

FLINT LAKE
Porter County
2010 Status and Trends Summary

Date of Survey: June 22 to 23 and August 9, 2010

Biologists: Tom Bacula (Naturalist Aide) and Jeremy Price

Survey Objectives: Conduct a fishery evaluation under status and trends lake sampling protocol under work plan 300FW1F10D642.

Introduction: Flint Lake is an 89-acre natural lake with a maximum depth of 70 ft located north of Valparaiso, Indiana. Flint Lake is one in a series of seven lakes. Access to Flint Lake is from a county road on the south shore. Fish management surveys occurred in 1976 and 1986 by the Division of Fish and Wildlife (DFW). The fish community has primarily been composed of bluegill, largemouth bass, black crappie, and brown bullhead. Spot check surveys for stocked walleyes have occurred in 1982 and 2005 and no walleyes were collected. Flint Lake is one of the annual lakes to survey for the status and trends work plan.

Methods: Status and trends lake sampling was conducted on June 22 to 23 and August 9, 2010. Physical and chemical characteristics were collected in the deepest part of the lake according to DFW sampling guidelines (Shipman et al. 2001). Plankton was sampled using four vertical tows in the deepest part of the lake. Aquatic vegetation was sampled on August 9, 2010 using the DFW Tier II Aquatic Vegetation Survey Protocol (IDNR 2007).

Fish were collected using three sampling gears at standard locations: pulsed DC, shoreline night electrofishing for 30 min at two 15 min transects to cover the entire shoreline, two standard gill nets, and two trap nets were fished overnight. All fish collected were measured to the nearest 0.1 in total length (TL) and to the nearest 0.1 lb in weight. Five scale samples were taken per half-inch group (X.0-X.4 for inch group and X.5-X.9 for half-inch group) from all sportfish for age and growth analysis. For largemouth bass, five scale (fish < 12.0 in TL) or fin ray (fish ≥ 12.0 in TL) samples were taken per half-inch group for age and growth analysis. Catch per unit effort (CPUE) was calculated as catch divided by effort for each sampling gear.

Summary: A total of 11 species of submersed aquatic vegetation were collected. The most common species were coontail, Eurasian watermilfoil, eelgrass, and leafy pondweed. Aquatic vegetation was collected down to 19.5 ft, and coontail was observed but not collected deeper than 20 ft. The mean rake score for all sampling locations was 2.88 and the maximum species per site was eight. Additionally, five species of emergent vegetation were identified during the survey.

A total of 460 fish were collected representing 17 species for a total weight of 137.2 lbs. The five most abundant species by number were bluegill (63%), largemouth bass (18%), redear sunfish (5%), yellow perch (3%), and gizzard shad (2%). The most abundant by weight were largemouth bass (42%), bluegill (18%), gizzard shad (10%), brown bullhead (7%), and common carp (6%).

Bluegill was the most abundant species collected by number (288 fish) and second by weight (24.9 lbs). Bluegill CPUE for electrofishing was 246.0/h, 78.5/lift in trap nets and 4.0/lift for gill nets. Total length of bluegills ranged from 2.0 to 8.8 in and only 10% were considered harvestable ($TL \geq 6.0$ in). Bluegill proportional stock density (PSD; number of fish ≥ 6.0 in TL / number of fish ≥ 3.0 in TL times 100) for fish collected with electrofishing was 14 (Anderson and Neumann 1996). Bluegill ages ranged from 1 to 6 and 8, while 39% of fish collected were age-3 fish.

There were 83 largemouth bass collected that weighed 58.3 lbs. The majority of bass were collected with electrofishing (CPUE = 160.0/h), while gill nets (CPUE = 1.0/lift) and trap nets (0.5/lift) collected a few fish. Collected bass ranged in TL from 1.3 to 16.2 in and nine fish were above legal length ($TL \geq 14.0$ in). Bass PSD (number of fish ≥ 12.0 in TL/ number of fish ≥ 8.0 in TL times 100) was 17. Bass ages ranged from 2 to 7, but the 1.3 in fish was not aged and is likely an age-0 individual. Bass reached legal length between age 5 and 6.

Twenty four redear sunfish were collected that ranged in length from 6.0 to 8.4 in, 54% of fish were larger than 7.0 in. There were 15 yellow perch collected that ranged from 3.4 to 8.8 in, but the majority (86%) of perch were smaller than 7.0 in. Other sportfish collected in low abundance were black crappie and northern pike.

Similar to previous surveys Flint Lake supports a diverse fish community. Bluegill size structure indexed as PSD is below the objective range for a balanced bluegill population of 20 to

40. Largemouth bass PSD is well below the objective range of 40 to 60. Black crappie and northern pike were more abundant in the 1986 survey, but had dropped in this survey. While adequate opportunities exist for fishermen Flint Lake, the fish community should be monitored throughout status and trends sampling to determine if future management actions need to be taken.

References:

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.

Shipman, S. T., E. Braun, D. Carnahan, L. Koza, B. Schoenung, D. Keller, D. Kittaka, and T. Stefanavage. 2001. Manual of fisheries survey methods. Indiana Department of Natural Resources. Division of Fish and Wildlife. Indianapolis, Indiana.

IDNR. 2007. Tier II aquatic vegetation survey protocol. Indiana Department of natural Resources. Division of Fish and Wildlife. Indianapolis, Indiana.

Submitted by: Tom Bacula, Naturalist Aide
Date: December 6, 2010

Approved by: Jeremy Price, Fisheries Biologist

Approved by: Stuart Shipman, Regional Supervisor
Date: January 3, 2011

APPENDIX I

GLACIAL LAKE SURVEY - STATUS AND TRENDS											
LAKE NAME Flint			COUNTY Porter				CITY Valparaiso				
QUAD Chesterton			SAMPLE ID 1624, 1625, 1999, 1757				DATE(S) OF SURVEY 6/22-6/23/2010 & 8/9/2010				
CLUSTER B			BIOLOGIST(S) AND CREW Jeremy Price, Chip Long, Tom Bacula								
ACCESSIBILITY											
STATE OWNED PUBLIC			PRIVATELY OWNED PUBLIC				OTHER County road				
EFFORT											
ELECTROFISHING STATION 1						TRAP NET 1					
START			END			N 41.51232		W -87.04659			
N	41.51512		N	41.51424		SET TIME		LIFT TIME		TOTAL HRS	
W	-87.04506		W	-87.04889		8:50 pm CT		10:25 am CT		13.3	
ELECTROFISHING STATION 2						TRAP NET 2					
START			END			N 41.51124		W -87.03951			
N	41.51386		N	41.51126		SET TIME		LIFT TIME		TOTAL HRS	
W	-87.04887		W	-87.04366		9:00 pm CT		10:30 am CT		13.5	
COMMENTS						COMMENTS					
GILL NET 1						GILL NET 2					
START			END			START			END		
N	41.51236		N	41.51309		N	41.51543		N	41.51542	
W	-87.03988		W	-87.03989		W	-87.04315		W	-87.04224	
SET TIME		LIFT TIME		TOTAL HRS		SET TIME		LIFT TIME		TOTAL HRS	
8:40 pm CT		10:10 am CT		13.5		8:45 pm CT		10:17 am CT		13.5	
DEPTH RANGE		COMMENTS				DEPTH RANGE		COMMENTS			
10.0 - 15.5 ft						9.0 - 12.0 ft					
PHYSICAL AND CHEMICAL CHARACTERISTICS											
ACRES		MAX DEPTH		MEAN DEPTH		ACRE FEET		WATER LEVEL		SECCHI	
89		70						796 MSL		8.5 ft	
AIR TEMP		WATER COLOR		LAKE BOTTOM							
88		Clear		BOULDER	GRAVEL	SAND	MUCK	CLAY	MARL		
CONDUCTIVITY		ALKALINITY		pH		BAROMETER		WATER CHEMISTRY AND ZOOPLANKTON			
S	582		S	40		30.03 S		N	41.51373		TIME 8:00 pm CT
B	804		B	40		R S F		W	-87.04382		
LAKE TEMPERATURE AND DISSOLVED OXYGEN (DO) PROFILES											
DEPTH	TEMP	DO	DEPTH	TEMP	DO	DEPTH	TEMP	DO	DEPTH	TEMP	DO
0	81.7	10.5	34	43.6	1.4						
2	81.7	9.8	36	43.0	1.4						
4	81.6	10.1	38	42.7	1.4						
6	80.1	10.0	40	42.3	1.4						
8	79.7	9.9	42	42.0	1.4						
10	77.6	8.7	44	41.8	1.4						
12	74.3	6.9	46	41.7	1.4						
14	70.2	4.8	48	41.6	1.4						
16	66.3	3.5	50	41.4	1.4						
18	62.4	2.9									
20	58.8	2.0	YSI Cord is only 50'								
22	55.7	1.4									
24	52.3	1.3									
26	49.4	1.4									
28	47.4	1.4									
30	45.6	1.4									
32	44.5	1.4									

Occurrence and Abundance of Submersed Aquatic Plants - Overall

Lake: Flint	Secchi (ft): 8.5	Mean species/site: 2.48
County: Porter	Sites with plants: 37	SE Mean species/site: 0.27
Date: 8/9/2010	Sites with native plants: 37	Mean native species/site: 2.08
Littoral Depth (ft): 19.5	Number of species: 11	SE Mean natives/site: 0.22
Littoral Sites: 40	Number of native species: 10	Species diversity: 0.80
Total Sites: 40	Maximum species/site: 8	Native species diversity: 0.75

All Depths	Frequency of Occurrence	Rake score frequency per species				Plant Dominance
Species		0	1	3	5	
Coontail	92.50	7.50	47.50	7.50	37.50	51.50
Eurasian Watermilfoil	40.00	60.00	40.00	0.00	0.00	8.00
Eelgrass	32.50	67.50	32.50	0.00	0.00	6.50
Leafy Pondweed	20.00	80.00	20.00	0.00	0.00	4.00
Northern Watermilfoil	17.50	82.50	17.50	0.00	0.00	3.50
Flatsteam Pondweed	12.50	87.50	12.50	0.00	0.00	2.50
Southern Naiad	10.00	90.00	10.00	0.00	0.00	2.00
Variable Pondweed	10.00	90.00	10.00	0.00	0.00	2.00
Chara	5.00	95.00	5.00	0.00	0.00	1.00
Richardsons Pondweed	5.00	95.00	2.50	2.50	0.00	2.00
Elodea	2.50	97.50	2.50	0.00	0.00	0.50

Filamentous Algae 50.00

Other species observed: Arrowhead, cattail, star duckweed, spatterdock, white water lily

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					19.0				
1.5					19.5				
2.0	1	0.3	0.01	0	20.0				
2.5	27	9.4	0.02	1, 2	20.5				
3.0	63	21.9	0.03	1, 2	21.0				
3.5	40	13.9	0.05	2, 3	21.5				
4.0	35	12.2	0.07	2, 3	22.0				
4.5	46	16.0	0.09	3, 4	22.5				
5.0	29	10.1	0.12	3, 4	23.0				
5.5	18	6.3	0.15	3, 4	23.5				
6.0	7	2.4	0.19	4, 5	24.0				
6.5	5	1.7	0.23	4, 5	24.5				
7.0	11	3.8	0.28	5, 6	25.0				
7.5	3	1.0	0.34	5	25.5				
8.0	1	0.3	0.40	6	26.0				
8.5	2	0.7	0.47	8	TOTAL	288			
9.0									
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	246.0 /h	GILL NET CATCH	4.0 /lift	TRAP NET CATCH	78.5 /lift
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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	1	1.2	0.00	Not aged	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	3	3.6	0.25	2	25.5				
8.0	5	6.0	0.30	2	26.0				
8.5	2	2.4	0.36	2, 3	TOTAL	83			
9.0	5	6.0	0.42	3					
9.5	13	15.7	0.49	3					
10.0	15	18.1	0.57	3, 4					
10.5	13	15.7	0.65	3, 4					
11.0	7	8.4	0.74	3, 4					
11.5	4	4.8	0.84	3, 4					
12.0	2	2.4	0.95	4					
12.5	1	1.2	1.07	4					
13.0	3	3.6	1.20	3, 4, 5					
13.5									
14.0	4	4.8	1.49	4, 5, 6					
14.5	4	4.8	1.65	5					
15.0									
15.5									
16.0	1	1.2	2.18	7					
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	160.0 /h	GILL NET CATCH	1.0 /lift	TRAP NET CATCH	0.5 /lift
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AGE-LENGTH KEY FOR BLUEGILL														
LENGTH GROUP (inches)	NUMBER COLLECTED	NUMBER AGED	AGE											
			1	2	3	4	5	6	7	8	9	10	11	12
1.0														
1.5														
2.0	1	0												
2.5	27	5	16	11										
3.0	63	5	25	38										
3.5	40	5		16	24									
4.0	35	6		6	29									
4.5	46	5			37	9								
5.0	29	5			17	12								
5.5	18	5			4	14								
6.0	7	5				1	6							
6.5	5	4				1	4							
7.0	11	5					9	2						
7.5	3	3					5							
8.0	1	1							1					
8.5	2	1									2			
9.0														
9.5														
Total	288	55	41	70	111	38	23	3		2				
Mean TL			3.1	3.4	4.5	5.4	7.0	7.6		8.8				
SE			0.04	0.05	0.05	0.08	0.11	0.31		0				

AGE-LENGTH KEY FOR LARGEMOUTH BASS													
LENGTH GROUP (inches)	NUMBER COLLECTED	NUMBER AGED	AGE										
			1	2	3	4	5	6	7	8	9	10	11
1.0	1												
1.5													
2.0													
2.5													
3.0													
3.5													
4.0													
4.5													
5.0													
5.5													
6.0													
6.5													
7.0													
7.5	3	3		3									
8.0	5	5		5									
8.5	2	2		1	1								
9.0	5	5			5								
9.5	13	5			13								
10.0	15	5			12	3							
10.5	13	5			10	3							
11.0	7	5			6	1							
11.5	4	3			1	3							
12.0	2	2				2							
12.5	1	1				1							
13.0	3	3			1	1	1						
13.5													
14.0	4	4				1	1	2					
14.5	4	4						4					
15.0													
15.5													
16.0	1	1							1				
16.5													
17.0													
17.5													
18.0													
18.5													
Total	83	53		9	49	15	2	6	1				
Mean TL				8.1	10.3	11.6	13.8	14.6	16.3				
SE				0.11	0.11	0.31	0.50	0.11					