

Old Holland Lake
Dubois County
Supplemental Survey

Date of Survey: April 27, 2009

Biologist: Daniel P. Carnahan, Fisheries Biologist

Survey Objective: Determine if a largemouth bass removal is necessary.

Methods: Fish collection effort consisted of 0.50 h of pulsed DC night electrofishing with two dippers. Fish were measured to the nearest 0.1 in TL and weights were estimated from standard weight equations (Anderson and Neumann 1996). Scales were removed from a subsample of sport fish for age and growth analysis. Submersed aquatic vegetation was sampled on August 3, 2009 using guidelines written by the Indiana Department of Natural Resources (2006).

Summary: A total of 140 largemouth bass was sampled that weighed 64 lbs. They ranged in length from 4.8 to 21.8 in. All but three of the bass sampled were less than 14.0 in. The electrofishing catch rate was 280.0/h which was nearly identical to 2008. Bass grew similar to 2004 and 2008 surveys and were on par with the district averages through age 4. The PSD index was below normal (8) for a balanced bass population and much lower than the 49 recorded in 2008. The PSD should be in the 40 to 70 range for a balanced bass population (Anderson and Neumann 1996). The RSD-15 was 2. The stock indices and high catch rate indicate that the population is comprised of small bass which are starting to stockpile at 11.5 in. Harvest could be impacting older big bass, but historically this lake has produced few bass larger than 14.0 in.

A total of 188 bluegill was sampled that weighed 24 lbs. They ranged in length from 1.3 to 9.0 in. The electrofishing catch rate increased from 104 (2007) to 376.0/h. Bluegill exhibited good growth with an age-5 fish averaging 7.9 in compared to the district average of 7.3 in. The stock indices were good. The PSD, RSD-7, and RSD-8 were 34, 18, and 6 which all are characteristics of a good bluegill fishing lake. The bluegill fishing potential index (BGFP) was 26 which classifies the lake as "excellent" for bluegill fishing (Ball and Tousignant 1996). The BGFP in 2007 was 25.

Twenty-nine redear sunfish were sampled that weighed 7 lbs. They ranged in length from 5.0 to 10.2 in. Redear grew fast as they were reaching 9.0 in by age 4 and 10.0 in by age 5.

Plant abundance increased since 2007. Fifteen out of 30 sites possessed vegetation compared to 11 sites in 2007. Also, 16% of the sites had a rake score of 5 compared to 0 in

2007. A 3 ft winter drawdown was conducted in January to help reduce plant biomass and it did not help as there were still plants in the area exposed to freezing. A longer freezing period may be needed in future drawdowns.

Discussion: Old Holland Lake has an excellent bluegill and redear sunfish fishery with a mediocre bass fishery comprised primarily of small bass. Bass were removed from the lake in 1998 and 1999 to help bring the predator-prey proportions back into balance and it worked as more larger bass were produced. However, by 2007 the bass population was reverting back to a stunted population and has further progressed in that direction in 2009. Historically, this lake has possessed quality bluegill and small bass and it appears that may be best for this lake. Quality bluegill fishing lakes are becoming harder to find and Dubois County already possesses some good “big” bass lakes (Patoka Lake and Huntingburg Lake). A bass removal would only be a short term fix while a regulation change to a slot limit would not be advisable on a 14-acre lake.

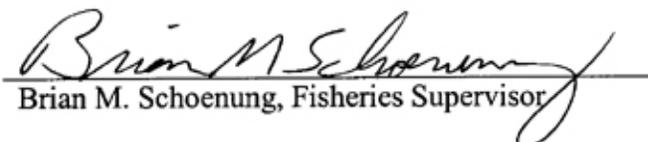
Recommendations:

- A longer freezing period will be needed during the winter drawdown.
- A largemouth bass removal is not recommended.

Literature Cited:

- Anderson, R. O. and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-481 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.
- Ball, R. L. and J. N. Tousignant. 1996. The development of an objective rating system to assess bluegill fishing in lakes and ponds. Research report. Indiana Department of Natural Resources. Indianapolis. 18 pp.
- Indiana Department of Natural Resources. 2006. Tier II aquatic vegetation survey protocol. 9 pp.

Submitted by: Daniel P. Carnahan, Fisheries Biologist
Date: August 20, 2009

Approved by: 
Brian M. Schoenung, Fisheries Supervisor

Date: November 12, 2009

LAKE SURVEY REPORT

Type of Survey	<input type="checkbox"/> Initial Survey	<input checked="" type="checkbox"/> Re-Survey
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Lake Name Old Holland City Lake	County Dubois	Date of survey (Month, day, year) April 27, 2009
Biologist's name Daniel P. Carnahan	Date of approval (Month, day, year) November 12, 2009	

LOCATION		
Quadrangle Name Velpen	Range 6W	Section 14
Township Name 3S	Nearest Town Holland	

ACCESSIBILITY					
State owned public access site		Privately owned public access site		Other access site City owned boat ramp	
Surface acres 13.7	Maximum depth 18.0	Average depth 9.0	Acre feet 123.3	Water level 491 MSL	Extreme fluctuations None
Location of benchmark					

INLETS		
Name Intermittent stream	Location Northeast end of lake	Origin Runoff

OUTLETS			
Name	Location		
Water level control 8.0 in pipe to New Holland Lake			
POOL	ELEVATION (Feet MSL)	ACRES	Bottom type <input type="checkbox"/> Boulder <input type="checkbox"/> Gravel <input type="checkbox"/> Sand <input checked="" type="checkbox"/> Muck <input checked="" type="checkbox"/> Clay <input type="checkbox"/> Marl
TOP OF DAM			
TOP OF FLOOD CONTROL POOL			
TOP OF CONSERVATION POOL	491	13.7	
TOP OF MINIMUM POOL	482		
STREAMBED			

Watershed use Park, agriculture
Development of shoreline City park

Previous surveys and investigations Fisheries surveys: 1966, 1977, 1980, 1988, 1990, 1991, 1994, 1997, 2001, 2004, and 2007.

SAMPLING EFFORT					
ELECTROFISHING	Day hours		Night hours		Total hours
			0.5		0.5
TRAP NETS	Number of traps		Number of Lifts		Total effort
GILL NETS	Number of nets		Number of Lifts		Total effort
ROTENONE	Gallons	ppm	Acre Feet Treated	SHORELINE SEINING	Number of 100 Foot Seine Hauls

PHYSICAL AND CHEMICAL CHARACTERISTICS			
Color		Turbidity	
		Feet	Inches (SECCHI DISK)
Alkalinity (ppm)*		pH	
Surface:	Bottom:	Surface:	Bottom:
Conductivity:		Air temperature:	
276 micromhos		°F	
Water chemistry GPS coordinates:			
N		W	

TEMPERATURE AND DISSOLVED OXYGEN (D.O.)								
DEPTH (FEET)	Degrees (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)
SURFACE	74.0		36			72		
2			38			74		
4			40			76		
6			42			78		
8			44			80		
10			46			82		
12			48			84		
14			50			86		
16			52			88		
18			54			90		
20			56			92		
22			58			94		
24			60			96		
26			62			98		
28			64			100		
30			66					
32			68					
34			70					

COMMENTS
Most water chemistry parameters were not measured.

*ppm-parts per million

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF BLUEGILL									
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	2	1.1	0.01	1	19.0				
1.5	8	4.3	0.01	1	19.5				
2.0	6	3.2	0.01	1	20.0				
2.5	1	0.5	0.01	1	20.5				
3.0	6	3.2	0.02	2	21.0				
3.5	13	6.9	0.03	2	21.5				
4.0	22	11.7	0.05	2, 3	22.0				
4.5	24	12.8	0.07	2, 3	22.5				
5.0	30	16.0	0.09	2, 3	23.0				
5.5	18	9.6	0.13	2, 3	23.5				
6.0	10	5.3	0.17	2, 3, 4	24.0				
6.5	16	8.5	0.22	3, 4	24.5				
7.0	12	6.4	0.28	3, 4	25.0				
7.5	10	5.3	0.34	4, 5	25.5				
8.0	9	4.8	0.41	4, 5, 6	26.0				
8.5					TOTAL	188			
9.0	1	0.5	0.58	7					
9.5									
10.0									
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	376.0/h	GILL NET CATCH	N/A	TRAP NET CATCH	N/A
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NUMBER, PERCENTAGE, WEIGHT, AND AGE OF LARGEMOUTH BASS

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				
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5					21.5	2	1.4	4.87	8, 9
4.0					22.0				
4.5	3	2.1	0.04	1	22.5				
5.0	5	3.6	0.06	1	23.0				
5.5	2	1.4	0.08	1	23.5				
6.0	5	3.6	0.10	1	24.0				
6.5	1	0.7	0.13	not aged	24.5				
7.0					25.0				
7.5	1	0.7	0.20	2	25.5				
8.0	1	0.7	0.24	2	26.0				
8.5	10	7.1	0.28	2	TOTAL	140			
9.0	48	34.3	0.33	2					
9.5	19	13.6	0.39	2, 3					
10.0	5	3.6	0.46	2, 3					
10.5	14	10.0	0.53	3					
11.0	13	9.3	0.62	3, 4					
11.5	3	2.1	0.71	3, 4					
12.0	3	2.1	0.80	4					
12.5	2	1.4	0.91	4					
13.0	2	1.4	1.02	4, 5					
13.5									
14.0	1	0.7	1.31	5					
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	280.0/h	GILL NET CATCH	N/A	TRAP NET CATCH	N/A
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NUMBER, PERCENTAGE, WEIGHT, AND AGE OF REDEAR SUNFISH

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				
1.5					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	2	6.9	0.09	2	23.0				
5.5	6	20.7	0.13	2	23.5				
6.0	7	24.1	0.17	2, 3	24.0				
6.5	6	20.7	0.22	2, 3	24.5				
7.0	1	3.4	0.27	2	25.0				
7.5	1	3.4	0.33	3	25.5				
8.0	1	3.4	0.40	3	26.0				
8.5	2	6.9	0.48	3, 4	TOTAL	29			
9.0	2	6.9	0.57	4					
9.5									
10.0	1	3.4	0.76	5					
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	58.0/h	GILL NET CATCH	N/A	TRAP NET CATCH	N/A
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BLUEGILL AGE-LENGTH KEY

Length group (in)	Total number	Sub-sample	AGE							
			1	2	3	4	5	6	7	
1.0	2	2	2							
1.5	8	5	8							
2.0	6	4	6							
2.5	1	1	1							
3.0	6	5		6						
3.5	13	7		13						
4.0	22	7		19	3					
4.5	24	5		14	10					
5.0	30	9		3	27					
5.5	18	5		7	11					
6.0	10	6		2	3	5				
6.5	16	7			2	14				
7.0	12	5			2	10				
7.5	10	4				5	5			
8.0	9	7				3	3	4		
8.5										
9.0	1	1								1
Totals	188	80	17	64	58	36	8	4		1

AGE-LENGTH KEY SUMMARY							
Age	Number	Mean			Lower 95%CI	Upper 95%CI	
		TL	Var	SE			
1	17	1.8	0.54	0.18	1.4	2.1	
2	64	4.4	0.58	0.09	4.2	4.6	
3	58	5.4	0.44	0.09	5.2	5.6	
4	36	7.1	0.31	0.09	6.9	7.2	
5	8	7.9	0.06	0.09	7.7	8.1	
6	4	8.3	0.00				
7	1	9.3					

LARGEMOUTH BASS AGE-LENGTH KEY

Length group (in)	Total number	Sub-sample	AGE									
			1	2	3	4	5	6	7	8	9	
4.5	3	3	3									
5.0	5	4	5									
5.5	2	2	2									
6.0	5	4	5									
6.5	1	0										
7.0												
7.5	1	1		1								
8.0	1	1		1								
8.5	10	6		10								
9.0	48	6		48								
9.5	19	5		15	4							
10.0	5	4		1	4							
10.5	14	5			14							
11.0	13	8			10	3						
11.5	3	2			2	2						
12.0	3	3				3						
12.5	2	2				2						
13.0	2	2				1	1					
13.5												
14.0	1	1					1					
21.5	2	2									1	1
Totals	140	61	15	76	33	11	2	0	0		1	1

AGE-LENGTH KEY SUMMARY						
Age	Number	Mean			Lower 95%CI	Upper 95%CI
		TL	Var	SE		
1	15	5.6	0.35	0.15	5.2	5.9
2	76	9.3	0.14	0.04	9.2	9.4
3	33	10.8	0.27	0.09	10.6	11.0
4	11	12.1	0.49	0.21	11.6	12.5
5	2	13.8	0.50	0.50	12.8	14.8
6	0					
7	0					
8	1	21.8				
9	1	21.8				

REDEAR SUNFISH AGE-LENGTH KEY

Length group (in)	Total number	Sub-sample	AGE					
			1	2	3	4	5	
5.0	2	2		2				
5.5	6	5		6				
6.0	7	6		5	2			
6.5	6	6		5	1			
7.0	1	1		1				
7.5	1	1			1			
8.0	1	1			1			
8.5	2	2			1	1		
9.0	2	2				2		
9.5								
10.0	1	1						1
Totals	29	27	0	19	6	3		1

AGE-LENGTH KEY SUMMARY						
Age	Number	Mean			Lower 95%CI	Upper 95%CI
		TL	Var	SE		
1	0					
2	19	6.2	0.32	0.13	5.9	6.4
3	6	7.3	1.14	0.42	6.4	8.1
4	3	9.1	0.08	0.17	8.8	9.4
5	1	10.3				

GPS LOCATION OF SAMPLING EQUIPMENT

GILL NETS			TRAP NETS			ELECTROFISHING		
1	N	W	1	N	W	1	N 38.25391	W -87.03888
	N	W	2	N	W		N 38.25213	W -87.04120
2	N	W	3	N	W	2	N 38.25162	W -87.04104
	N	W	4	N	W		N 38.25062	W -87.03940
3	N	W	5	N	W	3	N	W
	N	W	6	N	W		N	W
4	N	W	7	N	W	4	N	W
	N	W	8	N	W		N	W
5	N	W	9	N	W	5	N	W
	N	W	10	N	W		N	W
6	N	W	11	N	W	6	N	W
	N	W	12	N	W		N	W
7	N	W	13	N	W	7	N	W
	N	W	14	N	W		N	W
8	N	W	15	N	W	8	N	W
	N	W	16	N	W		N	W
9	N	W	17	N	W	9	N	W
	N	W	18	N	W		N	W
10	N	W	19	N	W	10	N	W
	N	W	20	N	W		N	W
11	N	W				11	N	W
	N	W					N	W
12	N	W				12	N	W
	N	W					N	W
13	N	W				13	N	W
	N	W					N	W
14	N	W				14	N	W
	N	W					N	W
15	N	W				15	N	W
	N	W					N	W
16	N	W				16	N	W
	N	W					N	W
17	N	W				17	N	W
	N	W					N	W
18	N	W				18	N	W
	N	W					N	W
19	N	W				19	N	W
	N	W					N	W
20	N	W				20	N	W
	N	W					N	W