OTTER PIT

Warrick County

Supplemental Crappie Survey

Date of Survey: March 7 to 20, 2018

Biologist: Tyler D. Ham, District 6 Assistant Fisheries Biologist

Survey Objectives: 1. Collect catch rate and growth data for crappie in Otter Pit. 2. Evaluate the potential for improving size structure and yield of crappie in Otter Pit.

Methods: Fish collection effort consisted of 26 overnight standard trap net lifts as well as 8 overnight Michigan-style trap net lifts. Both Black and White Crappie were measured to the nearest 0.1 in (TL) and weighed to the nearest 0.01 lb. Otoliths were extracted from a subsample of fish for analyses of age and growth. Fisheries Analysis and Modeling Simulator (FAMS) was employed to determine if a minimum length limit (MLL) could potentially improve size structure and therefore yield (Slipke 2010).

Summary: A total of 205 White Crappie and 66 Black Crappie were collected during sampling efforts. White Crappie ranged in length from 3.9 to 12.6 in, while Black Crappie ranged from 6.2 to 11.1 in. Nearly 30% of the White Crappie were over 9 in and over 60% were above 8 in,

similar to the results of the most recent survey in 2011. White Crappie relative weights (Wr) were average, down slightly from 2011. Relative weights for crappie that were at least 8.0 in and 10.0 in were 81 and 89, respectively. Catch rates were similar between gears for both species. For White Crappie, the catch rates were 6.1 (+\-2.1 SE) and 6.0/lift (+\-0.94) for the Michigan-trap and standard trap respectively. Catch rates were 1.8 (+\-0.73) and 2.0 (+\-0.57) for Black Crappie between the same gears. The 2011 catch rates were 4.8/lift for White Crappie and 1.2/lift for Black Crappie using standard trap nets only.

Due to the smaller sample size of Black Crappie, growth and FAMS analyses focused on White Crappie only. White Crappie growth remained slow, following the trend from 2011. Crappie fell below district averages for growth at nearly all ages. Age-4 and age-5 crappie averaged 8.8 and 9.4 inches compared to 8.9 and 9.6 inches in 2011. Growth was highly variable with age-4 fish ranging from 6.9 to 11.1 inches, age 5 between 7.4 and 11.0 inches, and age 6 between 9.3 and 12.6 inches. This similar growth pattern was observed in 2011.

Population statistics were calculated using a catch curve analysis in FAMS (Ricker 1975). Instantaneous mortality (Z) was 0.81, total annual mortality (A) was 0.45, survival was (S) 0.55, conditional rate of natural mortality (cm) was 0.41, instantaneous rate of fishing mortality (F) was 0.28, conditional rate of fishing mortality (cf) was 0.24, and the rate of exploitation (u) was 0.08. In 2011, cm was 0.48 and cf was 0.19. From these analyses, it appears that overall fishing pressure remains low and it appears most White Crappie were succumbing to natural mortality.

The potential benefits of implementing a MLL on Otter Pit were modeled. Under current conditions there would be no benefit to the fishery by implementing a MLL. Instead, harvest should be encouraged to reduce crappie numbers and stimulate growth via reduced competition.

Recommendations:

- No changes are recommended.

Literature Cited:

Ricker, W.E. 1975. Competition and interpretation of biological statistics of fish populations. Bull. Fish. Res. Board Can. 191: 382p.

Slipke, J.W. 2010. Fishery analysis and modeling simulator. Auburn University, Auburn, Alabama.

Submitted by: Tyler D. Ham, Assistant Fisheries Biologist

Date: June 25, 2018

Approved by: Dan Carnahan

Daniel P. Carnahan, South Region Fisheries Supervisor

Date: August 16, 2018

LAKE SURVEY REPORT

Type of Survey: [ ] Initial Survey [X] Re-Survey

Lake Name	County	Date of survey (Month, day, year)
Otter Pit	Warrick	March 7 to 20, 2018
Biologist's name		**Date of approval (Month, day, year)**
Rebecca A. Munter and Tyler D. Ham		August 16, 2018

LOCATION

Quadrangle Name	Range	Section
Daylight	9W	7, 18
Township Name	**Nearest Town**	
5S	Daylight	

ACCESSIBILITY

State owned public access site	Privately owned public access site	Other access site
Concrete boat ramp		

Surface acres	Maximum depth	Average depth	Acre feet	Water level	Extreme fluctuations
73.7	63 ft	20 ft	1,474	unknown	6 ft

Location of benchmark

INLETS

Name	Location	Origin
Culvert	North end of pit	Loon Pit

OUTLETS

Name	Location
Ditch leading to Pigeon Creek	South west

Water level control

POOL	ELEVATION (Feet MSL)	ACRES
TOP OF DAM		
TOP OF FLOOD CONTROL POOL		
TOP OF CONSERVATION POOL		73.7
TOP OF MINIMUM POOL		
STREAMBED		

Bottom type

- [ ] Bolder
- [ ] Gravel
- [ ] Sand
- [X] Muck
- [ ] Clay
- [ ] Marl

Watershed use

Reclaimed coal strip mine ground. Based on the 12 digit HUC watershed (051402020302), land cover (2018) is 48% agriculture, 19% forest, and 11% open space/park.

Development of shoreline

One boat ramp area.

Previous surveys and investigations

Crappie Supplemental Survey 2006, 2008 and 2011.
General fisheries survey 2001.
Lake Standard survey 2009.

SAMPLING EFFORT

ELECTROFISHING	Day hours		Night hours		Total hours
TRAP NETS	Number of traps: 26		Number of Lifts: 1		Total effort: 26 overnight lifts
MICHIGAN TRAP NETS	Number of nets: 4		Number of Lifts: 2		Total effort: 8 overnight lifts
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)* Surface: Bottom:	pH Surface: Bottom:
Conductivity: micromhos	Air temperature: °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		
3/8/2018	46.1		38			74		
3/15/2018	46.0		40			76		
3/20/2018	48.9		42			78		
			44			80		
			46			82		
			48			84		
			50			86		
			52			88		
			54			90		
			56			92		
			58			94		
			60			96		
			62			98		
			64			100		
			66					
			68					
			70					

COMMENTS

SPECIES AND RELATIVE ABUNDANCE OF FISHES COLLECTED BY NUMBER AND WEIGHT					
*COMMON NAME OF FISH	NUMBER	PERCENT	LENGTH RANGE (inches)	WEIGHT (pounds)	PERCENT
White Crappie	205	75.6	3.9 - 12.6	56.52	74.5
Black Crappie	66	24.4	6.2 - 11.1	19.37	25.5
Totals	271			75.89	

*Common names of fishes recognized by the American Fisheries Society.

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	1	0.5	0.05	1	22.0				
4.5					22.5				
5.0	3	1.5	0.09	2,3	23.0				
5.5	2	1.0	0.12	2	23.5				
6.0	4	2.0	0.11	2,3	24.0				
6.5	12	5.9	0.14	3	24.5				
7.0	22	10.8	0.18	2,3,5	25.0				
7.5	34	16.7	0.20	3,4	25.5				
8.0	38	18.6	0.25	3,4	26.0				
8.5	33	16.2	0.31	3,4,5,6	TOTAL	204			
9.0	21	10.3	0.35	3,4,5,6					
9.5	17	8.3	0.42	4,5					
10.0	9	4.4	0.48	4,5					
10.5	5	2.5	0.48	4,5,6					
11.0	1	0.5	0.66	5,6					
11.5	1	0.5	0.66	Not Aged					
12.0									
12.5	1	0.5	0.79	6					
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

MICHIGAN TRAP NET CATCH	6.1 /lift	GILL NET CATCH	N/A	STANDARD TRAP NET CATCH	6.0 /lift

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	1	1.5	0.12	3	24.0				
6.5	3	4.5	0.15	3,4	24.5				
7.0	10	15.2	0.20	3,4	25.0				
7.5	16	24.2	0.23	3,4,5	25.5				
8.0	9	13.6	0.25	4,5	26.0				
8.5	13	19.7	0.33	3,4,5,6	TOTAL	66			
9.0	8	12.1	0.39	4,5					
9.5	4	6.1	0.50	3,5,6,10					
10.0									
10.5									
11.0	2	3.0	0.72	4					
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									

MICHIGAN TRAP NET CATCH	1.8 /lift	GILL NET CATCH	N/A	STANDARD TRAP NET CATCH	2.0 /lift

WHITE CRAPPIE AGE-LENGTH KEY								
Length group (in)	Total number	Sub-sample	AGE 1	2	3	4	5	6
4.0	1	1	1					
4.5								
5.0	3	3		2	1			
5.5	2	2		2				
6.0	4	4		2	2			
6.5	12	12			12			
7.0	22	22		3	16		3	
7.5	34	34			20	14		
8.0	38	38			25	13		
8.5	33	33			21	4	4	4
9.0	21	21			3	6	9	3
9.5	17	17				9	9	
10.0	9	9				3	6	
10.5	5	5				3	1	1
11.0	1	1					1	1
11.5	1	0						
12.0								
12.5	1	1						1
Totals	204	203	1	9	100	50	33	10

AGE-LENGTH KEY SUMMARY						
Age	Number	Mean TL	Var	SE	Lower 95%CI	Upper 95%CI
1	1	4.3				
2	9	6.3	0.69	0.28	5.7	6.8
3	100	7.9	0.59	0.08	7.7	8.0
4	50	8.8	0.88	0.13	8.5	9.0
5	33	9.4	0.82	0.16	9.1	9.7
6	10	9.7	1.83	0.43	8.8	10.5

BLACK CRAPPIE AGE-LENGTH KEY

Length group (in)	Total number	Sub-sample	AGE				
			3	4	5	6	10
6.0	1	1	1				
6.5	3	2	2	2			
7.0	10	5	4	6			
7.5	16	6	3	11	3		
8.0	9	4		5	5		
8.5	13	6	2	2	4	4	
9.0	8	5		3	5		
9.5	4	4	1		1	1	1
10.0							
10.5							
11.0	2	1		2			
Totals	66	34	12	30	17	5	1

AGE-LENGTH KEY SUMMARY						
Age	Number	Mean TL	Var	SE	Lower 95%CI	Upper 95%CI
3	12	7.7	0.96	0.28	7.1	8.2
4	30	8.1	1.15	0.20	7.7	8.5
5	17	8.7	0.36	0.14	8.4	9.0
6	5	8.9	0.19	0.19	8.6	9.3
7						
8						
9						
10	1	9.8				

GPS LOCATION OF SAMPLING EQUIPMENT					
TRAP NETS			MICHIGAN TRAP NETS		
1	N 38.06937	W -87.45234	1	N 38.06937	W -87.45220
2	N 38.06704	W -87.45597	2	N 38.06659	W -87.45631
3	N 38.06972	W -87.45211	3	N 38.06001	W -87.44948
4	N 38.06634	W -87.45631	4	N 38.06903	W -87.46098
5	N 38.06012	W -87.44976	5	N	W
6	N 38.05984	W -87.44900	6	N	W
7	N 38.06865	W -87.46070	7	N	W
8	N 38.06910	W -87.46102	8	N	W
9	N 38.06383	W -87.45523	9	N	W
10	N 38.06290	W -87.45491	10	N	W
11	N 38.06947	W -87.45767	11	N	W
12	N 38.06995	W -87.45433	12	N	W
13	N 38.06933	W -87.45295	13	N	W
14	N 38.06974	W -87.45215	14	N	W
15	N 38.06588	W -87.45666	15	N	W
16	N 38.06781	W -87.45475	16	N	W