Big Lake

Fish and Wildlife Research and Management Note
Author: Jed Pearson, Fisheries Biologist
Date: September 7, 2000
Title: Big Lake - Noble County

BACKGROUND

Big Lake is a 228-acre natural lake located along SR 109 north of Columbia City. Prior to drainage years ago it was twice as large. Public access is available at a state-owned ramp in the southeast corner. The lake lies within the Tippecanoe River watershed and drains 5,690 acres. Hydraulic retention time is 355 days. Most of its east basin is developed but some homes are present on the middle and west basins.

Maximum depth of Big Lake is 70 feet and average depth is 25 feet. Oxygen levels are adequate for fish (less than 3ppm) down to 40 feet in early summer but decline later in the year. Water clarity usually averages 5 feet but may have improved recently (Table 1). Cattails and spatterdock are the major emergent plants. Coontail is the dominant submerged plant and covers much of the lakebed down to 12 feet. The bottom is mainly sand, muck and marl.

Big Lake's fish management history dates back to an initial survey in 1963. Surveys were also done in 1974, 1980 and 1987. Largemouth bass sampling was conducted in 1990 prior to imposition of a 12-inch size limit and in 1996. Electrofishing catch rates of 8-inch and larger bass increased from 121 per hour to 172 per hour. To obtain current information on the status of the lake, another fish population survey was conducted on June 5-8, 2000. Sampling consisted of 60 minutes of DC electrofishing, eight gill net lifts and four trap net lifts. The results and comparisons to previous surveys are presented in this report.

SURVEY RESULTS

During the survey, 1,087 fish weighing 473 pounds were collected. Eighteen species were noted. Bluegills comprised half the catch by number (49%), followed by largemouth bass (33%) and yellow perch (5%). Bass also comprised most of the weight (45%). Spotted gar made up 13 percent and bluegills made up 15 percent. Sport fish accounted for 93 percent of the total number and 69percent of the weight.

Bluegills ranged from 1-10 inches long. Twenty-six were 8-inches or larger. The number captured by electrofishing (97/15-min) was average compared to other lakes in the area. Their growth rate was also average up to age three, then increased. Age four bluegills were 7-inches long compared to 6-inches in most lakes.

Of the 359 largemouth bass caught in the survey, all but 10 were captured by electrofishing at a rate of 87/15-minutes, three times the typical rate at other lakes. Bass measured 3-17 inches long, but only eight met the current 14-inch minimum size limit. Most bass were either 7-8 inches

(age-2) or 9-12 inches (age-3 or age-4). Their growth rate was normal compared to bass in other lakes.

Fifty-one yellow perch were collected. All were captured in gill nets. They were 7-13 inches long, although 60 percent were 10-inch or larger. They ranged in age from 2-7 and grew faster than normal compared to perch in other lakes. They averaged over 8 inches long by age three and over 10 inches by age five.

Other sport fish in the catch were 29 redear up to 11 inches long, 15 warmouth, eight black crappies up to 10 inches, seven pumpkinseeds, yellow and brown bullheads and a 29-inch northern pike. Other fish included 32 spotted gar (12 of which were 38 inches long), 13 brook silversides, nine white suckers and nine bowfin, four lake chubsuckers and spotted suckers, three golden shiners and a 26-inch carp. Brook silversides were abundant but difficult to capture.

SURVEY COMPARISONS

The number of fish collected in surveys at Big Lake from 1963 through 2000 varied from 517 to 2,313 and averaged 1,074 (Table 2). The differences were most likely due to changes in sampling methods and dates and do not reflect any major changes within the fish community. Bluegills, largemouth bass, miscellaneous sunfish and yellow perch typically accounted for most of the catch in each survey.

Differences between 1987 and 2000 more likely reflect real changes within the fish community since sampling was similar. More bluegills were collected in 2000, including larger ones (Table 3). Although fewer 7-inch and larger bluegills were caught in 2000, more 8-inch and larger ones were caught. More smaller bluegills were also caught in 2000. As a result, mean length declined from 5.7 inches in 1987 to 4.3 inches in 2000.

Largemouth bass apparently increased from 1987 to 2000 and could be due to imposition of the 12-inch size limit in 1991 and 14-inch limit in 1998 (Table 4). Mean electrofishing catch rates of 8- to 11-inch bass before limits (66/hr) more than doubled after (152/hr) while the catch rate of 12- to 13-inch bass tripled between 1996 and 2000 (Table 5). Despite an increase in sublegal bass numbers, larger bass remain scarce. Fewer bullheads, chubsuckers, and white suckers were caught in 2000 compared to 1987. One channel catfish was found in 1987 and a northern pike was netted in 2000. Black bullheads and longnose gar were reported in 1963 but not found in subsequent surveys. Log perch were caught only in 1974.

MANAGEMENT IMPLICATIONS

Big Lake continues to support ample numbers of catchable-size bluegills, yellow perch and other sport fish. Despite the apparent scarcity of large bass, bass recruitment and growth are good. Fishing mortality may have reduced the number of small bass in the past prior to minimum size limits. Therefore, numbers of larger bass may increase as the current group of 10- to 14-inch bass reach legal-size. However, more changes in fishing regulations may be necessary in the future to increase the number of 18-inch and larger bass.

No immediate fish management programs are needed at Big Lake, however efforts should continue to protect fish habitat, enhance the natural character of the lake and continue to reduce the input of nutrients and sediments to the lake to protect water quality.

Table 1. Oxygen levels (ppm) and water clarity (secchi depth) at Big Lake from 1963-2000.

Depth (ft)	8/63	7/74	7/80	6/87	6/00
0	7.4	12.0	10.0	9.0	8.6
5	7.5	11.0	10.0	9.0	8.4
10	7.6	9.0	7.0	9.0	8.1
15	6.6	1.2	1.8	1.0	4.8
20	1.7	0.4	1.0	1.0	3.1
25	0.0	0.1	0.8	4.0	3.4
30	-----	0.0	0.0	6.0	3.7
45	-----	-----	-----	-----	1.0
50	-----	0.0	3.0	0.3	
60	-----	-----	-----	0.5	0.2
70	-----	-----	0.0	0.1	0.2
Secchi	6.5	3.0	3.5	6.6	15.3

Table 2. Number of fish collected during fish population surveys at Big Lake from 1963-2000.

Species	1963	1974	1980	1987	2000
Black bullhead	1	0	0	0	0
Black crappie	53	0	7	1	8
Bluegill	806	335	484	196	534
Bowfin	7	0	5	6	9
Brook silverside	0	0	2	0	13
Brown bullhead	0	5	16	24	4
Carp	1	0	3	0	1
Channel catfish	0	0	0	1	0
Grass pickerel	23	9	10	2	0
Green sunfish	27	0	1	0	0
Golden shiner	5	4	5	2	3
Lake chubsucker	83	48	75	9	4
Largemouth bass	175	65	70	135	359
Log perch	0	5	0	0	0
Longnose gar	3	0	0	0	0
Northern pike	0	0	0	0	1
Pumpkinseed	547	0	33	12	7
Redear	171	73	11	20	29
Spotted gar	28	4	7	18	32
Spotted sucker	3	0	0	0	4
Warmouth	119	19	36	9	15
White sucker	5	0	3	13	9
Yellow bullhead	106	2	23	20	4
Yellow perch	150	2	92	49	51
TOTAL	2,313	571	883	517	1,087
Sampling effort					
Electrofishing hrs	8 AC	1 AC	2 AC	1 DC	1 DC
Gill net lifts	24	0	10	6	8
Trap net lifts	0	0	10	8	4
Wire traps	20	0	0	0	0

Table 3. Size of bluegills collected at Big Lake from 1963-2000.

	Number				
Inches	**1963**	**1974**	**1980**	**1987**	**2000**
1-1	0	0	1	1	11
2-2	120	5	16	5	62
3-3	535	64	110	22	148
4-4	64	110	92	19	78
5-5	43	64	96	36	104
6-6	25	81	97	32	64
7-7	15	11	54	65	41
8-8	4	0	20	16	20
9-9	1	0	0	0	5
10-10	1	0	0	0	1

Table 4. Number of largemouth bass collected during surveys at Big Lake from 1963-2000.

Inches	**1963**	**1974**	**1980**	**1987**	**2000**
<8	57	35	33	38	67
8-9	26	21	22	43	69
10-11	62	2	5	44	112
12-13	22	5	3	6	93
14-17	5	2	0	3	8
18	3	0	1	1	0

Table 5. Number of largemouth bass captured per hour of electrofishing at Big Lake from 1990-2000.

Inches	**1987**	**1990***	**1996***	**2000**
8-11	82	50	123	181
12-13	6	30	31	93
14-17	2	38	15	8
18	1	3	3	0

*denotes two nights of selective sampling in May for bass only.

These management and research notes are issued periodically to provide a quick source of information on wildlife surveys and investigations, and various wildlife programs prior to more

formal reports. Any information provided is subject to further analysis and therefore is not for publications without permission.