



Lake Charlevoix 2009 Fisheries Survey

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Lake Charlevoix is a 17,260 acre lake in western Charlevoix County, in the northwestern lower peninsula of Michigan. Lake Charlevoix is the third largest inland lake in Michigan, and it flows directly into Lake Michigan through 65-acre Round Lake, in the City of Charlevoix. The outlet to Lake Michigan is commonly known as the Pine River. The Lake Charlevoix watershed is approximately 335 square miles in size. The main tributaries to Lake Charlevoix are the Jordan and Boyne Rivers, which contribute approximately 75% of the discharge to the lake. Other significant tributaries are Horton, Stover, Porter, and Loeb Creeks (all State Designated Trout Streams). The maximum depth in the main basin of Lake Charlevoix is 122 feet, while the south arm has a maximum depth of 58 feet. Lake Charlevoix has eight different boat launches (Hanchin 2010), including including Young's State Park, Whiting County Park, Ironton, East Jordan Municipal Park, Dutchman's Bay, and Charlevoix Municipal Park.

Lake Charlevoix is designated as a Type E trout lake by the DNR Fisheries Division (Fisheries Division). The trout and salmon open and possession seasons are all year and there are no tackle restrictions. The minimum size limit is 15 inches for Atlantic salmon, brook, brown, and rainbow trout, and 10 inches for Chinook, coho, and pink salmon. The daily possession limit is three for each species with no more than one Atlantic salmon.

Lake Charlevoix has a long and diverse stocking history (Table 1). Numerous fish species have been stocked in the lake since the early 1900s, including rainbow trout, lake trout, brown trout, and walleye. Rainbow trout were stocked intermittently from 1933-1981. The rainbow trout stocking program was discontinued due to limited return to creel. However, Fisheries Division annually stocks 8,000 yearling steelhead into the Jordan River and 8,000 yearling steelhead into the Boyne River. These steelhead provide a fishery in Lake Charlevoix as they migrate to and from Lake Michigan.

Lake trout were stocked intermittently into Lake Charlevoix from 1907-2008. The lake trout stocking program was discontinued after 2008 due to poor population levels and poor returns to creel (Hanchin 2010). It is suspected that many of the lake trout stocked into Lake Charlevoix were migrating to Lake Michigan.

Brown trout were stocked intermittently into Lake Charlevoix from 1937-2004, and walleye have been stocked intermittently into Lake Charlevoix since 1905. The brown trout stocking program was discontinued after 2004 because it was not maintaining a significant fishery, and return to creel was very limited. In addition, Fisheries Division began stocking Lake Charlevoix with walleye in 2001. Stocking brown trout in conjunction with walleye is not a biologically sound management option, because walleye can prey heavily on stocked brown trout and compete for food resources.

Lake Charlevoix has a long and diverse history of fisheries surveys. Surveys were conducted by Fisheries Division in 2006, 1998, 1996, 1992, and 1990. The 2006 survey consisted of three different efforts conducted at different times of the year (April, June, and October) as part of the Large Lake Survey Program (Hanchin 2006). A total of 1,947 walleye, 319 northern pike, and 345 smallmouth bass were tagged (Hanchin 2010). That survey also included creel census conducted during the summer of 2006 and the winter of 2007. A total of 20,090 angler trips were estimated, resulting in an estimated 57,126 angler hours of effort.



The most recent Fisheries Division survey of Lake Charlevoix occurred on September 21, 2009. The survey consisted of an electrofishing effort targeting young walleye using the Serns survey protocol (Serns 1982, 1983). A total of 56 walleye from 5.0-11.6 inches in length were caught (Table 2). Of those, 36 were age-0 (2009 year class), ranging from 5.0 to 7.5 inches in length. The remaining 20 walleye caught in the survey were age-1, ranging from 8.6 to 11.6 inches in length. The age-0 and 1 walleye from the 2009 fisheries survey had growth rates that were slightly below the state average. The 2009 walleye year class was estimated at 35,550 fish, or 2.1/surface acre, while the 2008 year class was estimated at 16,374 fish, or 0.95/surface acre. Catch rates for age-0 walleye were 8.8/acre, and for age-1 were 4.89/acre. Although the 2009 Serns fall walleye sampling efforts all resulted in a "poor" year class according to Ziegler and Schneider (2000), it is possible that the index doesn't exactly fit Lake Charlevoix. A poor year class according to Ziegler and Schneider (2000) may actually be a good year class on Lake Charlevoix.

Management Direction

1. The Lake Charlevoix walleye fishery is very popular, and must be supported by stocking at this time. Previous Serns surveys conducted in 1996 and 1998 (Table 3) did not document young of the year walleye being produced in non-stocking years. Therefore, we should continue to stock Lake Charlevoix with 150,000 (8.7/acre) spring fingerling walleye every other year, starting in 2011. We should also continue to evaluate the walleye stocking program through Serns surveys in both stocking and non-stocking years.

References:

- Hanchin, P. A. 2010. The fish community and fishery of Lake Charlevoix, Charlevoix County, Michigan in 2006-07. Michigan Department of Natural Resources and Environment, Fisheries Special Report X, Ann Arbor. *In press*
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- Ziegler, W., and J. C. Schneider. 2000. Guidelines for evaluating walleye and muskie recruitment. Chapter 23 *in* Schneider, James C. (ed.) 2000. *Manual of fisheries survey methods II: with periodic updates*. Michigan Department of Natural Resources, Fisheries Special Report 25, Ann Arbor.



Table 1. DNRE Lake Charlevoix Fish Stockings, 1990-2010					
Year	Species	Number	Age	Strain	Fin clip
1990	Brown trout	30,000	Fall fingerlings	Plymouth Rock	Ad-CWT
	Brown trout	71,250	Yearlings	Plymouth Rock	
	Brown trout	3,746	Yearlings	Soda Lake	
	Lake trout	100,000	Yearlings	Marquette	
1991	Brown trout	39,805	Yearlings	Plymouth Rock	Ad-CWT
	Brown trout	39,608	Yearlings	Seeforellen	
	Lake trout	100,000	Yearlings	Lake Superior	
	Walleye	80,000	Spring fingerlings	Bay De Noc	
1992	Brown trout	19,497	Yearlings	Seeforellen	RV
	Brown trout	46,413	Yearlings	Wild Rose	LV
	Lake trout	100,000	Yearlings	Lake Superior	Ad-CWT
	Walleye	92,000	Spring fingerlings	Bay De Noc	
1993	Brown trout	39,992	Yearlings	Plymouth Rock	RV
	Brown trout	33,786	Yearlings	Wild Rose	LV
	Lake trout	96,000	Yearlings	Marquette	RPLV
	Rainbow trout	500	Adv. yearlings	Eagle Lake	
	Walleye	150,000	Spring fingerlings	Bay De Noc	
1994	Brown trout	45,135	Yearlings	Seeforellen	RV
	Brown trout	45,100	Yearlings	Wild Rose	LV
	Lake trout	100,000	Yearlings	Marquette	Ad-CWT
	Walleye	73,400	Spring fingerlings	Bay De Noc	
1995	Brown trout	39,988	Yearlings	Seeforellen	RV
	Brown trout	39,980	Yearlings	Wild Rose	LV
	Lake trout	77,250	Fall fingerlings	Marquette	
	Walleye	92,200	Spring fingerlings	Bay De Noc	
1996	Brown trout	35,975	Yearlings	Seeforellen	
	Brown trout	37,173	Yearlings	Wild Rose	
1997	Brown trout	56,355	Yearlings	Seeforellen	
	Lake trout	80,879	Yearlings	Marquette	
	Walleye	90,000	Spring fingerlings	Bay De Noc	
	Walleye	40,000	Spring fingerlings	Tittabawassee	
1998	Brown trout	48,800	Yearlings	Seeforellen	
	Rainbow trout	9,770	Yearlings	Eagle Lake	
1999	Lake trout	134,296	Yearlings	Marquette	RVLP
	Brown trout	24,800	Adv. yearlings	Wild Rose	LP
	Walleye	96,000	Spring fingerlings	Bay De Noc	



	Walleye	3,200,000	Fry	Bay De Noc	
2000	Brown trout Lake trout	25,000 100,140	Adv. yearlings Yearlings	Wild Rose Marquette	RP
2001	Brown trout Lake trout Walleye Walleye	19,024 100,040 20,000 86,155	Adv. yearlings Yearlings Spring fingerlings Spring fingerlings	Wild Rose Marquette Tittabawassee Bay De Noc	RP RV OTC OTC
2002	Brown trout Lake trout Rainbow trout	25,000 133,256 10,000	Adv. yearlings Yearlings Yearlings	Wild Rose Marquette Eagle Lake	RPLV
2003	Brown trout Lake trout Walleye	25,000 111,543 101,478	Adv. yearlings Yearlings Spring fingerlings	Wild Rose Marquette Muskegon	RP
2004	Brown trout Lake trout Rainbow trout Walleye	25,000 101,092 3,593 3,000	Adv. yearlings Yearlings Yearlings Spring fingerlings	Wild Rose Marquette Eagle Lake Bay De Noc	RVLP
2005	Lake trout Rainbow trout Walleye	100,000 6,160 9,900	Yearlings Yearlings Spring fingerlings	Marquette Eagle Lake Bay De Noc	LV
2006	Lake trout Lake trout Walleye	87,300 13,697 106,274	Yearlings Yearlings Spring fingerlings	Marquette Seneca Lake Bay De Noc	LP LP
2007	Lake trout Lake trout	46,694 42,952	Yearlings Yearlings	Marquette Seneca Lake	RVLP RVLP
2008	Lake trout Lake trout Walleye	50,358 33,218 90,800	Yearlings Yearlings Spring fingerlings	Lewis Lake Seneca Lake Muskegon	RV RV
2009	Walleye	180,432	Spring fingerlings	Muskegon	



Table 2. 2009 Lake Charlevoix Serns Index Survey Results

		Site:		South Arm, Dutchman's Bay	
		Miles of shoreline sampled:		4.09	
		Lake Charlevoix acreage:		17,260	
		Serns Age-0 constant:		0.234	
		Serns Age-1 constant:		0.194	
Year Class	Age	# walleye captured	Catch Rate (# walleye/mile of shoreline sampled)	Year Class strength estimate	Serns Index (# walleye/surface acre)
2009*	0	36	8.80	35550	2.060
2008*	1	20	4.89	16374	0.949
*Stocking year					

Table 3. Comparison of Lake Charlevoix Serns Index survey data.

	# walleye captured	Catch Rate (# walleye/mile of shoreline sampled)	Year Class strength estimate	Serns Index (# walleye/surface acre)
1996 (South Arm)				
Age 0	0			
Age 1	4	1.45	5,875	0.340
1998 (North Arm)				
Age 0	0			
Age 1	1	0.25	1,010	0.059
2006 (South Arm)				
Age 0	20	5.08	20,502	1.188
Age 1	1	0.25	1,025	0.059
2006 (North Arm)				
Age 0	0			
Age 1	0			
2009 (South Arm)				
Age 0	36	8.80	35,550	2.060
Age 1	20	4.89	16,374	0.949