

Bear Lake

Fish and Wildlife Research and Management Notes

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Title: Bear Lake - Noble county

BACKGROUND

Bear Lake is a 136-acre natural lake located 1 miles southwest of Wolf Lake. It lies within the Elkhart River watershed and drains 4,467 acres. Inlets flow from High Lake and Wolf Lake and the outlet flows to Muncie Lake. Maximum depth is 59 feet and average depth is 22 feet. Hydraulic retention time is 243 days. Much of the watershed lies within the Merry Lea Environmental Center and is abandoned farmland, woodlots and restored wetlands.

Bear Lake was larger originally but its size was reduced by drainage. An 1834 survey shows the lake covered about 1,000 acres and included High and Cub lakes. Natural shoreline areas and wetlands are present today on the south and west sides of the lake. Homes are built on the north and east sides. A beach and state-owned boat ramp are available on the east shore.

Bear Lake is moderately fertile. Enough oxygen is present for fish 10 feet deep but levels sometime drop too low below 15 feet (Table 1). Water clarity varies from 3-7 feet. The bottom is mostly sand and muck. Coontail and curly-leaf pondweed are abundant in some areas of the lake, while cattails, spatterdock and water lilies are the major shoreline plants. Permits are issued annually for weed control around boat docks.

Fish management at Bear Lake has been directed at establishing a northern pike population. Prior to 1979 there were no records of pike in the lake, although they were in Muncie Lake. From 1979-82, a total of 1,528 fingerlings, 6-18 inches long were released. Stocked pike survived well and reproduced by 1986. A survey of anglers in summer 1984 indicated over half favored the stocking program and 6 percent fished for pike but only 10 were caught. Another survey in 1995 found pike had no adverse effects on other fish in the lake.

FISH POPULATION SURVEY RESULTS

As many as 1,543 fish were collected during the latest survey (Table 2). Total weight was estimated to be 551 pounds. Twenty-one species were represented. Bluegills dominated the catch by number (67 percent) and weight (30 percent). Largemouth bass ranked second in number (10 percent) and third in weight (14 percent) behind spotted gar (27 percent). Altogether, sport fish comprised 95 percent of the catch by number and 64 percent by weight.

Bluegills measured 1^o-9 inches long, with 67 measuring 8 inches or larger. Another 200 were 7-7 inches. The total number captured by electrofishing (271/15-min) was high compared to other lakes in the area. Bluegills up to 8 years old were noted and their growth rate was normal. Most bluegills averaged six inches by four years old.

A total of 147 largemouth bass, ranging in length from 1-15 inches, were sampled. The electrofishing catch rate was high (63/15-min) but many bass were less than 10 inches long (61 percent) and only seven were legal-size (14-inches). Bass growth was normal up to four years old, but slowed slightly after that. Four-year-old bass averaged 11 inches.

Thirty-one yellow perch were caught, ranging up to 13 inches long. Perch 10-inch or larger accounted for 39 percent of the sample. All but seven perch were 8-inch or larger. Perch growth was above average with four-year-old fish averaging 10 inches long.

Other sport fish in the catch included 134 redear up to 10 inches long, 51 black crappies up to 11 inches, miscellaneous sunfish, 14 yellow bullheads, six brown bullheads and an 18-inch channel catfish. Four northern pike were caught in gill nets (0.8/lift) and were 28-32 inches long and 5-8 years old. Non-sport fish included 61 spotted gar up to 34 inches long, six bowfin, six golden shiners, three carp, and one spotted sucker, central mudminnow and grass pickerel.

FISH SURVEY COMPARISONS

Because different sampling techniques (gear, effort and season) were used in each survey, it is difficult to compare survey catches. The results generally indicate however Bear Lake's fish community has changed little during the last 23 years, except for the establishment of northern pike.

Bluegills and largemouth bass dominated survey catches in all years. Pumpkinseeds and warmouth were more prevalent in 1967 due to the use of wire traps. Redear were more abundant in 1995 and 2000 and were mostly caught in trap nets. Yellow perch made up a sizeable percentage of the catch in 1978 (22 percent) but accounted for less than 10 percent of the number or weight in other years. Crappies have never been especially numerous, nor have bullheads or other sport fish. The pike population has apparently stabilized at a low level comparable to many other lakes in the area (<1/lift).

The average size of bluegills has varied from 4-6 inches since 1967 but more 8-inch and larger bluegills were caught in the two most recent surveys ([Table 3](#)). The average size of four-year-old bluegills has also increased. More 12-inch and larger bass were also caught in 1995 and 2000 ([Table 4](#)) and may be due to size limits imposed in 1991 and 1998, although larger bass remain scarce.

Spotted gar have been the dominant non-sport fish. Chubsuckers and suckers were more abundant prior to stocking pike. Smaller catches of these species since 1986 might be due to predation by northern pike.

ANGLER SURVEY RESULTS

Anglers at Bear Lake fished a total of 6,476 hours (48/ac) from May 1 to August 19 ([Table 5](#)). Weekend effort accounted for 41 percent and weekday effort accounted for 58 percent of the total. Peak fishing occurred in July (43 percent), followed by June (26 percent), August (19 percent) and May (11 percent). Anglers in boats comprised 92 percent of the effort while shore anglers comprised 8 percent. The average number of anglers present per hour each day in boats was 3.3, compared to 0.3 on shore. Anglers were counted 416 times at hourly intervals on 53 different days during the survey.

No one actively fished for northern pike. Of the 205 responses from 179 boat anglers asked their species preference, bluegill ranked first (58 percent), followed by bass (24 percent), crappie (10 percent), anything (6 percent) or others (two percent). Shore anglers fished for bluegills (60 percent) or anything (40 percent).

Fishermen caught and kept an estimated 8,354 fish during the survey. Of these, 8,185 were taken by boat anglers and 169 by shore anglers ([Table 6](#)). These figures were based on an observed catch of 1,637 fish. Anglers also caught and released 1,270 bass, 95 percent of which were caught and released by boat anglers. No one reported catching any pike.

Boat anglers who fished specifically for bluegills kept them at the rate of 1.2/hour and crappie anglers took crappies at a rate of 1.2/hour. Bass anglers fished 1.3 hours to catch a bass but kept them at the rate of one bass per 10 hours of fishing.

Anglers removed bluegills from 5-10 inches long (Table 7). While 71 percent were 7-inch or larger, 23 percent were 8-inch or larger. Crappies were 7-14 inches long, of which 34 percent were 10-inch or larger. The creel clerks saw one sub-legal bass removed (five percent). The rest were 14-18 inches. Sunfish were 5-10 inches and perch measured up to 11 inches.

Bear Lake anglers were generally satisfied with the quality of fishing. As many as 36 percent of boat anglers and 13 percent of shore anglers rated fishing 'good', while 43 percent of boat anglers and 53 percent of shore anglers rated fishing as fair. The rest rated fishing as 'poor', except 3 percent of boat anglers who had no opinion. Among boat anglers fishing for bluegills, 42 percent rated fishing good, 43 percent rated fishing fair and 10 percent rated fishing as poor. Bass anglers in boats were less satisfied. Only 25 percent rated fishing good, 36 percent rated fishing fair, but 36 percent also rated bass fishing as poor. Crappie anglers said fishing was either good (40 percent) or fair (60 percent).

ANGLER SURVEY COMPARISONS

Boat fishing effort in June 2000 (1,497 hrs) was similar to the estimate in June 1984 (1,493 hrs). July effort however increased 60 percent from 1984 (1,649 hrs) to 2000 (2,645 hrs). Total effort during the 2000 survey was 48 hours/acre, half the typical fishing pressure noted at most other lakes in the area. The percentage of anglers fishing for bluegills dropped from 80 percent in 1984 to 58 percent in 2000 but the percentage fishing for bass increased from 11 percent to 24 percent. Pike drew interest from 5 percent of the anglers in 1984 and none in 2000.

Anglers removed about twice as many fish during June and July 2000 (6,006) than they did in the same months in 1984 (2,899). The bluegill catch increased from 2,249 fish to 3,855, including an increase in the percentage of 7-inch and larger bluegills from 29 percent in 1984 to 71 percent in 2000. Crappie harvest increased from 377 to 916 and sunfish harvest increased from 135 to 1,130. While no size limit was in effect on largemouth bass in 1984 anglers removed 39 bass that were 7-15 inches long. Ten more bass (49) were taken in 2000, despite imposition of a 14-inch size limit.

MANAGEMENT IMPLICATIONS

Based on results of the most recent surveys, Bear Lake continues to provide good fishing for bluegills, crappies and perch. Adequate numbers of largemouth bass are present but large bass are scarce. Non-sport fish are not abundant. Previous northern pike stockings have established a reproducing pike population in the lake and have had no apparent adverse effects on the fish community. However, local anglers have shown little interest in pike fishing. Lack of interest most likely reflects the low density of pike in Bear Lake and the availability of pike fishing at other lakes in the area. As a result, there is no need to initiate any new pike management efforts at Bear Lake. Likewise, there is no need to change fishing regulations at Bear Lake at the present time, although new regulations may be needed in the future to increase the number of larger bass.

Meanwhile residents and property owners in the watershed are encouraged to protect fish habitat and preserve the natural character of the lake. Lakefront property owners should minimize alterations to the shoreline. Efforts to protect the shoreline from erosion should incorporate glacial boulders and bio-engineered materials only. All emergent plants in the lake should also be protected. Herbicide

applications or mechanical control of submergent aquatic plants should continue only for access to piers and small beaches.

Table 1. Oxygen levels (ppm) and water clarity (secchi depth) at Bear Lake from 1967-2000.

Depth (ft)	7/67	6/78	7/81	8/83	6/83	6/95	6/00
0	4.4	8.5	7.0	7.0	9.0	1.0	8.9
5	4.0	9.0	7.0	7.5	9.0	11.0	8.3
10	4.6	8.5	5.0	7.0	5.0	7.0	5.3
15	0.6	5.0	1.0	1.5	4.0	5.0	0.5
20	0.0	3.0	0.0	trace	2.0	3.0	0.3
25	0.0	2.5	0.0	0.0	3.0	0.8	0.2
30	0.0	1.0	0.0	0.0	2.0	0.8	0.2
secchi-ft	3.5	6.5	4.5	7.0	3.5	5.25	5.0

Fish population surveys have been conducted at Bear Lake five times: July 1967, June 1978, 1986, 1995 and June 26-28, 2000. Sampling during the latest survey consisted of hour of DC electrofishing, five gill net lifts and three trap net lifts. Another angler survey was conducted from May 1 to August 19, 2000. The results of the latest sampling and comparisons to previous surveys are presented in this report.

Table 2. Number and weight of fish collected during fish population surveys at Bear Lake from 1967-2000.

Species	1967	1978	1986	1995	2000*
Bass	74	108	97	164	147
Bluegill	659	255	1,757	807	1,037
Bullheads	28	10	8	20	20
Chubsucker	27	33	8	3	4
Crappies	8	19	88	12	51
Gar	15	17	15	38	61
Perch	14	152	45	92	31
Pike	0	0	8	4	4
Pumpkinseed	225	14	17	16	10
Redear	25	0	23	85	134
Suckers	8	17	3	3	1
Warmouth	108	39	9	38	22
Miscellaneous	20	27	26	22	21
Total	1,211	691	2,104	1,304	1,543
Pounds					
Bass	27.7	58.0	62.1	77.8	
Bluegill	44.6	235.7	97.1	165.7	
Bullheads	9.1	5.8	16.7	17.3	

Chubsucker	8.9	1.7	0.5	1.2
Crappies	6.8	22.5	3.5	14.9
Gar	36.5	28.0	13.3	150.0
Perch	59.5	6.7	23.3	14.7
Pike	0.0	43.6	16.0	24.0
Pumpkinseed	1.6	1.5	2.0	1.4
Redear	0.0	8.5	26.8	30.3
Suckers	29.5	4.1	7.2	1.6
Warmouth	5.4	0.8	6.6	3.2
Miscellaneous	38.8	32.9	24.7	49.1
Total	268.4	449.8	359.6	551.2

*weights estimated from length-weight regression models.

Table 3. Size and number of bluegills collected at Bear Lake from 1967-2000.

Inches	1967	1978	1986	1995	2000
1-1	6	9	4	9	
2-2	30	2	14	93	30
3-3	195	19	116	243	128
4-4	199	16	171	117	120
5-5	149	69	741	78	230
6-6	66	46	433	99	253
7-7	20	74	259	134	200
8-8	0	22	14	32	62
9-9	0	1	0	7	5
Mean Length (inches)	4.4	5.9	5.5	4.7	5.6
Four-year-olds (inches)	6.0	6.4	6.2	6.6	6.6

Table 4. Size and number of largemouth bass collected at Bear Lake from 1967-2000.

Inches	1967	1978	1986	1995	2000
<8	35	68	18	69	24
8-11	34	34	59	7	81
12-13	4	2	9	19	35
14-17	0	4	9	3	7
18	1	0	2	0	0

Table 5. Estimated angler effort (hours) at Bear Lake from May 1 through August 19, 2000.

Month	Boat	Shore	Boat	Shore
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May	394	71	245	45
June	552	97	945	85
July	1,151	77	1,494	73
August	316	15	891	25
Total	2,413	260	3,574	228

Table 6. Number of fish caught and kept by anglers at Bear Lake from May 1 through August 19, 2000.

Species	Boat Anglers	Shore Anglers
Bluegill	5,389	128
Sunfish	1,309	41
Crappies	1,216	0
Bass	143	0
Perch	128	0
Total	8,185	169

Table 7. Size and number of fish taken by anglers at Bear Lake from May 1 through August 19, 2000.

Inches	Bluegill	Crappie	Bass	Sunfish	Perch
5-5	41	0	0	10	0
6-6	1,577	0	0	358	5
7-7	2,649	175	0	626	52
8-8	1,093	443	0	257	32
9-9	150	182	0	33	27
10-10	7	202	0	21	5
11-11	117	0	5		
12-13	85	7			
14-17	12	122			
18	14				
Expanded	5,517	1,216	143	1,309	128
Observed	808	187	19	234	24

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