Biological and Commercial Catch Statistics from the Chippewa Inter-Tribal Gill Net Fishery within Michigan Waters of Lake Superior During 2000

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ABSTRACT

The 2000 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 only gear used in the fishery.

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 lifting 4.5 million feet of gill net and harvesting 821,194 round pounds of fish. Whitefish was the primary target species, making up 71% of the total, followed by lake trout (21%), siscowet (4%), and lake herring (3%). Other species harvested either incidentally or through targeting efforts included salmon, walleye, chubs, and round whitefish (menominee).

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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 (Ebener et al. 1985; Ebener and Bronte 1986, 1987, 1988; Ebener et al. 1989, 1990; Shively et al. 1992a, b, 1993, Mattes et al. 1994, Mattes et al. 1995, Mattes et al. 1996, Mattes et al. 1997, Mattes et al. 1998, Mattes et al. 1999, Mattes et al. 2000).

Biological and commercial fishery statistics were summarized for calendar year 2000 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 and grid, as indicated on individual catch reports.

DESCRIPTION OF THE FISHERY

The commercial fishery consisted of six (6) large boats and 15 small boats, representing 22 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 only 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, 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. 1989b.
[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

Harvest and effort 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 catch and effort for his vessel. 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 all other species not listed below 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 lifting 4.5 million feet of gill net and harvesting 689,900 dressed pounds (821,194 round pounds) of fish (Tables 1, 2, and 3). Lake whitefish, the primary target species, made up 71% of the total followed by lake trout (21%), siscowet (4%), and lake herring (3%). Other species harvested either incidentally or through targeting efforts included salmon, walleye, chubs, and round whitefish (menominee).

Unit MI-2

Effort. Twenty-two percent of the total effort was expended in MI-2 (Table 1). Fishing effort was 0.99 million feet with gill nets of 4 ½ inch mesh accounting for 77% (0.76 million feet) of the unit effort (Table 3, Figure 2). The remaining 23% (0.23 million feet) of the effort consisted of a unspecified mix of $4^{7/16}$, 4 ½, 5, and 5 ½ inch mesh. Fishing occurred in twelve grids grouped into seven general areas: Misery Bay (grid 1219), Union Bay (grids 1315, 1316, and 1317), Black River (grids 1413 and 1414), off-shore at Black River (grids 1313 and 1314), Porcupine Mountains (grid 1214), Ontonagon (grid 1217), and off-shore at Saxon Harbor 1411 and 1412. An additional area, Saxon Harbor (grids 1511 and 1512), was not fished in 2000 (Figure 1). Sixty percent of the effort occurred at Misery Bay followed by Black River (29%), off-shore at Black River (4%), Union Bay (4%), off-shore at Saxon Harbor (2%) and less than 1% at the Porcupine Mountains and Ontonagon.

Harvest. Thirty percent of the total harvest (209,534 dressed or 246,037 round pounds) was taken in MI-2. Whitefish made up 94%, lake trout 4%, and siscowet 2% of this harvest (Tables 1 and 3). The majority of harvest occurred around Misery Bay. For whitefish, 39% of the harvest was from grids near Misery Bay followed by Black River (28%), off-shore at Black River (16%), Union Bay (8%), off-shore at Saxon Harbor (6%) and off-shore at Ontonagon (1%) (Table 1). Harvest of lake trout was highest around Misery Bay (45%) Black River (36%), off-shore at Saxon Harbor (17%), Union Bay (2), and off-shore at Black River and at Ontonagon (<1%). Siscowet were only harvested near Black River (94%) and Union Bay (6%).

Target Effort and Harvest. All fishing effort in MI-2 was targeted for whitefish and lake trout (Table 4). Target effort (985,800 feet) and harvest (198,512 pounds) of whitefish increased greatly over 1999 (495,700 feet and 70,938 pounds) (Table 5), while target lake trout harvest (7,103 pounds) remained 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 twelve grids fished in MI-2 varied from 131-872 pounds for whitefish and averaged 201 pounds (Table 4), the highest average whitefish CPE recorded over the past 17 years (1984-2000) (Table 5). Conversely, lake trout CPE ranged from 1-63, and averaged 7 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 off-shore were higher (Black River: 872 pounds, Ontonagon: 813

pounds, Saxon Harbor: 594 pounds, and Porcupine Mountains: 578 pounds), the average CPE in the grids fished at Union Bay (426 pounds), Black River (193 pounds), and Misery Bay (131 pounds). For lake trout, average CPE was highest in off-shore grids 1411 and 1412 near Saxon Harbor (63 pounds) followed by Black River (9 pounds) Misery Bay (5 pounds), Union Bay (3 pounds), and the off-shore areas at Black River, Porcupine Mountains, and Ontonagon (1 pound).

Unit MI-3

Effort. Twenty-three percent of the total effort was expended in MI-3 (Table 1). Fishing effort was 1.02 million feet (Table 3, Figure 2), and all nets fished were 4 ½ inch mesh. Fishing had become more confined within the area over the past few years. However in 2000, fishing occurred in eleven grids compared to three in 1999. These grids were grouped into six general areas: Redridge/West Entry (grids 1022, 1121 and 1122), 5 Mile Point (grid 1023), Eagle River (grid 1024), Eagle Harbor (grid 925), Copper Harbor (grids 926 and 927) and three off-shore grids (922, 923, and 924) (Figure 1). The percent of total MI-3 effort fished at Redridge/ West Entry was 85%, followed by 11% at 5 Mile Point, 2% in the three off-shore grids, 1% each at Copper Harbor and Eagle River, and 0.3% at Eagle Harbor.

Harvest. Twenty percent of the total harvest (135,209 dressed or 158,927 round pounds) was taken in MI-3 (Table 3). Of harvest in this unit, whitefish made up 93%, lake trout 4%, and siscowet 3% (Tables 1 and 3). For whitefish 81% were taken from Redridge/West Entry, 17% from 5 Mile Point, and 2% from Eagle River. For lake trout, 73% were taken from Redridge/West Entry, 20% from 5 Mile Point, and 7% from Eagle River. Siscowet were harvested from two grids; 79% were harvested from grid 1023 at 5 Mile Point and 21% from grid 1122 at West Entry (Table 1).

Target Effort and Harvest. All fishing effort in MI-3 was targeted at whitefish and lake trout (Table 4). Target effort in 2000 (1.02 million feet) decreased by 381,400 feet compared to 1999 (Table 5). Compared to 1999, target harvest of whitefish (126,047 pounds) decreased by 14,966 pounds, while target harvest of lake trout (5,773 pounds) decreased by 3,374 pounds.

Catch per effort. CPE for targeted fishing in MI-3 varied from 2-368 pounds for whitefish and averaged 124 pounds, the highest average whitefish CPE recorded over the past 17 years (1984-2000) (Tables 4 and 5). CPE for lake trout ranged from 1-51 pounds (average: 6 pounds) (Table 4). For whitefish and lake trout, CPE's were highest at Eagle River (grid 1024) at 368 pounds and 51 pounds, respectively. This was followed by 5 Mile Point at 188 pounds for whitefish and 10 pounds for lake trout and by Redridge/West Entry at 118 pounds for whitefish and 5 pounds for lake trout. CPE's for both species in the remaining three areas were low.

Unit MI-4

Effort. Since 1986 this unit has received the majority of tribal effort (1986-1999 average: 62%). In 2000, 45% percent of the total tribal effort was fished in MI-4 (Table 1). Fishing effort was 2.02 million feet and continues to be stable since peaking in 1990 and then declining for the next 5 years (Figure 2). Large mesh gill nets of 4 ½ inch mesh accounted for 97% of the effort with various sized small mesh accounting for the remaining 3% (Table 3).

Fishing occurred in 12 grids grouped into four general areas: 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 (1325, 1326, and 1226) (Figure 1). In 2000, most of the fishing effort occurred in Keweenaw Bay (33% or 0.67 million feet), followed by Traverse Bay to Bete Grise area (28% or 0.57 million feet), Traverse Island (21% or 0.43 million feet), and Huron Islands (18% or 0.36 million feet). For the third consecutive year, a fifth general area, Keweenaw Point (grid 1028), was not fished in 2000 (Table 1).

Harvest. Forty-eight percent of the total harvest (243,905 dressed or 293,507 round pounds) were taken in MI-4 (Table 1). Of this harvest, whitefish made up 53%, lake trout 32%, siscowet 7%, herring 6%, and salmon 1% (Table 3). Percentages of whitefish taken by area were 37% from Traverse Bay to Bete Grise, 33% from Keweenaw Bay, 18% from Huron Islands, and 12% from Traverse Island. For lake trout, 48% of the harvest was from Keweenaw Bay followed by 25% at Traverse Island, 16% at the Huron Islands and 11% from Traverse Bay to Bete Grise. The majority of the siscowet harvest was from Traverse Bay to Bete Grise, (75%), followed by the Huron Islands (11%), Keweenaw Bay (8%), and Traverse Island (6%). Fifty-four percent (7,460 pounds) of herring were harvested from the Huron Islands followed by 36% (4,985 pounds) from Keweenaw Bay in 2000. This was nearly the reverse of 1999 when 7,208 pounds and 3,947 pounds of herring were harvested from Keweenaw Bay and the Huron Islands, respectively. Ninety-nine percent of the salmon harvest (2,399 pounds) was from Keweenaw Bay (Table 4).

Target Effort and Harvest. The majority of fishing effort (95%) was targeted at whitefish and lake trout with the remainder directed at siscowet (2%), lake herring (2%), and salmon (1%) (Table 4). The target effort for whitefish and lake trout in 2000 (1.99 million feet) was 0.4 million feet lower than in 1999 (2.39 million feet). Target harvest of whitefish (128,261 pounds) was 16,622 pounds less than in 1999 (144,883 pounds), while lake trout harvest (78,318 pounds) increased for the fourth consecutive year (1996 to 2000). For siscowet, target harvest (6,616) and effort (43,700) were considerably lower than last year, (14,920 pounds and 79,400 feet, respectively) and were the lowest recorded during the last 15 years (1986 and 2000).

Catch per effort. CPE for targeted fishing in the 12 grids of MI-4 varied from 21-340 pounds per 1000 feet for whitefish (average: 67 pounds) and 10-107 pounds for lake trout (average: 41 pounds). Average CPE for lake trout was the highest observed since 1986 (Table 5). For the 4 grids where siscowet were targeted CPE ranged from 23-318 pounds (average: 151

pounds). For the 3 grids with effort directed at herring CPE ranged from 114-133 pounds (average: 118 pounds). For the 2 grids with effort directed at salmon CPE was 37 and 56 pounds (average: 50 pounds).

For whitefish, CPE was highest from Traverse Bay to Bete Grise (average: 88 pounds) and lowest in Traverse Island grids (average: 35 pounds). For lake trout, CPE was highest in Keweenaw Bay (average: 63 pounds) followed by Traverse Island (average: 46 pounds), the Huron Islands (average: 35 pounds) and Traverse Bay to Bete Grise (average 16 pounds). CPE for siscowet was highest from grid 1125 in the Traverse Bay to Bete Grise area (318 pounds) where 86% of the target harvest occurred, followed by the Keweenaw Bay area with 12% of the harvest (average: 35 pounds), and the Huron Islands area with 2% of the harvest (average: 33 pounds) (Table 4).

Other Species. Herring and salmon continued to be important target species of the small boat fishery in MI-4. Harvest of herring was 13,879 dressed pounds which was below the fourteen year average (1986-1999: 22,698 pounds) and only a third of the average harvest from 1991 to 1994 (41,610 pounds) (Figure 5). Salmon harvest was 2,434 dressed pounds 1,708 pounds below the 1986 to 2000 average (4,142 pounds). Thirty-six percent of the herring and 99% of the salmon harvests were caught by the small boat fishery in grids 1323, 1324, and 1423 of MI-4 (Table 1).

Unit MI-5

Effort. Eleven percent of the total effort was fished in MI-5. Fishing effort was 484,100 feet, an increase of 275,100 feet from 1999 (209,000 feet) (Table 3). Fishing effort was primarily (99%) large mesh net targeted at whitefish, lake trout, and siscowet (Figure 2, Tables 3 and 5). Fishing occurred in four grids grouped into three general areas: Big Bay (grid 1327), Granite Island (grids 1428 and 1429) and Presque Isle (grid 1529) (Table 1). The percent of total effort fished at Big Bay was 49% (0.24 million feet), followed by Granite Island (42% or 0.21 million feet), and Presque Isle (9% or 0.05 million feet). Total effort in MI-5 has been less than in other units because of limited docking space with direct access to fishing grounds.

Harvest. Fifteen percent of the total harvest (101,252 dressed or 122,723 round pounds) was taken from MI-5. Whitefish made up 43%, lake trout 45%, siscowet 3%, herring 5%, and salmon 1% of the harvest (Table 3). The percent of whitefish taken from the three areas generally followed the pattern of effort. For whitefish, 67% were taken from Big Bay, followed by 27% from Granite Island, and 6% from Presque Isle. For siscowet, 98% were taken from Big Bay and 2% from Granite Island. The percent of lake trout, herring, and salmon taken from the three areas did not follow the pattern for effort. For lake trout, 21% were taken from both Big Bay and Presque Isle and 58% from Granite Island. For herring 49% were taken from Granite Island, followed by 39% at Big Bay, and 12% at Presque Isle. For salmon, 77% were taken at Presque Isle, 21% at Granite Island, and 2% at Big Bay.

Target Effort and Harvest. Targeted whitefish harvest was the highest since 1990 at 43,505 dressed pounds which was nearly double the 1986-1999 average of 20,464 pounds (Table 5). Targeted lake trout harvest was 46,402 dressed pounds, four times the 1986 to 1999 average (11,057 pounds). A total of 3,073 dressed pounds of siscowet, 6,105 dressed pounds of herring, and 1,228 pounds of salmon were harvested (Table 1).

Catch per effort. Catch per effort for targeted fishing in the three grids varied from 51-129 pounds per 1,000 feet for whitefish (average: 94 pounds) and 42-220 pounds for lake trout (average: 100 pounds). Siscowet were targeted in grid 1327 with a CPE of 77 pounds and herring and salmon were targeted in grid 1428 with a CPE of 129 and 83 pounds, respectively (Table 4).

Biological Statistics

Lake Trout MI-2

The lake trout catch from management unit MI-2 was comprised of eight year classes of hatchery fish (1986-1988, 1990-1994) and eighteen year classes of wild fish (1978, 1982-1998) (Table 6). Of the 135 fish sampled 87% were wild trout. Percent wild fish ranged from 70 to 100% among year classes. Mean age for hatchery and wild fish was 8.6 and 9.6 years, respectively. Fish ten years and older made up 47% of the wild component of the catch. Mean length and weight of all fish sampled was 22.8 inches and 3.9 pounds round, respectively. The average size of hatchery fish was 21.7 inches and the average size of wild fish was 23.0 inches.

Average lamprey marking rates were 3 wounds and 3 scars/100 fish (Table 7), with fish greater than 25 inches exhibiting the highest scarring rates.

Annual total mortality was estimated to be 20% (± 34%) for wild fish of ages 9-13 (Table 8). Mortality of wild and hatchery fish combined for ages 9-13 was 18% (± 30%).

Lake Trout MI-3

Two year classes of hatchery fish (1990 and 1991) and seven year classes of wild fish (1989-1995) were represented in the 51 lake trout sampled (Table 9). Mean age for hatchery and wild fish was 9.3 and 8.1 years, respectively. Wild trout composed 93% of the catch. Percent wild fish ranged from 50 to 100% among year classes.

Mean length and weight of all fish sampled was 22.2 inches and 3.7 pounds round, respectively. Average size of wild fish (22.3 inches) was greater than that of hatchery fish (20.8 inches). 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 0 wounds and 1.7 scars/100 fish (Table 7), with fish greater than 25 inches exhibiting the highest scarring rates.

Annual total mortality rate for wild fish 7-9 years old was estimated to be 16% (± 22%) (Table 8). Mortality of wild and hatchery fish combined for ages 7-11 was 18% (± 45%). Small sample sizes and low R^2 values reduced the confidence in the mortality estimates.

Lake Trout MI-4

Eleven year classes of hatchery fish (1986-1988, 1990-1997) and nineteen year classes of wild trout (1978, 1980-1997) were represented in a sample of 574 lake trout from MI-4 (Table 10). Mean age of hatchery and wild fish was 6.7 and 8.7 years, respectively. Wild fish, age ten and older, composed 23% of all wild trout. Overall, wild fish composed 62% of all lake trout sampled. This proportion was 41% in 1985 and increased to around 80% from 1988 to 1994. The percentage of the wild component of the catch has decreased since 1995, most likely due to the continuation of stocking in this management unit. Percent wild fish ranged from 18 to 100% among year classes (Table 10).

Mean length and weight of all fish sampled was 21.9 inches and 3.5 pounds, similar to values for 1992-1998. The average size of wild fish was greater than hatchery fish.

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 0.7 wounds and 2.4 scars/100 fish (Table 7), with the larger, older fish exhibiting the greatest occurrence of scars.

Annual total mortality was estimated to be 28% (± 59%) for wild fish ages 6-13 (Table 8), an increase from 18% (± 7%) in 1999. Mortality rates for wild fish have generally declined from the rate of 60% (± 13%) calculated in 1988, and in only 3 years since 1994 has the mortality rate exceeded 25%. Mortality of ages 5-13 wild and hatchery fish combined was 24% (± 52%). This compares to mortality estimates of 22% (± 3%) in 1999, 26% (± 13%) in 1998, 29% (± 12%) in 1997, 43% (± 15%) in 1996, 22% (± 17%) in 1995, 27% (± 9%) in 1994, 26% (± 24%) in 1993, 36% (± 8%) in 1992, 44% (± 10%) in 1991, 45% (± 9%) in 1990, 51% (± 22%) in 1989 and 42% (± 28%) in 1988 (Table 9).

Lake Trout MI-5

Of the 193 lake trout sampled, nine year classes of hatchery fish (1977, 1984, 1986-1987, 1991-1995) and twenty-two year classes of wild fish (1968, 1972, 1974, 1978-1993, 1995-1997) were found (Table 11). Mean age of hatchery and wild fish was 10.5 and 12.3 years, respectively. Wild trout composed 91% of the sample. Fish ten years and older made up 66% of the wild component. Mean length and weight of all fish sampled was 27.0 and 7.2 pounds, respectively. Average length of hatchery and wild fish was 27.1 and 27.0 inches, respectively.

Overall lamprey marking rates were 4.1 wounds and 31.1 scars/100 fish (Table 7). The largest incidence of scarring was seen on fish >29.0 inches. Annual total mortality rate for wild fish 10-16 years old was estimated to be 17% (± 34%) (Table 8). Mortality of wild and hatchery fish combined for ages 10-16 was 16% (± 26%).

Lake Whitefish MI-2

Eleven year classes (1982, 1986-1995) were represented in the 850 whitefish aged in MI-2 (Table 12). The 1990-93 year classes (ages 7-10) were dominant and comprised 83% of the aged fish sample. The mean age was 8.6 years. Average length and weight of lake whitefish was 19.9 inches and 2.9 pounds based on a sample size of 1,263 fish. Annual total mortality was estimated at 39% for ages 8-13.

Lake Whitefish MI-3

Ten year classes (1982, 1987-1995) were represented in the 912 whitefish aged in MI-3 (Table 12). The 1990-93 year classes (ages 7-10) were dominant and comprised 90% of the aged fish sample. The mean age was 8.6 years. Average length and weight of lake whitefish was 20.0 inches and 2.8 pounds based on a sample size of 1,009 fish. Annual total mortality was estimated at 26% for ages 8-12.

Lake Whitefish MI-4

Nine year classes (1987-1995) were represented in the 940 whitefish aged in MI-4 (Table 12). The 1990-93 year classes (ages 7-10) were dominant and comprised 85% of the aged fish sample. The mean age was 8.1 years. Average length and weight of lake whitefish was 20.8 inches and 3.1 pounds based on a sample size of 1,356 fish. Annual total mortality was estimated at 32% for ages 8-12.

Statistic	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Mean Age	6.7	6.8	6.7	7.0	6.6	7.3	6.8	7.0	7.6	8.0	8.1
Mean Length	20.1	20.1	20.1	19.7	20.2	20.4	19.3	19.3	19.4	20.4	20.8

Lake Whitefish MI-5

The sample size was only composed of one whitefish. That fish was 8 years old, 23.9 inches and 5.3 lbs.

Siscowet

There were twenty three year classes (1974-1996) represented in the harvest from MI-2, MI-3, MI-4, and MI-5 (Table 13). The mean age for siscowets in all management units was 14.1 years. The mean age was 13.5 in MI-2, 13.6 in MI-3, 14.8 in MI-4, and 13.9 in MI-5. Overall, the mean size was 21.9 inches and 3.6 pounds. Mean size by management unit was: MI-2, 21.9 inches and 3.8 pounds; MI-3, 21.9 inches and 3.7 pounds; MI-4, 21.7 inches and 3.4 pounds; and MI-5, 24.1 inches and 4.8 pounds. Small sample sizes and wide age distributions prevented the calculation of mortality rates in the management units.

Lake Herring and Menominee Whitefish

Lake herring were only sampled in MI-4, where fourteen year classes (1984-1997) were represented in the 123 fish aged (Table 14). The 1989-92 year classes were most dominant (63%) in the sample. The mean age was 9.2 years. The mean size of herring was 17.2 inches and 1.7 pounds. Small sample sizes and wide age distributions prevented the calculation of mortality rates in the management units.

Three menominee whitefish were sampled in 2000 representing the 1995 and 1996 year classes. The mean length was 13.3 inches.

Coho Salmon

All coho salmon sampled from the tribal harvest were taken from MI-3 and MI-4. Two year classes (1997 and 1998) were represented in the 5 fish aged with a mean age of 2.6 years. The mean size was 14.5 inches and 1.2 pounds. No chinook salmon were sampled in the tribal harvest in 2000.

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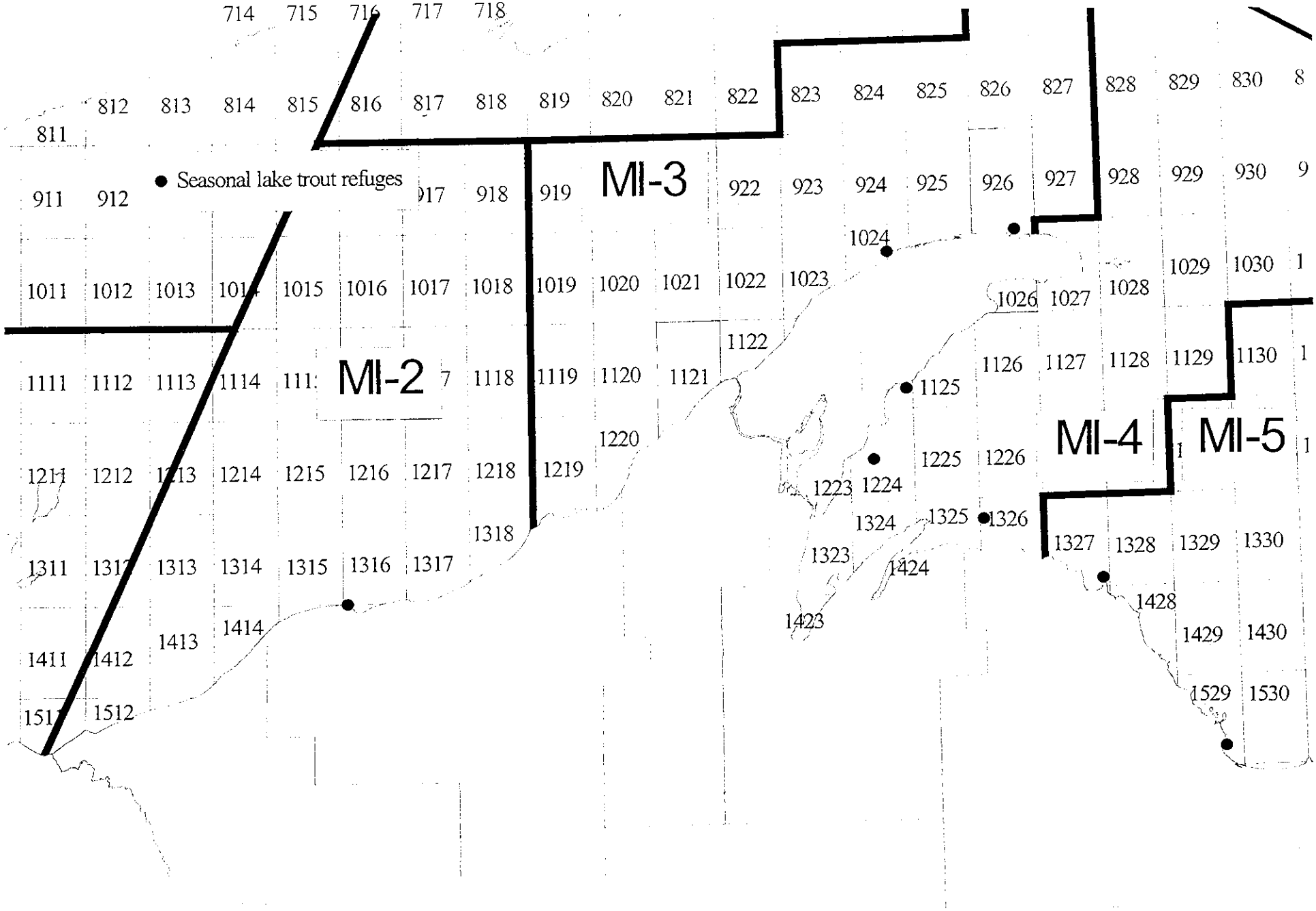
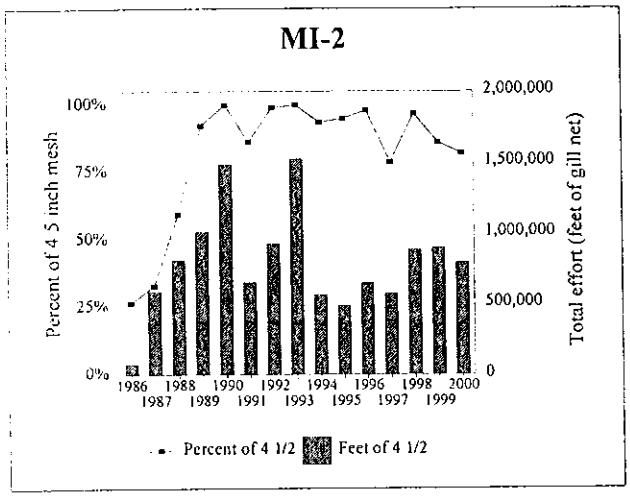
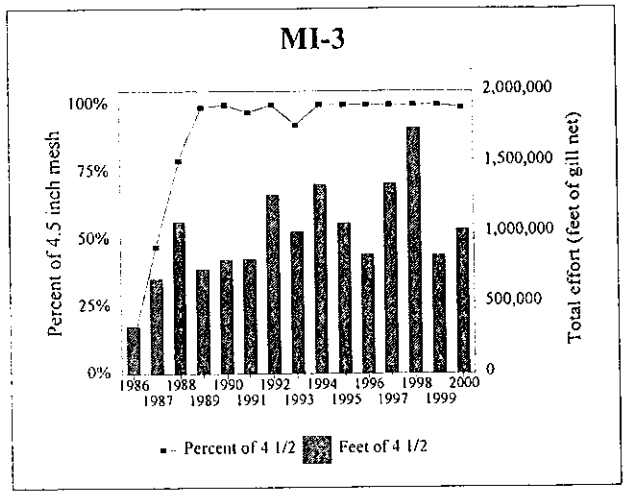
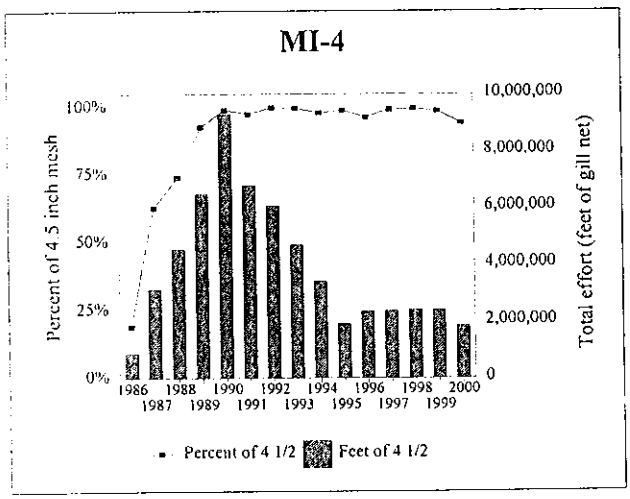


Figure 1. Management units and statistical grids in the 1842 treaty ceded area within Michigan waters of Lake Superior.







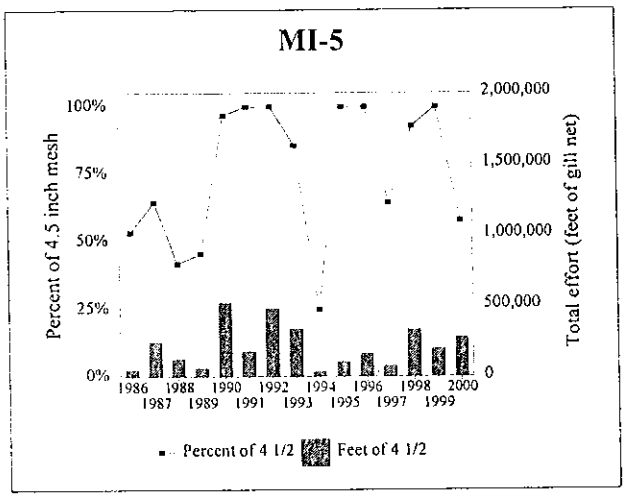


Figure 2. Proportion and total tribal large mesh gill net effort composed of 4 1/2 inch mesh by management unit, 1986 to 2000.

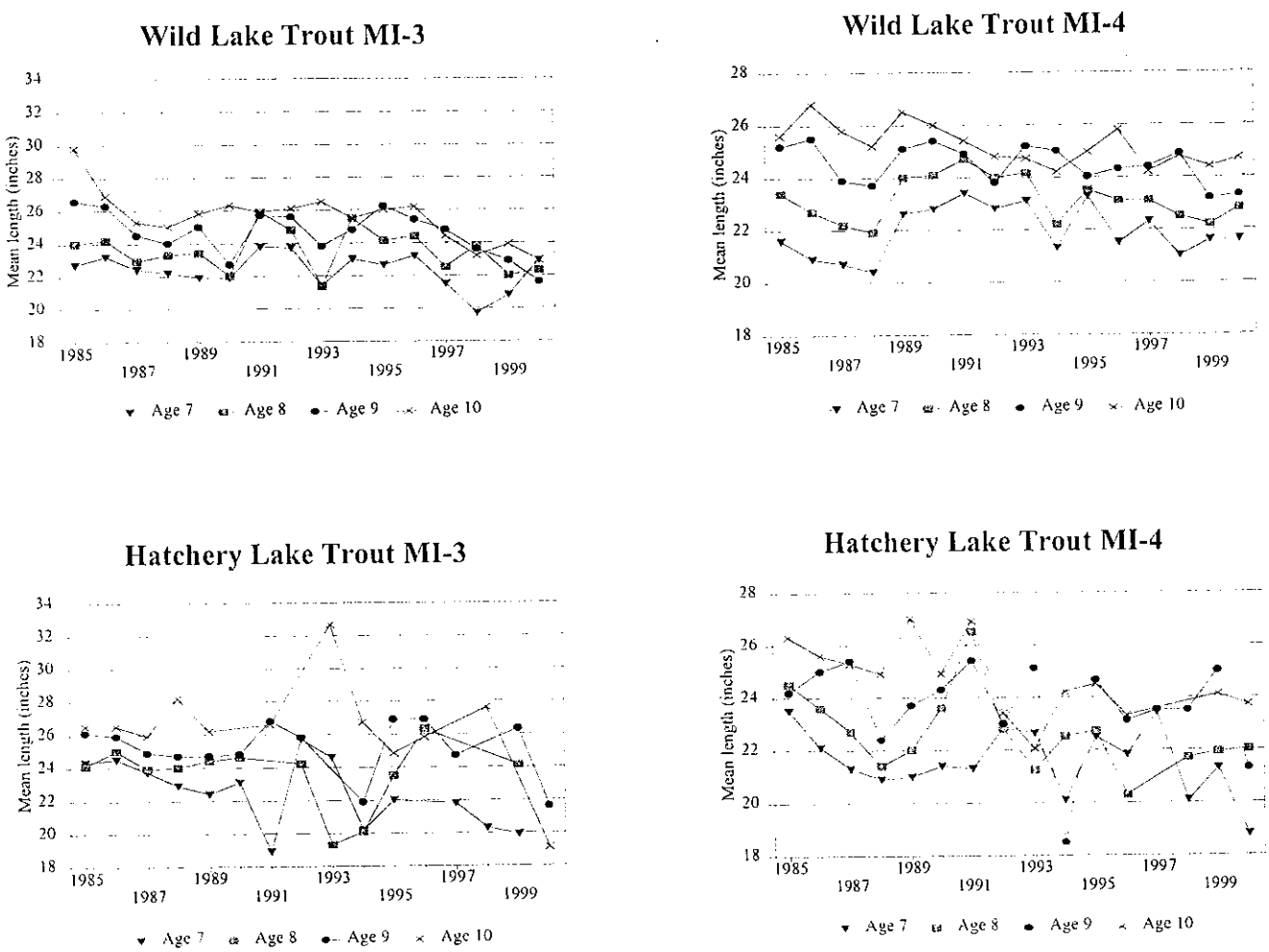
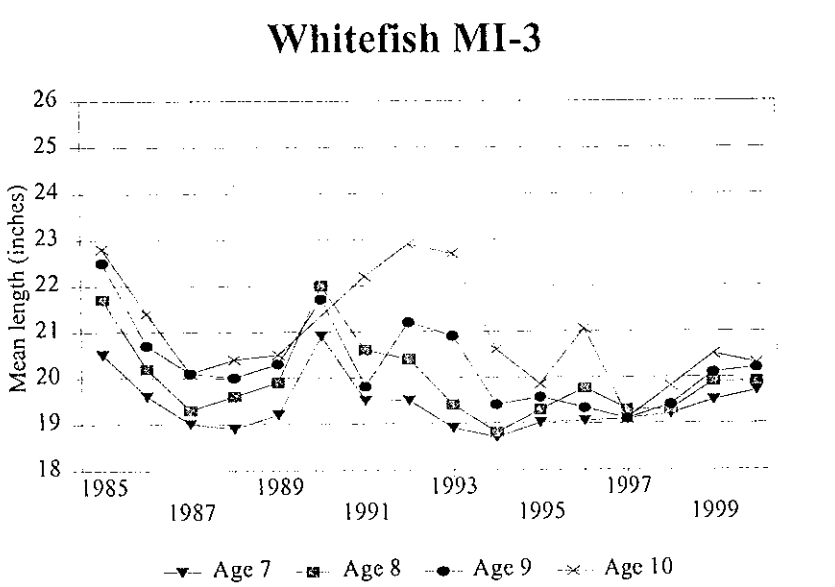


Figure 3. Trends in average length (inches) of hatchery and wild lake trout (ages 7-10) in Michigan management units MI-3 and MI-4, from 1985-2000.



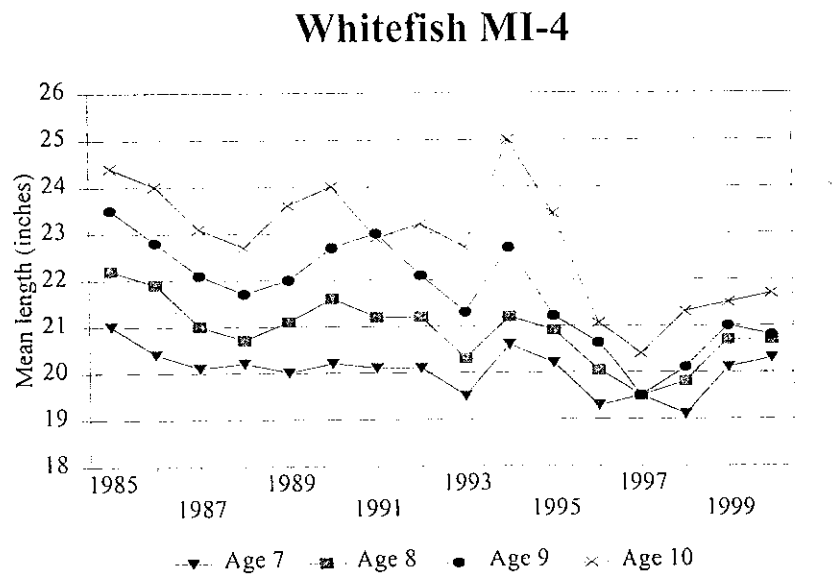


Figure 4. Trends in average length (inches) of whitefish (ages 7-10) in Michigan management units MI-3 and MI-4, from 1985-2000.

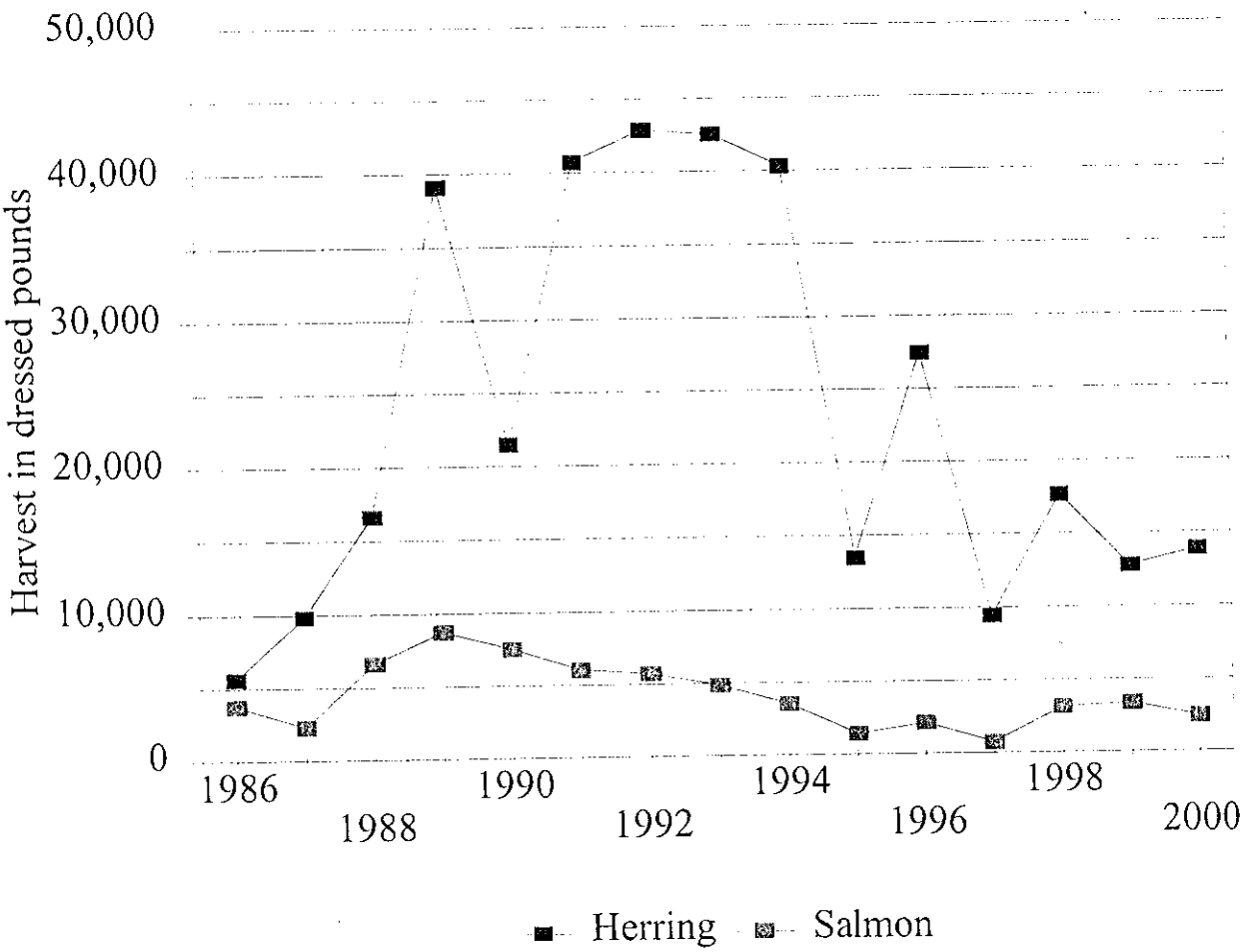


Figure 5. Trends in harvests of lake herring and salmon in Michigan management unit MI-4 from 1986-2000.

Table 1. Tribal commercial effort (feet) and harvest by management unit and grid from the 1842 ceded area within Michigan waters of Lake Superior in 2000. Lake trout, whitefish, siscowet, herring, salmon menominee, and chubs are dressed pounds, all others are round.

Unit	Grid	Effort	Lake trout	Whitefish	Siscowet	Herring	Salmon	Menominee	Chub	Burbot	Walleye	Smelt
MI-2	1214	6,400	6	3,700	0	0	0	0	0	0	0	0
	1217	3,200	2	2,600	0	0	0	0	0	0	0	0
	1219	594,000	3,178	78,018	0	0	8	0	0	0	0	0
	1313	12,800	10	12,500	0	0	0	0	0	0	0	0
	1314	22,400	21	18,200	0	0	0	0	0	0	0	0
	1315	12,600	92	3,536	223	0	0	0	0	0	0	0
	1316	9,600	7	49	0	0	0	0	0	0	0	0
	1317	16,000	9	12,700	0	0	0	0	0	0	0	0
	1411	9,600	309	7,100	0	0	0	0	0	0	0	0
	1412	9,600	900	4,300	0	0	0	0	0	0	0	0
	1413	49,800	983	12,533	105	0	0	0	0	0	0	0
	1414	239,800	1,586	43,276	3,583	0	0	0	0	0	0	0
Subtotal		985,800	7,103	198,512	3,911	0	8	0	0	0	0	0
MI-3	922	4,500	3	9	0	0	0	0	0	0	0	0
	923	7,000	4	18	0	0	0	0	0	0	0	0
	924	7,000	4	19	0	0	0	0	0	0	0	0
	925	3,000	2	13	0	0	0	0	0	0	0	0
	926	7,000	6	20	0	0	0	0	0	0	0	0
	927	1,500	3	8	0	0	0	0	0	0	0	0
	1022	14,300	230	3,605	0	0	0	0	0	0	0	0
	1023	111,100	1,150	20,848	711	0	0	0	0	0	0	0
	1024	7,900	400	2,909	0	0	0	0	0	0	0	0
	1121	714,000	1,913	76,215	0	0	0	0	0	0	0	0
	1122	138,000	2,058	22,383	2,678	0	0	0	0	0	0	0
Subtotal		1,015,300	5,773	126,047	3,389	0	0	0	0	0	0	0
MI-4	1026	232,000	3,535	13,625	2,160	70	0	0	0	0	0	0
	1125	309,500	3,041	27,388	10,555	1,183	0	0	0	0	0	0
	1126	19,000	2,042	5,616	702	0	0	0	0	0	0	0
	1223	14,500	700	310	0	0	0	0	0	0	0	0
	1224	414,600	18,934	14,685	1,035	181	0	0	0	0	0	0
	1225	5,000	400	1,700	0	0	0	0	0	0	0	0
	1226	48,000	2,078	7,363	155	0	0	0	0	0	0	0
	1323	206,000	13,660	14,572	615	2,058	1,848	10	0	0	0	0
	1324	239,600	13,614	18,668	85	127	107	0	0	0	0	0
	1325	192,200	6,136	8,386	1,773	1,060	35	0	0	0	0	0
	1326	114,600	4,064	7,400	0	6,400	0	0	0	0	0	0
	1423	224,825	10,893	9,575	771	2,800	444	3	0	0	0	0
Subtotal		2,019,825	79,097	129,288	17,851	13,879	2,434	13	0	0	0	0
MI-5	1327	235,400	9,773	29,610	2,998	2,360	25	0	0	0	0	0
	1428	132,500	16,662	6,386	0	2,791	261	0	0	0	0	0
	1429	71,200	10,517	5,476	75	212	0	0	0	0	0	1
	1529	45,000	9,899	2,421	0	742	942	0	0	0	0	0
Subtotal		484,100	46,851	43,893	3,073	6,105	1,228	0	0	0	0	1
Grand Total		4,505,025	138,824	497,740	28,224	19,984	3,670	13	0	0	0	1

Table 2. Total and target harvest and effort statistics by tribe for lake trout, whitefish, and siscowet in Michigan waters of Lake Superior in 2000. 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	18,000	1,237	69	1,494	83	0	0	18,000	1,237	69	1,494	83	0	0	0
	Red Cliff	967,800	197,275	204	5,609	6	3,911	4	967,800	197,275	204	5,609	6	0	0	0
	subtotal	985,800	198,512	201	7,103	7	3,911	4	985,800	198,512	201	7,103	7	0	0	0
MI-3	Bad River	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Keweenaw Bay	163,000	21,114	130	3,206	20	536	3	163,000	21,114	130	3,206	20	0	0	0
	Red Cliff	852,300	104,933	123	2,567	3	2,853	3	852,300	104,933	123	2,567	3	0	0	0
	subtotal	1,015,300	126,047	124	5,773	6	3,389	3	1,015,300	126,047	124	5,773	6	0	0	0
MI-4	Bad River	347,800	20,618	59	13,476	39	492	1	347,800	20,618	59	13,476	39	0	0	0
	Keweenaw Bay	1,130,525	63,134	56	57,859	51	3,942	3	1,050,725	62,107	59	57,080	54	25,700	896	35
	Red Cliff	541,500	45,536	84	7,762	14	13,417	25	523,500	45,536	87	7,762	15	18,000	5,720	318
	subtotal	2,019,825	129,288	64	79,097	39	17,851	9	1,922,025	128,261	67	78,318	41	43,700	6,616	151
MI-5	Bad River	72,800	11,602	159	4,085	56	0	0	72,800	11,602	159	4,085	56	0	0	0
	Keweenaw Bay	375,300	24,540	65	41,506	111	1,459	4	353,800	24,152	68	41,057	116	7,500	578	77
	Red Cliff	36,000	7,751	215	1,260	35	1,614	45	36,000	7,751	215	1,260	35	0	0	0
	subtotal	484,100	43,893	91	46,851	97	3,073	6	462,600	43,505	94	46,402	100	7,500	578	77
Total	Bad River	420,600	32,220	77	17,561	42	492	1	420,600	32,220	77	17,561	42	0	0	0
	Keweenaw Bay	1,686,825	110,025	65	104,065	62	5,937	4	1,585,525	108,610	69	102,837	65	33,200	1,474	44
	Red Cliff	2,397,600	355,495	148	17,198	7	21,795	9	2,379,600	355,495	149	17,198	7	18,000	5,720	318
	All Tribes	4,505,025	497,740	110	138,824	31	28,224	6	4,385,725	496,325	113	137,596	31	51,200	7,194	141

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 2000. Lake trout, whitefish, siscowet, herring, salmon, menominee, and chubs are dressed weight, all others are round.

Unit	Mesh Size (in)	Effort (ft)	Lake trout	Whitefish	Siscowet	Herring	Salmon	Menominee	Chub	Burbot	Walleye	Other
MI-2												
large mesh	4.438	41,600	2,179	16,800	0	0	0	0	0	0	0	0
	4.5	760,400	2,581	152,192	885	0	0	0	0	0	0	0
	4.5-5.0	173,000	1,034	28,587	3,026	0	0	0	0	0	0	0
	5.5	10,800	1,309	933	0	0	8	0	0	0	0	0
	subtotal	985,800	7,103	198,512	3,911	0	8	0	0	0	0	0
MI-3												
large mesh	4.5	1,015,300	5,773	126,047	3,389	0	0	0	0	0	0	0
MI-4												
small mesh	2.0	2,400	0	0	0	35	4	0	0	0	0	0
	2.5	12,800	324	114	71	773	54	0	0	0	0	0
	2.75	1,500	0	0	0	25	0	3	0	0	0	0
	3.0	34,700	0	0	0	9,992	420	10	0	0	0	608
	subtotal	51,400	324	114	71	10,825	478	13	0	0	0	608
large mesh	4.5	1,857,925	76,596	118,907	15,543	3,034	1,126	0	0	0	0	735
	4.5-5.0	50,000	156	8,200	1,837	0	0	0	0	0	0	0
	5.0	6,000	736	261	0	0	343	0	0	0	0	0
	5.5	54,500	1,285	1,806	400	20	487	0	0	0	0	0
	subtotal	1,968,425	78,773	129,174	17,780	3,054	1,956	0	0	0	0	735
MI-5												
small mesh	3.0	6,000	1,223	494	0	1,273	136	0	0	0	0	0
large mesh	4.5	273,800	16,437	31,459	2,127	3,161	0	0	0	0	0	101
	5.0	68,800	16,225	5,142	75	929	0	0	0	0	0	0
	5.5	135,500	12,966	6,798	871	742	1,092	0	0	0	0	1
	subtotal	478,100	45,628	43,399	3,073	4,832	1,092	0	0	0	0	102
	Total	4,505,025	138,824	497,740	28,224	19,984	3,670	13	0	0	0	1,445

Table 4. Harvest and effort statistics for target species by grid and management unit in Michigan waters of Lake Superior in 2000. 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	1214	6,400	3,700	578	6,400	6	1									
	1217	3,200	2,600	813	3,200	2	1									
	1219	594,000	78,018	131	594,000	3,178	5									
	1313	12,800	12,500	977	12,800	10	1									
	1314	22,400	18,200	813	22,400	21	1									
	1315	12,600	3,536	281	12,600	92	7									
	1316	9,600	49	5	9,600	7	1									
	1317	16,000	12,700	794	16,000	9	1									
	1411	9,600	7,100	740	9,600	309	32									
	1412	9,600	4,300	448	9,600	900	94									
	1413	49,800	12,533	252	49,800	983	20									
	1414	239,800	43,276	180	239,800	1,586	7									
	subtotal	985,800	198,512	201	985,800	7,103	7	0	0	0	0	0	0	0	0	0
MI-3	922	4,500	9	2	4,500	3	1									
	923	7,000	18	3	7,000	4	1									
	924	7,000	19	3	7,000	4	1									
	925	3,000	13	4	3,000	2	1									
	926	7,000	20	3	7,000	6	1									
	927	1,500	8	5	1,500	3	2									
	1022	14,300	3,605	252	14,300	230	16									
	1023	111,100	20,848	188	111,100	1,150	10									
	1024	7,900	2,909	368	7,900	400	51									
	1121	714,000	76,215	107	714,000	1,913	3									
	1122	138,000	22,383	162	138,000	2,058	15									
	subtotal	1,015,300	126,047	124	1,015,300	5,773	6	0	0	0	0	0	0	0	0	0
MI-4	1026	232,000	13,625	59	232,000	3,535	15									
	1125	291,500	27,388	94	291,500	3,041	10	18,000	5,720	318						
	1126	19,000	5,616	296	19,000	2,042	107									
	1223	14,500	310	21	14,500	700	48									
	1224	414,600	14,685	35	414,600	18,934	46									
	1225	5,000	1,700	340	5,000	400	80									
	1226	48,000	7,363	153	48,000	2,078	43									
	1323	179,000	14,100	79	179,000	13,165	74	4,200	95	23	13,800	1,635	118	9,000	501	56
	1324	239,600	18,668	78	239,600	13,614	57									
	1325	184,100	8,288	45	184,100	6,076	33	3,000	100	33	5,100	680	133			
	1326	114,600	7,400	65	114,600	4,064										
	1423	180,125	9,118	51	180,125	10,669	59	18,500	701	38	22,400	2,561	114	3,800	142	37
	subtotal	1,922,025	128,261	67	1,922,025	78,318	41	43,700	6,616	151	41,300	4,876	118	12,800	643	50
MI-5	1327	227,900	29,390	129	227,900	9,567	42	7,500	578	77						
	1428	122,000	6,218	51	122,000	16,419	135				9,000	1,164	129	1,500	125	83
	1429	67,700	5,476	81	67,700	10,517	155									
	1529	45,000	2,421	54	45,000	9,899	220									
	subtotal	462,600	43,505	94	462,600	46,402	100	7,500	578	77				1,500	125	83
Grand Total		4,385,725	496,325	113	4,385,725	137,596	31	51,200	7,194	141	41,300	4,876	118	14,300	768	54

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 1984-2000. 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	1984	214,400	10,066	47	10,066	214,400	8,580	40	8,580	0	0	0	0
	1985	263,100	39,163	149	39,163	263,100	9,488	36	9,488	0	0	0	0
	1986	265,000	30,938	117	30,938	265,000	15,339	58	15,339	0	0	0	0
	1987	1,520,800	163,821	108	165,774	1,520,800	36,634	24	36,634	61,800	5,274	85	15,851
	1988	1,081,500	116,105	107	116,105	1,081,500	29,860	28	29,860	42,000	6,470	154	11,878
	1989	1,038,400	90,225	87	90,225	1,038,400	31,955	31	31,964	24,000	4,243	177	12,377
	1990	1,339,500	90,812	68	93,631	755,300	12,805	17	19,963	28,000	8,145	291	22,093
	1991	564,200	44,286	78	44,286	564,200	10,422	18	10,422	0	0	0	6,930
	1992	393,800	52,250	133	52,813	393,800	4,693	12	4,735	166,000	25,946	156	27,509
	1993	1,143,900	134,320	117	134,573	1,143,900	12,022	11	12,505	67,400	10,988	163	22,385
	1994	599,200	48,612	81	48,612	599,200	11,332	19	11,332	33,000	1,847	56	6,809
	1995	497,000	45,429	91	46,353	497,000	11,961	24	12,336	15,000	3,307	220	8,738
	1996	657,300	70,882	108	70,882	657,300	14,820	23	14,820	1,200	3	3	2,754
	1997	710,200	54,723	77	55,473	710,200	18,055	25	19,047	17,000	2,928	172	9,092
	1998	912,600	128,469	141	128,469	912,600	15,939	17	15,939	0	0	0	8,735
	1999	495,700	70,938	143	70,938	495,700	5,013	10	5,013	0	0	0	7,538
	2000	985,800	198,512	201	198,512	985,800	7,103	7	7,103	0	0	0	3,911
MI-3	1984	501,000	74,961	150	74,961	501,000	13,468	27	13,468	0	0	0	0
	1985	2,305,700	248,920	108	248,920	2,305,700	24,702	11	24,702	0	0	0	0
	1986	2,828,000	251,548	89	253,198	2,828,000	32,017	11	32,017	161,000	26,172	163	44,382
	1987	975,300	50,925	52	59,717	975,300	19,339	20	19,339	480,200	53,523	111	64,528
	1988	1,461,800	109,025	75	112,144	1,461,800	20,191	14	20,672	158,400	20,409	129	27,788
	1989	735,600	77,364	105	78,107	735,600	9,748	13	9,858	44,000	6,417	146	14,350
	1990	776,600	40,600	52	41,169	565,000	8,863	16	11,677	75,000	6,484	86	19,992
	1991	905,200	50,474	56	52,981	905,200	17,408	19	18,641	123,400	14,458	117	23,887
	1992	1,559,400	116,269	75	117,154	1,559,400	17,382	11	17,757	84,600	8,272	98	28,279
	1993	1,375,300	112,170	82	112,388	1,375,300	12,716	9	13,013	48,700	4,974	102	18,347
	1994	1,267,800	43,681	34	44,757	1,267,800	9,279	7	10,061	602,000	11,990	20	17,400
	1995	1,066,400	57,165	54	57,165	1,066,400	5,781	5	5,781	0	0	-	7,718
	1996	792,000	69,358	88	70,158	792,000	2,800	4	3,755	56,000	2,750	49	3,712
	1997	1,340,200	101,010	75	101,010	1,340,200	8,574	6	8,690	6,000	226	38	6,489
	1998	1,729,500	149,117	86	149,192	1,729,500	11,815	7	11,945	9,500	400	42	3,221
	1999	1,396,700	141,013	101	141,013	1,396,700	9,147	7	9,147	0	0	0	7,545
	2000	1,015,300	126,047	124	126,047	1,015,300	5,773	6	5,773	0	0	0	3,389
MI-4	1984	0	0	0	102,759	0	0	0	91,725	0	0	0	0
	1985	1,362,275	233,824	172	233,824	1,362,275	49,132	36	49,132	0	0	0	0
	1986	4,871,300	535,969	110	540,674	4,871,300	135,821	28	135,821	105,800	25,924	245	32,347
	1987	3,353,100	291,067	87	310,727	3,353,100	75,330	22	75,330	768,200	136,596	178	160,676
	1988	5,709,515	264,759	46	268,496	5,709,515	127,436	22	130,756	272,000	34,986	129	57,107
	1989	6,872,775	388,497	57	389,290	6,872,775	117,726	17	119,173	70,000	21,781	311	39,130
	1990	6,696,400	369,916	55	402,084	3,206,700	76,030	24	144,899	600,500	38,606	64	84,121
	1991	6,171,400	291,352	47	298,517	6,171,400	98,899	16	108,305	789,300	55,800	71	102,460
	1992	5,143,350	295,795	58	309,431	5,143,350	75,149	15	86,671	962,750	47,679	50	96,778
	1993	3,962,825	167,129	42	178,046	3,962,825	66,231	17	77,152	747,500	55,090	74	92,678
	1994	2,868,725	90,028	31	96,257	2,868,725	67,078	23	76,295	571,050	38,828	68	60,496
	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	56,300	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	2,385,700	144,883	61	146,442	2,385,700	72,696	30	73,921	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

Note: 1984 data for MI-2 and MI-3 was for August-October only, whereas data for MI-4 was based on January-December samples but effort was not reported. 1990 target effort for whitefish and lake trout was not combined.

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	1984	0	0	0	0	0	0	0	0	0	0	0	0
	1985	0	0	0	0	0	0	0	0	0	0	0	0
	1986	84,000	10,696	127	10,696	84,000	4,287	51	4,287	4,000	750	188	1,437
	1987	330,000	22,058	67	24,275	330,000	11,027	33	11,027	48,000	2,502	52	5,890
	1988	292,000	25,721	88	25,721	292,000	20,630	71	20,630	0	0	0	2,031
	1989	132,000	25,517	193	25,517	132,000	7,731	59	7,731	0	0	0	2,345
	1990	538,000	60,976	113	60,976	320,000	9,232	29	12,853	0	0	0	7,801
	1991	142,500	11,884	83	12,069	142,500	3,965	28	4,075	36,000	405	11	4,026
	1992	420,000	35,793	85	36,694	420,000	7,597	18	8,132	60,000	1,780	30	7,482
	1993	392,000	19,686	50	19,833	392,000	24,508	63	24,550	4,500	206	46	2,673
	1994	127,000	3,038	24	3,108	127,000	10,799	85	10,799	26,000	1,582	61	2,657
	1995	113,400	9,288	82	9,288	113,400	8,445	74	8,445	0	0	-	1,839
	1996	161,400	7,672	48	7,672	161,400	8,040	50	8,040	0	0	-	1,033
	1997	102,300	17,997	176	18,831	102,300	5,249	51	6,105	8,000	200	61	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	462,600	43,505	94	43,893	462,600	46,402	100	46,851	7,500	578		3,073
All	1984	0	0	0	187,786	0	0	0	113,773	0	0	0	0
units	1985	3,931,075	521,907	133	521,907	3,931,075	83,322	21	83,322	0	0	0	0
	1986	8,048,300	829,151	103	835,506	8,048,300	187,464	23	187,464	270,800	52,846	195	78,166
	1987	6,179,200	527,871	85	560,493	6,179,200	142,330	23	142,330	1,358,200	197,895	146	246,945
	1988	8,544,815	449,080	53	522,466	8,544,815	198,117	23	201,918	472,400	61,865	131	98,804
	1989	8,778,775	581,603	66	583,139	8,778,775	167,160	19	168,726	138,000	32,381	235	68,202
	1990	9,350,500	562,304	60	597,860	4,847,000	106,930	22	189,392	703,500	53,235	76	134,007
	1991	7,783,300	397,996	51	407,853	7,783,300	130,694	17	141,443	948,700	70,663	74	137,303
	1992	7,516,550	500,107	67	516,092	7,516,550	104,821	14	117,295	1,273,350	83,677	66	160,048
	1993	6,874,025	433,305	63	444,840	6,874,025	115,477	17	127,220	868,100	71,258	82	136,083
	1994	4,862,725	185,359	38	192,734	4,862,725	98,488	20	108,487	1,232,050	54,247	44	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	90,142	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	4,456,100	369,047	83	371,206	4,458,500	105,198	24	107,905	94,900	16,142	170	44,275
	2000	4,385,725	496,325	113	497,740	4,385,725	137,596	31	138,824	51,200	7,194	141	28,224

Table 6. Age and size composition of hatchery and wild lake trout in tribal commercial harvests from unit MI-2 during 2000. Weight is in round pounds, sd=standard deviation. (Totals include 3 unaged hatchery fish and 6 unaged wild fish).

		Hatchery						Wild						Total						Percent
Year		length (in)			weight (lb)			length (in)			weight (lb)			length (in)			weight (lb)			
Class	Age	N	mean	sd	N	mean	sd	N	mean	sd	N	mean	sd	N	mean	sd	N	mean	sd	wild
1998	2	0	---	---	0	---	---	1	13.7	0.0	1	0.9	0.0	1	13.7	0	1	0.9	0	100
1997	3	0	---	---	0	---	---	5	16.4	1.2	5	1.5	0.2	5	16.4	1.2	5	1.5	0.2	100
1996	4	0	---	---	0	---	---	2	18.9	0.1	2	2.2	0.1	2	18.9	0.1	2	2.2	0.1	100
1995	5	0	---	---	0	---	---	7	19.9	0.5	5	2.3	1.1	7	19.9	0.5	5	2.3	1.1	100
1994	6	3	18.4	2.1	3	2.1	0.6	7	20.9	0.8	6	3.0	1.1	10	20.1	1.8	9	2.7	1.0	70
1993	7	3	20.4	2.0	2	2.5	1.1	8	21.8	1.2	5	3.3	1.6	11	21.4	1.6	7	3.0	1.5	73
1992	8	3	21.1	1.8	2	3.4	1.3	9	21.7	1.4	7	3.6	1.5	12	21.6	1.5	9	3.5	1.5	75
1991	9	1	23.6	0.0	1	4.4	0.0	17	24.1	1.7	9	4.4	1.9	18	24.1	1.7	10	4.4	1.9	94
1990	10	1	25.0	0.0	1	5.5	0.0	14	23.6	2.0	8	4.3	1.8	15	23.7	1.9	9	4.4	1.9	93
1989	11	0	---	---	0	---	---	14	23.7	1.6	7	4.3	1.8	14	23.7	1.6	7	4.3	1.8	100
1988	12	1	23.9	0.0	1	5.0	0.0	7	22.9	1.2	3	4.7	1.9	8	23.1	1.2	4	4.8	1.9	88
1987	13	1	23.4	0.0	1	4.6	0.0	8	25.2	2.6	7	5.4	2.3	9	25.0	2.6	8	5.3	2.2	89
1986	14	1	27.3	0.0	1	6.5	0.0	4	25.0	4.7	3	3.9	1.5	5	25.4	4.3	4	4.6	2.1	80
1985	15	0	---	---	0	---	---	4	27.3	2.4	3	6.9	3.5	4	27.3	2.4	3	6.9	3.5	100
1984	16	0	---	---	0	---	---	2	24.3	1.1	1	4.1	0.0	2	24.3	1.1	1	4.1	0.0	100
1983	17	0	---	---	0	---	---	1	27.1	0.0	1	6.1	0.0	1	27.1	0.0	1	6.1	0.0	100
1982	18	0	---	---	0	---	---	1	35.1	0.0	0	---	---	1	35.1	0.0	0	---	---	100
1981	19	0	---	---	0	---	---	0	---	---	0	---	---	0	---	---	0	---	---	---
1980	20	0	---	---	0	---	---	0	---	---	0	---	---	0	---	---	0	---	---	---
1979	21	0	---	---	0	---	---	0	---	---	0	---	---	0	---	---	0	---	---	---
1978	22	0	---	---	0	---	---	1	30.3	0.0	0	---	---	1	30.3	0.0	0	---	---	100
Sample Size		17						118						135						87
Means			21.7	3.0		3.8	1.8		23.0	3.2		3.9	2.0		22.8	3.2		3.9	1.9	
Mean Age		8.6						9.6						9.5						

Table 7. 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, January to December 2000.

		Type AI, AII, AIII Wounds						Scars					
Unit		<17.0	17-20.9	21-24.9	25-28.9	>29.0	Total	<17.0	17-20.9	21-24.9	25-28.9	>29.0	Total
MI-2	Marks observed	0	0	1	3	0	4	0	0	1	3	0	4
	No. fish examined	4	26	76	25	4	135	4	26	76	25	4	135
	No. marks/100 fish	0.0	0.0	1.3	12.0	0.0	3.0	0.0	0.0	1.3	12.0	0.0	3.0
MI-3	Marks observed	0	0	0	0	0	0	0	0	0	1	0	1
	No. fish examined	0	16	38	3	1	58	0	16	38	3	1	58
	No. marks/100 fish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	1.7
MI-4	Marks observed	0	0	2	0	2	4	0	1	3	5	5	14
	No. fish examined	39	185	263	71	16	574	39	185	263	71	16	574
	No. marks/100 fish	0.0	0.0	0.8	0.0	12.5	0.7	0.0	0.5	1.1	7.0	31.3	2.4
MI-5	Marks observed	0	0	1	1	6	8	0	0	3	4	53	60
	No. fish examined	0	14	60	60	59	193	0	14	60	60	59	193
	No. marks/100 fish	0.0	0.0	1.7	1.7	10.2	4.1	0.0	0.0	5.0	6.7	89.8	31.1

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 1988-2000.

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	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	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	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	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 9. Age and size composition of hatchery and wild lake trout in tribal commercial harvests from unit MI-3 during 2000. Weight is in round pounds, sd=standard deviation. (Totals include 1 unaged hatchery fish and 28 unaged wild fish).

		Hatchery						Wild						Total						
Year		length (in)			weight (lb)			length (in)			weight (lb)			length (in)			weight (lb)			Percent
Class	Age	N	mean	sd	N	mean	sd	N	mean	sd	N	mean	sd	N	mean	sd	N	mean	sd	wild
1995	5	0	---	---	0	---	---	1	18.3	0.0	0	---	---	1	18.3	0.0	0	---	---	100
1994	6	0	---	---	0	---	---	3	19.5	1.1	1	2.8	0.0	3	19.5	1.1	1	2.8	1.0	100
1993	7	0	---	---	0	---	---	7	22.9	5.9	2	3.7	1.3	7	22.9	5.9	2	3.7	1.3	100
1992	8	0	---	---	0	---	---	5	22.3	1.3	1	3.3	0.0	5	22.3	1.3	1	3.3	1.1	100
1991	9	2	21.6	1.0	0	---	---	5	21.6	1.1	1	3.3	0.0	7	21.6	1.1	1	3.3	0.9	71
1990	10	1	19.1	0.0	0	---	---	1	22.9	0.0	1	4.1	0.0	2	21.0	1.9	1	4.1	1.7	50
1989	11	0	---	---	0	---	---	4	23.8	1.6	2	4.2	1.7	4	23.8	1.6	2	4.2	1.7	100
Sample Size		4						54						58						93
Means			20.8	1.3		---	---		22.3	2.7		3.7	1.1		22.2	2.6		3.7	1.0	
Mean Age		9.3						8.1						8.2						

Table 10. Age and size composition of hatchery and wild lake trout in tribal commercial harvests from unit MI-4 during 2000. Weight is in round pounds, sd=standard deviation. (Totals include 25 unaged hatchery fish and 41 unaged wild fish).

		Hatchery						Wild						Total						Percent
Year		length (in)			weight (lb)			length (in)			weight (lb)			length (in)			weight (lb)			
Class	Age	N	mean	sd	N	mean	sd	N	mean	sd	N	mean	sd	N	mean	sd	N	mean	sd	wild
1997	3	9	18.4	1.1	9	1.9	0.4	2	17.0	1.4	2	1.9	0.5	11	18.1	1.3	11	1.9	0.5	18
1996	4	12	18.7	2.4	12	2.3	0.8	7	16.6	1.6	7	1.3	0.5	19	17.9	2.3	19	2.0	0.8	37
1995	5	74	19.3	2.4	74	2.4	0.9	41	19.2	2.0	41	2.3	0.6	115	19.3	2.2	115	2.4	0.8	36
1994	6	7	18.8	2.5	7	2.2	0.8	53	20.5	1.8	53	2.8	0.7	60	20.3	2.0	60	2.7	0.7	88
1993	7	22	22.0	2.4	22	3.6	0.9	49	21.6	2.1	49	3.3	0.9	71	21.8	2.2	71	3.4	0.9	69
1992	8	29	21.3	1.8	29	3.1	0.7	52	22.8	1.9	52	3.8	0.8	81	22.3	2.1	81	3.6	0.8	64
1991	9	17	23.7	2.4	17	4.2	1.5	29	23.3	1.6	29	4.1	1.0	46	23.5	1.9	46	4.2	1.2	63
1990	10	4	22.8	0.8	4	3.8	0.6	36	24.7	2.4	36	4.8	1.5	40	24.5	2.4	40	4.7	1.5	90
1989	11	0	---	---	0	---	---	13	26.0	2.9	13	5.7	2.2	13	26.0	2.9	13	5.7	2.2	100
1988	12	8	23.2	2.6	8	4.2	1.1	10	24.3	3.2	10	4.7	1.8	18	23.9	3.0	18	4.5	1.5	56
1987	13	8	24.1	1.3	8	4.2	0.9	6	25.9	1.8	6	5.7	2.2	14	24.9	1.8	14	4.8	1.6	43
1986	14	1	24.8	0.0	1	4.7	0.0	3	21.9	0.9	3	3.7	0.5	4	22.6	1.5	4	3.9	0.7	75
1985	15	0	---	---	0	---	---	5	30.8	2.3	5	10.2	1.5	5	30.8	2.3	5	10.2	1.5	100
1984	16	0	---	---	0	---	---	3	24.8	6.3	3	6.8	4.4	3	24.8	6.3	3	6.8	4.4	100
1983	17	0	---	---	0	---	---	2	31.8	0.6	2	11.1	0.1	2	31.8	0.6	2	11.1	0.1	100
1982	18	0	---	---	0	---	---	1	24.8	0.0	1	4.6	0.0	1	24.8	0.0	1	4.6	0.0	100
1981	19	0	---	---	0	---	---	1	23.5	0.0	1	4.1	0.0	1	23.5	0.0	1	4.1	0.0	100
1980	20	0	---	---	0	---	---	3	24.7	1.8	3	4.8	0.8	3	24.7	1.8	3	4.8	0.8	100
1979	21	0	---	---	0	---	---	0	---	---	0	---	---	0	---	---	0	---	---	---
1978	22	0	---	---	0	---	---	1	29.5	0.0	1	6.6	0.0	1	29.5	0.0	1	6.6	0.0	100
Sample Size		216						358						574						62
Means			20.9	2.9		3.1	1.1		22.5	3.3		3.8	1.6		21.9	3.2		3.5	1.5	
Mean Age		6.7						8.7						8.0						

Table 11. Age and size composition of hatchery and wild lake trout in tribal commercial harvests from unit MI-5 during 2000. Weight is in round pounds, sd=standard deviation. (Totals include 4 unaged hatchery fish and 16 unaged wild fish).

		Hatchery						Wild						Total						
Year		length (in)			weight (lb)			length (in)			weight (lb)			length (in)			weight (lb)			Percent
Class	Age	N	mean	sd	N	mean	sd	N	mean	sd	N	mean	sd	N	mean	sd	N	mean	sd	wild
1997	3	0	---	---	0	---	---	1	18.7	0.0	1	2.1	0.0	1	18.7	0.0	1	2	0.0	100
1996	4	0	---	---	0	---	---	14	20.2	1.0	14	2.7	0.5	14	20.2	1.0	14	3	0.5	100
1995	5	1	22.4	0.0	1	3.4	0.0	4	20.5	0.9	4	2.7	0.4	5	20.8	1.1	5	3	0.4	80
1994	6	3	21.3	2.0	3	3.2	0.7	0	---	---	0	---	---	3	21.3	2.0	3	3	0.7	0
1993	7	1	23.0	0.0	1	4.0	0.0	2	23.4	0.2	2	4.5	0.0	3	23.2	0.3	3	4	0.3	67
1992	8	2	25.7	0.9	2	5.3	0.2	8	23.1	1.3	8	4.0	0.5	10	23.6	1.6	10	4	0.7	80
1991	9	1	22.1	0.0	1	3.2	0.0	14	24.0	1.5	14	4.3	0.8	15	23.9	1.5	15	4	0.8	93
1990	10	0	---	---	0	---	---	22	25.1	1.3	22	5.0	1.0	22	25.1	1.3	22	5	1.0	100
1989	11	0	---	---	0	---	---	12	26.0	2.2	12	5.6	1.6	12	26.0	2.2	12	6	1.6	100
1988	12	0	---	---	0	---	---	11	26.8	2.4	11	6.5	1.6	11	26.8	2.4	11	6	1.6	100
1987	13	3	29.8	4.4	3	8.7	3.3	13	27.0	1.5	13	6.6	1.1	16	27.5	2.6	16	7	1.9	81
1986	14	1	27.6	0.0	1	7.3	0.0	11	29.9	2.9	11	9.0	2.5	12	29.7	2.8	12	9	2.4	92
1985	15	0	---	---	0	---	---	8	27.1	3.1	8	7.0	2.1	8	27.1	3.1	8	7	2.1	100
1984	16	1	29.9	0.0	1	11.0	0.0	5	31.1	3.9	5	11.3	5.0	6	30.9	3.6	6	11	4.5	83
1983	17	0	---	---	0	---	---	9	30.4	2.6	9	9.8	3.6	9	30.4	2.6	9	10	3.6	100
1982	18	0	---	---	0	---	---	10	31.2	4.0	10	11.2	5.0	10	31.2	4.0	10	11	5.0	100
1981	19	0	---	---	0	---	---	6	28.8	2.9	6	7.8	2.3	6	28.8	2.9	6	8	2.3	100
1980	20	0	---	---	0	---	---	1	23.4	0.0	1	4.3	0.0	1	23.4	0.0	1	4	0.0	100
1979	21	0	---	---	0	---	---	2	34.0	1.8	2	13.3	4.0	2	34.0	1.8	2	13	4.0	100
1978	22	0	---	---	0	---	---	2	35.9	0.5	2	17.3	0.4	2	35.9	0.5	2	17	0.4	100
1977	23	1	35.1	0.0	1	16.5	0.0	0	---	---	0	---	---	1	35.1	0.0	1	17	0.0	0
1976	24	0	---	---	0	---	---	0	---	---	0	---	---	0	---	---	0	---	---	---
1975	25	0	---	---	0	---	---	0	---	---	0	---	---	0	---	---	0	---	---	---
1974	26	0	---	---	0	---	---	2	35.3	0.1	2	16.9	1.3	2	35.3	0.1	2	17	1.3	100
1973	27	0	---	---	0	---	---	0	---	---	0	---	---	0	---	---	0	---	---	---
1972	28	0	---	---	0	---	---	1	35.4	0.0	1	19.6	0.0	1	35.4	0.0	1	20	0.0	100
1971	29	0	---	---	0	---	---	0	---	---	0	---	---	0	---	---	0	---	---	---
1970	30	0	---	---	0	---	---	0	---	---	0	---	---	0	---	---	0	---	---	---
1969	31	0	---	---	0	---	---	0	---	---	0	---	---	0	---	---	0	---	---	---
1968	32	0	---	---	0	---	---	1	38.0	0.0	1	18.9	0.0	1	38.0	0.0	1	19	0.0	100
Sample Size		18						175						193						91
Means			27.1	5.1		7.6	4.9		27.0	4.5		7.1	4.1		27.0	4.6		7.2	4.2	
Mean Age		10.5						12.3						12.2						

Table 12. Age and size composition of whitefish in tribal commercial harvests from management units in the 1842 ceded area within Michigan waters of Lake Superior, January-December 2000. Weight is in round pounds, sd = standard deviation.

		MI-2					MI-3					MI-4					MI-5				
			length (in)		weight (lb)			length (in)		weight (lb)			length (in)		weight (lb)			length (in)		weight (lb)	
Year class	Age	N	mean	sd	mean	sd	N	mean	sd	mean	sd	N	mean	sd	mean	sd	N	mean	sd	mean	sd
1995	5	7	17.7	1.4	2.0	1.0	4	18.4	1.6	1.6	0.6	13	19.4	1.1	2.6	0.8	0	---	---	---	---
1994	6	46	18.0	0.8	2.2	0.8	27	19.4	1.3	2.4	1.1	80	20.1	1.3	2.9	1.2	0	---	---	---	---
1993	7	158	19.0	1.2	2.7	1.4	168	19.7	1.5	2.5	1.1	236	20.3	1.9	2.8	1.1	0	---	---	---	---
1992	8	250	19.5	1.4	2.8	1.0	272	19.9	1.4	2.7	1.2	282	20.7	1.9	3.1	1.2	1	23.9	0.0	5.3	0.0
1991	9	191	20.0	1.5	2.9	1.2	235	20.2	1.4	2.8	1.2	182	20.8	1.5	3.2	1.3	0	---	---	---	---
1990	10	105	20.6	1.5	3.1	1.3	146	20.3	1.6	2.9	1.1	100	21.7	1.6	3.7	1.3	0	---	---	---	---
1989	11	54	20.8	1.5	3.3	1.5	46	20.7	1.6	3.1	1.3	32	21.7	2.3	3.9	1.9	0	---	---	---	---
1988	12	28	22.3	1.4	4.1	1.6	10	21.1	1.7	3.4	1.5	11	23.1	2.0	4.5	1.9	0	---	---	---	---
1987	13	7	22.2	2.0	4.3	2.1	3	19.5	0.6	2.5	0.3	4	24.7	5.0	6.5	4.0	0	---	---	---	---
1986	14	3	23.6	1.8	4.9	1.0	0	---	---	---	---	0	---	---	---	---	0	---	---	---	---
1985	15	0	---	---	---	---	0	---	---	---	---	0	---	---	---	---	0	---	---	---	---
1984	16	0	---	---	---	---	0	---	---	---	---	0	---	---	---	---	0	---	---	---	---
1983	17	0	---	---	---	---	0	---	---	---	---	0	---	---	---	---	0	---	---	---	---
1982	18	1	20.9	---	---	---	1	23.3	0.0	4.0	0.0	0	---	---	---	---	0	---	---	---	---
1981	19	0	---	---	---	---	0	---	---	---	---	0	---	---	---	---	0	---	---	---	---
1980	20	0	---	---	---	---	0	---	---	---	---	0	---	---	---	---	0	---	---	---	---
1979	21	0	---	---	---	---	0	---	---	---	---	0	---	---	---	---	0	---	---	---	---
1978	22	0	---	---	---	---	0	---	---	---	---	0	---	---	---	---	0	---	---	---	---
Sample size		1263					1009					1356					1				
Means			19.9	1.8	2.9	1.4		20.0	1.5	2.8	1.2		20.8	1.8	3.1	1.6		23.9	0.0	5.3	0.0
Sample size- age		850					912					940					1				
Mean Age		8.6					8.6					8.1					8				

Table 13. Age and size composition of siscowets in tribal commercial harvests from management units in the 1842 ceded area within Michigan waters of Lake Superior, January-December 2000. Weight is in round pounds, sd = standard deviation.

		MI-2					MI-3					MI-4					MI-5				
Year			length (in)		weight (lb)			length (in)		weight (lb)			length (in)		weight (lb)			length (in)		weight (lb)	
class	Age	N	mean	sd	mean	sd	N	mean	sd	mean	sd	N	mean	sd	mean	sd	N	mean	sd	mean	sd
1996	4	0	---	---	---	---	0	---	---	---	---	4	17.1	0.8	1.5	0.3	0	---	---	---	---
1995	5	1	20.7	0.0	3.2	0.0	2	18.6	1.2	2.3	0.3	4	19.3	2.0	2.5	0.6	2	20.0	0.6	2.6	0.2
1994	6	4	19.6	2.0	2.9	0.8	3	18.3	0.7	2.3	0.9	2	18.5	2.2	2.0	0.9	2	20.5	0.8	2.4	0.1
1993	7	1	18.3	0.0	---	---	1	18.1	0.0	2.1	0.0	5	16.8	1.7	1.5	0.6	0	---	---	---	---
1992	8	0	---	---	---	---	5	22.1	4.3	5.8	2.5	5	18.7	4.9	2.6	1.8	0	---	---	---	---
1991	9	2	22.0	0.3	---	---	7	20.9	2.7	3.3	1.6	7	16.7	2.4	1.5	0.6	0	---	---	---	---
1990	10	2	22.8	1.6	---	---	12	18.9	7.6	3.6	1.5	9	18.3	2.1	1.8	0.6	0	---	---	---	---
1989	11	5	20.0	1.4	3.1	1.2	11	19.8	1.9	3.0	1.2	9	19.4	1.8	2.0	0.6	0	---	---	---	---
1988	12	10	21.0	2.0	2.9	1.2	14	20.1	5.8	2.6	1.3	4	21.3	3.2	3.2	1.9	1	22.8	0.0	3.9	0.0
1987	13	14	21.8	2.0	3.8	1.6	14	20.6	5.6	3.0	1.2	8	20.1	3.5	2.6	1.6	1	22.6	0.0	3.9	0.0
1986	14	12	21.7	2.3	4.3	1.7	14	23.6	6.4	4.6	2.2	12	22.5	3.3	3.7	1.6	0	---	---	---	---
1985	15	10	21.8	2.1	3.4	1.3	11	23.3	1.7	4.1	1.6	12	21.8	2.3	3.2	1.3	2	26.3	2.8	4.4	0.6
1984	16	9	22.8	1.5	4.0	1.6	11	23.4	7.2	3.9	1.7	13	22.9	2.6	3.8	1.2	1	23.3	0.0	4.1	0.0
1983	17	5	24.3	1.3	5.0	1.7	9	23.5	2.1	4.8	1.8	12	23.4	1.8	3.7	0.8	1	25.8	0.0	6.5	0.0
1982	18	1	19.8	0.0	2.6	0.0	12	24.4	1.8	4.4	1.8	17	23.0	2.1	3.8	1.5	0	---	---	---	---
1981	19	2	23.9	0.6	5.5	2.2	6	25.2	1.1	4.4	1.7	13	24.1	2.4	4.7	2.0	1	26.8	1.2	7.4	1.2
1980	20	0	---	---	---	---	4	23.5	1.1	4.2	1.5	11	25.3	1.5	4.5	1.0	1	23.6	0.0	4.7	0.0
1979	21	1	23.7	0.0	5.0	0.0	1	22.1	0.0	3.0	0.0	3	24.8	0.4	5.1	0.7	0	---	---	---	---
1978	22	0	---	---	---	---	0	---	---	---	---	5	25.6	3.5	5.7	3.6	1	29.6	0.0	8.5	0.0
1977	23	0	---	---	---	---	0	---	---	---	---	2	25.9	0.7	5.2	0.8	0	---	---	---	---
1976	24	0	---	---	---	---	0	---	---	---	---	1	23.4	0.0	3.8	0.0	0	---	---	---	---
1975	25	0	---	---	---	---	0	---	---	---	---	2	23.6	0.1	3.6	0.0	0	---	---	---	---
1974	26	0	---	---	---	---	0	---	---	---	---	1	28.3	0.0	8.8	0.0	0	---	---	---	---
Means			21.9	2.2	3.8	1.7		21.9	5.1	3.7	1.7		21.7	3.7	3.4	1.8		24.1	3.2	4.8	2.1
Sample size- age		79					137					161					13				
Mean Age		13.5					13.6					14.8					13.9				

Table 14. Age and size composition of lake herring and menominee whitefish in tribal commercial harvest from management units in the 1842 treaty area within Michigan waters of Lake Superior, January-December 2000. Weight is in round pounds, sd = standard deviation.

		Herring MI-4					Menominee MI-4				
Year			length (in)		weight (lb)			length (in)		weight (lb)	
class	Age	N	mean	sd	mean	sd	N	mean	sd	mean	sd
1997	3	2	14.0	1.0	0.7	0.3	0	--	--	--	--
1996	4	6	14.6	0.9	1.1	0.4	2	12.5	0.3	0.0	0.0
1995	5	7	14.1	1.4	0.9	0.2	1	14.9	0.0	--	--
1994	6	4	15.8	1.9	1.0	0.2	0	--	--	--	--
1993	7	9	16.2	1.1	1.3	0.3	0	--	--	--	--
1992	8	17	17.3	1.0	1.7	0.5	0	--	--	--	--
1991	9	16	17.5	0.9	1.7	0.2	0	--	--	--	--
1990	10	26	18.4	0.9	2.0	0.3	0	--	--	--	--
1989	11	19	17.8	0.7	1.8	0.2	0	--	--	--	--
1988	12	8	17.5	1.1	1.7	0.6	0	--	--	--	--
1987	13	2	18.7	2.1	2.3	0.4	0	--	--	--	--
1986	14	3	17.7	1.4	1.7	0.2	0	--	--	--	--
1985	15	1	16.7	0.0	0.0	0.0	0	--	--	--	--
1984	16	3	18.0	0.7	2.0	0.5	0	--	--	--	--
Sample size		123					3				
Means			17.2	1.6	1.7	0.8		13.3	1.2	0.0	0.0
Mean Age		9.2					4.3				