

# Wisconsin's Commercial Trawl Harvest 1999

Steve Surendonk  
Wisconsin DNR, Mishicot Field Station

## INTRODUCTION

Wisconsin's commercial fishing industry typically utilizes three types of gear on Lake Michigan: gill net, entrapping nets and trawler. This report focuses on the commercial trawling industry and utilizes the harvest information submitted by the commercial fisherman for rainbow smelt *Osmerus mordax*, bloater chub *Coregonus hoyi* and alewife *Alosa pseudohargus*.

Historically, commercial trawling has targeted three main species of fish in the Wisconsin waters of Lake Michigan. Much of the harvest was a general forage catch that was utilized by the pet food market. This type of trawling caught large numbers of fish, chiefly alewife, rainbow smelt, and bloater chub. The catch from 1983 to 1990 ranged from 9,547,528 to 25,757,452 pounds and was dominated by alewife (Peeters 1991).

The other portion of the trawl fishery was a targeted rainbow smelt harvest used for the human food market. The targeted harvest of rainbow smelt peaked in 1990 at 1,834,014 pounds, and has since declined.

During 1991 additional rules regulating trawling in the waters of Lake Michigan and Green Bay were adopted. These rules were designed to allow the harvest of rainbow smelt and to eliminate general forage catches and established a Total Allowable Commercial Harvest (TACH) for rainbow smelt. The regulations also restricted the areas, dates, and times fished to establish a daylight, deep water (depths greater than 60 feet) Lake Michigan fishery from November 15 to April 20, and a nighttime, deep water (depths greater than 65 feet) Green Bay fishery from June 15 to September 30 (Figure 1). The (TACH) for rainbow smelt, effective license year 2000 is 1 million pounds annually, of which no more than 351,993 pounds can be caught in Green Bay.

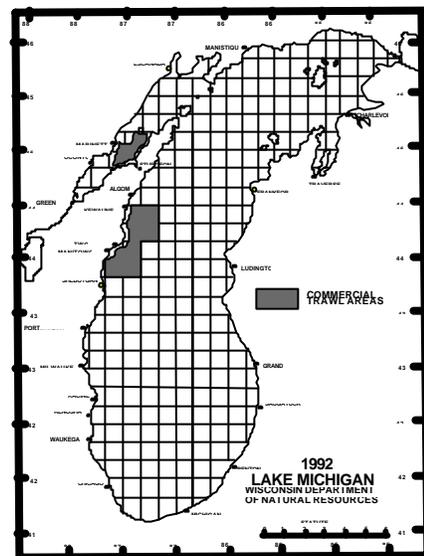


Figure 1. Permitted commercial trawling grounds.

This report builds on earlier reports from Peeters (1989, 1991, and 1992) and Surendonk (1993, 1996, 1997 and 1998). Further, it summarizes trawl harvest from Lake Michigan and

Green Bay for calendar year 1999 and license year 1999 and 2000 as described in Wisconsin Administrative Code N.R. 25.9 (2)(d).

### METHODS AND RESULTS

Trawl harvest information was obtained from the mandatory biweekly catch forms submitted by commercial license holders during the statutory season. This report examines reported harvest data two ways, on a calendar year and licenses year basis. Calendar year harvest is reported for historical comparison and license year harvest is presented to examine quota harvest since new rule changes were established in license year 1992.

Unsorted catch harvest, as defined in this report, includes incidentally caught fish which were landed and not discarded offshore as dead scrap or reported as processed bloater chub. Incidental (unsorted) catch is mostly bloater chub but also includes other species not limited to alewife and unmarketable smelt.

#### Calendar Year 1999

(January 1, 1999- December 31, 1999)

In calendar year 1999, trawlers reported harvesting a combined total of 844,739 pounds of rainbow smelt from Lake Michigan and Green Bay (Figure 2, Appendix 1). The total rainbow smelt harvest in 1999 was 113 percent above the 1998 calendar year harvest.

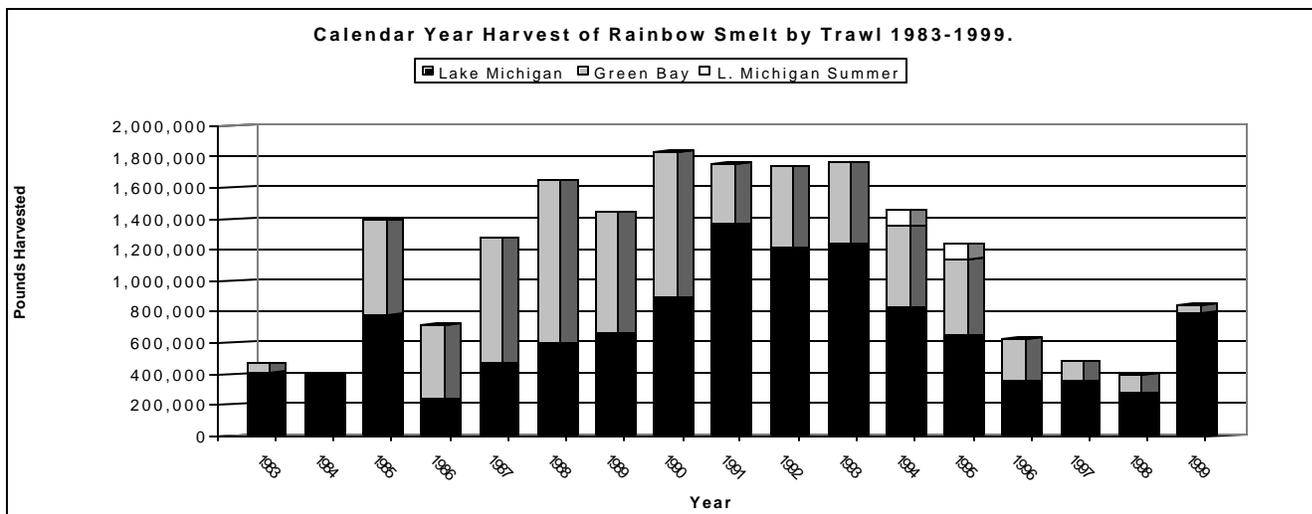


Figure 2. Calendar year reported harvest of rainbow smelt from Lake Michigan and Green Bay from 1983 through 1999 by commercial trawl.

## Lake Michigan

The 1999 calendar year rainbow smelt harvest from Lake Michigan was 794,151 pounds. Trawlers fished for 1,851 hours with a catch per effort (CPE) of 429 pounds per hour trawled (Figure 3, Appendix 1). The Lake Michigan harvest was 192 percent higher than the 1998 harvest and CPE increased 166 percent from 1998 levels.

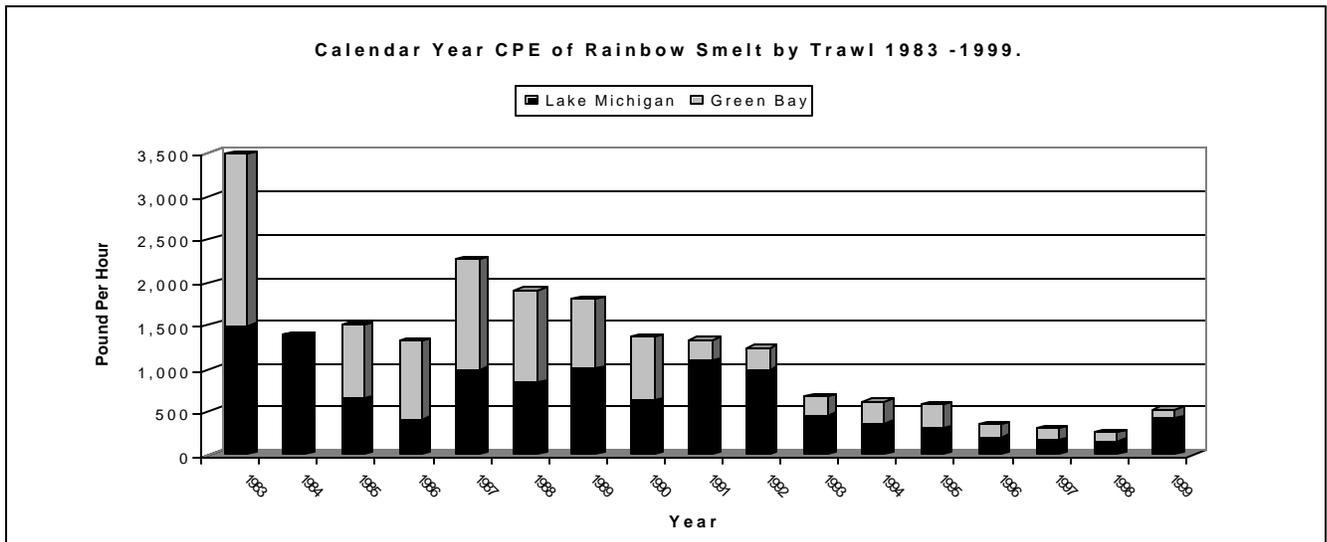


Figure 3. Calendar year reported catch per effort of rainbow smelt, by commercial trawl, from Lake Michigan and Green Bay from 1983 through 1998.

Additionally, the trawlers reported harvesting 26,951 pounds of bloater chub which were processed for their flesh or roe; 1,677 pounds of bloater chub roe or unprocessed roe and 156,643 pounds of unsorted catch consisting mainly of bloater chub, alewife and unmarketable rainbow smelt.

## Green Bay

On Green Bay, trawlers reported harvesting 50,588 pounds of rainbow smelt during calendar year 1999. Trawlers fished for 489 hours with a CPE of 104 pounds per hour trawled during calendar year 1999 (Figure 3, Appendix 1). The Green Bay harvest was 60 percent lower than the 1998 harvest and CPE increased 11 percent from the 1998 level.

Additionally, trawlers reported harvesting 930 pounds of

unsorted catch consisting mainly of bloater chub, alewife and unmarketable rainbow smelt.

**License Year 1999**  
(July 1,1998 - June 30,1999)

In license year 1999 trawlers reported harvesting a combined total of 945,129 pounds of rainbow smelt from Lake Michigan and Green Bay (Figure 4, Appendix 2). License year 1999 harvest increased 126 percent from the 1998 harvest but was 50 percent lower than the 1992 license year harvest, the first license year affected by the quota system.

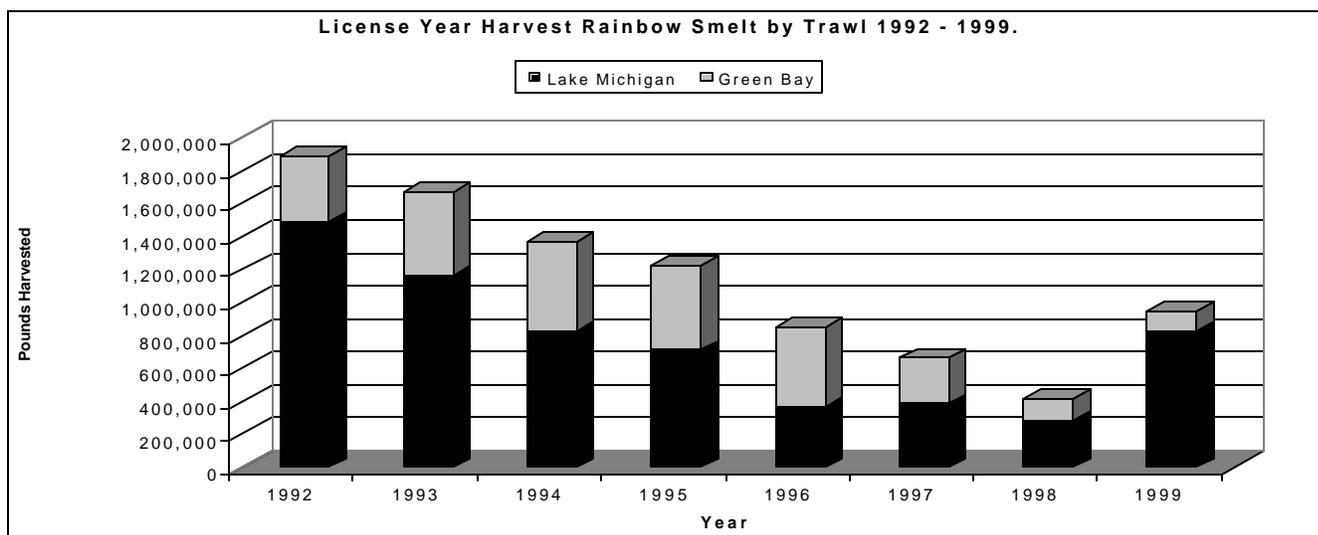


Figure 4. License year reported harvest of rainbow smelt from Lake Michigan and Green Bay from 1992 through 1999 by commercial trawl.

**Lake Michigan**

The 1999 license year rainbow smelt harvest from Lake Michigan was 824,286 pounds. Trawlers fished for 1,991.7 hours with a CPE of 413.9 pounds per hour trawled (Figure 5 Appendix 2). The 1999 harvest was 194 percent higher than the 1998 harvest and 45 percent lower than the 1992 license year harvest. While hours trawled has increased 7 percent from 1998 they have increased 49 percent from the 1992 license year. The CPE has increased 176 percent from 1998 levels but decreased 63 percent from the 1992 license year.

Additionally, the trawlers reported harvesting 5,570 pounds of bloater chub which were processed for their flesh or roe; 1,582 pounds of bloater chub roe or unprocessed roe and 200,385 pounds of unsorted catch consisting mainly of bloater chub, alewife and unmarketable rainbow smelt.

## Green Bay

The 1999 license year rainbow smelt harvest from Green Bay was 120,843 pounds. Trawlers fished for 1,291 hours with a CPE of 94 pounds per hour trawled (Figure 5 and Appendix 2). The 1999 harvest was 13 percent lower than the 1998 harvest and 70 percent lower than the 1992 harvest. Hours trawled have increased 11 percent from 1998 but have decreased 23 percent from the 1992 license year. CPE has declined 21 percent from the 1998 level and 61 percent from the 1992 license year.

Additionally, trawlers reported harvesting 1,472 pounds of unsorted catch consisting mainly of bloater chub, alewife and unmarketable rainbow smelt.

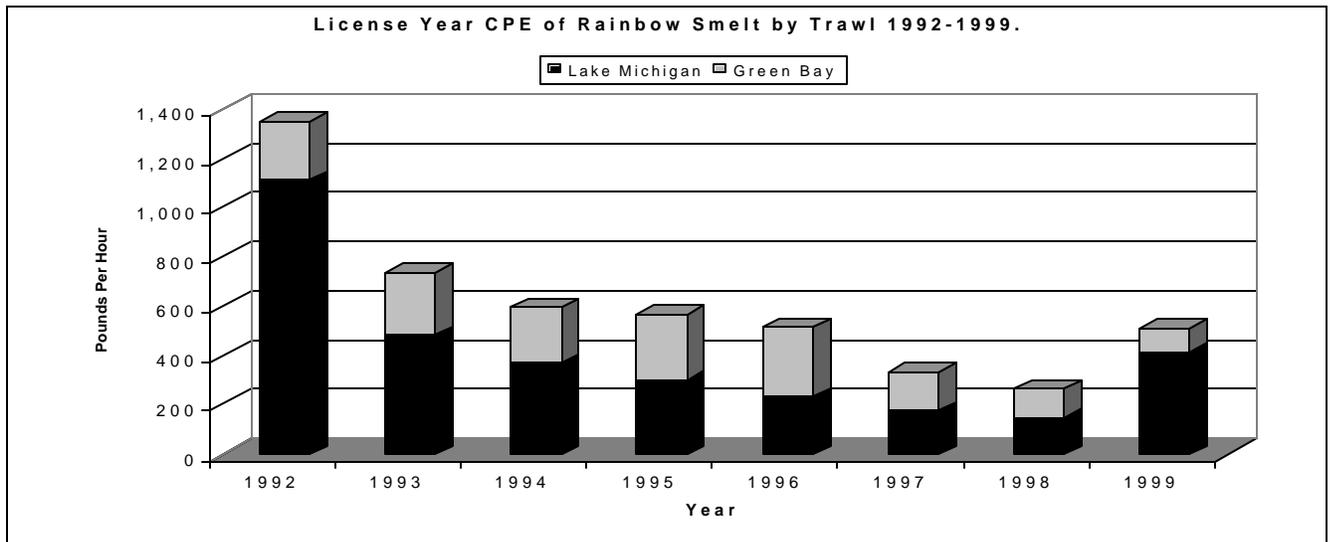


Figure 5. License year reported catch per effort of rainbow smelt by commercial trawl, from Lake Michigan and Green Bay from 1992 through 1999.

## License Year 2000 (July 1, 1999 - June 30, 2000)

In license year 2000, trawlers harvested a combined total of 306,241 pounds of rainbow smelt from Lake Michigan and Green Bay (Figure 6, Appendix 2). License year 2000 harvest decreased 68 percent from the 1999 harvest and was 84 percent lower than the 1992 license year harvest, the first license year affected by the quota system.

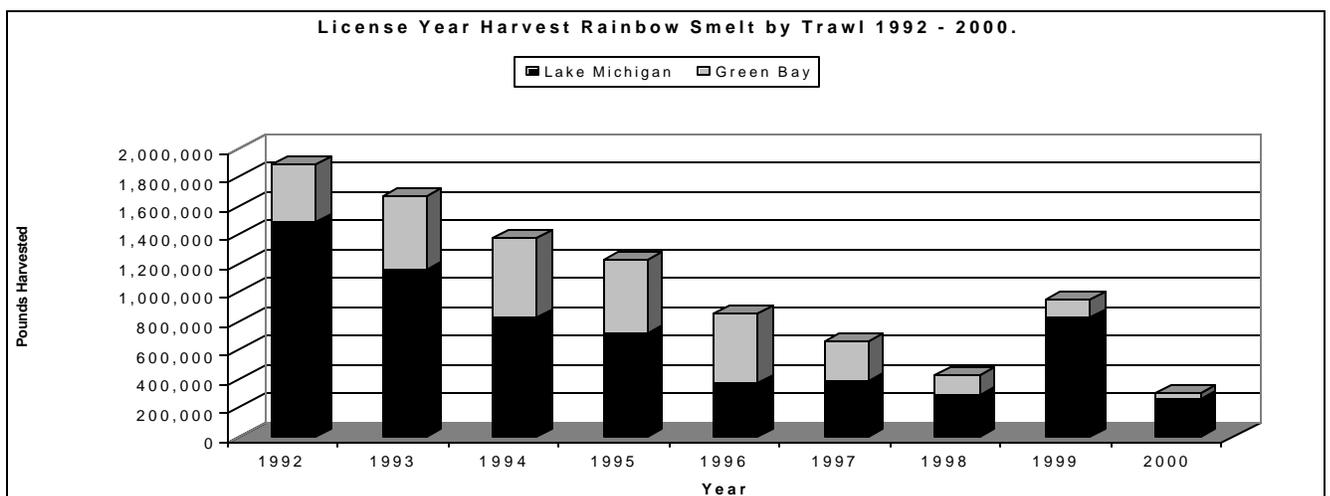


Figure 6. License year reported harvest of rainbow smelt from Lake Michigan and Green Bay from 1992 through 2000 by commercial trawl.

### Lake Michigan

The 2000 license year rainbow smelt harvest from Lake Michigan was 257,905 pounds. Trawlers fished for 1,214.4 hours with a CPE of 212.4 pounds per hour trawled (Figure 7 Appendix 2). The 2000 harvest was 69 percent lower than the 1999 harvest and 83 percent lower than the 1992 license year harvest. While hours trawled have decreased 39 percent from 1999 they have decreased 9 percent from the 1992 license year. The CPE has decreased 49 percent from 1999 levels and decreased 81 percent from the 1992 license year.

Additionally, the trawlers reported harvesting 32,698 pounds of bloater chub which were processed for their flesh or roe; 751 pounds of bloater chub roe or unprocessed roe and 275,503 pounds of unsorted catch consisting mainly of bloater chub, alewife and unmarketable rainbow smelt.

### Green Bay

The 2000 license year rainbow smelt harvest from Green Bay was 48,336 pounds. Trawlers fished for 459 hours with a CPE of 105 pounds per hour trawled (Figure 7 and Appendix 2). The license year harvest was 60 percent lower than the 1999 harvest and 88 percent lower than the 1992 harvest. Hours trawled have decreased 64 percent from 1999 and have decreased 72 percent overall from the 1992 license year. CPE has increased 12 percent from the 1999 level but have decreased 56 percent from the 1992 license year.

Additionally, trawlers reported harvesting 137 pounds of unsorted catch consisting mainly of bloater chub, alewife and unmarketable rainbow smelt.

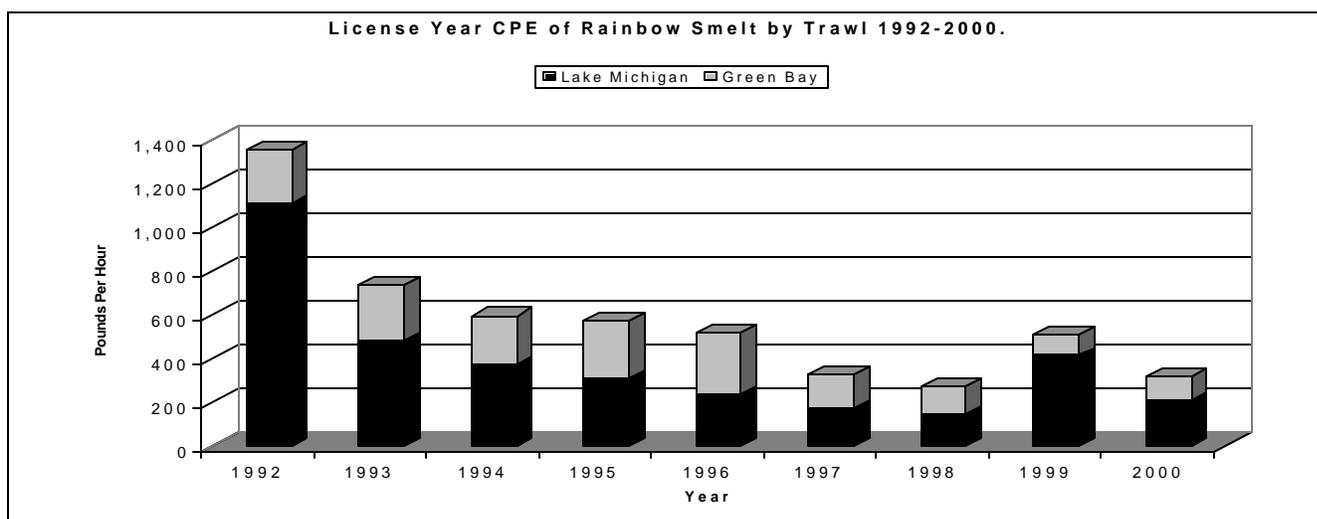


Figure 7. License year reported catch per effort of rainbow smelt by commercial trawl, from Lake Michigan and Green Bay from 1992 through 2000.

### DISCUSSION

Reported harvest figures used throughout this report were obtained from commercial catch reports submitted by commercial fisherman. Frequently all that is reported is the poundage of saleable rainbow smelt sorted from the catch for human consumption. At times, the incidental catch of rainbow smelt too small for the human consumption market can be substantial.

Peeters (1991) indicated the discrepancy between monitored and reported CPE might be the result of sorting for marketable fish with the remainder being reported as unsorted catch or returned dead to the water as scrap.

The declines in harvest and CPE appear to be independent of the regulatory changes enacted in 1992, and may be an indicator of an overall lakewide decline in rainbow smelt stock. Data collected by the Department of the Interior, U.S. Geological Survey Biological Resource Division (USGS) indicates that relative abundance and biomass of rainbow smelt (available to bottom trawl) has declined from 1992 levels (Fleisher et al 2000). The USGS data indicates a 76 percent decline in biomass of rainbow smelt between the years of 1992 and 1999 (Figure 8).

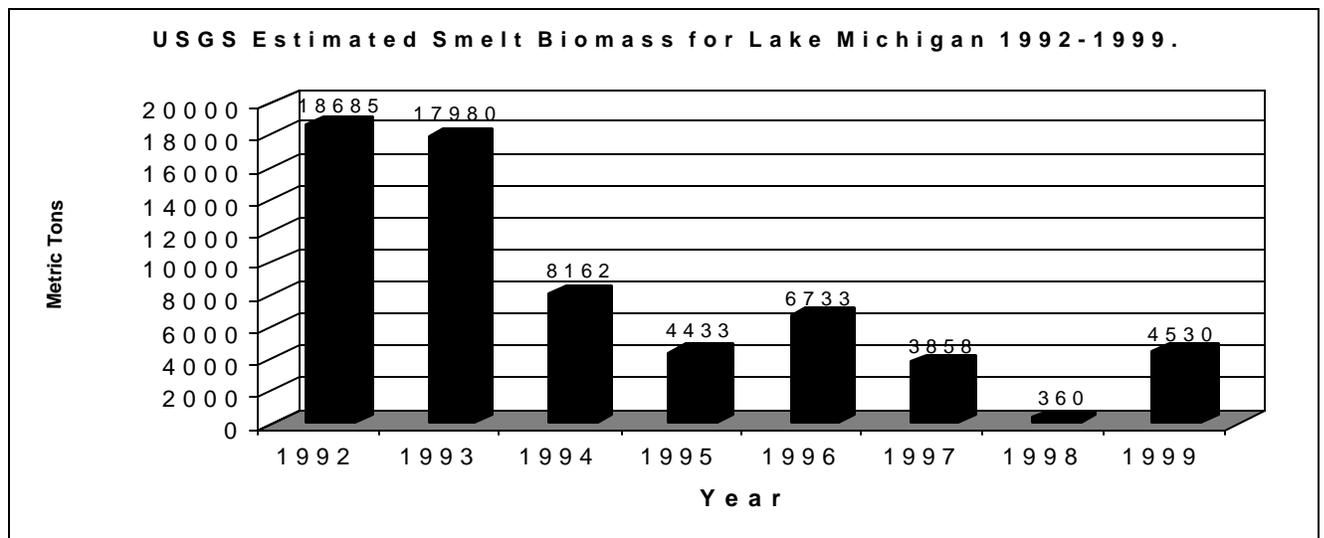


Figure 8. United States Geological Survey estimated biomass of rainbow smelt in Lake Michigan 1992-1999, based on bottom trawl survey.

Generally, the harvest of rainbow smelt by commercial trawlers is similar to population trends determined by U.S.G.S. index trawling. In 1999 increased harvest by trawl was not predicted

by U.S.G.S. trawling. It is unknown if increased harvest by commercial trawl is an indication of an increase in rainbow smelt numbers, if trawlers were fishing a localized concentration of fish not indicative of lakewide populations or due to U.S.G.S. sampling difficulties in 1998.

Fishing effort on Lake Michigan dropped below the 2 year moving average in license year 2000 (Figure 9, Appendix 2). Throughout this 9 year time span effort has remained relatively constant.

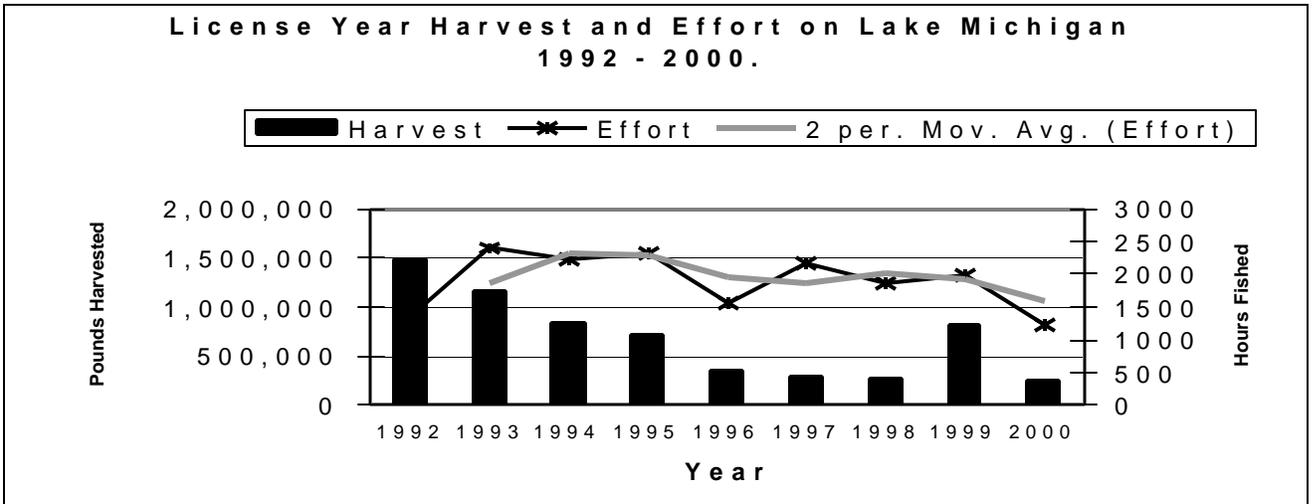


Figure 9. License year reported harvest of rainbow smelt and reported effort from Lake Michigan from 1992 through 2000 by commercial trawl.

On Lake Michigan the trawling industry utilized 6 vessels in license year 1999 and 5 vessels in license year 2000. During this two-year time span all but one vessel reported less effort for the 2000 license Year (Figure 10, appendix 3). Further, the two-year difference in effort is most represented in the months of December, January and February (Figure 11, appendix 4).

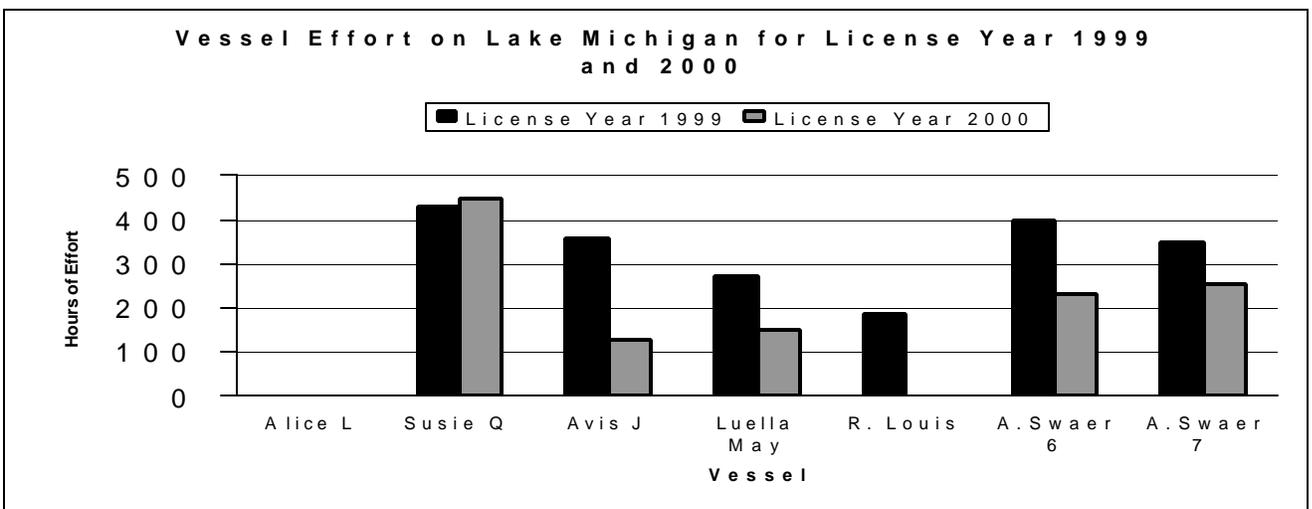


Figure 10. Reported effort by vessel on Lake Michigan, license year 1999 and license year 2000.

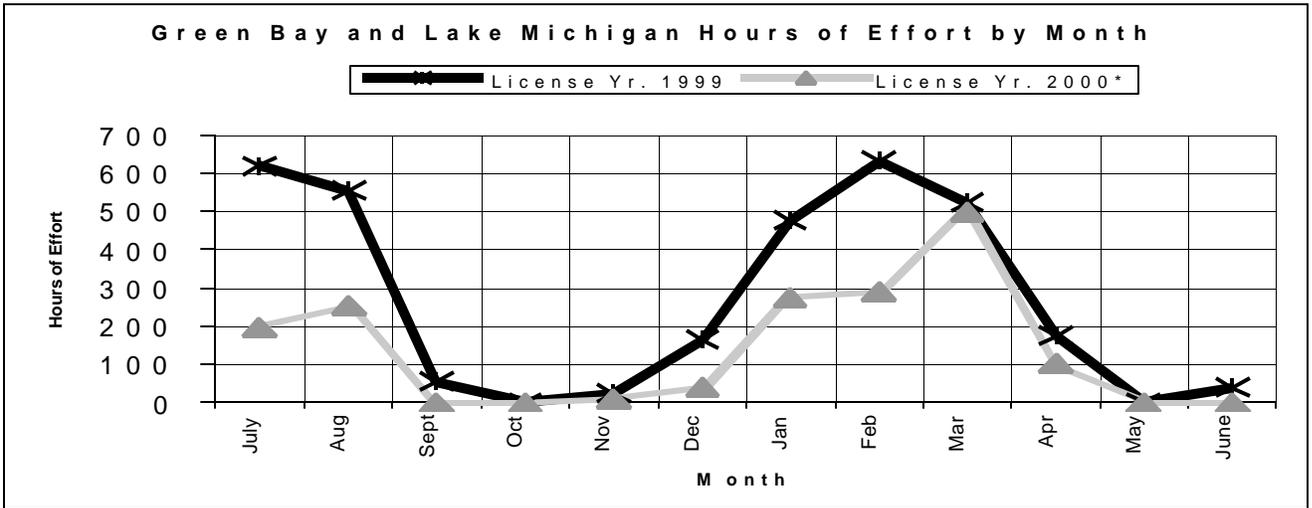


Figure 11. Reported effort by month on Lake Michigan and Green Bay for license year 1999 and license year 2000.

Green Bay effort is at a 9 year low and CPE is slightly above the nine year low which was established in 1999 (Figure 12, Appendix 2). Effort has been declining since its high in 1994.

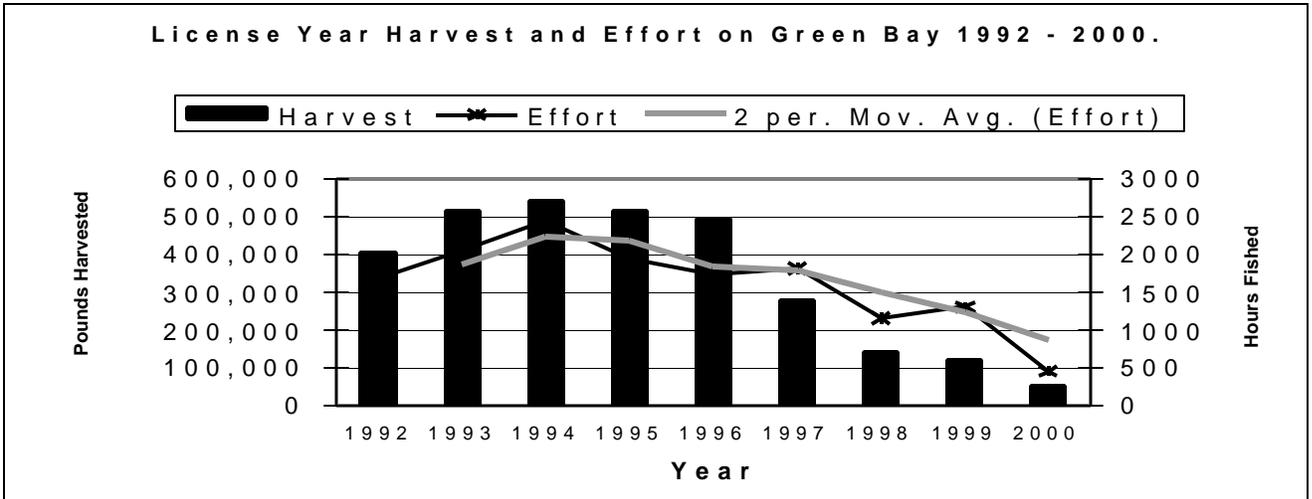


Figure 12. License year reported harvest of rainbow smelt and reported effort from Green Bay from 1992 through 2000 by commercial trawl.

On Green Bay the trawling industry utilized 6 vessels in license year 1999 and 3 vessels in license year 2000 (Figure 13, appendix 3). During this two-year time span all vessels reported less effort for the entire 2000 license year (Figure 11, appendix 4).

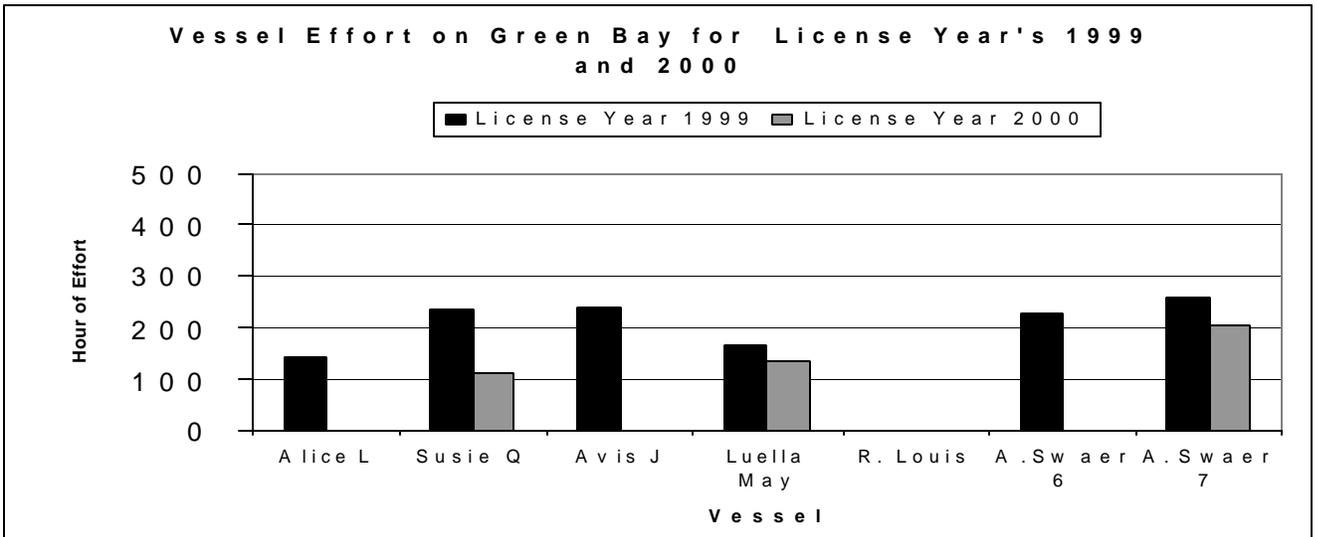


Figure 13. Reported effort by vessel on Green Bay, license year 1999 and license year 2000.

The decline in effort may reflect a decreased interest in trawling due to lower levels of rainbow smelt and bloater chub biomass, as observed in the USGS forage survey.

## References

- Fleischer G.W., Madenjian C.P., DeSorcie T.J. Holuszko J.D. 2000. Status of Prey Fish Populations in Lake Michigan, 1999. Department of the Interior, U.S. Geological Survey, Biological Resource Division, Great Lakes Science Center, 9pp.
- Peeters, P.J. 1989. Description of the Wisconsin Commercial Trawl Fishery, 1983-1989. Wisconsin Department of Natural Resource. 34pp.
- Peeters, P.J. 1991. Description of the Wisconsin Commercial Trawl Fishery, 1990-1991. Wisconsin Department of Natural Resource. 35pp.
- Peeters, P.J. 1992. Description of the Wisconsin Commercial Trawl Fishery, 1991-1992. Wisconsin Department of Natural Resource. 25pp.
- Surendonk, S.P. 1993. Description of the Wisconsin Commercial Trawl Fishery, 1992-1993. Wisconsin Department of Natural Resource. 25pp.
- Surendonk, S.P. 1996. Description of the Wisconsin Commercial Trawl Fishery, 1994-1996. Wisconsin Department of Natural Resource. 25pp.
- Surendonk, S.P. 1997. Description of the Wisconsin Commercial Trawl Fishery, 1997-1998. Wisconsin Department of Natural Resource. 11pp.
- Surendonk, S.P. 1998. Description of the Wisconsin Commercial Trawl Fishery, 1998-1999. Wisconsin Department of Natural Resource. 10pp.

Appendix 1. Reported rainbow smelt harvest and CPE for commercial trawling on Lake Michigan and Green Bay for calendar years 1983 through 1999.

Calendar Year*	Lake Michigan Harvest (lbs.)	CPE**	Green Bay Harvest (lbs.)	CPE**	Summer Study Harvest (lbs.)	Total Harvest (lbs.)
1983	408,928	1,489	54,990	2,000		463,918
1984	385,704	1,401	0	0		385,704
1985	779,618	654	609,454	860		1,389,072
1986	239,340	422	476,732	901		716,072
1987	467,245	996	808,775	1,284		1,276,020
1988	596,112	845	1,046,045	1,072		1,642,157
1989	660,890	1,004	781,171	814		1,442,061
1990	887,765	641	946,249	732		1,834,014
1991	1,366,419	1,099	389,440	246		1,755,859
1992	1,215,253	988	524,856	248		1,740,109
1993	1,237,106	465	529,560	220		1,766,666
1994	828,396	363	518,096	266	104,366	1,450,858
1995	642,324	304	496,744	284	101,716	1,240,784
1996	349,900	205	276,454	154		626,354
1997	347,696	180	131,229	121		478,925
1998	272,075	161	125,396	94		397,471
1999	794,151	429	50,588	104		844,739

\*Calendar year runs from January 1 through December 31 of the same year (Example: Calendar year 1998, January 1, 1998 - December 31, 1998).

\*\*CPE is reported as pounds/hour trawled.

Appendix 2. Reported smelt harvest, CPE, and effort for commercial rainbow smelt trawling on Lake Michigan and Green Bay for license years 1992 through 2000.

License Year*	Lake Michigan Harvest (lbs.)	CPE**	Effort (hrs)	Green Bay Harvest (lbs.)	CPE**	Effort (hrs)	Total Harvest (lbs.)***
1992	1,488,460	1,110	1,341	401,768	241	1,669	1,890,228
1993	1,158,984	484	2,395	512,788	251	2,041	1,671,772
1994	829,724	373	2,223	538,859	222	2,430	1,386,115
1995	710,510	305	2,330	513,894	266	1,929	1,353,592
1996	363,592	235	1,548	491,417	283	1,735	914,371
1997	386,521	178	2,168	276,431	154	1,800	662,952
1998	280,281	150	1,867	138,256	119	1,158	418,537
1999	824,286	414	1,992	120,843	94	1,291	945,129
2000	257,905	212	1,214	48,336	105	459	306,241

\*License year runs from July 1 through June 30 of the following year (Example License Year 1992: July 1, 1991 - June 30, 1992).

\*\*CPE was calculated as pounds/hour trawled and does not include harvest and effort data

from  
the Lake Michigan Summer Study 1994 and 1995.  
\*\*\*Total Harvest does not include harvest from the Lake Michigan Summer Study 1994 and 1995.

Appendix 3. Reported commercial smelt trawl effort by vessel on Lake Michigan.

Trawling Vessel	Lake Michigan hours of effort		Green Bay hours of effort	
	License Year 1999	License Year 2000	License Year 1999	License Year 2000
Alice L	0	0	142	0
Susie Q	430	449	235	111
Avis J	357	129	241	0
Luella May	270	149	163	134
R. Louis	185	0	0	0
A.Swaer 6	401	233	228	0
A.Swaer 7	351	255	260	215

Appendix 4. Hours of effort by month for Lake Michigan and Green Bay for license year 1999 and license year 2000.

Month	Lake Michigan and Green Bay reported effort for License Year 1999.	Lake Michigan and Green Bay reported effort for License Year 2000.
July	620	196
August	555	254
September	55	0
October	Season Closed	Season Closed
November	24	7
December	164	39
January	477	273
February	633	292
March	523	499
April	173	105
May	Season Closed	Season Closed
June	39	10