

SUBJECT: Great Lakes commercial fishing harvest limits

FOR: DECEMBER BOARD MEETING

TO BE PRESENTED BY / TITLE: William Horns, Great Lakes Fisheries Specialist

SUMMARY:

Several years ago the Natural Resources Board requested that the Department provide periodic reviews of harvest limits for all commercial fish species in the Wisconsin waters of Lake Michigan and Lake Superior. These reviews provide an opportunity for Department staff to describe methods used to determine harvest limits, to give you some advance notice about possible changes or controversies, and to answer questions that you may have.

RECOMMENDATION: None, this is an information item only

LIST OF ATTACHED MATERIALS:

- | | | | |
|--|---|---|----------|
| No <input checked="" type="checkbox"/> | Fiscal Estimate Required | Yes <input type="checkbox"/> | Attached |
| No <input checked="" type="checkbox"/> | Environmental Assessment or Impact Statement Required | Yes <input type="checkbox"/> | Attached |
| No <input type="checkbox"/> | Background Memo | Yes <input checked="" type="checkbox"/> | Attached |

APPROVED:

Michael Staggs
Bureau Director, Michael Staggs

11/15/2011
Date

Ken Johnson
Administrator, Ken Johnson

11/24/2011
Date

Cathy Stepp
Secretary, Cathy Stepp

11/28/11
Date

- cc: NRB Liaison
- DNR Rules Coordinator
- Michael Staggs - FH/4
- Ken Johnson - AD/8
- Bill Horns - FH/4

- Lake Michigan Commercial Fishing Board
- Lake Superior Commercial Fishing Board
- Dale Maas - GLSC
- Chuck Weier - WF/GLSFC
- George Meyer - WWF

- Randy Schumacher - SER
- Steve Avelallemant - NOR
- Steve Hewett - FH/4

DATE: November 14, 2011

FILE REF: 3600

TO: Natural Resources Board

FROM: Cathy Stepp

SUBJECT: Review of commercial fishing harvest limits.

Several years ago the Natural Resources Board requested that the Department provide periodic reviews of harvest limits for all commercial fish species in the Wisconsin waters of Lake Michigan and Lake Superior. These reviews provide an opportunity for Department staff to describe methods used to determine harvest limits, to give you some advance notice about possible changes or controversies, and to answer questions that you may have. On December 14, our Great Lakes Fisheries Specialist, Bill Horns, will provide an oral presentation on this subject and take your questions.

That presentation will focus on the decline in bloater chubs and some of the ideas being considered in adjusting that commercial harvest limit. These include initiating a simplified or automated system for setting quotas, first for chubs and possibly later for other species. These ideas are timely because of 1) the shortage of revenues to support the level of data collection and analysis needed to meet the needs of modern fisheries models and 2) the delays inherent in promulgating the administrative rule changes needed to change harvest limits.

Although the Department holds the authority to set harvest limits, the Commercial Fishing Boards for Lake Michigan and Lake Superior are now required by statute (1997 Wisconsin Act 189) to recommend species harvest limits, and the Department is required to give due consideration to those recommendations. In the spirit of that legislation, the Chairmen of the two Commercial Fishing Boards have been invited to attend the December 14 meeting.

Most of the material here is background information repeated from past briefing memos for the benefit of new members. Where appropriate, the information about individual species has been updated. Since the last review, in January of this year, no harvest limits have been changed. Department biologists have recently reviewed harvest limits for yellow perch from Lake Michigan, but do not at this time recommend changes. Harvest limits for bloater chubs from Lake Michigan are currently under review, and changes may be recommended in the next few months.

The use of **harvest limits** is one of three defining features of the management of commercial fishing in Wisconsin waters of the Great Lakes. The others are limited entry and individual transferable quotas. All the major commercial species in Lake Michigan (yellow perch, bloater chubs, lake whitefish, rainbow smelt, round whitefish) are subject to harvest limits. In Lake Superior harvest limits have been established only for lake trout and have not been established for lake whitefish, bloater chubs, lake herring, or rainbow smelt. However, gill net effort limits tied to lake trout quotas act as *de facto* limits on the catch of other species in some situations.

Under Wisconsin's **limited entry** system, the privilege of a commercial license is limited to 10 licensed fishers on Lake Superior and 65 licensed fishers on Lake Michigan. Limited entry legislation was adopted for Lake Superior in 1968 and extended to Lake Michigan in 1978, at which time the Legislature provided a statement of legislative intent:

The intent of the legislature in revising commercial fishing laws is to provide for multi-use management of the Great Lakes fishery, including an economically viable and stable commercial fishery and an active recreational fishery. To reach this management objective the legislature recognizes that it may be necessary to limit participation in the commercial fishery and to limit the harvest of commercially fished species through proven scientific management techniques.¹

For those species for which harvest limits are established, the total annual allowable harvests are allocated among licensed fishers² through the specification of **individual transferable quotas**, which are expressed as percentages of the total. Individual transferable quotas allow each commercial fishing operation to be conducted at the time most convenient for the individual fisherman, free of pressure to race to catch the limited harvest before others.

All commercial and sport fishing rests on the premise that there is a harvestable surplus in the adult population. That is, that some adult fish can be harvested annually without diminishing the ability of the population to sustain itself. Fisheries scientists and managers throughout the world have struggled to develop objective criteria for setting harvest levels. Recently the National Research Council, noting that many populations of marine organisms have been severely over-fished, recommended a conservative approach³:

Managing single-species fisheries with an explicitly conservative, risk-averse approach should be a first step toward achieving sustainable marine fisheries. The precautionary approach should apply. A moderate level of exploitation might be a better goal for fisheries than full exploitation, because fishing at levels believed to provide the maximum long-term yield tends to lead to over-exploitation.

In setting commercial harvest limits on the Great Lakes, the Department has subscribed to that philosophy. The establishment of specific harvest limits in Wisconsin involves consideration of several things, including trends in the abundance of harvestable fish, the number of young fish believed to be available for recruitment into the harvestable population, the incidental harvest of non-target species by the commercial fishery, and claims on the fish population by sport fishers, tribal fishers, or commercial fishers in adjoining states.

On Lake Michigan we use a zone system in which Wisconsin waters are divided into three zones. Zone 1 is southern Green Bay, zone 2 is the waters surrounding the northern Door County peninsula and extending south to near Algoma on the Lake Michigan side, and zone 3 is our waters of Lake Michigan south of Algoma. Each zone has a characteristic mix of commercial species. Total allowable commercial harvests and individual quota allocations are specified for each zone separately. The zones also help distribute commercial effort to avoid conflicts with other users.

In Wisconsin there is no single method for deriving harvest limits. The fish populations and annual reproduction are monitored to the best of our ability and efforts are made to increase or cut harvest limits in response to trends, using the best analytical tools available.

We are developing statistical catch-at-age (SCAA) models for estimating abundance of several commercial species. These models integrate data from assessments conducted by Department biologists with commercial catch reports and creel survey results to estimate fish populations. A rapid expansion of the use of these models in the Great Lakes was stimulated by negotiations between the State of Michigan and upper peninsula Indian tribes over the harvest of lake trout and lake whitefish from US waters of

¹ Ch. 418, Laws of 1977. Section 923(37)(d) Revision of sport trolling and commercial fishing laws: legislative intent.

² The chub harvest on Lake Michigan is not entirely allocated among fishers, a significant fraction is still subject to an unallocated or "racehorse" fishery.

³ Sustaining Marine Fisheries. National Academy Press. 1999

northern Lake Michigan, eastern Lake Superior, and northern Lake Huron. Today we have SCAA models in place for lake trout in Lake Superior, yellow perch in Green Bay and Lake Michigan, and lake whitefish in Lake Michigan. The following table summarizes harvest limits established since 1982.

Commercial harvest limits for Lake Michigan, Green Bay, and Lake Superior 1982-2003. All harvest limits are expressed in pounds, except that starting in 1986 harvest limits for Lake Superior lake trout are expressed in numbers of fish. For all changes, dates of NRB adoption are shown.									
		Perch (GB)	Perch (LM)	Chubs (LM & GB)	Whitefish (LM & GB)	Menominee (LM & GB)	Forage (LM & GB)	Smelt (LM and GB)	Lake Trout (LS)
1982	May	(no limit)	(no limit)	1,650,000	(no limit)	(no limit)	(no limit)	(no limit)	180,000
1983	Feb.	200,000		2,500,000					
1984	Feb.	350,000		3,000,000					
1986	July	400,000		3,500,000			18,000,000		80,000 fish
1989	Feb.		320,000		1,150,000	75,000		1,000,000 (GB only, no LM limit)	
	Sept.	475,000							
1991	Feb.	400,000							81,200 fish
	Mar.						0	2,358,000 (830,000 from GB)	
	Dec.			3,600,000	1,300,000				
1994	Jun.	300,000							
1995	Apr.		112,000		1,450,000				
1996	Sept.		0						104,400 fish
	Dec.				1,770,000				
1997	Mar.	200,000							
1999	Feb.				2,470,000				
	June							1,000,000 (351,993 from GB)	
2001	Oct.	20,000							
2002	Oct.								126,600 fish
2004	Feb							1,000,000 (25,000 from GB)	
2005	Dec	60,000							150,500 fish
2007	Dec	100,000							
2009	Nov				2,880,001				
current limits		100,000	0 ⁴	3,600,000	2,880,001	75,000	0 ⁵	1,000,000 (25,000 from GB)	150,500 fish

Lake trout from Lake Superior. Lake trout restoration has been a marked success in Lake Superior, thanks to the efforts of the state, federal, and tribal partners. We have a healthy, naturally reproducing population in the Apostle Islands area, and we believe that further population growth is possible. The status of our Lake Superior lake trout population is assessed by a technical working group made up of state, tribal, and federal biologists. Harvest limits are guided by a statistical catch-at-age model that was developed by Dr. Michael Hansen and his students (UW Stevens Point). Lake trout is the only species subject to harvest limits in Wisconsin waters of Lake Superior. Because the Red Cliff and Bad River

⁴ The harvest limit of 112,000 is still on the books, but the season is closed.

⁵ By law, alewives and chubs caught during commercial trawling may be landed.

Bands of Lake Superior Chippewa retain harvest rights in Lake Superior, lake trout harvest limits are negotiated with the tribes and are specified in the State-Tribal Lake Superior Agreement. Renegotiation of that agreement was completed in 2005, with new harvest limits implemented in December of that year. The agreement provides for periodic adjustments of the lake trout harvest limits and netting effort. In November of 2009 the total allowable harvest was revised, but because the allocation to recreational fishers is typically not harvested, it was not necessary to change the total allowable commercial harvest.

Lake whitefish from Lake Michigan. The lake whitefish population appears to be stable or growing. In November of 2009 the lake whitefish harvest limit was increased by 16.6%, to 2,880,001 pounds.

For several years there has been some concern across the Great Lakes about declines in abundance of burrowing amphipods of the genus *Diporeia*, and how that might affect lake whitefish, which utilize them for food. The condition (weight per unit length) of individual lake whitefish was a concern in the recent past, but appears to have improved somewhat in the last few years. Over the same period the average size-at-age of whitefish has declined and the age at which whitefish become vulnerable to commercial harvest has increased. Over the past decade the seasonal movements of whitefish have changed, possibly a consequence of the *Diporeia* decline, other ecological changes, or changes in water clarity. Whitefish are now sought farther off shore than in the past and, very recently, fishing effort in Green Bay has increased. In 2001 the Department increased the maximum trap net depth from 90 to 150 feet (NRB Order FH-30-01) to accommodate the need to pursue whitefish into deeper water.

The whitefish harvest is divided among zones 1, 2, and 3, with the largest portion being allocated to and taken from zone 2. This has been a point of discussion in the past, with zone 3 fishers asking the Department to consider allowing quota transfers between zones or increasing the zone 3 harvest limit. When the current harvest limits were adopted one year ago, the 16.6% increase was allocated equally among zones, a departure from past policy of allocating increases in proportion to existing zone-specific harvest limits.

The best available data indicate that the whitefish from both zones belong to a single population that spawns predominantly along the east shore of Door County, so we are committed to managing that whitefish population as a single stock. Recently a study under the direction of Dr. Brian Sloss of UW-Stevens Point demonstrated that there are six genetically distinct whitefish stocks in Lake Michigan (including Michigan waters), and that it would be possible to assess the contribution of each of those to the exploited population in Wisconsin⁶. If data from such a study were to show that the harvests from Zones 2 and 3 are taken from different genetic stocks, we might justify setting separate harvest limits in the two zones, but there is not yet a strong reason to believe that is the case.

The allocation of northern Green Bay whitefish between Wisconsin and Michigan commercial fishers remains a point of contention. Department biologists believe that fishers from both states harvest adult lake whitefish from the single population that spawns in our waters, but Michigan biologists believe that the Michigan harvest is drawn predominantly from one or more distinct populations that spawn in Michigan waters of northern Green Bay. The genetic studies under the direction of Dr. Sloss may help resolve this issue.

Yellow perch from Lake Michigan. This fishery was closed in 1995 following several consecutive years of very poor natural reproduction. A limited recreational fishery with a daily bag limit of five fish has remained in place. The 1998 year class was strong and 2005 was a good year for natural reproduction by yellow perch in Lake Michigan, giving hope for a recovery of the population, but so far there is no discernable upward trend in older yellow perch.

⁶ Sloss, B.L., J.A. VanDeHey, T.M. Sutton, P.J. Peeters, and P.J. Schneeberger. 2007. Genetic stock structure of lake whitefish in northern Lake Michigan and Green Bay. Great Lakes Fishery Commission Project Completion Report.

Our biologists work with the inter-jurisdictional yellow Perch Task Group⁷ to attempt to understand the causes behind the decline in yellow perch recruitment, and to monitor its recovery. On behalf of the Yellow Perch Task Group and with financial support from the Great Lakes Fish and Wildlife Restoration Act, Drs. Mike Wilberg and James Bence of Michigan State University developed an SCAA model for yellow perch in Lake Michigan⁸. Department biologists and the YPTG, also cooperated with modelers at the Quantitative Fisheries Center at Michigan State University to explore various management strategies using computer simulations. In 2010, the Lake Michigan Fisheries team reviewed all available information on yellow perch including model results and concluded that the mortality rates were too high to justify additional harvest.

Yellow perch from Green Bay. This population appears to be stabilizing following a decade of poor natural reproduction. The Department increased the annual harvest limit to 100,000 pounds in 2007 (NRB Order FH-07-07). We have been encouraged by strong natural reproduction by Green Bay yellow perch in recent years, especially in 2003, and have been closely monitoring those recent year classes. Despite sustained strong natural reproduction, including a good hatch in 2009, the adult population has not rebounded as expected.

Our understanding of the Green Bay yellow perch population is supported by an unusually long and deep database reaching back almost 30 years. That database includes an annual trawl survey at 78 stations in Green Bay. The Department has worked closely with the USFWS Fisheries Resources Office in Green Bay to review assessment methods, digitize historical data, and upgrade our modeling tools. One product of that cooperation is the development of an SCAA model for yellow perch in Green Bay. In the future, Department biologists will explore methods of explicitly linking harvest limits to indices of yellow perch abundance and thereby having the harvest limits move up and down automatically as total yellow perch abundance changes in the Bay.

For Green Bay, as for Lake Michigan, we have followed a policy of attempting, over the long term, to split the total harvest equally (by numbers) between sport and commercial fishers.

Bloater chubs from Lake Michigan. Bloater chubs have declined in Lake Michigan over the past 20 years. Department biologists are currently reviewing the commercial harvest limit. The Current harvest limit of 3,600,000 pounds was adopted by the NRB in 1991, but has not been approached by commercial fishers for many years. The lake-wide bloater chub population is shared by all four states, but the only significant commercial harvest occurs in Wisconsin waters, making the rest of the lake a virtual refuge. In 2008, for example, only about 4% of the estimated lakewide bloater chub biomass was harvested in all of Lake Michigan, but almost 90% of that was taken in Wisconsin. The failure to produce a strong year class in recent years has resulted in a marked decline in the biomass as measured by the Great Lakes Science Center (a facility of the US Geological Survey) in its annual surveys of forage species. The chub population decline has resulted in sharply reduced fishing efficiency, and the livelihoods of some of our commercial fishers have been significantly affected. Chuck Madenjian, the Great Lakes Sciences Center biologist who coordinates and analyzes the annual forage surveys has hypothesized that we are at the low point of a long-term cycle in bloater chub abundance in Lake Michigan.

Recent harvests have been small, but because our total allowable commercial harvest now approaches 50% of the lakewide bloater chub biomass, we think it is prudent to reduce the harvest limit at this time so that when the population recovers there is no risk of excessive harvest from the recovering population. In 2012 we hope to initiate a rule to reduce the bloater chub harvest limit and to implement a system by

⁷ The YPTG was established by the Lake Michigan Committee in 1994. It is made up of state, federal, and tribal fisheries managers and scientists.

⁸ Wilberg, M.J., J.R. Bence, B.T.Eggold, D. Makauskas, and D. Clapp. 2005. Yellow perch dynamics in southwestern Lake Michigan during 1986-2002. *North American Journal of Fisheries Management*. 25:1130-1152.

which the harvest limit will rise and fall with population fluctuations without requiring future formal rule-making, either to reduce or increase the harvest limit. If this is successful, we would consider similarly automating harvest limits for other species.

Rainbow smelt from Lake Michigan and Green Bay. Rainbow smelt abundance has declined dramatically throughout Lake Michigan over the last decade. Assessment trawling conducted annually by the Great Lakes Science Center shows a long term lake-wide decline in smelt abundance from a peak in 1980, with a modest and apparently temporary increase in 2005, but lower numbers in 2006, 2007, and 2008. The commercial trawl fishery for this species has been highly controversial for many years. In response to a petition, the harvest limit was reduced from 2,358,000 pounds to 1,000,000 pounds in June of 2000. At that time the following policy statement was articulated by Department biologists:

The Department recognizes that the rainbow smelt, a naturalized non-native member of the Lake Michigan fish community, plays several roles in the Lake Michigan ecosystem. It provides food for human consumption, and is therefore a source of income for the commercial fishery and source of recreational opportunities for sport fishers. The rainbow smelt provides forage for native and stocked game fish but also, as a predator, may adversely affect some native species, such as lake whitefish and lake herring. The Department will provide opportunities for both sport and commercial harvests of rainbow smelt to the extent that is possible while still meeting other management goals. Commercial harvest limits may be adjusted as the population of smelt changes, but the Department will not, for the purpose of enhancing the smelt population, limit salmon or trout stocking. The Department may, however, adjust stocking levels as changes occur in the general forage population of which the rainbow smelt is a part, in order to promote the health of stocked fish, or to achieve other management objectives.

Participants in the 2002 Conservation Congress spring hearings voted overwhelmingly in support of a complete closure of rainbow smelt trawling in Green Bay. In 2004 we reduced the commercial harvest limit from Green Bay to 25,000 pounds.

Commercial trawlers have been critical of regulations that serve to limit the harvest of alewives -- the requirements that limit trawling in Green Bay to hours of darkness and limit trawling in Lake Michigan to winter months. That policy of limiting the harvest of alewives in commercial trawls recognizes the dependence of salmon on alewives for food. The importance for chinook salmon, especially, of sustaining an alewife populations has been illustrated in recent years in Lake Huron where a collapse of the alewife population has been followed by a collapse of the recreational fishery for chinook salmon. The policy has been reviewed and re-affirmed by the NRB and others a number of times, and any change would be highly controversial.

Menominee (round whitefish). The current harvest limit of 75,000 pounds has been in effect since 1989. The annual reported harvest is small (1667 pounds reported in the 2004-05 fishing year), so we do not invest time and effort in modeling this population, or in adjusting the harvest limit.

Rough and detrimental fish. In addition to the quota species listed above, commercial fishers are offered a contract/permit to harvest incidentally caught rough and detrimental fish, defined specifically as bullheads, burbot, catfish, gizzard shad, suckers, white bass, and white perch. Under that contract/permit, an individual's harvest of those species (in aggregate) may not exceed his/her combined individual harvest limit for all quota fish species. In recent years the harvest of rough and detrimental species has been negligible, with the exception of several thousand pounds of burbot each year.

White perch. Within the last decade the non-native white perch proliferated in Green Bay, to the point where they are a nuisance to yellow perch fishers, and then declined sharply in 2003. Because of high

PCB levels, the Department had not previously considered facilitating the development of a commercial harvest of white perch, but in 2002 studies showed that PCB levels were below FDA action levels, and therefore could be sold in commercial markets. Department biologists took steps to explore opening a commercial fishery for white perch, but because of the population decline in 2003 that possibility is not currently being pursued.