

**2014 Annual Report on Implementation of the 2000 Consent Decree
for 1836 Treaty-Ceded Waters of the Great Lakes**

Prepared for:

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Table of Contents

	Page
Preface	3
<u>Fisheries</u>	3
I. General Information.....	3
A. Large-mesh gill-net retirement	3
B. Report from Modeling Subcommittee and modeling process description.....	4
C. Model estimates used during negotiation	6
II. Harvest Limits and TAE’s (Total Allowable Effort).....	7
A. Lake Trout	7
B. Lake Whitefish.....	8
III. Harvest and Effort Reporting	9
A. State-licensed commercial and recreational fishing	9
1. Lake Trout.....	9
2. Lake Whitefish.....	12
B. Tribal commercial and subsistence fishing.....	13
1. Lake Trout.....	13
2. Lake Whitefish.....	14
3. Walleye	15
4. Yellow Perch.....	16
5. Chinook and Coho salmon.....	17
6. Subsistence Fishing.....	18
7. Tribal Charter Fishing.....	22
IV. Fisheries Contacts	22
<u>Law Enforcement</u>	23
I. Introduction	23
II. General Information.....	23
A. Equipment/Maritime Activity	23
III. Enforcement	24
A. Complaints and Violations	24
B. Inspections	27

IV. Aquatic Invasive Species and Aquatic Disease 27

V. Training and Education 28

VI. Assistance to Other Agencies..... 30

VII. Law Enforcement Contacts..... 32

Lake Trout Management Units..... 33

Lake Whitefish Management Units..... 34

Appendices 35

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 2014, 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

In an effort 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 2014 the tribal gill-net effort in lakes Michigan and Huron was still approximately 19 million feet less than the 1993-1998 average (Table 1). Gill-net effort had increased above the 1993-1998 average in MI-6 during 2012 and 2013, but it was reduced in 2014. Effort in MI-7 during the 2014 fishing season exceeded that of the baseline years for the first time under the current Consent Decree. This likely occurred as new operations fished seasonally in this unit, as fishing success in Northern Lake Huron has declined in recent years.

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 projected effort in 2014.

Lake	Management Unit	Effort		2014 reduction ^b
		1993-98 ^a	2014	
Michigan	MM-123	17,912	12,178	5,734
	MM-4	1,794	576	1,218
	MM-5	240	187	53
Huron	MH-1	16,470	6,698	9,772
	MH-2	6	0	6
Superior	MI-6	780	381	399
	MI-7	2,028	2,275	0 (247 increase)
	MI-8	6,578	4,454	2,124
Totals		45,808	26,749	19,059

^a Average annual effort during base years.

^b The relative reduction in 2014 (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 2014 was completed in August 2014. 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>. The TFC approved changes to the format of this report, which were implemented in 2013 and continued for 2014. The report has been streamlined, eliminating some duplicative information, which allowed the report to be completed in a more timely manner.

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 based on the fact that growth slows as fish approach a maximum size. Mortality is estimated from age structure data by examining the decline in catch at age across age classes. Generally, there is a steady decline in the relative abundance of successive age classes over time. Total mortality is comprised of fishing and natural mortality. Fishing mortality includes recreational, subsistence, and commercial harvest, as well as mortality of fish returned to the water due to hooking and netting injuries. Harvest is monitored annually for each user group through direct reporting, wholesale fish reports, charter boat reports, and creel surveys. Models incorporate an estimate of hooking mortality for lake trout derived from a 1980s study in Lake Superior. The value currently used is 15%, but research is nearly completed in both Lake Huron and Lake Superior to update this value. 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.

In order to describe the dynamics of a population over time, modelers specify the initial numbers of fish at each age in the first year and recruitment of the youngest age in subsequent years. Currently, in lakes Michigan and Huron, lake trout recruitment is defined as the number of yearlings stocked or migrating into an area less those migrating out of the area. 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 in order to not exceed target mortality rates set forth in the Consent Decree and are derived by applying various fishing mortality rates to the population abundance estimated at the start of the year. Target mortality rates are comprised of an assortment of age-specific mortality rates. Additionally, the target mortality rates are defined by taking into consideration the concept of spawning stock biomass per recruit, or the amount of spawning biomass that an average recruit is expected to produce. This provision ensures that there is an adequate amount of spawning stock per recruit and that more than one age class is contributing considerably to the spawning population. A more extensive 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 2014, stipulations to the Consent Decree set harvest limits in MM-123, MM-4, and MM-5. These stipulations have been in place for more than 6 years and are the result of high levels of lamprey-induced mortality on lake trout, which would otherwise severely restrict all lake trout fishing. The stipulation for MM-5 had not been used since its signing, because the model estimated harvest limits were higher than the stipulated levels; however, in 2013 the model provided lower harvest limits than the stipulation, which triggered the stipulated harvest limits. A low model limit triggered the stipulation again in 2014.

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 2014, this rule was applied in MH-1 and MI-7. The MH-1 model harvest limit declined by more than 15% and the parties agreed to limit the reduction to only 15% lower than the 2013 limit. In MI-7 the model increased by more than 15%, but the parties kept the limit to only 15% higher than 2013. A map of the lake trout management units is provided at the end of this document (Figure 1), and the 2014 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 2014 fishing season.

Lake	Unit	Model-output HLs		Final HLs		Tribal TAE
		State	Tribal	State	Tribal	
Michigan	MM-123 ^a	0	0	50,000	453,000	12,954,000
	MM-4 ^a	65,332	79,851	77,200	94,300	842,000
	MM-5 ^a	34,335	22,890	58,800	39,200	139,000
	MM-67	396,920	44,102	396,920	44,102	NA
Huron	MH-1 ^b	24,480	179,520	48,093	352,682	10,567,000
	MH-2	137,700	6,100	137,700	6,100	NA
Superior	MI-5	138,039	7,265	138,039	7,265	NA
	MI-6	86,206	86,206	86,206	86,206	3,564,000
	MI-7 ^b	27,320	63,745	25,527	59,561	2,916,000

^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 2013 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 2013. A map of lake whitefish management units is provided at the end of this document (Figure 2), and the 2014 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 WFM-01, the TFC agreed to a limit of 2 million lb, despite the model estimating a limit of 1.5 million lb. The model structure changed in 2013 and the estimated harvest limit dropped substantially. The TFC decided again to wait an additional year to determine if the model

generated limit was appropriate for this stock or an artifact of the new structure. In non-shared units, the final tribal HRGs in the Northern Lake Huron unit and WFH-05 were both set lower than the model values, as model changes produced higher harvest limits than were expected. The HRGs were set lower so as not to establish unrealistic expectations in a fishery as a result of one year of a model increase. The MSC does not calculate recommended harvest limits in WFM-07 and WFS-06 due to limited fishery data. The HRGs in these units remained constant from prior years. 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 2014 fishing season.

Lake	Unit	Final State HL	Model output Tribal HL	Final Tribal HL or HRG
Michigan	WFM-01	200,000	-	1,800,000
	WFM-02	-	559,000	559,000
	WFM-03	-	976,000	976,000
	WFM-04	-	548,000	548,000
	WFM-05	-	492,000	492,000
	WFM-06	65,000	-	145,000
	WFM-07 ^a	-	-	500,000
	WFM-08	500,000	-	900,000
Huron	(H01-H04 Combined)		735,000	437,157
	WFH-05	-	727,000	634,300
Superior	WFS-04	10,200	91,800	91,800
	WFS-05	59,520	312,480	312,480
	WFS-06 ^a	-	-	210,000
	WFS-07	-	539,000	539,000
	WFS-08	-	130,000	130,000

^a No model output

III. Harvest and Effort Reporting

A. State-licensed commercial and recreational fishing

1. Lake Trout

Lake trout harvest by the State of Michigan consists 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. Lake trout harvest by sport anglers in 2014 was below harvest limits in all management units. Estimated State-licensed recreational harvest of primary species are 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 2014 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	280,536	6,917	33,893	8,848	27,517	33,022	9,907	5,759	61,506	160	821
	MM-4	121,517	14,420	65,129	0	0	5,296	1,589	778	8,309	50	257
	MM-5	137,871	7,975	51,613	68	211	0	0	12,808	136,789	1,626	8,341
	MM-67	646,390	10,726	62,417	272	846	27,901	8,370	70,349	751,327	14,984	76,868
Totals		1,186,314	40,038	213,052	9,188	28,575	66,219	19,866	89,694	957,932	16,820	86,287
Huron	MH-1	125,786	6,988	29,267	2,885	7,414	64,194	21,184	3,181	25,830	81	416
	MH-2	61,214	4,631	28,040	3,051	7,841	6,654	2,196	858	6,967	102	523
Totals		187,000	11,619	57,307	5,936	15,256	70,848	23,380	4,039	32,797	183	939
Superior	MI-5 ^b	36,548	8,367	32,160	0	0	0	0	341	1,282	638	1,072
	MI-6	37,770	3,795	14,524	0	0	188	41	1,121	4,215	1,334	2,241
	MI-7	20,970	2,072	7,624	12	36	0	0	114	429	1,972	3,313
Totals		95,288	14,234	54,309	12	36	188	41	1,576	5,926	3,944	6,626
Grand totals		1,468,602	65,891	324,668	15,136	43,866	137,255	43,287	95,309	996,654	20,947	93,851

^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 0, 114, and 202 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 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 zero pounds for 2014. MDNR issued a research permit for an experimental purse seine in Big Bay de Noc in 2013 that was reissued for 2014. The purpose of the research project was to determine if whitefish could be captured with minimal bycatch using this gear, which would result in fewer trap nets left in the water in the fall in Big Bay de Noc. The seine was closely monitored by MDNR personnel, and it successfully captured whitefish, had almost zero bycatch, and effectively removed 10 trap nets from the water.

The largest monitored recreational fishery for whitefish has 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 2014. Recreational harvest of whitefish was estimated to be 409 fish in Grand Traverse Bay, and 14,378 fish in Grand Marais. The other area where recreational harvest of whitefish is common is Munising, where 1,713 fish were harvested in 2014. 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 2014 fishing season.

Lake	Unit	Harvest	Effort
Michigan	WFM-01	190,721	21 ^a
	WFM-06	19,932	129
	WFM-08	86,624	333
Lake totals		297,277	483
Superior	WFS-04 ^b	47,510	224
	WFS-05	33,175	144
Lake totals		80,685	368
Grand totals		377,962	851

^aEffort in WFM-01 is low, as an experimental purse seine was used in 2014.

^bIncludes all of WFS-04, harvest and effort in 1842 waters was not removed.

B. Tribal commercial and subsistence fishing

Data in this section are as reported to the MDNR from the Chippewa Ottawa Resource Authority (CORA). At the time this report was completed, CORA had not finalized harvest data for 2014; thus, all reported numbers are considered preliminary. It is unknown how much these 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. 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

The final 2013 Tribal lake trout harvest in MM-123 (reported in October 2014) was higher than the preliminary value reported in April 2014 and was 16.4% higher than the limit, which would have triggered an overharvest penalty for the 2014 fishing season. The difficulty was that the fishing season was nearly completed when the Consent Decree parties agreed on final harvest number for 2013. About that same time an investigation that had been conducted by Federal agents from the USFWS was revealed. At the time of this report, the investigation into alleged illegal activity by numerous individuals associated with the commercial fishery continues. The Consent Decree parties have not agreed how to handle the tribal overharvest in MM-123 from 2013 because of the Federal investigation and timing of when the final harvest data were available.

In 2014 lake trout harvest by tribal commercial fishers was below established harvest limits in all management units, except for MM-123. The projected tribal harvest in this unit was 21.6% higher than the limit, which would trigger an overharvest penalty. The tribes recognized that overharvest was a concern in late 2014 and implemented a 600-lb bag limit for lake trout in MM-123 during the month of December 2014 and prohibited retention in trap nets. Those regulations have been extended for the entire 2015 fishing season. Lake trout are most commonly harvested by tribal commercial fishers as bycatch in the lake whitefish fishery; thus, effort is not reported in Table 6 (see Table 7). The tribes estimated the throwback mortality from trap and gill nets in MH-1 where bag limit regulations apply, and it is anticipated that throwback mortality estimates will be conducted in MM-123 for 2015. For 2014, the lake trout daily bag

limit for gill-net fishers in MH-1 was 600 lb per day, and for non-converston trap-net fishers it was 100 lb of lake trout each day.

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 2014 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	10,105	540,815	550,920
	MM-4	645	93,607	94,252
	MM-5	3,195	27,361	30,556
	MM-67	226	0	226
Lake total		14,171	661,783	675,954
Huron	MH-1 ^a	5,690	201,058	206,748
	MH-2	0	0	0
Lake total		5,690	201,058	206,748
Superior	MI-5	0	0	0
	MI-6	1,145	14,336	15,481
	MI-7	360	50,227	50,587
	MI-8	3,010	53,627	56,637
Lake total		4,515	118,190	122,705
Grand total		24,376	981,031	1,005,407

^a Includes estimated throwback mortality of 11,808 lb.

2. Lake Whitefish

Lake whitefish harvest by Tribal commercial fishers was below the approved harvest limits and HRGs in all management units. In management units that are not shared, the tribes manage the fishery in accordance with the Tribal Plan and no penalty is incurred for overharvest. In shared whitefish management zones, overharvest penalties are incurred when a party exceeds the harvest limit by greater than 25%, 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 2014 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	427,092	1,883	0	0	427,092
	WFM-02	120,525	405	124,608	2,732	245,133
	WFM-03	268,212	1,845	273,078	5,250	541,290
	WFM-04	69,127	433	151,942	2,520	221,069
	WFM-05	2,019	12	35,280	950	37,299
	WFM-06	9,975	60	19,550	177	29,525
	WFM-07	0	0	0	0	0
	WFM-08	0	0	0	0	0
Lake totals		896,950	4,638	604,458	11,629	1,501,408
Huron	Northern	83,786	836	180,424	5,300	264,210
	WFH-05	187,566	354	0	0	187,566
Lake totals		271,352	1,190	180,424	5,300	451,776
Superior	WFS-04	0	0	0	0	0
	WFS-05	4,976	62	27,520	355	32,496
	WFS-06	1,724	22	66,540	1,335	68,264
	WFS-07	158,561	1,024	301,147	4,878	459,708
	WFS-08	64,035	447	18,937	420	82,972
Lake totals		229,296	1,555	414,144	6,988	643,440
Grand totals		1,397,598	7,383	1,199,026	23,917	2,596,624

3. Walleye

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

The largest reported walleye harvest in 2014 occurred in Lake Huron unit MH-1 (37,084 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 2014 fishing season.

Lake	Unit	Trap nets		Gill nets		Total harvest
		Harvest	Effort	Harvest	Effort	
Michigan	MM-123	632	0	5,570	23	6,202
	MM-4	41	0	922	0	963
	MM-5	0	0	53	0	53
Lake totals		673	0	6,545	23	7,218
Huron	MH-1	315	0	36,769	1,152	37,084
Superior	MI-7	0	0	195	0	195
	MI-8	53	0	1,630	0	1,683
Lake totals		53	0	1,825	0	1,878
Grand totals		1,041	0	45,139	1,175	46,180

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 2014 was in MH-1 where 4,549 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 actually targeting other species.

Table 9. Summary of tribal commercial yellow perch harvest (pounds) and targeted effort (trap-net lifts or 1,000 feet of large-mesh and small-mesh gill net) by management unit in 1836 Treaty-ceded waters of the Great Lakes for the 2014 fishing season.

Lake		Trap nets		Gill nets		Total
		Harvest	Effort	Harvest	Effort	Harvest
Michigan	MM-123	131	0	622	42	753
	MM-4	2	0	266	15	268
	MM-5	10	0	0	0	10
Lake totals		143	0	888	57	1,031
Huron	MH-1	0	0	4,549	360	4,549
Superior	MI-8	0	0	10	0	10
Grand totals		0	0	5,447	417	5,590

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 are allowed to 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 2014 occurred in Lake Huron unit MH-1 (Table 10). The 170,760 lb harvested in MH-1 represents a 51% decline from the 2013 take of Chinook salmon in this area. In recent years, Coho salmon have been primarily harvested from Lake Superior, but in 2014 a low number were taken from northern Lake Michigan (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 2014 fishing season.

Lake	Unit	Trap nets		Gill nets		Total harvest
		Harvest	Effort	Harvest	Effort	
Michigan	MM-123	37	0	546	0	583
Huron	MH-1	0	0	170,760	3,002	170,760
Superior	MI-8	0	0	86	0	86
Grand totals		37	0	171,392	3,002	171,429

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 2014 fishing season.

Lake	Unit	Trap nets		Gill nets		Total harvest
		Harvest	Effort	Harvest	Effort	
Michigan	MM-123	0	0	14	0	14
Superior	MI-7	0	0	60	0	60
	MI-8	837	0	1,185	0	2,022
Lake Total		837	0	1,245	0	2,082
Grand Totals		837	0	1,259	0	2,096

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 2014 was 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 2014 fishing season.

Species	MH-1	MI-5	MI-6	MI-7	MI-8	MM-123	MM-4	MM-67	St. Marys River	Total
Atlantic salmon	0	0	0	0	56	0	0	0	4	60
Bass	10	0	0	0	2	305	0	0	0	317
Brown Trout	0	0	18	0	0	0	0	27	0	45
Burbot	9	0	89	0	14	57	0	0	105	274
Catfish	2	0	0	0	0	0	0	0	0	2
Carp	10	0	0	0	0	180	0	0	60	250
Freshwater Drum	0	0	0	0	0	54	4	0	0	58
Cisco	0	0	24	0	53	0	0	0	270	347
Lake Sturgeon	0	0	0	0	0	10	0	0	0	10
Lake Trout	446	0	228	0	67	483	132	193	42	1,591
Menominee	67	0	0	51	21	0	0	0	0	139
Northern Pike	139	0	9	5	36	353	0	11	292	845
Pink Salmon	0	0	0	0	7	0	0	0	0	7
Steelhead	0	0	309	83	99	301	0	287	7	1,086
Salmon	53	0	663	453	814	32	0	125	605	2,745
Smelt	11	0	0	0	20	0	0	0	0	31
Splake	9	0	79	0	0	0	0	0	0	88
Sturgeon	0	0	0	0	0	10	0	0	0	10
Sucker	74	0	210	16	103	198	0	0	221	822
Walleye	133	0	2	0	49	3,882	30	0	150	4,246
Whitefish	808	106	759	68	266	2,397	134	0	221	4,759
Yellow Perch	71	0	3	0	0	3,560	0	0	5	3,639
Effort (feet)	26,850	600	15,043	2,900	21,750	105,850	1,200	3,000	11,950	189,143

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 2014 fishing season.

Species	MH-1	MI-6	MI-7	MI-8	MM-123	MM-67	St. Marys River	Total
Atlantic salmon	15	0	0	0	0	0	940	955
Bass	0	0	0	18	258	0	31	307
Burbot	0	48	0	0	0	0	9	57
Catfish	0	0	0	0	0	0	22	22
Panfish	0	0	0	0	0	0	1	1
Cisco	56	0	0	0	0	0	155	211
Lake Sturgeon	0	0	0	0	0	0	10	10
Lake Trout	519	52	28	4	474	0	56	1,133
Menominee	0	8	0	0	0	0	0	8
Northern Pike	97	0	0	12	102	0	972	1,183
Pink Salmon	48	0	0	0	0	0	293	341
Steelhead	33	6	12	22	84	0	36	193
Salmon	660	108	53	224	185	0	1,131	2,361
Smelt	50	0	0	60	0	0	26	136
Splake	4	88	0	0	0	0	0	92
Sturgeon	0	0	0	0	0	0	10	10
Sucker	0	0	0	0	0	0	6	6
Walleye	4	0	0	370	309	0	1,050	1,733
Whitefish	0	253	0	194	10	0	318	775
Yellow Perch	625	0	0	0	904	39	1,560	3,128

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. Only one trip was reported, which occurred in Lake Michigan grid 911 and catch was 29 lb of Chinook Salmon, 38 lb of Lake Trout, 7 lb of Steelhead, and 4 lb of Brown Trout.

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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 each agency's annual summary report is reviewed.

This report provides a summary of enforcement activity for the MDNR GLEU in 2014 which is currently staffed by (3) 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 2014 season, the Unit's vessels were put to use for a total of 304 sea service hours. A total of 63 patrols were conducted along with an additional 2 patrols on vessels from outside of the Unit. 2,427 gallons of fuel was purchased for a total cost of \$9,723.86.

The Unit's larger vessels and specialized equipment has always been an asset to the local districts and in 2014 our officers were requested to render enforcement and security assistance at the following maritime events:

- Bay City area hydroplane races and Tall Ships Festival
- Traverse City Cherry Festival Air Show
- Menominee Waterfront Festival fireworks display

III. Enforcement

A. Complaints and Violations

In 2014, the GLEU investigated a total of 82 commercial fishery related complaints. 57 concerned 1836 Treaty fishing and 22 concerned state commercial fishing. Some of these complaints were unfounded, and the others resulted in a total of 24 citations and 2 verbal warnings being issued. Twenty-eight referrals were made to tribal officers for follow up. Numerous contacts concerning delinquent reporting were made with state fishers, wholesalers, and minnow catchers. 1 citation was issued for delinquent reporting.

Table 14. Commercial fish complaints investigated by the GLEU in 2014.

Complaints	1836 Treaty Fishery	State Fishery	1842 Treaty Fishery	Totals
Nets	42	12	3	57
Licensing	1	2	-	3
Access Sites	2	0	0	2
Closed Area or Season	4	3	0	7
Other	8	5	0	13
Totals	57	22	3	82

Table 15. Summary of commercial fisheries related violations in 2014.

Violations	1836 Treaty Fishery	State Fishery	1842 Treaty Fishery	Totals
Arrests	24	0	n/a	24
Referrals	24	-	4	28
Warnings	1	1	-	2

GLEU complaints and violations of note include the following:

- The GLEU kept busy locating and monitoring the removal process of abandoned trap nets off of Ludington and Whitehall. In the spring, GLEU Officers and the USCG Station Ludington checked 16 waypoints of net locations that had been recorded the previous fall. Only one of the previously noted nets was located. This was a high priority patrol to try and locate as many of the problem nets before the boating season arrived. As the boating season progressed, several net complaints were received in this area from boaters and anglers experiencing snags and entanglements. The locations of these problem areas were documented and forwarded to tribal law enforcement for follow up. A contractor was eventually hired to remove the nets and the tribe indicated that approximately 14 nets were removed.
- A Traverse City charter boat operator got caught in a net line near South Manitou Island. The vessel became entangled in the line while underway which caused it to abruptly stop which sent the passengers to the deck. The charter boat operator was able to free the vessel. The USCG was contacted and a notice to mariners was immediately sent out. It is believed that this could have been a remnant from one of the abandoned nets from the Ludington area.
- Another charter boat became entangled in a line near South Manitou Island, and another had gear snagged in a suspected abandoned/lost net off of nine-mile point near Charlevoix. A Unit Officer located and removed several hundred feet of line and an anchor near South Manitou Island. A local commercial fisher later located and removed part of a trap near the island.
- A court case was concluded involving two SSM tribal commercial fishermen that had abandoned approximately 10,000 feet of gill in Lake Michigan east of the Garden Peninsula. One of the subjects was found responsible for the abandoned net and net marking violations and was sentenced to \$300 in fines and forfeiture of the nets. This is their 3rd offense.
- A complaint of a suspected abandoned trap net off of Poverty Island in Lake Michigan was received. Anglers had snagged the net, which had no markings on it. Sault Tribe Police assisted with their net lifter but was unable to lift the net. Later efforts resulted in the removal of an anchor and line.
- An 1842 tribal vessel sank at the dock in Lake Superior and was raised by USCG divers. The remaining fuel was removed and the vessel was taken possession of by the owner.
- Officers assisted a Great Lake Indian Fish and Wildlife Commission Officer in attempting to locate a net in Lake Superior near Marquette. Several anglers reported getting snagged in a net in approximately 140' of water. The officers hooked what they thought was the net but were unable to keep it hooked in the grapple to get it to the surface.

- Tribal commercial trap nets were illegally set in state waters outside of the 1836 disputed fishing zone near Alpena. Seven nets belonging to two tribal fishers were located 1 - 2 miles into state waters. The fishers were contacted and 2,154 lb of whitefish were seized. The department sold the fish for \$4,523.40 and the money went to the state fish and game fund. Both were cited for 12 counts each of fishing in state waters without a commercial license. They pled guilty to all counts. A deferred sentence was arranged where they both paid \$180 fines and costs for 1 count and \$1,100 each to the State Fish and Game Fund. At the end of 1 year if they have no additional violations 11 of the 12 citations for each will be removed from the court record. A total of 3 nets were seized and forfeited from the 2 fishers.
- A floating gill net near Detour that appeared to be cut or broken loose was observed on a patrol and the information was turned over to Sault Tribe law enforcement.
- The GLEU and Sault Tribe Law Enforcement conducted a patrol to search for a suspected abandoned/unattended gill net. The officers were able to locate the net east of Poverty Island in Lake Michigan. The net was improperly marked but did have a tribal fisher's ID on it. SSM Officers used their gill net lifter to pull approximately 1 mile of net and observed rotten fish. Due to winds and worsening sea conditions, the officers had to stop the effort, but later returned to remove another 8,000 feet of net. Sault Tribe Officers issued citations for improper markings and abandoning a net. This is the fourth time in five years that this fisher has been prosecuted for having unattended and/or abandoned nets. The fisher pled guilty and received a fine.
- State commercial fishermen were unable to retrieve several nets in December 2013 due to the quickly forming ice in Saginaw Bay. Unit officers assisted fishers in the spring/summer of 2014 with locating the nets so that they could be recovered.
- Follow up was conducted to a complaint regarding a market in the Detroit area selling game fish illegally. The investigation revealed that the market was legally selling farm-raised fish.
- The Grand Rapids water intake plant on Lake Michigan reported that their intake pipes/channel had filled with whitefish. This impacted their water withdrawal from Lake Michigan. A Scientific Collector's Permit was applied for by the city to remove the fish from their system via a state commercial fisherman with the following provisions:
 - Legal sized whitefish could be retained and marketed as compensation for removal
 - Live undersized fish and non-target fish were to be returned to Lake Michigan
 - Undersized dead whitefish that were edible could be processed for a local food bank
 The majority of the fish were legal in size and at least 3,000 pounds were removed. The city contracted with divers who inspected the intake pipeline system to see where all of the fish were coming from.

B. Inspections

Unit members completed total of 557 inspections in 2014. These included 162 net inspections, 29 commercial vessel boardings, 187 dockside inspections, and 120 state wholesale inspections.

Table 16. GLEU inspections during 2014.

Inspections	1836 Treaty Fishery	State Fishery	1842 Treaty Fishery	Totals
Nets	105	57	-	162
Boardings	20	9	-	29
Docksides	162	125	-	187
State Wholesale	-	120	-	120
Bait Industry	n/a	59	-	59
Total	287	270	0	557

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.

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:

- Bi-national Grass Carp Risk Assessment Conference in Cleveland, Ohio - Focused on the risk of Grass Carp in the Great Lakes and identifying pathways for entry into the basin.
- Reviewing invasive species laws and providing recommendations for change, working with a team on improving a website for people to find answers on invasive species, and reviewing grant project ideas.
- Developing a list of recommendations which will list what each DNR Division can do to help reduce the spread of aquatic diseases (decontamination policy and procedure guidelines)
- Unit Officers conducted a large Aquatic Invasive Species initiative in Grand Rapids, Lansing, Flint, Ann Arbor, and Ypsilanti where approximately 30 fish markets and pet stores were inspected for prohibited species. No violations were observed.
- GLEU provided assistance to the US Fish and Wildlife Service (USFWS) on a major Asian carp/baitfish initiative. Bait (golden shiners and fathead minnows) and tank water samples were obtained from at least 40 bait dealers across the state. Over the course of two days, Unit officers and officers from the Special Investigations Unit made covert purchases of minnows at the bait dealers. Very specific procedures were used to collect and package the water and minnow samples which were delivered to a mobile USFWS lab. The objective of the project was to test the water samples for Asian carp eDNA. This project was funded by the Asian Carp/Invasive Species Task Force grant from the USFWS. The test results came back negative.
- Inspections of Pond Stocking trucks were done in the Grand Rapids and Saginaw areas. No violations for aquatic invasive species were observed.
- Follow up was done on a release of KOI and goldfish from a pond in Charlevoix.
- GLEU responded to information received regarding a company that had imported VHS uncertified Pacific Herring bait into Michigan. The Oregon based company had contacted the MDNR Fisheries Division requesting information on selling the product in Michigan. Company officials were not pleased that their methods of handling the product were not an approved method that was accepted by Michigan to prevent the spread of disease. The company stressed the high demand for their product in the Great Lakes region and it was suspected that the company would try to import the product anyway. Unit officers received intelligence that the company had imported the product under another company name and was selling it in a retail store in Saugatuck. An inspection was conducted and 67 packages of the Pacific Herring were confiscated and taken to a lab for testing. Additional shipments that later arrived in Michigan were also seized. The law enforcement section of the National Oceanic and Atmospheric Administration (NOAA) and agents from the USFWS assisted the unit. Admissions were obtained to the knowledge of the regulations and the attempt to ship and sell product in Michigan without the certification. The company was charged by NOAA Law Enforcement and paid a \$2,000 settlement for the illegal activity.

V. Training and Education

Training conducted by unit officers includes the following:

- Training was done for the division's 23 new officers. Topics covered included fish ID and enforcement, CZM inspections, state and tribal commercial fishing enforcement, AIS enforcement, and bait industry enforcement.
- Training was done for conservation officers with the Great Lakes Indian Fish and Wildlife Commission, which included officers from Michigan, Wisconsin, and Minnesota. The training consisted of presentations on state and tribal commercial fishing, aquatic invasive species laws and enforcement efforts in Michigan, fish hauler identification, the minnow industry, and aquatic invasive species education and identification.

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

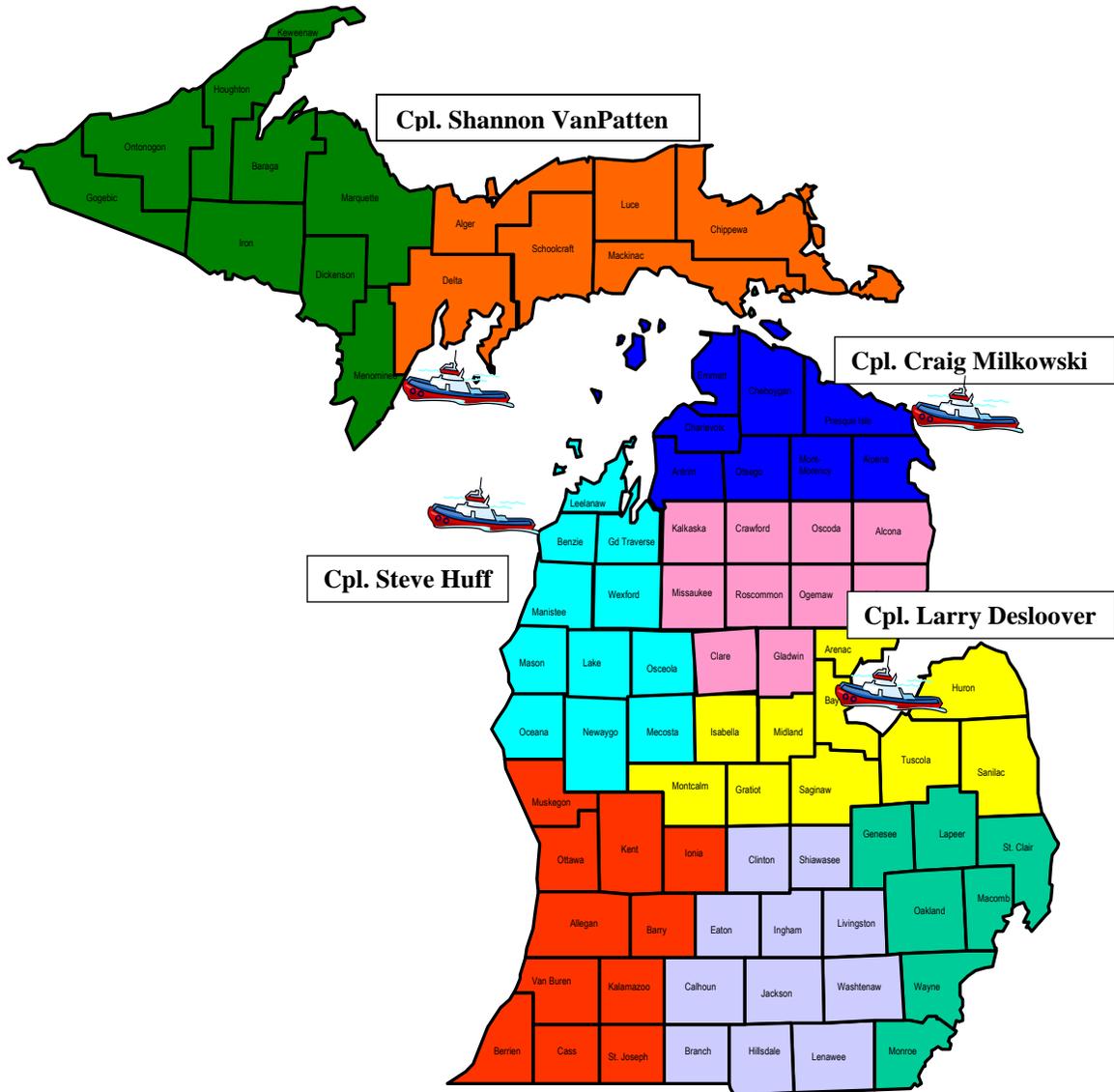
- Lakes Huron, Michigan, Superior, Erie & St. Clair Citizens Fishery Advisory Committees.
- Michigan Fish Producers Association – Working with representatives from this organization and Fisheries Division on a re-write of the current commercial fishing laws.
- Saginaw Bay Walleye Club - Addressed walleye, commercial fishing, and AIS issues.
- Local Business Owners of Little Bay DeNoc Area – Met in conjunction with NRC Commissioner Madigan, U.P. Regional Coordinator Welling-Haughey, a representative from Senator Casperson's office, and Fish Division staff to discuss walleye numbers, stocking efforts, and tribal issues regarding Little Bay de Noc.
- Bay de Noc Sport Fishing Club – Met in conjunction with Fish Division staff and Natural Resource Commissioner Madigan to answer questions and concerns.
- Calumet-Keweenaw Sports Club – Presentation given along with a GLIFWC Officer on state and tribal commercial fishing.
- Michigan Charter Boat Association – Provided GLEU updates, charter boat reporting requirements, net marking issues, and education on aquatic invasive species.

VI. Assistance to Other Agencies

The GLEU often works with officers from other agencies and jurisdictions. Examples of this include the following:

- Transportation provided to the MSP Dive Team to Mackinac Island to assist the state harbor with dive operations involving the harbor's bubbler system.
- US Border Patrol and Canadian RCMP - Border issues, intelligence, and joint patrol efforts.
- GLEU was part of an operation involving USCG Sector Lake Michigan - Milwaukee, USCG Sturgeon Bay, Wisconsin DNR, and local Wisconsin police agencies. The operation involved targeting suspected nighttime illegal activity involving fish, drugs, and marine violations. This was on Green Bay waters in northern Lake Michigan along the state line.
- GLEU was part of a multi-day operation with the USCG Sault Ste. Marie Station on Lake Superior looking for illegal fishing and other illegal activities along the international border.
- Assistance was provided to local law enforcement and the USCG with maintaining a marine security and safety zone during the launching of the naval ship USS Detroit at Marinette Marine Shipyard. The Detroit is a 400' LCS Class naval warship that will be assigned to the Pacific Fleet based in San Diego.
- An audit by Conservation Officers in Minnesota identified discrepancies in the species listed sold and transported from a commercial fisher in southern Michigan to a subject in Minnesota. A Unit officer obtained records of fish shipments from the Michigan fisher to assist Minnesota with the investigation.

Michigan Department of Natural Resources Commercial Fish Enforcement Section



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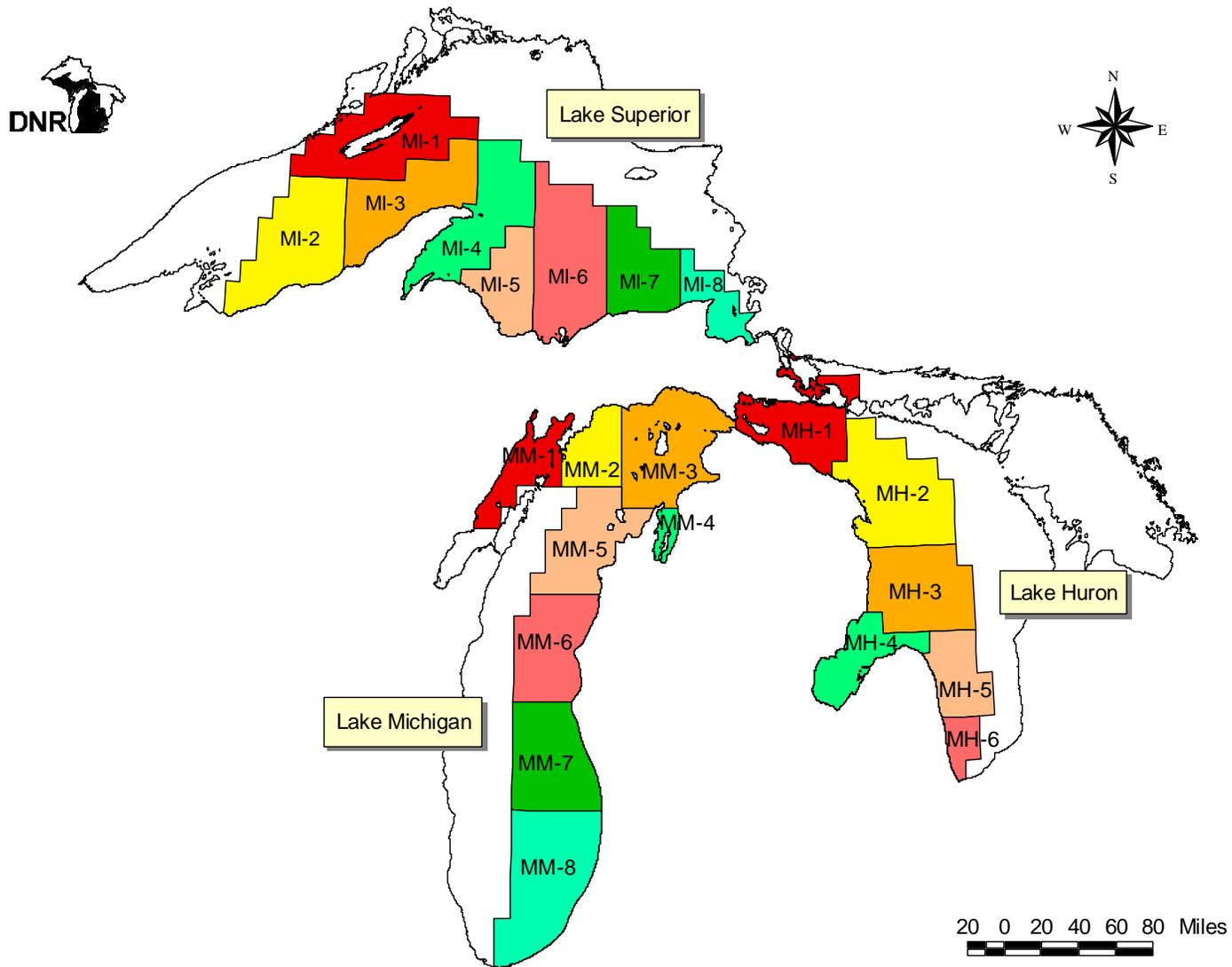


Figure 1. Lake Trout Management Units for Lakes Superior, Michigan and Huron.

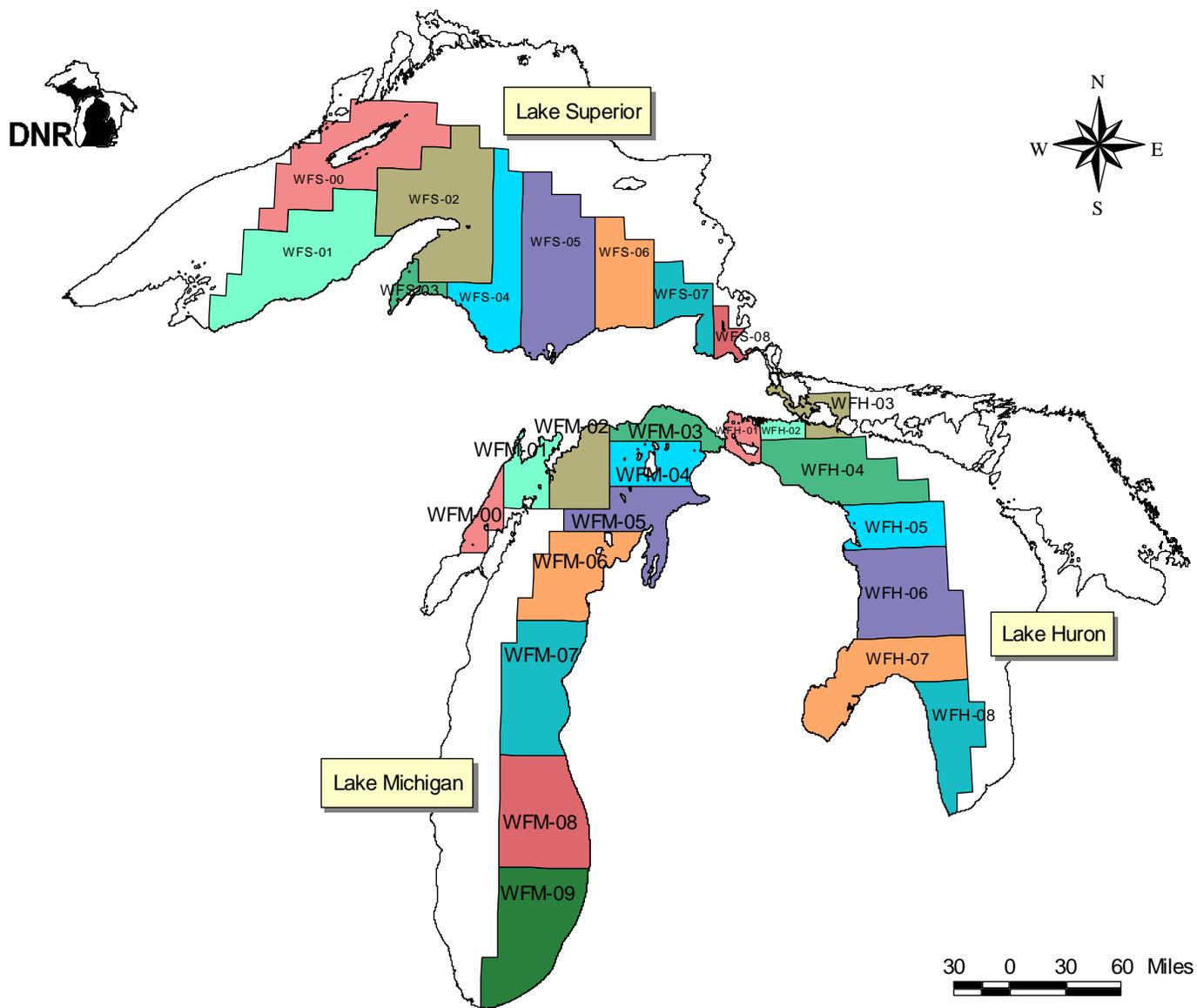


Figure 2. Lake Whitefish Management Units for Lakes Superior, Michigan and Huron.

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 commercial effort and sport effort increases by 20%.

45% SSBR = 0.20

2006 SSBR = 0.53

2020 SSBR = 0.53

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

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

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

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

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

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

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

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

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

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

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