
Lake Survey Report for Big Bass Lake, Marathon County, WI

Final Report
March 2007



Figure 1: Aerial Photo of Big Bass Lake Taken in 1992, showing the fall 2005 electrofishing IBI survey (solid red line) and spring 2006 fyke net locations (dotted blue line).

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Executive Summary:

Two fishery surveys were completed on Big Bass Lake in 2005 and one was completed in 2006. A single night mini-fyke net survey was performed in early August of 2005 and a single run electrofishing run was performed in late September of 2005. During April of 2006, fyke nets were set for four nights. During the summer of 2005 young of year panfish and gamefish were targeted and resulted in catches of black crappie, bluegill, green sunfish, largemouth bass and yellow perch. The fall electrofishing run, which included an index station, turned up black crappie, bluegill, largemouth bass and yellow perch. The spring fyke net survey produced walleye, northern pike, largemouth bass, yellow perch, bluegill and pumpkinseed sunfish. Previous surveys used different surveying techniques which resulted in a lack of comparability between surveys. Future surveys should be completed in a similar fashion as previous surveys to evaluate trends and regulations in the fish community.

Lake and Location:

Big Bass Lake, WBIC 375001
SE Marathon County, T26N, R9E, Section 20, N 44.71947 W -89.43318, near the town of Bevent.

Physical, Chemical Characteristics

Morphometry: 174 Acres, mean depth 5 feet, max depth 13 feet.

Lake Type: Seepage (Ground water from NW), occasionally drainage during high water events.

*Water Chemistry (2001): Hardness 92 mg/l; Alkalinity 89 mg/l; Chloride 8 mg/l; Nitrate+nitrite-N= 0.11 mg/l; pH 8.26; Conductivity 176 us/m³

*Littoral Substrate (2001): Silt 65%; 28% sand; 7% gravel.

†Aquatic Vegetation (1999): Swamp milkweed, spike rush, softstem bulrush, common cattail, yellow pond lily, white water lily, *Chara sp.*, *Potamogeton sp.*

*Shoreline (2001): Wetland (NE) 20%, upland 80%

Winterkill: Historical (current aeration system prevents winterkill)

Other features: Connecting channel between Big Bass Lake and Plover River, controlled by small damming structure.

*(Information provide by Big Bass Lake Planning Grant Final Report, 2001)

†(Information provided by The Aquatic Plant Community of Big Bass Lake)

Fishing Regulations

Current fishing regulations on Big Bass Lake as of 2005 follow the general state regulations: panfish- 25 total daily bag limit; largemouth bass- 5 total daily bag limit; northern pike; five total daily bag limit.

Background:

Past Surveys

A single Alternating Current (AC) electrofishing run was completed in September of 1993. During this survey large mouth bass, walleye, northern pike, white sucker, bluegill, black crappie, pumpkinseed, yellow perch and golden shiners were captured. Bluegills were the most numerous (n=19) where as largemouth bass were the longest (17”).

In 2000, three surveys were performed on Big Bass Lake. In April, a single electrofishing (AC) run was completed. This survey turned up largemouth bass, walleye, northern pike, yellow perch, black crappie and bluegill. Bluegill was the most common fish shocked and northern pike, walleye and largemouth bass were the largest (28.0”, 22.0” and 18.5” respectively). In mid-July, another electrofishing survey was completed to collect samples for contaminant testing. Walleyes up to 21.0 inches and largemouth bass up to 19.0 inches were captured along with bluegill, pumpkinseed and Iowa darters. During the same day, four mini-fyke nets were set for one night to capture young-of-year panfish and gamefish. Bluegills, black crappies, pumpkinseed, largemouth bass, green sunfish and yellow perch were captured (Table 1).

In early June of 2002, another single run electrofishing (AC) survey was performed to evaluate the panfish (1/2 mile index station) and gamefish (entire shoreline) community. Bluegills were the dominant fish species captured along with pumpkinseed and largemouth bass.

Deborah Konkel (WDNR) completed an Aquatic Plant Community evaluation in 1999 which covered the current make up of macrophytes in Big Bass Lake. The Big Bass Lake Planning Grant Final Report was complete in 2001 by Byron Shaw (UWSP) and Dean Kaatz (Marathon County LCD). They presented results and discussed options dealing with the water quality issues experienced in Big Bass Lake and homeowners surrounding it.

Stocking Report

Stocking has occurred in Big Bass Lake for the past several decades (Table 1). Northern Pike were the most numerous species stocked; largemouth bass have also been stocked. Since 1989 almost 9,000 northern pike fingerlings (7-9” long) have been stocked. Notable numbers of northern pike (668,027) and largemouth bass (15,000) fry were stocked in 1986 and 1988 respectively.

Table 1. Recent Stocking Events that have taken Place in Big Bass Lake.

Year	Species	Size	Number
1986	Northern Pike	Fry	683,027
1988	Largemouth Bass	Fry	15,000
1989	Northern Pike	Fingerling	445
1990	Northern Pike	Fingerling	900
1991	Northern Pike	Fingerling	870
1992	Northern Pike	Fingerling	5,000
1993	Northern Pike	Fingerling	1000
1995	Northern Pike	Fingerling	765

Methods:

Spring Fyke Netting

Personnel with the Wisconsin Department of Natural Resources (WDNR) fished four fyke nets from April 10 until April 14, 2006 targeting adult gamefish. Each net has 4' x 5' frames with 0.5"-0.75" bar-mesh and leads ranging from 50-100 feet in length. Nets were set in varying habitat types (i.e. substrate and vegetation) and depths along the shoreline (Figure 1). Individual net data was recorded separately. Length (nearest 0.1 inch) was recorded for each gamefish and all panfish except for bluegills captured during April 14 (only a count was done). Weight (nearest 0.1 Kg) was recorded and an age structure was removed for the first five fish in each 0.5' category. Bluegill, pumpkinseed sunfish and yellow perch were aged using scales. Northern pike were aged using the anterior anal fin ray, largemouth bass were aged using an anal fin spine and walleye were aged using a dorsal fin spine. All gamefish were fin clipped.

Summer Fyke Netting

Personnel with the Wisconsin Department of Natural Resources (WDNR) fished six mini-fyke nets from August 23 to August 24, 2005 to target Young of Year (YOY) panfish and gamefish. Each net had 3' x 3' frames with white nylon 3/16" bar mesh with turtle exclusions on the rear frame. Each lead was 30 feet long. Nets were set in varying habitat types (i.e. substrate and vegetation type/density) and depths of water. Individual net data were recorded separately. Length (nearest 0.1 inch) was recorded for all panfish and gamefish captured. No weights or age structures were taken for fish captured during this survey.

Fall Electrofishing

Electrofishing was conducted on September 27, 2005 at night using an AC electrofishing boat operating at an output of 100 Volts and 5.9 Amps. The effort was used to gather length and catch per effort (CPE) data. The entire shoreline (GET station; 2.0 miles) was shocked once during the night during which all gamefish were collected. A ½ mile index station, starting at landing and going clockwise, (Figure 1) was selected to collect both gamefish and panfish species. Electrofishing catch per unit effort (CPUE) was recorded in tenths of hours.

Results:

Spring Fyke Netting

Fyke nets were fished for a total of 16 net-nights during April 2006. Six species of fish were captured in the fyke nets. Bluegill was the most numerous with the other captured species being northern pike, walleye, largemouth bass, yellow perch and pumpkinseed sunfish (Table 2).

Bluegill

Bluegills were captured at a rate of 43 per net/night for a total of 689 in 2006 (Table 2). They averaged 6.5 inches and were most abundant in the length range from 5.5 to 7.5 inches (Figure 2). The PSD value was 81%, but RSD_p was 2% (Table 3). W_r values of bluegill were below standard and averaged 60 (Figure 3). Bluegill growth rates were greater than the central lakes average, but few fish above 8" were captured (Figure 4).

Black Crappie

Only 10 black crappies were captured in the fyke nets for a catch rate of 0.6 black crappies per net/night (Table 2). Black crappie averaged 10.1 inches and those captured ranged from 9.3-11.3 inches. Wr values averaged 81, below the desired 100 (Figure 5). Growth rates were slightly above the central lake average for the age classes represented in our catch (Figure 6). PSD and RSD values were not calculated.

Yellow Perch

Yellow Perch were also captured at a low rate of 0.9 per net/night for a total of 15 captured (Table 2). Yellow perch averaged 8.5 inches with fish ranging from 7.2-9.3 inches. Wr values averaged 51%, well below standard (Figure 7). Growth rates were above the central lakes average for fish aged 2-4, but similar by age 5 (Figure 8). PSD was 87 and RSDp was 7 (Table 3).

Largemouth Bass

A total of 21 largemouth bass were captured in the fyke nets or 1.2 per net/night (Table 2). The bass averaged 13.1 inches and ranged from 10.0 to 19.0 inches (Figure 9). Wr for bass averaged 84% and was consistently below standard (Figure 10). Largemouth bass growth was right at the central lakes average (Figure 11). While PSD and RSDp were 57% and 29%, respectively (Table 3).

Northern Pike

Only 3 northern pike were captured in the survey for a rate of 0.4 per net/night (Table 2). These were all fish greater than 25 inches. Growth was calculated for the 3 fish available, but inconclusive (Figure 12). A few fish from fall electrofishing were combined with fyke netted fish to calculate Wr, which was below standard (Figure 13). Stock density values could not be calculated.

Walleye

A total of 19 walleye were captured for a rate of 1.2 fish per net/night (Table 2). The walleye averaged 21.6 inches and ranged in size from 20.0 to 23.8 inches (Figure 14). Wr for walleye averaged 79%, below standard (Figure 15). PSD and RSDp were 100% (Table 3).

Table 2. Total number and Catch Per Effort (CPE) of fish captured using fyke nets set in Big Bass Lake, WI during the spring of 2006.

Species	Total number	CPE (fish/net/night)
Bluegill	689	43
Black crappie	10	0.6
Yellow perch	15	0.9
Northern pike	3	0.4
Walleye	19	1.2
Largemouth bass	21	1.3

Table 3. Proportional Stock Density (PSD) and Relative Stock Density Preferred (RSD_P) values for fish captured in fyke nets from Big Bass Lake during the spring of 2006.

Species	PSD	RSD _P
Bluegill	81	2
Walleye	100	100
Largemouth bass	57	29
Yellow perch	87	7

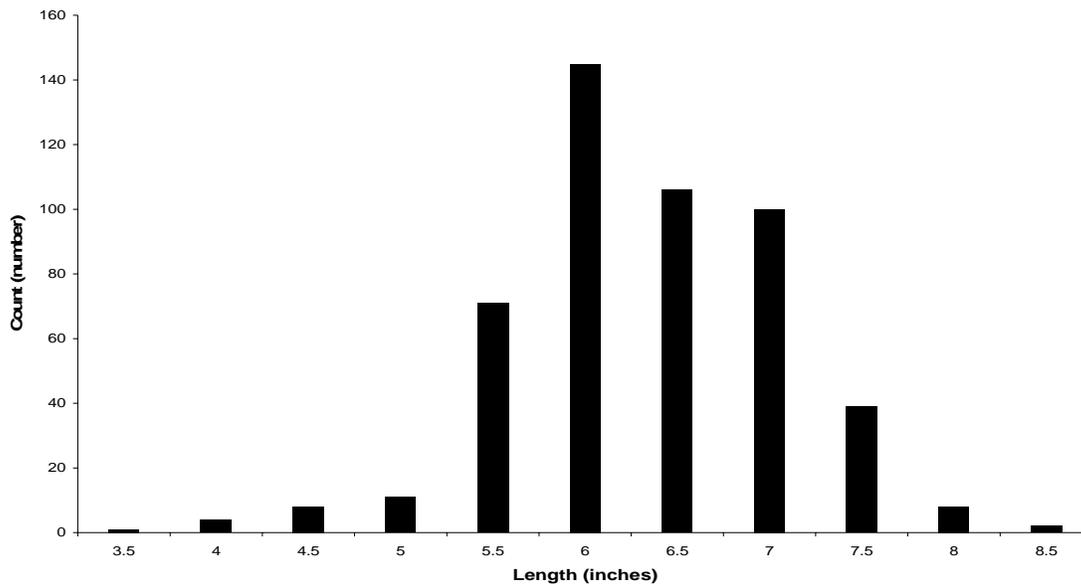


Figure 2. Length frequency of bluegill captured by fyke nets set in Big Bass Lake during the spring of 2006.

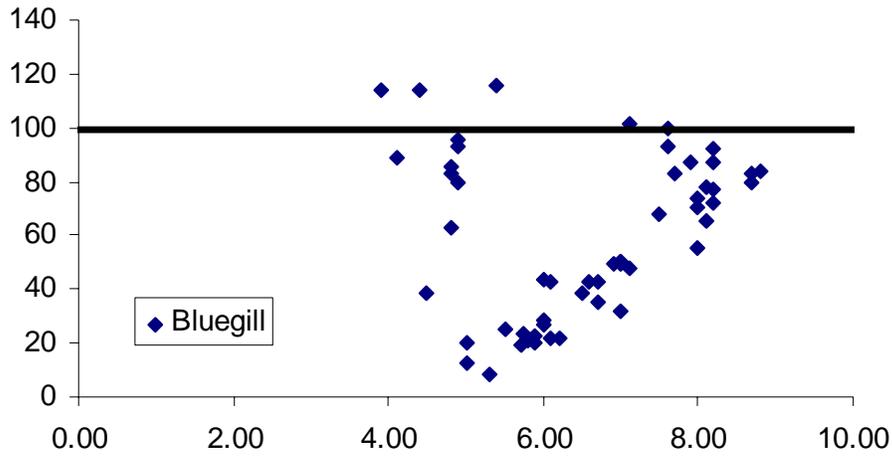


Figure 3. Relative Weight of Bluegill captured by fyke nets set in Big Bass Lake during the spring of 2006.

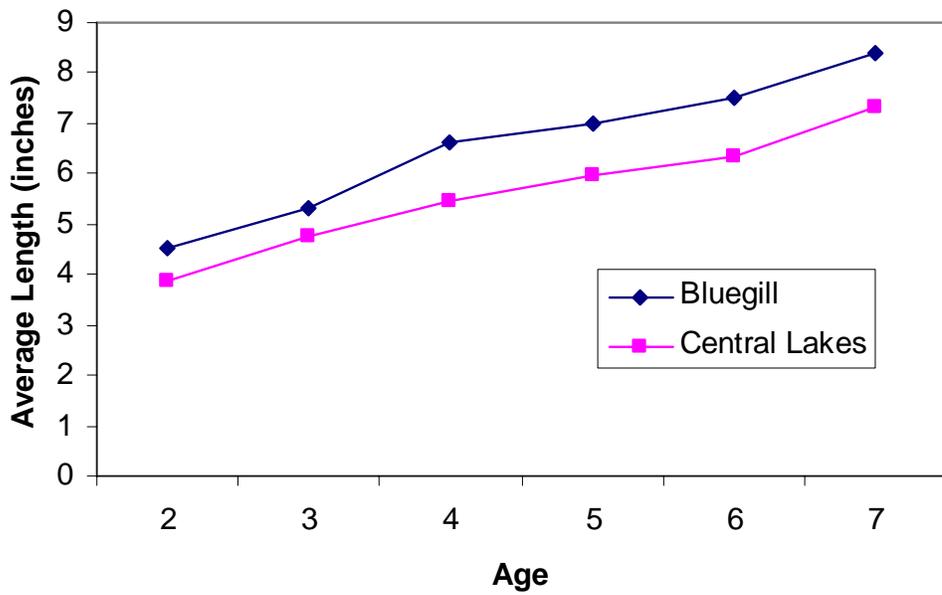


Figure 4. Length at age of bluegill captured by fyke nets set in Big Bass Lake during the spring of 2006.

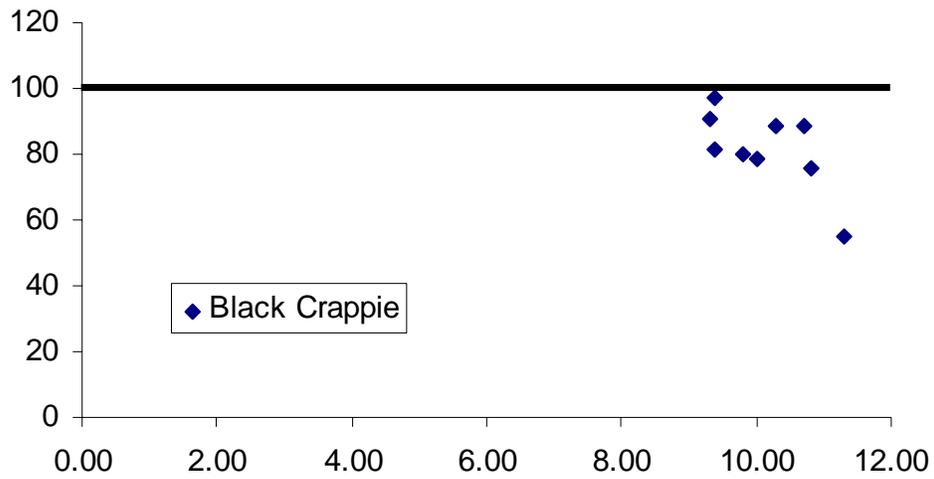


Figure 5. Relative Weight (W_R) of black crappie captured by fyke nets set in Big Bass Lake during the spring of 2006.

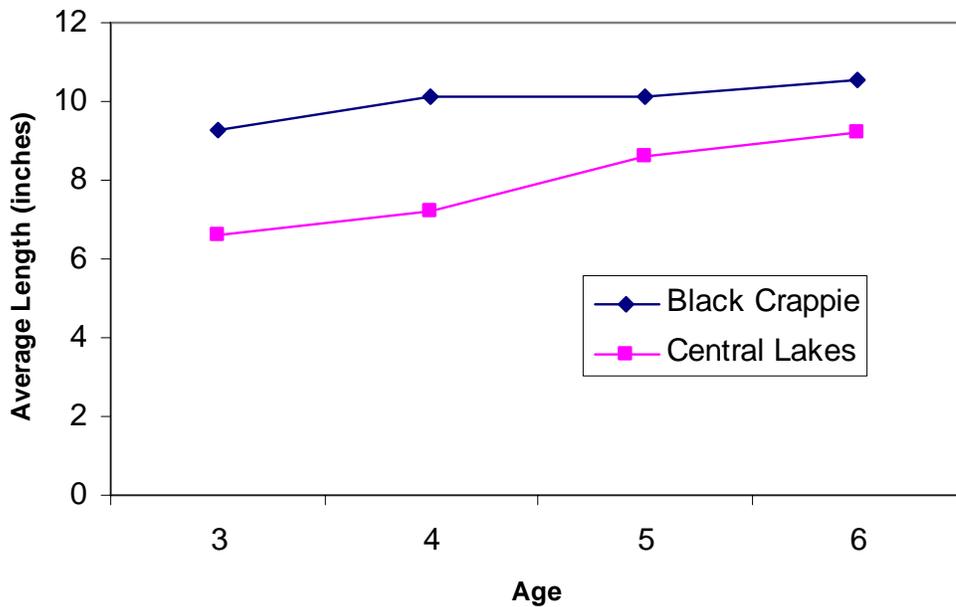


Figure 6. Length at age of black crappie captured by fyke nets set in Big Bass Lake during the spring of 2006.

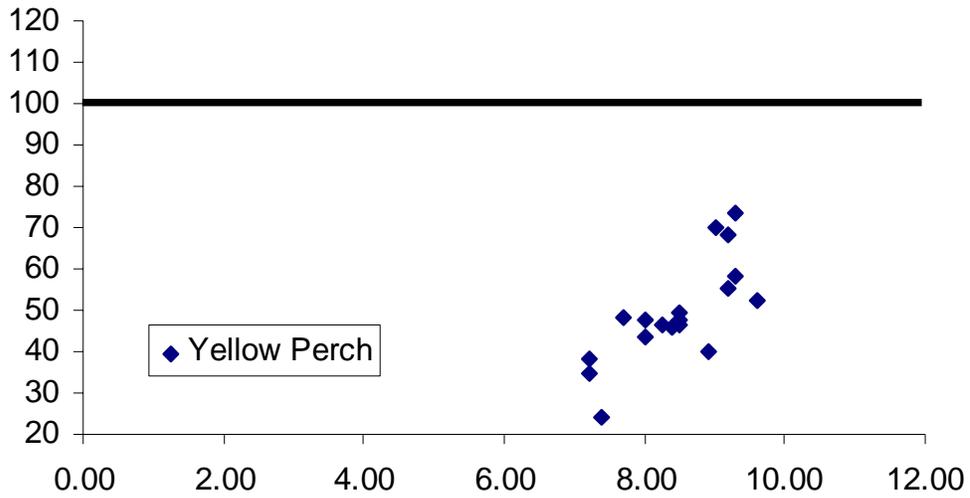


Figure 7. Relative Weight (W_R) of yellow perch captured by fyke nets set in Big Bass Lake during the spring of 2006.

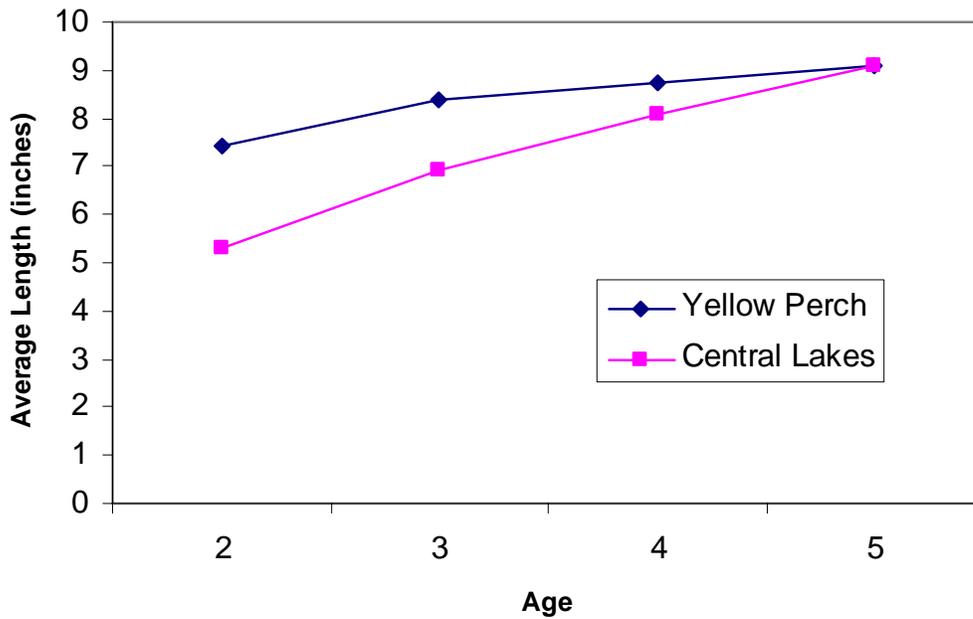


Figure 8. Length at age of yellow perch captured by fyke nets set in Big Bass Lake during the spring of 2006.

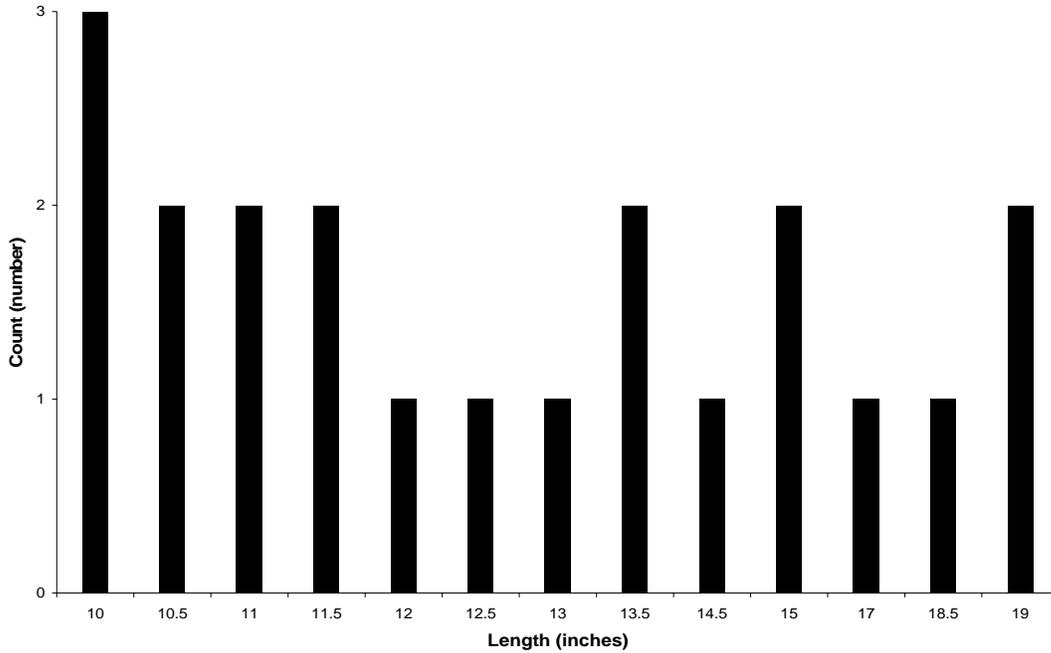


Figure 9. Length frequency of largemouth bass captured by fyke nets set in Big Bass Lake during the spring of 2006.

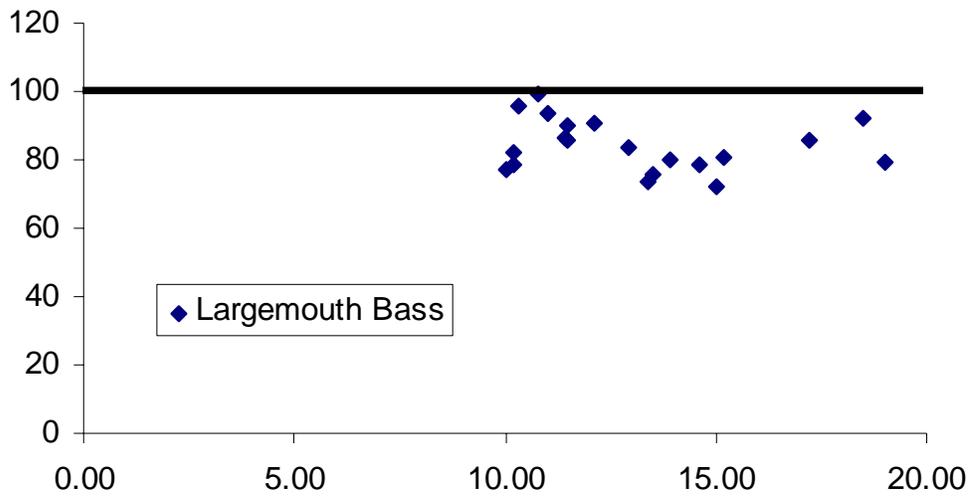


Figure 10. Relative Weight of largemouth bass captured by fyke nets set in Big Bass Lake during the spring of 2006.

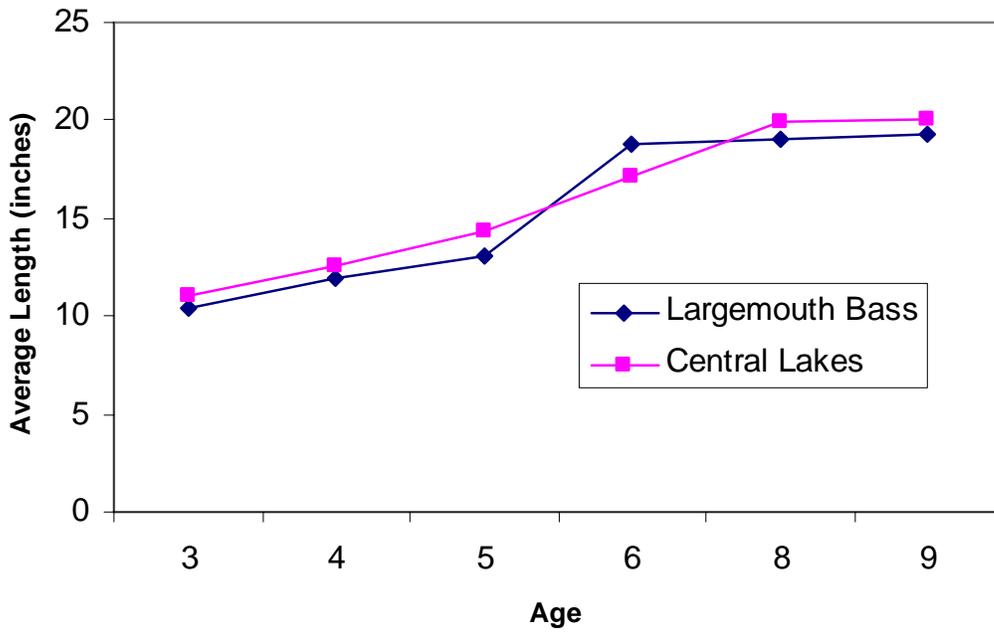


Figure 11. Length at age of largemouth bass captured by fyke nets set in Big Bass Lake during the spring of 2006.

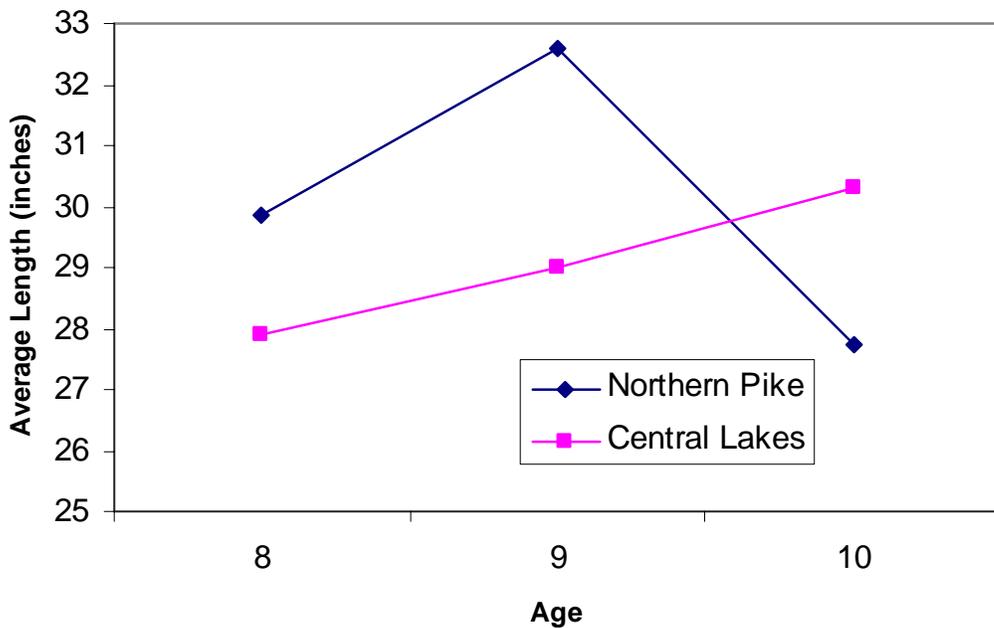


Figure 12. Length at age of northern pike captured by fyke nets set in Big Bass Lake during the spring of 2006.

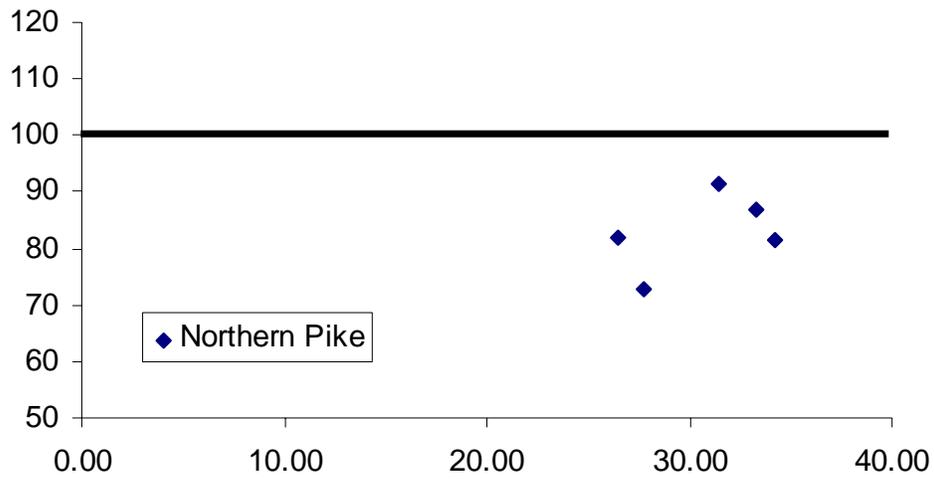


Figure 13. Relative Weight (W_R) of northern pike captured by fyke nets set in Big Bass Lake during the spring of 2006.

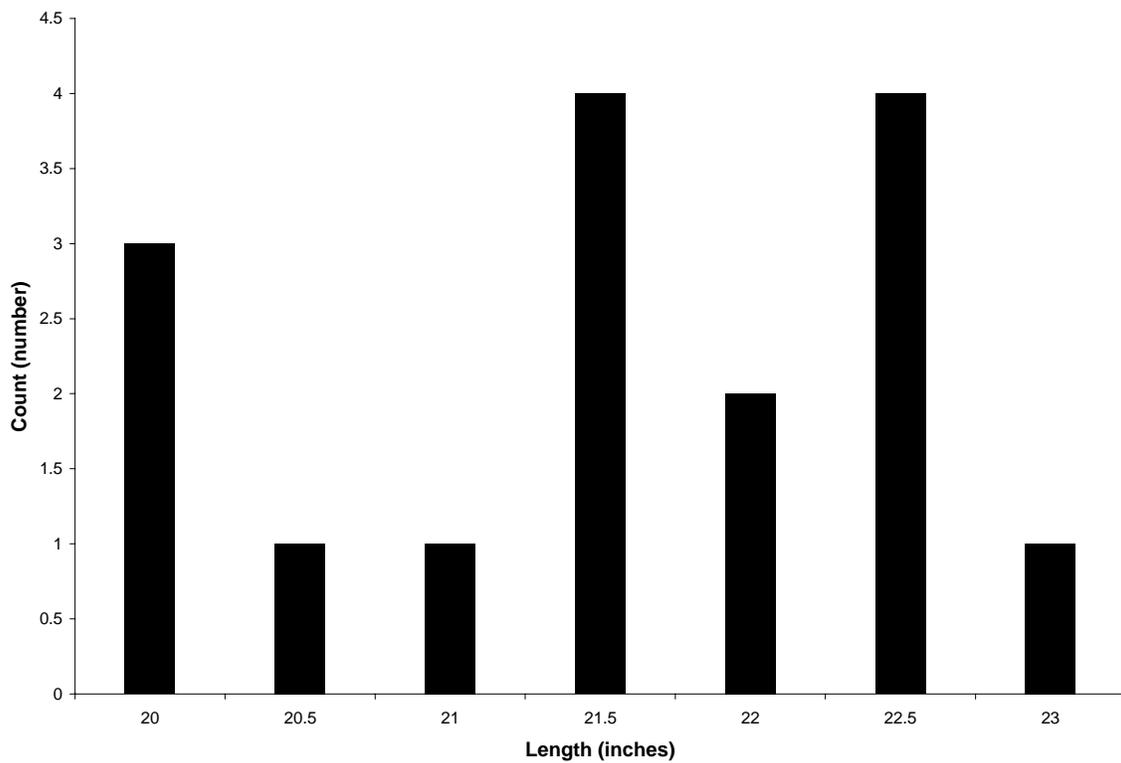


Figure 14. Length frequency of walleye captured by fyke nets set in Big Bass Lake during the spring of 2006.

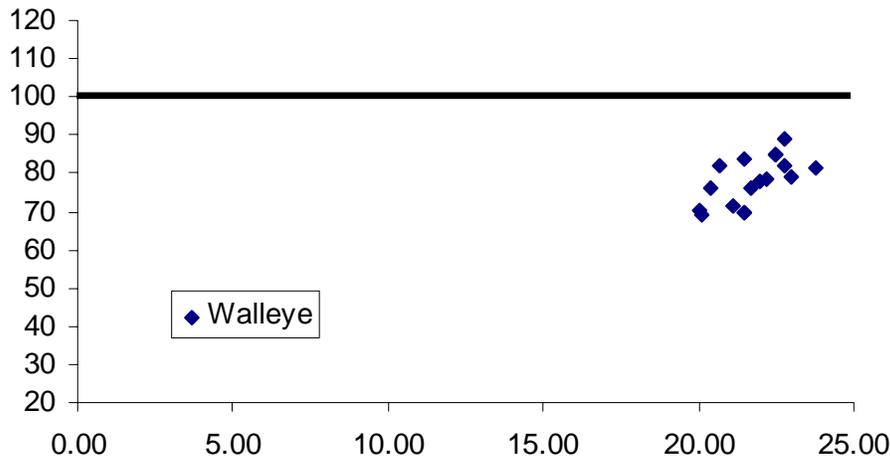


Figure 15. Relative Weight of walleye captured by fyke nets set in Big Bass Lake during the spring of 2006.

Fall Electrofishing

Electrofishing the ½ mile index station took 12 minutes (0.2 hours), the entire lake took 56 minutes (1.0 hours). Four species of fish were captured while electrofishing in the ½ mile index station, bluegill being the most common (Table 4). The longest bluegill captured was 7.5 inches and the mean was 5.9 inches (Figure 16). The longest largemouth bass being 18.8 inches and the mean 11.5 inches (Figure 17).

Table 4. Number of Fish Captured and Catch per Mile using a Mini-boom Electrofishing Boat in Big Bass Lake on September 27, 2005.

Species	All Species (index station)		Gamefish (GET Station)	
	Number of Fish	Catch per Mile/Hour	Number of Fish	Catch per Mile/Hour
Black Crappie	1	2/10		
Bluegill	100	200/1000		
Largemouth Bass	5	10/50	6	4/6
Yellow Perch	1	2/10		

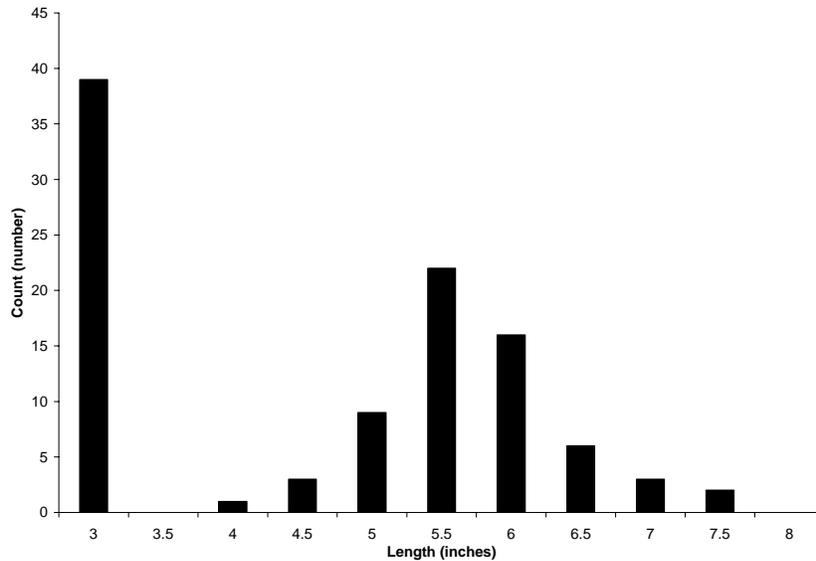


Figure 16. Length Frequency of Bluegills Captured using a Mini-boom Electrofishing Boat in Big Bass Lake during the night of September 27, 2005.

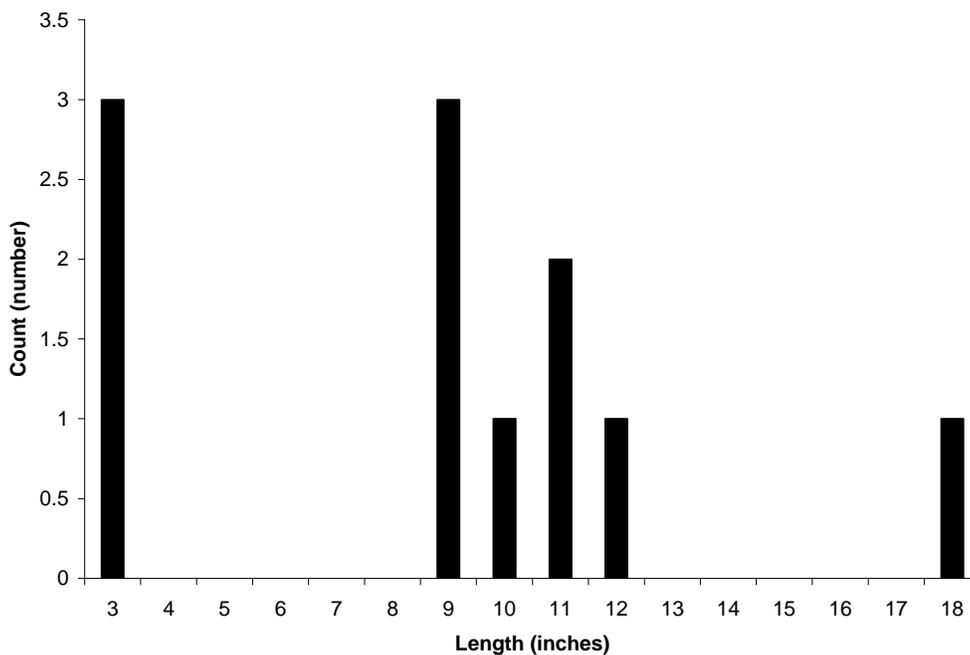


Figure 17. Length Frequency of Largemouth Bass Captured using a Mini-boom Electrofishing Boat in Big Bass Lake during the night of September 27, 2005.

Discussion:

Big Bass Lake has mainly been managed to maintain a healthy self-sustaining largemouth bass-bluegill fishery. Northern pike and walleye, although in good condition and exhibiting several age classes, have low abundance and play a minor predatory role in the fishery. Yellow perch and black crappie comprise a smaller part of the prey base than do bluegills and should be managed as such.

Largemouth bass captures are low although the completed surveys have not specifically targeted them. Late spring electrofishing surveys that target adult largemouth bass should provide more catches. Data collected from these surveys will provide better abundance, size structure, growth and condition factors. Largemouth bass recruitment appears to be increasing as demonstrated by the summer fyke netting. Future summer mini-fyke net surveys should be completed to evaluate trends in recruitment.

Bluegills appear to be abundant with good growth, although few large bluegills over 8 inches (memorable length) were found. Late spring electrofishing surveys that target adult bluegills will determine if there are more “memorable” size bluegills than previous surveys show.

Recommendations:

Manage Big Bass Lake as a largemouth bass-bluegill fishery. Reducing the number of bluegills in the 5”-7” length range would reduce competition. Reducing competition should allow more bluegills to grow above the 8” mark and even out the size structure (i.e. reduce PSD and increase RSDp). To achieve this result we recommend increasing the predation by largemouth bass via increasing the number of 14”-18” fish. This could be accomplished through a protected slot limit. We also recommend that future spring fyke netting and electrofishing surveys be conducted to evaluate the effect of the regulation. Abundance (catch rates), growth (length at age), condition (Wr), and mortality should be used in the assessment. Recommend shallow and deep water habitat be installed to provide fish cover for both summer and winter.

Current Management:

After this survey was written a Largemouth bass slot limit was proposed and accepted. A slot limit protecting largemouth bass from 14”-18” went into effect in 2008.

Acknowledgements:

Dale Kufalk, fisheries technician, performed the summer mini-fyke nets survey, operated the mini-boom electrofishing boat and entered data in the WDNR data base. Glen Falkowski netted fish for the electrofishing survey. Jason Folstad, fisheries technician, assisted with the spring fyke net survey and assisted with preparation of fish spines used for aging.

Literature Cited:

- Konkel, Deborah; 1999. The Aquatic Plant Community of Big Bass Lake, 1999
Marathon County, WI. WDNR.
Shaw, Byron and Kaatz, Dean. Big Bass Lake Planning Grant Final Report, 2001.
UWSP and Marathon County LCD.

Appendix 1. Summary of age-at-length for fish captured in fyke nets, Spring 2006

Species	Age (Completed Summers of Growth)	Number of Fish	Average Fish Length (Inches)	Length Range (Inches)	Central Lakes Average (Inches)
Largemouth Bass	3	3	10.7	10.0-11.5	11.0
	4	9	12.3	10.2-15.2	12.6
	5	5	14.2	11.4-17.2	14.3
	6	2	18.8	18.5-18.7	17.1
	8	1	19.0	19.0	19.9
	9	1	19.3	19.3	20.0
Black Crappie	3	1	9.3	9.3	6.6
	4	2	10.2	10.0-10.3	7.2
	5	5	10.1	9.4-11.3	8.6
	6	1	10.7	10.7	9.2
Bluegill	2	9	4.7	3.9-5.4	3.9
	3	15	5.5	4.4-6.9	4.8
	4	13	6.6	5.8-8.2	5.5
	5	16	7.6	5.7-8.8	5.9
	6	3	7.6	6.7-8.2	6.3
	7	2	8.4	8.1-8.7	7.3
Northern Pike	8	2	29.8	26.5-33.3	27.9
	9	3	32.6	31.5-34.3	29.0
	10	1	27.8	27.8	30.3
Yellow Perch	2	1	7.4	7.4	5.3
	3	11	8.4	7.2-9.3	6.9
	4	6	8.7	7.8-9.6	8.1
	5	1	9.1	9.1	9.1