

LAKE MAXINKUCKEE
Marshall County
2010 and 2011 Walleye Evaluation

Date of Survey: October 3 and November 2, 2010; October 6 and 24, 2011

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Survey Objectives: Conduct a walleye evaluation under statewide percid plan under work plan 300FW1F10D44617.

Introduction: Lake Maxinkuckee is a 1,864-acre natural lake, the second largest natural lake in the state. Lake Maxinkuckee has a maximum depth of 88 ft and a mean depth of 24 ft. The town of Culver lies on the northeast shore. The only public access is located on the southwest shore. The Division of Fish and Wildlife (DFW) has conducted numerous fisheries surveys, creel surveys, and evaluations on the lake starting in 1965 (Robertson and Long 2009).

Walleye evaluations were conducted in the 1980's to the early 2000's primarily to evaluate stocking success and monitor the development of the fishery. The earliest walleye stockings occurred in the late 1800's and early 1900's, but the DFW annual walleye stockings started in 1980 (Table 1). For ten years (1980 to 1990) fry were stocked in Lake Maxinkuckee at a target rate of 3,000 fish/acre. Most years except for 1987 near target stocking rates occurred. Fry stockings resulted in few walleyes being collected and were deemed unsuccessful. Spring fingerling stockings began in 1991 at a target stocking rate of 100 fish/acre in an attempt improve stocking success. Target rates were met or exceeded in most years except for 2005, 2008, and 2010 when rates were between 21 to 69 fish/acre. Fingerling walleye stockings were considered successful with fall electrofishing catch rates exceeding the target of 7.0 age-0 walleye/hour from 1995 to 2000 except for 1997 (Table 2; Shipman 1992). In 1996, a 14 in minimum size limit on walleye was added to the existing 6-fish per day bag limit. The minimum length limit did not improve growth, but angler catch and harvest rates were higher in 1999 creel than previous years (Cwalinski 2000). In 2010, a walleye evaluation was conducted to determine if fingerling stocking was continuing to meet success criteria, but due to low catch rates another

evaluation was conducted in 2011. Results of the 2010 and this survey are combined in this report.

Methods: Walleye were collected on October 3 and November 2, 2010 and October 6 and 24, 2011. Fish were collected using pulsed DC, night electrofishing with two dippers at eight stations for 15 min per station each night at fixed locations each year. Total electrofishing effort was four hours and boat driving was in a zig-zag pattern to sample both shallow (< 3 ft depth) and deeper water (3 to 6 ft depth) habitats. Surface water temperature was recorded on each sampling night. All walleye were measured to the nearest 0.1 in total length (TL) and weight was estimated from standard weight-length regressions. Five scale samples were taken per half-inch group (X.0-X.4 for inch group and X.5-X.9 for half-inch group) for age and growth analysis. Catch per unit effort (CPUE) was calculated as catch divided by electrofishing effort.

Summary: In 2010, a total of 31 walleye was collected for an overall CPUE of 5.2 fish/h. Fish ranged in length from 8.0 to 19.3 in, and 45% of fish were legal length or longer (TL \geq 14.0 in). There were seven age-0 fish collected that averaged 8.8 in (CPUE = 1.2 fish/h). Assigned ages ranged from 0 to 6. Surface water temperature in 2010 was 62.5°F on October 3 and 53.3°F on November 2. There were 36 walleyes collected in 2011 for an overall CPUE of 9.5 fish/h. Walleye ranged from 7.5 to 19.4 in, but only 18% of fish collected were legal length. The majority of walleye (30 fish) collected were age-0 fish that averaged 8.6 in (CPUE = 7.5 fish/h). Assigned ages were 0 to 4. In 2011, water temperatures were 65.5 and 55.6°F on October 6 and 24, respectively.

In 2010, the walleye stocking did not meet the success criteria of 7.0 age-0/h or 4.2 age-1/h (Shipman 1992). Therefore, to determine if this was a sampling abnormality due to below target stocking rate, or truly a problem with walleye stocking in Lake Maxinkuckee, another evaluation conducted in 2011. The same sampling effort and locations were used in both years, and water temperatures were very similar. In 2010, the stocking rate was 69/acre, and 2011 the rate was 99/acre, negligibly below the target rate (100/acre). In 2010, the age-0 CPUE was 1.2 fish/h, while in 2011 the CPUE was 7.5 fish/h and was considered successful. Since the late 1990's several stockings have been deemed successful base on age-0 catch criteria, but all subsequently failed to achieve the yearling success criteria of 4.2 fish/h in the following year.

Walleye stockings are not consistently meeting success criteria, and therefore the walleye stocking strategy must change to improve the quality of the fishery.

Fry were initially stocked in Lake Maxinkuckee and after subsequent evaluations were considered unsuccessful in developing a walleye fishery. Stocking was switched from fry to June fingerlings and were successful with acceptable age-0 and age-1 catch rates. Two creel surveys in the 1990's demonstrated that the fingerling stockings were successful with anglers catching and harvesting walleyes. In recent years, age-0 and age-1 catch rates have declined, and June walleye fingerlings are not meeting success criteria. Therefore, to maintain this fishery advanced fall walleye fingerlings should be stocked at 10/acre at a minimum size of 7.0 inches. Lake Maxinkuckee is the second largest natural lake and would be the largest lake in Indiana stocked with advanced walleyes requiring a total of 18,640 advanced walleyes each year. Due to the amount of walleyes needed and the limited number of fish available, an experimental stocking strategy should be employed to maximize the use of advanced walleye fingerlings. Advanced walleye stocking should occur in even years (ie. 2012, 2014, etc.) and June fingerling stockings in odd years (ie. 2013, 2015, etc.). This would allow a similar number of walleyes to be used for alternate years stocking in other lakes such as Clear Lake (Steuben County). Walleye evaluations must occur to determine stocking success, in at least odd years to collect age-1 walleyes from the advanced stocking and collect age-0 from the June fingerling stocking. If sampling schedules allow yearly sampling should be conducted to further examine yearly survival. Prior to any management changes, a spring trap netting and creel survey should be conducted starting in March 2012 to determine the current walleye population. Spring trap netting should incorporate standard and Michigan-style trap nets to effectively target adult walleye. The angler creel survey should also be conducted in 2012 and incorporate winter creel surveys to determine if there is significant pressure on walleyes through the ice. To better incorporate variability in winter angling two winter creels should be conducted in the winter of 2012 and 2013. In five years spring trap netting and a creel survey should be conducted to determine if this change in management was successful.

Recommendations:

1. Advanced walleye stocking should occur in even years (ie. 2012, 2014, etc.) and June fingerling stockings in odd years (ie. 2013, 2015, etc.).
2. Conduct walleye evaluation in odd years to determine success of each size at stocking.

3. Conduct spring trap netting and a creel survey in 2012 and 2017 to evaluate pre and post changes in management.

References:

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Table 1. Walleye stocking history at Lake Maxinkuckee, Marshall County, Indiana from 1975 to 2011. Target stocking rates for fingerlings are 100/acre and fry were 3,000/acre.

Year	Number	Average Size (in)	Number/acre
2011	185,460	1.18	99
2010	128,333	1.41	69
2009	186,633	1.53	100
2008	110,392	1.35	59
2007	189,235	1.27	102
2006	186,168	1.43	100
2005	39,500	1.74	21
2004	201,512	1.59	108
2003	192,228	1.13	103
2002	192,265	1.10	103
2001	186,100	1.56	100
2000	184,120	1.55	99
1999	247,660	1.54	133
1998	282,770	1.46	152
1997	278,960	0.91	150
1996	187,055	1.08	100
1995	182,794	1.58	98
1994	185,347	1.56	99
1993	184,490	1.56	99
1992	187,517	1.56	101
1991	353,268	1.85	190
1990	5,447,300	Fry	2922
1989	6,193,425	Fry	3323
1988	6,222,800	Fry	3338
1987	2,628,425	Fry	1410
1986	5,563,625	Fry	2985
1985	5,640,000	Fry	3026
1984	5,071,325	Fry	2721
1983	5,036,600	Fry	2702
1982	5,572,100	Fry	2989
1980	5,633,163	Fry	3022
1975	30,000	Fry	16

Table 2. Fall electrofishing catch from 1986 to 2011 from Lake Maxinkuckee Marshall County, Indiana.

Year	Effort (h)	Total catch	< 10.0 in.	10.0 - 13.5 in.	14.0 - 17.5 in.	≥18.0 in.	Age-0 CPUE	Age-1 CPUE
1986	3.0	23	4	15	0	4	1.00	5.33
1987	6.0	58	37	4	6	11	6.17	0.50
1995	7.5	184	92	68	24	9	11.60	9.33
1996	8.0	159	82	50	27	8	10.25	6.13
1997	10.0	79	42	11	26	6	4.40	0.70
1998	8.0	300	245	11	44	17	31.00	1.00
1999	8.0	150	104	26	9	11	12.88	3.50
2000	8.0	152	97	27	15	11	12.00	3.38
2010	4.0	31	7	10	10	4	1.75	1.75
2011	4.0	38	30	1	1	6	7.5	0.25

APPENDIX I

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF WALLEYE (2010)									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0	1	3.2	2.38	6
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5					21.5				
4.0					22.0				
4.5					22.5				
5.0					23.0				
5.5					23.5				
6.0					24.0				
6.5					24.5				
7.0					25.0				
7.5					25.5				
8.0	2	6.5	0.12	0	26.0				
8.5	2	6.5	0.15	0	TOTAL	31			
9.0	2	6.5	0.19	0					
9.5	1	3.2	0.22	0					
10.0									
10.5	1	3.2	0.31	1					
11.0	1	3.2	0.37	1					
11.5									
12.0	2	6.5	0.49	1					
12.5	1	3.2	0.57	1					
13.0	3	9.7	0.65	1, 2					
13.5	2	6.5	0.74	2					
14.0	3	9.7	0.84	2, 3					
14.5									
15.0	2	6.5	1.06	3					
15.5									
16.0	1	3.2	1.32	3					
16.5									
17.0	2	6.5	1.63	3, 5					
17.5	2	6.5	1.80	4, 5					
18.0	1	3.2	1.98	5					
18.5	2	6.5	2.18	6					

ELECTROFISHING CATCH	7.8 /h	
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NUMBER, PERCENTAGE, WEIGHT, AND AGE OF WALLEYE (2011)									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0	3	7.9	2.38	4
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5					21.5				
4.0					22.0				
4.5					22.5				
5.0					23.0				
5.5					23.5				
6.0					24.0				
6.5					24.5				
7.0					25.0				
7.5	2	5.3	0.10	0	25.5				
8.0	5	13.2	0.12	0	26.0				
8.5	13	34.2	0.15	0	TOTAL	38			
9.0	5	13.2	0.19	0					
9.5	5	13.2	0.22	0					
10.0									
10.5	1	2.6	0.31	1					
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5	1	2.6	1.47	2					
17.0									
17.5	2	5.3	1.80	3					
18.0									
18.5	1	2.6	2.18	3					

ELECTROFISHING CATCH	9.5 /h	
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AGE-LENGTH KEY FOR WALLEYE (2010)														
LENGTH GROUP (inches)	NUMBER COLLECTED	NUMBER AGED	AGE											
			0	1	2	3	4	5	6	7	8	9	10	11
5.0														
5.5														
6.0														
6.5														
7.0														
7.5														
8.0	2	2	2											
8.5	2	2	2											
9.0	2	2	2											
9.5	1	1	1											
10.0														
10.5	1	1		1										
11.0	1	1		1										
11.5														
12.0	2	2		2										
12.5	1	1		1										
13.0	3	3		2	1									
13.5	2	2			2									
14.0	3	2			2	2								
14.5														
15.0	2	2				2								
15.5														
16.0	1	1				1								
16.5														
17.0	2	2				1		1						
17.5	2	2					1	1						
18.0	1	1						1						
18.5	2	2							2					
19.0	1	1							1					
19.5														
20.0														
Total	31	30	7	7	5	6	1	3	3					
Mean TL			8.8	12.3	13.8	15.5	17.8	17.8	18.9					
SE			0.21	0.36	0.20	0.50		0.29	0.17					

AGE-LENGTH KEY FOR WALLEYE (2011)															
LENGTH GROUP (inches)	NUMBER COLLECTED	NUMBER AGED	AGE												
			0	1	2	3	4	5	6	7	8	9	10	11	12
5.0															
5.5															
6.0															
6.5															
7.0															
7.5	2	2	2												
8.0	5	5	5												
8.5	13	5	13												
9.0	5	5	5												
9.5	5	5	5												
10.0															
10.5	1	1		1											
11.0															
11.5															
12.0															
12.5															
13.0															
13.5															
14.0															
14.5															
15.0															
15.5															
16.0															
16.5	1	1			1										
17.0															
17.5	2	2				2									
18.0															
18.5	1	1				1									
19.0	3	3					3								
19.5															
20.0															
Total	38	30	30	1	1	3	3								
Mean TL			8.9	10.8	16.8	18.1	19.3								
SE			0.10			0.33	0								