

Little Chapman Lake
Kosciusko County
Fish Management Report - 2005

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Division of Fish and Wildlife
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2005

EXECUTIVE SUMMARY

Local residents have become increasingly involved in lake management issues at Big and Little Chapman Lakes. In 2004 they hired a consultant to conduct an aquatic plant survey and develop a plant management plan. Based on results of the survey, plans were to treat the entire lake with fluridone in 2005 to control Eurasian water milfoil. The treatment, however, was postponed to allow for additional plant sampling and to obtain data on the status of the fish community at both lakes. At Little Chapman Lake, the Division of Fish and Wildlife sampled submersed aquatic plants on May 16 and August 3, mapped emergent plant beds on August 8, and conducted a standard fish population survey on July 11-13, 2005.

Submersed plants were found in 75% of the littoral zone but generally not at dense levels. Eurasian water milfoil was the dominant plant in May and occurred at 39% of the sites and generated a mean density score of 1.4. By August, Eurasian water milfoil dropped to second after coontail in abundance and was found at 31% of the sites at a mean density of 1.6. Twenty-one emergent plant beds, totaling 14½ acres, were located. Spatterdock was noted in 17 beds and water lilies were noted in 19 beds.

During the fish survey, 855 fish were collected. Bluegills ranked first by number (65%) and equaled northern pike by weight (23%). Largemouth bass ranked second by number (11%) and third by weight (19%). All other species comprised less than 5% of the number. Sport fish made up 93% of the total number of fish collected in the survey and 85% of the weight. Bluegills, although abundant, were generally small and grew slowly. Largemouth bass ranged in size from 1½-17 inches, but only seven bass were legal size (14-inch or larger).

Few changes have occurred in the fish community at Little Chapman Lake over the past 40 years. The most notable differences included the appearance of northern pike and large increase in bluegills in the 1999 survey. However, bluegills, largemouth bass, and yellow perch have generally comprised the bulk of the catch each year. Crappies have never been abundant, nor have non-sport fish, although more gizzard shad and lake chubsuckers were caught in 1976.

Overall, current levels of herbicide use appear to be adequately controlling Eurasian water milfoil. No fish management recommendations are suggested at this time.

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INTRODUCTION

Little Chapman Lake is a 177-acre natural lake located northeast of Warsaw, Indiana. Public access is available at a Division of Fish and Wildlife site in the southeast corner of nearby Big Chapman Lake, then through a channel to Little Chapman Lake. It lies in the Tippecanoe watershed and drains approximately 70 square miles. The outlet empties into Pike Lake. Hydraulic retention time is 139 days and the water level is generally stable. An earthen levee at the southwest corner of the lake serves as part of the water level control structure and was rebuilt in 2005 to prevent failure and leakage.

Little Chapman Lake is 30 feet deep and averages 14¾ feet. Clarity varies from 3-5 feet and averages 4 feet (Table 1). Oxygen levels of 3 ppm are present to 20 feet in early summer but no deeper than 10-15 feet by midsummer. Water fertility is high (mean TSI = 56) compared to other lakes in the area. The bottom consists mainly of sand, muck and marl. Coontail and Eurasian water milfoil are the dominant submersed plants, although not particularly abundant. Spatterdock and water lilies are common on the west shore along a significant wetland. Other shoreline areas are residential.

Little Chapman Lake's management history dates back to the 1960s when local residents stocked walleye fingerlings. Fish population surveys were conducted in 1964, 1969, and 1976. Rotenone was applied in 1967 to reduce numbers of small panfish and stimulate growth. Largemouth bass were then restocked. Walleye fry and small fingerlings were again released in Big Chapman Lake in the 1980s but never established a population in either lake. A 14-inch size limit on largemouth bass was imposed in 1984.

Local lake residents have become increasingly involved in lake management issues at Big and Little Chapman Lakes in recent years. In 2001 and 2003, they received public funds through the Department of Natural Resources Lake and River Enhancement (LARE) program to conduct diagnostic studies of watershed problems and implement various improvement projects intended to reduce the input of sediment and nutrients to the lakes. In 2004 local residents also hired a consultant to conduct an aquatic plant survey and develop an aquatic plant management plan, funded in part by LARE. Based on results of the survey, plans were to treat the entire lake with fluridone (Sonar®) in 2005 to control Eurasian water milfoil. The treatment, however, was postponed to allow for additional plant sampling by which the need and effectiveness of the project could be

assessed and to obtain current data on the status of the fish community by which the potential long-term impacts of a fluridone treatment on fishing quality could be examined (Workplan #204289). In lieu of the fluridone treatment, a total of 14 acres of Eurasian water milfoil and other species were treated on two occasions in May 2005 at Little Chapman Lake by two commercial pesticide applicators. Of the total area involved, one acre was located in a manmade channel at the south end of the lake and 13 acres were treated along the entire east shore. Eurasian water milfoil along this shoreline was treated with a 2,4-D formulation (Navigate®).

To obtain additional data on the aquatic plant and fish communities at Little Chapman Lake prior to a proposed fluridone treatment, the Division of Fish and Wildlife sampled submersed aquatic plants on two occasions, mapped emergent floating-leaf and bulrush plant beds, and conducted a standard fish population survey in 2005. Although summary pages of the plant data are presented in this report, more detailed analysis and comparisons with other lakes will be included in the research study report (Workplan #204289). The primary purpose of this report is to summarize the fish survey data.

METHODS

Submersed plants were sampled at 56 random sites in Little Chapman Lake on May 16 and August 3, 2005 using a doubled-head rake according to Division of Fish and Wildlife sampling guidelines at the time (note – they have since been modified slightly). Sites locations on the first occasion were recorded with a GPS unit and then approximately relocated on the second occasion. Fifty sites were within the littoral zone to a depth of 15 feet in May and 42 were within the littoral zone to a depth of 9½ feet in August. Channel areas were not included. Plant abundance, including algae, was quantified at each site by stacking the plant biomass evenly across one side of the rake tines. Scores (0-5) were assigned to the amount of plants based on increments marked evenly on the tines. Species were then separated and scored individually at each site.

Emergent plant beds were mapped on August 8, 2005 by boating along the lakeward perimeters of all beds and recording GPS coordinates of their edges. Width of the bed at each GPS point oriented perpendicularly to shore (i.e. visual transect) was measured with a laser rangefinder. Bed size was calculated by summing areas of each

polygon created by the linear distance between two consecutive GPS points and their mean width. The presence of various species along each visual transect was recorded, as was the presence of various nearshore wetland plants associated with each transect. Beds were generally defined as areas where emergent plants covered more than 625 square feet and spaces between plants were more than 25 feet. Small emergent stands, defined as isolated patches (<625 sq ft), were also mapped and characterized by species.

The fish population survey was conducted on July 11-13, 2005. Surface water temperature was 82 degrees. To ensure comparability with previous surveys and reduce mortality of fish (especially northern pike) caught in gill nets, sampling effort included 30 minutes of pulsed DC electrofishing (504V) with two dip-netters and two gill nets set for two days (4 lifts) at four sites. Two trap nets were set for one day (2 lifts) at two sites, but one developed a large hole and failed to catch fish. All captured fish were measured to the nearest tenth-inch 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

Plant community

Submersed aquatic plants were found at 76% of all littoral sites in May and 74% in August, but generally not at dense levels. Native species however were found only at 48% of the littoral sites in May but increased to 71% in August. Six species were found in May and seven were found in August. Overall mean rake scores were similar (1.9-2.0) on both occasions. Filamentous algae was sparse in May and occurred at 18% of the sites but increased to 43% in August.

Eurasian water milfoil was the dominant plant in May and occurred at 56% of the sites and generated a mean density score of 1.4. By August, Eurasian water milfoil dropped to second in abundance and was found at 31% of the sites at a mean density of 1.6 (Figure 1). Coontail, which ranked second in dominance in May, was the most dominant species in August. It was present at 42% of the sites in May and 52% in August and its mean density increased from 1.7 to 2.3. Curly-leaf pondweed, present at 28% of

the sites at a mean density of 2.5 in May (Figure 2), was found only at one site in August. All other species in May were found at fewer than 9% of the sites. However, two other species were present at 14% or more of the sites in August. Eel grass was found at 24% of the August sites at a mean density of 1.5 and chara was found at 14% of the sites at a mean density of 1.8.

Twenty-one emergent plant beds were located in Little Chapman Lake, ranging in size from less than a tenth-acre to nearly 4 acres. Total bed area was 14½ acres, or 10% of the lake surface area. Beds were present primarily on the west side of the lake. Spatterdock was noted in nine beds (50%), varying from 8-100% of the coverage. Water lilies were noted in 19 beds and varied from 29-100% of the coverage. Swamp loosestrife and cattails grew along most of the west shore. Other emergent species noted during the sampling included purple loosestrife and yellow pond lilies. Eleven isolated patches of emergents, mostly lilies, were also noted.

Fish community

During the July fish survey, 855 fish were collected. Total weight was 228 pounds. Seventeen species, plus hybrid bluegills, were found. Bluegills ranked first by number (65%) and accounted for 23% of the weight. Northern pike also accounted for 23% of the weight but ranked 11th numerically. Largemouth bass ranked second by number (11%) and third by weight (19%). All other species comprised less than 5% of the number. However, sport fish made up 93% of the total number of fish collected in the survey and 85% of the weight.

Bluegills, although abundant, were generally small and grew slowly. They ranged in size from 1-7½ inches and were up to six years old. The number captured by electrofishing (249/15-min) was well above average (100/15-min), although the percentage of large bluegills was small. Of all 3-inch and larger bluegills (543), only 20% were 6-inch or larger and only 3% were 7-inch or larger. No 8-inch or larger bluegills were collected. At most area lakes, 6-inch and larger bluegills average 32% of the catch, while 8-inch and larger bluegills average 4%. Bluegills in Little Chapman Lake averaged only 5½ inches long by age-4 and 6½ inches by age-5. Normally, bluegills reach 6 inches by age-4 and are 7 inches by age-5 at lakes in the area.

Ninety-one largemouth bass were captured. They ranged in size from 1½-17 inches, but only seven bass were legal size (14-inch or larger). The number captured by electrofishing (40/15-min) was slightly above average compared to other Indiana natural lakes (25-30/15-min). Most bass were age-2 and age-3. Their growth rate was normal, although not enough older bass were captured to adequately assess growth after age-5.

Eight northern pike were collected, ranging in size from 27½-34½ inches, but few other catch-able size sport fish were found. Four pike were 30-inch or larger. All were caught in gill nets at a rate of 4/lift. Thirty-eight yellow perch, ranging in size from 4½-10 inches, but only 14 were 8-inch or larger. Other sport fish included 23 yellow bullheads and 18 brown bullheads, 16 warmouth, 14 black crappies, 12 longear, 11 redear, six pumpkinseeds, two white bass measuring 14⅓-16⅓ inches, and a hybrid sunfish. The few non-sport fish that were collected included 37 adult gizzard shad up to 13½ inches, eight spotted gar, eight golden shiners, four bluntnose minnows, and two brook silversides. All but five young-of-the-year shad were 9½ inches or larger.

DISCUSSION

Based on results of the 2005 survey, few changes have occurred in the fish community at Little Chapman Lake over the past 40 years (Table 2). The most notable changes were the appearance of northern pike and large increase in bluegill numbers in the 1999 survey. However, bluegills, largemouth bass, and yellow perch have generally comprised the bulk of the catch each year. Crappies have never been especially abundant. A variety of miscellaneous sunfish species have always been present but none have comprised substantial percentages of the catch, except in 1964 when 80 wire traps were used. Bullheads have also been relatively scarce, at least since 1969. In addition, non-sport fish, such as carp and suckers, have never been abundant, although more gizzard shad and lake chubsuckers were caught in 1976. Numbers of gar have been consistently low. Overall, most minor fluctuations in catches of various species probably reflect differences in sampling date, sampling gear and effort, as well as the imprecision of the survey results.

Although Little Chapman Lake is dominated by sport fish, most of them are small. Catchable-size bluegills, those 7-inch or larger, accounted for only 3-8% of all 3-

inch and larger bluegills in each previous survey (Table 3). No 8-inch and larger bluegills were caught in 1964, 1969 or 2005, and fewer than 15 were caught in other years. Of 3,438 bluegills caught in all five surveys from 1964 through 2005, only 16 were 8-inch or larger (<1%). The poor size structure of the bluegill population results from poor growth. Likewise, few large bass have ever been captured at Little Chapman Lake, although growth is normal. Of 382 bass captured in all five surveys since 1964, only 39 were 14-inch or larger (10%) and three (2%) were 18-inch or larger (Table 3). Percentages of 14-inch and larger bass of all 8-inch and larger bass (i.e. proportional stock densities) varied from 9-20% and averaged 15% from 1964 through 2005, and apparently did not increase after imposition of a 14-inch minimum size limit in 1984.

Contrary to results of the 1999 survey, bluegill and largemouth bass fishing at Little Chapman Lake are marginal. Although bluegills and bass are abundant, few large fish are present. Slow growth of bluegills, coupled with excessive recruitment of young fish and angler exploitation of old fish, may explain the scarcity of large bluegills in the lake. The reasons why bluegill growth is slow, however, are not known. A research study is currently in progress (Workplan #202201) at several northeast Indiana natural lakes to examine factors that may limit bluegill quality, including aquatic plant distribution and abundance, food resources, water chemistry, and predator abundance. Another study is underway (Workplan #202068) to examine the impacts of bass fishing on bass density and size in large lakes. Results of these projects may have application to Little Chapman Lake and may ultimately provide insight into ways to improve fishing.

Meanwhile, Little Chapman Lake also provides an opportunity to more closely evaluate and better understand the impacts of aquatic plant management efforts at Indiana lakes. Based on comparisons with data initially available from other lakes, Eurasian water milfoil is not unusually abundant nor does it restrict recreational access except in some specific nearshore riparian areas. For example, Eurasian water milfoil in nearby Dewart Lake was found at 56% of littoral sites in May 2005 and 60% in August 2005 with density scores averaging 2.5 and 3.0, respectively. In contrast, at Little Chapman Lake it was found at 56% of littoral sites but reduced to 31% after treatment.

Overall, current levels of herbicide use appear to be adequately controlling Eurasian water milfoil, especially along the east half of the lake following the 2005

treatment (as depicted in Figure 1). By limiting control to current levels for the next several years, the assumption that Eurasian water milfoil is an aggressive invader and will likely expand throughout the lake can be tested. By delaying any fluridone treatment, possible adverse impacts on water quality or native plants can be avoided and adequate amounts of cover can be maintained for fish. At Little Chapman Lake, where northern pike are an important part of the fish community, current Division of Fish and Wildlife guidelines suggest vegetation should cover up to 80% or more of the littoral zone. Native plant species were detected at 48% of the sites in May and 71% in August, while the actual number of littoral sites with native plants increased from 24 to 30.

Additional management interest at Little Chapman Lake should be directed at protecting the remaining sections of undeveloped shoreline and adjacent wetlands, as well as continuing to reduce the input of sediment and nutrients to the lake. Once all erodable areas within the watershed are addressed, sediment delta at the mouths of inlets should be removed. Likewise, efforts are needed to protect emergent aquatic plants by curtailing use of motorized watercraft near them in selected areas. The Division of Fish and Wildlife should also continue to work with local agencies, conservation organizations, recreational user-groups, and landowners to preserve the natural character of the lake through on-going watershed management programs, land acquisition, permit review and regulatory compliance, zoning ordinances, strategic planning, and environmental education.

RECOMMENDATION

1. No fish management recommendations are suggested at this time.

NOTE: For additional information aquatic plant management at Little Chapman Lake, the reader is referred to Workplan #204289 of the Division of Fish and Wildlife.

LITERATURE

Workplan 202068. Natural lakes largemouth bass investigations. Division of Fish and Wildlife, Indiana Department of Natural Resources, Indianapolis, IN.

Workplan 202201. Understanding the relationship between zooplankton abundance and bluegill growth. Division of Fish and Wildlife, Indiana Department of Natural Resources, Indianapolis, IN.

Workplan 204289. Whole-lake fluridone effects. Division of Fish and Wildlife, Indiana Department of Natural Resources, Indianapolis, IN.

Submitted by: Jed Pearson, fisheries biologist

December 5, 2005

Approved by: _____

Stu Shipman, regional supervisor

Date: _____

Table 1. Historic oxygen levels (ppm) and water clarity (secchi depth) at Little Chapman Lake, 1964 through 2005 (source - Division of Fish and Wildlife files).

Depth (ft)	6/1964	7/1969	8/1976	6/1999	7/2005
0	10.0	9.4	9.7	11.0	8.8
5	9.8	10.2	9.0	11.0	8.3
10	9.7	8.8	7.6	10.0	4.7
15	8.9	4.8	2.4	3.0	0.6
20	8.0	0.0	0.0	8.0	0.5
25	1.8	0.0	0.0	2.0	0.4
30	---	---	0.0	0.0	---
secchi depth (ft)	3½	4b	4½	4½	3⅓

Table 2. Number of fish collected in fish population surveys at Little Chapman Lake, 1964 through 2005.

Species	Jun 1964	Jul 1969	Aug 1976	Jun 1999	Jul 2005
Black crappie	34	15	24	17	14
Bluegill	351	241	478	1,812	556
Bluntnose minnow	0	*	0	4	4
Bowfin	2	1	1	1	0
Brook silverside	1	*	*	12	2
Brown bullhead	131	10	9	11	18
Carp	9	3	4	1	0
Central mudminnow	0	*	1	1	0
Channel catfish	0	7	1	0	0
Gizzard shad	81	20	319	71	37
Golden shiner	29	9	16	10	8
Grass pickerel	6	3	9	1	0
Green sunfish	1	0	2	0	0
Hybrid sunfish	0	0	0	1	1
Lake chubsucker	3	32	87	10	0
Largemouth bass	73	112	156	75	91
Logperch	0	0	0	1	0
Longear	137	23	41	17	12
Northern pike	0	0	0	16	8
Pumpkinseed	78	20	51	12	6
Redear	136	28	42	51	11
Shortnose gar	1	0	0	0	0
Spotted gar	4	10	8	9	8
Spotted sucker	3	0	4	0	0
Walleye	3	3	0	0	0
Warmouth	80	20	68	31	16
White bass	0	0	0	2	2
White catfish	0	0	1	0	0
White crappie	12	0	8	10	0
White sucker	16	3	10	0	0
Yellow bullhead	48	9	26	19	23
Yellow perch	273	23	158	75	38
TOTAL	1,512	592	1,524	2,270	855
SAMPLING EFFORT					
Electrofishing hours	8 AC	2 AC	2½ AC	½ DC	½ DC
Gill net lifts	16	4	8	2	4
Trap net lifts	0	0	0	5	1
Wire traps	80	0	0	0	0

*denotes fish collected but not counted.

Table 3. Number and size of bluegills and largemouth bass collected at Little Chapman Lake, 1964 through 2005.

Inches	Jun 1964	Jul 1969	Aug 1976	Jun 1999	Jul 2005
Bluegill					
<3	6	8	42	49	13
3-5½	227	186	376	1,527	434
6-6½	90	37	44	141	91
7-7½	28	10	14	81	18
≥8	0	0	2	14	0
Largemouth bass					
<4	0	2	83	1	12
4-7½	25	36	33	21	10
8-11½	37	66	23	25	59
12-13½	3	1	9	19	3
14-17½	3	6	8	6	7
≥18	5	1	0	3	0

Figure 1. Locations where Eurasian water milfoil was detected out of 50 random littoral sites during aquatic plant sampling at Little Chapman Lake on May 16 and out of 42 random littoral sites on August 3, 2005. Dot sizes represent relative abundance scores: small dots depict sites with Eurasian water milfoil rake scores of 1 or 2, medium dots presents scores of 3 or 4, and large dots represent scores of 5.

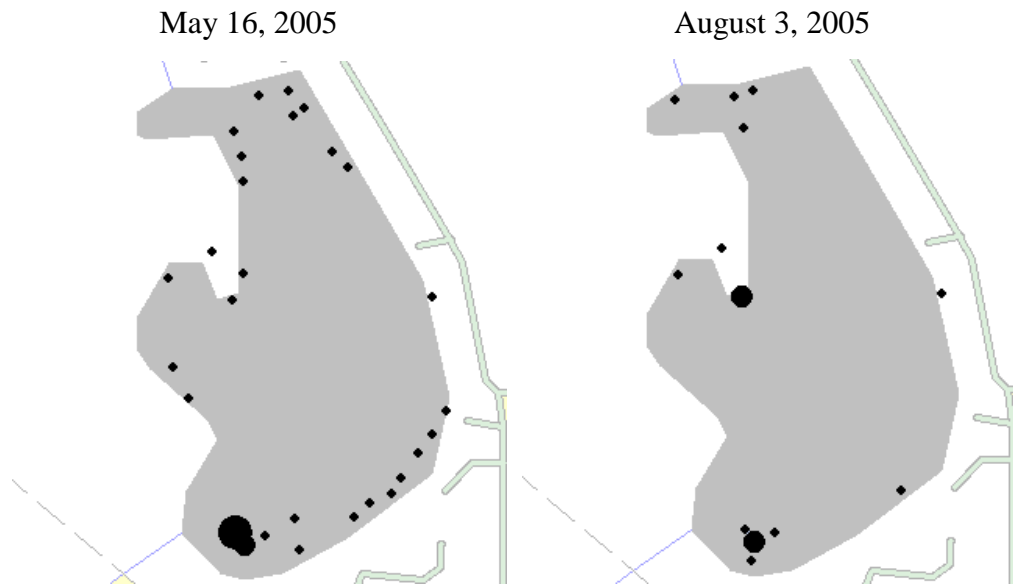
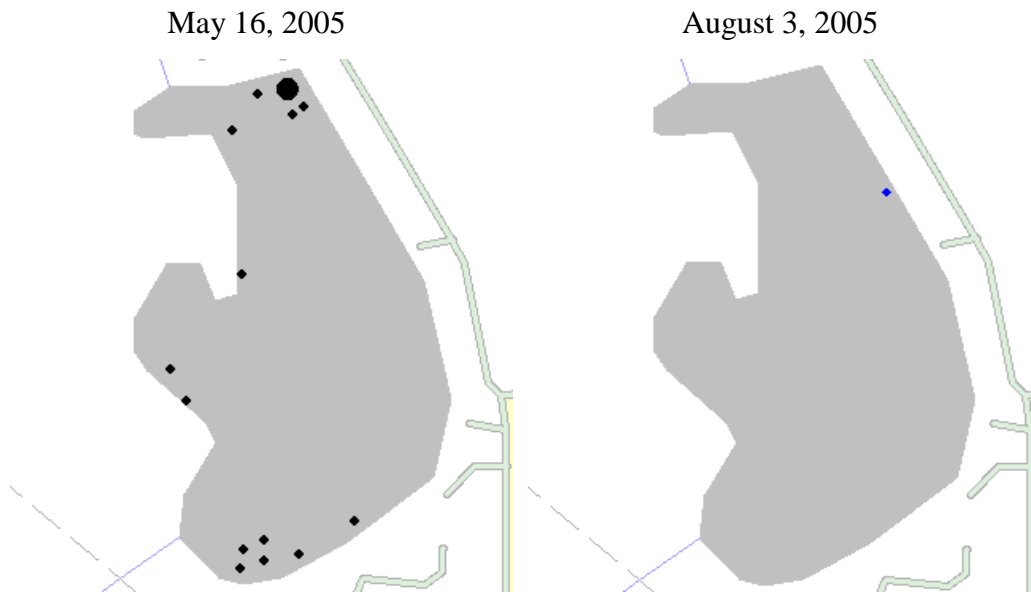


Figure 2. Locations where curly-leaf pondweed was detected out of 50 random littoral sites during aquatic plant sampling at Little Chapman Lake on May 16 and out of 42 random littoral sites on August 3, 2005. Dot sizes represent relative abundance scores: small dots depict sites with curly-leaf pondweed rake scores of 1 or 2, medium dots presents scores of 3 or 4, and large dots represent scores of 5.



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)
Little Chapman Lake	Kosciusko	7/11-7/13/05
Biologist's name	Date of approval (Month, day, year)	
Jed Pearson		

LOCATION		
Quadrangle name	Range	Section
Leesburg	6E	35
Township	Nearest town	
33N	Warsaw	

ACCESSIBILITY

State owned public access site	Privately owned public access site	Other access site			
Located on Big Chapman Lake					
Surface acres	Maximum depth (ft)	Average depth (ft)	Acre feet	Water level (msl)	Extreme fluctuations (ft)
177	31	14.2	1,977	813.21	None

INLETS		
Name	Location	Origin
Arrowhead Drain	Northeast corner	Runoff
Lozier's Creek	Southeast corner	Runoff
Highland Park Drain	East side	Runoff

OUTLET			
Name	Location		
Heeter Ditch	Southwest corner, flows to Pike Lake through Deed's Creek		
Water level control			
Concrete structure and earthen levee (repaired and reinforced with cellular concrete in 2005)			
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
About 60% is agricultural with 11% wetland
Development of shoreline
The north, east, and a portion of the south shore are residentially-developed. A state-owned wetland is located along the west shore.
Previous surveys and investigations
Mapping, USGS, 1962: Bluegill data, Hile 1931, Ricker 1942: Fish surveys, IDNR, 1964, 1969, 1976, 1999: LARE studies, IDNR, 2001 and 2003.

SAMPLING EFFORT			
ELECTROFISHING	Day hours	Night hours	Total hours
		0.5	0.5
TRAPS	Number of traps	Days	Total lifts
	2	1	1 (hole cut in one trap)
GILL NETS	Number of nets	Days	Total lifts
	2	2	4

PHYSICAL AND CHEMICAL CHARACTERISTICS	
Color	Turbidity
Grey	3 Feet 4 Inches (Secchi disk)

TEMPERATURE, DISSOLVED OXYGEN (ppm), TOTAL ALKALINITY (ppm), pH							
Depth (ft)	Degrees F	Oxygen*			Depth (ft)	Degrees F	Oxygen*
Surface	81.5	8.8					
2	81.5	8.8					
4	81.5	8.7					
5	81.5	8.3					
6	80.6	8.6					
8	80.4	7.0					
10	79.3	4.7					
12	78.1	1.0					
14	75.2	0.7					
15	73.9	0.6					
16	70.5	0.6					
18	66.6	0.5					
20	62.2	0.5					
22	58.8	0.4					
24	56.5	0.4					
25	55.6	0.4					
26	54.9	0.4					
28	54.5	0.3					

Sampling date: Data from LARE 2001		
	Surface	Bottom
pH	8.6-9.0	7.0-7.9
Alkalinity*	112-154	190-240
Conductivity	370	350
TDS		

*ppm = parts per million

Occurrence and abundance of submersed aquatic plants in Little Chapman Lake

Date: 5/16/05	Littoral sites with plants:	38	Mean species/site:	1.42
Littoral depth (ft): 15.0	Littoral sites with native plants:	24	Mean native species/site:	0.58
Littoral sites: 50	Number of species:	6	Species diversity:	0.71
Total sites: 56	Number of native species:	4	Native diversity:	0.44
Secchi (ft): 4.5	Maximum species/site:	4	Average rake score:	1.90

Common Name	Site Frequency	Relative Density	Rake score frequencies					Mean Density	Plant Dominance
			1	2	3	4	5		
Eurasian water milfoil	56.0	0.76	22	4	1	0	1	1.36	15.2
Coontail	42.0	0.72	13	4	2	1	1	1.71	14.4
Curly-leaf pondweed	28.0	0.40	10	3	0	1	0	1.43	8.0
Chara	8.0	0.20	2	0	1	0	1	2.50	4.0
Flat-stem pondweed	6.0	0.06	3	0	0	0	0	1.00	1.2
Elodea	2.0	0.02	1	0	0	0	0	1.00	0.4
Filamentous algae	18.0								

Occurrence and abundance of submersed aquatic plants in Little Chapman Lake

Date: 8/3/05	Littoral sites with plants:	31	Mean species/site:	1.36
Littoral depth (ft): 9.5	Littoral sites with native plants:	30	Mean native species/site:	1.02
Littoral sites: 42	Number of species:	7	Species diversity:	0.75
Total sites: 56	Number of native species:	5	Native diversity:	0.66
Secchi (ft): 6.0	Maximum species/site:	4	Average rake score:	1.95

Common Name	Site	Relative	Rake score frequencies					Mean	Plant
	Frequency	Density	1	2	3	4	5	Density	Dominance
Coontail	52.4	1.21	8	3	1	1	0	2.32	24.3
Eurasian water milfoil	31.0	0.50	1	0	0	0	0	1.62	10.0
Eel grass	23.8	0.36	7	7	4	2	2	1.50	7.1
Chara	14.3	0.26	4	0	0	0	0	1.83	5.2
Sago pondweed	9.5	0.10	6	3	1	0	0	1.00	1.9
Curly-leaf pondweed	2.4	0.02	4	1	0	0	1	1.00	0.5
Water stargrass	2.4	0.02	1	0	0	0	0	1.00	0.5
Filamentous algae	42.9								

Little Chapman Lake Emergent Plant Beds

08/08/05

Bed	Sites	Mean	Mean	Mean	Species Frequency of Occurrence						Species		Calculated values		
		Latitude	Longitude	Width	SPA	WAL	SWL	CAT	PRL	YPL	N	N/site	Acres	Length	
1	14	41.27693	-85.79441	70.1	100.0	92.9	71.4	100.0				4	3.64	1.90	1174
2	7	41.27641	-85.79301	66.0	100.0	28.6	85.7	100.0	14.3			5	3.29	0.87	594
3	9	41.27452	-85.79250	33.7	100.0		88.9	88.9				3	2.78	0.65	779
4	8	41.27373	-85.79323	31.5	25.0	100.0	87.5	100.0				4	3.13	0.26	350
5	4	41.27351	-85.79454	25.5	100.0	75.0	75.0	100.0				4	3.50	0.08	108
6	6	41.27187	-85.79471	76.0	33.3	100.0	100.0	100.0			33.3	5	3.33	0.87	423
7	3	41.27118	-85.79431	22.0	100.0	33.3	33.3	100.0				4	2.67	0.07	121
8	5	41.26991	-85.79282	200.4	20.0	60.0	80.0	100.0			40.0	5	2.60	2.43	381
9	2	41.26916	-85.79193	27.0	50.0	50.0		100.0				3	2.00	0.07	106
10	2	41.26884	-85.79159	18.0	100.0	100.0	100.0	100.0				4	4.00	0.01	14
11	11	41.26805	-85.79195	152.5	36.4	90.9	54.5	100.0				4	2.82	3.82	1138
12	7	41.26764	-85.79114	135.9	85.7	28.6	71.4	57.1				4	2.43	2.20	654
13	2	41.26817	-85.78914	22.5	100.0	50.0						2	1.50	0.01	29
14	4	41.27656	-85.78995	51.0		100.0						1	1.00	0.16	128
15	3	41.27683	-85.79019	61.0		100.0						1	1.00	0.07	51
16	3	41.27714	-85.79042	82.0	66.7	100.0						2	1.67	0.15	71
17	3	41.27738	-85.79028	46.0	66.7	100.0						2	1.67	0.06	55
18	6	41.27738	-85.79061	77.0		100.0						1	1.00	0.59	273
19	3	41.27721	-85.79277	32.0		100.0						1	1.00	0.07	80
20	2	41.27711	-85.79315	55.5	100.0							1	1.00	0.05	36
21	5	41.27725	-85.79355	30.0	60.0	100.0						2	1.60	0.13	154
			Mean	62.6							Mean	3.0	2.27		
			Count		17	19	11	12	1	2					
												Sum	14.50		6720

Isolated patches

11	18.2	90.9	9.1	18.2	4	1.36
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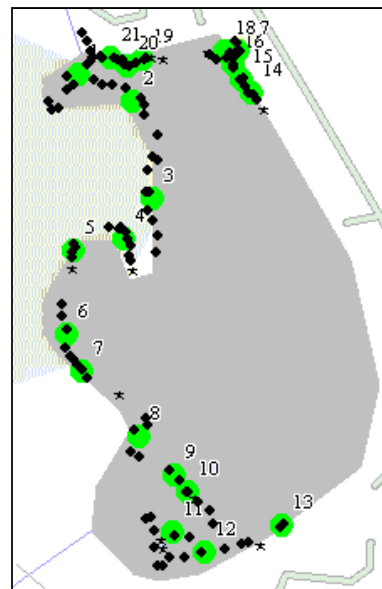
Species present

- CAT *Cattail*
- PRL *Purple loosestrife*
- SPA *Spatterdock*
- SWL *Swamp loosestrife*
- WAL *Water lily*
- YPL *Yellow pond lily*

Lake surface acreage:	139
Percent surface coverage:	10.4
Contour acreage within 10-ft depth:	
Percent 10-ft contour area coverage:	
Lake shoreline perimeter in miles:	2.28
Estimated emergent bed miles:	1.27
Bed edge:shoreline ratio (%):	55.8

The map at the right depicts the lakeward locations of 21 emergent plant beds (small black dots), the geographic lakeward centers of each bed (large dots), and patches (stars) of emergent plants in Little Chapman Lake.

Data summary prepared by Jed Pearson - 10/21/05
Indiana Division of Fish and Wildlife



Relative Abundance, Size and Estimated Weight of Fish Collected at Little Chapman Lake						
Common Name*	Number	Percent	Minimum	Maximum	Weight (lb)**	Percent
			Length (in)	Length (in)		
Bluegill	556	65.0	1.0	7.5	51.81	22.8
Largemouth bass	91	10.6	1.7	17.1	43.26	19.0
Yellow perch	38	4.4	4.6	9.9	7.71	3.4
Gizzard shad	37	4.3	1.3	13.4	18.19	8.0
Yellow bullhead	23	2.7	8.2	13.0	13.54	5.9
Brown bullhead	18	2.1	9.0	12.2	11.53	5.1
Warmouth	16	1.9	2.2	5.7	1.03	0.5
Black crappie	14	1.6	7.6	9.6	5.48	2.4
Longear	12	1.4	3.9	5.4	1.12	0.5
Redear	11	1.3	6.0	7.6	2.59	1.1
Northern pike	8	0.9	27.7	34.7	52.19	22.9
Spotted gar	8	0.9	19.0	27.4	13.70	6.0
Golden shiner	8	0.9	1.5	8.4	1.16	0.5
Pumpkinseed	6	0.7	5.0	5.9	0.69	0.3
Bluntnose minnow	4	0.5	1.2	2.2	0.01	0.0
White bass	2	0.2	14.3	16.3	3.42	1.5
Brook silverside	2	0.2	3.3	4.0	0.01	0.0
Hybrid sunfish	1	0.1	6.7		0.22	0.1
	855				227.66	

Number, catch by gear, percentage, estimated weight and age of bluegills															
Length (in)	Catch by gear			Total Number	Percent	Estimated Weight (lb)	Age	Length (in)	Catch by gear			Total Number	Percent	Estimated Weight (lb)	Age
	EF	GN	TN						EF	GN	TN				
1.0	3			3	0.5	0.00	0	14.5							
1.5								15.0							
2.0	5			5	0.9	0.01	1	15.5							
2.5	5			5	0.9	0.01	1	16.0							
3.0	9			9	1.6	0.02	1,2	16.5							
3.5	36		1	37	6.7	0.03	2,3	17.0							
4.0	75		5	80	14.4	0.05	3	17.5							
4.5	153		3	156	28.1	0.07	3,4	18.0							
5.0	85	2	3	90	16.2	0.09	3,4	18.5							
5.5	56	4	2	62	11.2	0.12	3,4,5	19.0							
6.0	47	12	2	61	11.0	0.16	4	19.5							
6.5	13	15	2	30	5.4	0.20	4,5,6	20.0							
7.0	9	7		16	2.9	0.26	4,5	20.5							
7.5	2			2	0.4	0.32	4,6	21.0							
8.0								21.5							
8.5								22.0							
9.0								22.5							
9.5								23.0							
10.0								23.5							
10.5								24.0							
11.0								24.5							
11.5								25.0							
12.0															
12.5															
13.0															
13.5															
14.0								Total				556		51.81	
Electrofishing catch:				498			Gill net catch:				40		Trap net catch:		18

Number, catch by gear, percentage, estimated weight and age of largemouth bass																									
Length	Catch by gear			Total	Percent	Estimated	Age	Length	Catch by gear			Total	Percent	Estimated	Age										
(in)	EF	GN	TN	Number		Weight (lb)		(in)	EF	GN	TN	Number		Weight (lb)											
1.0								14.5	1			1	1.1	1.53	5										
1.5	2			2	2.2	0.00	0	15.0	1			1	1.1	1.70	4										
2.0	4			4	4.4	0.00	0	15.5																	
2.5	6			6	6.6	0.01	0	16.0																	
3.0								16.5																	
3.5								17.0	1	1		2	2.2	2.49	6										
4.0								17.5																	
4.5								18.0																	
5.0	1			1	1.1	0.06	1	18.5																	
5.5	4	1		5	5.5	0.08	1	19.0																	
6.0	2			2	2.2	0.10	1	19.5																	
6.5								20.0																	
7.0								20.5																	
7.5	2			2	2.2	0.20	2	21.0																	
8.0	2	3		5	5.5	0.25	2	21.5																	
8.5	2	2		4	4.4	0.30	2	22.0																	
9.0	11	2		13	14.3	0.35	3	22.5																	
9.5	10			10	11.0	0.42	3	23.0																	
10.0	12			12	13.2	0.49	3	23.5																	
10.5	3			3	3.3	0.57	3,4	24.0																	
11.0	6	2		8	8.8	0.65	3,4	24.5																	
11.5	4			4	4.4	0.75	3,4	25.0																	
12.0	1			1	1.1	0.85	4																		
12.5	1			1	1.1	0.97	4																		
13.0	1			1	1.1	1.09	4																		
13.5																									
14.0	3			3	3.3	1.37	4,5	Total				91		43.26											
Electrofishing catch:													80			Gill net catch:			11			Trap net catch:			0

Number, catch by gear, percentage, estimated weight and age of yellow perch																	
Length (in)	Catch by gear			Total Number	Percent	Estimated Weight (lb)	Age	Length (in)	Catch by gear			Total Number	Percent	Estimated Weight (lb)	Age		
	EF	GN	TN						EF	GN	TN						
1.0								14.5									
1.5								15.0									
2.0								15.5									
2.5								16.0									
3.0								16.5									
3.5								17.0									
4.0								17.5									
4.5	2	2		4	10.5	0.04	1	18.0									
5.0	1			1	2.6	0.06	1	18.5									
5.5	3			3	7.9	0.08	3	19.0									
6.0	3			3	7.9	0.10	3	19.5									
6.5	1			1	2.6	0.13	4	20.0									
7.0	4	2		6	15.8	0.17	3	20.5									
7.5	2	4		6	15.8	0.21	4,5	21.0									
8.0	1	4		5	13.2	0.25	4,5	21.5									
8.5	1	4		5	13.2	0.31	4,5	22.0									
9.0		2		2	5.3	0.37	4	22.5									
9.5								23.0									
10.0		2		2	5.3	0.52		23.5									
10.5								24.0									
11.0								24.5									
11.5								25.0									
12.0																	
12.5																	
13.0																	
13.5																	
14.0								Total				38		7.71			
Electrofishing catch:				18			Gill net catch:				20		Trap net catch:				0

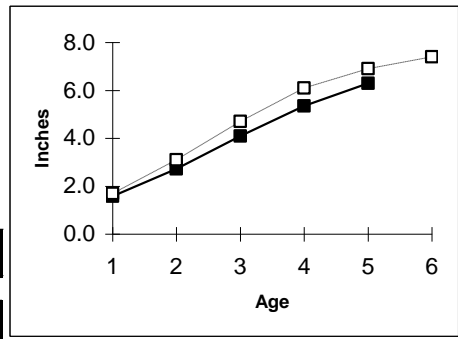
Number, catch by gear, percentage, estimated weight and age of gizzard shad																								
Length	Catch by gear			Total	Percent	Estimated	Age	Length	Catch by gear			Total	Percent	Estimated	Age									
(in)	EF	GN	TN	Number		Weight (lb)		(in)	EF	GN	TN	Number		Weight (lb)										
1.0								14.5																
1.5	3			3	8.1	0.00		15.0																
2.0	2			2	5.4	0.00		15.5																
2.5								16.0																
3.0								16.5																
3.5								17.0																
4.0								17.5																
4.5								18.0																
5.0								18.5																
5.5								19.0																
6.0								19.5																
6.5								20.0																
7.0								20.5																
7.5								21.0																
8.0								21.5																
8.5								22.0																
9.0								22.5																
9.5		1		1	2.7	0.31		23.0																
10.0		2		2	5.4	0.36		23.5																
10.5		2		2	5.4	0.41		24.0																
11.0		4		4	10.8	0.47		24.5																
11.5	1	4		5	13.5	0.53		25.0																
12.0	4	6		10	27.0	0.60																		
12.5	1	4		5	13.5	0.68																		
13.0		2		2	5.4	0.76																		
13.5		1		1	2.7	0.85																		
14.0								Total				37		18.19										
Electrofishing catch:												11			Gill net catch:			26			Trap net catch:			0

Bluegill
Intercept: 0.8 inch

BACK-CALCULATED LENGTH (inches) AT EACH AGE

Year Class	Count	I	II	III	IV	V	VI
2004	6	1.6					
	stdev	0.21					
2003	8	1.4	2.4				
	stdev	0.20	0.31				
2002	15	1.6	2.6				
	stdev	0.23	0.37				
2001	15	1.7	2.9	4.1	5.4		
	stdev	0.23	0.33	0.54	0.72		
2000	5	1.6	3.0	4.1	5.3	6.3	
	stdev	0.11	0.32	0.65	0.71	0.59	
1999	2	1.8	2.8	4.1	4.9	6.1	6.7
	stdev	0.22	0.67	0.45	0.28	0.67	0.82
Mean*		1.6	2.7	4.1	5.3	6.3	
SD		0.13	0.26	0.02	0.02		
Count		49	43	35	20	5	

Bluegill growth (solid line) compared to other lakes (dotted line).



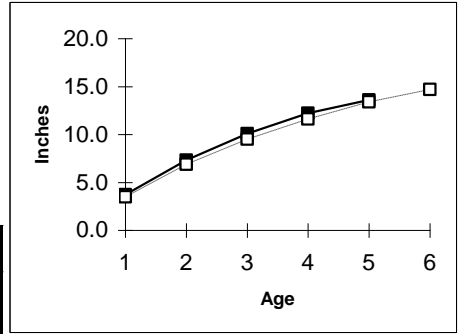
* Age groups with less than three samples not included in year class averages

Largemouth bass
Intercept: 0.8 inch

BACK-CALCULATED LENGTH (inches) AT EACH AGE

Year Class	Count	I	II	III	IV	V	VI
2004	3	4.4					
	stdev	0.30					
2003	10	3.8	6.9				
	stdev	0.34	0.71				
2002	21	3.5	7.2	9.4			
	stdev	0.77	1.10	0.74			
2001	11	3.7	7.5	10.5	11.6		
	stdev	0.83	1.25	1.33	1.24		
2000	3	3.2	7.6	10.4	12.9	13.6	
	stdev	0.40	0.22	0.58	0.42	0.04	
1999	0						
	stdev						
Mean*		3.7	7.3	10.1	12.2	13.6	
SD		0.46	0.31	0.58	0.89		
Count		48	45	35	14	3	

Largemouth bass growth (solid line) compared to other lakes (dotted line).



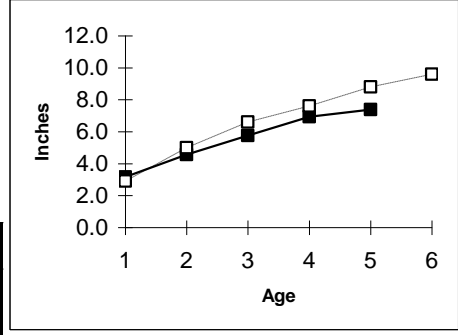
* Age groups with less than three samples not included in year class averages

Yellow perch
Intercept: 1.2 inch

BACK-CALCULATED LENGTH (inches) AT EACH AGE

Year Class	Count	I	II	III	IV	V	VI
2004	4	3.4					
	stdev	0.25					
2003	0						
	stdev						
2002	7	2.9	4.4	5.5			
	stdev	0.40	0.45	0.72			
2001	9	3.5	4.9	6.3	7.3		
	stdev	0.31	0.42	0.71	0.72		
2000	3	2.8	4.4	5.5	6.6	7.4	
	stdev	0.44	0.11	0.28	0.86	0.52	
1999	0						
	stdev						
Mean*		3.2	4.6	5.8	6.9	7.4	
SD		0.36	0.28	0.46	0.48		
Count		23	19	19	12	3	

Yellow perch growth (solid line) compared to other lakes (dotted line).



* Age groups with less than three samples not included in year class averages