

**2016 Annual Report on Implementation of the 2000 Consent Decree
for 1836 Treaty-Ceded Waters of the Great Lakes**

Prepared for:

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May 2017

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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 2016, as required by the September 27, 2001 Memorandum of Understanding between the State of Michigan, Department of Natural Resources (MDNR) 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

To reduce the amount of large-mesh gill net fished by tribal fishers, the Consent Decree called for the Sault Ste. Marie 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. Large-mesh gill-net effort has increased since then; however, in 2016 the tribal gill-net effort in lakes Michigan and Huron was still approximately 17 million feet less than the 1993-1998 average (Table 1).

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 2016.

Lake	Management Unit	Effort		2016 reduction ^b
		1993-98 ^a	2016	
Michigan	MM-123	17,912	8,633	9,279
	MM-4	1,794	1,131	663
	MM-5	240	158	82
Huron	MH-1	16,470	8,980	7,490
	MH-2	6	0	6
Superior	MI-6	780	962	0 (182 increase)
	MI-7	2,028	2,606	0 (578 increase)
	MI-8	6,578	5,999	579
Totals		45,808	28,469	17,339

^a Average annual effort during base years.

^b The relative reduction in 2016 (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 “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). The report detailing populations and harvest limits for fishing year 2016 was completed in August 2016. This and all previous versions are available on the 2000 Consent Decree page of the MDNR’s Tribal Coordination Unit website: <http://www.michigan.gov/greatlakesconsentdecree>.

Statistical catch-at-age (SCAA) models are used to describe populations of lake trout and lake whitefish and to recommend 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 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 key rates: growth, mortality, and recruitment. These are each estimated in the first stage of the modeling process and then incorporated into the projection models. Growth is described using mean length at age, which is fit to a nonlinear regression model since 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 (41%) that has recently been updated based on research completed in lakes Superior and Huron. Natural mortality is comprised of losses due to old age, disease, and predation. Natural mortality is generally 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-5 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.

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. However,

natural reproduction of lake trout in Lake Huron has increased in recent years and is now accounted for by adjusting the estimated number of hatchery fish in the population by the proportion of wild fish captured in surveys, commercial nets, and recreational fishing gear. 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 harvest limits. Harvest levels are set 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 and technical description of the entire modeling process is contained in the *Stock Assessment Models* section of the 2012 Status of the Stocks Report (this section was removed from the 2013 and subsequent Status of the Stocks Report).

C. Model estimates used during negotiation

During the final stages of negotiations in 1999, model estimates of harvest limits and total allowable effort were projected under presumed 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. For numerous reasons, some of these projections were not accurate and the fishery operates under harvest limits that differ considerably from the projections.

II. Harvest Limits 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 30 of each year to be submitted to the Parties for final approval. In 2016, stipulations to the Consent Decree set harvest limits in MM-123, MM-4, MM-5, MH-1, and MH-2. The MM-4 and MM-5 stipulations have been in place since the mid-2000s and were the result of high levels of lamprey-induced mortality, which would otherwise severely restrict all lake trout fishing. However, in MM-5 the rates of Sea Lamprey induced mortality have been trending downward and the TFC agreed in fall 2016 that the provisions of the stipulation related to lamprey mortality had been met. This will require the parties to reexamine the model harvest limits in 2017. The stipulation that was signed in 2015 for the Lake Huron harvest limits also applied in 2016. The MSC continued to work on reconstructing an assessment model that incorporated dynamics of both wild fish and new information suggesting that MH-1 and MH-2 contain the same biological stock of fish. The MSC proposed and TFC agreed that these two units should be modeled as one for assessment purposes.

Although a stipulation has been in place in MM-123 for more than a decade, there was no agreement on a harvest limit for 2015, as the Parties differed in their opinion about penalties associated with the CORA overharvest in 2013 and 2014, and the appropriate magnitude of a harvest limit. The 2016 fishing season followed suit with no harvest limit in place. During the August 2016 Executive Council meeting, the Parties agreed to set all prior year harvest deviations to zero, and moved forward with a single year stipulation that provided the State with a higher proportion of the total Lake Trout limit compared to what is listed in the Consent Decree. This stipulation expired at the end of 2016, and the Parties agreed to meet in May 2017 to address the harvest limits for 2017 and beyond.

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 2016, this rule was applied in MM-67. The MM-67 model-generated harvest limit declined by more than 15% and the parties agreed to limit the reduction to only 15% lower than the 2015 limit. A map of the lake trout management units is provided at the end of this

document (Figure 1), and the 2016 lake trout harvest and effort limits for each management unit are below in Table 2.

Table 2. Model estimates of harvest limits (HL; 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 2016 fishing season.

Lake	Unit	Model-output HLs		Final HLs		Tribal TAE
		State	Tribal	State	Tribal	
Michigan	MM-123	14,822	133,397	80,000	525,000	Not Set
	MM-4 ^a	40,942	50,040	77,200	115,461	955,000
	MM-5 ^a	41,166	27,444	58,800	39,200	205,000
	MM-67 ^b	194,366	21,596	286,775	31,864	NA
Huron	MH-1 ^a	Not Run	Not Run	50,512	370,419	10,791,000
	MH-2 ^a	Not Run	Not Run	118,750	6,250	NA
Superior	MI-5	141,272	7,515	141,272	7,515	NA
	MI-6	106,921	106,921	106,921	106,921	3,848,000
	MI-7	33,410	77,956	33,410	77,956	4,583,000

^a Final HLs resulted from orders to amend the Consent Decree.

^b TFC invoked the 15% rule, limiting the HL to a 15% deviation from the 2015 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 2015. A map of lake whitefish management units is provided at the end of this document (Figure 2), and the 2016 lake whitefish harvest limits for each management unit are below in Table 3.

The MSC was able to generate model recommended harvest limits in all shared units and most non-shared units. The Leland/Frankfort unit (WFM-06) and the Muskegon unit (WFM-08) maintained constant harvest limits, which were first established in 2011 and 2013, respectively.

In non-shared units, the final tribal HRG was set lower than the model value in Northern Lake Huron. The MSC does not calculate recommended harvest limits in WFM-07 and WFS-06 due to limited fishery data. The HRG in WFS-06 remained unchanged from prior years, but in WFM-07 the tribes reduced the limit from 500,000 lb to 350,000 lb. The tribes accepted model-generated recommendations for HRGs in other units.

Table 3. Model estimates for harvest limits (HL; pounds) or harvest regulation guidelines (HRG; pounds) for lake whitefish by management unit in 1836 Treaty-ceded waters of the Great Lakes for the 2016 fishing season.

Lake	Unit	Final State HL	Model output Tribal HL	Final Tribal HL or HRG
Michigan	WFM-01	146,630	1,319,670	1,319,670
	WFM-02	-	367,400	367,400
	WFM-03	-	797,700	797,700
	WFM-04	-	601,800	601,800
	WFM-05	-	425,000	425,000
	WFM-06	65,000	-	145,000
	WFM-07 ^a	-	-	350,000
	WFM-08	500,000	-	900,000
Huron	(H01-H04 Combined)		561,100	379,900
	WFH-05	-	394,000	394,000
Superior	WFS-04	13,600	122,400	122,400
	WFS-05	53,800	282,300	282,300
	WFS-06 ^a	-	-	210,000
	WFS-07	-	599,800	599,800
	WFS-08	-	178,800	178,800

^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 entirely of harvest by sport anglers. 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 also estimated for each management unit and added to the weight of lake trout harvested for comparison to harvest limits. A study was initiated in 2010 in lakes Superior and Huron to examine the extent of hooking mortality on lake

trout by state recreational anglers. The results of the research indicate that on average, 41% of lake trout that are caught and subsequently released by anglers will not survive. This represented a large increase over the prior value used (15%) and will increase the total lake trout kill by state anglers in areas where there are many released fish, primarily Lake Michigan. This new information has impacts for how lake trout regulations are set. Complex length limits that require high numbers of lake trout to be released after they are caught will be less effective at controlling total kill.

Lake trout harvest by sport anglers in 2016 was below harvest limits in all management units except for MH-1. The harvest in MH-1 increased by 78% from 2015 to 2016 and exceeded the harvest limit by 55% or 27,840 lb. This is the largest exceedance of a harvest limit by recreational fishers under the 2000 Decree. As a result, the State will be incurring a 27,840 lb penalty, which will be applied to the agreed upon 2017 harvest limit. The creel data was scrutinized to ensure the increase in harvest was accurate. Numerous harvest metrics increased such as, number of anglers per boat, length of a fishing trip, number of lake trout caught per angler, average size of a lake trout caught, and in some areas overall boat counts also increased. The State had concerns over the potential magnitude of lake trout harvest in Lake Michigan given the declines in salmon abundance and increases in lake trout populations due to stocking; however, total harvest stayed within the approved limits. In MM-67, harvest increased 73%, likely because of lower salmon abundance. State-licensed recreational harvest of primary species is listed below in Table 4, as is total effort for all species combined.

Table 4. Total effort, number, and weight (pounds) of estimated State-licensed recreational harvest for both creel and charter anglers, by lake trout management unit in 1836 Treaty-ceded waters of the Great Lakes for the 2016 fishing season.

Lake	Management Unit	Total effort (angler hours)	Lake trout ^a		Walleye		Yellow perch		Chinook salmon		Coho salmon	
			Number	Weight	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Michigan	MM-123	270,799	7,566	48,261	3,420	10,260	40,996	13,119	1,991	22,498	1,586	8,247
	MM-4	144,071	9,752	47,208	124	372	1,814	580	3,891	43,968	703	3,656
	MM-5	90,498	9,442	51,512	0	0	0	0	4,400	49,720	1,553	8,076
	MM-67	550,205	17,549	117,693	0	0	15,001	4,800	38,246	432,180	12,193	63,404
Totals		1,055,573	44,309	264,674	3,544	10,632	57,811	18,499	48,528	548,366	16,035	83,383
Huron	MH-1	162,841	15,969	78,352	1,595	3,828	56,013	11,763	3,475	27,800	323	1,163
	MH-2	72,180	13,861	69,250	6,842	16,421	1,654	347	710	5,680	113	407
Totals		235,021	29,830	147,602	8,437	20,249	57,667	12,110	4,185	33,480	436	1,570
Superior	MI-5 ^b	43,599	10,523	37,764	0	0	0	0	109	752	1,631	3,262
	MI-6	45,062	8,387	28,056	0	0	0	0	253	1,746	3,884	7,768
	MI-7	17,262	3,650	16,024	0	0	0	0	4	28	1,009	2,018
Totals		105,923	22,560	81,844	0	0	0	0	366	2,526	6,524	13,048
Grand totals		1,396,517	96,699	494,120	11,981	30,881	115,478	30,609	53,079	584,372	22,995	98,001

^a Weight of Lake Trout harvest shown in the table includes hooking mortality. Lake Superior lake trout number and weight do not include Siscowets; number of Siscowet harvested was estimated at 320, 10, and 0 fish, for MI-5, MI-6, and MI-7, respectively.

^b 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 effectively at or below harvest limits in all lake 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 356 pounds for 2016. MDNR has permitted a purse seine in Big Bay de Noc since 2013. The results of those efforts have shown that the gear can effectively catch whitefish, while capturing nearly zero bycatch. Because this is an active gear, it goes back to the dock with the fisherman at the end of the day, and nothing is left in the water to be disturbed by weather or interfere with recreational boating or fishing. Purse seines are effective in specific types of areas. They are not a widespread solution to gear conflict throughout Treaty Waters, but in Big Bay de Noc it has proven to be effective. The Sault Tribe has threatened to dispute the State fisher's use of the purse seine, and its effectiveness has caused conflict in Big Bay de Noc during the fall whitefish fishery. Sault Tribe requested a formal study of the impacts of the purse seine on tribal trap nets; however, their fishers failed to collect the necessary data to perform such an analysis. As a result, no changes are planned to the State fishery in WFM-01.

The largest monitored recreational fishery for whitefish historically occurred in WFM-05 (Grand Traverse Bay area). In 2011, the recreational harvest from Grand Marais (WFS-06) exceeded that from Grand Traverse Bay for the first time, and that pattern has continued through each year since. Recreational harvest of whitefish was estimated to be 245 fish in Grand Traverse Bay, and 5,456 fish in Grand Marais. The other area where recreational harvest of whitefish is common is Munising, where 1,072 fish were harvested in 2016. 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 2016 fishing season.

Lake	Unit	Harvest	Effort
Michigan	WFM-01	147,183	0 ^a
	WFM-06	4,384	53
	WFM-08	172,658	357
Lake totals		324,225	410
Superior	WFS-04 ^b	13,570	61
	WFS-05	51,443	335
Lake totals		65,013	396
Grand totals		389,238	806

^aTrap-net effort in WFM-01 was zero, due to the fisher's exclusive use of a purse seine.

^bIncludes 1836 waters only.

B. Tribal commercial and subsistence fishing

Data in this section are as reported to the MDNR from the Chippewa Ottawa Resource Authority (CORA). In 2015, Sault Tribe and the Grand Traverse Band removed the fisher identification numbers from their harvest data that is shared with the State and Federal governments. The claim was that the State and Federal government had violated a confidentiality clause of the Consent Decree. The State disagreed with that position as these identification numbers are specifically required by the Consent Decree to identify fishers from one year to the next. Despite numerous efforts by the State to find common ground with the Tribes to allow for reinstatement of the identification numbers, they continue to be withheld. Their removal prevents the State from 1) evaluating patterns in the fishery, 2) conducting detailed analysis on harvest at the level of the individual fisher, and 3) comparing tribal catch reports to wholesale reports. Such evaluations and comparisons were routine and were what allowed the 2013 overharvest of lake trout in MM-123 to be discovered by the State, not the tribes.

At the time this report was completed, CORA had not finalized harvest data for 2016; thus, all reported numbers are considered preliminary. Typically, CORA provides a harvest projection in February of the year following harvest. This inflates the preliminary numbers to account for the suspected number of harvest reports still outstanding and is used in the

assessment models, harvest deviations for penalty calculations, and for reporting to interested parties. No harvest projection for 2016 was made due to staffing issues within the Inter Tribal Fisheries and Assessment Program. A revised set of preliminary harvest numbers for 2016 was provided to the State in April 2017, which is uncommon, but likely occurred due to the confusion related to tribal staffing. The tribes have stated that harvest reporting has improved in recent years, and thus, these preliminary numbers are close to final. However, it is unknown if or by how much these numbers will change when they are made final. Historically, whitefish numbers have changed more often and by a greater margin than numbers for lake trout or other species, but with reduced whitefish catches and a changing fishery it is unclear if that trend will continue. If readers are interested in receiving an update on final harvest numbers when they become available, please contact Dave Caroffino, caroffinod@michigan.gov.

1. Lake trout

In areas where the tribes have implemented lake trout bag limits for gill-net fishers (MM-123 and MH-1), they are required to estimate mortality due to discarded lake trout. 2016 was the second year of discard estimation in MM-123, and the tribes estimated their fishers discarded 109,000 lb of lake trout that were or would end up dead. This amount is added to their reported harvest to achieve the total kill for comparison to the harvest limit. Estimation of discards has been occurring for nearly a decade in MH-1, and the 2016 estimate of throwback mortality was 5,800 lb.

In MM-4, the Grand Traverse Band exceeded their lake trout harvest limit by 9,171 lb or 7.9% in 2016. This was not high enough to trigger a penalty. Grand Traverse Band has a management plan in place to monitor their harvest and adjust fishing regulations to stay within their harvest limit and/or avoid reaching the penalty threshold. Through this process, they recognized in November 2016 that their harvest was close to reaching a penalty threshold, and as a result, they closed the tribal fishery during December 2016 in Grand Traverse Bay. The State was not notified of that closure, but learned about it during the spring 2017 lake trout modeling / harvest limit cycle. Tribal harvest, reported in Table 6 below, was below established harvest limits in all other management units.

Table 6. Summary of projected tribal commercial lake trout harvest (pounds) by management unit in 1836 Treaty-ceded waters of the Great Lakes for the 2016 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-123 ^a	0	401,688	401,688
	MM-4	9,236	115,396	124,632
	MM-5	0	21,684	21,684
	MM-67	0	0	0
Lake total		9,236	538,768	548,004
Huron	MH-1 ^a	925	252,348	253,273
	MH-2	0	0	0
Lake total		925	252,348	253,273
Superior	MI-5	0	0	0
	MI-6	0	26,254	26,254
	MI-7	0	32,277	32,277
	MI-8	1,957	36,045	38,002
Lake total		1,957	94,576	96,533
Grand total		12,118	885,692	897,810

^a Includes estimated throwback mortality of 5,800 lb for MH-1 and 109,000 lb for MM-123.

2. Lake Whitefish

Lake whitefish harvest by Tribal commercial fishers was below the approved harvest limits and HRGs in all management units in 2016. 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%, although this provision of the Decree has yet to be triggered.

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 2016 fishing season. Minor harvest from small-mesh gill nets is also included in gill-net harvest, but not effort.

Lake	Unit	Gill nets				Total harvest
		Harvest	Effort	Harvest	Effort	
Michigan	WFM-01	421,448	2,357	0	0	421,448
	WFM-02	60,200	225	98,698	2,896	158,898
	WFM-03	156,914	1,700	154,719	3,052	311,633
	WFM-04	25,092	234	60,128	1,225	85,220
	WFM-05	9,189	152	36,551	1,699	45,740
	WFM-06	0	0	7,805	147	7,805
	WFM-07	0	0	0	0	0
	WFM-08	0	0	0	0	0
Lake totals		672,843	4,668	357,901	9,019	1,030,744
Huron	Northern	72,023	766	108,889	5,364	180,912
	WFH-05	30,350	136	0	0	30,350
Lake totals		102,373	902	108,889	5,364	211,262
Superior	WFS-04	0	0	0	0	0
	WFS-05	0	0	36,637	957	36,637
	WFS-06	0	0	50,786	1,476	50,786
	WFS-07	150,473	923	361,504	6,383	511,977
	WFS-08	145,816	921	51,720	707	197,536
Lake totals		296,289	1,844	500,647	9,523	796,936
Grand totals		1,071,505	7,414	967,437	23,906	2,038,942

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 targeting other species. The largest reported walleye harvest in 2016 occurred in Lake Huron unit MH-1 (37,710 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 2016 fishing season.

Lake	Unit	Trap nets		Gill nets		Total harvest
		Harvest	Effort	Harvest	Effort	
Michigan	MM-123	250	0	4,168	166	4,418
	MM-4	904	3	1,695	3	2,599
	MM-5	0	0	81	0	81
Lake totals		1,154	3	5,944	169	7,098
Huron	MH-1	0	0	37,710	1,322	37,710
Superior	MI-8	135	0	3,191	4	3,326
Grand totals		1,289	3	46,845	1,495	48,134

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 2016 was in MM-123 where 5,164 pounds were harvested (Table 9). Yellow perch are occasionally harvested as incidental catch, which is why often there is harvest with no effort listed for a unit because the fishers were 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 2016 fishing season.

Lake		Trap nets		Gill nets		Total
		Harvest	Effort	Harvest	Effort	Harvest
Michigan	MM-123	140	0	5,024	304	5,164
	MM-4	35	0	552	26	587
Lake totals		175	0	5,576	330	5,751
Huron	MH-1	0	0	4,386	561	4,386
Superior	MI-8	0	0	125	8	125
Grand totals		175	0	10,087	899	10,262

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 gill-net fishers can harvest these species as incidental catch. Fishing is restricted by season, gear, depth, and area; though no harvest limits are set. As in most years, the largest Chinook salmon harvest in 2016 occurred in Lake Huron unit MH-1 (Table 10). The 125,946 lb harvested in MH-1 is almost double the 2015 value. In recent years, Coho salmon have been primarily 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 2016 fishing season.

Lake	Unit	Trap nets		Gill nets		Total harvest
		Harvest	Effort	Harvest	Effort	
Michigan	MM-123	0	0	456	2	456
	MM-4	0	0	2,184	16	2,184
	MM-5	0	0	420	4	420
Lake Total				3,060	22	3,060
Huron	MH-1	0	0	125,946	2,047	125,946
Superior	MI-8	0	0	8	0	8
Grand totals		0	0	129,014	2,069	129,014

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 2016 fishing season.

Lake	Unit	Trap nets		Gill nets		Total harvest
		Harvest	Effort	Harvest	Effort	
Huron	MH-1	0	0	8	0	8
Superior	MI-6	0	0	48	0	48
	MI-7	0	0	621	0	921
	MI-8	137	0	3,259	11	3,396
Lake Total		137	0	3,928	11	4,365
Grand Totals		137	0	3,936	11	4,373

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 impoundment nets requires a Tribal permit that may be limited in duration and by area. The Consent Decree states that MDNR is to be provided with copies of all subsistence licenses and permits and that data from the subsistence harvest reports of Tribal fishers shall be compiled by CORA and provided to the Parties within six (6) months. Final subsistence data for 2016 has been reported by the tribes and is included below in Tables 12 and 13.

Table 12. Summary of final tribal subsistence harvest (round pounds) with gill nets for each management unit by species for the 2016 fishing season.

Species / Unit	MH-1	MH-2	MI-6	MI-7	MI-8	MM-123	MM-67	SMR	Total
Atlantic Salmon								24	24
Bass	4					32		52	88
Bowfin						10			10
Brook trout						5			5
Brown trout			30				25	9	64
Bullhead								16	16
Burbot			28			14		6	48
Carp	30		20		10	120		3	183
Catfish								5	5
Drum	127					38		2	167
Lake herring			30			40		342	412
Lake trout	235	38	297		47	622	94		1,332
Menominee	334		31	71	2			52	491
Northern pike	53		36		35	1,184	11	414	1,732
Perch	69		1			3,015		21	3,107
Steelhead			380	213	101	1,520	995	16	3,225
Rock Bass	1					5			5
Salmon	166		771	875	302	383		40	2,536
Smelt					122			0	122
Splake			283						283
Suckers	158		207	3	89	267		34	758
Walleye	476	3	14		10	5,761	17	656	6,938
Whitefish	166	130	674	75	415	530		78	2,067
Effort (feet)	22,225	300	18,620	2,250	13,800	105,035	50	3,600	

Table 13. Summary of final tribal subsistence harvest (round pounds) via snagging, traditional hook and line, tip-ups, dip nets, and spears (combined) for each management unit by species for the 2016 fishing season.

Species / Unit	MH-1	MI-6	MI-7	MI-8	MM-123	MM-4	SMR	Total
Atlantic Salmon	11						626	636
Bass	57			6	12		49	124
Bowfin	10							10
Bullhead	6							6
Burbot							14	14
Carp	40						50	90
Catfish							10	10
Drum	16						2	18
Lake herring	123						25	149
Lake trout	199	75			420		29	723
Menominee	1						12	13
Northern pike	401			94	174		741	1,410
Perch	260			15	211		1,518	2,003
Pink salmon	7							7
Salmon	113	6	8		46		144	316
Splake	307	13					10	330
Steelhead	15	4	6		12		88	125
Suckers							18	18
Walleye	163			159	219		3,801	4,342
Whitefish	3			17		36	105	160
Totals	1,731	97	14	291	1,095	36	7,240	10,504

7. Tribal Charter Fishing

The Consent Decree includes guidelines for tribally-licensed and operated charter boats. They must pass a safety inspection similar to that required by State law. Non-tribal members fishing with a tribal charter boat must follow state laws, and the Decree outlines reporting requirements that are similar to state charter boats. In 2014, the first tribal charter boat was licensed since the signing of the 2000 Consent Decree. This individual only recorded one trip in 2014 and has not recorded any trips since. Tribal biologists indicated that they did not believe this charter boat would continue fishing in the future.

IV. Fisheries Contacts

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LAW ENFORCEMENT

I. Introduction

The Great Lakes Enforcement Unit (GLEU) is housed within the Michigan Department of Natural Resources (MDNR) Law Enforcement Division (LED). The Unit is tasked with the monitoring and enforcement of aquatic species commercialization within the state as well as other Great Lakes protection issues.

Areas of oversight include:

- State commercial fishery
- 2000 Consent Decree
- The wholesale fish industry
- Michigan's bait industry (wholesale, retail, and harvesters)
- Transportation and commercialization of aquatic invasive species
- Coastal zone management
- General marine enforcement

The 2000 Consent Decree details the allocation, management, and regulation of fishing in 1836 Treaty waters. The Decree also establishes a Law Enforcement Committee (LEC) as the primary body for consultation and collaboration on enforcement issues pertaining to the fishery in 1836 Treaty 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 MDNR.

Under the Decree, each of the Tribes and the State shall commit one position as available to work with a mutual-aid enforcement team pool each year. The team shall engage in group patrols at least eight times per year, and those patrols are scheduled by the LEC. The LEC is required to meet four times a year with the first meeting taking place in January where annual summaries from each agency are reviewed.

This report provides a summary of enforcement activity for the MDNR GLEU in 2016 which is currently staffed by (4) Commercial Fish Specialists (CFS), and (1) Commercial Fish Investigator (CFI), and a 2nd/Lt. Unit Supervisor.

II. General Information

A. Equipment/Maritime Activity

For the 2016 season, the Unit's vessels were used for a total of 363 sea service hours. A total of 80 patrols were conducted along with an additional 12 patrols on vessels from outside of the Unit. 3,574 gallons of fuel were purchased for a total cost of \$10,484.71.

The Unit's larger vessels and specialized equipment have always been an asset to the local districts and in 2016 our officers were requested to render enforcement and security assistance at the following maritime events:

- Marinette Marine shipyard launch of the two latest LCS class naval warships : USS Sioux City and USS Wichita
- Menominee Waterfront Festival Fireworks display
- Elk Rapids Harbor Days
- Traverse City National Cherry Festival Air Show
- Straits Area Fireworks display
- Bay City Tall Ships Celebration
- Leland Wine and Food Festival
- Bay City Fireworks display
- Operation Drywater
- Bay City River Roar Hydroplane Race

III. Enforcement

A. Complaints and Violations

In 2016, Law Enforcement Division investigated a total of 91 commercial fishery related complaints. Within the state commercial fishery, a total of 1,687 contacts were made, 500 inspections were conducted and 7 warnings were given. Within the tribal fishery, a total of 624 contacts were made, 287 inspections were conducted, 3 citations were issued, and 3 warnings were given. In addition, 6 referrals were made to tribal officers for follow up.

Table 14. 2016 Summary of LED Actions Regarding State Commercial Fishing Activities

	Contacts	Delinquent Reporting Complaints	Other Complaints	Inspections	Arrests	Delinquent Reporting Warnings	Other Warnings
Bait Dealers	95	16	3	53	0	17	6
State Commercial	1,429	0	12	384	0	0	0
Wholesale	163	26	2	63	0	15	1

Table 15. 2016 Summary of LED Actions Regarding Tribal Fishing Activities

	Contacts	Complaints	Inspections	Arrests	Warnings	Referrals
1836 Treaty	604	31	287	3	3	6
1842 Treaty	20	1	0	0	0	0

GLEU complaints, violations and activities of note include the following:

- A GLEU officer attended a net forfeiture hearing in Sault Tribal Court. The defendant already admitted responsibility to fishing with 600 feet more gillnet than allowed and paid his fine. Prior to the hearing, he told the prosecutor that the nets were not his and that his nephew and brother had set them and asked him to lift them while they were working out of town. The prosecutor had him sign a sworn statement outlining these facts and requested that the nephew and brother be re-interviewed as they had already stated that they were not fishing and had filed catch reports indicating such. GLEU officers re-interviewed the nephew and brother. Both subjects gave the officers written statements indicating that the nets were not theirs and that they had not been fishing or asked the defendant to fish for them. Prior to any further tribal court action, the defendant died in a snowmobile accident.
- A GLEU officer cited a LTBB Commercial fisher for fishing after the closed season. In court, the subject stated in his opening statement that he was not contesting the ticket because he was innocent of the charge; he went on to say that he did, in fact, fish after the season was closed. He stated he was contesting the ticket because he didn't agree with the law. The court briefly adjourned and the prosecutor and defendant met. Because he had another outstanding ticket with the court the prosecutor made him a plea offer. He

pled to improper net marking and paid \$100, and also pled to fishing during the closed season and paid \$250 and received a 30-day license suspension.

- District 1 officers received a complaint of an individual who was selling crayfish, frogs, newts, and various fish species on e-bay. Contact was made with SIU/GLEU. The individual was on parole so a GLEU officer and a detective from SIU were able to contact him through his parole officer. The subject admitted to catching and selling numerous species that he had caught in local lakes and sold them on line to make a few dollars. He claimed to be doing well in the business and had already sold 15-20 lots of various species. Most of the sales were to individuals out of state. Officers seized the following live organisms: 100 fish of various species, 2 turtles, 49 newts/salamanders, 24 crayfish, and somewhere between 100-150 frogs in various life stages between tadpoles and fully developed frogs. The subject was cited for violation of the fisheries order on reptiles and amphibians, and selling minnows/crayfish without a license.
- A GLEU officer conducted surveillance for several days of tribal subsistence fishers who were using gill nets under the ice in Little Bay de Noc. The effort was in response to a complaint that the tribal fishers were taking more than the 100 lb of fish per day that was allowed. The officer contacted the subjects on the final day of his surveillance after observing them remove their nets and shanty from the ice. The tribal subsistence fishers had no violations and were well below their 100 lb daily limit.
- GLEU officers conducted numerous patrols during the week-long CORA LEC patrol for northern Lake Michigan. Officers worked directly with tribal officers and several fishing vessels and fishers were contacted.
- GLEU officers worked on putting together wholesale records after a request from CORA. This was one of the largest requests for such records to date and appeared to be used by CORA staff to reconcile tribal fisher catch reports. Subsequently, a letter was drafted outlining the issues with this system, the problems with violations not being addressed by the tribes, and the need to move to a different process.

- GLEU officers along with the USFWS and other LEC members attended meetings with natural resource boards/conservation committees from the 1836 tribes. The meetings consisted of a presentation given by the USFWS to outline and address the illegal activity going on in the fishery as discovered during their covert operation and the challenges placed on law enforcement with current regulations and procedures. The meetings were coordinated through the LEC and were held to help educate the tribal governing bodies so that future changes may be made.
- GLEU officers participated in the CORA LEC patrol in the Little Bay de Noc area. High subsistence and harvest fishing activity was reported with numerous checks made of fishers and gear. Officers documented the amount of effort and take observed.
- A tribal commercial fisher was ticketed into the Grand Traverse Bay Band of Ottawa and Chippewa Indians court for an unattended net located in East Bay. The net had been monitored by law enforcement and marked as unattended.
- A complaint of a gill net snagged on the shipwreck “Northwestern” near Rogers City was investigated. GLEU officers attempted to pull the gill net off the wreck with the use of the gill net lifter on the Schaffer boat but were not successful. Attempts will be made to coordinate with the MSP dive team to remove the net from the wreck for diver safety.
- Contact was made with two commercial fishers in the Munising area for nets that were missing net tags and for using multiple net tags from previous years in addition to the current net tag. Enforcement action taken.
- GLEU officers dealt with net complaints in the straits area. The first involved a complaint from a charter captain stating that subjects were setting nets around Mackinaw Island that were improperly marked. A patrol was conducted and commercial fishers contacted but no violations observed. The second involved a subject stating that he found an abandoned net in Cecil Bay west of the Mackinac Bridge. A patrol was conducted

using the side-scan sonar on PB 25-5 but no net was observed or located. Tribal officers were also advised of the possible net.

- A GLEU officer followed up with a complaint of a vessel that had been caught in a net off Munising. The USCG had responded to the original vessel complaint. The state licensed fisher's net was appropriately marked but was near the navigational channel. It appears the vessel operator either didn't understand net markings or did not see them as the vessel is suspected of catching one of the anchor lines in the rudder. When the vessel came to a stop, the line slid off.
- A GLEU officer investigated a complaint of a meat processor in Southwest Michigan selling sport caught fish. An inspection of the facility and paperwork revealed that the fish are being purchased from Superior Seafood. The owner was very cooperative and did advise that he smokes fish for customers.
- A GLEU officer received a complaint late one night that Mackinaw Band fishers were possibly going to be setting commercial nets in Big Bay de Noc the following morning. A shore surveillance, boat, and land response crew was scrambled consisting of GLEU officers, tribal officers, and agents from the USFWS. There was no activity noted the following morning as sea conditions were bad.
- GLEU officers responded to a net complaint at Nuns Creek and found a net filled with rotten salmon. Officers were unable to lift the net to remove it. The owner was identified and pictures taken of the net. Attempts to locate the subject were unsuccessful. The GLEU officers contacted Sault Tribe officers and relayed the information. Sault Tribe law enforcement is submitting a request for charges through tribal court.
- GLEU officers conducted a joint patrol with Sault Tribe Officers on Big Bay DeNoc. The officers encountered an individual captaining a vessel that was unauthorized to do so in those waters. Sault Tribe cited the subject for the violation. The officers also

encountered nets belonging to two different fishers with marking violations. Sault Tribe will be following up and citing the fishers for those violations as well.

- GLEU officers conducted a patrol on Saginaw Bay prior to the state commercial fish closure. The patrol, which included net inspections and a commercial fish vessel boarding was filmed by the department photographer to be used at a later date to help educate legislators on the need for additional staffing in the unit.
- GLEU officers paired with a Sault tribal officer and worked an on-the-water patrol of the Big Bay DeNoc area after the commercial fishing closure (Nov. 6). The officers located 6 tribal trap nets still in the water. The officers were unable to determine if the nets were closed or open and still fishing due to the rough water conditions and water depth. A follow up patrol the next day included a Wisconsin warden and his ROV, The ROV is a Remotely Operated Underwater Vehicle; basically, a submersible remotely controlled camera. Using the ROV, the officers were able to quickly determine that the nets were closed and not fishing. The Wisconsin Warden also explained that he commonly uses his ROV for not only underwater net inspections and other commercial applications but also in recovery operations for drowning victims. He stated that the underwater equipment has been essential in these operations and accomplishes in minutes what officers may never be able to accomplish from the surface.
- A GLEU officer worked surveillance on several subsistence nets in Garden Bay where it was suspected that a non-native was involved. The officer observed a boat in the area being operated by the non-native. Two additional subjects were also in the boat. The subjects checked and lifted three different nets. Upon contact, it was found that they had lifted the third net at the request of another tribal member whose husband was too sick to drive the boat for her. Sault Tribal Code allows assistance from household members (in conflict with the Consent Decree) so there was nothing that could be done in this situation. The lifting of the additional gear issue was turned over to Sault Tribe Law Enforcement.

- Representatives from the GLEU participated in the Lean Process Improvement (LPI) workgroup. The workgroup consisted of staff from Fisheries Division, Department of Management and Budget, reps from the commercial fish and wholesale industry, the 1836 tribes and CORA. The process is being facilitated by the Office of Licensing and Regulatory Affairs. The workgroup has been charged with identifying a new process for electronically reporting in the wholesale fish, commercial fish, and charter boat industries. Several different electronic reporting systems were studied. The field was narrowed down to two companies that then made presentations regarding their systems to the workgroup.

IV. Aquatic Invasive Species and Aquatic Disease

Preventing the spread of Aquatic Invasive Species such as Asian Carp, and fish diseases such as Viral Hemorrhagic Septicemia (VHSv) continue to be a topic of importance to the state, tribal, and federal governmental units around the Great Lakes region. Both of these threaten Michigan’s fishery populations and could have very detrimental effects on commercial and recreational fishing.

The GLEU represents LED as a member agency of the Asian Carp Task Force coordinated by the United States Fish and Wildlife Service. The task force is comprised of state, federal and provincial law enforcement agencies cooperating to enforce regulations pertaining to the sale and movement of Asian Carp. This exchange of information and combined enforcement efforts has enhanced LED’s ability to detect, interdict and prosecute for violations of transporting and marketing the fish.

The GLEU provides training to other law enforcement agencies as well as outreach programs for the public in regards the identification, detection and interdiction of Asian Carp and other invasive species.

Table 16. 2016 Summary of LED Actions Regarding Aquatic Invasive Species.

	Complaints	Inspections	Arrests	Warnings	Presentations
Aquatic Invasive Species	25	315	1	0	13

Unit members are becoming increasingly proactive in the monitoring of potential vectors that may spread invasive species/disease, as well as handling complaints concerning them. As part of this proactive involvement GLEU Officers have been involved in the following:

- GLEU officers conducted statewide organism-in-trade inspections. During this year long initiative, officers attempted to contact every known pet trade store in Michigan. In addition to conducting inspections, officers provided educational material to organism-in-trade business owners regarding invasive species.
- An inspection was conducted by a GLEU officer at a wholesaler in Ludington. During the inspection, the officer and observed a shipment of Silver Carp which totaled over 2,000 pounds. The wholesaler had imported them from Illinois and plans on selling them as a smoked product. The fish were eviscerated and no violations were observed. This is the first confirmed case of a wholesaler importing an Asian Carp species into Michigan to be marketed.
- GLEU officers worked an AIS detail with the entire SIU and several District 7 officers in the Grand Rapids area. A complaint was received regarding live Red Swamp Crayfish entering the state and being sold in an Asian food market in Grand Rapids. The officers obtained information as to when the next shipment was arriving and set up surveillance to conduct a covert buy of the crayfish soon after delivery. After the successful buy occurred, a team of officers conducted an inspection of the facility and found additional prohibited crayfish in the back of the store. Moving surveillance was conducted on the truck until uniformed officers could make a traffic stop on the vehicle. The truck was empty but information was discovered that a previous delivery that day in Madison Hts. had occurred. District 9 officers were contacted and were able to respond to the store where they seized another 10 bags of illegal crayfish. Approximately 400 pounds of live Red Swamp Crayfish were seized during the operation. Prosecution is being sought.

- GLEU worked with an agent of the USFWS regarding possible federal violations involving a subject possessing Arowana Dragon Fish. The species is not listed as a prohibited or restricted species in Michigan.
- GLEU attended an e-DNA training in Ohio. The GLEU received three e-DNA testing devices and the training was held on the proper use of the units to determine if e-DNA exists or had existed in any samples collected.
- Members of the GLEU conducted an aquatic invasive species (organisms in trade) detail involving the inspection of pet stores and food markets in the Saginaw, Bay City, and Midland area. Nearly 30 businesses that sell live fish and aquatic plants were contacted in the area. No violations were observed.
- Members of the SIU and GLEU worked “Operation Metro Crawdad” in the Madison Heights area. The operation was put in place after a complaint was received of an Asian market receiving and selling live Red Swamp Crayfish. Attempts were made the previous week but the shipment did not arrive. After additional information was received, the operation was again conducted. Officers conducted surveillance on the suspect market and after hours of monitoring and acquiring information, SIU was finally successful in purchasing 10 pounds of live Red Swamp Crayfish. After the purchase, GLEU officers conducted an inspection of the store plus an additional store owned by the same owners. No additional crawfish were found.
- GLEU received a complaint of a restaurant obtaining and selling live Red Swamp Crayfish for crayfish boils. An inspection of the restaurant was conducted and receipts were examined. Pre-cooked and sealed Red Swamp Crayfish imported from Louisiana were found but no live crayfish. The owner was very familiar with the laws pertaining to live Red Swamp Crayfish. The restaurant’s website advertising live crayfish is being updated. Future inspections will be planned.

- GLEU participated in an interview on the Mike Avery radio show. The interview was based on aquatic invasive species and the challenges faced by law enforcement and recent efforts by law division to prevent introduction into Michigan.
- GLEU continued follow up with Fish Division staff with inspections of facilities and collection of bait samples of a supplier in response to the positive VHS finding that was found in a bait shop in Harrison.
- During recent organism-in-trade inspections, a GLEU officer found, what he believed to be, a red stem parrot feather, which is a prohibited species. A local MDARD inspector was contacted and further testing will be done to identify the species.
- GLEU attended the Upper Midwest Invasive Species Conference held in La Crosse Wisconsin and presented a summary of the Great Lakes Enforcement Unit's efforts in the "organisms in trade" initiative. The presentation generated many questions and positive comments regarding the role for law enforcement in invasive species prevention and education. GLEU also represented Michigan on the Mississippi River Basin Panel, which is comprised of representatives (invasive species coordinators, Attorney General staff, and law enforcement leaders) from the basin states. The goals of the workshop were to facilitate interstate dialogue and cooperation in preventing the introduction and spread of invasive species.
- GLEU received a complaint from a D-3 officer that originally came in from Gaylord PD of a subject selling blue crawfish. After investigating the pet store in question, it was determined that the crawfish were the electric blue crawfish, which are not prohibited.

V. Training and Education

Training conducted by unit officers includes the following:

- GLEU officers instructed at a three-day Fish Identification and Enforcement School at Camp Grayling for Conservation Officer Recruit Academy #7. The 17 new officers

were provided training in topics including state and tribal commercial fishing, tribal subsistence fishing, fish species identification and enforcement, bait industry enforcement, aquatic invasive species identification and enforcement, fish hauler identification and coastal zone management enforcement. The recruits also participated in general enforcement scenarios.

- GLEU gave an AIS presentation at the Michigan State University Law College.
- GLEU presented the division's FirstNet use case presentation at the Michigan Statewide Interoperable Communications Conference in Traverse City. The annual conference, which is made up of representatives from the local, state, and federal level in the communication sector, is working on improving technology among agencies across the region. The presentation highlighted the division's unique challenges with communication on the Great Lakes and how improved technology can lead to improved officer and public safety, enforcement, and resource protection.
- GLEU officers, along with Fisheries Division and DTMB personnel, received a demonstration of an electronic commercial harvest reporting system from a firm in British Columbia. This is a continuing part of the LPI project and that department's desire to move to electronic reporting for various industries.
- GLEU gave a presentation on job duties to the Northern Michigan Community College Police Academy recruits at the Leelanau County Sheriff's Dept.

Education efforts and meetings attended by Unit officers include the following:

- Lakes Huron, Michigan, Superior, Erie & St. Clair Citizens Fishery Advisory Committees
- International Conference on Aquatic Invasive Species
- Michigan Fish Producers Association – Working with representatives from this organization and Fisheries Division on a re-write of the current commercial fishing laws.

- Upper Midwest Invasive Species Conference
- Great Lakes Sport Fishing Club
- Aquatic Invasive Species Early Detection / Rapid Response work group meeting
- Aquatic Invasive Species Decontamination work group meeting
- Aquatic Invasive Species Website work group meeting
- Northern Michigan Community College Police Academy - Natural resource law enforcement and aquatic invasive species.
- Aquatic Invasive Species Terrestrial and Aquatic CORA team meeting
- Career Opportunity Expo
- Michigan Statewide Interoperable Communications Conference
- Various local sportfishing and sportsmen clubs across the state

VI. Assistance to Other Agencies

The GLEU often works with officers from other agencies and jurisdictions as well as aiding Conservation Officers from local Districts. Examples of this include the following:

- A Unit officer assisted MSP and the Alpena County Sheriff's Dept. with apprehending a subject who had fled officers and jumped in a river. The subject was being questioned at the Alpena hospital regarding a possible CSC when he fled, took off his clothes, and jumped in a nearby river. The subject was swinging a tree branch at officers and had waded up to his neck in 42-degree water. The GLEU officer met a Sgt. with the Sheriff's department, hooked up a patrol boat, and headed out to the scene. After 40 minutes the subject was finally convinced to come out of the water and was arrested and treated.
- GLEU assisted with two separate security details during the launch of two 387 ft. Littoral Combat Ships; the U.S.S. Sioux City (launched 01/30/16), and the USS Wichita (launched 09/17/16), at Marinette Marine. The vessels were launched into the Menominee River at the border of Michigan and Wisconsin. Other agencies assisting with the security detail included the United States Navy, United States Coast Guard, Wisconsin DNR, Menominee Sheriff Dept., Menominee City PD and Marinette PD.

- Unit officers reviewed wholesale records from a wholesale fish dealer in Wisconsin in connection with Operation “Fishing for Funds” for violations of Michigan commercial fishers. The records were obtained during a search warrant conducted by agents with the USFWS and Wisconsin Conservation Wardens and the potential records with Michigan violations were forwarded to the GLEU for follow up.
- Unit officers responded to a request for assistance by a Michigan State Trooper on a traffic stop. Both the female and male subjects in the vehicle were arrested for possession of marijuana. There was also an assortment of prescription drugs found in the vehicle there were of a suspect nature.
- A request for assistance was received from the USCG in Ludington in locating the owner of the Little River Band (LRB) commercial fishing vessel SANDY. The vessel was reported as in the process of sinking at the dock in Ludington. A GLEU officer was able to make contact with Sgt. Robles with LRB Public Safety and was advised that one of their officers checked on the vessel the previous day and determined that it was fine. Upon receiving the information from GLEU, LRB sent an officer to re-check the vessel and to contact the owner. GLEU advised the USCG of LRB’s efforts. In the meantime, the vessel had sunk up to the pilot house and was resting on the bottom.
- GLEU assisted the Petoskey Police Department and the USCG with a report of a missing person in the water.
- A Unit officer assisted the Leelanau County Sheriff’s department regarding a subject that was assaulted with an oar while in a vessel on Lake Leelanau. A dispute between brothers led to one receiving a slashed forearm.
- A Unit officer assisted USCG investigators/Homeland Security officers with placement of a camera on a subject/business in Northern Michigan as part of an ongoing investigation into illegal movement of contraband.

- GLEU received information that conservation officers with Ontario had found a net belonging to a Sault Tribe member in Canadian waters north of Drummond Island. Contact was made with the Sault Tribe Police Chief and officers responded. Ontario officers had determined that part of the net was across the international line and they removed and seized that portion of the net that was in their waters. According to the SSM Police Chief, the fisher had reported someone cutting part of his net off.
- A Unit officer assisted District 2 officers with a detail targeting illegal activity by people floating the Au Train River. For a number of years there have been complaints of garbage being thrown in the river and on private property, alcohol use by minors, intoxicated behavior, and drug use. Officers worked plain clothes on the river observing groups. Numerous marine, alcohol, drug, and litter violations were observed and turned over to waiting uniformed officers down river.
- GLEU officers assisted with contacting the USCG in Sault Ste. Marie and Duluth, MN regarding issuing a local notice to mariners and radio broadcasts for the navigational hazard created by massive flooding at the Oman boat landing in the west end of the Upper Peninsula. Several large 9,000-pound concrete prisms used in erosion control were washed out into Lake Superior. Unit officers continued to monitor the situation and prepared to assist with efforts to locate the prisms.
- GLEU officers and District 1 officers assisted with marine patrols during Menominee's Waterfront Festival. A credible threat of violence was received prior to the festival of actions that would result in mass casualties and direct targeting of various first responders and law enforcement officers. An increased officer presence from multiple agencies was arranged due to the threat. No activities related to the threat were observed during the Festival.
- GLEU officers and officers from District 1 conducted a marine patrol on the Saturday of Menominee's Waterfront Festival. A vessel in distress call was received and the

officers located the vessel approximately 5 miles northeast of Menominee out in the waters of Green Bay. The small vessel had six subjects on board, including a child. The operator stated he could not stop the boat because it was taking on water in 2 plus ft. waves and was afraid the boat would sink if he stopped. The subjects on board were instructed to put on life jackets. While following the vessel on its way to shore, it became apparent to the officers that the operator was struggling with maintaining course and appeared to head directly into the waves resulting in water coming over the bow and entering the vessel. While attempting to escort the vessel, the vessel ran out of fuel further risking the safety of everyone on board. The passengers and driver were taken aboard law enforcement vessels and the “sinking” boat towed to shore. Ultimately, the operator was arrested for operating a vessel under the influence. Further investigation determined it was the operation of the driver that was causing water to enter the vessel, not a structural problem. Assistance was also provided by the US Coast Guard and a Menominee County Sheriff Dept. patrol vessel.

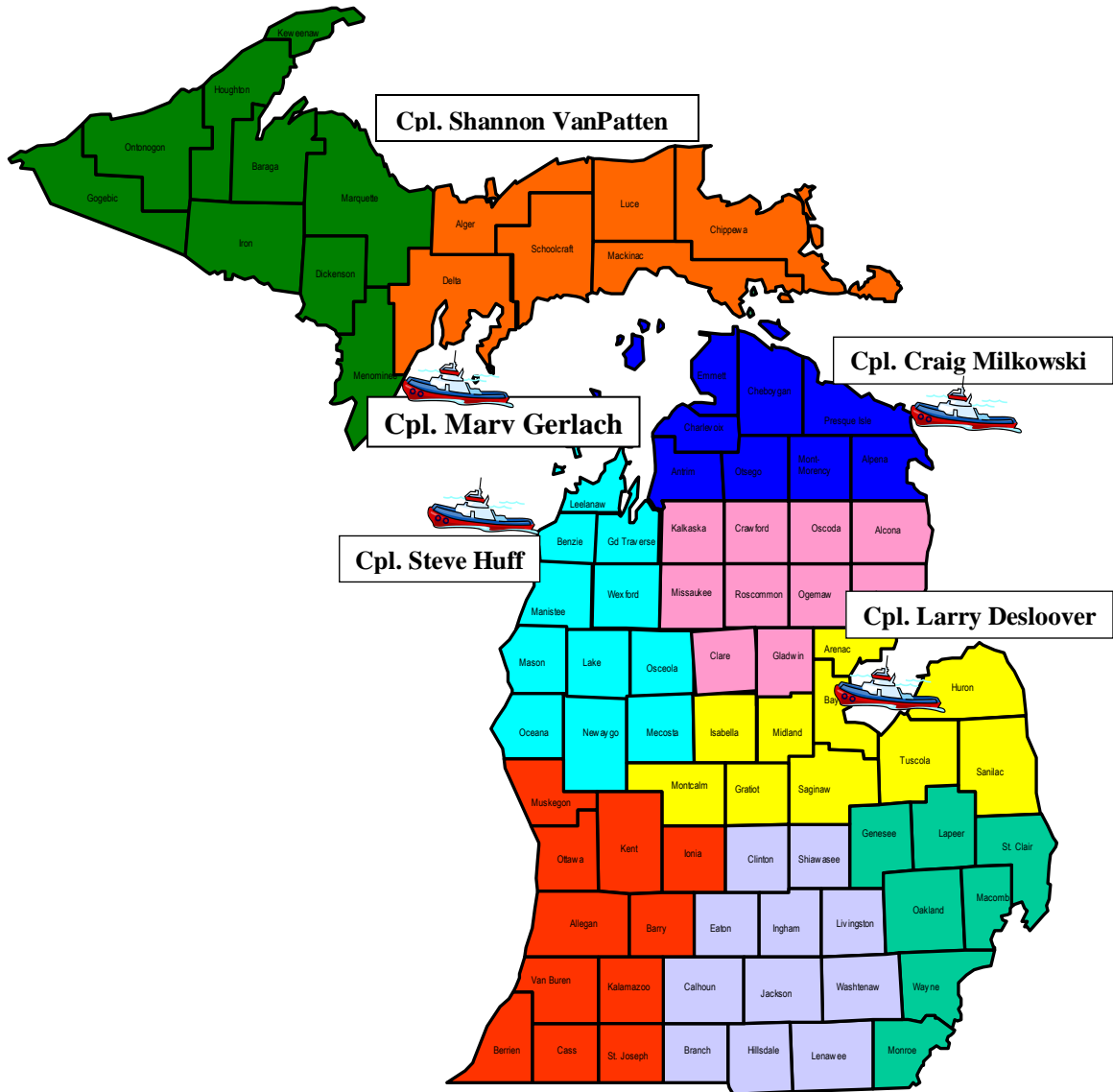
- GLEU assisted with monitoring the situation involving a diver death in Lake Huron from a diver charter. Information has been shared with the Wisconsin DNR as the vessel is out of Wisconsin. Wisconsin is compiling and using the information in attempts to better regulate their charter vessels with possible new regulations.
- GLEU met with and provided information that was requested regarding wholesale purchases for an ongoing investigation conducted by the US Coast Guard Investigative Services.
- GLEU officers participated in a marine patrol on the Menominee County Sheriff Department patrol vessel on Sunday during Menominee’s Waterfront Festival. During the fireworks display at the Menominee Harbor, officers were requested to assist with subjects swimming in the Menominee Harbor and attempting to climb the break wall where the fireworks were being shot from. When officers located three male subjects (21 and 22 years old) swimming in the harbor in dangerous proximity (mere feet) to the fireworks and got them to a dock, one of the subjects became unruly. All three

subjects (who had been drinking and were under the influence of alcohol) were ultimately arrested for disorderly conduct and lodged in the Menominee County jail. The excuse for trying to climb the break wall during the fireworks display was a bet of \$75 between the subjects.

- GLEU officers attended and instructed at various hunter safety classes across the state.
- While returning to the Cedar River State Harbor with the 40' patrol vessel, GLEU officers received a complaint from marina staff of an injured eagle at a residence near the marina. Upon inspection, the bird was found to be an immature Red-tailed hawk. The bird was turned over to Wildlife Division and taken to a raptor rehab in Marquette.
- GLEU assisted SIU and D-1 officers with the execution of a search warrant in a case of a logger suspected of illegally cutting extra trees on a timber sale on state land. It is estimated that the subject may have cut an additional \$100,000 - \$150,000 worth of unmarked trees in a sale in an environmentally sensitive area.
- GLEU officers assisted the Charlevoix County Sheriff's Department with searching for a subject in Lake Michigan. The situation is very suspicious. Two subjects left Harbor Springs in a boat. One subject was found after running out of fuel claiming that his friend put on a weight belt and had jumped overboard to commit suicide. The found subject has since failed a polygraph. Search efforts and the investigation are continuing.
- A Unit officer assisted in recovery efforts of a missing kayaker in Platte Bay.
- GLEU officers responded to a call regarding a waterfowl hunter in need of help on North Lake in Menominee County. As darkness fell, the hunter was unable to make it back to the access site in his small duck boat due to high winds that had pushed him further into the marsh. The officers launched a small boat and after navigating the

marsh in the dark were able to locate the hunter and bring him safely back to the access site. Although cold, the hunter suffered no ill effects from his ordeal.

Michigan Department of Natural Resources Great Lakes Enforcement Unit



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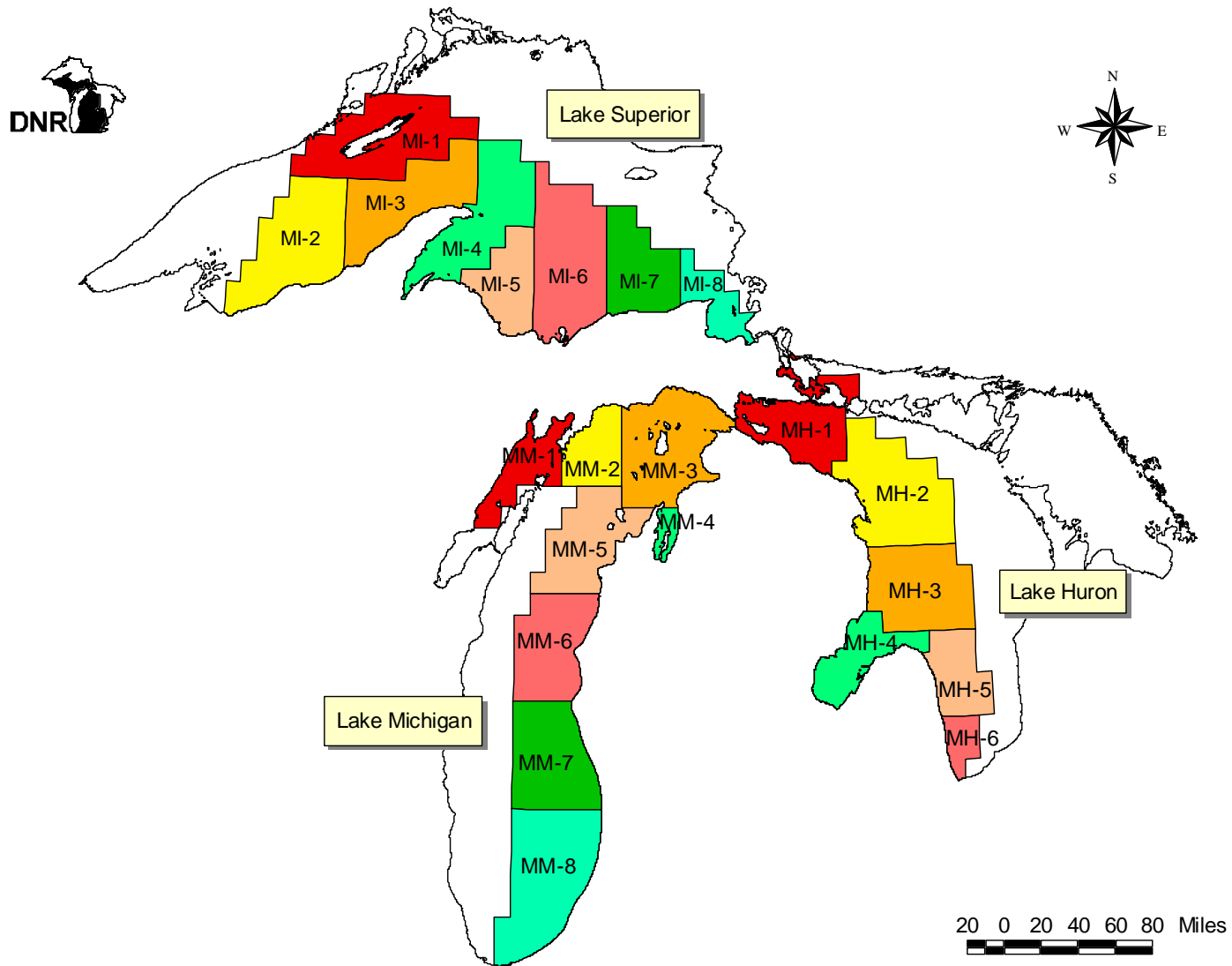


Figure 1. Lake Trout Management Units for Lakes Superior, Michigan and Huron.

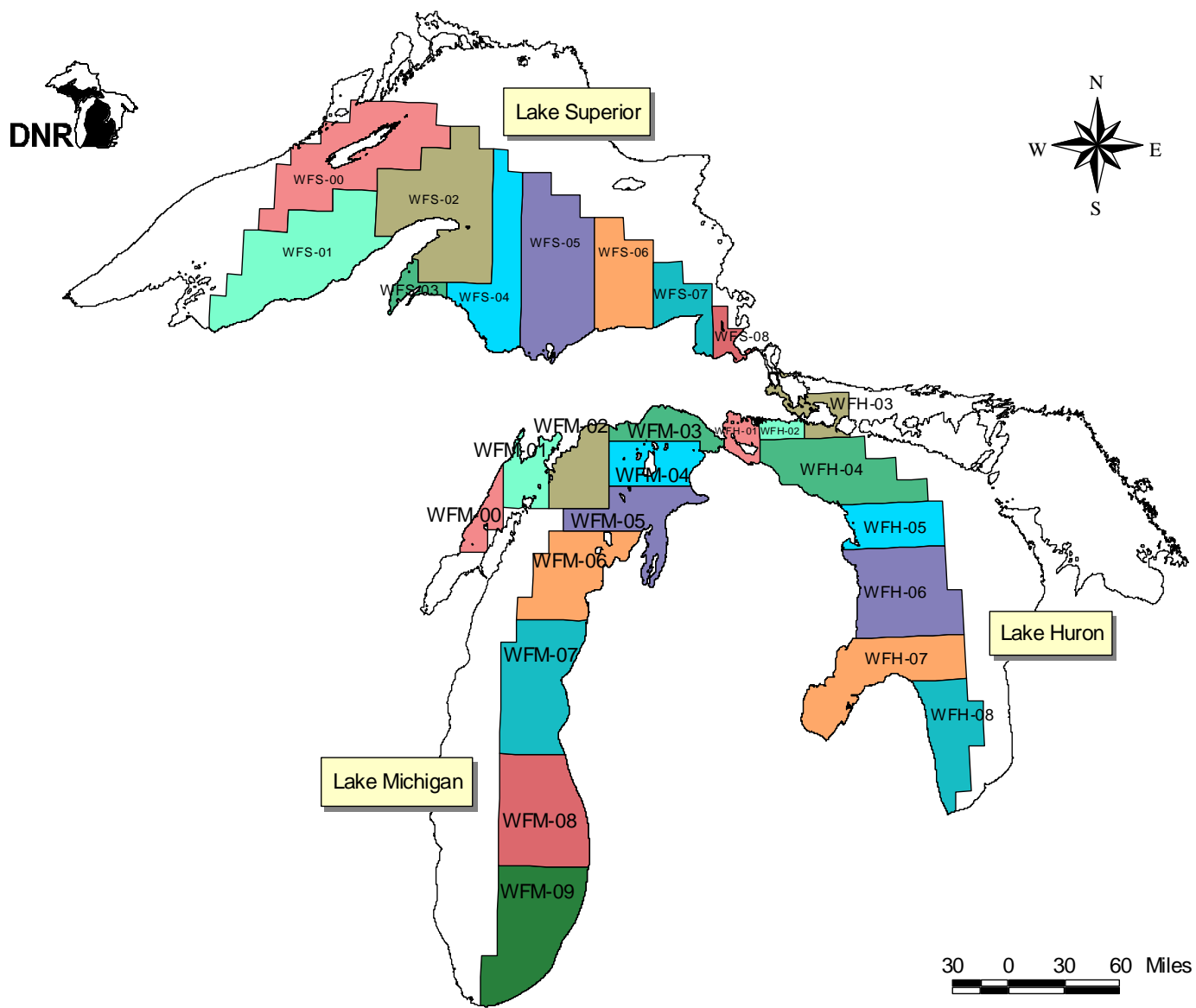


Figure 2. Lake Whitefish Management Units for Lakes Superior, Michigan and Huron.

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.

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 commercia 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	WFS-05	WFS-06	WFS-07	WFS-08	WFS-04	WFS-05
	55%	45%	37%	50%	65%	25K or 10%	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