State of Wisconsin

CORRESPONDENCE/MEMORANDUM

DATE: January 24, 2012 FILE REF: [Click **here** and type file ref.]

TO: Mike Donofrio
Long Lake, Manitowoc County File

FROM: Steve Hogler
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SUBJECT: 2011 Long Lake Electrofishing Survey Results

Long Lake is a drainage lake located in western Manitowoc County (Figure 1). The lake has a surface area of 120 acres and a maximum depth of 38 feet. The lake is moderately developed with residences and has public access on the northeast corner of the lake.

Since the 1940's, fish surveys have been conducted on Long Lake. Over time abundant, desirable species such as northern pike, largemouth bass, yellow perch and fast growing bluegill have been replaced by carp, bullhead and slow growing panfish. During this same period, water quality in the lake has also declined. The fish population was further perturbed by a large fish kill in 1984, caused by a copper sulfate treatment for aquatic plants that killed a large percentage of the fish population of the lake. The last full survey of Long Lake was in 2007. Overall in 2007, the most abundant fish were bluegill followed black crappie and northern pike. Northern pike were the most common gamefish followed by largemouth bass and walleye. Carp and bullhead were also present. Survey results from this survey were consistent with the findings of previous surveys.

Based on the 2007 survey results, gamefish populations in Long Lake were judged to be fair. It appears that bass and pike have had variable recruitment (good and bad years) probably due to poor water quality, lack of feed for young fish, or high angler exploitation. Walleye number remained low and continued stocking will be needed to maintain the population. Panfish numbers were down, but they still remain abundant in the lake. Although growth has improved over earlier surveys, panfish were generally small in size. Small size may be due to angler harvest of larger individuals or selective mortality caused by fish kills because age analysis indicated young (small) fish.

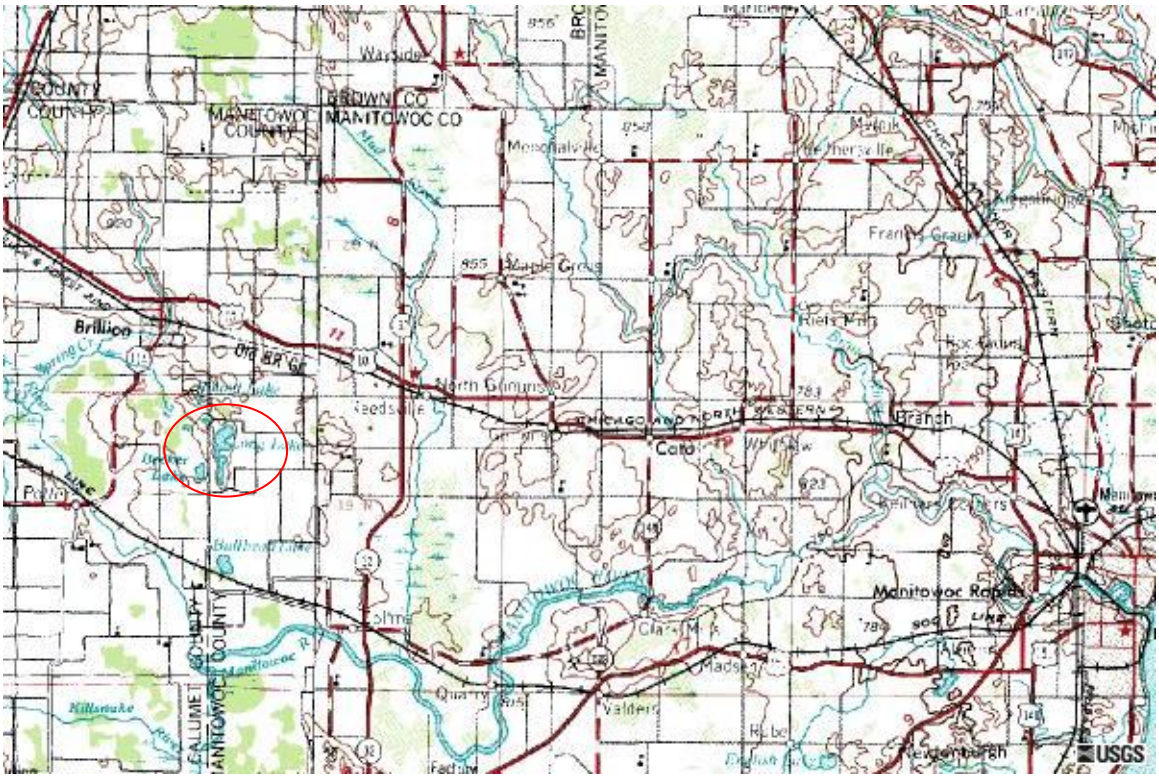

Figure 1. Long Lake is located on the western edge of Manitowoc County, west of the city of Manitowoc.

METHODS

On the night of June 2, 2011 1.5 miles of the 2.18 mile shoreline was electroshocked to estimate adult largemouth bass and panfish relative abundance (Figure 2). All fish were netted, identified, and measured except for common carp that were only counted. Scales for ageing were collected from all largemouth bass and a sub-sample (10 per 10 mm group) were collected from bluegill.

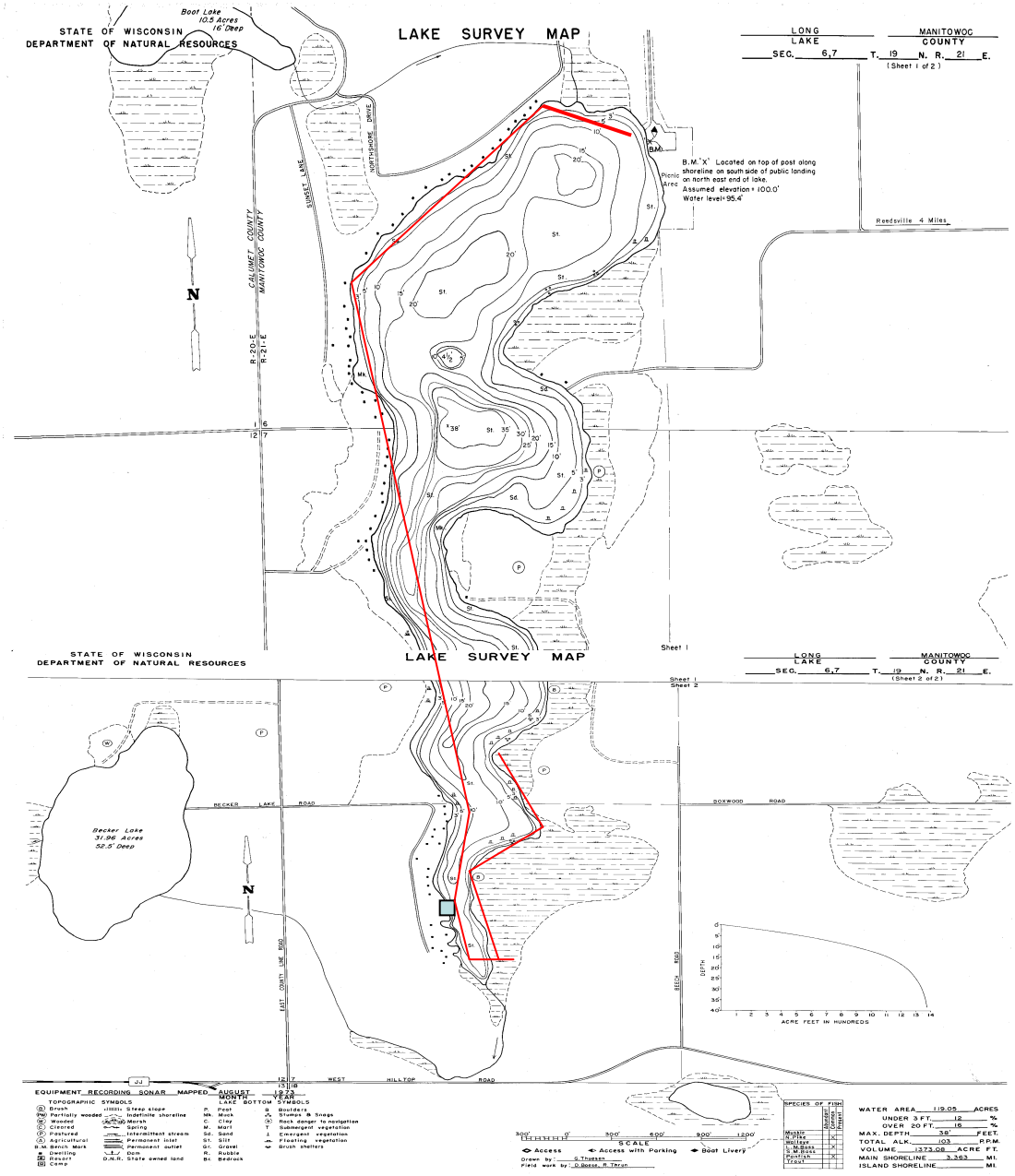

Figure 2. The red line denotes the shoreline that was electrofished on the night of June 2, 2011.

Statistical Analyses

Basic fisheries statistics, such as average length, length frequencies and age distributions were calculated. Mean length at age was determined first by using an age length key to extrapolate length age distributions from the sub-sample of fish that were aged to the full sample length frequency, then second calculating the arithmetic mean of the length for a given age from the estimated full sample age distribution.

RESULTS

During the 100 minutes (1.67 hours) of electroshocking, we captured 527 individual fish representing eleven species (Table 1). Bluegill dominated our catch with 352 captured or 237.7 per mile shocked. Largemouth bass, carp, black crappie and other species were captured in much lower abundances.

Table 1. Fish captured during nighttime electroshocking on Long Lake on June 2, 2011. All lengths are in millimeters.

Species	Number	CPE (Fish/Hr)	CPE (Fish/ Mile)	Average Length	Size Range
Largemouth Bass	59	35.3	39.3	285	91-512
Northern Pike	2	1.2	1.3	590	534-645
Walleye	1	0.6	0.7	180	--
Bluegill	352	210.8	234.7	132	39-202
Pumpkinseed Sunfish	8	4.8	5.3	120	94-155
Black Crappie	43	25.7	28.7	122	83-237
Yellow Perch	10	6.0	6.7	125	76-200
Yellow Bullhead	1	0.6	0.7	265	--
Black Bullhead	1	0.6	0.7	303	--
Golden Shiner	1	0.6	0.7	185	--
Carp	49	29.3	32.7	--	--
Total Captured	**527**	**315.6**	**351.3**		

Gamefish

The 59 largemouth bass that we captured ranged in length from 91 mm to 512 mm and averaged 285 mm in length (Table 1). Analysis of the bass size distribution indicates that 30.5% of the bass that we captured were greater than the 355 mm (14”) size minimum regulation for Long Lake and that 5.1% of the bass were greater than 457 mm (18”) in length indicating a good size distribution of bass in Long Lake (Table 2).

Based on the scale samples that we collected, bass ranged in age from age 1 through age 6, age 9 and age 10 and older (Table 2). Age 4 was the dominant age class with other ages much less abundant. The age 3 year class appeared to be very weak. Age classes older than age 5 were also low in number.

Comparing the growth of largemouth bass in Long Lake, measured as average length at each age to statewide averages it appears that bass grow at or slightly above state average rates (Table 3). In addition, growth measured in 2011 appears to be similar or slightly greater than growth noted during previous surveys on Long Lake.

Table 2. Age distribution by length for largemouth bass captured during electroshocking on Long Lake in early summer 2011.

Length (mm)		Age									
	Number	1	2	3	4	5	6	7	8	9	10+
90	2	2									
100	2	2									
110	3	3									
120											
130	1	1									
140											
150											
160	2		2								
170	3		3								
180	3		3								
190	3		3								
200	4		4								
210											
220											
230											
240											
250											
260											
270											
280	1			1							
290	5				5						
300	2				2						
310	2				2						
320	1			1							
330	2				2						
340	3				3						
350	4				3	1					
360	3				2	1					
370	2				1	1					
380	1					1					
390											
400	1					1					
410											
420	2					2					
430	2					2					
440	2					1	1				
450											
460											
470	1									1	
480											
490	1						1				
500											
510	1										1
Number	59	8	15	2	20	10	2			1	1
Ave. Length	285	108	187	305	328	398	464			470	512
S.D.	114.77	13.7	15.14	33.23	26.04	30.9	27.15			--	--

Table 3. Average length at age for largemouth bass and bluegill captured during electroshocking on Long Lake in 2011 compared to previous Long Lake surveys and statewide average growth (Hogler and Surendonk 2007).

Species	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE 8	AGE 9	AGE 10	AGE 11
Bluegill											
2011 survey	64	97	148	167	198	193					
2007 survey	99	113	169	187	--	--	--				
1999 survey	46	84	124	155	175	191	209				
1983 survey	43	90	143	169	188	--	--				
(State Average)	(64)	(97)	(122)	(147)	(167)	(183)	(196)				
Largemouth Bass											
2011 survey	108	187	305	328	398	464	--	--	--	--	--
2007 survey	--	--	317	327	376	388	446	460	--	--	--
1999 survey	68	138	216	279	330	369	406	437	460	481	492
1983 survey	66	141	213	271	326	372	409	435	454	474	488
(State Average)	(97)	(165)	(229)	(290)	(338)	(384)	(414)	(447)	(454)	(485)	

Northern pike and walleye were infrequently captured during our survey (Table 1). The two pike ranged in size from 534 mm to 645 mm and had an average length of 590 mm. The single captured walleye was 180 mm length and was likely stocked the previous summer.

Panfish

Panfish were numerous in our electroshocking catch, with bluegill the dominant species captured (Table 4). The 352 bluegill that we captured ranged in length from 39 mm to 202 mm and had an average length of 132 mm. 167 bluegill (47.4%) were greater than 152 mm (6”) in length, but only 2 (0.56%) were greater than 200 mm (8”) in length.

244 bluegill had scales removed for ageing. Our scale ageing indicated that ages 1 through 6 were present in our collected sample (Table 5). Age 4 bluegill were the most common aged bluegill with ages 1 through 3 also very common. Very few bluegill over age 5 were represented in our sample.

The growth rate for bluegill in Long Lake as measured by length at age appears to be at or above statewide averages (Table 4). Growth for bluegill in the lake appears to increase with increasing age.

Other species of fish captured during electroshocking in decreasing abundance include common carp, black crappie, yellow perch, pumpkinseed sunfish, yellow bullhead, black bullhead and golden shiner (Table 1).

Table 4. Length frequencies of panfish and other species that were captured on June 2, 2011 during electroshocking.

Length (mm)	Bluegill	Pumpkin-seed	Black Crappie	Yellow Perch	Yellow Bullhead	Black Bullhead	Golden Shiner
30	1						
40	3						
50	13						
60	38						
70	1			1			
80	20		4				
90	31	1	14	3			
100	21	2	13	1			
110	3	2	1				
120	6	1	1	1			
130	10			1			
140	27						
150	45	2		1			
160	56		1				
170	56		1	1			
180	17		1				1
190	2		3				
200	2			1			
210			3				
220							
230			1				
240							
250							
260					1		
270							
280							
290							
300						1	
Total	352	8	43	10	1	1	1
Ave. Length	132	120	122	125	265	303	185
S.D.	42.9	23.5	44.9	40.1	--	--	--

Table 5. Age distribution by length bluegill captured during electroshocking on Long Lake in early summer 2011.

Length (mm)	Number	Age					
		1	2	3	4	5	6
30	1	1					
40	3	3					
50	13	13					
60	38	38					
70	1	1					
80	20	8	12				
90	31		31				
100	21		21				
110	3		3				
120	6			6			
130	10			10			
140	27			12	15		
150	45			20	25		
160	56			11	45		
170	56				56		
180	17				17		
190	2					1	1
200	2					2	
Total	**352**	**64**	**67**	**59**	**158**	**3**	**1**
Ave. Length	**132**	**64**	**97**	**148**	**167**	**198**	**193**
S.D.	**42.85**	**9.72**	**7.36**	**12.60**	**10.99**	**6.93**	**--**

SUMMARY

In 2011, a full fisheries survey (fyke netting and electrofishing) of Long Lake was scheduled, but because of a biologist vacancy, only the early summer centrarchid electrofishing was completed. Results from this one night survey were similar to results from past surveys in the same time period with bluegill and largemouth bass dominating our catch. Age and growth in 2011 was similar to age and growth from previous surveys. Long Lake remains a bass-bluegill lake based on survey results. Fish are generally small, not because of slow growth, but because of young age. Angler harvest certainly impacts the size structure of fish in Long Lake. Missing or weak year classes of gamefish were noted in the length and age frequencies and are likely due to poor water quality or harvest of older individual fish.

REFERENCES

Hogler, S. and S. Surendonk. 2010. Long Lake 2007 Survey Report. Unpublished. WDNR, Madison, WI. 22 pages.