

CARR LAKE
Kosciusko County
2006 Fish Management Report

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2007

EXECUTIVE SUMMARY

- A general lake survey was completed on Carr Lake from June 12 to 13, 2006. During this survey, water chemistry data was also collected. An aquatic vegetation survey was conducted on July 24, 2006.
- The Secchi disk reading was 5.5 ft on June 12 and 3 ft on July 24. Dissolved oxygen concentration was adequate for fish survival above 14 ft on June 12. Submersed vegetation was found to a maximum depth of 13.5 ft on July 24. Coontail dominated the plant population in the vegetation survey. Most of the shoreline was natural and comprised of several native species including white water lily, cattails, softstem bulrush, button bush, willow, spatterdock, and pickerelweed.
- A total of 559 fish, representing 14 species, was collected during the general survey. Bluegill ranked first by number, followed by largemouth bass and yellow perch. Largemouth bass ranked first by weight, followed by bluegill, carp, and yellow perch. Overall, the quality of the largemouth bass fishery was only fair because there were not many fish of harvestable size (>14 in). Largemouth bass reached 14.0 in TL between ages 5 and 6. In contrast, the bluegill population was of high quality because many fish were greater than 8 inches. Bluegill were fast-growing in this lake and reached 6.0 in TL by age 3.
- In Carr Lake, the DFW should maintain a 14-in minimum size limit on largemouth bass. In addition, if there is further interest in the bluegill fishery on this lake, targeted sampling should be conducted in 2007 to get a better picture of the bluegill population.

TABLE OF CONTENTS

	Page
LIST OF TABLES	iv
LIST OF FIGURES	v
INTRODUCTION	1
METHODS	1
RESULTS	2
DISCUSSION	3
RECOMMENDATIONS	4
LITERATURE CITED	4
APPENDIX: Lake pages.....	11

LIST OF TABLES

Table	Page
1. Carr Lake vegetation survey results by rake score on July 24, 2006. A total of 50 sites was sampled during the survey.....	5
2. Fish species and number of individuals captured in Carr Lake general surveys from 1978 through 2006. The species lists from 1970 and 1977 are not shown	6
3. Age-length key for bluegill captured using night electrofishing on Carr Lake in June 2006. The NA denotes where variance could not be calculated because the sample size was too small.	8
4. Age-length key for largemouth bass captured during the general survey on Carr Lake in June 2006. The NA denotes where variance could not be calculated because the sample size was too small.	9

LIST OF FIGURES

Figure	Page
1. Sampling gear locations in Carr Lake, Kosciusko County on June 12-13, 2006.....	10

INTRODUCTION

Carr Lake is a 79-acre natural lake located in southern Kosciusko County near Claypool, Indiana (Figure 1). Most of the shoreline is undeveloped making it one of the few natural lakes in the state that has remained relatively undisturbed by development. A state-owned public access site is located on the northwest shore. Maximum depth is 35 ft with an average depth of 17 ft. This lake was classified as eutrophic in 2004 based on the Indiana Trophic Status Index, meaning that there is high productivity within the lake (Indiana Department of Environmental Management (IDEM), 2004). Previous fish population surveys were conducted by the Indiana Department of Natural Resources in 1970, 1977, 1978, 1980, and 2000. Gizzard shad were abundant in the 1970 and 1977 surveys. In the winter of 1977/1978, a severe shad die-off occurred and they were not found in either the 1978 or 1980 surveys (Walterhouse 1988). It was determined in the 1988 survey that shad had reestablished themselves in Carr Lake. A fisheries survey was conducted in order to evaluate the current fishery of Carr Lake and to address concerns from the local anglers that the bluegill population was declining.

METHODS

The Carr Lake general survey was conducted from June 12 to 13, 2006 as part of DFW Work Plan 204755 that covers general fisheries surveys of natural lakes. Some physical and chemical characteristics of the water were measured in the deepest area of the lake (Indiana Division of Fish and Wildlife 2001). Submersed aquatic vegetation was sampled on July 24, 2006 using guidelines written by DFW (2006). A global positioning system (GPS) device was used to record the location of the limnological data collection site, aquatic vegetation sample sites, and fish collection sites.

Fish were collected by pulsed D.C. electrofishing the shoreline at night with two dippers for a total of 1 h (4 different locations, 15-minute stations). Two trap nets and four experimental-mesh gill nets were also fished overnight. All fish collected were measured to the nearest 0.1 in TL and weighed in the field to the nearest 0.01 lb.

Fish scale samples were taken from bluegill, largemouth bass, and yellow perch for age and growth analysis. Proportional stock density (PSD) and relative stock density (RSD) was calculated for bluegill and largemouth bass (Anderson and Neumann 1996). Additionally, age-

length keys and mean length-at-age were created and calculated for bluegill and largemouth bass captured during this general survey.

RESULTS

Carr Lake was at normal pool. On June 12, dissolved oxygen concentration was adequate for fish survival to 14 ft and Secchi depth was 5 ft, 6 in. The thermocline was located between 8 and 12 ft.

The Secchi disk reading was 3 ft on July 24. Submersed vegetation was found to a maximum depth of 13.5 ft (Table 1). In 40 sites sampled, coontail *Ceratophyllum demersum* (70%) dominated the vegetation population. Eurasian watermifoil *Myriophyllum spicatum* (10%), sago pondweed *Potamogeton pectinatus* (7.5%), Nitella spp. (5.0%), *Elodea canadensis* (2.5%), Najas spp. (2.5%), and curly-leaf pondweed *Potamogeton crispus* (2.5%) were also present in the lake. Coontail was prevalent and dense throughout 0 to 15 feet in depth and was the only species that was found at depths greater than 10 feet. Eurasian watermilfoil was found at low densities in the 0- to 10-ft depth range and was not considered to be at nuisance levels. The entire shoreline was natural and comprised of several native species including white water lily, cattails, softstem bulrush, button bush, willow, spatterdock, and pickerelweed.

A total of 559 fish, representing 14 species, was collected during the general survey. Total weight of the fish sample was approximately 316.3 lbs. Bluegill ranked first by number, followed by largemouth bass and yellow perch. Largemouth bass ranked first by weight followed by bluegill, carp, and yellow perch. Species collected in past surveys, but not in this survey, include golden shiner, black crappie, hybrid bluegill, redear sunfish, quillback, white bass, channel catfish, black bullhead, green sunfish, and central mudminnow (Table 2).

A total of 219 bluegills was sampled that weighed 46.14 lbs. They ranged in length from 1.4 to 10.3 in TL. Relative abundance by number and weight were 39.2% and 14.6%, respectively. The electrofishing, gill net, and trap net catch rates were 147 fish/h, 3.3 fish/lift, and 29.5 fish/lift, respectively. The bluegill PSD was 49. The bluegill RSD-8 was 10. The bluegill population in this lake was fast-growing and high quality because many fish were greater than 8 inches. Overall mean length of bluegill was 5.5 in (Table 3). Mean length-at-age data from the age-length key indicated bluegill reached 6 in (i.e. quality size) before age 3 (Table 4).

A total of 203 largemouth bass was sampled that weighed 125.15 lbs. They ranged in length from 3.3 to 19.0 in TL. Relative abundance by number and weight were 36.3% and 39.6%, respectively. The electrofishing, gill net, and trap net catch rates were 192.0 fish/h, 2.8 fish/lift, 0 fish/lift, respectively. Largemouth bass PSD was 28 and the RSD-14 was 12. Overall, the quality of the largemouth bass fishery was only fair because there were not many fish of harvestable size (>14 in). Overall mean length of bass was 10.1 in (Table 3). Mean length-at-age data from the age-length key indicated bass reached 14 in (i.e. harvestable size) between their 5th and 6th year of growth (Table 5).

A total of 52 yellow perch was sampled that weighed 28.89 lbs. They ranged in length from 5.8 to 13.2 in TL. Relative abundance by number and weight were 9.3% and 9.1%, respectively. The electrofishing, gill net, and trap net catch rates were 0 fish/h, 12.3 fish/lift, 1.5 fish/lift. The PSD could not be calculated because no perch were collected while electrofishing. Back-calculated lengths indicated yellow perch reached 7 in (i.e. quality size) between their 2nd and 3rd year of growth.

Gizzard shad and carp were also captured during the general survey. Only two shad were collected and both were greater than 16 inches in length. The abundance of gizzard shad has declined considerably since the 1988 general survey. Four carp were captured, ranging in size from 25.5 to 32.0 in TL and ranked second by weight overall.

DISCUSSION

Carr Lake was classified as eutrophic in 2004 based on the Indiana Trophic Status Index (Indiana Department of Environmental Management (IDEM), 2004). Water quality in Carr Lake has improved since the previous survey in 2000 (Braun 2001). During the 2000 survey, dissolved oxygen was not high enough below 10 ft to support fish. In the 2006 survey, dissolved oxygen was high enough to support fish up to a depth of 14 ft.

With a change in water quality, there has also been a shift in the fish community that has occurred since the 2000 general survey. Black crappies were not collected during this survey and may indicate that this species is no longer an important part of the fish community. In addition, largemouth bass doubled in number and maintained the same RSD-14. The bluegill population is still balanced in this lake similar to what was found in the 2000 general survey. However, only a third of the numbers were collected in this survey compared to the 2000 survey. This can be

explained in part because far more effort (2 more gill nets and 4 more trap nets) was used to collect fish on this lake in 2000 than in 2006. The discrepancy in the overall catch by trap nets is most likely the result of natural variabilities that arise when sampling occurs on only one day with fewer sites sampled in 2006, but that is difficult to determine without more data. Overall, this lake does not seem to have a problem with its bluegill fishery – in fact, it appears that bluegill grow faster and reach larger sizes in this lake than many other natural lakes. At this time, no additional management is necessary to provide angling opportunities at Carr Lake.

RECOMMENDATIONS

- The Division of Fish and Wildlife should maintain the 14-inch minimum size limit on largemouth bass at Carr Lake.
- If there is further interest in the bluegill fishery on this lake, targeted sampling should be conducted in 2007 to get a better picture of the bluegill population.

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- Submitted by: Angela C. Grier, Assistant Fisheries Biologist
Date: February 6, 2007

Approved by: Ed Braun, Fisheries Biologist

Approved by: Stu Shipman, Fisheries Supervisor
Date: February 20, 2007

Table 1. Carr Lake submerged vegetation survey results on July 24, 2006. A total of 40 sites were sampled.

Occurrence and Abundance of Submersed Aquatic Plants - Overall						
Lake:	Carr	Secchi (ft):	3	SE Mean species/site:	0.14	
Date:	7/24/2006	Littoral sites with plants:	29	Mean natives/site:	0.88	
Littoral Depth (ft):	13.5	Number of species:	7	SE Mean natives/site:	0.11	
Littoral Sites:	40	Maximum species/site:	4	Species diversity:	0.49	
Total Sites:	40	Mean species/site:	1	Native diversity:	0.35	
Species	Frequency of Occurrence	Score Frequency				Dominance
		0	1	3	5	
Coontail	70.0	30.0	17.5	17.5	35.0	49.0
Eurasian watermilfoil	10.0	90.0	5.0	5.0	0.0	4.0
Sago pondweed	7.5	92.5	2.5	5.0	0.0	3.5
Nitella spp.	5.0	95.0	5.0	0.0	0.0	1.0
Curly-leaf pondweed	2.5	97.5	2.5	0.0	0.0	0.5
Naiad spp.	2.5	97.5	2.5	0.0	0.0	0.5
Elodea	2.5	97.5	2.5	0.0	0.0	0.5
Filamentous Algae	35.0					
Occurrence and Abundance of Submersed Aquatic Plants - 0 to 5 ft.						
Lake:	Carr	Secchi (ft):	3	SE Mean species/site:	0.21	
Date:	7/24/2006	Littoral sites with plants:	17	Mean natives/site:	1.3	
Littoral Depth (ft):	13.5	Number of species:	7	SE Mean natives/site:	0.14	
Littoral Sites:	17	Maximum species/site:	4	Species diversity:	0.57	
Total Sites:	17	Mean species/site:	1.5	Native diversity:	0.45	
Species	Frequency of Occurrence	Score Frequency				Dominance
		0	1	3	5	
Coontail	94.1	5.9	11.8	23.5	58.8	75.3
Nitella spp.	11.8	88.2	11.8	0.0	0.0	2.4
Eurasian watermilfoil	11.8	88.2	5.9	5.9	0.0	4.7
Sago pondweed	11.8	88.2	0.0	11.8	0.0	7.1
Curly-leaf pondweed	5.9	94.1	5.9	0.0	0.0	1.2
Naiad spp.	5.9	94.1	5.9	0.0	0.0	1.2
Elodea	5.9	94.1	5.9	0.0	0.0	1.2
Filamentous Algae	64.7					

Occurrence and Abundance of Submersed Aquatic Plants - 5 to 10 ft.						
Lake:	Carr	Secchi (ft):	3	SE Mean species/site:	0.21	
Date:	7/24/2006	Littoral sites with plants:	9	Mean natives/site:	0.8	
Littoral Depth (ft):	13.5	Number of species:	3	SE Mean natives/site:	0.17	
Littoral Sites:	13	Maximum species/site:	2	Species diversity:	0.40	
Total Sites:	13	Mean species/site:	0.9	Native diversity:	0.18	
Species	Frequency of Occurrence	Score Frequency				Dominance
		0	1	3	5	
Coontail	69.2	30.8	15.4	23.1	30.8	47.7
Eurasian watermilfoil	15.4	84.6	7.7	7.7	0.0	6.2
Sago pondweed	7.7	92.3	7.7	0.0	0.0	1.5
Filamentous Algae	23.1					

Occurrence and Abundance of Submersed Aquatic Plants - 10 to 15 ft.						
Lake:	Carr	Secchi (ft):	3	SE Mean species/site:	0.15	
Date:	7/24/2006	Littoral sites with plants:	3	Mean natives/site:	0.3	
Littoral Depth (ft):	13.5	Number of species:	1	SE Mean natives/site:	0.15	
Littoral Sites:	6	Maximum species/site:	1	Species diversity:	0	
Total Sites:	10	Mean species/site:	0.3	Native diversity:	0	
Species	Frequency of Occurrence	Score Frequency				Dominance
		0	1	3	5	
Coontail	50.0	70.0	30.0	0.0	0.0	10.0

Table 2. Fish species and number of individuals captured in Carr Lake general surveys from 1978 through 2006. The species lists from 1970 and 1977 are not shown.

Species	1978	1980	1988	2000	2006
Bluegill	935	280	268	613	219
Largemouth bass	52	87	153	120	203
Yellow perch	26	37	9	102	52
Gizzard shad			195	76	2
Warmouth	17	16	16	69	20
Golden shiner	25	40	28	50	
Yellow bullhead	14	14	27	40	16
Black crappie	76	16	24	38	
Brown bullhead	17	16	8	19	2
Spotted gar	16	12	27	16	12
Pumpkinseed	15	5	7	16	7
Hybrid bluegill				10	
Carp	10	6	3	9	4
Lake chubsucker	45	14	6	9	10
Redear sunfish	2			2	
Grass pickerel	3			2	1
Quillback				1	
White sucker		3	3		9
White bass			1		
Spotted sucker	2	1			2
Channel catfish		1			
Black bullhead	2				
Green sunfish	1				
Central mudminnow	1				
Total	1,259	548	775	1,192	559

1978 effort: gill net = 12 lifts, trap nets = 12 lifts; AC electrofishing: Day = 1 h, Night = 1 h

1980 effort: gill net = 9 lifts, trap net = 9 lifts, AC electrofishing: Day = 0.32 h, Night = 1.05 h; PSDs calculated using only electrofishing data

1988 effort: DC electrofishing = 2.54 h; PSDs calculated using only electrofishing data

2000 effort: gill net = 6 lifts, trap net = 6 lifts, DC electrofishing = 0.75 h; PSDs calculated using only electrofishing data

2006 effort: gill net = 4 lifts, trap net = 2 lifts, DC electrofishing = 1 h; PSDs calculated using only electrofishing data

Table 4. Age-length key for bluegill captured using night electrofishing on Carr Lake in June 2006. The NA denotes where variance could not be calculated because the sample size was too small.

Length group	# in sample	# (age) in subsample	age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8
1.5	1	1 (1)	1							
2.0	2	2 (1)	2							
2.5	15	6 (1)	15							
3.0	16	6 (1), 1 (2)	14	2						
3.5	8	1 (2)		8						
4.0	21	7 (2)		21						
4.5	19	4 (2)		19						
5.0	18	5 (2)		18						
5.5	14	3 (3)			14					
6.0	24	5 (3)			24					
6.5	25	4 (3), 1 (4)			20	5				
7.0	5	3 (3)			5					
7.5	14	3 (3), 3 (4)			7	7				
8.0	15	1 (3), 5 (4)			3	13				
8.5	10	2 (4), 2 (5)				5	5			
9.0	3	1 (4), 1 (5), 1 (6)				1	1	1		
9.5	2	1 (5)					2			
10.0	6	1 (6), 4 (7), 1 (8)						1	4	1
Total	218		32	68	73	31	8	2		
Mean length (in)			2.7	4.3	6.3	7.8	8.8	9.5	10.0	10.0
Variance			0.136	0.304	0.442	0.454	0.210	0.500	0.000	NA

Table 5. Age-length key for largemouth bass captured during the general survey on Carr Lake in June 2006. The NA denotes where variance could not be calculated because the sample size was too small.

Length group	# in sample	# (age) in subsample	age 1	age 2	age 3	age 4	age 5	age 6
3.0	3	2 (1)	3					
3.5	17	5 (1)	17					
4.0	7	2 (1)	7					
4.5	1	1 (1)	1					
5.5	1	1 (2)		1				
6.0	1	1 (2)		1				
6.5	1	1 (2)		1				
7.0	7	5 (2)		7				
7.5	3	3 (2)		3				
8.0	4	3 (3)		4				
8.5	1	1 (2)		1				
9.0	7	4 (3)			7			
9.5	14	1 (2), 5 (3)		2	12			
10.0	20	5 (3)			20			
10.5	15	4 (3), 1 (4)			12	3		
11.0	29	4 (3), 2 (4)			19	10		
11.5	25	3(3), 2 (4)			15	10		
12.0	7	1 (3), 3 (4)			2	5		
12.5	9	4 (4)				9		
13.0	5	3 (4), 2 (5)				3	2	
13.5	10	2 (4), 2 (5)				5	5	
14.0	8	2 (4), 2 (5), 1 (6)				3	3	2
14.5	3	2 (5), 1 (6)					2	1
15.0	2	1 (6)						2
15.5	1	1 (6)						1
16.0	1	1 (6)						1
Total	199		28	20	87	48	12	7
Mean length (in)			3.6	7.5	10.4	12.0	13.7	14.9
Variance			0.118	1.051	0.652	1.021	0.248	0.560

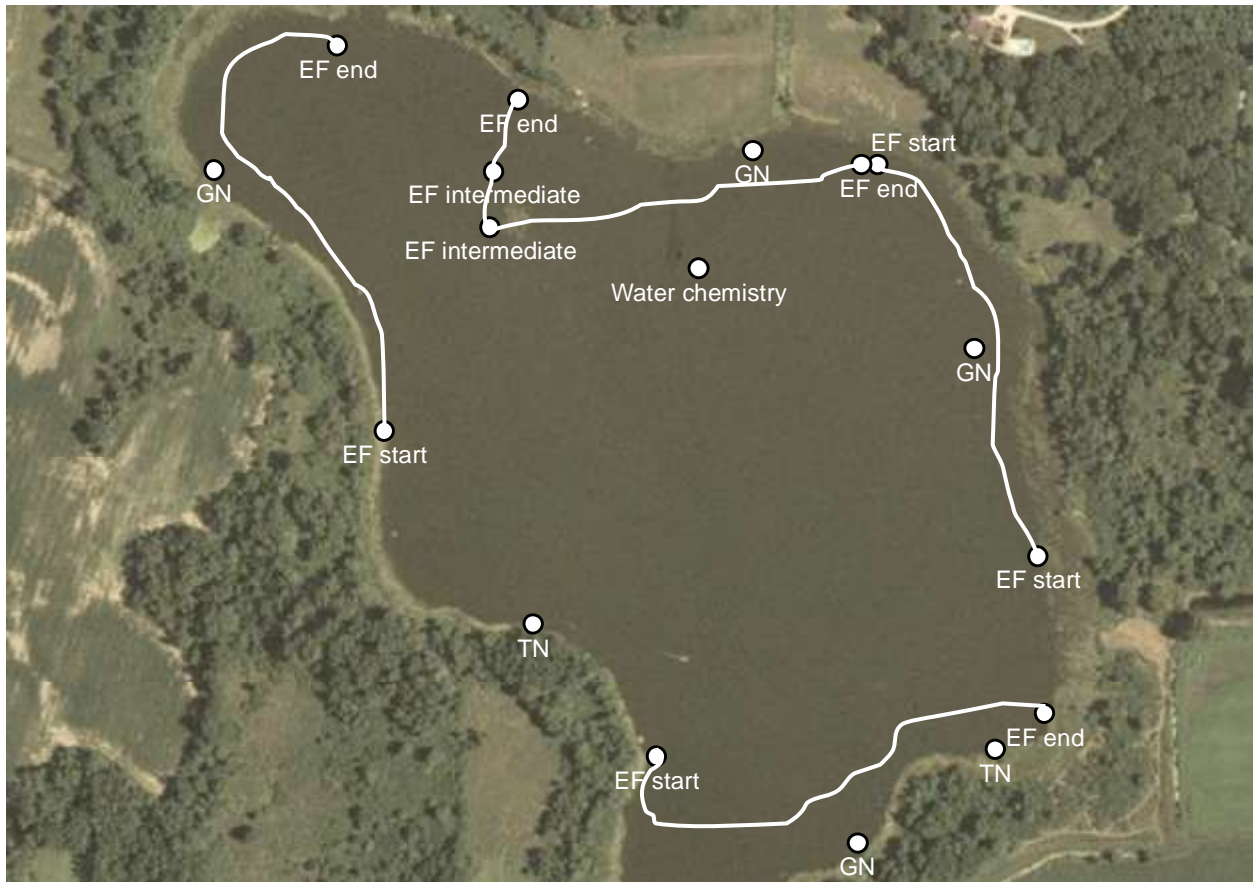


Figure 1. Sampling gear locations in Carr Lake, Kosciusko County on June 12-13, 2006.

APPENDIX

Lake Pages

LAKE SURVEY REPORT

Type of Survey	<input type="checkbox"/> Initial Survey	<input checked="" type="checkbox"/> Re-Survey
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Lake Name	County	Date of survey (Month, day, year)
Carr Lake	Kosciusko	6/12-13/2006
Biologist's name	Date of survey (Month, day, year)	
Edward R. Braun		

LOCATION		
Quadrangle Name	Range	Section
Warsaw	6E	9, 4
Township Name	Nearest Town	
31N	Claypool	

ACCESSIBILITY					
State owned public access site		Privately owned public access site		Other access site	
Northwest shore					
Surface acres	Maximum depth	Average depth	Acre feet	Water level	Extreme fluctuations
79	35 ft	17 ft	1,342	848.88 MSL	1 ft
Location of benchmark					
A water level gauge is located on the south shore					

INLETS		
Name	Location	Origin
Unnamed	Northwest	Reed Lake

OUTLETS			
Name	Location		
Unnamed to Walnut Creek	North shore		
Water level control			
Concrete dam			
POOL	ELEVATION (Feet MSL)	ACRES	Bottom type
TOP OF DAM			<input type="checkbox"/> Boulder
TOP OF FLOOD CONTROL POOL			<input type="checkbox"/> Gravel
TOP OF CONSERVATION POOL			<input checked="" type="checkbox"/> Sand
TOP OF MINIMUM POOL			<input checked="" type="checkbox"/> Muck
STREAMBED			<input checked="" type="checkbox"/> Clay
			<input checked="" type="checkbox"/> Marl

Watershed use
General farming and woodlots
Development of shoreline
South and northeast shorelines are developed for residential use.
Previous surveys and investigations
Fisheries surveys: 1970, 1977, 1978, 1980, 1988, and 2000

SAMPLING EFFORT					
ELECTROFISHING	Day hours		Night hours		Total hours
	0		1		1
TRAP NETS	Number of traps		Number of Lifts		Total effort
	2		2		2
GILL NETS	Number of nets		Number of Lifts		Total effort
	4		4		4
ROTENONE	Gallons	ppm	Acre Feet Treated	SHORELINE SEINING	Number of 100 Foot Seine Hauls

CARR LAKE

PHYSICAL AND CHEMICAL CHARACTERISTICS						
Color		Turbidity			Air temperature: F	
Green		5 Feet	6 Inches (SECCHI DISK)			
Water chemistry GPS coordinates:			N 41.15808427		W -85.8629609	

WATER QUALITY PARAMETERS																
DEPTH (Feet)	Degrees (F)	D.O.	SpC	pH	TDS	D.O.%	Turb.	DEPTH	Degrees (F)	D.O.	SpC	pH	TDS	D.O.%	Turb.	
SURFACE	70.9	11.77	0.435	9.64	0.3	11.77	10.1	52								
2	71	11.5	0.436	9.64	0.3	11.5	9.2	54								
4	70.9	11.27	0.435	9.65	0.3	131.9	9.5	56								
6	70.7	11.24	0.435	9.65	0.3	131	9.2	58								
8	70.6	10.82	0.436	9.62	0.3	126.2	8.7	60								
10	65.8	7.11	0.458	8.68	0.3	75.5	9	62								
12	62.2	4.68	0.461	8.51	0.3	48.2	13.8	64								
14	59.7	2.71	0.467	8.39	0.3	27.9	17.2	66								
16	58.2	1.32	0.47	8.36	0.3	13.2	18.9	68								
18	56.9	1.11	0.471	8.36	0.3	11	20.4	70								
20	54.7	0.97	0.468	8.34	0.3	9.4	25.9	72								
22	52.7	0.81	0.468	8.31	0.3	7.7	27.1	74								
24	51.3	0.72	0.469	8.26	0.3	6.7	26.3	76								
26	50.4	0.67	0.467	8.24	0.3	6.1	25.4	78								
28	49.3	0.6	0.471	8.2	0.3	5.4	25	80								
30	48.7	0.5	0.476	8.15	0.3	4.5	25.9	82								
32	48.2	0.41	0.489	8.1	0.3	3.7	25.3	84								
34	47.9	0.35	0.524	7.98	0.3	3.1	5999	86								
36								88								
38								90								
40								92								
42								94								
44								96								
46								98								
48								100								
50																

SPECIES AND RELATIVE ABUNDANCE OF FISHES COLLECTED BY NUMBER AND WEIGHT

*Common name of fish	Number	Percent	Length range (in)	Weight (lbs)	Percent
Bluegill	219	39.2	1.4 - 10.3	46.14	14.6
Largemouth bass	203	36.3	3.3 - 19.0	125.15	39.6
Yellow perch	52	9.3	5.8 - 13.2	28.89	9.1
Warmouth	20	3.6	3.6 - 8.4	4.52	1.4
Yellow bullhead	16	2.9	9.2 - 13.9	15.29	4.8
Spotted gar	12	2.1	19.3 - 26.6	19.50	6.2
Lake chubsucker	10	1.8	4.1 - 10.8	3.10	1.0
White sucker	9	1.6	9.8 - 17.6	7.49	2.4
Pumpkinseed	7	1.3	5.9 - 7.7	2.02	0.6
Carp	4	0.7	25.5 - 32.0	54.57	17.3
Gizzard shad	2	0.4	16.7 - 17.6	3.70	1.2
Brown bullhead	2	0.4	12.3 - 16.4	3.32	1.0
Spotted sucker	2	0.4	7.9 - 16.9	2.15	0.7
Redfin pickerel	1	0.2	13.3	0.46	0.1
Total (14 Species)	559	100.0		316.30	100.0

*Common names of fishes recognized by the American Fisheries Society.

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	1	0.5	0.00		19.5					
2.0	1	0.5	0.00		20.0					
2.5	8	3.7	0.01		20.5					
3.0	16	7.3	0.02		21.0					
3.5	15	6.8	0.03		21.5					
4.0	10	4.6	0.05		22.0					
4.5	24	11.0	0.06		22.5					
5.0	19	8.7	0.09		23.0					
5.5	12	5.5	0.12		23.5					
6.0	26	11.9	0.18		24.0					
6.5	26	11.9	0.23		24.5					
7.0	9	4.1	0.29		25.0					
7.5	13	5.9	0.36		25.5					
8.0	12	5.5	0.44		26.0					
8.5	10	4.6	0.51		TOTAL	219	100			
9.0	8	3.7	0.58							
9.5	2	0.9	0.71							
10.0	6	2.7	0.85							
10.5	1	0.5	0.94							
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		147 fish/h		GILL NET CATCH		3.3 fish/lift		TRAP NET CATCH		29.5 fish/lift

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					19.0	1	0.5	3.64		
1.5					19.5					
2.0					20.0					
2.5					20.5					
3.0					21.0					
3.5	10	4.9	0.02		21.5					
4.0	16	7.9	0.03		22.0					
4.5	1	0.5	0.04		22.5					
5.0	1	0.5	0.05		23.0					
5.5	1	0.5	0.08		23.5					
6.0	1	0.5	0.11		24.0					
6.5	1	0.5	0.14		24.5					
7.0	5	2.5	0.16		25.0					
7.5	5	2.5	0.19		25.5					
8.0	1	0.5	0.26		26.0					
8.5	4	2.0	0.28		TOTAL	203				
9.0	4	2.0	0.32							
9.5	7	3.4	0.38							
10.0	22	10.8	0.45							
10.5	15	7.4	0.52							
11.0	22	10.8	0.59							
11.5	30	14.8	0.68							
12.0	15	7.4	0.78							
12.5	9	4.4	0.90							
13.0	5	2.5	0.99							
13.5	8	3.9	1.13							
14.0	8	3.9	1.24							
14.5	6	3.0	1.40							
15.0	1	0.5	1.82							
15.5	2	1.0	1.88							
16.0	2	1.0	2.19							
16.5										
17.0										
17.5										
18.0										
18.5										
ELECTROFISHING CATCH		192 fish/h		GILL NET CATCH		2.8 fish/lift		TRAP NET CATCH		0 fish/lift

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF YELLOW PERCH									
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					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	3	5.8	0.09		24.0				
6.5	2	3.8	0.13		24.5				
7.0	2	3.8	0.15		25.0				
7.5	3	5.8	0.21		25.5				
8.0	4	7.7	0.23		26.0				
8.5	5	9.6	0.31		TOTAL	52	100		
9.0	3	5.8	0.39						
9.5	4	7.7	0.40						
10.0	3	5.8	0.51						
10.5	3	5.8	0.63						
11.0	1	1.9	0.65						
11.5	6	11.5	0.77						
12.0	7	13.5	0.90						
12.5	2	3.8	1.20						
13.0	2	3.8	1.22						
13.5	2	3.8	1.19						
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									
ELECTROFISHING CATCH	0 fish/h			GILL NET CATCH	12.3 fish/lift		TRAP NET CATCH	1.5 fish/lift	

Back-calculated lengths-at-age for bluegill, largemouth bass, and yellow perch in Carr Lake in June 2006.

Bluegill	Year	Number	Back Calculated Length (inches) at Each Age							
	Class	Aged	1	2	3	4	5	6	7	8
Intercept = 0.8	2005	15	2.1							
	2004	18	1.6	3.4						
	2003	20	1.4	2.9	5.7					
	2002	12	1.4	2.7	4.9	7.7				
	2001	4	1.7	3.0	5.6	8.2	8.9			
	2000	2	1.4	2.5	4.3	6.9	8.3	9.4		
	1999	4	1.7	3.2	6.0	8.0	8.9	9.6	10.0	
	1998	1	1.9	4.1	6.9	8.5	9.1	9.4	9.6	9.9

Largemouth bass	Year	Number	Back Calculated Length (inches) at Each Age					
	Class	Aged	1	2	3	4	5	6
Intercept = 0.8	2005	10	2.7					
	2004	13	3.1	6.1				
	2003	29	4.2	7.3	9.6			
	2002	19	4.3	8.7	11.0	12.2		
	2001	8	4.5	9.3	11.9	13.0	13.6	
	2000	5	4.3	8.6	12.0	13.4	14.4	15.1

Year Class	Number Aged	Back Calculated Length (inches) at Each Age											
		1	2	3	4	5	6	7	8	9	10	11	
2004	19	3.8	6.6										
2003	1	4.2	8.4	10.0									
2002	9	2.9	5.5	8.4	9.7								
2001	4	3.5	6.6	9.6	10.7	11.6							
2000	3	3.3	6.2	9.0	10.1	10.9	11.5						
1999	4	4.1	6.8	9.3	10.5	11.0	11.4	11.7					
1998	2	3.5	6.0	8.9	10.8	11.6	12.2	12.6	13.0				
1997	1	3.8	7.2	9.0	10.5	11.1	11.6	12.0	12.2	12.3			
1996	1	3.8	6.5	9.3	2.2	12.0	12.3	12.7	13.0	13.1	13.3		
1995	1	3.6	5.9	7.9	9.5	10.4	10.7	11.1	11.3	11.6	11.7	11.9	

Locations of gear types in Carr Lake given in decimal degrees.

GILL NETS				TRAP NETS				ELECTROFISHING			
1 N	41.15882456	W	-85.8674456	1 N	41.15466714	W	-85.8602519	1 N	41.15696847	W	-85.8659006
2 N	41.15402341	W	-85.8615447	2 N	41.15559518	W	-85.8645434	N	41.15968287	W	-85.8662868
3 N	41.15748882	W	-85.8604021					2 N	41.15465105	W	-85.8634115
4 N	41.15890503	W	-85.8624406					N	41.1549139	W	-85.8597959
								3 N	41.15602434	W	-85.8598388
								N	41.15879774	W	-85.8612765
								4 N	41.15879774	W	-85.8614267
								N	41.15878701	W	-85.8648545
								N	41.15839005	W	-85.8648975
								N	41.15929127	W	-85.8646185