2009 Annual Report on Implementation of the 2000 Consent Decree for 1836 Treaty-Ceded Waters of the Great Lakes

Prepared for:

Michigan United Conservation Clubs, Inc.

Michigan Fisheries Resource Conservation Coalition

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By:
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Preface

This report provides detailed information regarding the implementation of the 2000 Consent Decree in the 1836 Treaty-ceded waters of the Great Lakes during 2009, as required by the September 27, 2001 Memorandum of Understanding between the State of Michigan, Department of Natural Resources and Environment (MDNRE) and the Michigan United Conservation Clubs, Inc., Michigan Fisheries Resource Conservation Coalition, and Bay de Noc Great Lakes Sportfishermen, Inc.

FISHERIES

I. General Information

A. Large-mesh gill net retirement

In an effort to reduce the amount of large-mesh gill net fished by tribal fishers, the Consent Decree called 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 counted towards this commitment. The amount of gill net retired is based on comparison with the average effort during the base years 1993 through 1998 (Table 1). Gill net retirement has been accomplished through the trap-net conversion program and other methods.

The removal of large-mesh gill-net effort in lakes Huron and Michigan was successfully completed by 2003 when tribal fishers used approximately 25.5 million feet less than the 1993-1998 average. The 2009 tribal large-mesh gill-net effort in Lakes Michigan and Huron was approximately 21.9 million feet less than the 1993-1998 average (Table 1). For all three lakes, approximately 26.9 million feet less effort was fished in 2009 compared to the 1993-1998 average.

Table 1. Amount of large-mesh gill-net effort (1,000s ft) in the 1836 Treaty-ceded waters of the Great Lakes during base years 1993 to 1998 and preliminary effort in 2009.

Lake	Management Unit	Effort		2009 reduction[b]
		1993-98[a]	2009	
Michigan	MM-123	17,912	6,385	11,527
	MM-4	1,794	1,138	656
	MM-5	240	0	240
Huron	MH-1	16,470	6,965	9,505
	MH-2	6	0	6
Superior	MI-6	780	170	610
	MI-7	2,028	1,605	423
	MI-8	6,578	2,651	3,927
Totals		45,808	18,914	26,894

[a] Average annual effort during base years.
[b] The relative reduction in 2009 (average effort in base years minus effort in current year).

B. Report from Modeling Subcommittee and modeling process description

The Modeling Subcommittee (MSC) of the Technical Fisheries Committee (TFC) prepares an annual report entitled "Summary Status of Lake Trout and Lake Whitefish Populations in the 1836 Treaty-ceded waters of Lakes Superior, Huron, and Michigan, with recommended yield and effort levels" (referred to as the Status of the Stocks Report). In the past, the publication of this report has been delayed due to workloads and staff transition at the United States Fish and Wildlife Service. The MSC was able to get these reports back on schedule in 2009, as both the 2008 and 2009 Status of the Stocks reports were published. Copies of these reports are available on the 2000 Consent Decree page of the MDNRE's Tribal Coordination Unit website: **http://www.michigan.gov/dnr/0,1607,7-153-10364_36925---,00.html.** This annual report documents the status of lake trout and lake whitefish stocks at the time harvest limits were developed for each year and describes the parameters used in the modeling efforts.

Statistical catch-at-age analysis (SCAA) is the modeling process used to describe populations of lake trout and lake whitefish and to set the respective harvest limits. The modeling process begins by estimating parameters that describe each of the lake trout and lake whitefish stocks over time. Models are developed for the stocks in each defined Management

Unit with data from both standard assessments and commercial and recreational fisheries. Age-specific abundance and mortality rates are estimated for each year that data are available. All models are 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 and spawning stock biomass, set forth in the Consent Decree.

All fish populations are regulated by three forces or dynamic rate functions, which are 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 the fact 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 mortality of fish returned to the water due to hooking and netting injuries. 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, and predation. Natural mortality is estimated from an equation that relates the growth parameters of lake trout and lake whitefish to water temperature. 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 that is beyond the initial period of high 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 almost entirely on stocking (e.g., lake trout in Lake Michigan), 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. Currently, in lakes Michigan and Huron, lake trout recruitment is defined as the number of yearlings stocked or migrating into an area less those migrating out of the 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 (Lake Superior) and lake whitefish (all Management Units), 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 that produced them.

After parameters have been estimated, the next step is the short-term projection of total allowable catches (TACs). Harvest levels are set in order to not exceed target mortality rates set forth in the Consent 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 class is contributing considerably to the spawning population. A more extensive description of the entire modeling process is contained in the *Stock Assessment Models* section of the Status of the Stocks Reports.

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, TAC's and TAE's (Total Allowable Effort)

A. Lake trout

As required by the Consent Decree, the MSC calculates annual harvest and effort limits for lake trout and provides these recommendations to the TFC. After reviewing the recommendations, the TFC must approve harvest and effort limits by April 30th of each year to be submitted to the Parties for final approval. In recent years the Parties have not been able to approve harvest limits in MM-4 and MM-5; however, in August of 2009 a stipulation was agreed upon by the Parties that established methods for calculating harvest limits in these units. In MM-4 the stipulation established a baseline harvest limit for both the State and the Tribes, and if the State does not harvest its full allotment of lake trout in a given year, the remaining balance is transferred and added to the Tribal harvest limit the following year. In MM-5, the stipulation established a base harvest limit only for the Tribes. In both units, if the model generated harvest limit is higher than the base levels established by the stipulation, the model recommendation will be used. These methods will be in place until sea lamprey mortality in each unit is significantly below 1998 levels for three consecutive years. A map of the lake trout Management Units is provided (Figure 1), as are the 2009 lake trout harvest and effort limits for each Management Unit (Table 2).

The Consent Decree has a provision that harvest limits in fully-phased units should not change by more than 15% over the previous year unless all the Parties agree a greater change is appropriate. In 2009, there were four fully-phased Management Units where the model recommendations represented a change of greater than 15% of the 2008 harvest limits; MI-5, MI-6, MI-7, and MM-67. The TFC invoked the 15% rule in MI-5 and MI-7, keeping the 2009 TAC within 15% of the 2008 TAC. In these two units, the model recommendation was lower than the 2008 levels. The TFC waived the 15% rule in MI-6 and MM-67. In these units the model recommendation was higher than the 2008 level, and the TFC allowed the 2009 limits to increase to the model recommendations.

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 2009 fishing season.

		Model-output TACs		Final TACs		
Lake	Unit	State	Tribal	State	Tribal	Tribal TAE
Michigan	MM-123[a]	0	0	50,000	453,000	9,360,000
	MM-4[a]	41,990	62,984	63,000	138,059	468,000
	MM-5[a]	92,417	61,611	92,417	61,611	850,000
	MM-67	378,551	42,061	378,551	42,061	NA
Huron	MH-1[b]	18,240	184,431	20,000	210,000	7,687,000
	MH-2	83,277	4,383	83,277	4,383	NA
Superior	MI-5[c]	93,000	4,900	121,525	5,419	NA
	MI-6	74,000	74,000	74,000	74,000	6,176,000
	MI-7[c]	29,700	69,300	33,452	78,030	4,257,000

[a] Final TACs resulted from orders to amend the Consent Decree
[b] Per October 2007 Executive Council agreement
[c] TFC invoked the 15% rule, limiting the TAC to a 15% deviation from the 2007 harvest limit.

B. Lake Whitefish

As required by the Consent Decree, the MSC calculates annual lake 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 MSC also generates recommendations for HRGs that are considered by each Tribe. After reviewing and discussing recommended harvest limits for lake whitefish, the TFC submits these harvest limits to the Parties for final approval by December 1 for the subsequent year. The TFC reached consensus on harvest limits for all shared whitefish Management Units, and these figures were sent to the Parties in December 2008. A map of lake whitefish Management Units is provided (Figure 2), as are the 2009 lake whitefish harvest limits for each Management Unit (Table 3).

The MSC was able to generate recommendations for harvest limits or HRGs in all but three Management Units. In units WFH-03 and WFM-07 there were insufficient series of data, thus the models were not reliable for estimating harvest limits. The HRG for WFH-03 was lowered from a historical level of 306,000 lb. to 150,000 lb in 2008, and that conservative guideline was carried forward in 2009 as well. In 2004, the HRG for WFM-07 was set at

500,000 lb., which represented the approximate average of the model-generated harvest limits from adjacent units WFM-06 and WFM-08, and no changes have been made since. In unit WFS-06 a lack of commercial catch sampling resulted in poor model performance; thus, the 2009 HRG was again set at 210,000 lb, the same level it has been since 2004. In WFM-02 the 2009 HRGs was set at peak historical harvest, which is lower than the model output. In WFS-07 low model performance resulted in a HRG that was set lower than the model recommendation and equal to the 2008 HRG. Likewise, in WFH-04 the 2008 HRG was carried forward for 2009 as the model performance was low. The Tribes accepted model-generated recommendations for HRGs in all other units.

Table 3. Model estimates for total allowable catch (TAC; pounds) or harvest regulation guideline (HRG; pounds) for lake whitefish by Management Unit in 1836 Treaty-ceded waters of the Great Lakes for the 2009 fishing season.

Lake	Unit	Final State TAC	Model output Tribal TAC	Final Tribal TAC or HRG
Michigan	WFM-01	200,000	2,844,000	2,844,000
	WFM-02	0	797,000	558,000
	WFM-03	0	2,820,000	2,820,000
	WFM-04	0	846,000	846,000
	WFM-05	0	282,000	282,000
	WFM-06	62,000	145,000	145,000
	WFM-07[a]	0	-	500,000
	WFM-08	500,000	626,000	626,000
Huron	WFH-01	0	467,000	467,000
	WFH-02	0	500,000	500,000
	WFH-03[a]	0	-	150,000
	WFH-04	0	289,000	546,000
	WFH-05	0	962,000	962,000
Superior	WFS-04	8,000	73,000	73,000
	WFS-05	66,000	346,000	346,000
	WFS-06[a]	0	-	210,000
	WFS-07	0	636,000	535,000
	WFS-08	0	132,000	132,000

[a] No model output

III. Harvest and Effort Reporting

A. State-licensed commercial and recreational fishing

1. Lake Trout

Lake trout harvest by the State of Michigan consists almost entirely of harvest by sport anglers. Lake trout harvest by State-licensed recreational fishers in 2009 was below harvest limits in all Management Units, except MH-1. The 2009 State lake trout harvest limit in MH-1 was 20,000 lb, and final State harvest was 25,304 lb, representing a 26% deviation above the harvest limit. As a result of this over harvest, the State's final harvest limit for 2010 will be reduced by 5,304 lb as a penalty. Changes in length limits were made for MH-1 to take effect in 2010, with the goal of bringing harvest back in line with harvest limits. The harvest limits and reported harvest in Lake Superior represent lean lake trout only. Throwback mortality from the State recreational fishery (lake trout caught by hook and line that are returned to the water and subsequently die) was estimated for each Management Unit. These fish were added to the number and weight of lake trout harvested in the recreational fishery (Table 4). There were no lake trout regulation changes for the State recreational fishery between 2008 and 2009.

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. The Consent Decree does not require harvest limits to be set for these species.

Table 4. Total effort, number, and weight (pounds) of estimated State-licensed recreational harvest for both creel and charter anglers, by Management Unit in 1836 Treaty-ceded waters of the Great Lakes for the 2009 fishing season.

Lake	Management Unit	Total effort (angler hours)	Lake trout[a,b]		Walleye		Yellow perch		Chinook salmon		Coho salmon	
			Number	Weight	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Michigan	MM-1	252,533	0	0	10,022	28,733	24,796	2,480	753	4,608	0	0
	MM-2	22,745	12	80	198	568	44	4	1,475	16,682	0	0
	MM-3	82,181	2,221	19,511	0	0	0	0	5,273	59,638	1	7
	MM-4	205,653	5,784	33,282	28	80	22,760	2,276	6,972	89,032	40	270
	MM-5	137,412	2,932	16,149	0	0	0	0	24,969	281,151	3,819	32,232
	MM-6	445,318	6,037	36,113	23	66	18,575	1,858	74,565	864,208	5,336	40,874
	MM-7	314,023	5,734	39,523	81	233	63,146	6,315	35,592	365,494	5,351	27,611
Totals		1,459,865	22,720	144,658	10,352	29,680	129,321	12,929	149,599	1,680,813	14,547	100,994
Huron	MH-1	310,164	4,551	25,304	4,678	15,508	96,598	37,995	4,410	29,425	153	706
	MH-2	56,222	3,231	21,743	1,947	7,476	0	0	1,082	8,360	139	1,227
Totals		366,386	7,782	47,047	6,625	22,984	96,598	37,995	4,012	37,785	292	1,933
Superior	MI-5[c]	44,249	6,176	25,422	0	0	0	0	541	1,921	1,841	3,093
	MI-6	45,957	3,582	15,369	101	575	0	0	326	1,030	2,450	4,043
	MI-7	23,126	1,874	6,958	8	46	136	92	138	429	1,723	2,361
Totals		113,332	11,632	47,749	8	46	136	92	1,005	3,380	6,014	9,497
Grand totals		1,939,583	42,134	239,454	16,985	52,710	226,055	51,016	154,616	1,721,978	20,853	112,424

[a] Lake Superior lake trout number and weight do not include Siscowets; number of Siscowet harvested was estimated at 567, 897, and 1,453 fish, for MI-5, MI-6, and MI-7, respectively.

[b] Includes throwback mortality for all units.

[c] Includes recreational harvest from entire unit; harvest from 1842 Treaty-ceded area was not removed.

2. Lake Whitefish

Lake whitefish harvest by State-licensed commercial fishers was below harvest limits in all whitefish Management Units. The commercial whitefish harvest reported in Table 5 includes catch from targeted effort (trap nets). Catch of lake whitefish in chub nets is minimal most years and was zero pounds for 2009.

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 Grand Traverse Bay was an estimated 14,921 pounds in 2009. 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). Estimated recreational harvest of whitefish in these areas was 43, 5,051, and 11,769 pounds, respectively. The State does not estimate targeted recreational effort for lake whitefish in these Management Units.

Table 5. Summary of State-licensed commercial lake whitefish harvest (pounds) and effort (trap-net lifts) by lake whitefish Management Unit in 1836 Treaty-ceded waters of the Great Lakes for the 2009 fishing season.

Lake	Unit	Harvest	Effort
Michigan	WFM-01	192,523	260
	WFM-06	8,989	41
	WFM-08	195,730	339
Lake totals		397,242	640
Superior	WFS-04	2,190	14
	WFS-05	48,838	297
Lake totals		51,028	311
Grand totals		448,270	951

B. Tribal commercial and subsistence fishing

Data in this section are as reported to the MDNRE from the Chippewa Ottawa Resource Authority (CORA). At the time this report was completed, CORA had not finalized harvest data for 2009; thus, all reported numbers are considered preliminary. It is unknown if these preliminary numbers will change when they are made final, though the differences should be minor in most Management Units.

1. Lake trout

In 2009, lake trout harvest by tribal commercial fishers was below established harvest limits in all Management Units, except MH-1. The Tribal TAC in MH-1 was 210,000 lb, and the preliminary harvest estimate was 222,688 lb. This represents a deviation of 6% above the harvest limit, which does not exceed the 15% buffer and does not constitute a penalty for 2010. 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). The Tribes estimated the throwback mortality from trap and gill nets in MH-1 where special interim regulations apply. As a result of the October 2007 Executive Council agreement, it is stipulated that in 2007, 2008 and 2009, the estimated pounds of trap and gill-net throwback lake trout killed do not count against the Tribal harvest limit in MH-1.

Table 6. Summary of preliminary Tribal commercial lake trout harvest (pounds) by Management Unit in 1836 Treaty-ceded waters of the Great Lakes for the 2009 fishing season. Gill-net harvest includes that from small-mesh and large-mesh gill nets.

Lake	Unit	Trap-net harvest	Gill-net harvest	Total harvest
Michigan	MM-1,2,3	9,665	204,888	214,553
	MM-4	11,752	121,197	132,949
	MM-5	0	0	0
	MM-6,7	12,520	211	12,731
Lake total		33,937	326,296	360,233
Huron	MH-1	21	222,667	222,688
	MH-2	0	0	0
Lake total		21	222,667	222,688
Superior	MI-5	0	0	0
	MI-6	0	4,678	4,678
	MI-7	0	57,315	57,315
	MI-8	9,379	28,774	38,153
Lake total		9,379	90,767	100,146
Grand total		43,337	639,730	683,067

2. Lake Whitefish

Lake whitefish harvest by Tribal commercial fishers was below the approved harvest limits and HRGs in all Management Units. In Management Units that are not shared, the Tribes manage the fishery in accordance with the Tribal Plan and no penalty is incurred for overharvest.

In shared whitefish management zones, overharvest penalties are incurred when a party exceeds the harvest limit by greater than 25%; no harvest limits were exceeded in shared zones.

Table 7. Summary of preliminary Tribal commercial lake whitefish harvest (pounds) and targeted effort (trap net-lifts or 1,000 feet of large-mesh gill net) by Management Unit in 1836 Treaty-ceded waters of the Great Lakes for the 2009 fishing season. Minor harvest from small-mesh gill nets is also included in gill-net harvest, but not effort.

		Trap nets		Gill nets		Total
Lake	Unit	Harvest	Effort	Harvest	Effort	harvest
Michigan	WFM-01	879,073	1,540	0	0	879,073
	WFM-02	50,100	66	245,540	2,036	295,640
	WFM-03	739,766	2,009	118,236	1,629	858,002
	WFM-04	220,910	794	91,939	1,608	312,849
	WFM-05	92,510	403	92,853	1,658	185,363
	WFM-06	0	0	0	0	0
	WFM-07	258,135	582	0	0	258,135
	WFM-08	25,683	70	0	0	25,683
Lake totals		2,266,177	5,464	548,568	6,931	2,814,745
Huron	WFH-01	132,635	586	141,770	2,647	274,405
	WFH-02	150,594	755	47,836	1,102	198,430
	WFH-03	0	0	0	0	0
	WFH-04	0	0	150,737	2,248	150,737
	WFH-05	511,985	907	0	0	511,985
Lake totals		795,214	2,248	340,343	5,997	1,135,557
Superior	WFS-04	0	0	0	0	0
	WFS-05	0	0	12,315	170	12,315
	WFS-06	0	0	19,433	389	19,433
	WFS-07	129,634	418	218,204	3,082	347,838
	WFS-08	53,402	288	35,347	664	88,749
Lake totals		183,036	706	285,299	4,305	468,335
Grand totals		3,244,427	8,418	1,174,210	17,233	4,418,637

3. Walleye

Commercial fishing for walleye is permitted in and around Grand Traverse Bay and the Manitou Islands, in northeastern Lake Michigan (Naubinway to Gros Cap), and around St. Martin's Bay and the Les Cheneaux Islands in Lake Huron. There are gear, season, depth, size, and area restrictions on the various walleye fisheries, though no harvest limits are set forth in the Consent Decree. Walleye are occasionally harvested as incidental catch; thus, sometimes there is harvest with no effort listed for a Unit because the fishers were actually targeting other species. The largest reported walleye harvest in 2009 occurred in Lake Huron unit MH-1 (31,847 pounds).

Table 8. Summary of Tribal commercial walleye harvest (pounds) and targeted effort (trap-net lifts or 1,000 feet of small or large mesh gill net) by Management Unit in 1836 Treaty-ceded waters of the Great Lakes for the 2009 fishing season.

		Trap nets		Gill nets		Total harvest
Lake	Unit	Harvest	Effort	Harvest	Effort	
Michigan	MM-1,2,3	354	0	5,899	82	6,253
	MM-4	852	0	1,678	4	2,530
Lake totals		1,206	0	7,577	86	8,783
Huron	MH-1	413	0	31,847	672	32,260
Superior	MI-7	0	0	18	0	18
	MI-8	61	0	987	61	1,048
Lake totals		61	0	1,005	61	1,066
Grand totals		1,680	0	40,429	819	42,109

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 Consent Decree. The largest yellow perch harvest in 2009 was in Grand Traverse Bay, Unit MM-4, where harvest was 711 pounds (Table 9), a 78% decrease from 2008 harvest levels.

Yellow perch are occasionally harvested as incidental catch; thus, sometimes there is harvest with no effort listed for a unit because the fishers were actually targeting other species.

Table 9. Summary of Tribal commercial yellow perch harvest (pounds) and targeted effort (trap-net lifts or 1,000 feet of large-mesh and small-mesh gill net) by Management Unit in 1836 Treaty-ceded waters of the Great Lakes for the 2009 fishing season.

		Trap nets		Gill nets		Total
Lake		Harvest	Effort	Harvest	Effort	Harvest
Michigan	MM-1,2,3	0	0	65	0	65
	MM-4	31	0	680	78	711
Lake totals		31	0	745	78	776
Huron	MH-1	0	0	68	0	68
Superior	MI-8	0	0	18	0	18
Grand totals		31	0	831	78	862

5. Chinook and Coho salmon

Tribal commercial fisheries for salmon exist in northeastern Lake Michigan near shore 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 near shore from Cordwood Point to Hammond Bay Harbor light. There is no target fishery for salmon in Lake Superior, but fishers are allowed to harvest these species as incidental catch. Fishing is restricted by season, gear, depth, and area; though no harvest limits are set. The largest Chinook salmon harvest in 2009 occurred in Lake Huron unit MH-1 (Table 10). The 189,775 lb harvested in MH-1 represents a 44% increase over the 2008 take of Chinook salmon. Coho salmon were only harvested from Lake Superior (Table 11).

Table 10. Summary of Tribal commercial Chinook salmon harvest (pounds) and targeted effort (trap-net or 1,000 feet of gill net) by Management Unit in 1836 Treaty-ceded waters of the Great Lakes for the 2008 fishing season.

		Trap nets		Gill nets		Total
Lake		Harvest	Effort	Harvest	Effort	harvest
Michigan	MM-1,2,3	112	0	90	0	202
	MM-4	0	0	1,708	4	1,708
Lake totals		112	0	1,798	4	1,910
Huron	MH-1	153	0	189,622	1,592	189,775
Superior		0	0	0	0	0
Grand totals		265	0	191,420	1,596	191,685

Table 11. Summary of Tribal commercial Coho salmon harvest (pounds) and targeted 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 2008 fishing season.

		Trap nets		Gill nets		Total
Lake		Harvest	Effort	Harvest	Effort	harvest
Superior	MI-7	0	0	439	0	439
	MI-8	0	0	1,076	0	1,076
Lake totals		0	0	1,515	0	1,515

6. Subsistence fishing

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-ceded 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 certain 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 from their respective Tribe, and must abide by provisions of the Tribal Code. Additionally, subsistence fishing with gill or trap net requires a Tribal permit that may be limited in duration and by area. The MDNRE is to be provided with copies of all subsistence permits. The Consent Decree states that data from the subsistence harvest reports of Tribal fishers shall be compiled by CORA and provided to the Parties within six (6) months. Preliminary subsistence harvest and effort for 2009 is included below (Table 12). These values are as reported by subsistence fishers.

Table 12. Summary of preliminary Tribal subsistence harvest (round pounds) for each Management Unit by species and gear, including gill-net effort (feet of net lifted) for the 2009 fishing season.

Gear	Statistical District	Atlantic Salmon	Bass	Brown trout	Bullhead	Burbot	Carp	Catfish	Freshwater drum	Gizzard shad	Lake herring	Lake trout
Gill Net	MH-1	4	30	0	0	0	10	3	0	0	4	148
	MI-6	0	0	0	0	18	0	0	0	0	0	139
	MI-7	0	0	0	0	0	0	0	0	0	0	131
	MI-8	0	0	0	0	9	0	0	0	0	1,413	119
	MM-1	0	96	0	4	332	460	0	0	0	0	18
	MM-2	0	0	6	0	3	800	0	0	140	0	75
	MM-3	0	4	12	0	0	30	0	110	0	0	643
	MM-7	0	0	0	0	0	0	0	0	0	0	11
	St. Marys River	6	5	8	0	67	30	0	0	0	173	16
	Gill net total	10	135	26	4	429	1,330	3	110	140	1,590	1,300

Gear	Statistical District	Menominee	Northern pike	Rainbow trout	Rock bass	Salmon	Smelt	Splake	Steelhead	Sucker	Walleye	Whitefish	Yellow perch	Total Gill-Net Effort
Gill Net	MH-1	0	20	0	0	0	0	0	29	4	217	70	19	9,100
	MI-6	0	3	82	0	49	0	17	15	115	13	530	0	10,350
	MI-7	63	0	0	0	348	0	0	35	21	0	25	0	2,800
	MI-8	85	184	131	0	815	247	0	47	76	259	953	74	35,880
	MM-1	0	663	0	12	30	0	0	12	1,183	4,583	457	561	50,810
	MM-2	0	41	207	0	0	0	0	50	900	353	10	0	6,400
	MM-3	70	3	222	0	413	0	0	1,378	107	216	758	41	14,950
	MM-7	0	0	0	0	13	0	0	159	0	4	0	0	900
	St. Marys River	1	120	45	0	293	148	0	0	30	27	67	131	9,326
	Gill net total	219	1,034	687	12	1,961	395	17	1,725	2,436	5,672	2,870	826	140,516

7. Fisheries Contacts

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LAW ENFORCEMENT

I. Introduction

The 2000 Consent Decree establishes a Law Enforcement Committee (LEC) as the primary body for consultation and collaboration on enforcement issues pertaining to the fisheries in 1836 Treaty-Ceded Waters of the Great Lakes. The LEC is composed of the chief law enforcement officer or designee of each tribe and the chief law enforcement officer or designee of the Michigan Department of Natural Resources and Environment (MDNRE). The LEC is required to meet four times annually. The Decree requires that the LEC review summary reports of all law enforcement activities of member agencies during the previous year.

The Consent Decree also requires that the State maintain adequate staffing and equipment to implement enforcement activities and to monitor commercial fishing activity on the Great Lakes. This report provides a summary of 1836 Treaty fishery enforcement activity for the MDNRE Commercial Fish Enforcement Unit (CFEU) in 2009.

A. General Information

1. Staffing

This year the CFEU lost two members. In early May, Commercial Fish Specialist (CFS) John Morey, who was stationed in Rogers City, transferred into the Department's Recreational Safety, Education and Enforcement Section. In addition, 2nd /Lieutenant Richard Bonner retired in August after 37 years of service with the State of Michigan. At the present time, the CFEU is manned by (4) Commercial Fish Boat Captains and (1) Commercial Fish Investigator (CFI). Currently the CFI is also acting as the unit's supervisor until March 2010. There are (3) vacant CFS positions, and one vacant unit supervisor position. The CFS vacancies are in Leland, Charlevoix, and Rogers City.

As in years past, the CFEU had CFS Larry Desloover come north from his responsibilities with the State-licensed commercial fishermen in Saginaw Bay to assist with CORA Group Patrols conducted in the 1836 Treaty of Washington waters. With lower officer numbers, the unit also relied heavily on conservation officers from the districts to assist on board the unit's patrol vessels for net inventories, boarding commercial fish tugs and conducting patrols. The assistance that the districts provided the CFEU was invaluable and very much appreciated. The assistance from the following district conservation officers are worth noting:

C.O. Greg Patton - Muskegon
C.O. Rich Stowe – Rogers City
C.O. Marvin Gerlach – Cedar River
C.O.'s Reid Roeske and John Wenzel – The Bays De Noc

The CFEU also used the districts smaller boats to assist with patrols. In return, the unit's larger patrol vessels were used to assist the districts with busy on the water special events and festivals such as the Red Bull Air Races and the National Traverse City Cherry Festival Air Show.

Table 13. 2009 officer hours worked for Consent Decree and State commercial fish issues.

Enforcement Effort	CFEU (hrs)	LED* (hrs)	Total (hrs)
Consent Decree	4,775	529	5,304
State Commercial	1,932	70	2,002
Wholesale Fish	154	153	307
Totals	6,861	752	7,613

*LED represents hours worked by other MDNRE Law Enforcement Division personnel to address commercial fish issues.

2. Equipment

For the 2009 season all of the SeaArk Dauntless Class vessels were put to use for a total of 717 sea service hours. In addition there were approximately 39 hours put in on district vessels for a total of 756 hours. Repairs were required on three of the unit's vessels. Both shafts on the William Alden Smith were pulled during the off season and straightened. They were reinstalled with new bushings and seals. The port engine starter was rebuilt, the fuel system was drained and cleaned, and the fuel system sending unit was replaced. The H. Ransom Hill developed a transmission problem with the rear main seal, requiring the transmission to be removed, repaired and reinstalled. The M.W. Neal had a 2000 hour inspection performed, and also required a rather costly shifter repair. The unit is actively seeking grant money to replace the aging electronic equipment on the William Alden Smith, and upgrades for nighttime marine detection equipment. This will increase the effectiveness of the vessel and also allow some Homeland Security Patrols to be conducted.

Table 14. 2009 CFEU vessel service hours.

Vessel	1836 Treaty Fishery	State Fishery	1842 Treaty Fishery	Totals
WILLIAM ALDEN SMITH	54	54	N/A	108
RANSOM HILL	131	36	N/A	167
SHAFFER	N/A	10	N/A	10
M.W. NEAL	N/A	278	N/A	278
RICK ASHER	131	23	N/A	154
Other Vessels*	17	8	14	39
Totals	333	409	14	756

* The hours accumulated on non-unit vessels are from patrol logs.

During the 2009 season, the CFEU conducted a total of (118) patrols on board the unit's assigned vessels and also utilized local district patrol boats for (19) patrols. This practice along with lower fuel prices for 2009, allowed for substantial fuel savings compared to 2008. The CFEU boats consumed (5,520.86) gallons of fuel with a fuel expenditure of $15,444.53.

Table 15. Patrols, fuel consumption & fuel costs.

Vessel	Patrols	Fuel (Gal)	Cost ($)
WILLIAM ALDEN SMITH	19	1215.4	$3,319.91
RANSOM HILL	31	2122.1	$5,729.50
SHAFFER	2	20	$53.00
M.W. NEAL	40	834.12	$2,744.38
RICK ASHER	26	1329.24	$3,597.74
Other Vessels*	19	n/a	n/a
Totals	137	5520.86	$15,444.53

*Fuel for "Other Vessels" was paid for by the CFEU but a dollar amount was not available.

B. Enforcement

1. Complaints and Violations

In 2009, the CFEU investigated a total of (112) complaints, with (69) related to 1836 and 1842 Tribal commercial fishing; (43) complaints were received for the State commercial fishery, and (17) complaints were received related to the wholesale fish business (most for failure to report). Some of these complaints were unfounded, and the others resulted in a total of (22) citations being issued. Lastly, a total of (70) verbal warnings were issued, and (23) referrals were made to tribal officers.

Table 16. 2009 commercial fish complaints investigated by the CFEU.

Complaints	1836 Treaty Fishery	State Fishery*	1842 Treaty Fishery	Totals
Nets	42	9	4	55
Licensing	1	3	1	5
Access	1	1	0	2
Wholesale		17	0	17
Closed area / season	13	3	0	16
Other	7	10	0	17
Totals	64	43	5	112

* Includes netting complaints received on non-Tribal/non-State licensed individuals

Table 17. 2009 summary of commercial fisheries related violations

Violations	1836 Treaty Fishery	State Fishery*	1842 Treaty Fishery	Totals
Arrests	15	7	0	22
Referrals	22	0	1	23
Warnings	58	12	0	70
Totals	95	19	1	115

* Includes netting violations for non-Tribal/non-State licensed individuals

Complaints and Violations of note include the following:

- CFS Huff, while checking State wholesale purchase reports found a Little River Band (LRB) fisherman who was retaining and selling gross over harvest limits of walleye. Working with LRB Officers, the fisher was questioned and issued three separate citations for his violations.

- CFS Morey and Milkowski responded to a complaint that a Sault Ste. Marie (SSM) trap net conversion fisherman was using large mesh gill net in violation of the decree, and fishing through the ice on St. Martins Bay. The fisher was cited, and his catch of #320 of whitefish was seized and sold to a wholesale dealer with the monies going back to the tribe. The tribal fisherman later announced to the Sault Tribe Natural Resource Commission that he would not let the citation from the State stop him from fishing in violation of the consent decree.

- CFS Desloover worked a case concerning a State-licensed fisherman's trucking company possibly buying live fish in Wisconsin, and then transporting them back to Michigan which would be a violation of the federal VHS order. After some follow up interviews and review of records, it was determined that the fisher was in violation of Wisconsin Law in that he was not licensed to purchase fish in that state. The fish involved were consigned to a New York destination, and there was no violation of a state or federal VHS order.

- At the end of February, in one of the units most complicated and multi directional cases, tribal subsistence fishermen, non-tribal fishermen, tribal commercial fishermen and a State-licensed fish wholesaler were found to be involved in the illegal harvest of tons of walleye illegally taken out of the Bay de Noc area. The investigation started with the discovery of a large pile of walleye fillets back in 2006. Officers followed leads from there. Officers set up undercover surveillance of the bay to develop several suspects and multiple illegal net locations. After a use pattern was established, the fish in the nets were marked with a tracking device and discovered at the local wholesaler later on. This case is currently in the hands of the US Attorney and SSM special prosecutor. The

individuals involved have not yet been charged so these numerous violations were unable to be included in the violation table.

- CFI Shannon Van Patten and CFS Terry Short, along with District 2 C.O. Reid Roeske responded to a complaint from a local fisherman that had entangled his fishing lines with what he thought was a net on Little Bay de Noc. The officers found and removed over 600 feet of gill net that was loaded with rotten walleye. The nets are believed to be related to the above mentioned Bay de Noc walleye case.

- CFS Short and CFI Van Patten conducted numerous inspections on the State's only permitted commercial trawling vessel. They have also worked with Fisheries Division personnel to refine the permit wording for easier understanding and enforcement.

- CFS Desloover responded to complaints of a State-licensed fisher illegally keeping and marketing walleye. After many hours of covert surveillance as well as two boarding's, the complaint was determined to be unfounded.

- CFS Huff responded to a call of a pleasure boat that became entangled in a non-marked floating trap net off of Whitehall in Lake Michigan waters. The boater involved reported seeing nothing on the surface as they traveled at 28 MPH when their vessel was brought to a complete rapid stop throwing both occupants against the forward helm. The vessel was damaged, and one occupant sustained minor injuries. Follow up was done, and a State-licensed fisher out of Muskegon was contracted to pull the net. After breaking his gear, the contract fisher found two trap nets entangled together. One was a LRB tribal net and one was that of a State-licensed fisher. When interviewed, the State-licensed fisher told CFS Huff that he was actually missing two nets. The fisher contracted a commercial crane and barge at $700.00 an hour to pull both nets. Charges were sought against both the tribal and State-licensed fishers involved.

- While patrolling out of Marquette, CFI Van Patten and CFS Short responded to a call of a boater in distress. A small fishing boat caught in an abandoned gill net. They ended up

pulling almost 1,500 feet of gill net loaded with rotten fish, a ski pole, fishing pole, sauce pan, and a kite but no identification was found.

- CFS Milkowski, responding to several marine navigational complaints, located and removed over 600' of unmarked and abandoned tribal gill net from the De Tour Passage just north of Drummond Island. There was a tribal ID number found on one small marker. The subject was charged for abandoning the net.

- CFS Milkowski, CFS Desloover, and CFS Huff attended the grand opening celebration of the new Mackinaw City Marina. Following the dedication, the officers were in route back to Rogers City when they received a "may-day" call from a small boat in distress. About a mile from shore in Hammond Bay they found a 19' boat with 7 passengers onboard. The boat had struck a submerged rock, disabling the vessels out drive unit. The crew of the patrol boat took five of the passengers onboard the S. Ransom Hill. All five were very sea sick as there were reported 6' to 8' seas. The disabled boat, still with two onboard, was taken into tow by the patrol boat at 8:30 pm. It wasn't until 11:00 pm that they made it back to port in Rogers City.

- CFI Van Patten and CFS Short observed a small vessel with 2 men aboard set approximately #1,200 feet of gill net in Big Bay DeNoc. About 5 hours later, 4 men returned and pulled in the net which contained about #1,100 pounds of whitefish. When the officers contacted the men, one fled on foot, but not before being identified by CFI Van Patten. A ticket was issued to a non-native individual for fishing with an illegal device, and another individual was ticketed for subsistence fishing without a license. Warrants for fishing with an illegal device and R&O were sought for the other non-native individual that fled the scene. The fish and nets were seized, as well as a 14' boat and motor. In State court, one defendant received 24 months probation, $1,713 fines, costs, and fees, restitution of $5552.50 (to be split with the co defendant), 3 year suspension of fishing privileges, and 180 days in jail. The judge indicated that the jail time is to be served when he can do the least amount of damage to the fisheries resource. Time served will be between 4/15 to 5/30 to correspond to the walleye spawning season; and 10/19 to

11/30 to correspond to the whitefish spawning season. The remainder of jail time will be held until the end of the probation period, and revisited at that time. The second defendant received no probation, the same amount of fines, costs, fees, and restitution and 30 days in jail. His time will be split and served within the same spawning seasons.

2. Inspections

A total of 529 inspections of State and Tribal Fisheries were conducted by the CFEU statewide.

Table 18. 2009 CFEU inspections (from vessel log books & inspection forms).

Inspections	1836 Treaty Fishery	State Fishery	1842 Treaty Fishery	Totals
Nets	138	95	3	236
Boardings	41	25	1	67
Docksides	115	67	0	182
State Wholesale	23	21	0	44
Totals	317	208	4	529

C. Patrols

1. Joint Patrols

Officers from the CFEU conducted joint patrols with officers from the five signatory tribes. Joint patrols consisted of routine patrols with 1 or more tribal law enforcement officers, but did not include LEC sponsored group patrols which are summarized in Part E below.

- CFS Steve Huff and LRB Officer Mark Szynski worked approximately 9 patrols together in the Lake Michigan waters off of Ludington and Manistee. CFS Huff also worked 3 land based patrols with officers from the Grand Traverse Band.

- CFS Terry Short and CFI Shannon Van Patten worked 4 patrols with wardens from the Great Lakes Indian Fish and Wildlife Commission in both 1842 and 1836 waters.

- CFS Short and CFI Van Patten worked with Sault Tribe Officers on follow-up interviews and a grappling patrol stemming from the Little Bay DeNoc walleye case.

- CFS Milkowski worked 2 shore based patrols with officers from the Sault Tribe.

- Members of the CFEU and (4) Sault Tribe Officers teamed up in response to information that the Mackinac Tribe would be practicing its perceived commercial fishing right on the Great Lakes. The members set a gill net some 300' off shore, just to the north of Green Island in the Straights of Mackinaw. They used a small boat powered by an outboard that failed just after they set the gill net. This forced them to row the boat ashore, until the oar broke, which then required them to wade the boat to the shore. The net was in the water less than twenty minutes before the CFEU's vessel arrived on scene and pulled the 600' of net that they set. The SSM Officers issued citations to the two fishermen for being members of the SSM Band of Indians and not possessing a commercial fishing license.

2. LEC Group Patrols

The Decree requires the LEC to schedule a minimum of eight group patrols during the year [Section XVII (B) (f) (1)]. This past year (8) separate group patrols were set up. The dates where selected at LEC meetings conducted earlier in the year. As with every year, weather is always a major factor, and hopes are that it will be favorable for those patrols to take place.

- Both days of the CORA Group Patrol scheduled for Northern Lake Michigan in May had to be called off due to gale force winds.

- The CORA patrol scheduled for September 2nd and 3rd conflicted with the early Tribal Elk Season. CFS Huff and Desloover still ran the patrol along with C.O. Patton, and LRB Officer Szynski. The officers encountered 3 abandoned gill nets belonging to a LRB fisherman who was having problems getting his boat running. They were able to pull one 2,700 foot net full of rotting chubs and lake trout. One of the remaining nets was approved to be removed via contract between the tribe and another one of their fishermen. When this happened, the fisherman with the abandoned net finally got his boat running and assisted in the removal. The third net was located by the contract fisher, and that net was removed under supervision of the tribe. Overall, approximately 11,700 feet of net was removed from the area. The fisher was found responsible, and the judge

assessed him over $19,000 in restitution to cover the fish, officer's wages and boat fuel. Later, the fisher was given a reconsideration hearing. The restitution amount was reduced to $8,000 for the fish, $2,602.26 for the MDNRE costs, and a $200 fine. The suspect was put on a payment schedule of $50/month.

- The first day of the October Big Bay DeNoc patrol was canceled due to the weather. On the second day of the patrol, GLIFWC Officer Dan North accompanied the CFEU on the patrol.

3. MDNRE Patrols

In addition to the LEC Group Patrols, and the joint patrols conducted with tribal law enforcement officers, officers from the CFEU organized and executed several additional patrols frequently with local district conservation officers to address complaints that were received in specific areas during the year.

- CFS Milkowski and CFI Van Patten assisted the US Boarder Patrol, the Ontario Ministry of Natural Resources, Immigration and Customs Enforcement, and the Royal Canadian Mounted Police with "Operation Gro Cap." This was a multi-jurisdictional operation worked over several nights, focusing on marijuana smuggling along the St. Marys River. In conjunction with this, our officers focused on an area where a Canadian Subsistence Fisherman was alleged to be coming into Michigan waters at night and setting his nets.

- Unit members were involved with locating a "First Nation" gill net tug, suspected to be leaving a Canadian port in southern Lake Huron with an intended destination of fishing U.S waters of Whitefish Bay in Lake Superior. Help was enlisted from the USCG Air Station, Traverse City and District 2 Conservation Officer Gerald Thayer. The Coast Guard conducted a flight over the area and reported they were not able to locate the 66' gill net tug. It was not long after this that CO Thayer had a report that the tug was already in Lake Superior but on the Canadian side. Information through out the week indicated that the tug remained in Canadian waters.

4. Law Enforcement Contacts

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Patrol Vessel: H RANSOM HILL; CFS Craig Milkowski
Port: Rogers City, patrolling Northern Lake Huron, St. Marys River, and Eastern Lake Superior
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Patrol Vessel: M.W. NEAL; Captain CFS Larry Desloover
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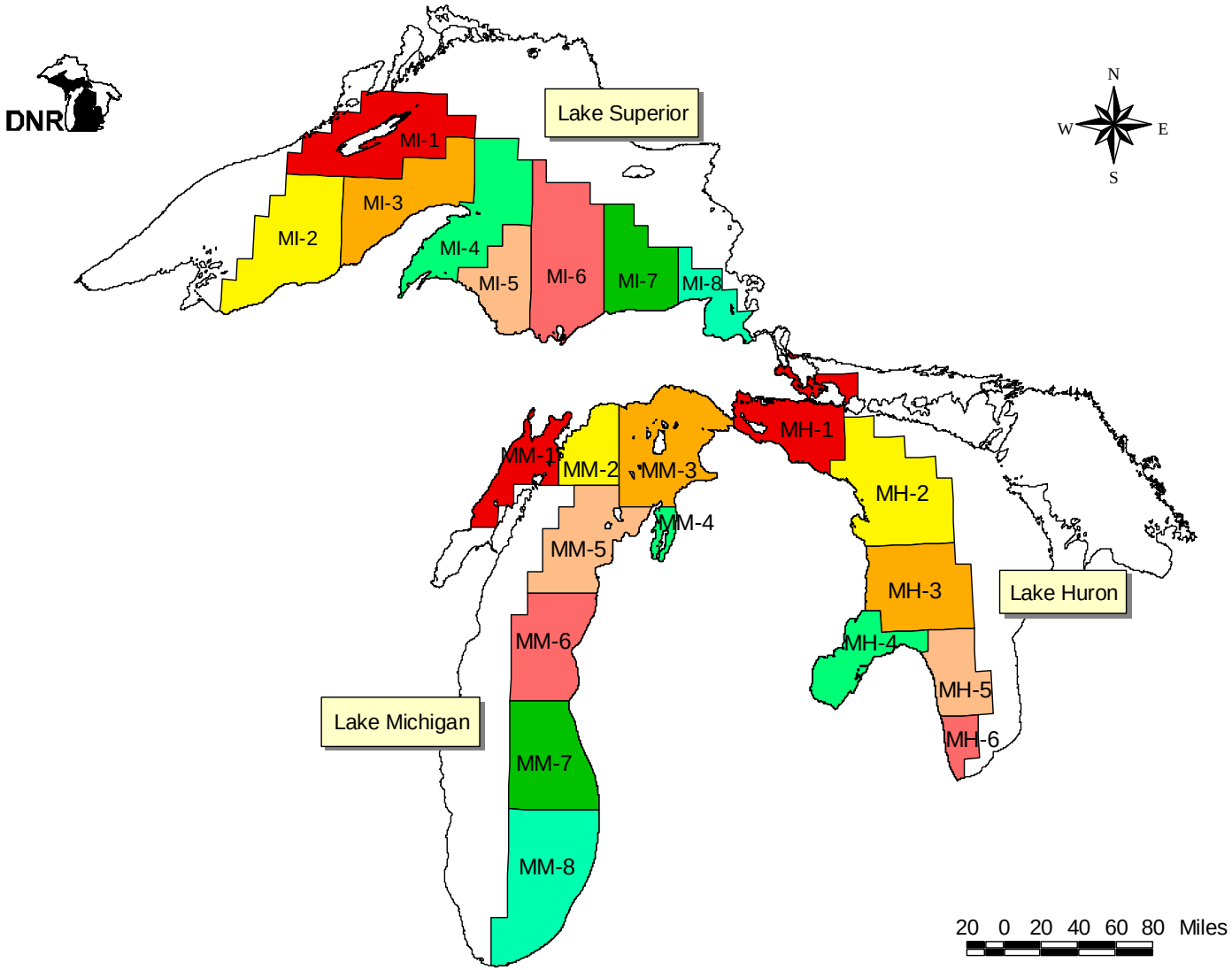

Figure 1. Lake Trout Management Units for Lakes Superior, Michigan and Huron.

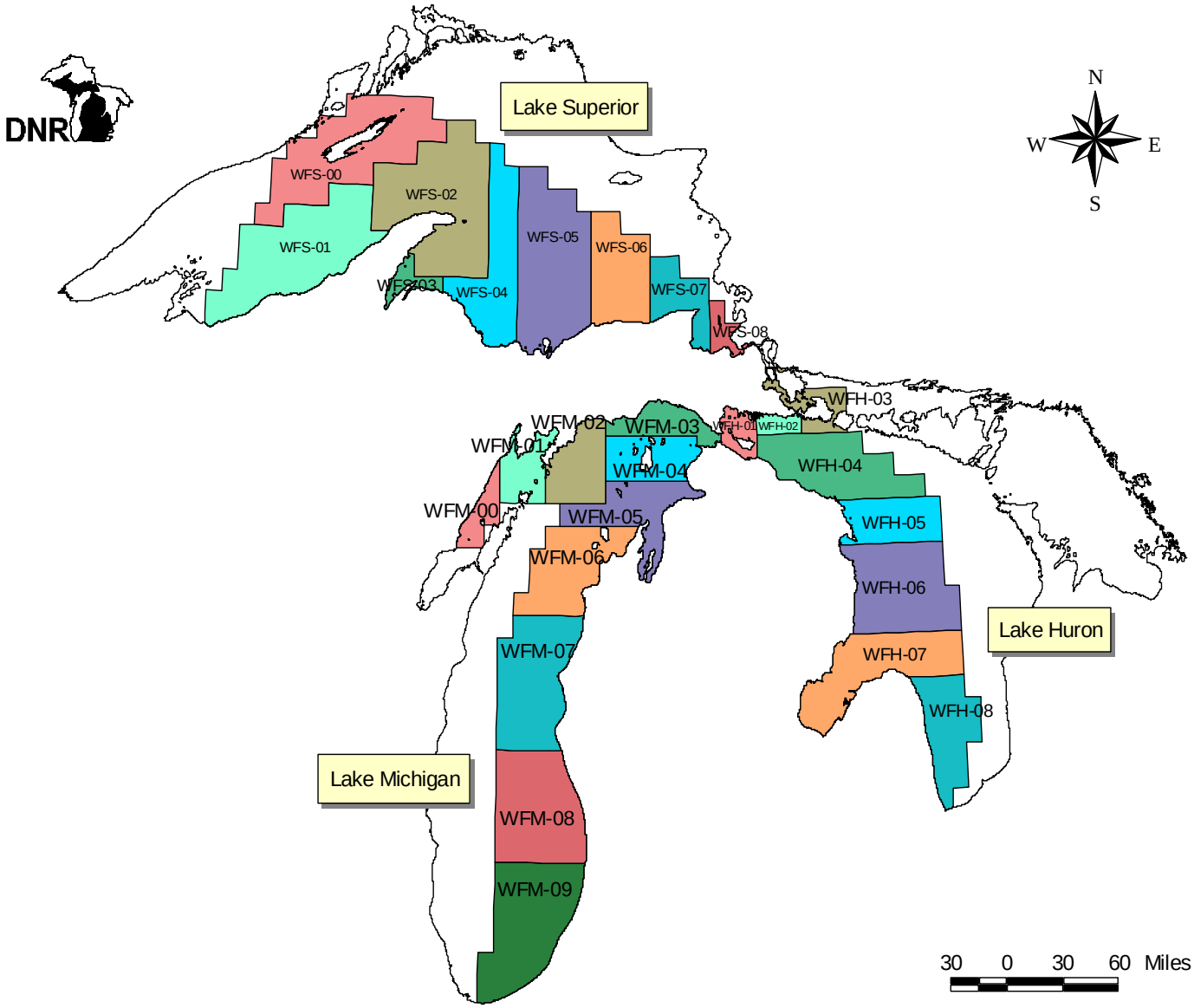

Figure 2. Lake Whitefish Management Units for Lakes Superior, Michigan and Huron.

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.

Apppendix 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. Rehabiltation 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.

	Commercial (Tribal)				Recreational (State)							Lake trout population	
Year	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

	Commercial (Tribal)				Recreational (State)							Lake trout population	
Year	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

	Commercial (Tribal)				Recreational (State)							Lake trout population	
Year	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

	Commercial (Tribal)				Recreational (State)							Lake trout population	
Year	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

	Commercial (Tribal)				Recreational (State)							Lake trout population	
Year	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

	Commercial (Tribal)				Recreational (State)							Lake trout population	
Year	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

	Commercial (Tribal)				Recreational (State)							Lake trout population	
Year	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

	Commercial (Tribal)				Recreational (State)							Lake trout population	
Year	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 commercia effort and sport effort increases by 20%.

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

	Commercial (Tribal)				Recreational (State)							Lake trout population	
Year	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.

	Whitefish Management Unit								State share		
Year and TAM used[1]	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.

	Whitefish Management Unit					State share	
Year and	WFS-04	WFS-05	WFS-06	WFS-07	WFS-08	WFS-04	WFS-05
TAM used[1]	55%	45%	37%	50%	65%	25K or 10%	130K or16%
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 us 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.

	Whitefish Management Unit					
Year and	WFH-01	WFH-02	WFH-03	WFH-04	WFH-05	WFH-06
TAM used[1]	65%	70%	No calc. done	65%	69%	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