

Waubee Lake
Kosciusko County
Fish Management Report– 2006

Jed Pearson, fisheries biologist

Fisheries Section
Indiana Department of Natural Resources
Division of Fish and Wildlife
I.G.C.-South, Room W273
402 W. Washington Street
Indianapolis, IN 46204

2006

EXECUTIVE SUMMARY

1. Waubee Lake is a 187-acre natural lake located 1 mile southeast of Milford.
2. Farming is the major watershed use. A public boat ramp and dock are available at a city-owned area in the northwest corner of the lake. A small user-fee is charged.
3. Waubee Lake is an unproductive marl lake. Enough oxygen is present in summer for fish down to 15-20 feet. Coontail and chara are the dominant submersed aquatic plants. Eurasian water milfoil is dense in some areas each year and is chemically treated. Floating-leaf emergents are present in 10 beds covering about 4½ acres.
4. To assess survival of walleyes and smallmouth bass stocked in the lake and obtain information on the status of the fish community, a survey was conducted in 2006 at the request of the local lake association. Sampling effort included 45 minutes of DC electrofishing, six gill net lifts, and four trap net lifts.
5. During the survey, 1,006 fish were collected. Total weight was 228 pounds. Twenty-six species were present. Bluegills dominated the catch by number and were second in weight. Largemouth bass ranked second by number and first by weight. The 629 bluegills and 128 largemouth bass caught during the survey were generally small. Three northern pike, three walleyes and a smallmouth bass were captured.
6. Despite the presence of several sport fish species, Waubee Lake supports a mediocre fish community. Low productivity apparently limits the numbers and pounds of fish that it can produce. Attempts to improve fishing by stocking have been costly and not very successful. It is recommended that no additional fish be stocked in the lake.
7. Meanwhile local residents are encouraged to continue efforts to protect and enhance the natural character of the lake. If water quality improves further, greater opportunity may exist to restore the native population of ciscoes.

CONTENTS

	Page
LIST OF TABLES AND FIGURES	4
INTRODUCTION	5
METHODS	6
RESULTS	6
DISCUSSION AND RECOMMENDATIONS	7
REFERENCE	8
APPENDICES	12

TABLES

Table	Page
1. <i>Oxygen levels (ppm) and water clarity (secchi depth) at Waubee Lake from 1972 through 2006.</i>	9
2. <i>Number and weight of fish collected during fish population surveys at Waubee Lake from 1976 through 2006.</i>	10
3. <i>Bluegill size at Waubee Lake from 1976 through 2006.</i>	11
4. <i>Largemouth bass size at Waubee Lake from 1976 through 2006.</i>	12

INTRODUCTION

Waubee Lake is a 187-acre natural lake located 1 mile southeast of Milford. It lies within the Turkey Creek-Elkhart River watershed and drains 9,344 acres. Inlets from Dewart Lake (Hammond Ditch) and runoff (Felkner Ditch) enter the east end of the lake. Maximum depth is 51 feet and average depth is 25 feet. Lake volume is 4,752 acre-feet and hydraulic retention time is estimated to be 182-263 days. Portions of the lakebed were enlarged by marl dredging in the early 1900s. In 2005, funds from the Lake and River Enhancement Program (LARE) were used to dredge organic sediment from the lakebed at the mouth of Felkner Ditch. Farming, including a large poultry operation, is the major watershed use. Small woodlots and wetlands are present. Most of the shoreline is residential. Areas of natural shoreline and wetlands occur mainly on the east side and a small area along the south shore. A public parking lot, boat ramp and dock are available at a city-owned area in the northwest corner of the lake. A small user-fee is charged.

Waubee Lake is an unproductive marl lake, although conflicting data was reported in the 1970s. A Indiana trophic index as high as 60 was calculated in 1975, while indices in 1982 to 1991 varied from 13-20 on three occasions and were attributed to better watershed management. Enough oxygen is now usually present in summer for fish down to 15-20 feet (Table 1) where temperatures are in the low 70°s. The water color is blue-green. Clarity varies from 4-9 feet and has averaged 8 feet since 1988. On August 2, 2005 at the time of dredging at the mouth of Felkner Ditch, water clarity was unaffected in the main area of the lake (10-11 ft) but declined in the south bay (<8 ft) and was significantly reduced near the mouth (<3 ft).

Coontail and chara are the dominant submersed aquatic plants (see appendices). Eurasian water milfoil is dense in some areas and is chemically treated. State LARE funds were used to assist in the control of milfoil in 2005 and 2006. Plants, however, are generally sparse due to the sharp contour and bottom material. Many areas are devoid of vegetation. An account from the 1940s also indicated shallow areas were barren except where peat was re-deposited on the lakebed after dredging (Wohlschlag 1950). Based on sampling conducted on August 8, 2006 by the Division of Fish and Wildlife (DFW), floating-leaf emergents (water lilies and spatterdock) are present in 10 beds covering about 4½ acres. Some remnant patches of lilies are scattered around the shore.

The DFW has information dating back to the 1970s on fish abundance and size at Waubee Lake. Standard fish population surveys were conducted in 1976, 1981, 1988 and 1995. Angler creel surveys were done in 1976 and 1982. Ciscoes were present but disappeared by the early 1970s due to declines in water quality. Northern pike were present but more were stocked by the DFW from 1976 to 1988 at the request of local residents. About 4,500 walleyes (3-4 in) were stocked by lake residents in the mid-1980s and 20,600 walleye fingerlings (2-in) were stocked by the DFW in 1996. Pike abundance increased but walleye survival was poor. Another 1,200 walleyes (6-8 in) were stocked by lake residents in 2000 and 1,000 smallmouth bass (5-7 in) were added in 2004. To assess the long-term survival of walleyes and smallmouth bass stocked in the lake, and to obtain current information on the status of the fish community, another survey was conducted on July 24-26, 2006 at the request of the local lake association. The results are presented in this report.

METHODS

Sampling effort during the latest fish population survey included 45 minutes of pulsed DC electrofishing (504V) with two dip-netters, six gill net lifts, and four trap net lifts. Surface water temperature was 79°. All captured fish were measured to the nearest tenth-inch (TL total length) and released when possible. Weights were estimated from standard length-weight formulas generated from data on file from natural lakes fish population surveys in the area. Fish scales were taken from dominant sport fish for age and growth analyses using standard body-length:scale-length relationships.

RESULTS

During the survey, 1,006 fish were collected (Table 2). Total weight was 228 pounds. Twenty-six species, including hybrid sunfish, were present. Bluegills dominated the catch by number (63%) and were second in weight (16%). Largemouth bass ranked second by number (13%) and first by weight (29%). None of the other species accounted for 10% or more of the catch by number or weight. Only three northern pike, three walleyes, and one small bass were captured. Altogether, sport fish made up 96% of the total number of fish and 83% of the total weight.

The 629 bluegills and 128 largemouth bass caught during the survey were generally small. Bluegills were 2.2-7.8 inches long, although 91% were less than 6 inches and only 11 (2%) were 7-inch or larger (Table 3). Most bluegills were either age-1 (31%) and were 2.0-3.0 inches long or age-2 (38%) and were 3.0-4.5 inches. The electrofishing catch of bluegills (140/15-min) was above average compared to other lakes in the area (100/15-min). Bluegills growth was slow, averaging less than 4.0 inches by age-3 and only 5.0 inches by age-4. Normally age-4 bluegills should be 6.0 inches long. Largemouth bass ranged from 1.8-20.3 inches long, but all but eight were less than 14 inches (legal-size). Half were 8.0-11.5 inches. Some bass reached legal-size after age-5 but only 14 were age-5 or older. The electrofishing catch rate (39/15-min) was similar to other lakes. Bass growth was also standard, with age-4 fish averaging 11.0 inches. Age-4 bass in most lakes are typically 10.5-12.7 inches.

The three northern pike were caught in gill nets (0.5/lift) and were 20.0-28.2 inches. The three walleyes measured 21.5-26.3 inches and were also captured in gill nets. The lone smallmouth bass was 14.0 inches and was captured during electrofishing. Other sport fish included 62 redear up to 10.8 inches long, 33 rock bass, 31 yellow bullheads up to 13.9 inches, 22 yellow perch, 19 longear, 16 warmouth, nine green sunfish, six brown bullheads, and four channel catfish. The channel catfish were 16.0-20.3 inches. Only two black crappies were collected. Non-sport fish included brook silversides, carp, spotted and longnose gar, white and spotted suckers, bowfin, redfin pickerel, logperch, and bluntnose minnow.

DISCUSSION AND RECOMMENDATIONS

Despite the presence of several sport fish species, Waubee Lake supports a mediocre fish community. As has been stated in previous reports, low productivity apparently limits the numbers and pounds of fish that it can produce. As a result, large sport fish, especially bluegills, are scarce due to slow growth. Although frustrating to anglers and lake residents, few options are available to improve fishing at the present time. Attempts to improve fishing by stocking various species not already present or not adequately reproducing in the lake, such as northern pike, walleyes and smallmouth bass, have been costly and not very successful, even though some stocked fish have survived

and a few have reportedly been caught. Likewise, stocking species that are adequately reproducing in Waubee Lake, such as bluegills and largemouth bass, is not needed and could only increase competition for limited food sources and suppress growth further. Based on this, it is recommended that no additional fish be stocked in the lake, although permits to stock walleyes, channel catfish, or smallmouth bass may be granted.

In lieu of stocking fish, local residents are encouraged to continue efforts to protect and enhance the natural character of the lake. The prohibition of high-speed boating should continue to minimize damage to water quality and the remaining sections of natural shoreline that might result from increased wave action and bottom disturbance. Lakefront property owners should minimize alterations to the shoreline and restore a more natural appearance by maintaining various plants along the edge and installing natural boulders in front of existing bulkhead seawalls to reduce wave energy. Efforts to control nuisance invasive plants species, such as Eurasian water milfoil and curly-leaf pondweed, should continue but beds of native species, including submersed and emergent plants, should be protected. A project to expand the coverage of water lilies and spatterdock could also be implemented to provide more diverse fish habitat. The presence of several scattered patches of lilies in some locations indicates that they may be remnants of once larger lily beds. On-going efforts to reduce the input of nutrients and sediments into the lake should also continue. If water quality improves further, greater opportunity may exist to restore the native population of ciscoes.

Submitted by: Jed Pearson, fisheries biologist
January 9, 2007

Approved by: _____
Stu Shipman, regional supervisor
January 16, 2007

REFERENCE

Wohlschlag, D. E. 1950. Vegetation and invertebrate life in a marl lake. *Investigations of Indiana Lakes and Streams* 3(9): 321-372.

Table 1. *Oxygen levels (ppm) and water clarity (secchi depth) at Waubee Lake from 1972 through 2006.*

Depth (ft)	7/72	9/72	7/76	8/81	8/88	7/95	7/06
0	9.9	9.6	11.0	9.5	9.0	10.0	7.3
5	9.0	10.1	11.8	8.0	9.0	10.0	7.1
10	6.7	8.2	11.8	7.0	9.0	10.0	7.0
15	0.4	2.4	5.0	4.0	9.0	12.0	6.3
20	0.2	0.8	1.2	2.0	4.0	8.0	2.3
25	0.0	0.0	0.0	0.2	2.0	1.2	1.0
30	0.0	0.0	0.0	0.0	1.2	0.8	0.6
35	0.0	0.0	0.0	0.0	0.0	0.4	0.2
40	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Secchi (ft)	6.0	4.0	4.0	4.0	9.0	7.0	8.0

Table 2. *Number and weight of fish collected during fish population surveys at Waubesa Lake from 1976 through 2006.*

Species	Number					Pounds				
	7/76	8/81	8/88	7/95	7/06	7/76	8/81	8/88	7/95	7/06
Black crappie	67	74	68	87	2	13.8	10.1	17.0	13.2	1.1
Bluegill	602	165	175	350	629	22.0	7.3	17.9	14.4	37.4
Bluntnose minnow	0	0	0	25	1	0.0	0.0	0.0	0.1	<0.1
Bowfin	7	5	1	4	1	19.6	18.2	4.1	14.0	5.7
Brook silverside	na	na	41	40	17	na	na	0.1	0.2	<0.1
Brown bullhead	4	5	5	4	6	3.8	4.7	2.9	4.0	6.0
Carp	11	6	1	1	4	54.9	40.6	15.0	3.0	7.7
Channel catfish	0	0	0	0	4	0.0	0.0	0.0	0.0	9.3
Central mudminnow	0	1	0	0	0	0	<0.1	0.0	0.0	0.0
Golden redhorse	0	1	0	0	0	0	1.4	0.0	0.0	0.0
Golden shiner	29	9	2	0	0	3.0	1.2	0.3	0.0	0.0
Green sunfish	3	1	0	0	9	0.1	0.1	0.0	0.0	0.2
Hybrid sunfish	0	0	1	1	1	0.0	0.0	0.1	0.1	0.2
Lake chubsucker	56	10	2	2	0	9.3	1.1	0.5	0.4	0.0
Largemouth bass	174	41	112	109	128	46.5	11.7	34.2	53.2	66.7
Logperch	0	0	5	3	1	0.0	0.0	0.1	<0.1	<0.1
Longear	2	1	1	2	19	0.1	0.1	<0.1	0.1	0.5
Longnose gar	2	11	4	7	3	6.1	48.7	14.9	19.6	10.3
Pumpkinseed	158	52	17	0	0	6.8	2.6	1.1	0.0	0.0
Northern pike	9	21	24	8	3	44.4	37.1	70.0	28.8	10.3
Redear	18	0	18	25	62	1.4	0.0	3.7	6.3	14.8
Redfin pickerel	8	1	0	1	1	1.3	<0.1	0.0	0.4	<0.1
Rock bass	2	0	2	6	33	0.5	0.0	0.3	0.9	3.9
Shorthead redhorse	0	0	1	0	0	0.0	0.0	<0.1	0.0	0.0
Smallmouth bass	0	0	0	0	1	0.0	0.0	0.0	0.0	1.4
Spotted gar	2	0	2	7	4	5.0	0.0	2.4	14.1	4.1
Spotted sucker	4	2	10	8	2	1.2	2.0	18.9	15.5	5.3
Walleye	0	0	9	8	3	0.0	0.0	18.2	23.4	12.9
Warmouth	10	6	9	4	16	1.5	0.5	0.8	0.6	3.5
White crappie	0	2	0	0	0	0.0	0.5	0.0	0.0	0.0
White sucker	153	67	29	19	3	170.8	75.9	42.8	20.3	5.8
Yellow bullhead	2	3	20	13	31	0.7	2.6	13.6	10.1	19.8
Yellow perch	98	31	34	59	22	6.7	2.8	1.5	3.8	1.2
Total	1,421	515	593	793	1,006	419.3	269.3	280.4	246.6	228.0
Number of species	23	23	24	24	25					
Species diversity	0.77	0.84	0.85	0.76	0.58					
Sampling effort										
Electro-min	150*	120**	45	45	45					
Gill net lifts	12	4	8	6	6					
Trap net lifts	0	3	8	8	4					

* includes 60 minutes at night and 90 minutes during day – all AC electrofishing gear

** includes 60 minutes at night and 60 minutes during day – all AC electrofishing gear

Table 3. *Bluegill size at Waubee Lake from 1976 through 2006.*

<u>Inches</u>	<u>1976</u>	<u>1981</u>	<u>1988</u>	<u>1995</u>	<u>2006</u>
1-1½	1	1	0	1	0
2-2½	143	94	5	51	120
3-3½	163	35	34	113	183
4-4½	236	16	40	133	152
5-5½	30	13	36	38	115
6-6½	15	8	33	7	48
7-7½	12	5	23	7	10
8-8½	2	1	4	0	1
Total	602	173	175	350	629
RSD-7	3.1%	7.7%	15.9%	2.3%	2.2%

Table 4. *Largemouth bass size at Waubee Lake from 1976 through 2006.*

<u>Inches</u>	<u>1976</u>	<u>1981</u>	<u>1988</u>	<u>1995</u>	<u>2006</u>
< 4	4	12	2	16	4
4-7½	129	14	64	19	31
8-11½	29	11	39	54	64
12-13½	6	3	5	13	21
14-17½	4	0	2	8	7
≥ 18	2	1	0	0	1
Total	174	41	112	109	128
RSD-14	14.6%	6.7%	4.3%	10.7%	8.6%

FISH SURVEY REPORT

Indiana Division of Fish and Wildlife

Type of survey
Initial: Re-survey: <input checked="" type="checkbox"/>

Lake name	County	Date of survey (Month, day, year)
Waubee Lake	Kosciusko	7/24-7/26/06
Biologist's name	Date of approval (Month, day, year)	
Jed Pearson		

LOCATION		
Quadrangle name	Range	Section
Milford	6E	16,21,22
Township	Nearest town	
34N	Milford	

ACCESSIBILITY

State owned public access site	Privately owned public access site	Other access site			
Surface acres	Maximum depth (ft)	Average depth (ft)	Acre feet	Water level (msl)	Extreme fluctuations (ft)
187	51	25.4	4,752	829.8	0.5-1.8

INLETS		
Name	Location	Origin
Hammond Ditch	northeast corner	Dewart Lake
Felkner Ditch	southeast corner	runoff

OUTLET	
Name	Location
Felkner Ditch	northwest corner to Turkey Creek

Water level control			
Low-level concrete dam			
POOL	ELEVATION (Feet MSL)	ACRES	Bottom type
TOP OF DAM			Boulder _____
TOP OF FLOOD CONTROL POOL			Gravel _____
TOP OF CONSERVATION POOL			Sand <input checked="" type="checkbox"/>
TOP OF MINIMUM POOL			Muck <input checked="" type="checkbox"/>
STREAMBED			Clay _____
			Marl <input checked="" type="checkbox"/>

Watershed use
General agriculture, including a large poultry operation, wetlands and woodlots
Development of shoreline
All but the east shore and a small section of the southwest side is residentially developed.
A city-owned park, beach and access site are in the northwest corner.
Previous surveys and investigations
Mapping USGS 1958; Cisco check DNR 1972; Fish surveys DNR 1976,81,88,95; Angler survey,DNR 1976,82;
Plant/invertebrate study, IU 1950; Water quality, ISBH 1976; Watershed studies, BSU 1982, LARE 2002;
Pike surveys, DNR, 1979,80; Walleye checks, DNR, 1996,98; Aquatic plant plan, LARE 2005,06

SAMPLING EFFORT			
ELECTROFISHING	Day hours	Night hours	Total hours
		0.75	0.75
TRAPS	Number of traps	Days	Total lifts
	2	2	4
GILL NETS	Number of nets	Days	Total lifts
	3	2	6

PHYSICAL AND CHEMICAL CHARACTERISTICS	
Color	Turbidity
Blue-green	8 Feet 0 Inches (Secchi disk)

TEMPERATURE, DISSOLVED OXYGEN (ppm), TOTAL ALKALINITY (ppm), pH							
Depth (ft)	Degrees F	Oxygen*		Depth (ft)	Degrees F	Oxygen*	
Surface	79.3	7.3		50			
2	79.3	7.3		52			
4	79.3	7.2		54			
5	79.3	7.1		55			
6	79.3	7.0		56			
8	79.3	7.0		58			
10	79.3	7.0		60			
12	79.3	6.9		62			
14	78.3	6.4		64			
15	77.5	6.3		65			
16	75.7	6.3		66			
18	71.4	4.5		68			
20	66.2	2.3		70			
22	63.1	1.9		72			
24	60.8	1.3		74			
25	59.9	1.0		75			
26	59.2	0.8		76			
28	57.9	0.6		78			
30	56.3	0.6		80			
32	54.5	0.5		82			
34	52.7	0.2		84			
35	52.0	0.2		Sampling date: 7/24/06			
36	51.6	0.2			Surface	Bottom	
38	50.4	0.2		pH	9.0	8.0	
40	49.5	0.2		Alkalinity*	120	188	
42	49.1	0.2		Conductivity			
44	48.9	0.2		TDS			
45	48.9	0.2					
46	48.6	0.2					
48	48.2	0.2					

*ppm = parts per million

Occurrence and abundance of submersed aquatic plants in Waubee Lake*

County: Kosciusko	Sites with plants:	35	Mean species/site:	1.92
Date: 7/27/06	Sites with native plants:		Standard error (ms/s):	
Secchi (ft): 9.0	Vegetated sites (%)	70.0	Mean native species/site:	1.82
Maximum plant depth (ft):	Number of species:	10	Standard error (mns/s):	
Trophic status: Oligo	Number of native species:	9	Species diversity:	0.87
Total sites: 50	Maximum species/site:	7	Native species diversity:	0.86

Depth (0 to 25 ft) Common Name	Occurrence Frequency (%)	Rake score observations (N,%) per species				Plant Dominance
		0 %	1 %	3 %	5 %	
Coontail	42.0					22.8
Chara	30.0					19.6
Brittle naiad	18.0					10.8
Flat-stemmed pondweed	22.0					6.0
Illinois pondweed	22.0					6.0
Common naiad	18.0					5.2
Water stargrass	12.0					4.8
Eel grass	10.0					4.4
Eurasian water milfoil	10.0					3.6
Sago pondweed	8.0					3.2

* Data reported by Aquatic Weed Control for the Lake and River Enhancement Program

Emergent Plant Beds in Waubee Lake

Date 8/8/06

Bed	Sites	Mean			Species Frequency of Occurrence							Species		Calculated values	
		Latitude	Longitude	Wid (ft)	SPA	WAL	SWL	CAT	PRL	BUL	ARH	N	N/site	Acres	Length
1	2	41.39598	-85.83694	28.5		100.0						1	1.00	0.03	51
2	3	41.39315	-85.83754	29.0		100.0				33.3		2	1.33	0.06	84
3	4	41.38844	-85.83419	39.0		100.0						1	1.00	0.10	105
4	3	41.38580	-85.83154	25.0		100.0						1	1.00	0.02	30
5	3	41.38556	-85.83130	17.0		100.0						1	1.00	0.02	31
6	7	41.38465	-85.82880	18.9	71.4	85.7		57.1		14.3	28.6	5	2.71	0.07	150
7	9	41.38407	-85.82830	17.3	22.2	100.0		44.4				3	1.67	0.15	340
8	4	41.38453	-85.82687	42.8		100.0	50.0	75.0	75.0			4	3.00	0.13	141
9	6	41.38608	-85.82783	112.0	100.0	66.7					66.7	3	2.33	3.78	1790
10	3	41.39468	-85.83567	19.0		100.0				100.0		2	2.00	0.05	112
Sum	44		Mean	34.8	64.6	95.2	50.0	58.9	54.2	57.1	47.6	2.3	1.7		
			Count	10	3	10	1	3	2	2	2	2	Sum	4.41	2833

Isolated patches

Sum	33		Mean	0.0	100.0				3.0	3.0	3.0	4	1.09		
------------	-----------	--	-------------	------------	--------------	--	--	--	------------	------------	------------	----------	-------------	--	--

Species present

- ARH Arrowhead
- BUL Bulrush
- CAT Cattail
- PRL Purple loosestrife
- SPA Spatterdock
- SWL Swamp loosestrife
- WAL Water lily

- Lake surface acreage: 187
- Percent surface coverage: 2.4
- Contour acreage within 10-ft depth: 2.4
- Percent 10-ft contour area coverage: 2.74
- Lake shoreline perimeter in miles: 0.54
- Estimated emergent bed miles: 19.6
- Bed edge:shoreline ratio (%): 19.6

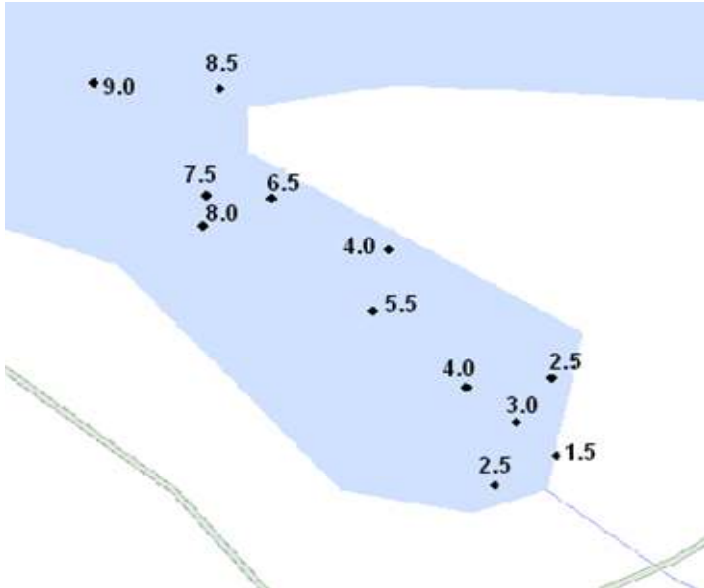
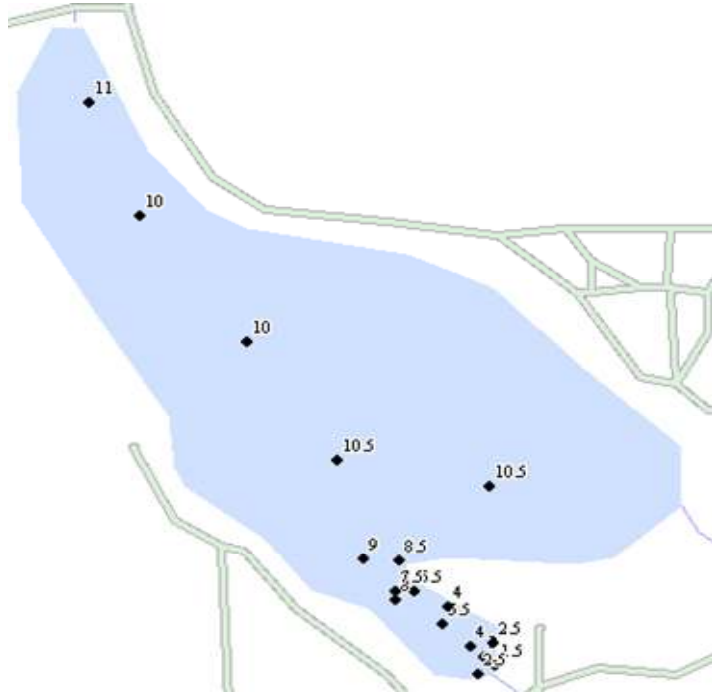


The map at the right depicts the lakeward locations of emergent plant beds (small black dots), the geographic lakeward centers of each bed (large dots), and patches (stars) of emergent plants in Waubee Lake.

Data summary prepared by Jed Pearson - 1/8/07
Indiana Division of Fish and Wildlife

Water clarity (secchi depth) during lakebed dredging near Felkner Ditch, August 2, 2005.

Latitude	Longitude	Secchi (ft)
41.39463	-85.83634	11.0
41.39249	-85.83515	10.0
41.39011	-85.83271	10.0
41.38787	-85.83060	10.5
41.38597	-85.82917	8.5
41.38537	-85.82883	6.5
41.38476	-85.82817	5.5
41.38435	-85.82755	4.0
41.38416	-85.82723	3.0
41.38398	-85.82697	1.5
41.38382	-85.82737	2.5
41.38440	-85.82700	2.5
41.38510	-85.82806	4.0
41.38523	-85.82928	8.0
41.38539	-85.82926	7.5
41.38600	-85.82999	9.0
41.38737	-85.82710	10.5



Relative Abundance, Size and Estimated Weight of Fish Collected at Waubee Lake						
			Minimum	Maximum		
Common Name*	Number	Percent	Length (in)	Length (in)	Weight (lb)**	Percent
Bluegill	629	62.5	2.2	7.8	37.35	16.4
Largemouth bass	128	12.7	1.8	20.3	66.74	29.3
Redear	62	6.2	2.9	10.8	14.76	6.5
Rock bass	33	3.3	2.3	8.4	3.94	1.7
Yellow bullhead	31	3.1	1.9	13.9	19.75	8.7
Yellow perch	22	2.2	3.9	5.6	1.17	0.5
Longear	19	1.9	2.2	4.5	0.54	0.2
Brook silverside	17	1.7	3.0	3.5	0.03	0.0
Warmouth	16	1.6	2.6	7.7	3.46	1.5
Green sunfish	9	0.9	2.2	4.7	0.16	0.1
Brown bullhead	6	0.6	11.0	13.6	6.01	2.6
Channel catfish	4	0.4	16.0	20.3	9.28	4.1
Carp	4	0.4	12.9	16.8	7.71	3.4
Spotted gar	4	0.4	14.8	22.4	4.05	1.8
Walleye	3	0.3	21.5	26.3	12.87	5.6
Longnose gar	3	0.3	29.7	39.5	10.33	4.5
Northern pike	3	0.3	20.0	28.2	10.25	4.5
White sucker	3	0.3	13.0	18.9	5.84	2.6
Spotted sucker	2	0.2	18.2	18.6	5.32	2.3
Black crappie	2	0.2	5.6	12.3	1.09	0.5
Bowfin	1	0.1	25.2		5.69	2.5
Smallmouth bass	1	0.1	14.0		1.37	0.6
Hybrid sunfish	1	0.1	6.5		0.20	0.1
Redfin pickerel	1	0.1	5.0		0.03	0.0
Logperch	1	0.1	4.3		0.02	0.0
Bluntnose minnow	1	0.1	2.6		0.01	0.0
TOTAL	1006				227.97	
*Common names of fishes recognized by the American Fisheries Society.						
**Weights estimated from standard length-weight regression models.						

Number, catch by gear, percentage, estimated weight and age of bluegills																			
Length (in)	Catch by gear			Total Number	%	Estimated Weight (lb)	Age analysis (scales/half-inch)						Age Composition (number/age)						
	EF	GN	TN				1	2	3	4	5	6+	1	2	3	4	5	6+	
2.0	3		2	5	0.8	0.01	1							5					
2.5	36		79	115	18.3	0.01	5							115					
3.0	49		40	89	14.1	0.02	4	1						71	18				
3.5	56		38	94	14.9	0.03		5							94				
4.0	85	1	20	106	16.9	0.05		5							106				
4.5	40		6	46	7.3	0.07		2	3						18	28			
5.0	46	2	3	51	8.1	0.09			4	1						41	10		
5.5	61		3	64	10.2	0.12			2	3						26	38		
6.0	33	5	1	39	6.2	0.16				2	3						16	23	
6.5	8	1		9	1.4	0.20				3	1						7	2	
7.0	4	2	3	9	1.4	0.26				1	1	2					2	2	5
7.5		1		1	0.2	0.32						1							1
8.0		1		1	0.2	0.39							1						1
8.5																			
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																			
19.0																			
19.5																			
20.0																			
Totals:	421	13	195	629		37.35	10	13	9	10	6	3	191	236	94	73	29	6	
													Mean length (in):	2.7	3.8	5.0	5.7	6.2	7.2
													Variance:	0.07	0.14	0.14	0.22	0.15	0.18

(*) represents the number of scale samples examined.

Bluegill							
Intercept: 0.8 inch							
BACK-CALCULATED LENGTHS (inches) AT EACH AGE							
Year	Count	I	II	III	IV	V	VI
2005	10	2.0					
	stdev	0.26					
2004	13	1.8	2.9				
	stdev	0.30	0.24				
2003	9	1.7	2.7	3.8			
	stdev	0.23	0.25	0.33			
2002	10	1.7	2.7	3.8	5.1		
	stdev	0.26	0.36	0.61	0.62		
2001	6	1.7	2.8	3.8	5.2	5.9	
	stdev	0.07	0.17	0.29	0.47	0.49	
2000	3	1.5	2.4	3.4	4.9	6.1	6.8
	stdev	0.22	0.05	0.04	0.51	0.38	0.58
	Mean*	1.7	2.7	3.7	5.0	6.0	6.8
	St dev	0.17	0.19	0.19	0.14	0.12	
	Count	51	41	28	19	9	3
<i>*Does not include age groups with less than three samples</i>							
Bluegill growth (solid line) compared to other Indiana natural lakes (dotted line).							
Largemouth bass							
Intercept: 0.8 inch							
BACK-CALCULATED LENGTHS (inches) AT EACH AGE							
Year	Count	I	II	III	IV	V	VI
2005	16	3.9					
	stdev	0.65					
2004	20	2.7	6.0				
	stdev	0.55	0.74				
2003	13	2.8	5.2	8.3			
	stdev	0.49	0.71	0.55			
2002	19	2.9	6.0	9.0	10.6		
	stdev	0.46	1.07	1.02	0.93		
2001	9	3.3	6.3	9.5	11.4	12.9	
	stdev	0.87	0.71	0.85	1.07	1.02	
2000	2	3.0	5.7	8.7	10.8	12.5	13.6
	stdev	0.41	0.66	1.20	1.09	1.66	1.86
	Mean*	3.1	5.9	8.9	11.0	12.9	
	St dev	0.50	0.48	0.57	0.56		
	Count	77	61	41	28	9	
<i>*Does not include age groups with less than three samples</i>							
Largemouth bass growth (solid line) compared to other lakes (dotted line).							