

Wall Lake
LaGrange County
Supplemental Sunfish and Walleye Evaluation

Dates of Survey: June 15 and 23, September 23 and October 20, 2009

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Objective: The objectives of these surveys were to monitor the bluegill, redear and largemouth bass populations following the introduction of walleyes and to evaluate advanced walleye stockings in accordance with work plan 300FW1F10D42643.

Methods: During June, sampling was conducted on two nights to collect bluegills, redear and largemouth bass. Sampling consisted of one hour of electrofishing on each occasion. Fish collection effort on September 23 consisted of 2 hours of electrofishing. Only walleyes were collected in September and nearly the entire shoreline was covered.

All fish collected were measured to the nearest 0.1 in TL. Weights were taken from walleye to the nearest 0.01 pound. Scale samples were taken from all four species for age and growth determination and a sub-sample of dorsal spines were taken from walleyes. All electrofishing samples were conducted at night with a pulsed D.C. electrofisher using two dip netters.

During the 2009 late April through October angler creel survey, walleye stomachs were also collected to determine food habits. Stomachs were collected by the creel clerk from harvested walleyes, by lake residents on non creel days and from any walleye mortalities that occurred during the general fish management survey. In October, 30 minutes of electrofishing was also conducted to supplement the sample. Prey items were enumerated and for whole fish measured to the nearest 0.1 in TL. The objective was to inspect 20 walleye stomachs per month and identify prey species by length when possible.

Results:

During the two hours of June electrofishing, 317 bluegills, 163 largemouth bass and 22 redear were collected (Table 1). Bluegills were collected at a rate of 159 per electrofishing hour. The historical bluegill electrofishing rate at Wall Lake has ranged from 136 in 2008 to 914 per hour in 2003. In 2003, relatively large year classes of age-2 and age-3 bluegills were present. The average bluegill electrofishing catch rate from similar size natural lakes in District 2 is 148 per hour. Bluegills less than 3 in TL were collected at a rate of 44.5 per electrofishing hour in 2009 and ranged from 12 in 2007 to 174 in 2003. Based on general fish community surveys, bluegill numbers have declined from the historically high numbers observed in 1987 and 2003 (Appendix 1).

Bluegills ranged in length from 1.5 to 8.5 in TL, similar to that observed in previous years. The major changes in the bluegill size distribution was an increase in the number of bluegills less than 3.0 in TL and those 8.0 in TL or larger. In fact, more 8.0 in TL or larger bluegill were collected in 2009 than all previous DC electrofishing samples combined. Over 21% of the bluegill collected by DC electrofishing were harvestable size, 6.0 in TL or larger and has ranged from 13.3% in 2003 to 44.1% in 2007 (Table 2).

Redear ranged in length from 4.7 to 8.9 in TL and were collected at a rate of 11 per hour. In 2008, redear were collected at a rate of 32 per hour compared to 29, 108 and 63 per electrofishing hour in 1987, 2003 and 2007 respectively. Harvestable sized redear, 6.0 in TL or larger, comprised 86.4% of the sample and ranged from 76% in 1987 to 100% in 2008. The percentage of redear 8 in TL and larger has ranged from 5.6% in 2003 to 73% in 2009.

In 2009, 82 largemouth bass were collected per electrofishing hour. They range in length from 3.4 to 14.2 in TL. Bass electrofishing catch rates have ranged from 61 in 1987 to 129 per hour in 2007. The percent of harvestable size bass, those 14 in TL or larger remains low while the percent of bass in the 10.0 to 11.5 in TL size range continues to increase.

Based on average length at last annulus formation, bluegill, redear and largemouth bass at Wall Lake have historically grown at rates well below average for northeast Indiana natural lakes (Table 3). One exception was the growth observed in 1987 for age-4 and older bass which was average.

The Wall Lake Fisherman's Association funded walleye stockings for Wall Lake in 2005, 2006 and 2007. During these years, 1,400 advanced walleye fingerlings, (10 per acre) ranging from 5 to 8 in TL were released (Table 4). Walleyes were not stocked in 2008 and no age-1 walleyes were collected during sampling in 2009.

During the 2009 fall survey the water temperature was 72 degrees F. A total of 33 walleyes ranging from 13.2 to 19.4 in TL were collected (Table 5). Age-2 and age -3 walleyes were collected at a rate of 5.5 and 10.5 per electrofishing hour respectively. Age-2 walleyes ranged in length from 13.2 to 15.6 in TL and averaged 13.2 in TL and 0.84 pounds (Table 6). The historical average length of age-1 Wall Lake walleyes is similar to the averages at Clear Lake and Lake Maxinkuckee but 1 to 1.2 in TL shorter than age-1 walleyes from Pretty and Big Turkey lakes respectively. Age-2 Wall Lake walleyes are 0.7 to 1.2 in TL shorter than age-2 walleye from Big Turkey, Clear, Pretty and Maxinkuckee (Table 7).

During 2009, 99 walleye stomachs were examined. Nine of these walleyes were young of the year fish that were examined approximately two weeks after stocking in October. These stomachs were empty. Of the 90 age-2 or older walleye stomachs examined, 56 (62.2%) were empty. Of the prey fish species that were identifiable to genus, *Lepomis* (bluegill, redear or pumpkinseed sunfish) comprised 55.5% of the sample followed by yellow perch (33.3%), brook silversides (5.6%), one shiner (2.8%) and a redfin pickerel (2.8%). Other items found in the walleye stomachs included bony parts from six fish (mostly jaws and backbones) and one insect. *Chara* algae was also seen in four fish and pondweed was found in two (Appendix 2).

Length of *lepomis* species identified ranged from 0.5 to 3.5 in TL and averaged 1.8 in TL. Yellow perch averaged 2.9 in TL and ranged from 2.8 to 4.0 in TL. Brook silversides averaged 2.6 in TL. The shiner was 2.0 in TL while the redfin pickerel was 9.0 in TL.

Although it is too early to draw any conclusions concerning the impacts of adding another predator fish to the population, there are some interesting observations. The percent of harvestable size bluegills collected by electrofishing increased from 13% in 2003 to 44% in 2007, 18 months following the initial Wall Lake walleye stocking. This coincided with a decline in the overall bluegill electrofishing catch rate from 914 per hour in 2003, when large year classes of

age-2 and age-3 fish were present, to 217 and 136 per hour in 2007 and 2008 respectively. The catch rate for bluegills less than 3 in TL also declined from 174 per hour in 2003 to 12 per hour in 2007 and 18 per hour in 2008 but increased to 44.5 per hour in 2009. This increase followed a relatively poor walleye year class and a missed stocking in 2008. However, since only 19 bluegills less than 3 in TL were collected per electrofishing hour in 1987, the declines seen in 2007 and 2008 could have been the result of something other than increased predation such as weather.

Redear catch rates also declined from 108 per electrofishing hour in 2003 to 11 per hour in 2009. The percent of harvestable size redear collected has fluctuated between 76% and 100%. Bluegill and redear continue to grow at a below average rate. However, growth has continued to improve since 2008.

The largemouth bass catch rate at Wall Lake has increased from 61 per hour in 1987 to 82 per hour in 2009. Although there appears to be an abundant panfish forage base, the percent of harvestable size bass declined from 19.7% in 1987 to less than 1.2% in 2009, in spite of imposition of a 12 in minimum size limit in 1992 which increased to 14 inches in 1998. Bass growth rates have showed some improvement since 2008. However, they remain below average for northern Indiana natural lakes.

Recommendations:

1. The DFW should pursue the production of advanced fall walleye fingerlings for stocking as addressed in previous Walleye Management Committee reports.
2. The DFW should continue to annually stock walleye into Wall Lake at a rate of 10 per acre.
3. During the next opportunity for rule changes, the minimum walleye size limit at Wall Lake should be increased to 16 inches and the daily bag limit reduced to two.
4. The DFW should continue to evaluate survival of fall stocked walleye following each stocking and continue the Wall Lake bluegill/walleye work plan.

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Date: 11/1/2010

Approved by: Stu Shipman, North Region Fisheries Supervisor

Date: 11/9/2010

Table 1. Number and size of bluegill, redear and largemouth bass collected from Wall Lake during nighttime DC electrofishing 1987, 2003, 2007, 2008 and 2009

Species	1987	2003	2007	2008	2009
Bluegill	286 (286hr)	457 (914/hr)	186 (217/hr)	136 (136/hr)	317 (159/hr)
<3"	19/hr	174/hr	12/hr	18/hr	44.5/hr
Percent harvestable	23.1	13.3	44.1	17.6	21.1
Redear	29 (29/hr)	54 (108/hr)	47 (63/hr)	32 (32/hr)	22 (11/hr)
<3"	0	0	0	0	0
Percent harvestable	75.9	85.2	97.9	100	86.3
Largemouth bass	61 (61/hr)	87 (87/hr)	97 (129/hr)	114 (114/hr)	163 (82/hr)
Percent harvestable	19.7	2.3	3.1	0.9	1.8
Electrofishing hours	1 DC	1 DC	.75 DC	1 DC	2 DC
Bluegill					
3-5.5 inch	198 (75.0%)	309 (83.5%)	83 (56.1%)	94 (79.7%)	161 (70.6%)
6-6.5 inch	58 (22.0%)	27 (7.3%)	29 (19.6%)	12 (10.2%)	21 (9.2%)
7-7.5 inch	8 (3.0%)	32 (8.7%)	20 (13.5 %)	11 (9.3%)	15 (6.6%)
≥ 8 inch	0	2 (0.5%)	16 (10.1%)	1 (0.8%)	31 (13.6%)
Total	267	370	148	118	228
PSD	24.7	16.5	43.9	20.3	29.4
RSD 8"	0	0.5	10.8	0.8	46.2
Redear					
3-5.5 inch	5 (17.2%)	8 (14.8%)	4 (8.5%)	0	3 (13.6%)
6-6.5 inch	10 (34.5%)	29 (53.7%)	6 (12.8%)	3 (9.4%)	0
7-7.5 inch	12 (41.4%)	14 (25.9%)	28 (59.6)	12 (37.5%)	3 (13.6%)
≥ 8 inch	2 (6.9%)	3 (5.6%)	9 (19.1%)	17 (53.1%)	16 (72.7%)
Total	29	54	47	32	22
PSD	82.8	85.2	91.5	100	86.4
RSD 8"	6.9	5.6	19.2	53.1	72.7
Largemouth bass					
8-9.5 inch	29 (56.9%)	25 (39.1%)	27 (32.1%)	41 (36.9%)	33 (25.0%)
10-11.5 inch	5 (9.8%)	24 (37.5%)	43 (51.2%)	55 (49.6%)	86 (65.2%)
12-13.5 inch	5 (9.8%)	13 (20.3%)	11 (13.1%)	14 (12.6%)	11 (8.3%)
14-17.5 inch	12 (23.5%)	2 (3.1%)	2 (2.4%)	1 (0.9%)	2 (1.5%)
≥ 18 inch	0	0	1 (1.2%)	0	0
Total	51	64	84	111	132
PSD	33.3	23.4	16.7	13.5	9.8
RSD 14"	23.5	3.1	3.6	0.9	1.5

Table 2. Percent of harvestable size bluegill, redear and largemouth bass collected from Wall Lake in 1969, 1987, 2003, 2007, 2008 and 2009.

Year	Bluegill		Redear		Largemouth bass	
	All gear	DC elect	All gear	DC elect	All gear	DC elect
1969	7.5	N/A	23.0	N/A	10.0	N/A
1987	30.0	23.1	70.0	75.9	20.0	19.7
2003	20.0	13.3	53.0	85.2	3.0	2.3
2007	47.2	44.1	85.9	97.9	2.9	3.1
2008	17.6	17.6	100	100	0.9	0.9
2009	28.7	21.1	87.9	86.4	1.2	1.2

Table 3. Average length at last annulus formation for bluegill, redear and largemouth bass collected with all gear types during the 1969, 1987, 2003, 2007 and 2008 fisheries surveys of Wall Lake.

Bluegill	Length (inches) at last annulus formation at each age							
Survey Year	1	2	3	4	5	6	7	8
1969	1.4	2.3	3.1	4.9	5.8			
1987			3.1	4.2	5.8	6.0		
2003		2.0	2.8	3.5	4.6	5.9	6.6	6.9
2007	1.8	2.2	2.8	3.9	4.7	6.3	6.9	7.4
2008		2.4	3.1	4.6	5.7	6.7	7.5*	7.2*
2009	1.8	2.4	3.6	5.1	5.8*	7.2	7.7	8.2*
Natural Lakes Average	1.7	3.1	4.7	6.1	6.9	7.4		

Note: Relatively few bluegills were aged in 1969 and zero intercept was used. *Only one or two fish aged.

Redear	Length (inches) at last annulus formation at each age							
Survey Year	1	2	3	4	5	6	7	8
1969			3.2	4.5	5.4	6.3		
1987			3.8	4.9	6.1	6.9		
2003			3.4	4.6	5.5	6.2	6.8	7.9
2007			4.2	4.3	5.8	7.0	7.2	8.4
2008				5.5	6.2	7.4	7.9	7.9
2009		3.4		6.2	6.8	7.9	8.2	8.5
Natural Lakes Average	2.2	3.4	4.7	6.2	7.4	6.8		

Largemouth bass	Length (inches) at last annulus formation at each age							
Survey Year	1	2	3	4	5	6	7	8
1969			6.5	9.0				
1987		5.7	8.3	11.6	13.5	15.0		
2003	3.9	6.1	8.0	9.8	11.4	12.4		
2008		6.5	8.7	10.4	11.4	13.0*	14.4*	
2009	2.8	7.1	8.5	9.9	11.8	12.8	14.0	15.2
Natural Lakes Average	3.5	6.9	9.5	11.6	13.4	14.7		

*Only one or two fish aged.

Table 4. Wall Lake Walleye Stockings 2005 through 2009.

Date Stocked	# Stocked	Size (inches)
10/15/05	1,400	5-7
10/3/06	1,400	5-8
10/17/07	1,400	6-8
2008	None	
10/8/09	1,410	7.4-9.6 (8.5 average)

Note: 2005-07 fish were purchased by the Wall Lake Fisherman's Association.

Table 5. Number, percentage, weight and age of walleye collected during fall nighttime D.C. electrofishing from Wall Lake, September 23, 2009.

Total Length	Number Collected	Percent Collected	Average Weight	Age of Fish
13.0	1	3.0	.71	2
13.5	1	3.0	.83	2
14.0	5	15.2	.89	2
14.5	4	12.1	.97	2,3
15.0	2	6.0	1.04	2
15.5	7	21.2	1.23	2,3
16.0	5	15.5	1.27	3
16.5	5	15.2	1.49	3
17.0	2	6.0	1.60	3
19.0	1	3.0	2.18	4
Total	33			

Age 2, 3 and 4 walleye were collected at rates of 5.5, 10.5 and 0.5 per electrofishing hour respectively.

Table 6. Number, length and weight for age-1 and age-2 walleye collected during fall nighttime D.C. electrofishing from Wall Lake, 2006, 2007, 2008 and 2009 and historical lengths for age-1 and age-2 walleye collected from Big Turkey, Clear and Pretty lakes.

Year	Age 1					Age 2				
	Number Collected	Length Range	Average Length	Weight Range	Average Weight	Number Collected	Length Range	Average Length	Weight Range	Average Weight
2006	51	10.3 – 13.6	11.7	0.21 – 0.69	0.43					
2007	10	10.4 – 12.4	11.4	0.31 – 0.54	0.43	13	13.2 – 15.8	14.4	0.80 – 1.26	0.97
2008	7	9.9 – 12.5	11.1	0.28 – 0.60	0.40	9	13.5 – 15.8	14.4	0.77 – 1.10	0.89
2009	0*					11	13.2 – 15.6	13.2	0.71 – 1.23	0.84
Totals	68	9.9 – 13.6	11.6	0.21 – 0.69	0.43	33	13.2 – 15.8	14.0	0.77 – 1.26	0.91

Table 7. Historical average lengths for age-1 and age-2 walleye collected during fall nighttime D.C. electrofishing from Big Turkey, Clear, Maxinkuckee, Pretty and Wall lakes.

Lake	Age 1		Age 2	
	Number	Average Length	Number	Average Length
Big Turkey	68	12.8	27	15.9
Clear	222	11.7	49	15.3
Maxinkuckee	190	11.9	73	14.7
Pretty	113	12.6	61	15.2
Wall	68	11.6	33	14.0

Appendix 1. Species and relative abundance of fish collected from Wall Lake using traps, gill nets and nighttime DC electrofishing during fish community surveys in June of 1969, 1987, 2003, 2007, 2008 and 2009.

	1969	1987	2003	2007	2009
Bluegill	493	709	547	195	212
Redear	58	420	248	71	58
Largemouth bass	29	67	98	105	86
Brown bullhead	29	74	38	40	35
Yellow bullhead	52	49	13	53	29
Yellow perch	128	69	13	22	57
Hybrid sunfish	0	49	0	0	
Warmouth	9	47	15	8	11
Pumpkinseed	9	28	2	0	
Black crappie	0	26	17	1	
Golden shiner	8	13	0	0	
Redfin pickerel	0	14	2	1	
Lake chubsucker	57	7	0	0	
Bowfin	8	3	1	3	
Northern pike	6	2	9	1	1
Green sunfish	0	2	9	3	4
Carp	1	0	0	0	
Spotted gar	0	0	7	9	20
Rock bass	0	0	3	8	14
Walleye**	0	0	0	24	29
Electrofishing hours	2 AC	1 DC	1 DC*	0.75 DC	1 DC
Gill net lifts	8	6	6	4	6
Trap net lifts	4	3	3	4	3

*In 2003, all fish were collected during the first 30 minutes of electrofishing. Bass were collected during the entire 60 minutes of sampling.

** Walleye were initially stocked into Wall Lake during the fall of 2005

Appendix 2. Stomach content from Wall Lake walleye, 2009.

Month	Walleye Length, inches	Bluegill	Unidentifiable sunfish, Lepomis	Yellow perch	Misc. fish	Misc. Items	Number of Empty Stomachs
May	14.0-19.3						18
	14.0		2.0				
	14.0		1.0				
	14.5		2.5				
	14.5			3.0			
	14.5			3.0	2.0 shiner spp		
	14.5				Fish parts-bones		
	16.0		2.5				
	17.0			3.5			
June	12.5-18.9						13
	12.3	1.0		2.9, 3.1, 3.4	Fish parts-bones		
	14.7	1.0					
	15.2		3.3	2.9			
	15.5	2.1					
	15.7			3.1			
	16.0		3.0, 2.3				
	16.0		3.3				
	16.0				Fish parts-bones		
July	None						
Aug	None						

Appendix 3. Wall Lake walleye back calculated length at annulus formation, 2009.

Species Walleye (spring)	YEAR CLASS	NUMBER OF FISH AGED	SIZE RANGE	BACK CALCULATED LENGTH (inches) AT EACH AGE							
				I	II	III	IV	V	VI	VII	VIII
Intercept = 2.2	2007	13	11.3–14.1	7.5	12.2						
	2006	49	13.1-17.0	6.8	12.5	14.8					
	2005	17	15.4-22.6	8.4	14.0	16.4	17.6				
AVERAGE LENGTH				7.3	12.8	15.2	17.6				
NUMBER AGED				79	79	66	17				

Species Walleye (fall)	YEAR CLASS	NUMBER OF FISH AGED	SIZE RANGE	BACK CALCULATED LENGTH (inches) AT EACH AGE							
				I	II	III	IV	V	VI	VII	VIII
Intercept = 2.2	2007	10	13.2 -15.5	7.2	12.0						
	2006	21	13.9-17.2	7.2	12.3	14.8					
	2005	1	19.4	7.2	14.0	16.7	18.6				
AVERAGE LENGTH				7.2	12.2	14.8					
NUMBER AGED				32	32	22					

