

**2001 Annual Report on Implementation of 2000 Consent Decree
for 1836 Treaty-Ceded Waters of the Great Lakes**

Prepared for:

Michigan United Conservation Clubs, Inc.
Michigan Fisheries Resource Conservation Coalition
Bay de Noc Great Lakes Sportfishermen, Inc.

By:

Michigan Department of Natural Resources
Fisheries Division
and
Law Enforcement Division

July 15, 2002

Table of Contents

	Page
Introduction.....	2
I. General Information	2
A. Large-mesh gill net retirement.....	2
B. Report from Modeling Subcommittee and modeling process description.....	3
C. Model estimates used during negotiation	6
II. Harvest Quotas, TACs and TAE's	7
A. Lake trout.....	7
B. Lake Whitefish.....	8
III. Harvest and Effort Reporting.....	10
A. State-licensed commercial and recreational fishing	10
1. Lake Trout.....	10
2. Lake Whitefish.....	13
B. Tribal commercial and subsistence fishing.....	14
1. Lake trout.....	14
2. Lake Whitefish.....	14
3. Walleye	15
4. Yellow perch.....	16
5. Chinook and coho salmon.....	17
IV. Enforcement.....	19
A. Summary of Enforcement Patrols.....	19
B. Summary of Violations	20
Appendices.....	23

Introduction

The September 27, 2001 Memorandum of Understanding (MOU) between the State of Michigan, Department of Natural Resources and the Michigan United Conservation Clubs, inc., Michigan Fisheries Resource Conservation Coalition, and Bay de Noc Great Lakes Sportfishermen, Inc. specified that an annual report would be provided detailing implementation of the August 7, 2000 court-ordered Consent Decree. This report provides the information requirements listed in the MOU.

I. General Information

A. Large-mesh gill net retirement

In an effort to reduce the amount of large-mesh gill net used by tribal fishers, the Consent Decree calls for the Sault Tribe to remove at least 14 million feet of large-mesh gill net effort from Lakes Michigan and Huron by 2003. Removal of large-mesh gill net effort by other Tribes also counts towards this commitment. The amount of gill net retired is determined by comparing current effort to the average effort during the base years 1993 through 1998 (Table 1). Gill net retirement is being accomplished through the trap net conversion program and other methods. Based on 2001 fishing effort, the Tribes have reduced large-mesh gill net effort in Lakes Michigan and Huron by approximately 15.9 million feet (Table 1), which meets and exceeds the requirements of the Consent Decree. Total large-mesh gill net retired for all three lakes is approximately 17.4 million feet.

Table 1. Amount of large-mesh gill net effort retired (1,000 ft.) based on a comparison of 2001 effort to the average effort from 1993 to 1998.

Lake	Management Unit	1993-1998 average effort	2001 effort	Gill net effort retired
Michigan	MM 1, 2, 3	17,912	8,089	9,823
	MM 4	1,794	733	1,061
	MM 5	240	188	52
Huron	MH 1	16,470	11,517	4,953
	MH 2	6	0	6
Superior	MI 6	780	949	-169 ^a
	MI 7	2,028	3,119	-1,091 ^a
	MI 8	6,578	3,826	2,752
Total		45,808	28,421	17,387

^a Increase, rather than retirement, of large-mesh gill net effort.

B. Report from Modeling Subcommittee and modeling process description

The Modeling Subcommittee of the Technical Fisheries Committee authored a report entitled “Summary Status of Lake Trout and Lake Whitefish Populations in the 1836 Treaty-Ceded Waters of Lakes Superior, Huron, and Michigan in 2000, with recommended yield and effort levels for 2001” (referred to as 2001 Status of the Stocks Report). This report is provided as a separate document. It documents the status of lake trout and lake whitefish stocks at the time the 2001 harvest limits were developed and describes the parameters used in the 2001 modeling efforts.

The modeling process contains three parts, beginning with the estimation of parameters that describe the population dynamics of lake trout and whitefish stocks over time. The type of modeling utilized is statistical catch-at-age analysis (SCAA). Models are developed for stocks in each defined management area with data from both standard assessments and commercial and recreational fisheries. Age-specific abundance and mortality rates are estimated for each year for which data are available. Each model is

tested for accuracy by comparing predictions to actual observations. The agreement between predictions and observations is measured by statistical likelihood. The set of adjustable parameters that gives the maximum likelihood (highest agreement) is used as the best estimate. After parameters are estimated, the fish population is projected forward through the next fishing season in order to make short-term projections of harvest and yield that will meet criteria, such as target mortality rates, set forth in the Consent Decree. The final step of modeling encompasses long-term projections under potential management scenarios.

All fish populations are regulated by three forces or dynamic rate functions, including growth, mortality, and recruitment. These rates are estimated in the first stage of the modeling process, and are then incorporated into the projection models. Growth is described using mean length at age, which is fit to a nonlinear regression model based on evidence that growth slows as fish approach a maximum size. Mortality is estimated from age structure data by examining the decline in catch at age across age classes. Generally, there is a steady decline in the relative abundance of successive age classes over time. Total mortality is comprised of fishing and natural mortality. Fishing mortality includes recreational, subsistence, and commercial harvest, as well as hooking mortality. Harvest is monitored annually for each user group through direct reporting, wholesale fish reports, charter boat reports, and creel surveys. Models incorporate an estimate of hooking mortality (approximately 15%) for lake trout derived from a controlled study on the Great Lakes. The estimate of hooking mortality is applied to age classes of catchable size. Natural mortality is comprised of losses due to old age, disease, parasitism, and predation. Natural mortality is usually estimated by subtracting

exploitation, or the percentage of fish harvested from the population, from the total annual mortality. An exploitation rate is usually estimated using a tag-return study. Additionally, sea lamprey mortality is calculated from wounds observed during assessments, along with the estimated probability of surviving an attack. Finally, recruitment is the process of reproduction and growth to a certain size class in the first year of life that is beyond the initial catastrophic mortality. Recruitment may also imply the entry into a fishery of individuals of legal size for harvest. Most exploited fisheries demonstrate variable recruitment due to an assortment of abiotic or biotic conditions. Recruitment variability is measured by assessing the relative abundance of a single age class using a standard effort, location, and time of year. For example, managers may use the relative abundance of age-3 fish in spring gill net surveys as an index of year-class strength. In the case of a fishery that relies on stocking (lake trout in Lakes Michigan and Huron), recruitment is essentially known.

In order to describe the dynamics of a population over time, modelers specify the initial numbers of fish at each age in the first year and recruitment of the youngest age in subsequent years. In Lakes Michigan and Huron, lake trout recruitment is defined as the number of yearlings stocked or migrating into an area. Movement into an area is calculated from tag return data and incorporated into a movement matrix, which shows the proportion of fish stocked in one unit that are actually recruited to another unit. For wild lake trout and whitefish, recruitment is estimated from a Ricker stock-recruit function. In general, a stock-recruit relationship describes how the number of young fish (recruits) relates to the number of spawners.

After parameters have been estimated, the second step is the short-term projection of total allowable catches (TACs). The model is used as an abstract of reality in our case to predict a recommended harvest that will permit sustainable yield in the fishery. Harvest levels are set in order to achieve target mortality rates set forth in the Decree, and are derived by applying various fishing mortality rates to the population abundance estimated at the start of the year. Target mortality rates are comprised of an assortment of age-specific mortality rates. Additionally, the target mortality rates are defined by taking into consideration the concept of spawning stock biomass per recruit, or the amount of spawning biomass that an average recruit is expected to produce. This provision ensures that there is an adequate amount of spawning stock per recruit and that more than one age is contributing considerably to the spawning population.

The final step of the modeling process involves long-term projections of the fish stocks under potential management scenarios, which is called “gaming”. Because management under the Consent Decree is still in its infancy, gaming scenarios have been limited to this date. An extensive description of the modeling process is contained in the *Stock Assessment Models* section of the 2001 Status of the Stocks Report.

C. Model estimates used during negotiation

During the final stages of negotiations, model estimates of harvest quotas, total allowable catch, and total allowable effort were projected under likely scenarios for the commercial and recreational fisheries over the life of the Consent Decree. For lake trout, the projections are separated into a phase-in period (where applicable), and rehabilitation period or sustainable management period. Phase-in periods are intended to allow for a

more gradual transition to target mortality rates and final allocation percentages. For comparison, a reference period is also included for each management unit. Information regarding the lake trout fishery is detailed by management unit in Appendix 1. Information regarding the whitefish fishery is detailed by whitefish management unit in Appendix 2.

II. Harvest Quotas, TACs and TAE's

A. Lake trout

As required by the Consent Decree, the Modeling Subcommittee of the Technical Fisheries Committee (TFC) calculates annual harvest and effort limits for lake trout and provides these recommendations to the TFC. After reviewing the recommendations, the TFC is to present final harvest and effort limits to the parties by April 30 of each year; these figures were sent to the parties on May 14, 2001. The 2001 lake trout harvest and effort limits for each management unit are provided in Table 2. Consensus on harvest and effort limits was reached for nearly all management units, with the exception of management units MM-4 and MM-5. Tribal harvest limits in these units were below the harvest expectations discussed during negotiations. In MM-4 the TFC decided to use the final phase-in allocations, which increased the tribal TAC by 2,000 pounds. The TAC in MH-2 was also altered from the model output in order to provide for a state recreational fishery. The State lake trout TAC was calculated by determining the 2000 harvest under a 20-inch minimum size limit; this figure (11,000 pounds) became the State 2001 TAC for MH-2. The TFC agreed to this change because of the uncertainty in sea lamprey mortality, which is the highest source of fishing mortality in this management unit, and

because the State had taken action to reduce harvest significantly (40%) through the regulation change.

Table 2. Model estimates of total allowable catch [TAC (pounds)] and total allowable effort [TAE (linear feet of gill net)] for lake trout by management unit in 1836 Treaty-ceded waters of the Great Lakes for the 2001 fishing season.

Lake	Unit	Model output TACs		Final TACs		Tribal TAE
		State	Tribal	State	Tribal	
Michigan	MM-1,2,3	35,000	486,000	35,000	486,000	8,500,000
	MM-4	57,000	68,000	57,000	70,000	1,100,000
	MM-5	32,000	21,000	32,000	21,000	720,000
	MM-6,7	828,000	92,000	828,00	92,000	NA
Huron	MH-1	3,000	69,000	3,000	69,000	5,900,000
	MH-2	0	0	11,000	1,000	NA
Superior	MI-5	137,000	7,000	137,00	7,000	NA
	MI-6	14,000	11,000	14,000	11,000	612,000
	MI-7	42,000	97,000	42,000	97,000	11,000,000

B. Lake Whitefish

As required by the Consent Decree, the Modeling Subcommittee of the TFC calculates annual whitefish harvest limits for shared management units, and provides these recommendations to the TFC. For each whitefish management unit that is not shared, the tribes set a harvest regulation guideline (HRG) in accordance with their Tribal Management Plan. The Modeling Subcommittee generates recommendations for HRGs that are considered by the tribes. After reviewing the recommendations, the TFC is to present final harvest limits to the parties by December 1 for the subsequent year; these figures were sent to the parties on June 6, 2001. The 2001 whitefish harvest limits for each management unit are provided in Table 3.

The Modeling Subcommittee was able to generate recommendations for harvest limits or HRGs in all but two management units. In units WFH-02 and WFH-03 data were either lacking (insufficient series of years), or parameter estimation was unreliable.

The HRGs for these units reflect the average commercial harvest during the years 1991-1999. Consensus was reached on harvest limits for all shared whitefish management units. The tribes accepted model-generated output for HRGs in all but three units. Tribes established HRGs for WFH-04 and WFH-05 that were reflective of the average commercial harvest for the years 1997-1999. The HRG established for WFM-02 was reflective of the 2000 commercial harvest, which was less than the 1997-1999 average harvest.

Table 3. Model estimates of total allowable catch [TAC (pounds)] or harvest regulation guideline [HRG (pounds)] for whitefish by management unit in 1836 Treaty-ceded waters of the Great Lakes for the 2001 fishing season.

Lake	Unit	Final State TAC	Model output Tribal TAC	Final Tribal TAC or HRG
Michigan	WFM-01	80,000	716,000	716,000
	WFM-02	0	117,000	357,000 ^a
	WFM-03	0	953,000	953,000
	WFM-04	0	590,000	590,000
	WFM-05	0	235,000	235,000
	WFM-06	45,000	106,000	106,000
	WFM-08	500,000	2,805,000	2,805,000
	Huron	WFH-01	0	327,000
WFH-02		0	-	620,000 - 650,000 ^b
WFH-03		0	-	220,000 - 250,000 ^b
WFH-04		0	263,000	787,000 ^c
WFH-05		0	229,000	461,000 ^c
Superior	WFS-04	25,000	415,000	415,000
	WFS-05	78,000	409,000	409,000
	WFS-06	0	63,000	63,000
	WFS-07	0	409,000	409,000
	WFS-08	0	176,000	176,000

^a HRG reflects 2000 harvest

^b No reliable model output – HRG reflects average harvest from 1991 to 1999

^c HRG reflects average harvest from 1997 to 1999

III. Harvest and Effort Reporting

A. State-licensed commercial and recreational fishing

1. Lake Trout

Lake trout harvest by the state consists almost entirely of harvest by sport anglers, though a small research commercial fishery exists around Isle Royale. In order to meet lake trout harvest quotas set by the Decree several new regulations were implemented in 2001 for the recreational fishery. The minimum size limit for lake trout in Lake Michigan from Arcadia north to the 45th parallel was increased from 10 inches to 22 inches (most of statistical district MM-5). In Lake Huron north of 44° 50' latitude, the minimum size limit for lake trout was increased from 10 inches to 20 inches (statistical districts MH-1&2). Finally, in Lake Superior lake trout management unit MI-6 the minimum size limit for lake trout was increased from 10 inches to 20 inches.

Lake trout harvest by state-licensed fishers was below harvest limits in all but one management unit. The recreational lake trout harvest limit (14,000 pounds) in Lake Superior management unit MI-6 (Munising/AuTrain area) was an estimated 25,042 pounds (Table 4) and exceeded the harvest limit by 11,042 pounds. In an effort to reduce harvest, a 20-inch minimum size limit had been implemented for MI-6 in 2001; however, recreational harvest actually increased 8% from 4,838 fish in 2000 to 5,222 fish in 2001. Recreational fishing effort also increased approximately 8%. The recreational catch per unit effort in 2001 was similar to that of 2000 and has been relatively constant since 1996. The proportion of lake trout less than 20 inches observed in creel surveys though has decreased from approximately 20-25% prior to effecting the 20-inch minimum size limit to 1.6% in 2001. Essentially, the recreational fishery in MI-6 has maintained

fishing pressure, and has shifted harvest to fish above 20 inches. The recreational harvest is converted annually to yield by multiplying the number harvested by the average weight of a harvested fish from creel survey data. The average weight of a recreationally harvested lake trout increased due to the larger size limit, which contributed to the higher yield. The harvest limit and reported harvest represent lean lake trout only and excludes a 14% allowance for siscowet harvest.

Estimated state-licensed recreational harvest of walleye, yellow perch, and chinook and coho salmon are also listed in Table 4. Effort indicated is for all species combined. Harvest limits are not set for these species.

Table 4. Summary of estimated state-licensed recreational harvest* [number and weight (pounds)] and effort (angler hours) by management unit in 1836 Treaty-ceded waters of the Great Lakes for the 2001 fishing season.

Lake	Management unit	Total effort (angler hours)	Lake trout		Walleye		Yellow perch		Chinook salmon		Coho salmon	
			Number	Weight	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Michigan	MM-1	639,480	26	146	54,873	153,644	105,646	21,129	473	9,413	4	25
	MM-2	11,788	11	62	143	400	12	2	413	3,428	20	126
	MM-3	58,000	1,481	8,294	0	0	0	0	3,110	37,631	0	0
	MM-4	186,592	5,460	25,662	502	452	5,221	2,088	8,337	124,221	139	1,084
	MM-5	324,587	2,039	13,050	0	0	1,655	927	24,937	314,206	13,332	103,990
	MM-6	792,151	17,731	115,252	27	68	842	480	63,088	889,541	10,425	75,060
	MM-7	1,161,095	24,892	151,841	51	128	169,413	81,318	70,054	826,637	10,810	56,212
Total		3,173,693	51,640	314,307	55,596	154,692	282,789	105,944	170,412	2,205,077	34,730	236,497
Huron	MH-1	276,625	697	2,684	247	1,482	26,087	6,522	20,360	203,600	376	2,294
	MH-2	139,862	2,143	8,268	34	204	0	0	20,187	234,169	148	740
Total		416,487	2,840	10,952	281	1,686	26,087	6,522	40,547	437,769	524	3,034
Superior	MI-5	51,911	14,634	48,656	0	0	0	0	287	1,096	1,618	2,799
	MI-6	58,834	5,423	25,042	0	0	170	63	440	2,130	2,926	3,687
	MI-7	15,732	2,077	9,424	1	1	527	195	52	252	478	2,103
Total		126,477	22,134	83,122	1	1	697	258	779	3,478	5,022	8,589

* Harvest weight was calculated using mean weights from 2000 for all species except lake trout.

2. Lake Whitefish

Whitefish harvest by state-licensed fishers was below harvest limits in all but one management unit. The state-licensed commercial harvest of whitefish in Lake Michigan management unit WFM-06 was 45,716 pounds, exceeding the harvest limit by 716 pounds (Table 3). This 1.6% deviation from the harvest limit does not exceed the 25% deviation that would trigger a penalty in the following year. The commercial whitefish harvest reported in Table 3 includes catch from both targeted effort (trap nets) and incidental catch in small-mesh gill nets of the chub fishery, however the effort reported is only targeted trap-net effort for whitefish.

There is one major sport fishery for whitefish in Lake Michigan waters that takes place in unit WFM-05 (Grand Traverse Bay area). Recreational harvest of whitefish in WFM-05 was 41,507 pounds. There are three sport fisheries for whitefish in Lake Superior, including units WFS-04 (Marquette area), WFS-05 (Munising area), and WFS-06 (Grand Marais area). Recreational harvest of whitefish in these areas was 333; 3,905; and 8,304 pounds, respectively. The state does not estimate targeted effort for whitefish in these units.

Table 5. Summary of state-licensed commercial whitefish harvest (pounds) and effort (trap-net lifts) by whitefish management unit in 1836 Treaty-ceded waters of the Great Lakes for the 2001 fishing season.

Lake	Unit	Harvest	Effort
Michigan	WFM-01	65,018	336
	WFM-06	45,716	566
	WFM-08	273,842	812
Superior	WFS-04	15,180	95
	WFS-05	77,758	602
Total		477,514	2,411

B. Tribal commercial and subsistence fishing

1. Lake trout

Lake trout harvest by tribal commercial fishers was below harvest limits in all but one management unit. In Lake Huron management unit MH-1 the harvest limit of 69,000 pounds was exceeded by 44,551 pounds (Table 6). Lake trout are harvested by tribal commercial fishers as bycatch in the lake whitefish fishery; thus, effort is not reported in Table 6 (see Table 7).

Table 6. Summary of tribal commercial lake trout harvest (pounds) by management unit in 1836 Treaty-ceded waters of the Great Lakes for the 2001 fishing season.

Lake	Unit	Trap-net harvest	Gill-net harvest	Total harvest
Michigan	MM-1,2,3	10,547	421,280	431,827
	MM-4	4,447	48,109	52,556
	MM-5	421	5,713	6,134
	MM-6,7	0	0	0
Huron	MH-1	21,305	92,246	113,551
	MH-2	0	0	0
Superior	MI-5	0	0	0
	MI-6	0	9,254	9,254
	MI-7	0	39,458	39,458
	MI-8	6,312	37,815	44,127
Total		43,032	653,875	696,907

2. Lake Whitefish

Whitefish harvest by tribal commercial fishers was below harvest limits in all but two management units. In Lake Huron unit WFH-03 there was no reliable model output, and the tribes adopted a HRG of 220,00 - 250,000 pounds, reflecting the average harvest from 1991 to 1999. The 2001 harvest in WFH-03 was 370,897 pounds (Table 7), which exceeded the HRG by 120,897 pounds. In Lake Huron unit WFH-05 the tribal harvest was 736,216 pounds and exceeded the HRG by 275,216 pounds. In management units

that are not shared, such as WFH-03 and WFH-05, the Tribes manage the fishery in accordance with the Tribal Plan and no penalty is incurred. In total, tribal harvest exceeded the model-output TACs in three whitefish management units (WFM-02, WFH-04, and WFH-05).

Table 7. Summary of tribal commercial whitefish harvest (pounds) and effort (trap net-lifts or 1,000 feet of gill net) by management unit in 1836 Treaty-ceded waters of the Great Lakes for the 2001 fishing season. Harvest from small-mesh gill nets is included in gill-net harvest.

Lake	Unit	Trap nets		Gill nets		Total
		Harvest	Effort	Harvest	Effort	
Michigan	WFM-01	588,538	1,439	0	0	588,538
	WFM-02	161,367	739	41,259	2,873	202,626
	WFM-03	676,998	1,899	165,081	1,877	842,079
	WFM-04	217,301	715	47,890	1,206	265,191
	WFM-05	40,064	297	110,620	2,865	150,684
	WFM-06	22,710	49	4,473	188	27,183
	WFM-07	6,299	4	0	0	6,299
	WFM-08	0	0	0	0	0
Huron	WFH-01	72,080	98	154,504	6,352	226,584
	WFH-02	262,003	1,015	53,905	1,589	315,908
	WFH-03	365,048	706	5,849	94	370,897
	WFH-04	396,006	972	227,999	3,481	624,005
	WFH-05	736,216	566	0	0	736,216
Superior	WFS-04	0	0	0	0	0
	WFS-05	0	0	65,276	949	65,276
	WFS-06	0	0	33,604	1,382	33,604
	WFS-07	76,066	175	240,069	4,656	316,135
	WFS-08	61,772	277	29,826	907	91,598
Total		3,676,231	8,948	1,180,35	28,419	4,856,586

3. Walleye

Commercial fishing for walleye is allowed in and around Grand Traverse Bay and the Manitou Islands, in Northeastern Lake Michigan (Naubinway to Gros Cap), and around the Les Cheneaux Islands. There are gear, season, depth, size, and area

restrictions on the various walleye fisheries, though no harvest limits are set forth in the Decree. The largest walleye harvest in 2001 occurred in Lake Michigan management unit MM-4 in Lake Huron management unit MH-1, and in Lake Superior management unit MI-8 (Table 8).

4. Yellow perch

Commercial fisheries for yellow perch exist in northeastern Lake Michigan around Grand Traverse Bay and the Manitou Islands, around the Beaver Islands, and near the northeastern shore. A yellow perch fishery also exists in Lake Huron around the Les Cheneaux Islands. The fishery has gear, depth, area, season, and size restrictions, though no harvest limits are set forth in the Decree. Yellow perch harvest was largest in Lake Michigan units MM-1,2,3 and MM-4, where harvest was 2,680 and 4,020 pounds respectively (Table 8).

Table 8. Summary of tribal commercial walleye and yellow perch harvest (pounds) and targeted effort (1,000 feet of gill net) by management unit in 1836 Treaty-ceded waters of the Great Lakes for the 2001 fishing season. Effort targeted at walleye includes both large-mesh and small-mesh gill nets; effort targeted at yellow perch includes only small-mesh gill nets.

Lake	Unit	Walleye		Yellow Perch	
		Harvest	Effort	Harvest	Effort
Michigan	MM-1,2,3	1,339	0	2,680	68.5
	MM-4	11,323	359.7	4,020	263.3
	MM-5	199	0	287	43
	MM-6,7	0	0	0	0
Huron	MH-1	10,172	121.1	239	0
	MH-2	0	0	0	0
Superior	MI-5	0	0	0	0
	MI-6	342	0	0	0
	MI-7	2	0	0	0
	MI-8	6,526	105.4 ^a	305	12.8
Total		29,903	586.2	7,531	387.6

^a In addition, 9 trap-net lifts were targeted at walleye.

5. Chinook and coho salmon

Tribal commercial fisheries for salmon exist in northeastern Lake Michigan nearshore from McGulpin Point south to Seven Mile Point, around the tip of the Leelanau Peninsula, and in Suttons Bay. Fisheries in northern Lake Huron exist in St Martin Bay, and nearshore from Cordwood Point to Hammond Bay Harbor light. Fishing is restricted by season, gear, depth, and area, though no harvest limits are set. The largest salmon harvest occurred in Lake Michigan unit MM-4 (25,152 pounds) and in Lake Huron unit MH-1 [(320,244 pounds)(Table9)].

Table 9. Summary of tribal commercial chinook and coho salmon harvest (pounds) and effort (1,000 feet of gill net) by management unit in 1836 Treaty-ceded waters of the Great Lakes for the 2001 fishing season.

Lake	Unit	Chinook harvest	Coho harvest	Effort
Michigan	MM-1,2,3	3,918	0	6
	MM-4	25,152	0	43.5
	MM-5	42	0	0
	MM-6,7	0	0	0
Huron	MH-1	320,244	0	3,128.2
	MH-2	0	0	0
Superior	MI-5	0	0	0
	MI-6	0	25	0
	MI-7	0	2,530	0
	MI-8	968	1,803	2
Total		350,324	4,358	3,179.7

Subsistence fishing as defined in the Consent Decree means taking fish for personal or family consumption and not for sale or trade. Tribal subsistence fishing is allowed in all 1836 Treaty waters with some exceptions. These exceptions include: no gill nets in lake trout refuges; no nets within 100 yards of a break wall or pier; no nets

within a 0.3-mile radius of some stream mouths (listed in section IV.C.8 of the Consent Decree); no prevention of fish passage into and out of streams that flow into 1836 Treaty waters; no gill nets or walleye possession in portions of the Bays De Noc during March 1 - May 15; no gill nets within 50 feet of other gill nets. Fishers are limited to 100 pounds aggregate catch of all species in possession, and catch may not be sold or traded.

Subsistence fishers may use impoundment gear, hooks, spears, seines, dip nets, and gill nets. Gill netting is limited to one 300-ft or smaller net per vessel per day. In the St. Marys River a single gill net may not exceed 100 ft in length. All subsistence gear must be marked clearly with floats, and Tribal identification numbers. Tribal fishers must obtain subsistence licenses issued by their Tribe, and must abide by provisions of the Tribal Code. Additionally, subsistence fishing with gill or trap nets requires a Tribal permit that may be limited in duration and by area. The MDNR is provided with copies of all subsistence permits.

Currently, reporting of tribal subsistence harvest and effort is inadequate. The Chippewa Ottawa Resource Authority (CORA) Code calls for monthly reporting by subsistence fishers to their Tribe. The CORA must provide data from subsistence harvest reports to parties of the Consent Decree within six months. The CORA is also obligated to develop a Tribal subsistence effort sampling system, and must provide all parties with effort sampling results. In the early stages of implementing the Consent Decree, parties have not yet met all required obligations. Consequently, the subsistence harvest reported is summarized only by lake (Table 10).

Table 10. Summary of tribal subsistence harvest (pounds) by species in 1836 Treaty - ceded waters of the Great Lakes for the 2001 fishing season.

Lake	Lake trout	Whitefish	Walleye	Yellow perch	Chinook salmon	Coho salmon
Michigan	287	1,389	3,792	1,169	269	150
Huron	3	95	17	23	100	0
Superior	466	608	56	0	98	285
Totals	756	2,092	3,865	1,192	467	435

IV. Enforcement

A. Summary of Enforcement Patrols

- 1) Personnel enforcement hours – 8,643
- 2) Patrol boat hours – 700+
- 3) Individual boat patrols – 144+

The personnel enforcement hours includes all state commercial and tribal enforcement time reported by all Conservation Officers (CO), both on-water and shore patrol effort. Some administrative time is included in the total, but the vast majority represents actual patrol time. The bulk of the hours reflect patrol effort by the Commercial Fish Enforcement Section (CFE) of the Wildlife Resource Protection Unit (WRPU). Most of the enforcement effort was expended patrolling the tribal fishers, as only a few state-licensed operations are located within the 1836 Treaty waters (Muskegon and Leland). It is worth noting that despite the reduced numbers of Conservation Officers statewide in the last two years, this Section remains fully staffed, with 7 Commercial Fish Enforcement Specialist COs, and one first line supervisor (Sergeant).

These personnel are located at Leland (2), Charlevoix (1), Escanaba (1), and Rogers City (2), with the Sergeant stationed in Charlevoix.

The boat hours and patrols listed reflect only the effort of the CFE Section of the WRPU. Local District law enforcement personnel supplied some additional directed patrol effort as well as net checks and tribal fishing vessel boardings during routine on-water patrol work. The boat hours and patrols reported are only those for the CFE Section's dedicated patrol boats. Delivery of new two new patrol boats, and delivery of two refurbished patrol boats was staggered throughout the summer of 2001, and it was not until mid-August that the entire fleet assigned to tribal patrol was on the water. During the interim, CFE Specialists utilized local district patrol vessels, and hours/patrols were not accurately recorded. Currently, the Unit has one 40' patrol vessel stationed in Charlevoix, one 28' vessel stationed in Leland, and two 32' vessels, one each in Rogers City and Escanaba. The patrol boats routinely work outside their assigned stations, as needs dictate.

B. Summary of Violations

- 1) SSM gill net fisher was cited for nets set in Northern Lake Michigan Lake Trout Refuge. The case went to SSM court and the penalty imposed included a \$250 fine, forfeiture of fish, and a 30 day fishing suspension.
- 2) Two SSM/BMIC fishers were cited for commercial fishing without a license and a licensed SSM captain was cited for allowing non-licensed fishers on board. Monetary fines were imposed on the two unlicensed fishers. The captain was treated as repeat offender by court and received a \$300 fine and costs, and 30 day license suspension.

- 3) SSM fisher was cited for not having a license in possession (following 3 documented earlier warnings by both state and tribal officers). The SSM court dismissed the charge.
- 4) Canadian tribal (Batchawana Bay First Nation) fisher was cited (in state court as this fisher has no tribal rights in Michigan waters) for fishing without a license. \$100 fine and costs were assessed, 6000 feet of seized small mesh gill net was forfeited to the State.
- 5) GTB fisher was cited for gill net in seasonally closed waters. GTB court assessed \$250 fine and costs, suspended the license for 30 days, and imposed forfeiture of the catch.
- 6) SSM trap net fisher was cited for possession of prohibited species (walleye and brown trout) in a trap net zone. No disposition was received from SSM court in this case.
- 7) SSM fisher was cited for retention of whitefish caught during closed season (net had not been tied closed). The case was plea bargained in the SSM court and resulted in a \$100 fine and costs and forfeiture of fish (approximately \$3000).
- 8) A SSM subsistence fisher cited for taking walleye (by spear) during closed season in the Bay de Noc closure area. With the concurrence of the State, this case was dismissed by the tribal court on the basis of legitimate confusion on the part of the fisher. No further incidents of such activity have occurred since.

The listing of violations does not include warnings for which citations were not issued. In some instances, violations were referred to the appropriate tribal law enforcement agency for follow-up. To the best of our knowledge, one citation was issued

by tribal officers during calendar year 2001, that being a GTB citation for allowing a non-tribal member aboard a tribal fishing vessel. The court disposition on this matter is unknown. There were no witnessed violations by state-licensed commercial fishers within the 1836 Treaty waters in 2001.

Appendices

Appendix 1. Model estimates of harvest quota for lake trout by lake trout management unit in the 1836 Treaty-ceded waters of the Great Lakes as used during the final stages of negotiations.

Appendix 2. Model estimates of harvest quota for lake whitefish by whitefish management unit in the 1836 Treaty-ceded waters of the Great Lakes as used during the final stages of negotiations.

Appendix 1. Lake Trout, Lake Huron, MH-1

Scenario =Effort-based, phase-in on commercial fishery from 2001 through 2005. Phase in a 24-in minimum size limit on sport fishery by 2005.

47% SSBR = 0.11

Extended phase-in of allocation percentages at 47% TAM from 2006 through 2011. Rehabilitation period at 45% TAM from 2012 through 2020.

45% SSBR = 0.13

Starting in 2002, stock 0.6 per acre of federal yearlings plus 100,000 MDNR yearlings. No change in Canadian commercial effort.

Year	Commercial (Tribal)				Recreational (State)							Lake trout population	
	Effort limit (million feet)	Harvest limit (pounds)	CPUE (pounds per million feet)	Percent of allowable harvest	Potential effort (hours)	Minimum size limit	Harvest limit (pounds)	CPUE (fish per 100 hours)	CPUE (pounds per 100 hours)	Average size (pounds)	Percent of allowable harvest	Female spawning biomass	SSBR
Reference Period													
1996	17.155	242,057	14,110	94%	116,026	10	15,869	4.0	13.7	3.4	6%		
1997	13.107	163,885	12,504	93%	124,637	10	12,665	2.8	10.2	3.6	7%		
1998	13.139	130,863	9,960	92%	129,874	10	11,939	2.3	9.2	4.0	8%	8,782	
Phase-in Period (Effort-Based for Commercial Fishery, Size Limit-Based for Recreational Fishery)													
2001	12.297	155,548	12,649	94%	123,512	20	9,400	2.0	7.6	3.8	6%	10,929	0.03
2002	7.957	112,004	14,077	91%	123,512	20	10,793	2.2	8.7	3.9	9%	15,974	0.04
2003	6.655	104,682	15,730	92%	123,512	22	9,141	1.8	7.4	4.1	8%	22,439	0.06
2004	5.787	107,177	18,521	91%	123,512	22	11,029	2.1	8.9	4.2	9%	30,473	0.09
2005	5.787	137,309	23,728	93%	123,512	24	9,919	1.9	8.0	4.2	7%	40,315	0.10
Extended Phase-in Period (TAM = 47%, Phase in of Allocation Percentages)													
2006	5.497	160,708	29,233	92%	135,864	24	13,934	2.4	10.3	4.3	8%	52,623	0.11
2007	5.931	196,919	33,199	92%	142,039	24	17,734	2.8	12.5	4.5	8%	67,344	0.11
2008	6.221	220,556	35,455	91%	148,215	24	21,113	3.1	14.2	4.6	9%	82,793	0.11
2009	6.365	233,171	36,631	91%	154,390	24	23,952	3.3	15.5	4.7	9%	96,081	0.11
2010	6.365	237,507	37,312	90%	154,390	24	25,410	3.4	16.5	4.8	10%	106,565	0.11
2011	6.510	245,712	37,743	90%	154,390	24	26,540	3.5	17.2	4.8	10%	114,382	0.11
Rehabilitation Period (TAM = 45%, Final Allocation - Tribal Share=88%, State Share=12%)													
2012	5.642	217,239	38,503	88%	158,096	24	28,378	3.7	18.0	4.9	12%	122,637	0.13
2013	5.642	223,029	39,530	88%	158,096	24	29,784	3.8	18.8	4.9	12%	130,495	0.13
2014	5.642	226,658	40,173	88%	158,096	24	30,920	3.9	19.6	5.0	12%	137,403	0.13
2015	5.787	234,045	40,445	88%	154,390	24	30,984	4.0	20.1	5.0	12%	142,788	0.13
2016	5.787	234,278	40,485	88%	154,390	24	31,483	4.0	20.4	5.0	12%	146,676	0.13
2017	5.787	234,257	40,482	88%	154,390	24	31,827	4.1	20.6	5.1	12%	149,351	0.13
2018	5.787	234,192	40,470	88%	154,390	24	32,069	4.1	20.8	5.1	12%	151,166	0.13
2019	5.787	234,147	40,463	88%	154,390	24	32,241	4.1	20.9	5.1	12%	152,418	0.13
2020	5.787	234,126	40,459	88%	154,390	24	32,364	4.1	21.0	5.1	12%	153,296	0.13

Appendix 1. Lake Trout, Lake Huron, MH-2

Scenario = Phase in a 24-in minimum size limit on sport fishery by 2005. Assume minimal subsistence fishing.
Assume sport fishing effort gradually increases by 25%. No change in Canadian commercial effort.

40% SSBR = 0.32

Year	Commercial (Tribal)				Recreational (State)							Lake trout population	
	Effort limit (million feet)	Harvest limit (pounds)	CPUE (pounds per million feet)	Percent of allowable harvest	Potential effort (hours)	Minimum size limit	Harvest limit (pounds)	CPUE (fish per 100 hours)	CPUE (pounds per 100 hours)	Average size (pounds)	Percent of allowable harvest	Female spawning biomass	SSBR
Reference Period													
1996	0.000	-	-	0%	213,906	10	45,841	5.1	21.4	4.2	100%		
1997	0.000	-	-	0%	212,802	10	53,203	6.1	25.0	4.1	100%		
1998	0.000	-	-	0%	157,710	10	41,558	5.9	26.4	4.5	100%	106,461	
Phase-in Period (Size Limit-Based for Recreational Fishery)													
2001	Subsistence	442	na	1%	194,806	20	47,517	5.7	24.4	4.3	99%	160,291	0.40
2002	Subsistence	333	na	1%	194,806	20	51,329	6.1	26.3	4.3	99%	193,286	0.35
2003	Subsistence	473	na	1%	214,287	22	44,672	4.3	20.8	4.9	99%	221,535	0.42
2004	Subsistence	608	na	1%	214,287	22	41,897	3.9	19.6	5.0	99%	248,990	0.51
2005	Subsistence	686	na	2%	233,767	24	33,975	2.9	14.5	5.1	98%	267,891	0.58
Rehabilitation Period (TAM = 40%)													
2006	Subsistence	816	na	2%	233,767	24	34,419	3.0	14.7	4.9	98%	282,713	0.64
2007	Subsistence	943	na	2%	243,508	24	38,251	3.2	15.7	4.9	98%	301,388	0.69
2008	Subsistence	991	na	2%	243,508	24	41,065	3.4	16.9	5.0	98%	325,931	0.73
2009	Subsistence	1,033	na	2%	243,508	24	43,311	3.5	17.8	5.0	98%	353,119	0.75
2010	Subsistence	1,076	na	2%	243,508	24	44,837	3.6	18.4	5.1	98%	380,032	0.78
2011	Subsistence	1,091	na	2%	243,508	24	45,872	3.7	18.8	5.1	98%	404,769	0.80
2012	Subsistence	1,102	na	2%	243,508	24	46,592	3.7	19.1	5.1	98%	426,678	1
2013	Subsistence	1,110	na	2%	243,508	24	47,098	3.8	19.3	5.2	98%	445,792	1
2014	Subsistence	1,115	na	2%	243,508	24	47,432	3.8	19.5	5.2	98%	461,963	0.82
2015	Subsistence	1,118	na	2%	243,508	24	47,635	3.8	19.6	5.2	98%	475,258	0.82
2016	Subsistence	1,119	na	2%	243,508	24	47,746	3.8	19.6	5.2	98%	485,903	0.82
2017	Subsistence	1,120	na	2%	243,508	24	47,803	3.8	19.6	5.2	98%	494,300	0.82
2018	Subsistence	1,120	na	2%	243,508	24	47,830	3.8	19.6	5.2	98%	500,853	0.82
2019	Subsistence	1,121	na	2%	243,508	24	47,842	3.8	19.6	5.2	98%	505,928	0.82
2020	Subsistence	1,121	na	2%	243,508	24	47,847	3.8	19.6	5.2	98%	509,839	0.82

Appendix 1. Lake Trout, Lake Michigan, MM-1/2/3

Scenario = Assume commercial effort and sport effort increases by 25%.
 Maintain 24-inch size limit on sport fishery.

40% SSBR = 0.77
 2006 SSBR = 0.98
 2020 SSBR = 1.02

Year	Commercial (Tribal)				Recreational (State)							Lake trout population	
	Effort limit (million feet)	Harvest limit (pounds)	CPUE (pounds per million feet)	Percent of allowable harvest	Potential effort (hours)	Minimum size limit	Harvest limit (pounds)	CPUE (fish per 100 hours)	CPUE (pounds per 100 hours)	Average size (pounds)	Percent of allowable harvest	Female spawning biomass	SSBR
Reference Period													
1996	17.536	749,556	42,744	90%	103,045	24	80,837	13.1	78.4	6.0	10%		
1997	15.311	685,279	44,757	89%	124,056	24	87,450	11.0	70.5	6.4	11%		
1998	14.472	781,010	53,967	88%	135,878	24	110,251	12.1	81.1	6.7	12%		
Rehabilitation Period (TAM = 40%)													
2001	19.716	548,805	27,835	89%	151,241	24	67,589	6.4	44.7	7.0	11%		
2002	19.716	498,310	25,274	89%	151,241	24	60,877	5.9	40.3	6.8	11%		
2003	19.716	464,066	23,537	89%	151,241	24	56,730	5.6	37.5	6.7	11%		
2004	19.716	442,790	22,458	89%	151,241	24	54,102	5.4	35.8	6.6	11%		
2005	19.716	431,674	21,894	89%	151,241	24	52,243	5.3	34.5	6.5	11%		
2006	19.716	427,203	21,668	89%	151,241	24	51,318	5.3	33.9	6.4	11%		
2007	19.716	426,332	21,623	89%	151,241	24	51,056	5.3	33.8	6.4	11%		
2008	19.716	426,837	21,649	89%	151,241	24	51,030	5.3	33.7	6.4	11%		
2009	19.716	427,734	21,695	89%	151,241	24	51,101	5.3	33.8	6.4	11%		
2010	19.716	428,616	21,739	89%	151,241	24	51,244	5.3	33.9	6.4	11%		
2011	19.716	429,374	21,778	89%	151,241	24	51,374	5.3	34.0	6.4	11%		
2012	19.716	430,011	21,810	89%	151,241	24	51,460	5.3	34.0	6.4	11%		
2013	19.716	430,504	21,835	89%	151,241	24	51,530	5.3	34.1	6.4	11%		
2014	19.716	430,827	21,851	89%	151,241	24	51,582	5.3	34.1	6.4	11%		
2015	19.716	431,013	21,861	89%	151,241	24	51,613	5.3	34.1	6.4	11%		
2016	19.716	431,111	21,866	89%	151,241	24	51,630	5.3	34.1	6.4	11%		
2017	19.716	431,159	21,868	89%	151,241	24	51,639	5.3	34.1	6.4	11%		
2018	19.716	431,181	21,869	89%	151,241	24	51,644	5.3	34.1	6.4	11%		
2019	19.716	431,191	21,870	89%	151,241	24	51,646	5.3	34.1	6.4	11%		
2020	19.716	431,195	21,870	89%	151,241	24	51,647	5.3	34.1	6.4	11%		

Appendix 1. Lake Trout, Lake Michigan, MM-4

Scenario =Effort-based, phase-in on commercial fishery from 2001 through 2005. Phase in a 24-in minimum size limit on sport fishery by 2005.
Forty-five percent TAM and 60/40 split from 2006 through 2009. Forty-five percent TAM and 55/45 split from 2010 through 2020.

45% SSBR = 0.40

Year	Commercial (Tribal)				Recreational (State)							Lake trout population	
	Effort limit (million feet)	Harvest limit (pounds)	CPUE (pounds per million feet)	Percent of allowable harvest	Potential effort (hours)	Minimum size limit	Harvest limit (pounds)	CPUE (fish per 100 hours)	CPUE (pounds per 100 hours)	Average size (pounds)	Percent of allowable harvest	Female spawning biomass	SSBR
Reference Period													
1996	2.260	112,637	49,840	78%	191,401	24	31,935	2.5	16.7	6.7	22%		
1997	1.776	109,354	61,573	59%	278,426	24	76,613	4.3	27.5	6.4	41%		
1998	1.556	160,063	102,868	52%	303,290	20	147,006	8.9	48.5	5.4	48%	149,532	
Effort-Based, Phase-in Period													
2001	1.864	129,753	69,610	64%	257,706	20	74,398	5.0	28.9	5.8	36%	124,666	
2002	1.268	93,833	74,029	54%	257,706	20	78,623	5.2	30.5	5.8	46%	135,249	
2003	1.268	100,951	79,645	59%	257,706	22	70,682	4.4	27.4	6.2	41%	149,413	
2004	1.268	105,272	83,054	58%	257,706	22	75,041	4.6	29.1	6.3	42%	159,232	
2005	1.268	108,645	85,714	64%	257,706	24	62,260	3.7	24.2	6.6	36%	167,267	
Rehabilitation Period (TAM = 45%, Tribal Share 60%, State Share 40%)													
2006	1.230	108,487	88,183	60%	288,630	24	72,421	3.8	25.1	6.6	40%	172,800	0.40
2007	1.230	110,259	89,624	60%	288,630	24	74,098	3.8	25.7	6.7	40%	176,541	0.40
2008	1.230	111,435	90,580	60%	288,630	24	75,202	3.9	26.1	6.7	40%	178,995	0.40
2009	1.230	112,146	91,158	60%	288,630	24	75,879	3.9	26.3	6.7	40%	180,579	0.40
Rehabilitation Period (TAM = 45%, Tribal Share 55%, State Share 45%)													
2010	1.156	105,649	91,417	55%	322,132	24	84,988	3.9	26.4	6.7	45%	180,988	0
2011	1.156	105,777	91,528	55%	322,132	24	85,063	3.9	26.4	6.8	45%	181,357	0
2012	1.156	105,888	91,624	55%	322,132	24	85,152	3.9	26.4	6.8	45%	181,706	0.40
2013	1.156	105,979	91,703	55%	322,132	24	85,237	3.9	26.5	6.8	45%	181,979	0.40
2014	1.156	106,046	91,760	55%	322,132	24	85,299	3.9	26.5	6.8	45%	182,169	0.40
2015	1.156	106,087	91,796	55%	322,132	24	85,339	3.9	26.5	6.8	45%	182,294	0.40
2016	1.156	106,111	91,817	55%	322,132	24	85,363	3.9	26.5	6.8	45%	182,370	0.40
2017	1.156	106,125	91,829	55%	322,132	24	85,377	3.9	26.5	6.8	45%	182,417	0.40
2018	1.156	106,133	91,836	55%	322,132	24	85,384	3.9	26.5	6.8	45%	182,444	0.40
2019	1.156	106,137	91,839	55%	322,132	24	85,387	3.9	26.5	6.8	45%	182,462	0.40
2020	1.156	106,139	91,841	55%	322,132	24	85,388	3.9	26.5	6.8	45%	182,473	0.40

Appendix 1. Lake Trout, Lake Michigan, MM-5

Scenario = Assume sport effort increases by 25% and commercial effort is controlled by harvest limit.
Phase in a 24-in minimum size limit on sport fishery by 2005.

45% SSBR = 0.29

Year	Commercial (Tribal)				Recreational (State)							Lake trout population	
	Effort limit (million feet)	Harvest limit (pounds)	CPUE (pounds per million feet)	Percent of allowable harvest	Potential effort (hours)	Minimum size limit	Harvest limit (pounds)	CPUE (fish per 100 hours)	CPUE (pounds per 100 hours)	Average size (pounds)	Percent of allowable harvest	Female spawning biomass	SSBR
Reference Period													
1996	0.215	40,965	190,533	32%	323,133	10	86,964	4.8	26.9	5.6	68%		
1997	0.332	75,478	227,344	53%	332,193	10	68,233	3.7	20.5	5.6	47%		
1998	0.487	47,996	98,555	35%	363,157	10	88,251	4.0	24.3	6.1	65%	131,889	
Rehabilitation Period (TAM = 45%)													
2001	0.312	45,876	147,075	42%	339,494	22	62,179	2.7	18.3	6.8	58%	134,820	
2002	0.312	46,579	149,329	43%	339,494	22	62,814	2.7	18.5	6.8	57%	136,008	
2003	0.314	47,028	149,939	42%	339,494	22	63,776	2.8	18.8	6.8	58%	138,536	
2004	0.324	48,156	148,635	43%	339,494	22	64,003	2.7	18.9	6.9	57%	139,226	
2005	0.362	53,498	147,825	46%	339,494	24	63,763	2.7	18.8	6.9	54%	139,419	
2006	0.334	49,753	148,817	49%	339,494	24	52,693	2.2	15.5	7.2	51%	141,429	0.33
2007	0.327	48,998	149,644	46%	373,444	24	58,473	2.2	15.7	7.2	54%	142,217	0.32
2008	0.321	47,909	149,463	43%	407,393	24	63,678	2.2	15.6	7.2	57%	141,596	0.32
2009	0.324	48,146	148,604	42%	424,368	24	65,757	2.2	15.5	7.2	58%	140,282	0.31
2010	0.326	48,145	147,815	42%	424,368	24	65,281	2.1	15.4	7.2	58%	139,378	0.31
2011	0.327	48,250	147,358	43%	424,368	24	64,969	2.1	15.3	7.2	57%	138,840	0.31
2012	0.327	48,176	147,133	43%	424,368	24	64,790	2.1	15.3	7.1	57%	138,578	0.31
2013	0.331	48,636	146,991	43%	424,368	24	64,678	2.1	15.2	7.1	57%	138,358	0.31
2014	0.331	48,594	146,864	43%	424,368	24	64,594	2.1	15.2	7.1	57%	138,195	0.31
2015	0.331	48,570	146,792	43%	424,368	24	64,538	2.1	15.2	7.1	57%	138,088	0.31
2016	0.331	48,557	146,752	43%	424,368	24	64,504	2.1	15.2	7.1	57%	138,021	0.31
2017	0.331	48,550	146,731	43%	424,368	24	64,485	2.1	15.2	7.1	57%	137,980	0.31
2018	0.331	48,547	146,719	43%	424,368	24	64,474	2.1	15.2	7.1	57%	137,956	0.31
2019	0.331	48,545	146,714	43%	424,368	24	64,468	2.1	15.2	7.1	57%	137,941	0.31
2020	0.331	48,544	146,711	43%	424,368	24	64,465	2.1	15.2	7.1	57%	137,932	0.31

Appendix 1. Lake Trout, Lake Michigan, MM-6/7

Scenario =Assume minimal subsistence fishing. Assume sport effort increases by 25%.

40% SSBR = 0.63
2006 SSBR = 1.13
2020 SSBR = 1.13

Year	Commercial (Tribal)				Recreational (State)							Lake trout population	
	Effort limit (million feet)	Harvest limit (pounds)	CPUE (pounds per million feet)	Percent of allowable harvest	Potential effort (hours)	Minimum size limit	Harvest limit (pounds)	CPUE (fish per 100 hours)	CPUE (pounds per 100 hours)	Average size (pounds)	Percent of allowable harvest	Female spawning biomass	SSBR
Reference Period													
1996	0.000	-	-	0%	1,137,475	10	155,230	2.8	13.6	4.9	100%		
1997	0.000	-	-	0%	1,321,468	10	183,520	2.4	13.9	5.9	100%		
1998	0.000	-	-	0%	1,359,033	10	254,120	3.6	18.7	5.2	100%		
Rehabilitation Period (TAM = 40%)													
2001	Subsistence	4,265	na	1%	1,590,823	10	319,710	3.1	20.1	6.6	99%		
2002	Subsistence	4,172	na	1%	1,590,823	10	311,448	2.9	19.6	6.7	99%		
2003	Subsistence	4,000	na	1%	1,590,823	10	295,197	2.8	18.6	6.7	99%		
2004	Subsistence	3,842	na	1%	1,590,823	10	279,365	2.6	17.6	6.8	99%		
2005	Subsistence	3,657	na	1%	1,590,823	10	264,016	2.5	16.6	6.7	99%		
2006	Subsistence	3,548	na	1%	1,590,823	10	254,767	2.4	16.0	6.6	99%		
2007	Subsistence	3,426	na	1%	1,590,823	10	247,308	2.4	15.5	6.6	99%		
2008	Subsistence	3,358	na	1%	1,590,823	10	243,548	2.3	15.3	6.5	99%		
2009	Subsistence	3,314	na	1%	1,590,823	10	241,364	2.3	15.2	6.5	99%		
2010	Subsistence	3,290	na	1%	1,590,823	10	240,417	2.3	15.1	6.5	99%		
2011	Subsistence	3,276	na	1%	1,590,823	10	239,902	2.3	15.1	6.5	99%		
2012	Subsistence	3,271	na	1%	1,590,823	10	239,698	2.3	15.1	6.5	99%		
2013	Subsistence	3,270	na	1%	1,590,823	10	239,602	2.3	15.1	6.5	99%		
2014	Subsistence	3,270	na	1%	1,590,823	10	239,550	2.3	15.1	6.5	99%		
2015	Subsistence	3,269	na	1%	1,590,823	10	239,513	2.3	15.1	6.5	99%		
2016	Subsistence	3,269	na	1%	1,590,823	10	239,486	2.3	15.1	6.5	99%		
2017	Subsistence	3,269	na	1%	1,590,823	10	239,466	2.3	15.1	6.5	99%		
2018	Subsistence	3,269	na	1%	1,590,823	10	239,452	2.3	15.1	6.5	99%		
2019	Subsistence	3,269	na	1%	1,590,823	10	239,442	2.3	15.1	6.5	99%		
2020	Subsistence	3,269	na	1%	1,590,823	10	239,434	2.3	15.1	6.5	99%		

Appendix 1. Lake Trout, Lake Superior, MI-5

Scenario = Assume minimal subsistence fishing. Assume sport fishing effort increases by 20%.

45% SSBR = 0.37
2006 SSBR = 1.06
2020 SSBR = 1.06

Year	Commercial (Tribal)				Recreational (State)							Lake trout population	
	Effort limit (million feet)	Harvest limit (pounds)	CPUE (pounds per million feet)	Percent of allowable harvest	Potential effort (hours)	Minimum size limit	Harvest limit (pounds)	CPUE (fish per 100 hours)	CPUE (pounds per 100 hours)	Average size (pounds)	Percent of allowable harvest	Female spawning biomass	SSBR
Reference Period													
1996	0.000	-	-	-	61,750	10	55,409	18.1	89.7	4.9	100%		
1997	0.000	-	-	-	72,922	10	72,385	20.7	99.3	4.8	100%		
1998	0.000	-	-	-	54,612	10	57,867	21.6	106.0	4.9	100%		
Sustainable Management Period (TAM = 45%)													
2001	Subsistence	2,041	na	4%	75,714	10	51,914	17.7	68.6	3.9	96%		
2002	Subsistence	1,949	na	4%	75,714	10	50,787	17.6	67.1	3.8	96%		
2003	Subsistence	1,902	na	4%	75,714	10	51,977	18.1	68.6	3.8	96%		
2004	Subsistence	1,913	na	4%	75,714	10	52,448	18.2	69.3	3.8	96%		
2005	Subsistence	1,908	na	4%	75,714	10	51,677	17.9	68.3	3.8	96%		
2006	Subsistence	1,908	na	4%	75,714	10	51,174	17.7	67.6	3.8	96%		
2007	Subsistence	1,893	na	4%	75,714	10	50,873	17.6	67.2	3.8	96%		
2008	Subsistence	1,883	na	4%	75,714	10	50,750	17.6	67.0	3.8	96%		
2009	Subsistence	1,882	na	4%	75,714	10	50,713	17.6	67.0	3.8	96%		
2010	Subsistence	1,878	na	4%	75,714	10	50,647	17.6	66.9	3.8	96%		
2011	Subsistence	1,875	na	4%	75,714	10	50,614	17.6	66.8	3.8	96%		
2012	Subsistence	1,875	na	4%	75,714	10	50,614	17.6	66.8	3.8	96%		
2013	Subsistence	1,875	na	4%	75,714	10	50,614	17.6	66.8	3.8	96%		
2014	Subsistence	1,875	na	4%	75,714	10	50,614	17.6	66.8	3.8	96%		
2015	Subsistence	1,875	na	4%	75,714	10	50,614	17.6	66.8	3.8	96%		
2016	Subsistence	1,875	na	4%	75,714	10	50,614	17.6	66.8	3.8	96%		
2017	Subsistence	1,875	na	4%	75,714	10	50,614	17.6	66.8	3.8	96%		
2018	Subsistence	1,875	na	4%	75,714	10	50,614	17.6	66.8	3.8	96%		
2019	Subsistence	1,875	na	4%	75,714	10	50,614	17.6	66.8	3.8	96%		
2020	Subsistence	1,875	na	4%	75,714	10	50,614	17.6	66.8	3.8	96%		

Appendix 1. Lake Trout, Lake Superior, MI-6

Scenario =Effort-based, phase-in on commercial fishery from 2001 through 2005. Phase in a 22-in minimum size limit on sport fishery by 2005.
Adjust commercial and sport effort to achieve a 50/50 split from 2006 through 2020.

45% SSBR = 0.24
2006 SSBR = 0.24
2020 SSBR = 0.24

Year	Commercial (Tribal)				Recreational (State)							Lake trout population	
	Effort limit (million feet)	Harvest limit (pounds)	CPUE (pounds per million feet)	Percent of allowable harvest	Potential effort (hours)	Minimum size limit	Harvest limit (pounds)	CPUE (fish per 100 hours)	CPUE (pounds per 100 hours)	Average size (pounds)	Percent of allowable harvest	Female spawning biomass	SSBR
Reference Period													
1996	0.820	17,322	21,130	47%	35,370	10	19,256	12.0	54.4	4.5	53%		
1997	0.452	20,107	44,496	48%	42,493	10	21,819	11.6	51.3	4.4	52%		
1998	0.879	19,604	22,308	48%	38,157	10	21,439	12.6	56.2	4.4	52%		
Phase-in Period (Effort-Based for Commercial Fishery, Size Limit-Based for Recreational Fishery)													
2001	0.717	10,942	15,265	51%	46,408	20	10,458	5.8	22.5	3.9	49%		
2002	0.681	10,920	16,035	50%	46,408	20	10,752	6.1	23.2	3.8	50%		
2003	0.638	10,532	16,508	48%	46,408	20	11,203	6.3	24.1	3.8	52%		
2004	0.638	10,034	15,728	51%	46,408	22	9,705	5.4	20.9	3.9	49%		
2005	0.638	10,267	16,093	50%	46,408	22	10,142	5.6	21.9	3.9	50%		
Sustainable Management Period (TAM = 45%)													
2006	0.638	10,632	16,666	50%	46,408	22	10,442	5.8	22.5	3.9	50%		
2007	0.638	10,706	16,782	50%	46,408	22	10,644	5.9	22.9	3.9	50%		
2008	0.638	10,742	16,838	50%	46,408	22	10,758	5.9	23.2	3.9	50%		
2009	0.638	10,757	16,861	50%	46,408	22	10,805	5.9	23.3	3.9	50%		
2010	0.638	10,762	16,870	50%	46,408	22	10,826	6.0	23.3	3.9	50%		
2011	0.638	10,765	16,873	50%	46,408	22	10,835	6.0	23.3	3.9	50%		
2012	0.638	10,765	16,874	50%	46,408	22	10,838	6.0	23.4	3.9	50%		
2013	0.638	10,765	16,875	50%	46,408	22	10,839	6.0	23.4	3.9	50%		
2014	0.638	10,765	16,875	50%	46,408	22	10,839	6.0	23.4	3.9	50%		
2015	0.638	10,765	16,875	50%	46,408	22	10,839	6.0	23.4	3.9	50%		
2016	0.638	10,765	16,875	50%	46,408	22	10,839	6.0	23.4	3.9	50%		
2017	0.638	10,765	16,875	50%	46,408	22	10,839	6.0	23.4	3.9	50%		
2018	0.638	10,765	16,875	50%	46,408	22	10,839	6.0	23.4	3.9	50%		
2019	0.638	10,765	16,875	50%	46,408	22	10,839	6.0	23.4	3.9	50%		
2020	0.638	10,765	16,875	50%	46,408	22	10,839	6.0	23.4	3.9	50%		

Appendix 1. Lake Trout, Lake Superior, MI-7

Scenario = Assume commercial effort and sport effort increases by 20%.

45% SSBR = 0.20
2006 SSBR = 0.53
2020 SSBR = 0.53

Year	Commercial (Tribal)				Recreational (State)							Lake trout population	
	Effort limit (million feet)	Harvest limit (pounds)	CPUE (pounds per million feet)	Percent of allowable harvest	Potential effort (hours)	Minimum size limit	Harvest limit (pounds)	CPUE (fish per 100 hours)	CPUE (pounds per 100 hours)	Average size (pounds)	Percent of allowable harvest	Female spawning biomass	SSBR
Reference Period													
1996	1.047	23,450	22,403	69%	14,872	10	10,712	13.9	72.0	5.2	31%		
1997	3.400	41,499	12,207	78%	17,563	10	11,802	14.4	67.2	4.7	22%		
1998	3.010	27,299	9,069	74%	13,153	10	9,665	16.0	73.5	4.6	26%		
Sustainable Management Period (TAM = 45%)													
2001	2.983	48,045	16,108	69%	18,235	10	21,153	32.2	116.0	3.6	31%		
2002	2.983	51,486	17,262	73%	18,235	10	19,451	27.9	106.7	3.8	27%		
2003	2.983	54,064	18,126	72%	18,235	10	20,745	29.6	113.8	3.8	28%		
2004	2.983	55,313	18,545	72%	18,235	10	21,470	30.5	117.7	3.9	28%		
2005	2.983	55,700	18,674	72%	18,235	10	21,684	30.7	118.9	3.9	28%		
2006	2.983	55,934	18,753	72%	18,235	10	21,722	30.7	119.1	3.9	28%		
2007	2.983	55,986	18,770	72%	18,235	10	21,686	30.6	118.9	3.9	28%		
2008	2.983	55,935	18,753	72%	18,235	10	21,636	30.6	118.7	3.9	28%		
2009	2.983	55,931	18,752	72%	18,235	10	21,610	30.5	118.5	3.9	28%		
2010	2.983	55,827	18,717	72%	18,235	10	21,577	30.5	118.3	3.9	28%		
2011	2.983	55,773	18,699	72%	18,235	10	21,564	30.5	118.3	3.9	28%		
2012	2.983	55,773	18,699	72%	18,235	10	21,564	30.5	118.3	3.9	28%		
2013	2.983	55,773	18,699	72%	18,235	10	21,564	30.5	118.3	3.9	28%		
2014	2.983	55,773	18,699	72%	18,235	10	21,564	30.5	118.3	3.9	28%		
2015	2.983	55,773	18,699	72%	18,235	10	21,564	30.5	118.3	3.9	28%		
2016	2.983	55,773	18,699	72%	18,235	10	21,564	30.5	118.3	3.9	28%		
2017	2.983	55,773	18,699	72%	18,235	10	21,564	30.5	118.3	3.9	28%		
2018	2.983	55,773	18,699	72%	18,235	10	21,564	30.5	118.3	3.9	28%		
2019	2.983	55,773	18,699	72%	18,235	10	21,564	30.5	118.3	3.9	28%		
2020	2.983	55,773	18,699	72%	18,235	10	21,564	30.5	118.3	3.9	28%		

Appendix 2. Model estimates of harvest quota for lake whitefish by whitefish management unit in 1836 Treaty-ceded waters of the Great Lakes as used during the final stages of negotiations.

Total harvest (lb) for whitefish in Lake Michigan whitefish management units (WFMU) for 1999-2020 with target mortality rate used in the unit.

Year and TAM used ¹	Whitefish management unit								State share		
	WFM-00 65%	WFM-01 59%	WFM-02 65%	WFM-03 85%	WFM-04 65%	WFM-05 60%	WFM-06 65%	WFM-08 65%	WFM-01 200K or 10%	WFM-06 65 K or 30%	WFM-08 500 K or 22.5%
1999	1,420,742	477,853	211,960	1,223,717	332,021	170,017	140,976	416,853	47,785	42,293	93,792
2000	1,216,222	847,198	173,320	1,203,052	306,771	158,806	322,036	415,147	84,720	96,611	93,408
2001	1,323,355	659,310	143,700	2,397,616	577,825	258,313	551,763	2,551,846	65,931	165,529	574,165
2002	1,272,192	854,887	188,129	1,686,142	565,289	241,118	349,487	1,676,415	85,489	104,846	377,193
2003	1,250,747	960,488	225,231	1,524,416	558,347	233,733	249,959	1,312,155	96,049	74,988	295,235
2004	1,242,439	1,013,997	244,311	1,493,578	557,877	228,845	212,595	1,168,241	101,400	63,778	262,854
2005	1,239,875	1,040,501	251,961	1,488,065	558,631	226,743	185,382	1,113,252	104,050	55,615	250,482
2006	1,238,931	1,052,527	254,740	1,487,144	558,703	226,041	176,252	1,092,576	105,253	52,876	245,830
2007	1,238,597	1,057,639	255,718	1,486,992	558,715	225,646	173,390	1,085,045	105,764	52,017	244,135
2008	1,238,481	1,059,745	256,060	1,486,967	558,720	225,517	172,086	1,082,351	105,974	51,626	243,529
2009	1,238,440	1,060,612	256,180	1,486,963	558,721	225,454	171,622	1,081,402	106,061	51,487	243,316
2010	1,238,426	1,060,969	256,221	1,486,963	558,722	225,425	171,457	1,081,070	106,097	51,437	243,241
2011	1,238,421	1,061,116	256,236	1,486,963	558,722	225,413	171,399	1,080,954	106,112	51,420	243,215
2012	1,238,419	1,061,177	256,241	1,486,963	558,722	225,408	171,378	1,080,913	106,118	51,413	243,205
2013	1,238,418	1,061,202	256,243	1,486,963	558,722	225,406	171,371	1,080,899	106,120	51,411	243,202
2014	1,238,418	1,061,212	256,244	1,486,963	558,722	225,405	171,368	1,080,894	106,121	51,410	243,201
2015	1,238,418	1,061,216	256,244	1,486,963	558,722	225,405	171,367	1,080,892	106,122	51,410	243,201
2016	1,238,418	1,061,218	256,244	1,486,963	558,722	225,405	171,367	1,080,891	106,122	51,410	243,201
2017	1,238,418	1,061,219	256,244	1,486,963	558,722	225,405	171,367	1,080,891	106,122	51,410	243,201
2018	1,238,418	1,061,219	256,244	1,486,963	558,722	225,405	171,367	1,080,891	106,122	51,410	243,201
2019	1,238,418	1,061,219	256,244	1,486,963	558,722	225,405	171,367	1,080,891	106,122	51,410	243,201
2020	1,238,418	1,061,219	256,244	1,486,963	558,722	225,405	171,367	1,080,891	106,122	51,410	243,201

¹ Rule 4 is to increase total mortality on fully vulnerable age class to 65% (Z=1.05) by increasing fishing mortality unless resulting SPR_T (Spawning potential reduction target) is less than 0.20. If SPR_T is less than 0.20, find fishing multiplier that produces SPR = 0.20

Total harvest (lb) for whitefish in Lake Superior whitefish management units (WFMU) for 1999-2020 with target mortality rate used in the unit.

Year and TAM used ¹	Whitefish management unit					State share	
	WFS-04 55%	WFS-05 45%	WFS-06 37%	WFS-07 50%	WFS-08 65%	WFS-04 25K or 10%	WFS-05 130K or 16%
1999	88,491	292,112	43,385	537,861	84,866	8,849	46,738
2000	91,340	371,008	47,114	500,323	71,839	9,134	59,361
2001	377,091	933,264	51,617	494,649	91,306	37,709	149,322
2002	274,538	759,312	59,577	512,639	90,299	27,454	121,490
2003	218,928	649,591	63,922	524,201	88,975	21,893	103,935
2004	187,843	572,498	66,031	527,126	87,994	18,784	91,600
2005	170,289	520,142	65,871	528,551	87,782	17,029	83,223
2006	159,891	482,461	66,672	530,220	87,766	15,989	77,194
2007	153,869	455,046	67,823	531,271	87,749	15,387	72,807
2008	150,655	438,522	69,009	531,932	87,741	15,065	70,164
2009	148,957	428,585	70,084	532,349	87,739	14,896	68,574
2010	148,061	422,612	70,994	532,611	87,738	14,806	67,618
2011	147,589	419,021	71,731	532,776	87,737	14,759	67,043
2012	147,339	416,863	72,311	532,880	87,737	14,734	66,698
2013	147,208	415,565	72,759	532,945	87,737	14,721	66,490
2014	147,138	414,785	73,098	532,986	87,737	14,714	66,366
2015	147,102	414,316	73,352	533,012	87,737	14,710	66,291
2016	147,082	414,034	73,540	533,028	87,737	14,708	66,246
2017	147,072	413,865	73,678	533,038	87,737	14,707	66,218
2018	147,067	413,763	73,779	533,045	87,737	14,707	66,202
2019	147,064	413,702	73,852	533,049	87,737	14,706	66,192
2020	147,062	413,665	73,905	533,052	87,737	14,706	66,186

¹ Rule 4 is to increase total mortality on fully vulnerable age class to 65% ($Z=1.05$) by increasing fishing mortality unless resulting SPR_T (Spawning potential reduction target) is less than 0.20. If SPR_T is less than 0.20, find fishing multiplier that produces $SPR = 0.20$

Total harvest (lb) for whitefish in Lake Huron whitefish management units (WFMU) for 1999-2020 with target mortality rate used in the unit.

Year and TAM used ¹	Whitefish management unit					
	WFH-01 65%	WFH-02 70%	WFH-03 No calc. done	WFH-04 65%	WFH-05 69%	WFH-06 No calc. done
1999	237,307	315,624		340,484	250,148	
2000	195,682	214,094		228,570	182,076	
2001	285,004	158,729		411,601	617,497	
2002	378,113	248,742		619,347	509,433	
2003	437,870	350,847		761,713	659,455	
2004	463,261	399,800		814,900	760,598	
2005	473,617	417,069		839,083	804,087	
2006	480,374	425,623		849,366	821,098	
2007	484,221	429,558		854,654	829,495	
2008	486,605	431,799		857,813	834,510	
2009	488,126	433,219		859,812	837,768	
2010	489,158	434,199		861,181	840,039	
2011	489,908	434,930		862,198	841,732	
2012	490,444	435,461		862,930	842,962	
2013	490,810	435,829		863,429	843,820	
2014	491,033	436,053		863,727	844,350	
2015	491,153	436,170		863,878	844,634	
2016	491,210	436,223		863,944	844,767	
2017	491,236	436,244		863,971	844,822	
2018	491,247	436,252		863,981	844,843	
2019	491,253	436,254		863,985	844,850	
2020	491,255	436,255		863,986	844,852	

¹ Rule 4 is to increase total mortality on fully vulnerable age class to 65% (Z=1.05) by increasing fishing mortality unless resulting SPR_T (Spawning potential reduction target) is less than 0.20. If SPR_T is less than 0.20, find fishing multiplier that produces SPR = 0.20