

Bluegrass Pit
Warrick County
Supplemental Crappie Survey

Date of Survey: March 13 to 17, 2008

Biologist: Michelle L. Cain, Assistant Fisheries Biologist

Survey Objectives: 1) Collect catch rate and growth data on crappie. 2) Evaluate the potential of improving size structure and increasing yield of crappie.

Methods: Fish collection effort consisted of 32 overnight standard trap net lifts. Some crappie were also collected by night electrofishing on April 1 and 9 during the supplemental largemouth bass survey. Black and white crappie were measured to the nearest 0.1 in TL and weighed to the nearest 0.01 lb. Otoliths were removed from a subsample of crappie for age and growth analysis. Fishery Analyses and Simulation Tools (FAST) software was used to determine if a minimum size limit (MSL) would improve the crappie population's size structure and yield (Slipke and Maceina 2000).

Summary: A total of 172 white crappie and 17 black crappie was collected. White crappie ranged in length from 5.6 to 12.8 in, while black crappie ranged from 8.9 to 11.5 in. The trap net catch rates were 5.1/lift for white crappie and 0.5/lift for black crappie. The 2005 white crappie catch rate was 3.0/trap net lift. Thirty-two percent of the white crappie collected were at least 9.0 in compared to 57% in 2005. White crappie grew fast to average up to age 4 and then growth slowed for age-5 and older fish. Length ranges for each age group older than age 4 varied considerably as they overlapped with each other. For example, age-5 crappie ranged from 8.1 to 10.5 in, age-6 crappie ranged from 9.3 to 10.7 in, and age-7 crappie ranged from 8.7 to 11.3 in. White crappie growth was similar to 2005 with growth slowing at age 4 and large cohorts of slow growing age-8 and age-9 crappie. The large cohorts of older crappie were not as dominant in 2008 as they were in 2005. This could be a good indicator that the population's size structure is improving.

The crappie population was stunted prior to the pit opening to public fishing in 2000 (Carnahan 2002). That stunted population has contributed to slow growing crappie for those fish produced before 2004. The variation in growth for age classes produced before 2003 may be due to intraspecific competition. Growth should improve with increased fishing mortality as Bluegrass Pit's use has increased with the liberalized outboard motor regulation (personal communication with Sugar Ridge Fish and Wildlife Area employees).

Results from FAST indicate that under a 9.0 in MSL yield would substantially decrease with conditional natural mortalities (cm) of both 0.3 and 0.4. Imposition of a 10.0 in MSL would also decrease yield under both cm estimates. Imposing a 9.0 or 10.0 in MSL would increase the number of crappie greater than 9.0 in and not substantially change the number of crappie greater than 10.0 in. However, even though more fish greater than 9.0 in would be present in the population, yield would substantially decrease. Also, with many crappie exhibiting slow growth, a MSL would further reduce growth by increasing intraspecific competition. The crappie regulations should not be changed at Bluegrass Pit at this time. A supplemental crappie survey should be conducted in 2011 to evaluate the same objectives as this survey.

Recommendations:

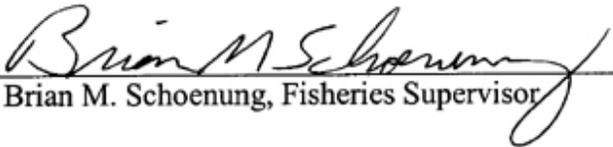
- Do not change crappie regulations at Bluegrass Pit.
- Evaluate the Bluegrass Pit crappie population in 2011 using the same methods as in 2008.

Literature Cited:

- Carnahan, D. P. 2002. Blue Grass Fish and Wildlife Area 2001 interim fish management report. Indiana Department of Natural Resources. Indianapolis. 44 pp.
- Slipke, J. W. and M. J. Maceina. 2000. Fishery analyses and simulation tools. Auburn University, Auburn, Alabama.

Submitted by: Michelle L. Cain, Assistant Fisheries Biologist
Date: June 11, 2008

Approved by: Daniel P. Carnahan, Fisheries Biologist

Approved by: 
Brian M. Schoenung, Fisheries Supervisor

Date: December 17, 2008

LAKE SURVEY REPORT

Type of Survey	<input type="checkbox"/> Initial Survey	<input checked="" type="checkbox"/> Re-Survey
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Lake Name Bluegrass Pit	County Warrick	Date of survey (Month, day, year) March 13 to 17, 2008
Biologist's name Michelle L. Cain		Date of approval (Month, day, year) December 17, 2008

LOCATION		
Quadrangle Name Elberfeld	Range 9W	Section 31
Township Name 4S	Nearest Town Elberfeld	

ACCESSIBILITY					
State owned public access site One concrete and one gravel boat ramp.		Privately owned public access site		Other access site	
Surface acres 173	Maximum depth 57	Average depth 25	Acre feet 4,325	Water level unknown	Extreme fluctuations unknown
Location of benchmark					

INLETS		
Name Bluegrass Creek	Location Northwest side of pit	Origin

OUTLETS			
Name Culvert pipe to Loon Pit		Location South end of pit	
Water level control			
POOL	ELEVATION (Feet MSL)	ACRES	Bottom type
TOP OF DAM			<input type="checkbox"/> Boulder
TOP OF FLOOD CONTROL POOL			<input type="checkbox"/> Gravel
TOP OF CONSERVATION POOL			<input type="checkbox"/> Sand
TOP OF MINIMUM POOL			<input checked="" type="checkbox"/> Muck
STREAMBED			<input type="checkbox"/> Clay
			<input type="checkbox"/> Marl

Watershed use Reclaimed coal strip mine ground
Development of shoreline None

Previous surveys and investigations Spot check survey in 2000.
Standard fisheries survey in 2001. Largemouth bass sampling in 2003, 2004, 2005, 2006, and 2007.
Angler creel survey 2004 and 2006.
Crappie sampling 2005.

SAMPLING EFFORT					
ELECTROFISHING	Day hours		Night hours		Total hours
	Number of traps 8		Number of Lifts 4		Total effort 32
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:	
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)
DATE	SURFACE		36			72		
3/13	44		38			74		
3/14	44		40			76		
3/15	44		42			78		
3/16	44		44			80		
3/17	44		46			82		
			48			84		
			50			86		
			52			88		
			54			90		
			56			92		
			58			94		
			60			96		
			62			98		
			64			100		
			66					
			68					
			70					

COMMENTS
No chemical characteristics were measured.

*ppm-parts per million

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF WHITE CRAPPIE

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					23.0				
5.5	1	0.6	0.10	2	23.5				
6.0	3	1.7	0.10	2	24.0				
6.5	2	1.2	0.13	3	24.5				
7.0	27	15.7	0.17	3	25.0				
7.5	30	17.4	0.20	3, 4	25.5				
8.0	32	18.6	0.24	2, 4, 5, 7, 9	26.0				
8.5	22	12.8	0.28	3, 4, 6, 7	TOTAL	172			
9.0	20	11.6	0.34	4, 6					
9.5	11	6.4	0.37	4, 5, 7					
10.0	9	5.2	0.49	4, 6, 8					
10.5	8	4.7	0.58	4, 5, 6, 7					
11.0	4	2.3	0.62	4, 8					
11.5	1	0.6	0.95	4					
12.0	1	0.6	1.05	7					
12.5	1	0.6	1.25	7					
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	10 collected	GILL NET CATCH	N/A	TRAP NET CATCH	5.1/lift
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NUMBER, PERCENTAGE, WEIGHT, AND AGE OF BLACK CRAPPIE

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					23.0				
5.5					23.5				
6.0					24.0				
6.5					24.5				
7.0					25.0				
7.5					25.5				
8.0					26.0				
8.5	1	5.9	0.4	3	TOTAL	17			
9.0	3	17.6	0.5	3, 4					
9.5	2	11.8	0.6	3, 4					
10.0	3	17.6	0.6	3, 4					
10.5	3	17.6	0.8	4, 5					
11.0	3	17.6	0.7	4					
11.5	2	11.8	0.9	4, 6					
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	1 collected	GILL NET CATCH	N/A	TRAP NET CATCH	0.5/lift
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WHITE CRAPPIE AGE-LENGTH KEY

Length group (in)	Total number	Sub-sample	AGE									
			1	2	3	4	5	6	7	8	9	
5.5	1	1		1								
6.0	3	3		3								
6.5	2	2			2							
7.0	27	15		2	25							
7.5	30	15			6	24						
8.0	32	15		3		23	2			2		2
8.5	22	15			1	18			1	1		
9.0	20	16				19			1			
9.5	11	11				9	1			1		
10.0	9	9				7			1			1
10.5	8	7				2	1		4	1		
11.0	4	4				3						1
11.5	1	1				1						
12.0	1	1								1		
12.5	1	1								1		
Totals	172	116		9	35	107	4	8	8	8	2	2

AGE-LENGTH KEY SUMMARY						
Age	Number	Mean TL	Var	SE	Lower 95%CI	Upper 95%CI
1						
2	9	7.0	0.96	0.35	6.3	7.6
3	35	7.4	0.14	0.06	7.2	7.5
4	107	8.8	0.91	0.09	8.6	9.0
5	4	9.3	1.51	0.59	8.1	10.5
6	8	10.0	0.81	0.34	9.3	10.7
7	8	10.0	3.29	0.65	8.7	11.3
8	2	10.7	0.56	0.56	9.6	11.8
9	2	8.3	0.00			

BLACK CRAPPIE AGE-LENGTH KEY

Length group (in)	Total number	Sub-sample	AGE						
			1	2	3	4	5	6	
8.5	1	1			1				
9.0	3	3			1	2			
9.5	2	2			1	1			
10.0	3	3			1	2			
10.5	3	3				2	1		
11.0	3	3				3			
11.5	2	2				1			1
Totals	17	17			4	11	1		1

AGE-LENGTH KEY SUMMARY						
Age	Number	Mean			Lower 95%CI	Upper 95%CI
		TL	Var	SE		
1						
2						
3	4	9.5	0.42	0.32	8.9	10.1
4	11	10.5	0.72	0.26	10.0	11.0
5	1	10.8				
6	1	11.8				

GPS LOCATION OF SAMPLING EQUIPMENT

GILL NETS			TRAP NETS			ELECTROFISHING		
1	N	W	1	N 38.09246	W -87.462666	1	N	W
	N	W	2	N 38.09316	W -87.455789		N	W
2	N	W	3	N 38.09456	W -87.458451	2	N	W
	N	W	4	N 38.09495	W -87.460311		N	W
3	N	W	5	N 38.09441	W -87.462412	3	N	W
	N	W	6	N 38.10309	W -87.461928		N	W
4	N	W	7	N 38.10488	W -87.461962	4	N	W
	N	W	8	N 38.10810	W -87.462736		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