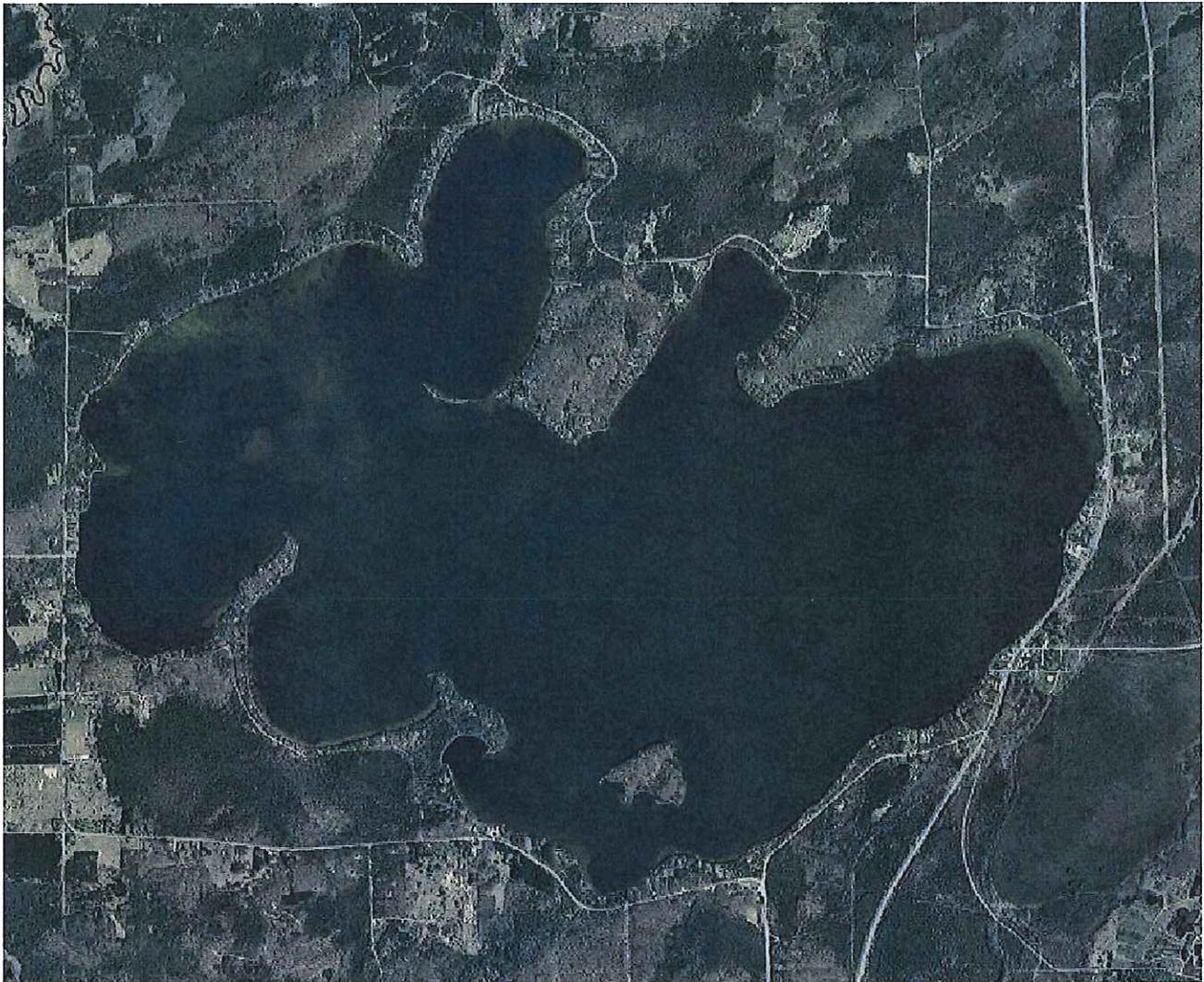


Comprehensive Fisheries Survey of Pelican Lake, Oneida County Wisconsin during 2011.

Waterbody Identification Code 1579900



John Kubisiak
Senior Fisheries Biologist
Rhinelanders
January, 2012



Your purchase of fishing equipment
and motor boat fuel supports boating
access and Sport Fish Restoration.

Comprehensive Fisheries Survey of Pelican Lake, Oneida County Wisconsin during 2011.

John Kubisiak
Senior Fisheries Biologist
January, 2012

EXECUTIVE SUMMARY

A comprehensive fisheries survey was conducted in Pelican Lake during spring and fall, 2011. We found good populations of gamefish including walleye (population estimate, PE = 2.4 adults per acre), northern pike (PE = 1.5 adults per acre), largemouth bass (0.53 adults per acre), smallmouth bass and muskellunge. The game species had good size and appeared to be in excellent condition. Panfish species were also abundant, with moderate to good size structure. We found high catches of bluegill, pumpkinseed and black bullhead, moderate catches of rock bass, bluegill x pumpkinseed hybrids, yellow perch and black crappie and lower numbers of yellow bullhead and white bass. Non-game species in the catch include burbot, creek chub, golden shiner, Iowa darter, troutperch and white sucker. I recommend continuing to manage Pelican Lake for quality size potential and a diverse fishery including trophy muskellunge, walleye, northern pike, largemouth bass, smallmouth bass, and panfish.

Lake and location:

Pelican Lake, south-west Oneida County, T35N R10E Sec14. Pelican Lake is in the towns of Enterprise and Schoepke, about 12 miles southeast of Rhinelander. The community of Pelican Lake (unincorporated) lies on its east shore. Pelican is part of the Upper Wisconsin River watershed. It is fed by three unnamed tributaries, and several other small or intermittent streams are not marked on topographic maps. A dam maintaining 6 feet of head and owned by Wisconsin Valley Improvement Company (WVIC) regulates the Pelican River outlet, which drains to Wisconsin River in Rhinelander. The Pelican Lake reservoir maximum elevation is 1591.98 ft MSL with a summer minimum of 1591.49 ft (April 1 to October 31) and a winter minimum of 1589.98 ft (November 1 to March 31). (Sam Morgan, WVIC, personal communication).

Physical/Chemical attributes (Andrews and Threinen 1966):

Morphometry: 3,585 acres with maximum depth of 39 feet.

Watershed: 10 square miles, including 361 acres of adjoining wetlands.

Lake type: Drainage with a low-head dam at the outlet.

Basic water chemistry: Soft – alkalinity 39 mg/l, conductance 104 μ mhos.

Water clarity: Clear water of moderate transparency.

Littoral substrate: 40% sand, 30% muck, 20% gravel and some rubble.

Aquatic vegetation: moderate; dense in some areas. Eurasian watermilfoil was discovered in 2010; curly-leaf pondweed and phragmites are present.

Winterkill: none.

Boat landing: Two concrete ramps with parking for 63 vehicles with trailers and 63 additional vehicles (numbers not verified). One asphalt and two gravel ramps with roadside parking. Several resorts provide access at private ramps.

Other features: Shoreline 95% upland with bog and meadow wetlands adjoining a limited portion of the lake.

Purpose of Survey: Assess status of game and panfish species and develop management recommendations.

Dates of fieldwork: Walleye netting, April 27 – May 3 2011. Muskellunge netting May 6-17 2011 Panfish netting, June 6-10 2011. Electrofishing May 4, May 17, May 24, June 9 and September 22, 2011.

BACKGROUND

Pelican Lake has the only white bass population in the area. It was most likely initiated by transferring live fish from the Lake Winnebago system. White bass fry, fingerlings and adults were transferred to inland lakes during 13 of the years between 1891 and 1914 (Wisconsin Fish Commission 1914), but the receiving waters are not listed for 1909 and later. On May 13 1898, 500 adult white bass were stocked in Pelican Lake, “Forest County” (Commissioners of Fisheries 1899). Superintendent James Nevin summarized the white bass stocking in the 1895-96 Commissioners report:

“WHITE BASS

Each year since the commission has been provided with a [railroad] car, a quantity of full grown white bass have been distributed to the summer resort lakes of the state. During the last season of distribution, thirteen thousand five hundred of this species were planted. The fish were obtained from Lake Winnebago, and were on the eve of spawning when planted.

The white bass is a very clean and handsome fish. It takes the hook readily during the summer months and is considered gamy by the angler. As a food fish it ranks little below the black bass. Its weight ranges from one to three pounds. Altogether, it is pre-eminently adapted for stocking summer resort lakes, and will afford the angler, whether lady, child or sportsman, more pleasure and amusement than any other fish that the commission can plant.”
(Commissioners of Fisheries 1897).

Kubisiak (2006) describes previous fisheries surveys. Since that time, Great Lakes Indian Fish and Wildlife Commission estimated an adult walleye population of 2.82 per acre in 2007 and fall electrofishing surveys have been conducted every year except 2009, when the survey was cancelled due to weather. In 2008, Pelican was part of a Michigan State University study of muskellunge spawning habitat (Nohner 2009). An angler creel survey conducted during the 2011-12 gamefish season is reported separately.

METHODS

The ice was mostly out when 14 standard fyke nets (¾-inch mesh, bar measure) were set on April 27, with one more set on April 29, 2011. These nets targeted walleye and northern pike. The nets were pulled on May 3, and effort totaled 88 net-nights. Six nets targeting muskellunge were set on May 6, with another 4 added on May 9. Muskellunge nets were pulled May 16 (4 nets) and May 17, for a total of 94 net-nights. Eight standard ¾-inch nets (except one ½-inch mesh was set to target smaller fish) targeting panfish were set June 6 and pulled June 9 (2 nets) and June 10 for a total of 30 net-nights.

Three electrofishing boats were used to collect gamefish on May 4, two boats on May 17 and 24, June 9 and September 8, 2011. One electrofishing boat on May 4, May 24 and September 8 was supplied by Sakaogan Chippewa Community and ran pulse direct current, while the remaining boats used WDNR-standard alternating current. The entire shoreline was electrofished on May 4 and September 8, while some shoreline was omitted during bass marking runs on the other dates.

Length or length category (nearest half-inch) was recorded for all gamefish and for panfish in June. Adult gamefish captured in spring were given a left-ventral fin clip and juveniles were given a top-tail clip for use in mark-recapture population estimates. Age structures (scales or spines) were removed from ten fish per species, per half-inch group. Age data are not available at this writing.

RESULTS AND DISCUSSION

Walleye

During walleye netting, 1,420 walleye were captured in 6 nights, including 74 recaptures, at a rate of 16.1 walleye per net night (Table 1). The electrofishing sample on May 4 yielded 186 walleye (11.3 fish per mile), including 11 juveniles. Adult walleye showed good size centered on about 15 inches (Figure 1). The mark-recapture population estimate of 8,632 adult walleye ($\pm 1,742$ SD), or 2.4 per acre, is below the predicted value of 3.2 per acre for a 3,585-acre lake supported by natural reproduction. However, it is within the 95% prediction interval of 1.0 to 9.7 per acre and is similar to past surveys on Pelican Lake (Figure 2). The consistently low proportion of adults less than 12 inches (Figure 2) suggests that walleye in Pelican Lake delay maturity until a larger size.

Fall surveys provide an index of walleye recruitment, the number of young fish moving into the population. A long-term Pelican Lake dataset of fall catch of young-of-year (yoy, born the previous spring and typically 4-8 inches in length, Figure 3) and age-1 walleye (two summers old, typically 8-11 inches) encompasses 25 of the 27 years from 1985 through 2011. These data show fairly consistent walleye recruitment, averaging 36.7 yoy (Figure 3) and 11.7 age-1 walleye per mile of shoreline. One moderate to strong yearclass every 3-4 years will sustain a fishable population (I look for at least 12 yoy or 5 age-1 per mile).

During 1997 through 2005, there was no minimum length limit for walleye on Pelican Lake, but only one fish could be larger than 14 inches. In 2006, the walleye rule reverted to the statewide 15-inch minimum length limit. The no minimum regulation is intended for high-density populations showing slow growth. In contrast, walleye surveys on Pelican show moderate adult densities and growth rates that are average or above.

Fish age and growth is important for management, but verification of age assignments requires known-age fish. During electrofishing on September 22, 2012, all 252 young-of-year walleye (defined by length) were given a complete left-ventral fin clip. This will produce a number of known-age fish that can be used to verify age assignments in future years.

Table 1. Catch per unit effort during a 2011 survey of Pelican Lake, Oneida County WI. Netting catch rates are reported as number of fish per net night, while electrofishing catch rates are number of fish per mile of shoreline. Blank cells during shocking runs indicate a species was not targeted.

species	walleye netting	muskie netting	May 4 shocking	May 17 shocking	May 24 shocking	June 9 shocking	panfish netting
walleye	16.1	1.4	11.3				2.5
largemouth bass	0.011	0.48	5.3	8.9	14.9	3.5	0.33
smallmouth bass	0.023	0.19	0.18	1.5	2.9	0.09	0.63
white bass	0	0.021	0.18	0	0.26		0.40
muskellunge	0.17	0.82	1.1	0.80	0.40		0.10
northern pike	7.0	1.3	3.3				0.50
hybrid pike x muskellunge	0	0	0	0	0.13		0
black bullhead	0.023	3.2					20.8
black crappie	0.14	1.6					5.1
bluegill	2.2	21.8					155.5
hybrid bluegill x pumpkinseed	0	1.4					7.2
burbot	0.74	0.096					0
creek chub	0	0.21					0
golden shiner	0	0.053					0.57
Iowa darter	0.011	0					0
pumpkinseed	0.36	10.7					74.8
rock bass	0.27	3.1					9.6
troutperch	0.10	0.011					0
white sucker	1.0	9.3					0.33
yellow bullhead	0.023	0.83					3.4
yellow perch	3.2	9.8					8.1

Table 2. Fish stocking record during 1975 through 2011 in Pelican Lake, Oneida County Wisconsin.

Year	Species	Size	Number	Comments
1975	walleye	lg fingerling	20,000	
1976	walleye	lg fingerling	20,000	
1976	muskellunge	lg fingerling (10 inch)	1,390	
1977	muskellunge	lg fingerling (11 inch)	2,369	
1980	muskellunge	lg fingerling (8 inch)	2,500	
1981	muskellunge	lg fingerling (12 inch)	890	
1982	muskellunge	lg fingerling (11 inch)	2,500	
1984	walleye	fry	3,000,000	
1984	muskellunge	lg fingerling (9 inch)	1,186	
1985	muskellunge	lg fingerling (11 inch)	2,500	
1986	muskellunge	lg fingerling	1,176	
1988	muskellunge	lg fingerling (11 inch)	2,500	
1988	muskellunge	lg fingerling	1,000	Permit to Dave's Musky Club
1989	muskellunge	lg fingerling	750	Permit to Dave's Musky Club
1989	muskellunge	lg fingerling (9-11 inch)	2,210	
1991	muskellunge	lg fingerling	910	
1991	muskellunge	lg fingerling (10.4 inch)	1,750	
1991	walleye	fry	400,000	Mole Lake
1993	muskellunge	lg fingerling	2,500	
1996	muskellunge	fry (0.5 inch)	100,000	
1996	muskellunge	lg fingerling (10.8 inch)	2,500	
1998	muskellunge	lg fingerling (12 inch)	2,500	
1999	walleye	fry	440,000	Mole Lake
2000	walleye	fry	460,000	Mole Lake
2000	smallmouth bass	lg fingerling	250	Pelican L. Prop. Owners Assoc.
2000	largemouth bass	lg fingerling	250	PLPOA
2001	yellow perch	adult	12,000	PLPOA
2002	yellow perch	adult	20,000	PLPOA
2003	yellow perch	adult (5.5 inch)	22,250	PLPOA
2004	bluegill	adult (4.2 inch)	34,670	PLPOA; LV clip on 26,431

Figure 1. Length-frequency of adult walleye during 2011 in Pelican Lake, Oneida County WI.

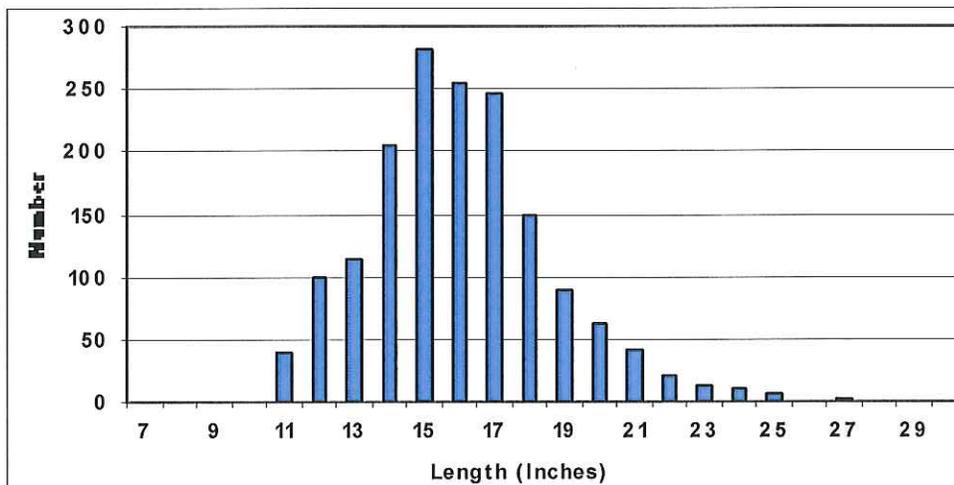


Figure 2. Adult walleye population estimates by length category during 1990 through 2011 on Pelican Lake, Oneida County WI.

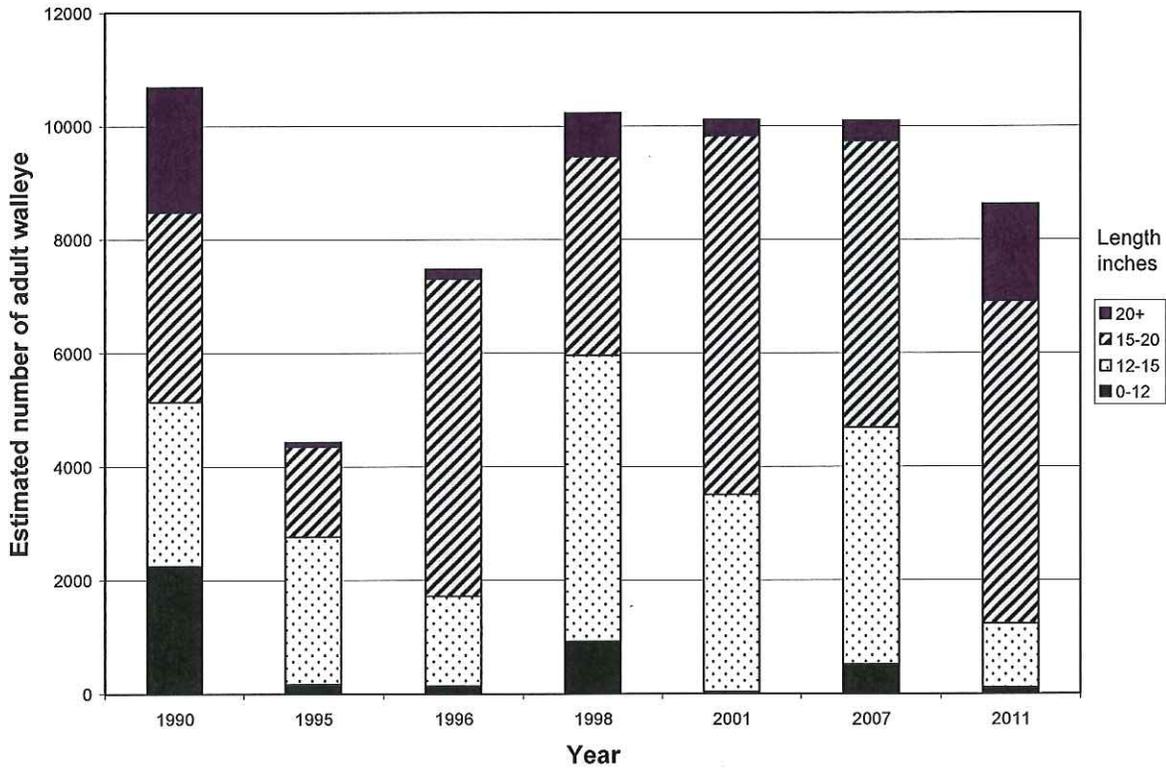
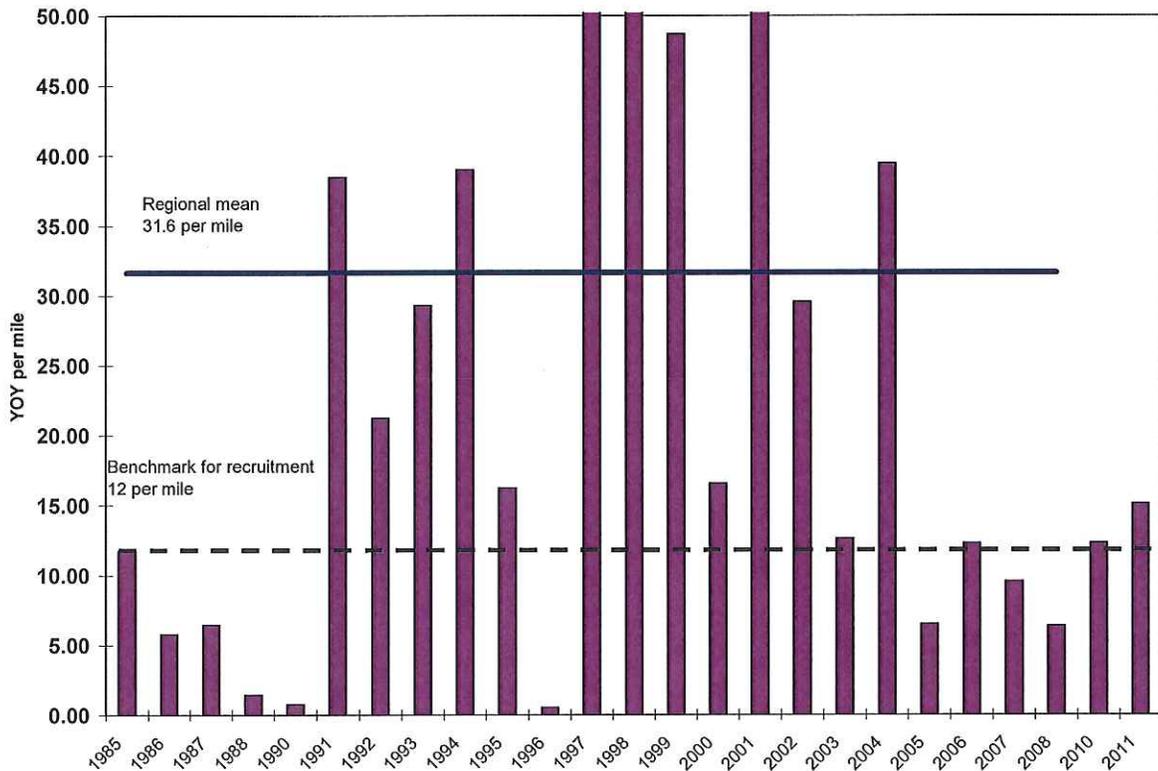


Figure 3. Catch of young-of-year (yoy) walleye per mile of shoreline in fall electrofishing surveys during 1985 to 2011 in Pelican Lake, Oneida County WI. Catch was 144 per mile in 1997, 136 per mile in 1998 and 136 per mile in 2001.



Largemouth and Smallmouth Bass

The minimum length limit for largemouth and smallmouth bass in Pelican is 18 inches, with a daily bag limit of 1 fish. The goal of this regulation is to increase bass predation on the invasive rusty crayfish, but it has also resulted in a high proportion of larger fish.

We captured 361 largemouth bass during spring sampling, including 25 recaptures of previously-marked fish. The largemouth population (including all fish over 8 inches) was estimated at 1,915 (\pm 383 SD), or 0.53 per acre, using the Schnabel multiple-capture method (Ricker 1975). This is low density for largemouth bass. Largemouth bass size structure was dominated by a broad range of 12 to 20 inch fish with average length of 15.2 inches (Figure 4). The longest largemouth was 20.2 inches; 79% were 14 inches and larger, while 7.2% were 18 inches and larger.

Seventy-six smallmouth bass (including 7 recaptures and 3 fish smaller than 8 inches) were captured during the survey. Average length was 15.6 inches, with good numbers of fish out to 20 inches. The largest smallmouth was 20.2 inches; 71% were 14 inches and larger, while 23% were at least 18 inches (Figure 5). Too few smallmouth were handled to attempt a population estimate.

Figure 4. Length-frequency of adult largemouth bass during 2011 in Pelican Lake, Oneida County Wisconsin.

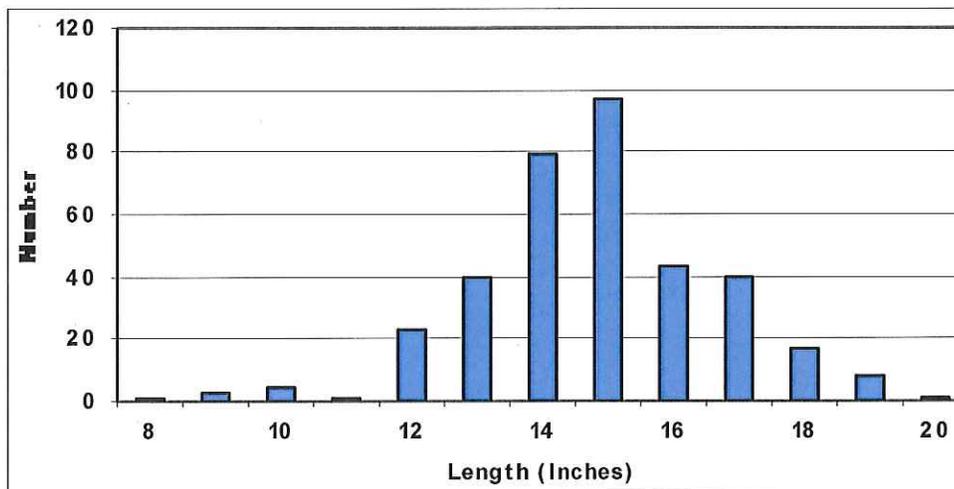
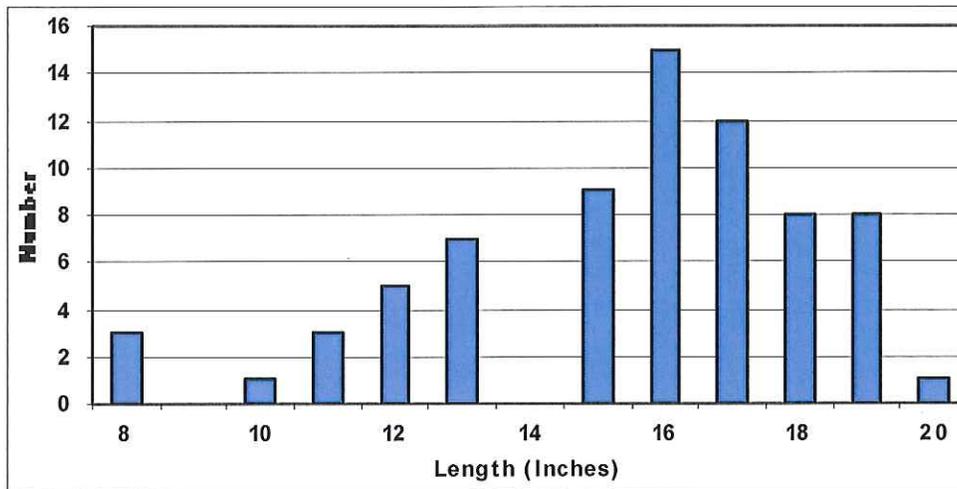


Figure 5. Length-frequency of adult smallmouth bass during 2011 in Pelican Lake, Oneida County Wisconsin.



White Bass

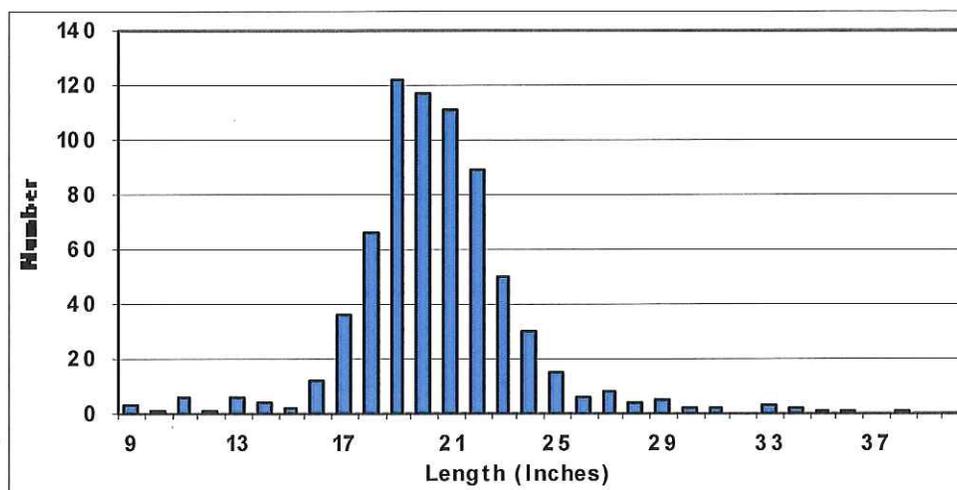
We captured 19 white bass during the survey. White bass lengths spanned a narrow range of 13.4 to 15.7 inches and average length was 14.6 inches. An abundant yearclass of approximately 4-inch fish, along with a handful of larger white bass up to 16 inches was noted during fall, 2010 electrofishing. It is unlikely that the 4-inch fish grew much over the winter, but it is puzzling that only larger fish were captured in 2011.

Northern Pike

We captured 813 northern pike (including 31 recaptures of previously-marked fish and 8 immature fish less than 12 inches in length). The northern pike population (including sexually mature fish and all fish over 12 inches) was estimated at 5,240 (± 941 SD), or 1.5 per acre, using the Schnabel multiple-capture method (Ricker 1975). This is considered low to moderate density for a northern pike population. The male population was estimated at 1.3 (± 0.26) and the females at 0.20 (± 0.07) per acre. Average size of northern pike was 21.0 inches; 5% of pike were 26 inches or larger and only 1.7% exceeded 30 inches (Figure 6). The largest northern pike was a 38.3 inch female.

Lymphosarcoma is a disease of northern pike and muskellunge, evidenced by skin sores or lesions. It is sometimes fatal, and may limit the abundance of these species. Lymphosarcoma has a fairly wide-spread distribution, but it is not evident in every lake in this region. Skin lesions consistent with Lymphosarcoma were reported by anglers in Pelican Lake fish in recent years, and we confirmed the presence of Lymphosarcoma in several Pelican Lake northern pike last spring.

Figure 6. Length-frequency of northern pike during 2011 in Pelican Lake, Oneida County Wisconsin.



Muskellunge

We captured 123 muskellunge during the survey, including 14 recaptures of previously-marked fish and 5 immature fish. Adult muskellunge ranged from 23.5 to 49.1 inches in length (Figure 7). The recapture portion of a mark-recapture population estimate is planned for spring, 2012. Pelican Lake has been identified as a potential source of muskellunge eggs for DNR hatcheries. We collected muskellunge tissue samples from fin clips to allow characterization of the genetic stock. Broodstock collections are rotated among 3-5 lakes, with first egg collection from Pelican scheduled during the spring, 2012 recapture netting.

Muskellunge were last stocked in Pelican Lake 13 years ago, in 1998 (Table 2). In Northern Wisconsin, average length of a 13-year-old male muskellunge is about 39 inches in length, while age-13 females average over 44 inches. Smaller fish in Pelican likely originate from natural reproduction. We captured five immature fish 10.5 to 13.3 inches in length during spring sampling, indicating a natural yearclass in 2010 (Figure 8). A single 11.0-11.4 inch muskellunge captured on September 22, 2011 provides evidence of a yearclass in 2011.

Many muskellunge anglers define a trophy muskellunge as 50 inches or greater in length. A 50-inch minimum length limit was implemented on Pelican Lake in 2007. Across northern Wisconsin, female muskellunge average about 18 years to reach 50 inches, while male muskellunge rarely exceed low 40's. Six Pelican Lake muskellunge aged using cleithral bones showed variable growth rates. The fish were 52.0 and 44.1 inches at age 18; 48.4 and 45.3 inches at age 14, 43.7 inches at age 13 and 44.0 inches at age 12. Ultimate length (i.e., maximum length predicted from growth trajectory by a numerical model, e.g., Casselman 1999) was estimated individually for five of the fish and ranged from 44.0 to 59.2 and averaged 51.0 inches (Matthew Faust, University of Wisconsin, Stevens Point, personal communication). All six can be presumed females although gender is listed as unknown for the 52, 48.4 and 45.3-inch fish.

Figure 7. Length-frequency of adult muskellunge during 2011 in Pelican Lake, Oneida County WI.

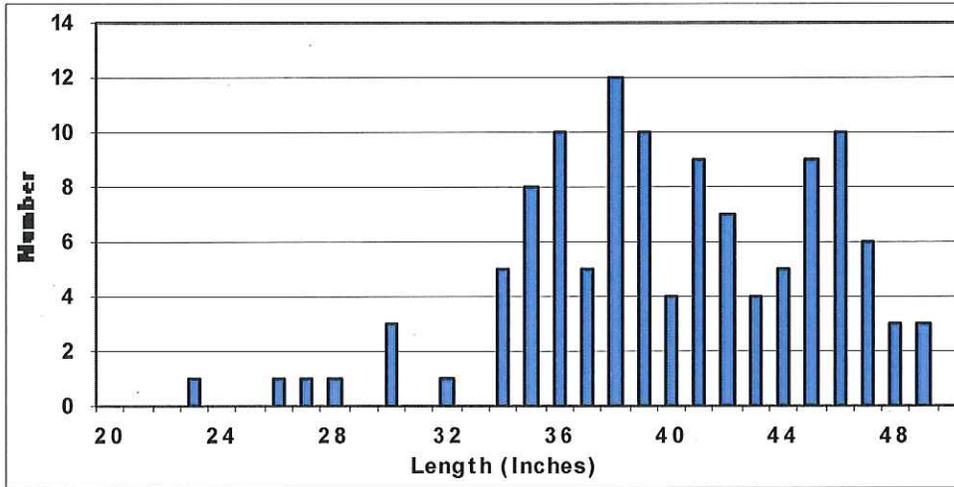


Figure 8. A naturally reproduced 11.9-inch muskellunge captured in a fyke net May 15, 2011 on Pelican Lake, Oneida County WI.



Panfish

Pelican is a lake with moderate depth and fertility and extensive beds of aquatic vegetation, despite the presence of invasive rusty crayfish. These conditions result in fairly high panfish abundance. We found very high June catches of bluegill, pumpkinseed and black bullhead, and moderate numbers of yellow perch and black crappies, which spawn earlier and tend to have higher catches in the earlier netting periods (Table 1). Moderate numbers of bluegill x pumpkinseed hybrids, rock bass and yellow bullhead were also encountered.

June bluegill catch increased dramatically from 60 per net night in a 2005 survey (Kubisiak 2006) to 155 per net night in 2011 and pumpkinseed increased from 7 per net night in 2005 to 75 per net night in 2011 (Table 1). The high 2011 catch may be at least partly due to fish movement due to a warming trend during the 2011 netting, but it also reflects a high panfish population. Bluegill size structure also increased between the two surveys. Average bluegill length increased about $\frac{3}{4}$ -inch, from 5.8 inches in 2005 to 6.5 inches in 2011. The fraction of 7-inch and larger fish doubled from 11% to 24% of the population. The proportion of 8-inch and larger bluegill was low in both surveys, but decreased from 5.7% in 2005 to 0.67% (only 2 of 299 bluegill measured in 2011 were 8 inches or larger, Figure 9).

Yellow perch showed a spike of 4-5 inch fish (Figure 12), likely 2-year-old fish hatched in 2008. The remaining perch were broadly distributed from 5.5 to 9.4 inches, with lower numbers out to 12.4 inches. Black crappie showed an upper size of 13.4 inches, with a strong peak at 8.5 to 9.5 inches likely reflecting a very strong 2007 yearclass (Figure 13). Rock bass size was skewed towards smaller fish, with low numbers over 8 inches (Figure 14). Black bullhead catch was very strong in June panfish nets at 20.8 per net night (Table 1). Size of black bullhead was a broad peak from 8 to 12 inches, with a few larger fish including one that exceeded 14.5 inches (Figure 15).

Figure 9. Length-frequency of bluegill during 2011 in Pelican Lake, Oneida County Wisconsin.

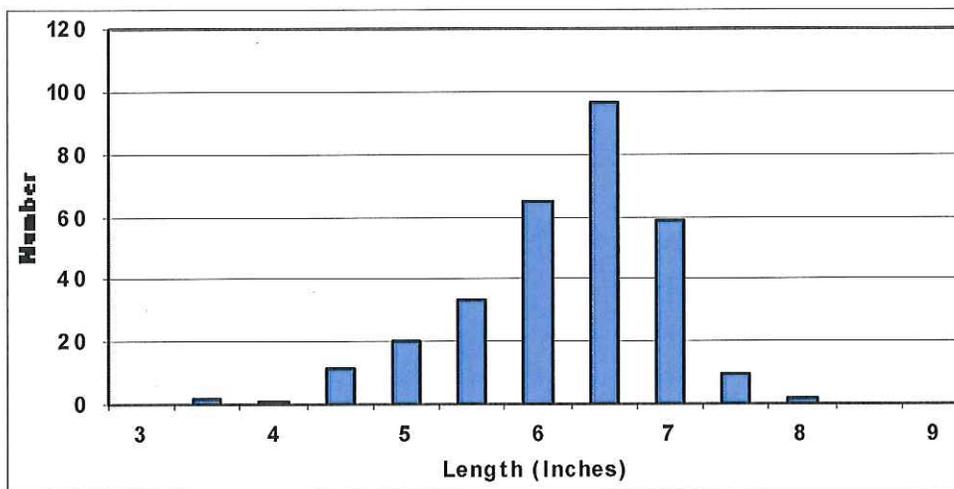


Figure 10. Length-frequency of pumpkinseed during 2011 in Pelican Lake, Oneida County WI.

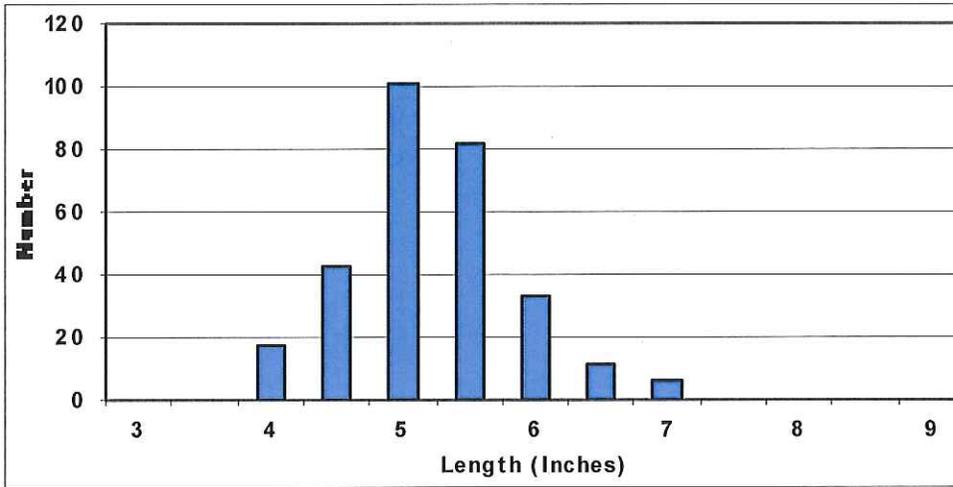


Figure 11. Length-frequency of bluegill x pumpkinseed hybrids during 2011 in Pelican Lake, Oneida County WI.

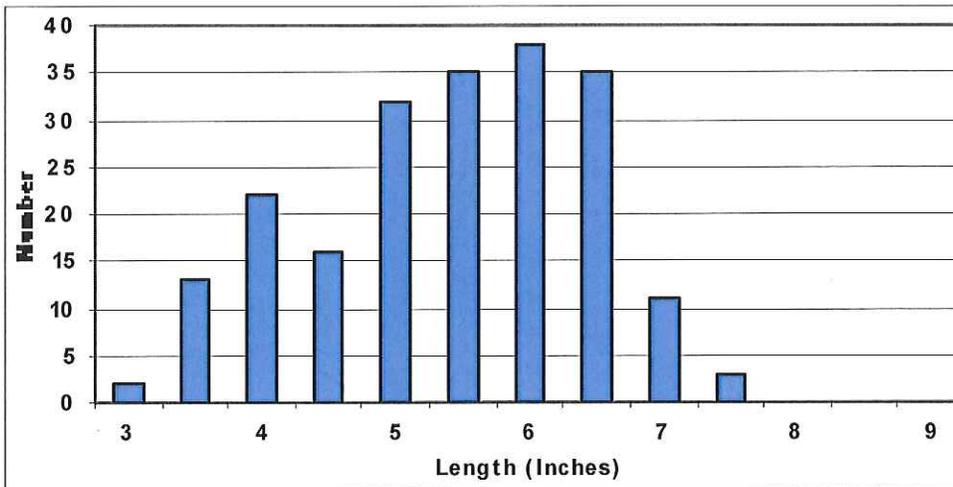


Figure 12. Length-frequency of yellow perch during 2011 in Pelican Lake, Oneida County WI.

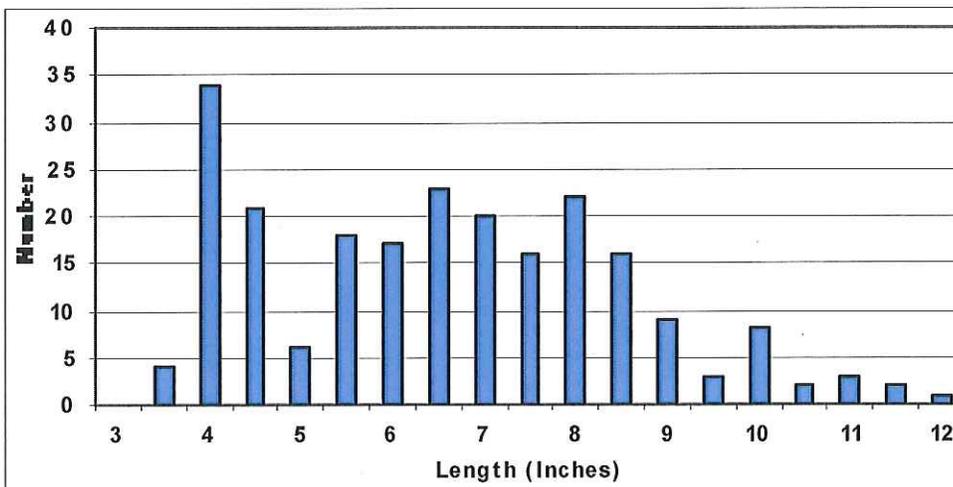


Figure 13. Length-frequency of black crappie during 2011 in Pelican Lake, Oneida County WI.

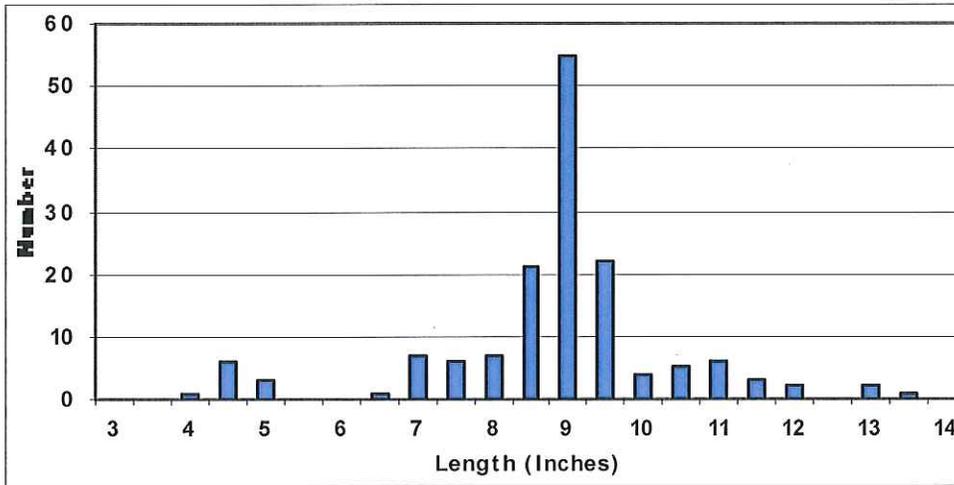


Figure 14. Length-frequency of rock bass during 2011 in Pelican Lake, Oneida County WI.

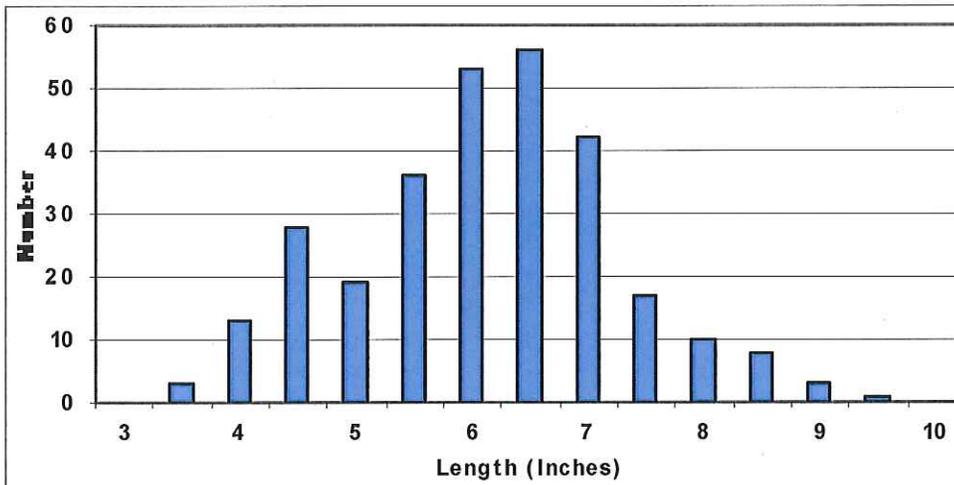
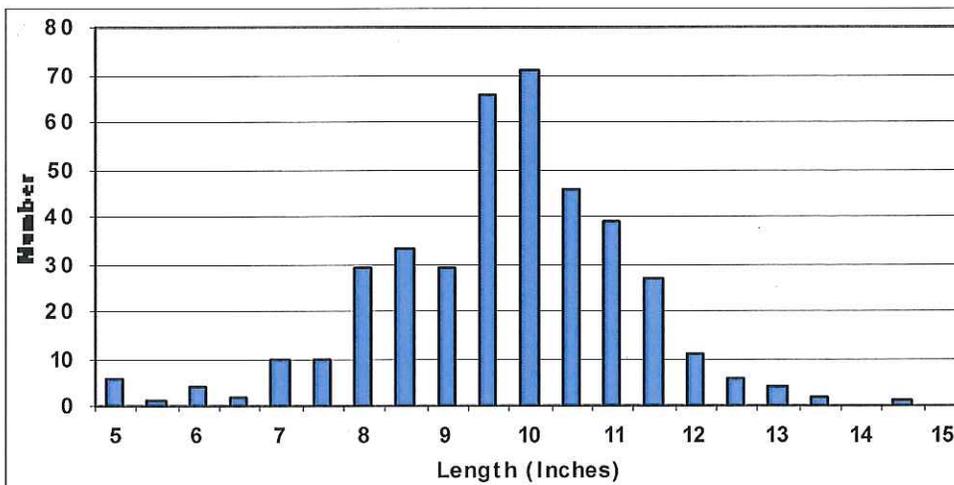


Figure 15. Length-frequency of black bullhead during 2011 in Pelican Lake, Oneida County WI.



MANAGEMENT RECOMMENDATIONS

Pelican Lake supports a diverse fishery. Walleye, northern pike, largemouth bass, smallmouth bass and muskellunge are all important parts of the gamefish community, with no one species dominating. Size structure of game species was excellent and individual fish were robust. Bluegill and pumpkinseed dominated the panfish catch, while black bullhead, yellow perch, rock bass, hybrid bluegill x pumpkinseed, black crappie and yellow bullhead were moderately abundant, with low numbers of white bass. We found 24% of bluegill were at least 7 inches, 29% of perch were at least 8 inches and 52% of black bullhead were 10 inches or larger. Forage and non-game species include burbot, creek chub, golden shiner, Iowa darter, troutperch and white sucker. Pelican is managed as a mixed fishery with trophy muskellunge and quality size potential of most other species.

ACKNOWLEDGEMENTS

Dennis Scholl supervised the field work for this survey using field crews from Antigo, Woodruff and Sokaogon Chippewa Community. Jeff Blonski, Nick Giannola, Steve Gilbert, David Gunderson, Fred Hagstrom, Gilbert Hammer, Jonathon Hansen, Zach Lawson, Kyle McLaughlin, Tanya Meives, Aaron Nelson, Ron Plank, Scott Poler, Mike Preul, Jeff Reissmann, Ben Rolling, Mike Rynski, Dave Seibel, Clint Soulier, Steve Timler, Tim Tobias, Joelle Underwood, Roger Weber and I assisted in the field work. Lake Association volunteers Ed Ericson, Larry Hahn and Bob Mott helped with the fall survey. Mike Coshun calculated the walleye population estimate.

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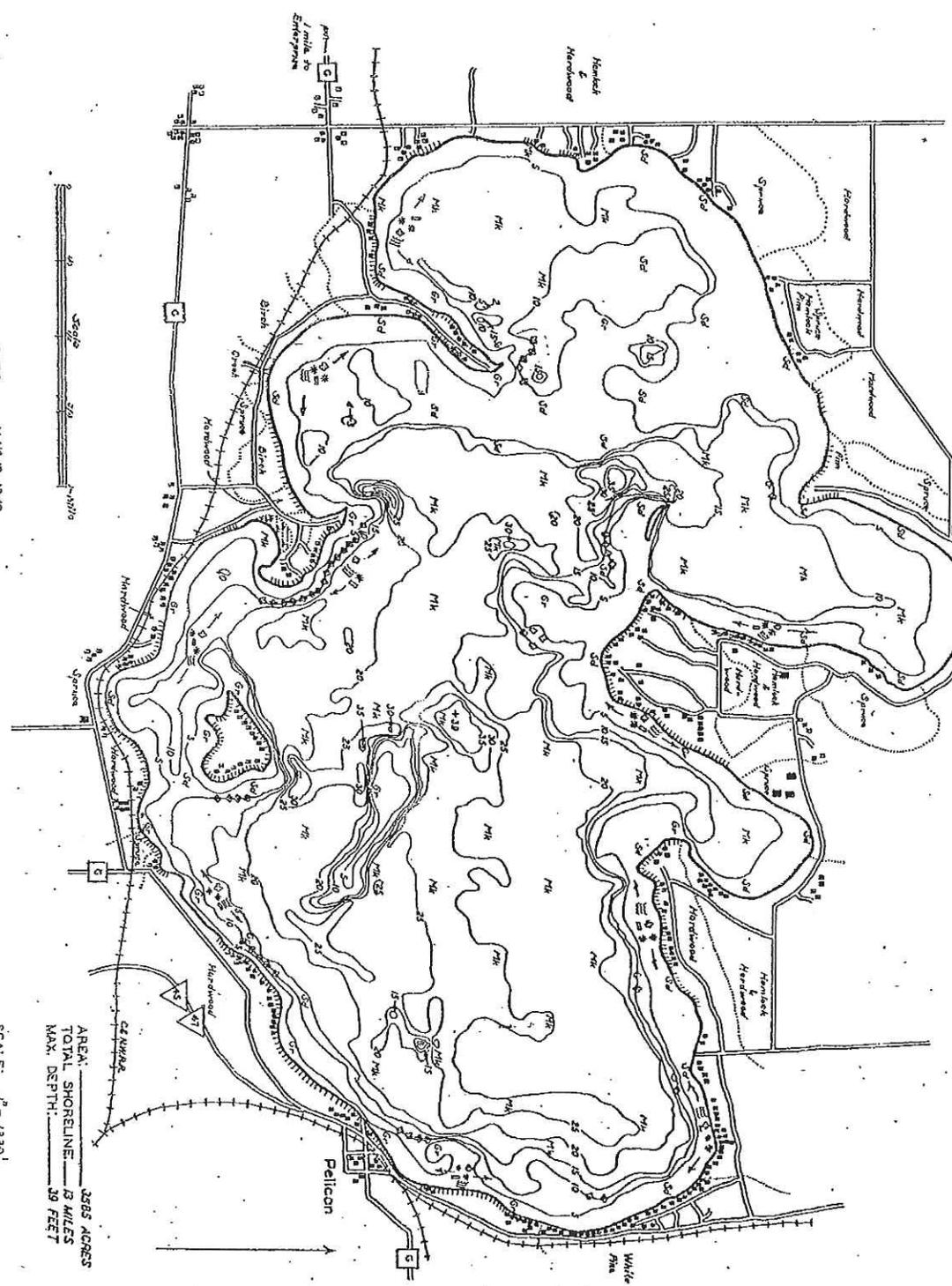
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Cover image courtesy of Oneida County website. www.co.oneida.wi.gov

WISCONSIN CONSERVATION DEPARTMENT
 BIOLOGY DIVISION
 LAKE AND STREAM IMPROVEMENT SECTION
 LAKE SURVEY MAP

LAKE PELICAN
 SECTION 18, 21, 24, 25
 TOWNSHIP 35
 RANGE 19, 11
 TOWN OF SCROBY
 COUNTY ONEIDA



DATE _____
 COMPILED BY _____
 TRACED BY _____
 SOURCE OF INFORMATION _____
 LAKE SURVEY SUBJECT _____
 M.C. CAMP _____
 SOUNDINGS 250' INTERVALS
 DATES OF MAP REVISION _____
 WORK AGENCY C.C.C.

LAKE IMPROVEMENT RECORD

TYPE	DATE
BRUSH REFUGES	1938
SAPLING TANGLES	1964
SPAWNING BOXES	31
SPAWNERS	32
TOTAL	33

AREA: 3885 ACRES
 TOTAL SHORELINE: 13 MILES
 MAX. DEPTH: 39 FEET
 SCALE: 1" = 1320'

LEGEND

- WEED BEDS
- ROCKY SHOALS
- OV SAND
- CLAY
- GRAVEL
- TK MUCK
- DWELLING
- ABANDONED DWELLING