

**2017 Annual Report on Implementation of the 2000 Consent Decree
for 1836 Treaty-Ceded Waters of the Great Lakes**

Prepared for:

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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 2017, 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 2017 the tribal gill-net effort in lakes Michigan and Huron was still approximately 18 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 2017.

Lake	Management Unit	Effort		2017 reduction ^b
		1993-98 ^a	2017	
Michigan	MM-123	17,912	9,351	8,561
	MM-4	1,794	976	818
	MM-5	240	97	143
Huron	MH-1	16,470	8,472	7,998
	MH-2	6	0	6
Superior	MI-6	780	1,003	(223 more)
	MI-7	2,028	1,525	503
	MI-8	6,578	5,959	619
Totals		45,808	27,383	18,425

^a Average annual effort during base years.

^b The relative reduction in 2017 (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 2017 was completed in August 2017. This and all previous versions are available on the 2000 Consent Decree page of the MDNR’s Tribal Coordination Unit website: https://www.michigan.gov/dnr/0,4570,7-350-79136_79236_84834_84838---,00.html

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 injuries or stress associated with hooking, netting, or abrupt water temperature and depth changes. 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 was updated in 2016 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 were separated into a phase-in period (where applicable), and rehabilitation period or sustainable management period. Phase-in periods were 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 2017, stipulations to the Consent Decree set harvest limits in MM-123, MM-4, and MM-5. In MM-123, the parties agreed to a stipulation in May 2017 that set harvest limits through 2020. It increased the tribal harvest limit to 550,000 lb and maintained the State harvest limit at 80,000 lb. 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 that the Sea Lamprey provision of the stipulation had been met. During a May 2017 Executive Council meeting, the parties reconsidered the harvest limits in the stipulation and decided to leave them in place.

Lake Trout harvest limits for Lake Huron units MH-1 and MH-2 were not formally agreed to by the parties in 2017. The stipulation that had set harvest limits in 2015 and 2016 had expired, and for the first time the MSC presented harvest limits produced from a combined assessment model (MH-1 and MH-2 modeled together as one unit). The TFC agreed with the MSC's assertions that there was substantial biological evidence that the populations in MH-1 and MH-2 were not distinct, but rather a single population that should be modelled as such. The harvest limits produced from the combined assessment model was substantially higher than expected, and biologists noted concerns about the sustainability of the population should the harvest limits be realized. Confounding matters was the fact that the State fishery in MH-1 exceeded the stipulated Lake Trout harvest limit in 2016 by 27,840 lb. This was high enough to constitute a penalty; however, disagreement arose about how to set the harvest limits given that the populations were not truly separate, but biologically one and modelled as such. The State proposed that management should follow the biological recommendations and the harvest limits for MH-1 and MH-2 should be combined. The Tribes disagreed with that proposal. After numerous meetings and conference calls, resolution could not be reached.

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 2017, 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 2016 limit. A map of the lake trout management units is provided at the end of this document (Figure 1), and the 2017 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 2017 fishing season (NA = not available).

Lake	Unit	Model-output HLs		Final HLs		Tribal TAE
		State	Tribal	State	Tribal	
Michigan	MM-123	40,389	363,272	80,000	550,000	11,727,000
	MM-4 ^a	51,570	63,030	77,200	124,292	1,132,000
	MM-5 ^a	46,173	30,782	58,800	39,200	269,000
	MM-67 ^b	88,173	9,797	243,759	27,084	NA
Huron	MH-1 ^a	77,223	566,296	NA	NA	NA
	MH-2 ^a	463,105	24,374	NA	NA	NA
Superior	MI-5	160,983	8,473	160,983	8,473	NA
	MI-6	89,505	89,505	89,505	89,505	3,243,000
	MI-7	30,110	70,256	30,110	70,256	6,125,000

^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, except for WFM-01. A disagreement arose over the modeling process and the potential influence of a separate study seeking to evaluate the perceived impact of a purse seine on tribal fishers. The parties were never able to come to an agreement on a harvest

limit for 2017 in WFM-01. A map of lake whitefish management units is provided at the end of this document (Figure 2), and the 2017 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) have been managed with constant harvest limits since 2011 and 2013, respectively. In 2017, these limits were substantially reduced, which was reflective of lower Lake Whitefish recruitment throughout Lake Michigan. In non-shared units, the final tribal HRG was set lower than the model value in Northern Lake Huron, WFH-05, and WFM-05. The MSC does not calculate recommended harvest limits in WFM-07 and WFS-06 due to limited fishery data, and the HRGs in these units remained unchanged from 2016. 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 2017 fishing season (NA = not available).

Lake	Unit	Final State HL	Model output Tribal HL	Final Tribal HL or HRG
Michigan	WFM-01	NA	993,300	NA
	WFM-02	-	362,300	362,300
	WFM-03	-	887,100	887,100
	WFM-04	-	543,900	543,900
	WFM-05	-	518,600	425,000
	WFM-06	37,500	93,200	87,500
	WFM-07 ^a	-	-	350,000
	WFM-08	225,000	152,515	275,000
Huron	(H01-H04 Combined)		479,100	379,900
	WFH-05	-	886,600	394,000
Superior	WFS-04	9,100	81,900	81,900
	WFS-05	50,000	262,300	262,300
	WFS-06 ^a	-	-	210,000
	WFS-07	-	481,000	480,000
	WFS-08	-	223,100	223,100

^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. The results indicated 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 resulted in increased lake trout kill in areas where there are many released fish, primarily Lake Michigan. This new information has limited the regulatory options for controlling Lake Trout harvest. 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, as will seasonal closures or bag limit changes if anglers continue to fish for other species and encounter Lake Trout.

Aside from the unique situation in Lake Huron, Lake Trout harvest by sport anglers in 2017 was below harvest limits in all management units except MM-4 and MM-5. The Lake Trout fishery in MM-5 exceeded the limit by only 449 lb. In MM-4 the State fishery exceeded the limit by 6,322 lb, which was 8.2% and not high enough to trigger a penalty, which would have impacted the 2018 harvest limit. Although formal harvest limits were not agreed to by the Parties in 2017 for Lake Huron, one interpretation of the Consent Decree is that limits for 2017 would have been set 15% higher than the 2016 stipulated levels, given the magnitude of the model-generated harvest limits. If this interpretation were applied and the State's 2017 limit in MH-1 was then reduced by the amount that exceeded the 2016 limit (per Decree rules), the State's 2017 Lake Trout harvest in MH-1 would have exceeded the limit by 24,112 lb, resulting in another penalty that would have to be applied to the 2018 fishing season. There were no issues with harvest in MH-2, regardless of how a limit could have been calculated. The sum of the State harvest in MH-1 and MH-2 would not have exceeded the limit had the units and harvest limits been combined into one for management purposes, as the State proposed throughout 2017. 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 2017 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	244,499	7,775	59,381	4,998	15,544	17,498	6,474	5,123	60,144	999	5,255
	MM-4	187,761	15,855	83,522	1	3	54,802	20,277	3,618	42,475	2,079	10,936
	MM-5	82,032	8,936	59,249	0	0	0	0	6,613	77,637	2,556	13,445
	MM-67	532,550	15,730	105,829	825	2,566	28,273	10,461	39,363	462,122	29,767	156,574
Totals		1,046,842	48,296	307,981	5,824	18,113	100,573	37,212	54,717	642,378	35,401	186,210
Huron	MH-1	113,201	10,979	54,361	4,015	9,877	52,015	17,165	3,264	29,343	73	292
	MH-2	52,140	9,690	74,722	2,933	7,215	30	10	491	4,414	147	588
Totals		165,341	20,669	129,083	6,948	17,092	52,045	17,175	3,755	33,757	220	880
Superior	MI-5 ^b	40,204	9,892	39,609	0	0	0	0	87	572	2,981	5,783
	MI-6	42,659	5,864	27,248	0	0	13	4	289	1,902	5,833	11,316
	MI-7	18,738	3,168	13,341	0	0	53	14	15	99	2,011	3,901
Totals		101,601	18,924	80,198	0	0	66	18	391	2,573	10,825	21,000
Grand totals		1,313,784	87,889	517,262	12,772	35,205	152,684	54,405	58,863	678,708	46,446	208,090

^a Weight of Lake Trout harvest shown in the table includes hooking mortality. Lake Superior lake trout number and weight do not include Siscowets.

^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 0 pounds for 2017.

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 214 fish in Grand Traverse Bay, and 13,890 fish in Grand Marais. The other area where recreational harvest of whitefish is common is Munising, where 503 fish were harvested in 2017. 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 2017 fishing season.

Lake	Unit	Harvest	Effort
Michigan	WFM-01	111,278	0 ^a
	WFM-06	10,523	70
	WFM-08	193,900	269
Lake totals		315,701	339
Superior	WFS-04 ^b	9,095	47
	WFS-05	37,245	304
Lake totals		46,340	351
Grand totals		362,041	690

^aTrap-net effort in WFM-01 was zero, due to the fisher's exclusive use of a purse seine (37 hauls).

^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.

At the time this report was completed, CORA had not finalized harvest data for 2017; 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. This projection had been completed by the Inter Tribal Fisheries and Assessment Program (ITFAP); however, in 2017, ITFAP was dissolved. There have been no indications that harvest projections will be completed in the future. It is unknown if or by how much the preliminary 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. 2017 was the third year of discard estimation in MM-123, and the tribes estimated their fishers discarded 98,112 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 2017 estimate of throwback mortality was 2,480 lb. 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 2017 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	521,994	521,994
	MM-4	610	107,608	108,218
	MM-5	0	16,958	16,958
	MM-67	0	0	0
Lake total		610	646,560	647,170
Huron	MH-1 ^a	1,465	216,776	218,241
	MH-2	0	0	0
Lake total		1,465	216,776	218,241
Superior	MI-5	0	0	0
	MI-6	0	44,242	44,242
	MI-7	131	18,696	18,827
	MI-8	450	22,162	22,612
Lake total		581	85,100	85,681
Grand total		2,656	948,436	951,092

^a Includes estimated throwback mortality of 2,480 lb for MH-1 and 98,112 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 2017. 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 never been triggered. In WFM-01, the Little Traverse Bay Bands licensed a fisher to conduct a gill-net assessment fishery in Big Bay de Noc. This effort began in 2017 and was permitted through the end of the current Consent Decree. The fisher is limited to 6,000 ft of gill net per day, filing regular harvest reports, and subject to onboard monitoring by tribal personnel for biological data collection.

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 2017 fishing season. Minor harvest from small-mesh gill nets is also included in gill-net harvest, but not effort.

Lake	Unit	Trap Nets		Gill nets		Total harvest
		Harvest	Effort	Harvest	Effort	
Michigan	WFM-01	292,020	1,881	15,331	57	307,351
	WFM-02	71,891	446	53,611	1,818	125,502
	WFM-03	105,812	1,294	104,184	2,619	209,996
	WFM-04	6,118	103	32,014	861	38,132
	WFM-05	1,132	18	28,142	1,415	29,274
	WFM-06	0	0	3,010	68	3,010
	WFM-07	0	0	0	0	0
	WFM-08	0	0	0	0	0
Lake totals		476,973	3,742	236,292	6,838	713,265
Huron	Northern	102,576	759	93,224	5,549	195,800
	WFH-05	48,442	101	0	0	48,442
Lake totals		151,018	860	93,224	5,549	244,242
Superior	WFS-04	0	0	0	0	0
	WFS-05	0	0	47,801	1,003	47,801
	WFS-06	6,408	49	23,250	830	29,658
	WFS-07	143,948	887	314,867	5,679	458,815
	WFS-08	134,879	889	41,548	922	176,427
Lake totals		285,235	1,825	427,466	8,434	712,701
Grand totals		913,226	6,427	756,982	20,821	1,670,208

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 2017 occurred in Lake Huron unit MH-1 (32,537 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 2017 fishing season.

Lake	Unit	Trap nets		Gill nets		Total harvest
		Harvest	Effort	Harvest	Effort	
Michigan	MM-123	143	0	2,136	24	2,279
	MM-4	77	0	1,102	3	1,179
	MM-5	0	0	3	0	3
Lake totals		220	0	3,241	27	3,461
Huron	MH-1	1,565	0	30,972	913	32,537
Superior	MI-7	0	0	126	0	126
	MI-8	15	0	3,368	34	3,383
Lake Totals		15	0	3,494	34	3,509
Grand totals		1,800	0	37,707	974	39,507

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 2017 was in MM-123 where 14,480 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 2017 fishing season.

Lake		Trap nets		Gill nets		Total
		Harvest	Effort	Harvest	Effort	Harvest
Michigan	MM-123	221	6	14,259	365	14,480
	MM-4	82	2	6,539	177	6,621
	MM-5	0	0	205	10	205
Lake totals		303	8	21,003	552	21,306
Huron	MH-1	0	0	2,387	243	2,387
Superior	MI-8	0	0	102	0	102
Grand totals		303	8	23,492	795	23,795

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 2017 occurred in Lake Huron unit MH-1 (Table 10). The 164,407 lb harvested in MH-1 is a slight increase over the prior year. 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 2017 fishing season.

Lake	Unit	Trap nets		Gill nets		Total harvest
		Harvest	Effort	Harvest	Effort	
Michigan	MM-123	3	0	1,540	0	1,543
	MM-4	0	0	5,831	13	5,831
Lake Total		3	0	7,371	13	7,374
Huron	MH-1	0	0	164,407	1,711	164,407
Superior	MI-8	0	0	75	0	75
Grand totals		3	0	171,853	1,724	171,856

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 2017 fishing season.

Lake	Unit	Trap nets		Gill nets		Total harvest
		Harvest	Effort	Harvest	Effort	
Michigan	MM-123	0	0	19	0	19
	MM-4	0	0	45	0	45
Lake Total		0	0	64	0	64
Huron	MH-1	0	0	164	0	164
Superior	MI-6	0	0	42	0	42
	MI-7	0	0	1,453	0	1,453
	MI-8	194	0	5,992	0	6,186
Lake Total		194	0	7,487	0	7,681
Grand Totals		194	0	7,715	0	7,909

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 2017 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 2017 fishing season.

Species / Unit	MH-1	MI-6	MI-7	MI-8	MM-123	MM-67	SMR	Total Harvest
Atlantic Salmon			4				5	9
Bass	18				80		18	116
Brown trout		20				9		29
Bullhead					2		2	4
Burbot		31			14		41	86
Carp	30				20			50
Catfish	10							10
Freshwater drum	2							2
Lake herring		7		3			223	233
Lake trout	144	239	47	5	389	58	14	896
Menominee	111		58					169
Northern pike	56	5	15	5	1,133		420	1,634
Rainbow trout		143	173	8	50			374
Rock bass	2				11			13
Salmon	108	405	683	119	76	11	134	1,536
Smelt				193			1	194
Splake		146	320		504	350	8	1,328
Suckers	50	69	76		243		29	467
Walleye	350	9		28	3,243	8	404	4,042
Whitefish	125	220	62	245	1,093		88	1,833
Yellow perch	23	1			2,079		45	2,148
Totals	1,029	1,294	1,438	606	8,936	437	1,432	15,173
Effort (feet)	9,000	7,385	4,100	6,900	76,500	1,500	9,900	115,285

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 2017 fishing season.

Species / Unit	MH-1	MI-7	MI-8	MM-123	SMR	Total
Atlantic Salmon					212	212
Bass	10		4	54	28	96
Burbot					71	71
Catfish			2			2
Crappie					0	0
Freshwater drum			2			2
Lake herring	194				89	283
Lake trout	596	80				676
Menominee	3				17	19
Muskellunge					6	6
Northern pike	186			237	957	1,380
Rainbow trout					39	39
Salmon	128				13	141
Smelt			74			74
Splake	102			16	16	134
Walleye	33		70	282	3,135	3,521
Whitefish		2,175	10	10	195	2,390
Yellow perch	164		1	220	1,346	1,731
Totals	1,417	2,255	163	818	6,124	10,777

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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:

- 2000 Consent Decree
- State commercial fishery
- 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 each agency's annual summary report is reviewed.

This report provides a summary of enforcement activity for the MDNR GLEU in 2017, for which time staff included (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 2017 season, the Great Lakes Enforcement Unit's vessels were put to use for a total of 349.1 sea service hours. A total of 67 patrols were conducted along with an additional 3 patrols on vessels from outside of the Unit. A total of 2,165 gallons of fuel was purchased for a total cost of \$6,313.97.

The Unit's larger vessels and specialized equipment has always been an asset to the local districts and in 2017 our officers were requested to render enforcement and security assistance at the following maritime events:

- Marinette Marine shipyard launch of the latest LCS class naval warship : USS Billings
- Menominee Waterfront Festival Fireworks display
- Labor day Mackinac Bridge Walk
- Bay City Fireworks display
- Operation Drywater
- Bay City River Roar Hydroplane Race

During 2017, funding was approved for a new trailerable Great Lakes commercial fishing enforcement vessel. The GLEU worked extensively on providing specifications for the vessel to make it a highly mobile, maneuverable and effective commercial fishing enforcement patrol vessel. The project was put out for bids and the contract was won by Pacific Boats of Marysville, Washington. The new patrol vessel will measure 30 feet in length with a 10-foot beam. It will be outfitted with dual 250 hp Mercury outboards, state of the art electronics, FLIR system and net lifter. The vessel is expected to be delivered in the spring of 2018.

Also in 2017, funding was approved for Law Enforcement Division's first ROV (Remotely Operated Vehicle) and was assigned to the GLEU. The ROV is a PRO4 manufactured by VideoRay. It is outfitted with a high-resolution camera, sonar and a manipulator arm with several different configurations of grasping, cutting and sampling jaws. The ROV has the capabilities to allow officers to conduct underwater operations without the necessity of a diver including but not limited to commercial fish net inspections, search and recovery in the event of a drowning incident, evidence recovery operations, shipwreck documentation and Homeland Security operations.

III. Enforcement

A. Complaints and Violations

In 2017, Law Enforcement Division investigated a total of 68 commercial fishery related complaints, which were primarily for late reporting, and 14 treaty fishing complaints. Within the state commercial fishery, a total of 923 contacts were made, 294 inspections were conducted, no citations were issued, and 61 warnings were given, which were primarily for late reporting with 7 complaints unfounded. Within the tribal fishery, a total of 467 contacts were made, 132 inspections were conducted, 5 citations were issued, and 6 warnings were given. In addition, 4 referrals were made to tribal officers for follow up.

Table 14. 2017 Summary of LED actions regarding state commercial fishing activities.

	Contacts	Delinquent Reporting Complaints	Other Complaints	Inspections	Arrests	Delinquent Reporting Warnings	Other Warnings
State Commercial	818	16	8	274	0	16	1
Wholesale	105	44	0	20	0	44	0

Table 15. 2017 Summary of LED actions regarding tribal fishing activities.

	Contacts	Complaints	Inspections	Arrests	Warnings	Referrals
1836 Treaty	460	12	131	5	6	2
1842 Treaty	7	2	1	0	0	2

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

- GLEU officers investigated a complaint regarding a stolen net from a commercial fisher in Saginaw Bay.
- GLEU continued to assist agents with the USFWS with records review and providing copies of wholesale reports for the ongoing FFF investigation.
- GLEU officers participated in a CORA LEC patrol working ice covered areas of the Great Lakes for subsistence fishing and netting. Officers patrolled the Bays de Noc area and northern Lake Huron from St. Ignace to Detour. Several wholesaler fish dealers were also inspected.

- GLEU provided assistance to District 2 officers and Sault Tribal officers in apprehending a subject that had placed a gill net in an Upper Peninsula inland lake and harvested approximately #210 walleye.
- A GLEU officer contacted two wholesale businesses that had been submitting their monthly reports for 2017 but had failed to purchase a 2017 wholesale fish license. Both businesses thought they had purchased the license, but upon contact by of the GLEU officer and checking their own paperwork, they realized that they had not. Both businesses apologized for the oversight and assured they would have everything in order within the week. Warnings were given to both businesses. Both businesses completed the proper paperwork for their licensing.
- GLEU contacted a wholesale fish dealer who had purchased a wholesale minnow license in addition to his wholesale fish license. During the conversation, it was determined that subject had mistakenly purchased the wholesale minnow license; the information will be forwarded to attempt to reimburse the wholesale fish dealer for the un-needed wholesale minnow license.
- GLEU officers worked the Bays de Noc Area spring fish runs. Surveillance has been conducted in closed areas where illegal harvest complaints have come in as well as overt patrols contacting numerous subsistence fishers and weighing fish. One fisher had a 5' lake sturgeon that was caught in his net in just a few feet of water. The fish was able to be successfully released.
- A GLEU officer along with a District 2 officer conducted three restaurant inspections in Schoolcraft County in response to a complaint regarding illegal marketing of fish from the Straits area to Marinette, WI. The three restaurants that were inspected had receipts indicating regular weekly purchases of perch and walleye from legal sources.
- GLEU officers worked a CORA LEC patrol on the Bays de Noc. Several inspections were conducted. The officers also attempted to locate a net that was reported in the closed area north of Saunder's Point in Little Bay de Noc but the officers were unable to locate any illegal nets.
- GLEU received complaints of improperly marked nets in the DeTour area. Several nets were checked by GLEU officers and the problem nets were addressed with the commercial fisher.

- GLEU officers attended a meeting with USFWS agents and USCG investigators at the Selfridge Air National Guard Base to discuss illegal activity along the border and any assets that the agencies may have to address it. It was noted by the USCG that incursions into US waters by Canadian commercial fishing vessels is occurring on a regular basis. The USCG also advised that information they received from the GLEU four years ago regarding complaints of unknown vessels randomly coming across from Canada to the Oscoda and Harrisville areas resulted in a large drug case. Two arrests were made and over 1 million dollars in fines were assessed to a company involved in illegally moving drugs across Lake Huron from Canada to the US.
- GLEU officers participated in a recent CORA LEC patrol for Northern Lake Michigan. Officers patrolled from Traverse City to the Straits area and also patrolled the Bays de Noc, Garden Peninsula and Manistique areas. Numerous wholesalers and fishers were inspected, and fishing vessel docks were checked.
- GLEU supervision attended negotiation training in Traverse City with Fisheries Div. staff, state tribal liaisons, AGs office, USFWS staff, and tribal representatives. The training was conducted to assist with future 2020 Consent Decree negotiations.
- GLEU supervision attended the Executive Council meeting in Traverse City where the majority of the meeting was spent discussing harvest limits in the various management units of Lakes Michigan and Huron. The previous resolution to have the Technical Fisheries Committee and Law Enforcement Committee work together to assemble a workgroup to address reporting mechanisms was also reaffirmed.
- A GLEU officer received a complaint of a vessel setting nets off the mouth of the Two Hearted River. The vessel did not match any description of the tribal fishing vessel and an inspection of the area did not turn up a net. A similar complaint earlier in the week in Thunder Bay turned out to be researchers from Central Michigan University. Follow up will be conducted as well as determining what the notification process is to eliminate potential issues.
- A complaint was received of an improperly marked net near Omena Point in West Bay. GLEU responded and a staff was located that was not attached to a net. The staff was turned over to the Grand Traverse Bay Tribe.

- A GLEU officer responded to a complaint of a Facebook post where a local restaurant said that they were in the process of filleting fresh walleye and northern pike for the special that evening. Receipts at the restaurant showed that the fish were from Gordon Food Service and the “Northern Pike” were really Ocean caught European Pike Perch.
- GLEU responded to a net complaint in Suttons Bay that turned to be a GTB natural resource research net.
- GLEU developed a PACC Coding system for Great Lakes Treaty Enforcement Violations that will assist in ease of ticket entry into SRMS and allow for better query capabilities.
- GLEU officers located a previously abandoned net near Goose Island is still intact and that the pot is within 30 feet of the surface. The situation will be discussed with tribal authorities to determine how to have the net removed.
- GLEU and District 2 officers served an arrest warrant on a subject from an illegal spring netting case. The prosecutor issued charges for conspiracy to fish with an illegal device.
- GLEU received information from a D-1 officer regarding a subject that was allegedly selling bags of lake trout out of his vehicle to supplement his income. The information was forwarded to SIU.
- GLEU received a complaint from Fisheries Division staff of improperly marked nets in Lake Michigan near Whitehall. Follow up inspection determined that the nets were that of a state licensed commercial fisher and were marked above the state requirements with no violations observed.
- Several members of the Great Lakes Enforcement Unit attended a two-day Law Enforcement Committee Meeting in Brimley. In conjunction with the regularly scheduled meeting agenda, Committee members started a review of the 2000 Consent Decree to pin point enforcement problems that need to be discussed for 2020. The Bay Mills Judge and prosecutor attended a portion of the meeting and a discussion ensued regarding the Federal FFF investigation and enforcement concerns that the operation uncovered.
- GLEU officers patrolled Green Bay waters along the state line and inventoried several nets. Officers responded to a complaint area where several anglers claimed to have lost gear in what could possibly be an unmarked net. Officers were able to determine that the

area in question is an old pound net fishing grounds and anglers were likely getting entangled on the stakes still driven into the bottom of the lake.

- A GLEU officer met with Bay Mills officers regarding a situation with net markings in Grand Marais. The fisher was contacted during a patrol in the area. The fisher was cited for net violations. According to local residents, other fishers have been entangled in the poorly marked nets. The fisher is also allegedly marking nets with milk jugs half full of water.
- The GLEU received Law Enforcement Division's first ROV (Remotely Operated tethered underwater Vehicle) that had been purchased from VideoRay. GLEU's ROV is equipped with the standard video camera and lights. Additional included equipment that expands the vehicle's capabilities is sonar, a still camera, and a manipulator arm that is capable of grasping, cutting and retrieving objects. The ROV can be used in a variety of underwater work activities, including but not limited to commercial fish net inspections, drowning victim recovery, evidence recovery operations, shipwreck documentation and Homeland Security operations.
- GLEU officers conducted a marine patrol in the Big Bay DeNoc area. GLEU'S new ROV was deployed on a tribal subsistence gill net. Video from the ROV was able to assist the officers in determining that the net was a single net and not several nets "ganged" together.
- GLEU officers conducted a marine patrol on Green Bay and deployed GLEU's ROV on the shipwreck "May Queen" located in 83 feet of water to the northeast of Menominee. The officers were able to locate the wreck using the ROV's sonar and video of the wreck was recorded. The officers were also able to locate and video several artifacts on the wreck including a glass jar and what appeared to be dinner plates.
- A GLEU officer and a District 5 officer to an abandoned net complaint on Saginaw Bay. The net was located, and several local commercial fishers were contacted. The owner of the net was able to claim it.
- GLEU and District 2 officers responded to complaints of anglers getting caught in a net in the straits area near the Mackinaw Bridge. The officers located what appears to be an old abandoned trap net that was supposed to have been removed by another fisher. Upon

contacting the fisher, Cpl. Milkowski was advised that he was not able to remove it yet. Efforts continue to have the net removed.

- GLEU and District 2 officers conducted a commercial fish patrol on the waters of Big Bay de Noc. The officers contacted one tribal commercial fisherman and inspected several tribal trap nets. The officers deployed GLEU's ROV and inspected several of the tribal nets as well as a jug without identifying markers that was determined to be marking an isolated weed bed.
- GLEU officers patrolled the Michigan waters of Green Bay after the state commercial fishing closure. They located several state nets still in the water and contacted the state fisher on the water. The commercial fisherman stated that the nets were in the process of being removed and the ones left in the water had been rendered unfishable. The remaining nets were located in approximately 60 to 70 feet of water. The officers deployed GLEU's ROV and determined that the state nets were indeed collapsed and not actively fishing.
- A complaint was received about a commercial fisher who was harvesting perch in the closed area of St. James Harbor of Beaver Island. The complainant was contacted and it was determined that there was photographs and a video of the activity. GLEU officers along with various tribal officers were able to intercept the fisher when he returned to the dock with approximately 2,300 pounds of Yellow Perch. The fisher initially indicated that he was well outside the closed area until he was shown the video. At that time, he admitted that he might have been over the line a "little bit" and later indicated that he had set his nets after dark the prior night and didn't really know where he was at. The fisher was cited into Sault Tribe court.
- GLEU was contacted by a District 2 officer who received a complaint of a suspected commercial net targeting whitefish during the closure. After returning to shore, a vehicle that looked similar to what a local wholesaler drove, met the small vessel. SIU and District 2 officers maintained surveillance on the net the next morning and watched as a single person lifted the net and returned to shore. The same vehicle arrived to meet the vessel at shore as the previous night, but it was determined that it wasn't a wholesaler. It was quite some time before both vehicles left the area. Contact was made with both individuals by a District 2 and GLEU officer. A subsistence fisher had wanted to set a

net but was unable to due to work scheduling. His son and his friend (commercial helper who is prohibited from obtaining a subsistence license) set the net for him. He met them that evening when they returned to shore. The following morning, he was supposed to meet his friend and lift the net, but they got their times mixed up and the friend lifted it without him. They were using illegal large mesh gear and had 186 lbs. of whitefish (86 lbs. over the subsistence limit). The fish and gear were seized, and citations were issued for allowing unlicensed assistance and subsistence fishing without a license.

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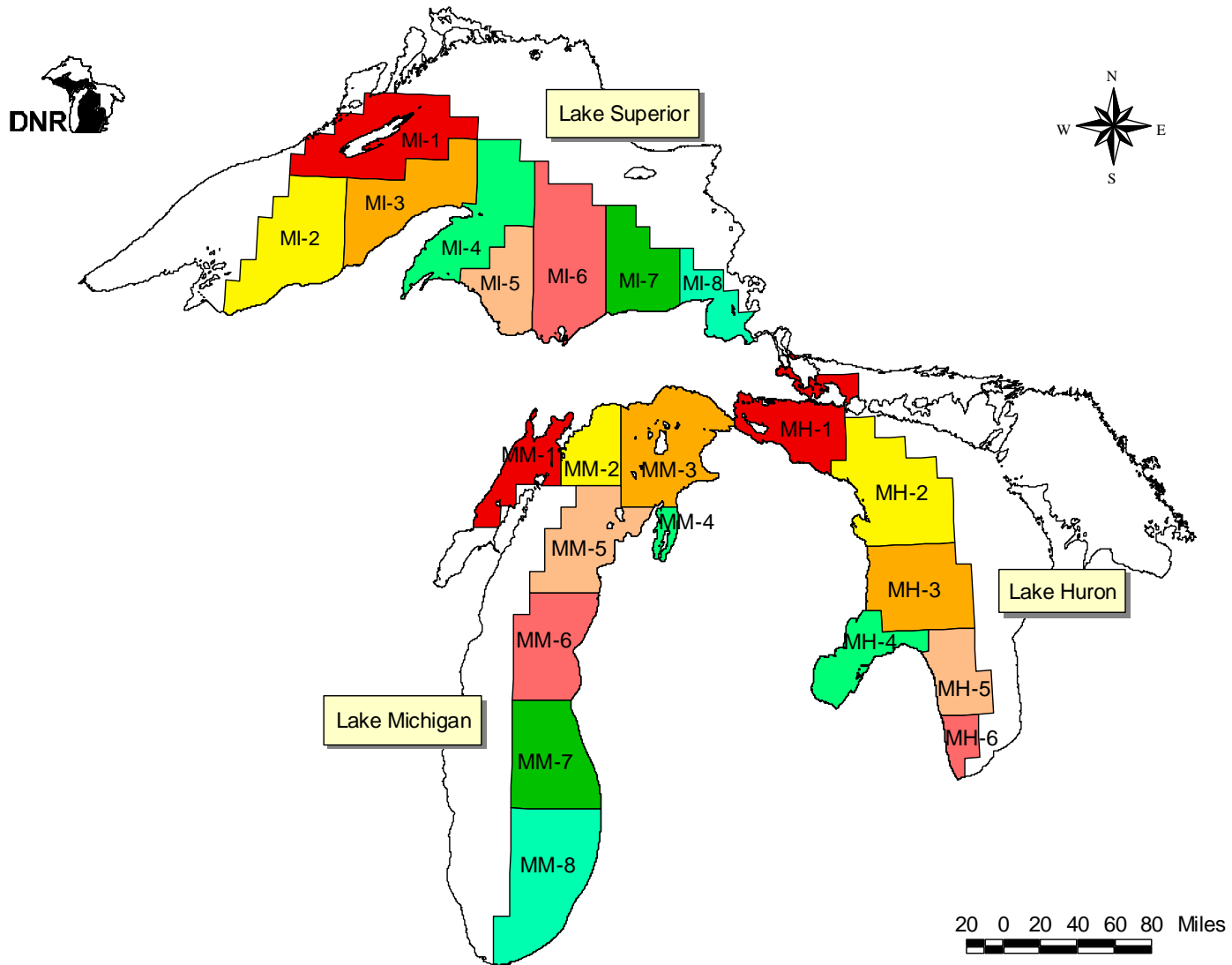


Figure 1. Lake Trout Management Units for Lakes Superior, Michigan and Huron.

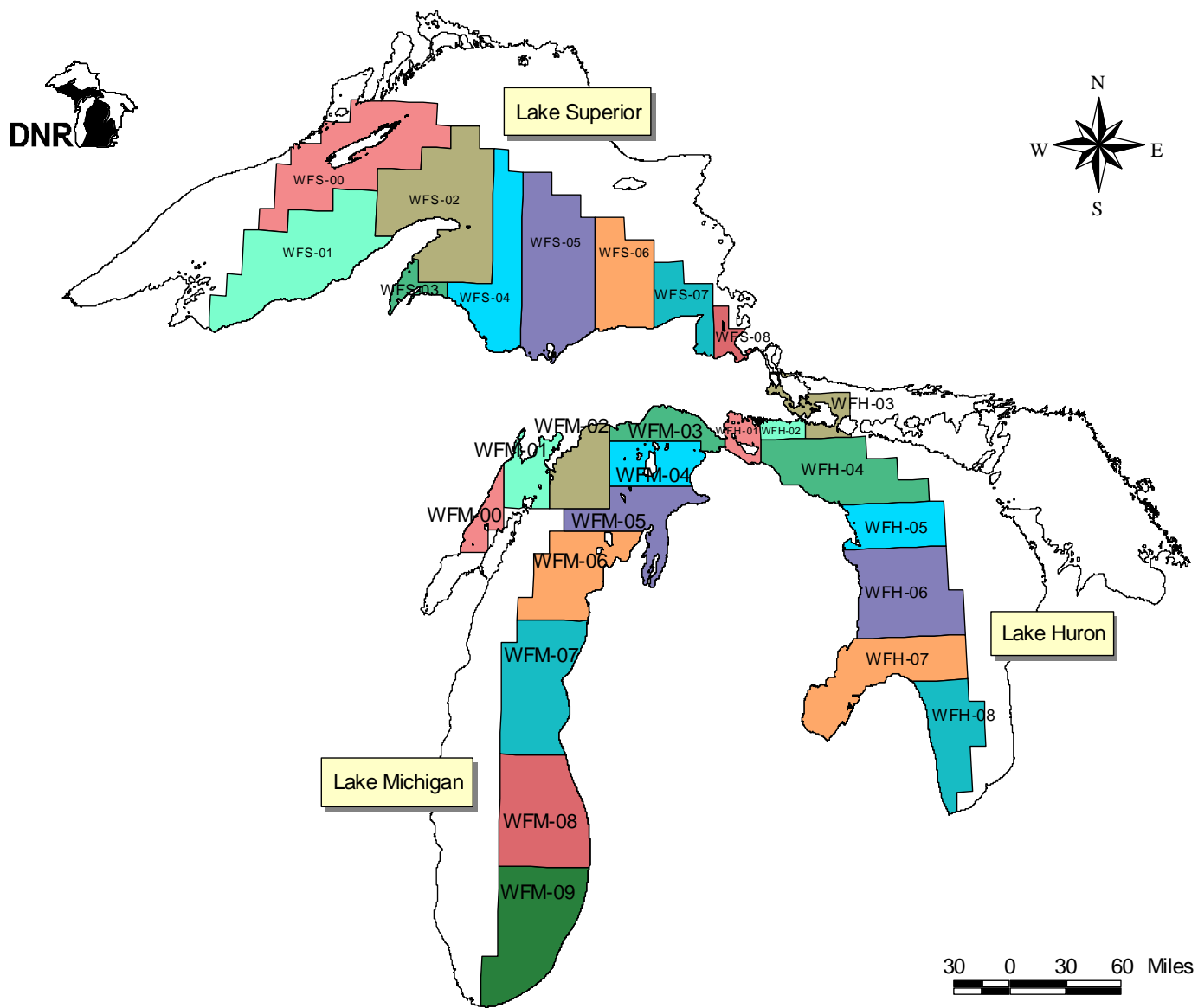


Figure 2. Lake Whitefish Management Units for Lakes Superior, Michigan and Huron.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Year and TAM used ¹	Whitefish Management Unit					State share	
	WFS-04	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 $SPR = 0.20$