 5, Figure 2). Large mesh gill nets of 4 ½ inch mesh accounted for 90% of the effort with various sized large mesh accounting for 6% and various sized small mesh accounting for the remaining 4% (Table 3). Trap net effort was 17,400 feet or 17 net nights (Table 6). However, effort was not reported for all trap net lifts.

Fishing occurred in 13 grids grouped into five general areas: Keweenaw Point (grid 1027), Traverse Bay to Bete Grise (grids 1026, 1125, 1126, and 1225), Traverse Island (grids 1223 and 1224), Keweenaw Bay (grids 1323, 1324, and 1423), and Huron Islands (1424, 1325, and 1326) (Figure 1, Table 1). In 2001, most of the gill net fishing effort occurred in the Traverse Bay to Bete Grise area (40% or 0.93 million feet), followed by Traverse Island (26% or 0.60 million feet), Keweenaw Bay (25% or 0.59 million feet), and the Huron Islands (9% or 0.20 million feet). For the first time since 1997 Keweenaw Point (grid 1027) was fished (1% or 0.02 million feet). Trap nets were fished at the Huron Islands (12 nights or 70%), Keweenaw Bay (3 nights or 18%), and Traverse Island (2 nights or 12%).

Harvest. Fifty-one percent of the total harvest (240,835 dressed or 290,580 round pounds) were taken in MI-4 (Tables 1 and 6). For gill net harvest, whitefish made up 49%, lake trout 29%, siscowet 14%, and herring 7%. Other species harvested which made up the remaining 1% were salmon (983 pounds), chub (453 pounds), walleye (151 pounds), menominee (38 pounds), and brown trout (13 pounds). Percentages of whitefish taken by area were 44% from Traverse Bay to Bete Grise, 24% from Keweenaw Bay, 21% from Traverse Island, 9% from Huron Islands, and 3% from Keweenaw Point. For lake trout, 47% of the harvest was from Traverse Island, followed by 37% at Keweenaw Bay, 10% from Traverse Bay to Bete Grise, and 6% at the Huron Islands. No lake trout were harvested from Keweenaw Point. The majority of the siscowet harvest was from Traverse Bay to Bete Grise, (70%), followed by Traverse Island (22%), Keweenaw Bay (7%), and the Huron Islands and Keweenaw Point (1% each). Gill net harvest for herring was from Keweenaw Bay (9,388 pounds or 53%), the Huron Islands (6,143 pounds or 35%), Traverse Bay to Bete Grise (1,751 pounds or 10%), and Traverse Island (335 pounds or 2%). Ninety-one percent of the salmon harvest (893 pounds) was from Keweenaw Bay followed by 6% at the Huron Islands (63 pounds), and 3% at Traverse Island (27 pounds).

For trap net harvest, whitefish made up 77% and lake trout 23% of the harvest (Table 6). For whitefish, 55% were harvested from the Huron Islands, 37% from Traverse Island and 8% from Keweenaw Bay, while for lake trout 56% were harvested from the Huron Islands, 35% from Traverse Island, and 9% from Keweenaw Bay.

Target Effort and Harvest. The majority of gill net effort (95%) was targeted at whitefish and lake trout with the remainder directed at lake herring (4%), and siscowet (1%) (Table 4). Very little effort (1,600 feet) was targeted at salmon in 2001. The target effort for whitefish and lake trout in 2001 (2.2 million feet) was 0.3 million feet higher than in 2000 (1.9 million feet) (Table 5). However, target harvest of whitefish (118,128 pounds) was 10,133 pounds less than in 2000 and lake trout harvest (67,924 pounds) also was less (10,394 pounds). For siscowet, target harvest (6,949) and effort (22,800) remained low with effort the lowest recorded during the last 16 years. **Trap net effort (17 trap net nights) included a harvest of 4,077 pounds of whitefish and 1,198 pounds of lake trout (Table 6).**

Catch per effort. CPE for targeted gill net fishing in the 13 grids of MI-4 varied from 38-170 pounds per 1,000 feet for whitefish (average: 53 pounds) and 0-65 pounds for lake trout (average: 31 pounds) (Table 4). For the 5 grids where siscowet were targeted CPE ranged from 30-430 pounds (average: 305 pounds). For the 7 grids with effort directed at herring CPE ranged from 3-1,013 pounds (average: 152 pounds). For the grid (1423) with effort directed at salmon CPE was 63 pounds.

For whitefish, CPE was highest at Keweenaw Point (170 pounds), while the remaining four areas ranged from an average of 43 pounds to 59 pounds (Table 4). For lake trout, CPE was highest at Traverse Island (average: 55 pounds) followed by Keweenaw Bay (average: 47 pounds), the Huron Islands (average: 22 pounds) and Traverse Bay to Bete Grise (average: 8 pounds). CPE for siscowet was highest from grid 1026 in the Traverse Bay to Bete Grise area (430 pounds), followed by grid 1224 at Traverse Island (413 pounds).

Unit MI-5

Effort. Seven percent of the total gill net effort was fished in MI-5 (Table 1), by one tribe fishing the area (Table 2). Fishing effort was 322,950 feet, a decrease of 161,150 feet from 2000 (484,100 feet) (Tables 3 and 5). Fishing effort was primarily (92%) large mesh net targeted at whitefish, lake trout, and siscowet (Figure 2). Large mesh nets consisted of a mix of 5 ½ (36%), 5 (32%), 4 ½ (27%), and 5 ¼ (5%) inch mesh. Fishing occurred in three grids: two at Granite Island (grid 1428 and 1429), and one at Presque Isle (grid 1529) (Table 1). Fifty-three percent of the effort was fished at Granite Island (0.17 million feet), and 47% at Presque Isle (0.15 million feet).

Harvest. Eight percent of the total harvest (36,934 dressed or 43,998 round pounds) was taken from MI-5 (Tables 1 and 3). Whitefish made up 62%, lake trout 20%, and herring 18% of the harvest. For whitefish, 54% were taken from Granite Island and 46% from Presque Isle, while for lake trout 55% were taken from Granite Island and 45% from Presque Isle. For herring 83% of the harvest occurred at Granite Island and 17% of the harvest occurred at Presque Isle.

Target Effort and Harvest. Targeted whitefish harvest was 22,949 dressed pounds, 21,505 pounds lower than 2000 (44,454 pounds) and near the 1986-2000 average of 28,679 pounds (Table 5). Targeted lake trout harvest was 6,377 dressed pounds, 41,653 pounds lower than 2000 (48,030 pounds) and below the 1986 to 2000 average (17,123 pounds). Targeted herring harvest was 14,545 pounds (Table 4).

Catch per effort. Catch per effort for targeted fishing in the three grids varied from 73-95 pounds per 1,000 feet for whitefish (average: 78 pounds) and 18-24 pounds for lake trout (average: 22 pounds) (Table 4). Herring were targeted in all three grids and CPE varied from 15-272 pounds (average: 173 pounds).

Biological Statistics

Lake Trout MI-2

Eight age groups of wild lake trout (7-11, 13-15), and two age groups of hatchery fish (9 and 12) were represented in the 21 fish aged in MI-2 (Table 7). Mean age for wild and hatchery fish was 10.3 and 10.5 years, respectively. Fish ten years and older made up 53% of the wild component of the catch. Mean length and weight of the 43 fish sampled was 22.5 inches and 3.7 pounds round, respectively. The average size of hatchery fish was 22.4 inches and the average length of wild fish was 22.5 inches.

Average lamprey marking rates were 2.3 wounds and 2.3 scars/100 fish, with fish 25-28.8 inches exhibiting the highest wounding rates (12.5 wounds/100 fish) (Table 8). Annual total mortality was not estimated due to low sample size.

Lake Trout MI-3

Six age groups of wild fish (8-13) were represented in the 17 wild lake trout aged with a mean age of 10.2 (Table 9). Mean length and weight for all eighteen fish sampled was 23.0 inches and 3.4 pounds round, respectively. Average size at age of 7-10 year old wild lake trout has decreased since 1985 (Figure 3). Average length of 7-10 year old hatchery fish has fluctuated since 1990 in MI-3, probably due to low sample sizes.

Overall lamprey marking rates were 5.6 wounds and 11.1 scars/100 fish, with fish greater than 25 inches exhibiting the highest scarring rates (Table 8). Annual total mortality rate for wild fish 8-12 years old was estimated at 16.5%, but sample size was low (Table 10).

Lake Trout MI-4

Twelve age groups of hatchery fish (3-12, 15, 17) and fifteen year classes of wild trout (3-15, 19, 22) were represented in a sample of 310 lake trout aged from MI-4 (Table 11). Mean age of hatchery and wild fish was 7.2 and 8.1 years, respectively. Fish ten years and older made up 21% of the wild component of the catch.

Mean length and weight of all fish sampled was 22.8 inches and 3.9 round pounds (Table 11). The average size of wild fish (22.8 inches, 3.9 pounds) was similar to hatchery fish (22.7 inches, 3.9 pounds). Average length of wild and hatchery fish at ages 7-10 has been tracked since 1985 (Figure 3). 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 primarily due to low numbers of fish sampled.

Lamprey marking rates were 3.4 wounds and 2.9 scars/100 fish, with the larger, older fish exhibiting the greatest occurrence of scars (Table 8). Annual total mortality was estimated to be 31% ($Z=0.37 \pm 0.40$) for wild fish ages 7-15, and 31% ($Z=0.37 \pm 0.50$) for wild and hatchery fish combined age 7-15 (Table 10).

Lake Trout MI-5

Six age groups of hatchery fish (6, 8, 9, 13, 16, 22) and fourteen age groups of wild fish (4-14, 16, 19, 20) were represented in a sample of 71 lake trout aged from MI-5 (Table 12). Mean age of hatchery and wild fish was 11.9 and 9.6 years, respectively. Fish ten years and older made up 45% of the wild component of the catch.

Mean length and weight of all fish sampled was 24.5 inches and 4.9 round pounds (Table 12). The average size of hatchery fish (26.6 inches, 6.6 pounds) was greater than wild fish (24.3 inches, 4.8 pounds).

Overall lamprey marking rates were 0.0 wounds and 6.8 scars/100 fish (Table 7). The largest incidence of scarring was seen on fish >29.0 inches (40.0 scars/100 fish). The estimated total annual mortality rate was not reported due to low correlation between catch and age.

Lake Whitefish MI-2

Seven age groups (7-13) were represented in the 169 whitefish aged in MI-2 which had a mean age of 9.9 years (Table 13). As in the past, the 1990-93 year classes (ages 8-11) were dominant and comprised 86% of the aged fish sample. Average length and weight of lake whitefish was 19.9 inches and 2.8 round pounds based on a sample of 169 fish. Annual total mortality was estimated at 55% for ages 10-13.

Lake Whitefish MI-3

Eight age groups (5, 7-13) were represented in the 435 whitefish aged in MI-3 which had a mean age of 10.1 years (Table 13). The 1990-93 year classes (ages 8-11) were dominant and comprised 87% of the aged fish sample. Average length and weight of lake whitefish was 19.6 inches (N=439) and 2.6 round pounds (N=438). The average length of age 7 to 10 year old fish was similar to the past five years (Figure 4). Annual total mortality was estimated at 60% for ages 10-13.

Lake Whitefish MI-4

Thirteen age groups (3-15) were represented in the 665 whitefish aged in MI-4 with a mean age of 8.6 years (Table 13). The 1990-93 year classes (ages 8-11) were dominant, comprising 69%, with the 1994 year class contributing an additional 15%. Average length and weight of lake whitefish was 21.1 inches and 3.3 round pounds based on a sample size of 667 fish. The

average length of age 7 to 10 year old fish has increased slightly over the past five years (Figure 4). Annual total mortality was estimated at 55% for ages 10-13.

Lake Whitefish MI-5

Nine age groups (5-11, 13, 21) were represented in the 38 whitefish aged in MI-5 (Table 13). The 1993 year class (age 8) was dominant, comprising 34% of the fish aged. For the 38 whitefish sampled the mean age was 9.1 years, mean length 23.5 inches, and mean weight 4.3 round pounds.

Siscowet

There were eighteen age groups (6-23) of siscowet represented in the fish aged from units MI-2, MI-3, and MI-4 (Table 14). The mean age for siscowets was 10.9 in MI-2, 14.2 in MI-3, and 14.7 in MI-4. Mean size by management unit was: MI-2, 20.2 inches and 2.6 pounds; MI-3, 22.4 inches and 3.6 pounds; MI-4, 22.7 inches and 4.0 pounds. Total annual mortality was 48% in MI-3 for fish aged 18-21, and 41% in MI-4 for fish aged 18-23. Small sample size and a wide age distribution prevented the calculation of a mortality rate in MI-2.

Lake Herring and Menominee Whitefish

Seventeen age groups (3-19) were represented in the 343 lake herring aged from MI-4 with a mean age of 9.7 (Table 15). For the second year otoliths replaced scale samples as the single aging structure used to assign age to individual fish. In MI-4, the 1989-92 year classes (age 9-12) were most dominant (62%) in the sample. The mean size for 365 herring sampled was 16.7 inches and 1.6 round pounds. Total annual mortality was 41% for fish aged 9-17.

No menominee whitefish were sampled in 2001.

Coho and Chinook Salmon

Only four coho salmon were sampled from the tribal harvest in MI-4 (Table 16). All fish were age 2. The mean size was 14.7 inches and 1.2 round pounds. No chinook salmon were sampled.

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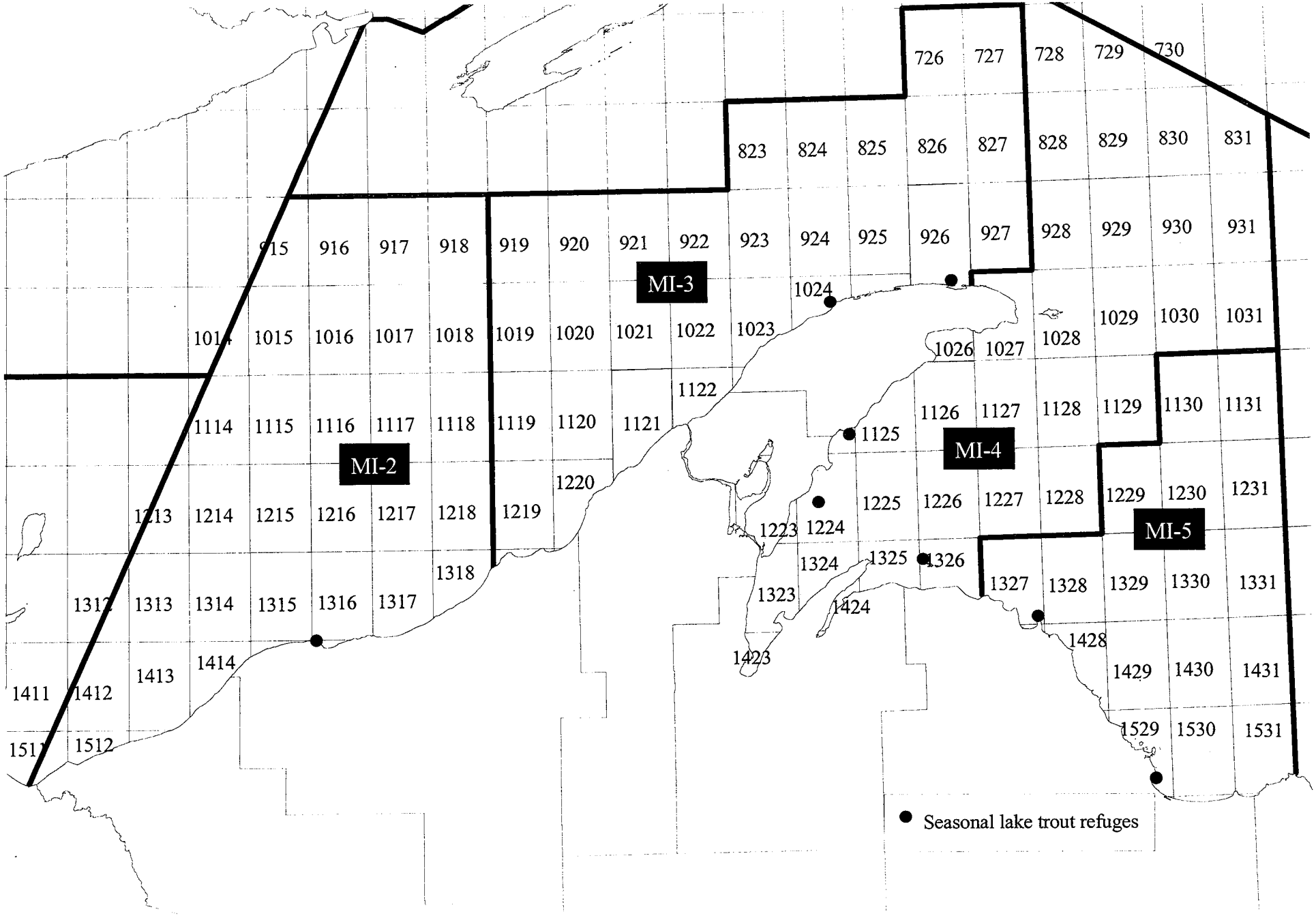


Figure 1. Management units and statistical grids in the 1842 treaty ceded area within Michigan waters of Lake Superior.

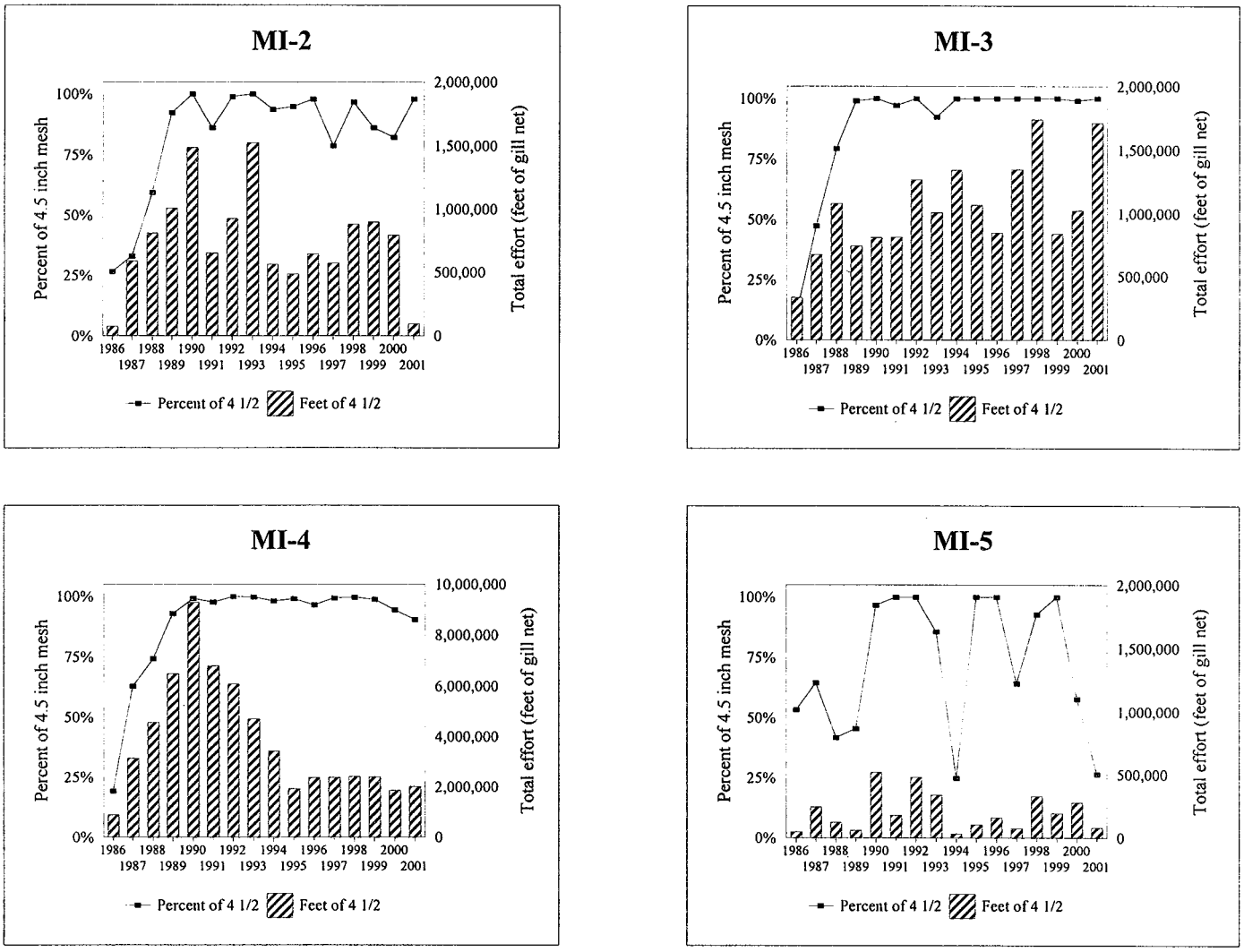


Figure 2. Proportion and total tribal large mesh gill net effort composed of 4 1/2 inch mesh by management unit, 1986 to 2001.

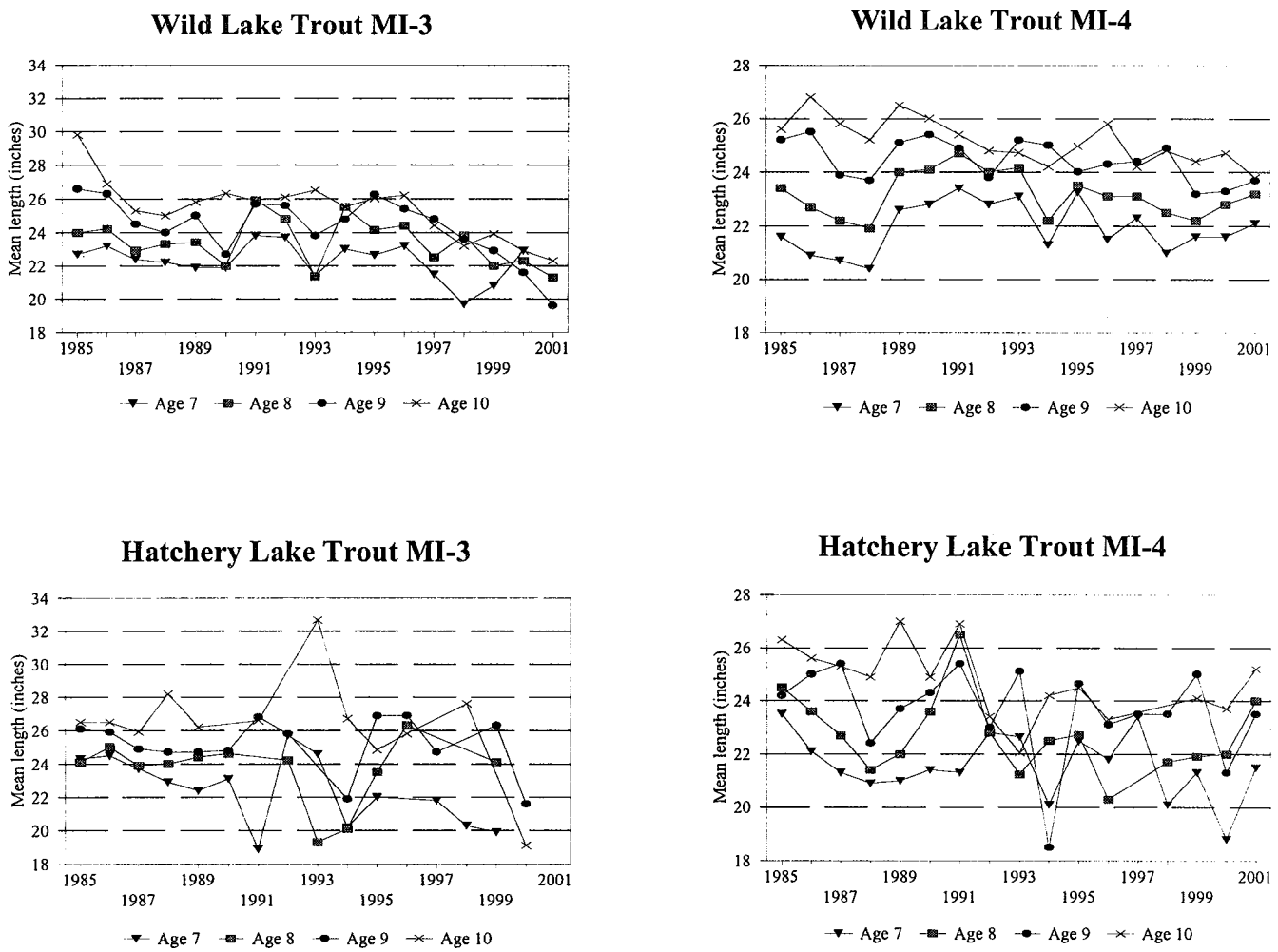
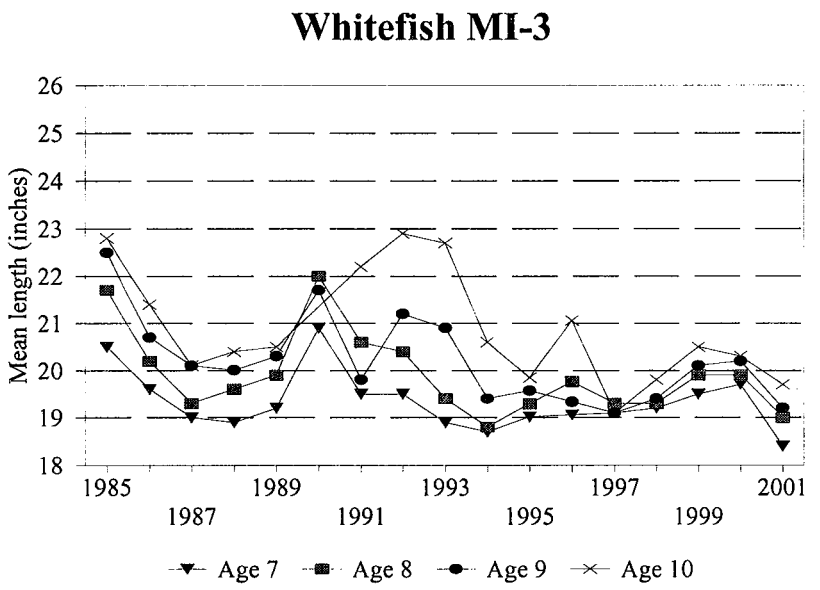


Figure 3. Trends in average length (inches) of hatchery and wild lake trout (ages 7-10) in Michigan management units MI-3 and MI-4, from 1985-2001.



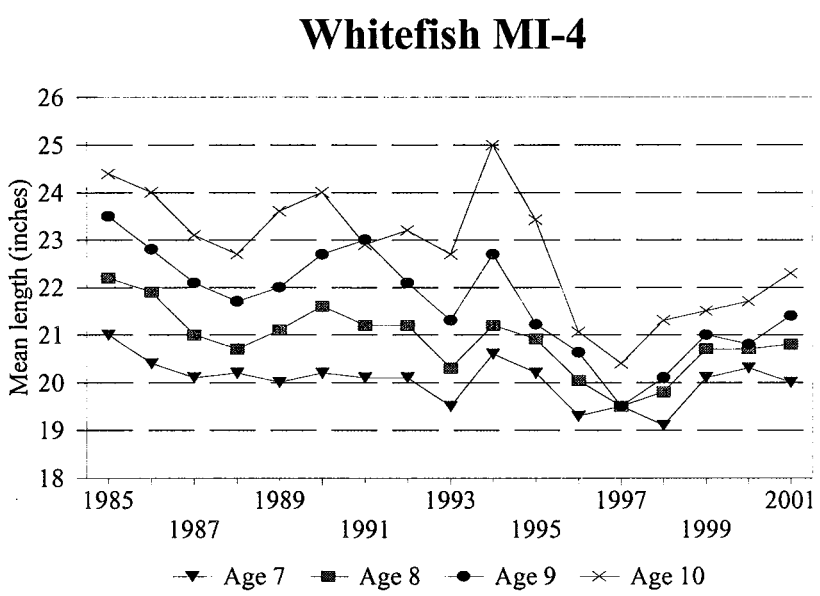


Figure 4. Trends in average length (inches) of whitefish (ages 7-10) in Michigan management units MI-3 and MI-4, from 1985-2001.

Table 1. Total tribal commercial gill net effort (feet) and harvest by management unit and grid from the 1842 ceded area within Michigan waters of Lake Superior in 2001. Lake trout, whitefish, siscowet, herring, salmon, menominee, and chubs are dressed pounds, all others are round.

Management Unit	Grid	Effort	Lake trout	Whitefish	Siscowet	Herring	Salmon	Menominee	Chub	Burbot	Walleye	Smelt
MI-2												
	1316	2,000	190	230	116	0	0	0	0	0	0	0
	1413	60,000	239	10,663	674	0	0	0	0	0	0	0
	1414	33,000	34	6,051	693	0	0	0	0	0	0	0
Subtotal:		95,000	463	16,944	1,483	0	0	0	0	0	0	0
MI-3												
	1023	312,000	6,302	46,287	3,175	0	0	0	0	0	0	0
	1120	9,000	56	655	176	0	0	0	0	0	0	0
	1121	669,000	3,768	30,847	2,192	0	0	0	0	0	0	0
	1122	294,000	746	17,445	978	0	0	0	0	0	0	0
	1219	388,000	4,236	52,851	1,298	0	0	0	0	0	0	0
	1220	39,600	2,138	6,069	0	0	0	0	0	0	0	0
Subtotal:		1,711,600	17,246	154,154	7,819	0	0	0	0	0	0	0
MI-4												
	1026	182,600	1,576	11,869	8,792	934	0	0	0	0	0	0
	1027	18,000	0	3,054	255	0	0	0	0	0	0	0
	1125	511,000	3,534	22,161	5,610	817	0	0	0	0	50	0
	1126	111,000	1,105	11,630	4,178	0	0	0	0	0	0	0
	1223	4,500	291	291	0	0	0	0	0	0	0	0
	1224	594,600	31,295	23,229	7,372	335	23	0	0	0	66	0
	1225	120,000	821	6,855	5,205	0	0	0	0	0	0	0
	1323	235,300	11,640	12,824	1,731	2,744	404	0	0	0	0	0
	1324	137,900	4,269	5,354	25	222	0	0	0	0	0	0
	1325	113,200	1,488	4,686	202	31	50	0	0	0	35	0
	1326	22,800	418	800	0	4,963	0	0	0	0	0	0
	1423	216,340	9,215	9,414	721	6,411	489	38	453	0	0	0
	1424	51,700	1,695	2,700	0	1,120	10	0	0	0	0	0
Subtotal:		2,318,940	67,347	114,867	34,091	17,577	976	38	453	0	151	0
MI-5												
	1428	74,950	2,199	5,003	0	1,954	0	0	0	0	0	0
	1429	95,800	1,805	7,338	0	3,566	0	0	0	0	0	0
	1529	152,200	3,317	10,608	0	1,144	0	0	0	0	0	0
Subtotal:		322,950	7,321	22,949	0	6,664	0	0	0	0	0	0
Grand Total:		4,448,490	92,377	308,914	43,393	24,241	976	38	453	0	151	0

Table 2. Total and target harvest and effort statistics by tribe for lake trout, whitefish, and siscowet in Michigan waters of Lake Superior in 2001. 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.

		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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Keweenaw Bay	2,000	230	115	190	95	116	58	2,000	230	115	190	95	0	0	0
	Red Cliff	93,000	16,714	180	273	3	1,367	15	93,000	16,714	180	273	3	0	0	0
	subtotal	95,000	16,944	178	463	5	1,483	16	95,000	16,944	178	463	5	0	0	0
MI-3	Bad River	292,000	41,096	141	8,721	30	2,988	10	292,000	41,096	141	8,721	30	0	0	0
	Keweenaw Bay	162,600	14,565	90	5,251	32	2,260	14	162,600	14,565	90	5,251	32	0	0	0
	Red Cliff	1,257,000	98,493	78	3,274	3	2,571	2	1,257,000	98,493	78	3,274	3	0	0	0
	subtotal	1,711,600	154,154	90	17,246	10	7,819	5	1,711,600	154,154	90	17,246	10	0	0	0
MI-4	Bad River	321,200	11,970	37	16,107	50	0	0	316,400	11,970	38	16,094	51	0	0	0
	Keweenaw Bay	1,031,740	48,861	47	44,126	43	4,578	4	957,400	48,195	50	43,540	45	6,800	279	41
	Red Cliff	983,400	58,113	59	8,312	8	29,513	30	937,400	57,963	62	8,290	9	16,000	6,670	417
	subtotal	2,336,340	118,944	51	68,545	29	34,091	15	2,211,200	118,128	53	67,924	31	22,800	6,949	305
MI-5	Bad River	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Keweenaw Bay	322,950	22,949	71	7,321	23	0	0	292,700	22,949	78	6,377	22	0	0	0
	Red Cliff	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	subtotal	322,950	22,949	71	7,321	23	0	0	292,700	22,949	78	6,377	22	0	0	0
Total	Bad River	613,200	53,066	87	24,828	40	2,988	5	608,400	53,066	87	24,815	41	0	0	0
	Keweenaw Bay	1,519,290	86,605	57	56,888	37	6,954	5	1,414,700	85,939	61	55,358	39	6,800	279	41
	Red Cliff	2,333,400	173,320	74	11,859	5	33,451	14	2,287,400	173,170	76	11,837	5	16,000	6,670	417
	All Tribes	4,465,890	312,991	70	93,575	21	43,393	10	4,310,500	312,175	72	92,010	21	22,800	6,949	305

Table 3. Tribal commercial harvest by management unit and gill net mesh size from the 1842 ceded area within Michigan waters of Lake Superior in 2001. Burbot, Walleye, and smelt are in round pounds, all others are dressed.

Unit	Mesh	Effort	Lake trout	Whitefish	Siscowet	Herring	Salmon	Menominee	Chub	Burbot	Walleye	Smelt
MI-2												
	4.5	93,000	273	16,714	1,367	0	0	0	0	0	0	0
	5.5	2,000	190	230	116	0	0	0	0	0	0	0
	subtotal:	95,000	463	16,944	1,483	0	0	0	0	0	0	0
MI-3												
	4.5	1,711,600	17,246	154,154	7,819	0	0	0	0	0	0	0
	subtotal:	1,711,600	17,246	154,154	7,819	0	0	0	0	0	0	0
MI-4												
	1.0	2,850	12	15	24	35	0	0	0	0	0	0
	2.5	14,250	106	86	139	233	5	38	3	0	0	0
	2.75	1,800	0	0	0	608	49	0	0	0	0	0
	3.0	68,640	655	296	155	12,810	363	0	450	0	0	0
	3.5	800	0	0	0	80	0	0	0	0	0	0
	4.5	2,016,700	59,658	102,961	32,141	3,731	370	0	0	0	85	0
	5.5	186,900	6,626	8,835	1,109	80	189	0	0	0	0	0
	4.5-5	27,000	290	2,674	523	0	0	0	0	0	66	0
	subtotal:	2,318,940	67,347	114,867	34,091	17,577	976	38	453	0	151	0
MI-5												
	2.375	7,000	0	0	0	117	0	0	0	0	0	0
	3.0	18,450	944	0	0	2,951	0	0	0	0	0	0
	4.5	78,800	3,723	3,551	0	40	0	0	0	0	0	0
	5.0	94,300	2,028	6,357	0	2,167	0	0	0	0	0	0
	5.25	16,000	0	3,352	0	738	0	0	0	0	0	0
	5.5	108,400	626	9,689	0	651	0	0	0	0	0	0
	subtotal:	322,950	7,321	22,949	0	6,664	0	0	0	0	0	0
	Total:	4,448,490	92,377	308,914	43,393	24,241	976	38	453	0	151	0

Table 4. Harvest and effort statistics for target species by grid and management unit in Michigan waters of Lake Superior in 2001. 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.

		Whitefish			Lake trout			Siscowet			Herring			Salmon		
Unit	Grid	Effort	pounds	CPE	Effort	pounds	CPE	Effort	pounds	CPE	Effort	pounds	CPE	Effort	pounds	CPE
MI-2	1316	2,000	230	115	2,000	190	95									
	1413	60,000	10,663	178	60,000	239	4									
	1414	33,000	6,051	183	33,000	34	1									
	subtotal	95,000	16,944	178	95,000	463	5	0	0	0	0	0	0	0	0	0
MI-3	1023	312,000	46,287	148	312,000	6,302	20									
	1120	9,000	655	73	9,000	56	6									
	1121	669,000	30,847	46	669,000	3,768	6									
	1122	294,000	17,445	59	294,000	746	3									
	1219	388,000	52,851	136	388,000	4,236	11									
	1220	39,600	6,069	153	39,600	2,138	54									
	subtotal	1,711,600	154,154	90	1,711,600	17,246	10	0	0	0	0	0	0	0	0	0
MI-4	1026	151,000	11,719	78	151,000	1,550	10	4,000	1,720	430	27,600	910	33			
	1027	18,000	3,054	170	18,000	0	0									
	1125	511,000	22,161	43	511,000	3,534	7									
	1126	111,000	11,630	105	111,000	1,105	10									
	1223	4,500	291	65	4,500	291	65									
	1224	582,000	24,664	42	582,000	31,742	55	12,000	4,950	413	3,000	10	3			
	1225	120,000	6,855	57	120,000	821	7									
	1323	221,800	12,878	58	221,800	11,497	52	3,000	95	32	13,500	1,902	141			
	1324	135,900	5,219	38	135,900	4,193	31				2,000	222	111			
	1325	122,200	6,931	57	122,200	2,095	17	3,000	160	53	4,800	4,863	1,013			
	1326	18,000	800	44	18,000	405	23				41,390	6,006	145			
	1423	167,700	9,226	55	167,700	8,996	54	800	24	30	3,600	632	176	1,600	100	63
	1424	48,100	2,700	56	48,100	1,695	35									
	subtotal	2,211,200	118,128	53	2,211,200	67,924	31	22,800	6,949	305	95,890	14,545	152	1,600	100	63
MI-5	1428	69,000	5,003	73	69,000	1,690	24				5,950	1,617	272			
	1429	77,500	7,338	95	77,500	1,370	18				18,300	3,526	193			
	1529	146,200	10,608	73	146,200	3,317	23				6,000	92	15			
	subtotal	292,700	22,949	78	292,700	6,377	22	0	0	0	30,250	5,235	173	0	0	0
Grand Total		4,310,500	312,175	72	4,310,500	92,010	21	22,800	6,949	305	126,140	19,780	157	1,600	100	63

Table 5. Tribal commercial effort (feet), harvest (dressed pounds), and catch per unit effort (CPE, pounds/1,000') statistics for whitefish, lake trout and siscowet by management unit and year from the 1842 ceded area within Michigan waters of Lake Superior from 1985-2001. 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	611,300	84,756	139	84,756	611,300	20,253	33	20,318	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
Average:		196,100	32,284	165	32,454	196,100	7,685	39	7,807	17,635	3,219	183	5,438
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	2,063,800	131,843	64	140,735	2,063,800	34,724	17	35,655	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
Average:		1,920,065	162,878	85	164,061	1,920,065	21,405	11	21,753	81,788	9,350	114	22,325
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	2,211,200	118,128	53	118,944	2,211,200	67,924	31	68,545	22,800	6,949	305	34,091
Average:		3,724,805	217,689	58	222,039	3,724,805	77,556	21	82,332	355,927	35,428	100	58,707

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
Average:		298,341	26,655	89	26,963	298,341	15,483	52	15,844	17,029	673	40	3,902
All	1985	3,659,575	533,855	146	534,565	3,659,575	83,857	23	85,028	0	0	0	6,384
units	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	4,310,500	312,175	72	312,991	4,310,500	92,010	21	93,575	22,800	6,949	305	43,393
Average:		6,139,311	439,506	72	445,516	6,139,311	122,129	20	127,736	472,380	48,671	103	90,371

Table 6. Total tribal commercial trap net effort (1,000 feet=1 trap night) and harvest by management unit and grid from nets fished in the 1842 ceded area within Michigan waters of Lake Superior in 2001. Lake trout and whitefish were the only species caught and reported. Effort was not reported for all nights that traps were set.

Management Unit	Grid	Trap net nights	Effort (feet)	Lake trout (dressed pounds)	Whitefish (dressed pounds)
MI-4					
	1224	2	2,400	447	1,435
	1323	3	3,000	94	367
	1325	12	12,000	657	2,275
Subtotal:		17	17,400	1,198	4,077
Grand Total:		17	17,400	1,198	4,077

Table 7. Age and size composition of hatchery (H) and wild (N) lake trout in tribal commercial harvests from unit MI-2 during 2001. 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-2									
	H								
			0	3	23.2	2.1	3	3.5	0.8
		9	1	1	21.3		1	2.9	
		12	1	1	21.1		1	3.2	
Sample Size:			2	5			5		
Means:		10.5			22.4	1.9		3.3	0.6
	N								
			0	19	23.5	3.3	19	4.5	2.1
		7	1	1	22.2		1	3.4	
		8	2	2	18.7	3.6	2	2.0	1.2
		9	6	6	20.9	1.7	6	2.9	0.7
		10	1	1	20.2		1	2.8	
		11	6	6	22.2	1.7	6	3.2	0.8
		13	1	1	25.3		1	4.5	
		14	1	1	20.8		1	2.9	
		15	1	1	25.8		1	5.5	
Sample Size:			19	38			38		
Means:		10.3			22.5	3.0		3.8	1.7
Sample Size:			21	43			43		
Means:		10.3			22.5	2.9		3.7	1.6

Table 8. Lamprey wounding and scarring rates (marks/100 fish) on lake trout captured in the tribal commercial harvests from management units in the 1842 ceded area within Michigan waters of Lake Superior during 2002. No lake trout were monitored from MI-5 in 2001.

Unit	Category	Fish Examined	Type AI, AII, AIII Wounds	Wounds per 100 fish	Scars	Scars per 100 fish
MI-2						
	1: < 17	1	0	0.0	0	0.0
	2: 17-20.9	9	0	0.0	0	0.0
	3: 21-24.9	23	0	0.0	1	4.3
	4: 25-28.9	8	1	12.5	0	0.0
	5: > 29	2	0	0.0	0	0.0
	Total:	43	1	2.3	1	2.3
MI-3						
	2: 17-20.9	6	0	0.0	0	0.0
	3: 21-24.9	7	0	0.0	0	0.0
	4: 25-28.9	4	0	0.0	1	25.0
	5: > 29	1	1	100.0	1	100.0
	Total:	18	1	5.6	2	11.1
MI-4						
	1: < 17	16	0	0.0	0	0.0
	2: 17-20.9	105	0	0.0	0	0.0
	3: 21-24.9	204	9	4.4	0	0.0
	4: 25-28.9	72	3	4.2	4	5.6
	5: > 29	16	2	12.5	8	50.0
	Total:	413	14	3.4	12	2.9
MI-5						
	2: 17-20.9	8	0	0.0	0	0.0
	3: 21-24.9	36	0	0.0	0	0.0
	4: 25-28.9	25	0	0.0	3	12.0
	5: > 29	5	0	0.0	2	40.0
	Total:	74	0	0.0	5	6.8

Table 9. Age and size composition wild lake trout in tribal commercial harvests from unit MI-3 during 2001. 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-3								
		0	1	29.3		1	7.1	
	8	4	4	21.3	2.2	4	2.9	1.4
	9	3	3	19.6	2.2	3	2.4	0.7
	10	3	3	22.3	2.7	3	3.3	0.8
	11	2	2	22.8	2.8	2	4.3	0.1
	12	2	2	27.1	1.4	2	5.0	0.8
	13	3	3	24.4	2.7	3	4.7	2.4
Sample Size:		17	18			18		
Means:	10.2			23.0	3.4		3.8	1.7
Sample Size:		17	18			18		
Means:	10.2			23.0	3.4		3.8	1.7

Table 10. 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 1988-2001.

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	2000	9-13	0.220	+/- 0.342	0.198	0.802
	1999	7-13	0.256	+/- 0.157	0.229	0.771
	1998	7-13	0.385	+/- 0.111	0.316	0.684
	1990	8-11	0.750	+/- 0.416	0.528	0.472
	1988	9-13	0.406	+/- 0.306	0.334	0.666
MI-3						
	2001	8-12	0.179	+/- 0.109	0.165	0.835
	2000	7-11	0.204	+/- 0.454	0.184	0.814
	1999	7-16	0.215	+/- 0.099	0.197	0.803
	1997	7-11	0.176	+/- 0.212	0.165	0.835
	1996	8-13	0.238	+/- 0.267	0.213	0.787
	1995	8-11	0.522	+/- 0.325	0.405	0.595
	1991	8-11	0.469	+/- 0.353	0.375	0.625
	1989	8-12	0.723	+/- 0.084	0.513	0.487
	1988	9-13	0.651	+/- 0.396	0.478	0.522
MI-4	2001	7-15	0.366	+/- 0.399	0.309	0.691
	2000	6-13	0.323	+/- 0.586	0.276	0.724
	1999	7-12	0.202	+/- 0.069	0.181	0.819
	1998	7-12	0.220	+/- 0.166	0.197	0.803
	1997	7-12	0.455	+/- 0.182	0.369	0.631
	1996	7-12	0.556	+/- 0.162	0.429	0.571
	1995	7-12	0.200	+/- 0.226	0.181	0.819
	1994	7-12	0.281	+/- 0.103	0.244	0.756
	1993	6-11	0.349	+/- 0.334	0.295	0.705
	1992	5-11	0.430	+/- 0.105	0.349	0.651
	1991	6-11	0.592	+/- 0.130	0.446	0.554
	1990	6-11	0.723	+/- 0.153	0.513	0.487
	1989	7-11	0.786	+/- 0.395	0.546	0.454
	1988	9-13	0.912	+/- 0.134	0.598	0.402
MI-5	2000	10-16	0.188	+/- 0.336	0.171	0.829
	1991	5-8	0.744	+/- 0.563	0.523	0.477
				Wild and Hatchery Lake Trout Combined		
MI-2	2000	9-13	0.220	+/- 0.300	0.197	0.803
	1999	7-13	0.287	+/- 0.162	0.252	0.748
	1998	7-13	0.389	+/- 0.106	0.323	0.677
	1990	8-12	0.706	+/- 0.247	0.508	0.492
MI-3	2001	8-12	0.179	+/- 0.109	0.165	0.835
	2000	7-11	0.200	+/- 0.450	0.181	0.819
	1999	7-16	0.039	+/- 0.090	0.197	0.803
	1997	7-11	0.208	+/- 0.196	0.189	0.811
	1996	8-13	0.276	+/- 0.190	0.244	0.756
	1995	8-11	0.563	+/- 0.328	0.429	0.571
	1992	7-13	0.372	+/- 0.355	0.309	0.691
	1991	8-11	0.396	+/- 0.334	0.330	0.670
	1989	8-11	0.642	+/- 0.094	0.473	0.527
	1988	11-13	0.779	+/- 0.445	0.541	0.459
MI-4	2001	7-15	0.368	+/- 0.500	0.309	0.691
	2000	5-13	0.270	+/- 0.520	0.237	0.763
	1999	7-12	0.254	+/- 0.030	0.221	0.779
	1998	7-12	0.299	+/- 0.129	0.259	0.741
	1997	7-12	0.339	+/- 0.115	0.288	0.712
	1996	7-12	0.572	+/- 0.154	0.434	0.566
	1995	7-12	0.252	+/- 0.170	0.221	0.779
	1994	7-12	0.305	+/- 0.094	0.267	0.733
	1993	6-11	0.300	+/- 0.242	0.259	0.741
	1992	5-11	0.448	+/- 0.081	0.362	0.638
	1991	6-11	0.577	+/- 0.104	0.440	0.560
	1990	6-11	0.591	+/- 0.088	0.446	0.554
	1989	7-11	0.705	+/- 0.218	0.508	0.492
	1988	8-13	0.540	+/- 0.276	0.417	0.583
MI-5	2000	10-16	0.165	+/- 0.256	0.156	0.844
	1991	5-8	0.602	+/- 0.452	0.451	0.549

Table 11. Age and size composition of hatchery (H) and wild (N) lake trout in tribal commercial harvests from unit MI-4 during 2001. 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	37	23.5	2.2	37	4.2	1.5
		3	4	4	16.7	1.1	4	1.5	0.4
		4	3	3	21.9	1.5	3	3.6	0.3
		5	8	8	20.9	2.4	8	2.9	1.0
		6	26	26	21.2	3.6	26	3.4	2.0
		7	4	4	21.5	3.5	4	3.7	1.6
		8	13	13	24.0	1.7	13	4.1	0.8
		9	8	8	23.5	1.7	8	4.1	1.0
		10	5	5	25.2	2.6	5	4.9	2.0
		11	1	1	24.0		1	4.8	
		12	1	1	26.1		1	5.5	
		15	2	2	28.5	0.6	2	7.3	0.0
		17	1	1	24.1		1	4.4	
Sample Size:			76	113			113		
Means:		7.2			22.7	3.1		3.9	1.6
	N								
			0	67	23.9	3.3	67	4.7	2.6
		3	4	4	16.6	0.3	4	1.3	0.2
		4	19	19	18.0	1.7	19	1.8	0.5
		5	16	16	19.4	1.9	16	2.2	0.8
		6	20	20	20.8	1.9	20	2.9	0.8
		7	36	36	22.1	2.0	36	3.4	1.1
		8	46	45	23.2	2.6	46	4.1	1.5
		9	43	43	23.7	2.2	43	4.1	1.4
		10	16	16	23.8	2.7	16	4.2	1.7
		11	14	14	23.8	3.3	14	4.5	2.0
		12	6	6	24.7	2.1	6	4.9	1.3
		13	4	4	26.2	2.5	4	5.9	2.4
		14	4	4	27.1	3.6	4	6.6	2.2
		15	4	4	28.3	3.7	4	6.7	2.9
		19	1	1	26.9		1	5.8	
		22	1	1	28.1		1	7.3	
Sample Size:			234	300			301		
Means:		8.1			22.8	3.3		3.9	2.0
Sample Size:			310	413			414		
Means:		7.9			22.8	3.2		3.9	1.9

Table 12. Age and size composition of hatchery (H) and wild (N) lake trout in tribal commercial harvests from unit MI-5 during 2001. Weight is in round pounds, length is in inches, and sd=standard deviation.

Unit	Origin	Age	Number Aged	Number Measured	Length (in.) mean	sd	Number Weighed	Weight (lbs) mean	sd
MI-5									
	H								
		6	1	1	23.4		1	3.9	
		8	1	1	25.7		1	5.5	
		9	2	2	24.9	1.5	2	4.3	0.2
		13	1	1	27.2		1	6.5	
		16	1	1	26.4		1	6.0	
		22	1	1	33.7		1	15.7	
Sample Size:			7	7			7		
Means:		11.9			26.6	3.4		6.6	4.1
	N								
			0	3	23.1	1.8	3	3.9	1.1
		4	1	1	17.5		1	1.7	
		5	1	1	21.9		1	2.6	
		6	6	6	21.9	1.7	6	3.4	0.7
		7	9	9	23.2	1.2	9	3.8	0.7
		8	15	15	24.0	1.8	15	4.5	1.1
		9	3	3	25.1	1.8	3	5.1	1.2
		10	7	7	24.1	2.8	7	4.5	1.8
		11	10	10	26.2	2.9	10	6.1	2.0
		12	2	2	29.7	1.8	2	8.3	0.9
		13	3	3	23.6	3.3	3	4.1	1.7
		14	2	2	24.1	5.9	2	4.6	3.0
		16	3	3	28.8	3.1	3	8.3	3.3
		19	1	1	26.0		1	5.6	
		20	1	1	24.4		1	4.7	
Sample Size:			64	67			67		
Means:		9.6			24.3	2.9		4.8	1.9
Sample Size:			71	74			74		
Means:		9.8			24.5	3.0		4.9	2.2

Table 13. Age and size composition of whitefish in tribal commercial harvests during 2001. 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								
	7	6	6	19.3	1.3	6	2.6	0.7
	8	18	18	18.6	1.5	18	2.2	0.6
	9	39	39	19.4	1.0	39	2.6	0.5
	10	45	45	19.9	1.4	45	2.8	0.6
	11	44	44	20.6	1.2	44	3.1	0.6
	12	12	12	21.3	1.2	12	3.4	0.7
	13	5	5	21.0	1.8	5	3.2	0.9
Sample Size:		169	169			169		
Means:	9.9			19.9	1.5		2.8	0.7
MI-3								
		0	4	19.6	1.0	4	2.9	0.5
	5	1	1	16.7		1	1.5	
	7	6	6	18.4	0.7	6	2.2	0.4
	8	35	35	19.0	0.9	35	2.4	0.5
	9	92	92	19.2	0.7	91	2.4	0.4
	10	140	140	19.7	0.7	140	2.5	0.3
	11	112	112	19.8	0.8	112	2.7	0.4
	12	40	40	20.2	0.8	40	2.9	0.4
	13	9	9	21.2	1.2	9	3.3	0.7
Sample Size:		435	439			438		
Means:	10.1			19.6	0.9		2.6	0.4

Table 13. Continued.

Unit	Age	Number Aged	Number Measured	Length (in.) mean	sd	Number Weighed	Weight (lbs) mean	sd
MI-4								
		0	2	20.7	0.2	2	3.2	0.1
	3	13	13	14.8	0.6	13	0.9	0.1
	4	3	3	18.7	1.0	3	1.8	0.1
	5	16	16	19.7	1.4	16	2.2	0.6
	6	38	38	20.1	1.4	38	2.5	0.5
	7	102	102	20.0	1.4	102	2.8	0.7
	8	160	160	20.8	1.5	160	3.1	0.7
	9	143	143	21.4	1.5	143	3.5	0.8
	10	104	104	22.3	1.7	104	3.9	1.1
	11	49	49	22.5	1.6	49	4.0	0.9
	12	20	20	23.1	1.7	20	4.4	1.2
	13	10	10	23.8	2.2	10	5.3	1.4
	14	3	3	23.7	0.7	3	4.3	0.9
	15	4	4	25.0	1.4	4	5.3	0.4
Sample Size:		665	667			667		
Means:	8.6			21.1	2.0		3.3	1.1
MI-5								
	5	1	1	17.6		1	1.9	
	6	3	3	20.6	0.4	3	2.8	0.3
	7	6	6	22.0	0.9	6	3.5	0.4
	8	13	13	22.1	2.1	13	3.4	1.0
	9	3	3	25.4	1.5	3	4.0	0.8
	10	4	4	25.3	0.7	4	4.8	1.5
	11	2	2	24.6	0.9	2	5.2	2.6
	13	5	5	27.4	1.7	5	7.2	1.4
	21	1	1	29.7		1	10.1	
Sample Size:		38	38			38		
Means:	9.1			23.5	2.9		4.3	1.9

Table 14. Age and size composition of siscowet in tribal commercial harvests during 2001. 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								
		0	9	19.4	3.9	9	2.4	1.1
	7	1	1	18.8		1	2.2	
	8	3	3	21.0	3.8	3	3.2	1.6
	9	2	2	20.7	0.4	2	2.6	0.0
	10	2	2	20.8	0.9	2	2.6	0.3
	11	4	4	20.1	1.6	4	2.5	0.5
	12	2	2	21.2	1.9	2	2.9	1.0
	13	1	1	19.9		1	2.2	
	15	1	1	19.2		1	2.1	
	16	2	2	21.4	1.8	2	2.8	0.8
Sample Size:		18	27			27		
Means:	10.9			20.2	2.6		2.6	0.9
MI-3								
		0	5	21.6	1.3	5	3.0	0.3
	8	3	3	17.9	0.8	3	1.7	0.1
	9	2	2	19.4	3.3	2	2.2	1.2
	10	4	4	21.1	1.2	4	3.1	0.8
	11	2	2	20.5	0.5	2	2.7	0.1
	12	6	6	20.9	0.9	6	3.0	0.6
	13	8	8	21.7	2.5	8	3.3	1.5
	14	7	7	22.8	1.7	7	3.7	1.2
	15	3	3	25.3	1.1	3	5.4	1.8
	16	2	2	24.3	1.1	2	3.9	0.3
	17	3	3	23.2	1.3	3	3.8	0.2
	18	5	5	25.0	1.6	5	5.6	1.1
	19	6	6	24.9	2.8	6	4.4	1.8
	20	1	1	24.1		1	2.8	
	21	1	1	25.0		1	4.1	
Sample Size:		53	58			58		
Means:	14.2			22.4	2.6		3.6	1.4

Table 14. Continued.

Unit	Age	Number Aged	Number Measured	Length (in.) mean	sd	Number Weighed	Weight (lbs) mean	sd
MI-4								
		0	7	23.5	1.8	7	4.3	1.1
	6	4	4	19.3	4.0	4	2.5	1.5
	7	3	3	19.5	2.8	3	2.2	0.9
	8	5	5	17.7	1.9	5	1.8	0.6
	9	6	6	19.2	1.7	6	2.1	0.6
	10	5	5	21.1	1.7	5	3.1	0.8
	11	8	8	20.0	1.8	8	2.8	1.1
	12	10	10	19.9	4.9	10	2.6	2.3
	13	7	7	20.2	2.6	7	2.6	0.9
	14	19	19	23.0	2.9	19	4.3	1.8
	15	10	10	23.3	2.2	10	3.8	1.4
	16	15	15	24.2	3.2	15	4.9	2.1
	17	9	9	25.5	2.5	9	5.3	1.9
	18	11	11	24.5	2.3	11	4.7	1.3
	19	12	12	25.1	2.2	12	5.2	2.2
	20	9	9	24.1	1.4	9	4.3	0.7
	21	5	5	24.6	1.8	5	5.2	0.9
	22	2	2	25.7	1.2	2	5.4	1.1
	23	1	1	24.5		1	5.0	
Sample Size:		141	148			148		
Means:	14.7			22.7	3.4		4.0	1.9

Table 15. Age and size composition of herring in tribal commercial harvests during 2001. 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-3								
	18	1	1	22.0		1	3.9	
Sample Size:		1	1			1		
Means:	18.0			22.0			3.9	
MI-4								
		0	22	15.8	1.2	22	1.3	0.4
	3	10	10	14.6	1.1	10	1.1	0.4
	4	6	6	15.1	1.2	6	1.3	0.4
	5	15	15	14.9	1.0	15	1.0	0.3
	6	15	15	14.8	1.5	15	1.1	0.5
	7	18	18	16.0	1.8	18	1.4	0.5
	8	29	29	16.6	2.0	29	1.6	0.7
	9	33	33	17.2	1.7	33	1.7	0.5
	10	86	86	16.4	1.9	86	1.5	0.6
	11	53	53	17.6	1.6	53	1.9	0.6
	12	42	42	17.2	1.8	42	1.9	0.7
	13	19	19	17.5	2.3	19	1.9	0.6
	14	7	7	18.5	1.0	7	2.3	0.4
	15	5	5	17.8	1.3	5	2.0	0.6
	16	2	2	16.4	1.9	2	1.5	1.0
	17	1	1	19.9		1	2.6	
	18	1	1	20.9		1	3.2	
	19	1	1	20.3		1	2.8	
Sample Size:		343	365			365		
Means:	9.7			16.7	1.9		1.6	0.6

Table 16. Age and size composition of coho salmon in tribal commercial harvests during 2001. Weight is in round pounds, length is in inches, and sd=standard deviation.

Unit	Age	N(Age)	N(length)	Length mean(in.)	sd(in.)	N(weight)	Weight mean(lb.)	sd(lb.)
MI-4								
	2	4	4	14.7	1.3	4	1.2	0.3
Sample Size:		4	4			4		
Means:	2.0			14.7	1.3		1.2	0.3