

# Panfish Survey and bluegill stocking evaluation on Pelican Lake, Oneida County Wisconsin during 2005.

Waterbody Identification Code 1579900



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Senior Fisheries Biologist  
Rhinelander  
February, 2006



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## EXECUTIVE SUMMARY

A panfish netting survey of Pelican Lake was conducted during June, 2005. I evaluated relative abundance and population parameters of panfish species, and measured the contribution of 34,670 bluegill stocked by Pelican Lake Property Owners Association during October, 2004. Pelican Lake has a diverse, high-quality panfish fishery. Panfish species found include black crappie, bluegill, pumpkinseed, bluegillx pumpkinseed hybrids, yellow perch, rock bass and a few black and yellow bullheads. Panfish abundance was high, with good size structure. Bluegill showed very strong abundance with a catch rate of 60 per net night. Bluegill were growing about a year ahead of the regional average and annual mortality was low at 51%. Stocked bluegill showed minimal contribution to the population, comprising only 0.27 % of the bluegill catch. I recommend continuing to manage Pelican Lake for a diverse fishery including walleye, muskellunge, northern pike, bass and panfish. Fish populations show adequate natural reproduction, and no stocking is currently needed.

### Lake and location:

Pelican Lake, Oneida County, T35N R10E Sec23. Located in south-east Oneida County in the towns of Enterprise and Schoepke. The City of Pelican Lake is located on the east shore of the lake. Pelican Lake is part of the Upper Wisconsin River watershed and is drained by the Pelican River.

### Physical/Chemical attributes (Andrews and Threinen 1966):

**Morphometry:** 3,585 acres, maximum depth 39 feet. Outlet dam raises the water level about 2 feet.

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

**Lake type:** Drainage. Two unnamed streams feed the lake; outlet is controlled by a low-head dam and is the source of the Pelican River.

**Basic water chemistry:** Soft – alkalinity 39 mg/l, conductance 104  $\mu$ mhos.

**Water clarity:** Clear water of moderate transparency.

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

**Aquatic vegetation:** Submerged vegetation moderate in density.

**Winterkill:** None.

**Boat landings:** Two asphalt and concrete ramps with parking for 63 vehicles with trailers and 63 additional vehicles; one asphalt ramp and one gravel ramp with roadside parking.

**Other features:** Shoreline 95% upland with bog and meadow wetlands adjoining a limited portion of the lake basin. Rusty crayfish are present.

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

Dates of fieldwork: Panfish netting June 6 - 10 2005.

## INTRODUCTION

Walleye fry were stocked in Pelican Lake at least as early as 1933, while walleye fingerlings were stocked fairly regularly from 1942 to 1976. Muskellunge fry were stocked as early as 1934 and fingerlings were stocked during 1938 through 1998 (Table 1). In years past, it was common to stock on top of naturally reproducing populations and to “plant-back” fry or fingerlings in years when eggs were taken for DNR hatcheries. However, recent studies indicate that walleye stocking to supplement natural reproduction is usually ineffective (Li et al. 1996). Other risks associated with stocking include genetic, fish health and aquatic invasive species issues. Genetic issues associated with stocking fish are described in Fields et al. (1997); they recommend: “If there is substantive natural reproduction...fish should not be introduced from any source.” Fish health risks include a variety of pathogens and parasites (e.g., *Heterosporis* sp.) that may be introduced with the fish. Health inspections required by Wisconsin Department of Agriculture and Consumer Protection (DATCP, the agency that regulates private hatcheries in Wisconsin) are a step in the right direction, although no health inspection can detect everything. Currently, health inspections of private hatcheries that stock fish in Wisconsin waters are not required annually and testing is not required for all pathogens of concern (e.g., testing for largemouth bass virus is not required, despite a 2001 fish health advisory issued by DATCP). The list of potential non-native and aquatic invasive species that could potentially be introduced from a fish-stocking event includes plants (e.g., Eurasian water milfoil), mussels (e.g., zebra mussel), zooplankton (e.g., spiny water flea) and fish (e.g., round goby, green sunfish).

It is against current DNR policy to permit walleye stocking in lakes with adequate natural reproduction because the potential risks outweigh the benefits. Nevertheless, Pelican Lake Property Owners Association (PLPOA) established a ‘Pelican Lake Stocking Fund’, financed by a large raffle. Their initial goal was to stock walleyes. However, when the WDNR Fisheries Biologist refused to authorize walleye stocking, the PLPOA turned towards panfish stocking as an alternative. Perch stocking was permitted in 2001-03. At the same time, large naturally-reproduced perch yearclasses were documented in 2002 and 2004. The PLPOA requested a permit to stock bluegill beginning in 2004, but I withheld permission pending the results of a baseline netting survey in August, 2004. After the netting results showed good adult bluegill numbers, size structure and growth rates, a permit was granted the PLPOA to stock bluegill on condition that the stocked fish be fin clipped to allow a more thorough evaluation of the Pelican Lake bluegill population and the relative contribution of stocked bluegill to the population (i.e., the present study). Additional stocking would only be permitted if the bluegill population showed low abundance (i.e., a netting catch rate less than 15 per net night) and stocked bluegill contributed to the population (i.e., if stocked fish contribute 10% or more of the 2005 bluegill catch).

## BACKGROUND

A netting survey during August 3 to 7, 1945 found good numbers of walleye, perch and rock bass, along with northern pike, crappie, smallmouth bass, sunfish, sucker and lawyer (burbot). “The [length] distribution sheet shows that Pelican Lake has a good supply of fish. Muskies are known to be present though none were taken in the nets. Minnows, fry, crayfish and insects are abundant, indicating adequate forage for game fish.” (Churchill 1945)

Unpublished data summaries indicate that three crews conducted 189 net-lifts on Pelican Lake during April 18 -27 1948, likely for spawning operations. Catch per net night included 110 walleye, 0.81 northern pike, 0.053 muskellunge, 17 perch and 0.72 suckers (Table 2). Other species recorded by one or two crews on 71 of the net lifts include 0.25 rock bass per net night, 0.38 lawyer (burbot) and 1.76 crappies (74 net lifts).

Various netting summaries from April and May spawning operations during 1953-57, 1960, 1973, 1975 and 1976 are contained in the file, but the panfish catch and the amount of effort were only recorded sporadically. However, the data summary from a netting survey during September 26-30, 1955 (42 net-

Table 1. Fish stocking record during 1975 through 2005 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	PLPOA
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

nights) gives numbers of panfish rounded to the nearest 50 or 100 fish (Table 2). Six nets set during October 3-5, 1973 (presumably 12 net-nights) found moderate catches of 11 species, dominated by black crappie (11 per net night) and yellow perch (4 per net night, Table 2)

A seine haul was made on August 10, 1955 with a 2000 by 14 foot (fishing depth) seine. A number of fish were counted and measured, including 57 walleyes, 63 northern pike and 1 muskellunge. An estimated 15,000 fish were released, consisting of 80% crappies and perch, 15% sunfish and bluegills and 5% suckers. According to Burdick (1956), "...the seine catch ranks among the highest ever obtained in the area." Growth rates were characterized as normal for young walleyes but below average for older fish, while crappies and perch were growing about average (Burdick 1956).

Bullheads were removed from Pelican Lake by seining during 1954. Bullhead removals were conducted during 1959 through about 1986, initially by commercial fishermen and (after around 1980) by volunteers. A May 21, 1959 sample of 514 bullheads ranged from 8.1 to 13.3 inches with an average length of 10.4 inches. Fifty-one of the bullheads (species not identified) were aged using dorsal spines, and the results indicate that 39% of the bullheads were age 2, 51% were age 3 and 10% were age 4 (Priegel, 1960)

Table 2. Catch per unit effort of gamefish and panfish species during historic and current netting surveys of Pelican Lake, Oneida County Wisconsin. Netting catch rates are reported as number of fish per net night. If available, mean lengths are given with number of fish measured (N) in parentheses.

species	Apr 18-27 1948	Sep 26-30 1955	Oct 3-5 1973	Aug 2-3 2004	June 6-10 2005
walleye	110 14.2" (N = 114)	2.3	1.8 16.3" (N = 21)	0.5 6.3" (N = 1)	0.3
largemouth bass	0	0.5	2.0 15" (N = 1) 3" (N = 3)	0	0.1
smallmouth bass	0	0	0.25 16.8" (N = 3)	0	0.5
muskellunge	0.053	0	0.33 37.5" (N = 4)	0	0.1 26.0" (N = 3)
northern pike	0.81 18.8" (N = 40)	0.3	0.25 16.4" (N = 3)	0.5 11.3" (N = 1)	0.9
bullheads		2.2		0.5 7" (N = 1)	1.0 9.7" (N = 31)
black crappie	1.76 7.2" (N = 29)	79	11 9.1" (N = 72) 3" (N = 60)	3.0 8.7" (N = 6)	5.0 8.1" (N = 191)
bluegill		62	2.2 6.9" (N = 10) 2.5" (N = 16)	107.5 5.1" (N = 50)	60.0 5.7" (N = 267)
hybrid bluegill xpumpkinseed				1.5 6.1" (N = 3)	1.6 6.4" (N = 53)
pumpkinseed (‘sunfish’)			0.50 5.0" (N = 6)	28.5 4.3" (N = 49)	6.9 5.3" (N = 214)
rock bass	0.25		2.5 6.8" (N = 18) 2.5" (N = 12)	14.5 5.1" (N = 26)	8.7 6.5" (N = 292)
white bass			0.08 13.0" (N = 1)	0	0
yellow perch	17 9.5" (N = 112)	20	4.0 6.8" (N = 8)	186.5 5.3" (N = 50)	7.8 6.8" (N = 235)

A shocking survey was conducted on July 6, 1960. Most of the shoreline was shocked from the west side of Antigo Island to the west shore of Outlet Bay. Large numbers of perch of all sizes were noted. "The other panfish were quite abundant but not in anywhere near the numbers of the perch." (Morehouse 1960) Moderate numbers of larger bullheads and walleyes were also noted, along with large numbers of lake shiners (species was not identified). The report recommended "With the continuation of the good perch population in Pelican Lake, because of the size and fertility of it, it is recommended that the lake be continued on the muskellunge stocking quota and stocked at a high rate. In those years when walleye spawning is necessary there, an additional bolster to the walleye population can be accomplished through the re-stocking of a percent of the spawn taken." (Morehouse 1960) This recommendation changed in the Oneida County annual report: "With the heavy harvest of perch that is normally experienced here during the winter months, and with other panfish populations in reasonable numbers, and the fact that no young of the year walleyes were noted, it is recommended that Pelican Lake be stocked with walleye fingerling again in 1961 followed by muskellunge stocking in 1962 to keep the panfish and forage populations in control...Commercial removal of bullheads is to be continued."

Periodic single-day angler creel-checks were conducted in 1954, 56, 58, 59, 60, 63, 64 and 67. All but one were during the ice-fishing period. A full (9-month) creel survey was conducted during May 5 1990 through March 1 1991, excluding November. The 1990-91 survey estimated total annual fishing effort of 62.3 hours per acre, nearly double the 1990-2001 Oneida County average of 33.7 hours per acre. Catch was focused on yellow perch (110,462 caught), bluegill (58,995), and black crappie (22,995). Catch of all game species combined was estimated at 26,173, dominated by walleye and northern pike.

Mark-recapture population estimates of the adult walleye population were conducted by WDNR in 1990 and by Great Lakes Indian Fish and Wildlife Commission (GLIFWC) in 1995, 96, 98 and 2001. Estimated walleye populations averaged 2.4 and ranged from 1.2 to 3.0 adults per acre. Fall young-of-year surveys were conducted by WDNR in 1984, 86, 87, 90 and 2002; by GLIFWC in 1988 and 1991 through 2001 [Sakagoan Chippewa Band (Mole Lake) assisted in 2001] and by WDNR and Mole Lake (one boat each) in 2003 through 2005. Young-of-year walleye catch in fall surveys during 1990 through 2005 (average of 44.7 young-of-year per mile) compares favorably with other regional lakes supported by natural reproduction over the same period (32.4 per mile).

A summer baseline survey with late-summer netting and fall shocking was conducted during 2004. The summer netting consisted of eight mini-fyke nets (3/16 inch bar-measure mesh with 1" exclusion netting to keep out predator fish and turtles) and two full-size fyke nets (1/2 and 3/4 inch mesh). Nets were fished for one night, August 2 – 3, 2004. Mini-fyke catch of minnow and darter species was very good, with 12 forage species represented including high catches of bluntnose minnow and johnny darter. The mini-fyke nets held moderate to good numbers of largemouth and smallmouth bass, while high catches of young-of-year yellow perch, johnny darter and Iowa darter indicated strong reproduction by Percids in 2004. Bluegill catch was low, with no young-of-year in the nets. This was consistent with other lakes in the region: the cold summer apparently caused a very poor 2004 yearclass. Panfish catch in the two full-size nets was very high at 107.5 bluegill and 186.5 perch per net night (Table 2).

## METHODS

Two of three shipments of bluegill stocked during October, 2004 (26,431 of 34,671 total fish) were marked by clipping half the left-ventral fin. The fish were held in two large net pens in the lake until they could be clipped. Clipping was performed by PLPOA volunteers and DNR staff. Clipping took about 2.5 hours on each day and about 300 fish were clipped per person per hour. Average length of bluegill in the two shipments was 4.8 and 4.1 inches. Mortality was 30 and 289 bluegill, respectively. Physical appearance of fish in the first shipment was very good. In contrast, a number of fish in the second shipment had poor color, cloudy eyes and generally looked stressed. The majority of stocked fish appeared healthy, but some

fish from the second shipment that were in poor condition swam or floated away from the clipping site and are not included in the 289 that died immediately. Other fish species mixed in with the stocked bluegill include pumpkinseed, yellow bullhead, fathead minnow (not native to Pelican Lake), green sunfish (not native to Pelican Lake) and bluegillxgreen sunfish hybrid.

Seven standard (3/4" bar mesh) and one small-mesh (1/2" bar mesh) fyke nets were set June 6. These nets targeted panfish and were fished through June 10. All bluegills were individually examined for presence of a fin clip. Length or length category (nearest half-inch) was recorded for a random sample of about 250 individuals for each panfish species. Age structures (scales) were removed from ten panfish per species, per half-inch group.

## RESULTS AND DISCUSSION

### Bluegill

June, 2005 fyke net catch of bluegill was excellent, at 60 per net night (Table 2). In Oneida County, June bluegill catch rates were about 20 to 80 per net night during recent surveys (an exception was Booth Lake, with 290 stunted bluegill per net night). Catch rates range as low as single digits in drawdown reservoirs, where water-level fluctuations during spawning result in low-density bluegill populations but excellent growth rates and size structure (Coon 1998). Bluegill catch rates above 100 per net night are considered high density and are commonly associated with stunted populations (Snow 1990). The Pelican Lake bluegill catch far exceeded my benchmark of 15 per net night that would indicate a relatively low bluegill population. It was nearly identical to the bluegill catch in 1955 (Table 2).

Lengths were recorded for a random sample of 267 bluegill. Bluegill length peaked at 5 to 6 inches, with an average of 5.7 inches (Figure 1). A few 8 to 9.5 inch bluegill were found in most nets. Age analysis found bluegill as old as 11+, and indicated that Pelican Lake bluegill are growing about a year ahead of the regional average (Figure 2, Table 3). Based on this sample, 30% of the bluegill population was quality ( $\geq 6$  inch) size (i.e.,  $RSD_6 = 30\%$ ) and 6% was preferred ( $\geq 8$  inch) size ( $RSD_8 = 6\%$ ).

Total annual mortality of the Pelican Lake bluegill population was estimated at 51%, using a catch curve (Figure 3). Panfish populations generally have high mortality rates because of their role as forage for many other species. Coble (1988) reported that seven annual mortality estimates for bluegill populations from five lakes in the upper Midwest averaged 70% and ranged from 59 to 87%. The relatively low mortality rate and fast growth measured in Pelican Lake indicate very good survival to larger sizes.

### Bluegill Stocking Evaluation

Each bluegill captured in fyke nets was examined for fin clips by pulling the ventral fins away from the body. Of 1,944 bluegill captured during June netting, 4 possessed a fin clip. Stocked fish contributed 0.27% of the bluegill catch, even after expanding to account for 8,240 fish stocked without a clip. This is well short of the 10% benchmark I set as an indication that stocking contributed to the population.

### Other Panfish Species

June net catch was dominated by bluegill, as is typical during early June netting. Crappies and perch are typically caught during April and May but net poorly during in June. However, June netting on Pelican Lake produced moderate catches of rock bass, yellow perch, pumpkinseed and black crappie (Table 2, Figures 4-7). Rock bass and pumpkinseed had stable length-frequencies (Figures 4 and 6), suggesting consistent recruitment. Yellow perch showed a strong yearclass of 5.5 to 7.5 inch fish (Figure 5), most likely 3-year-old fish from an abundant 2002 yearclass observed during fall shocking that year. Perch

smaller than about 6 inches are able to slip through the fyke net mesh, so another abundant yearclass from 2004 was not captured. The 2004 yearclass of perch was observed in 2004 mini-fykes and during 2004 and 2005 fall shocking. The black crappie length distribution (Figure 7) suggests dominance by a single yearclass, which is typical for crappies.

Figure 1. Length-frequency of bluegill during 2005 in Pelican Lake, Oneida County Wisconsin.

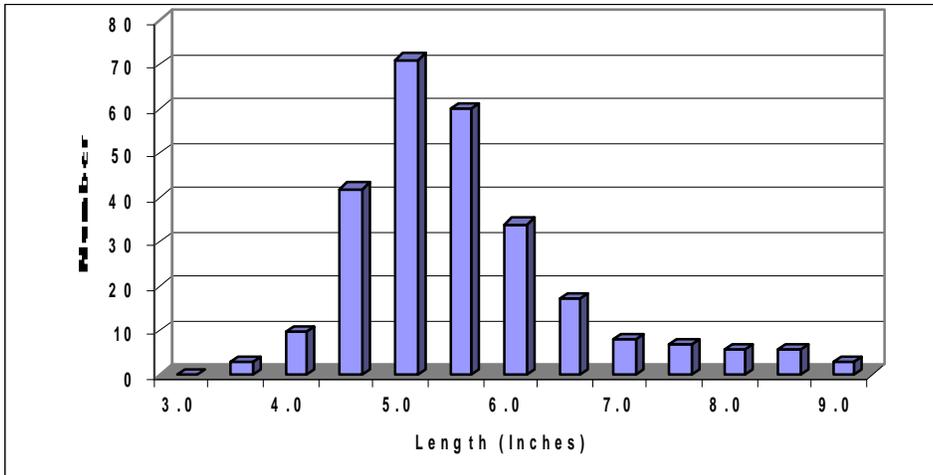


Figure 2. Length-at-age of bluegill in Pelican Lake, Oneida County Wisconsin during 2005 vs. Wisconsin River Headwaters regional average.

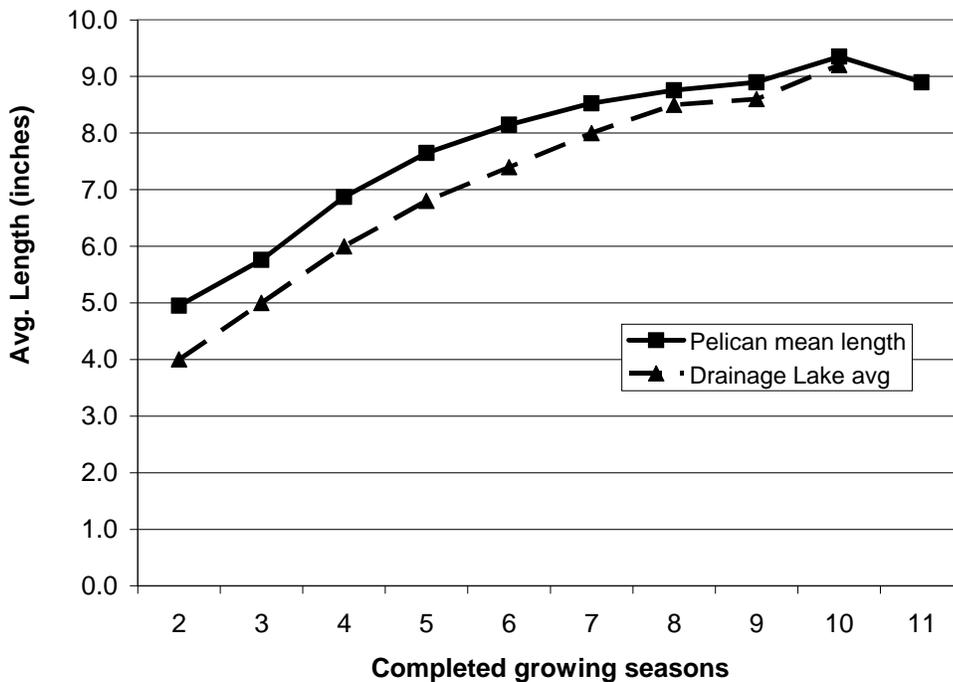


Table 3. Bluegill length-at-age in Pelican Lake, Oneida County Wisconsin during 2005. The Pelican Lake aged subsample was weighted against the length-frequency to ensure representative results

Age of fish	Number Pelican	Drainage	avg length lake avg
2	34	5.2	4.0
3	26	5.7	5.0
4	10	6.7	6.0
5	8	7.6	6.8
6	6	7.9	7.4
7	7	8.6	8.0
8	7	8.7	8.5
9	7	8.8	8.6
10	4	9.2	9.2

Figure 3. Bluegill catch curve (log of weighted catch by age) from Pelican Lake, Oneida County Wisconsin during 2005. Regression line is weighted by the number of fish in each age class and indicates a total annual mortality of 51%.

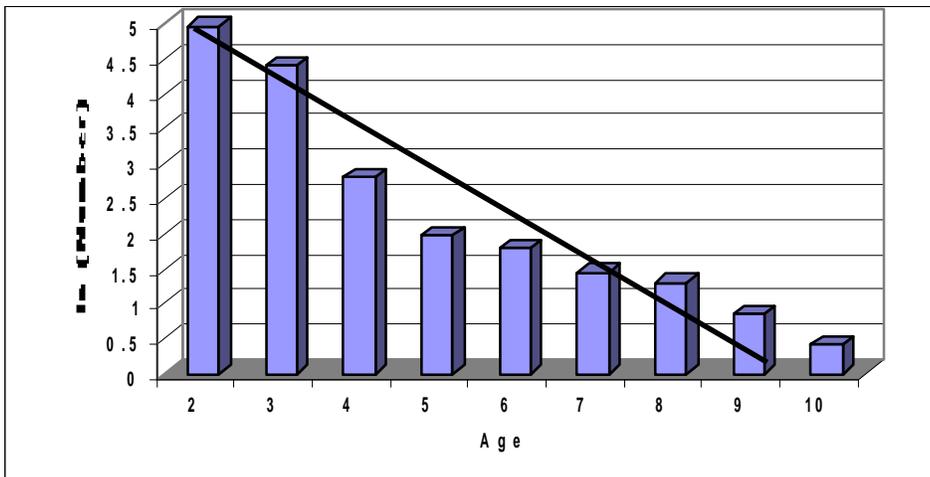


Figure 4. Length-frequency of rock bass during 2005 in Pelican Lake, Oneida County WI.

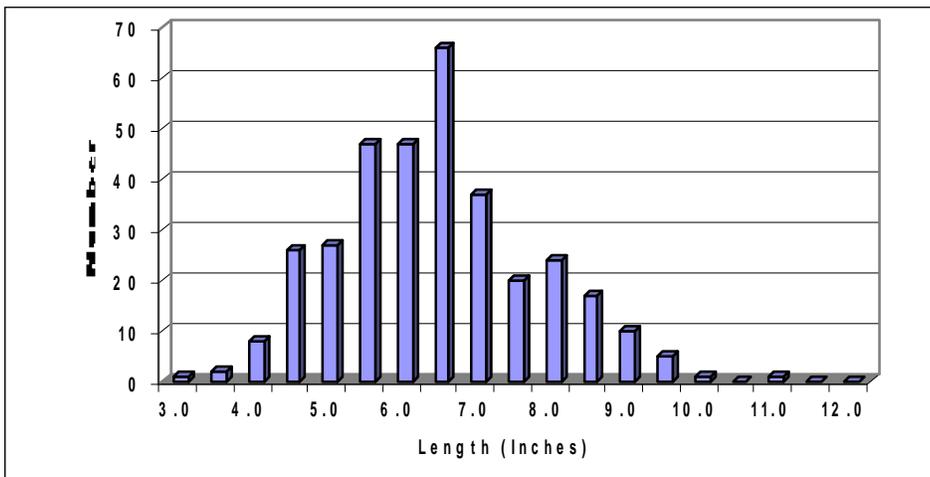


Figure 5. Length-frequency of yellow perch during 2005 in Pelican Lake, Oneida County WI.

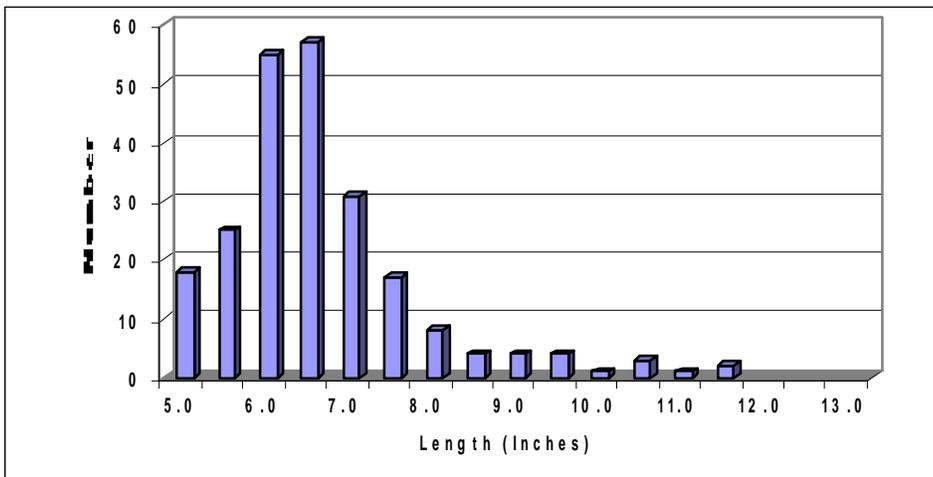


Figure 6. Length-frequency of pumpkinseed during 2005 in Pelican Lake, Oneida County WI.

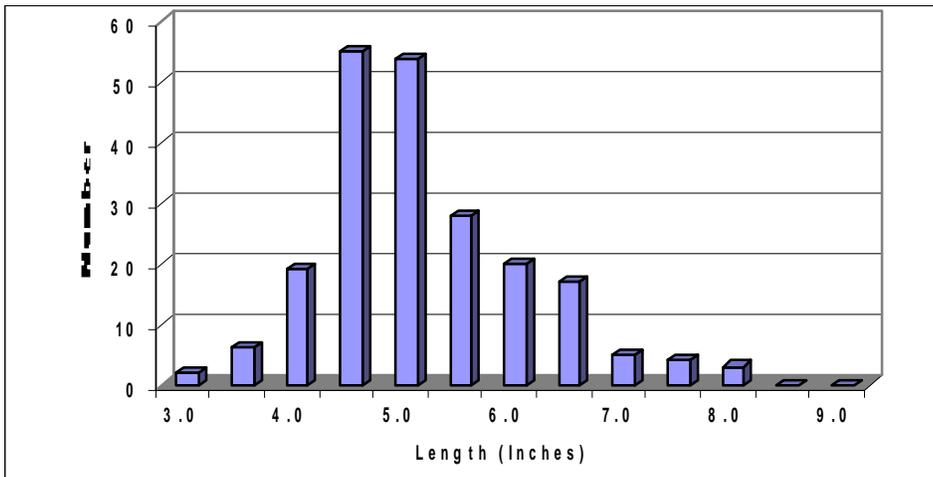
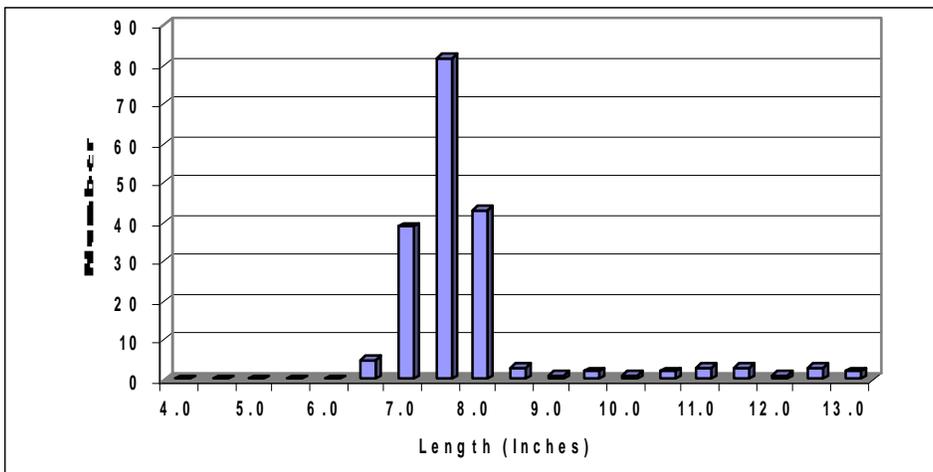


Figure 7. Length-frequency of black crappie during 2005 in Pelican Lake, Oneida County WI.



## MANAGEMENT RECOMMENDATIONS

Despite high bluegill abundance, their growth rates and size structure were above average. This indicates that the gamefish populations are in balance and are providing adequate predation on panfish. I recommend continuing to manage Pelican Lake for a diverse fishery, including panfish, walleye, northern pike and quality-size bass and muskellunge. The stocking evaluation showed negligible contribution of stocked fish to the Pelican Lake bluegill population. No stocking is currently recommended for any species of fish.

## ACKNOWLEDGEMENTS

Steve Timler and Pelican Lake Property Owners Association volunteers Ben Mott, Gina Javurek, Mike Schwartz, Ed Gengler and Bob Mott assisted in June netting. I especially appreciate the coordination efforts of Ben Mott. I assigned bluegill ages from scales. Aaron Nelson entered and summarized data.

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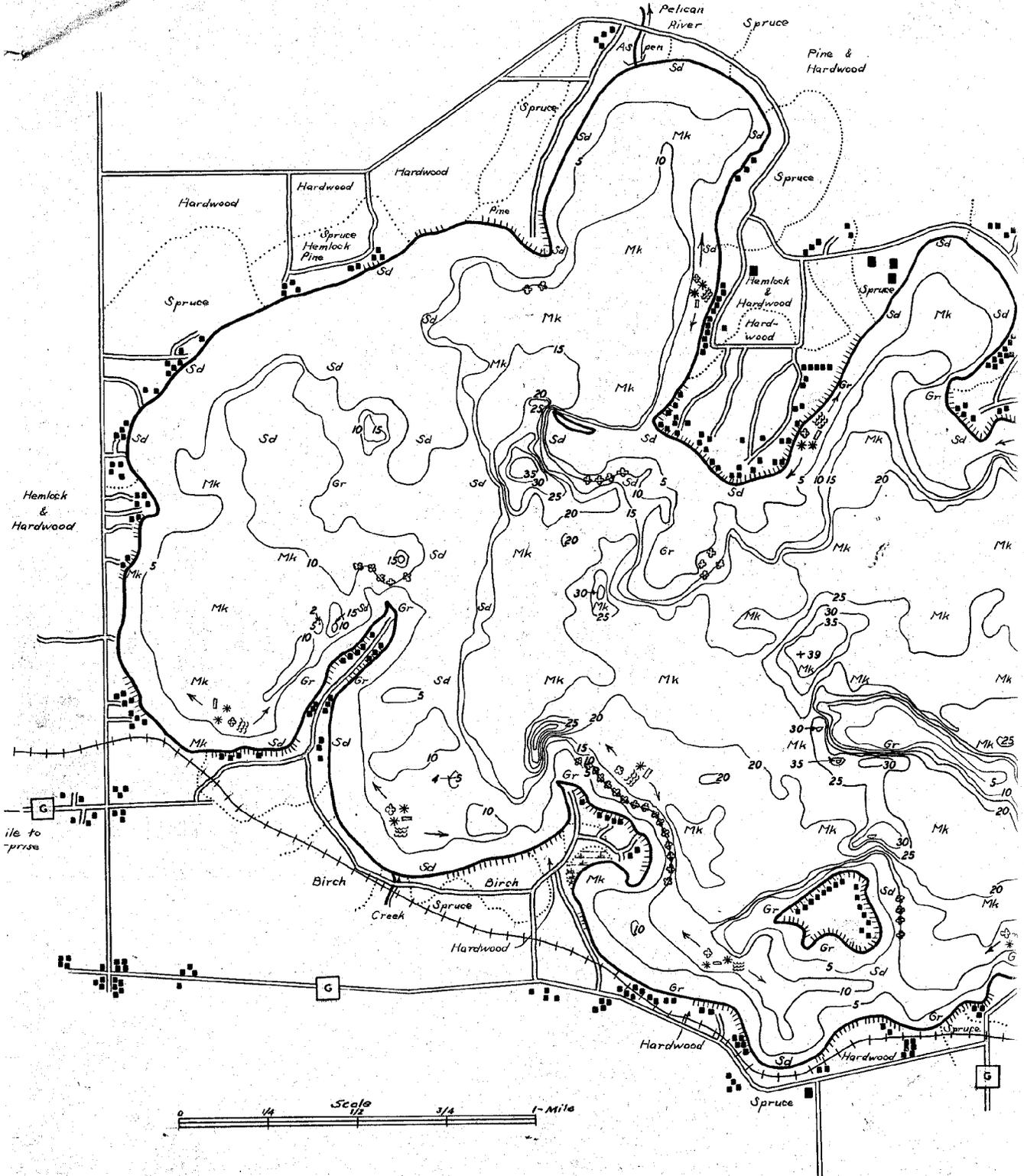
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WISCONSIN CONSERVATION DEPARTMENT  
 BIOLOGY DIVISION  
 LAKE AND STREAM IMPROVEMENT SECTION

LAKE SURVEY M.



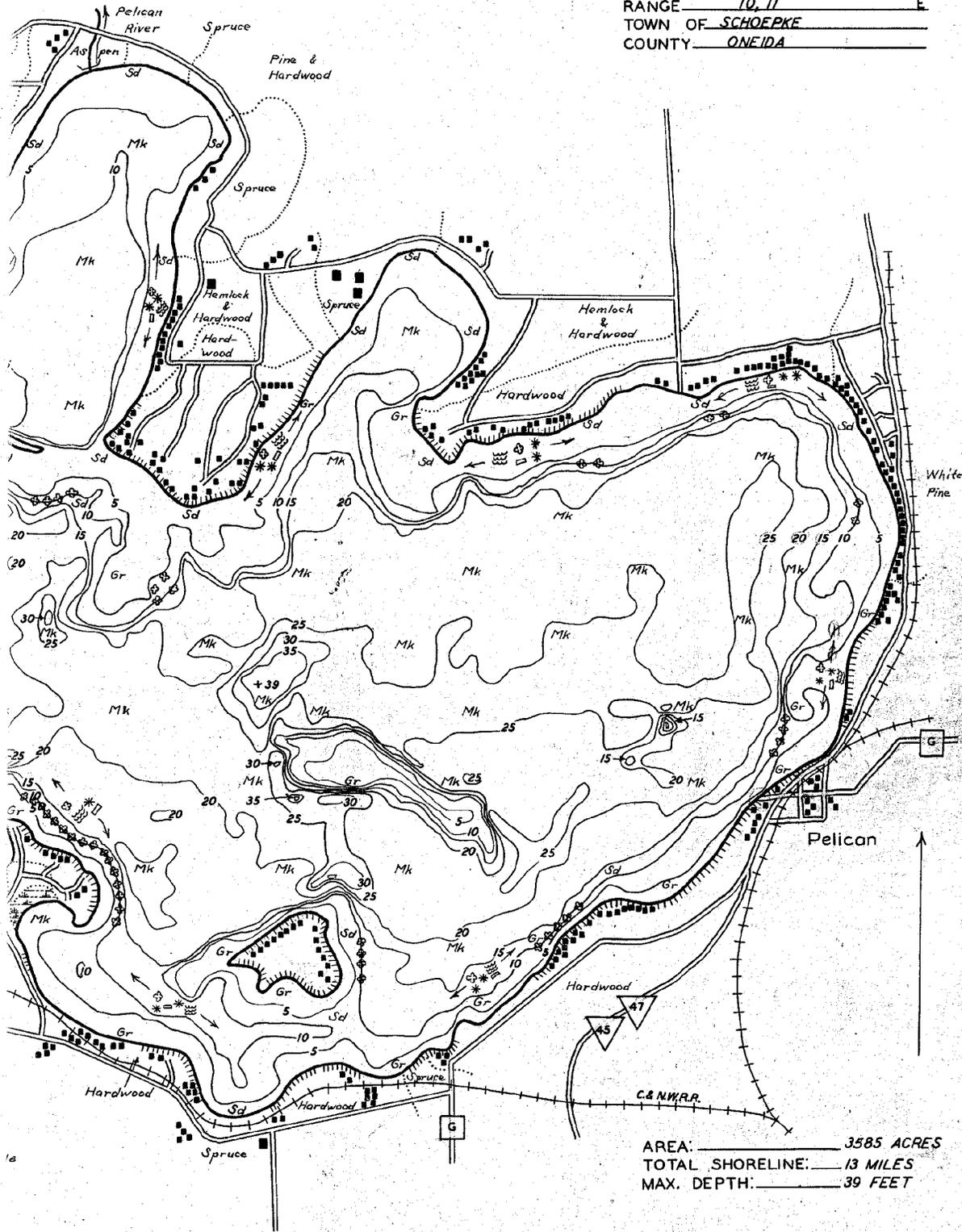
DATE MAY 10, 1940  
 COMPILED BY L.E.H. C.C.C.  
 TRACED BY T.J.W. C.C.C.  
 SOURCE OF INFORMATION LAKE SURVEY PROJECT  
C.C.C. CAMP ELCHO  
 SOUNDINGS 250' INTERVALS  
 DATES OF MAP REVISION \_\_\_\_\_  
 WORK AGENCY C.C.C.

LAKE IMPROVEMENT RECORD

TYPE	DATE	1936	1961
⊕ BRUSH REFUGES		51	50
∞ SAPLING TANGLES		67	
□ SPAWNING BOXES		58	
* MINNOW SPAWNERS		111	
TOTAL		287	50

LAKE SURVEY MAP

LAKE PELICAN  
SECTION 14, 19, 22, 23, 24, 25  
TOWNSHIP 35 N  
RANGE 10, 11 E  
TOWN OF SCHOEPKE  
COUNTY ONEIDA



AREA: 3585 ACRES  
TOTAL SHORELINE: 13 MILES  
MAX. DEPTH: 39 FEET

SCALE: 1" = 1320'

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LAKE IMPROVEMENT RECORD

TYPE	DATE	1936	1961	
BRUSH REFUGES		51	50	
SAPLING TANGLES		67		
SPAWNING BOXES		58		
MINNOW SPAWNERS		111		
TOTAL		287	50	

- LEGEND
- WEED BEDS
  - ROCKY SHOALS
  - SAND
  - CLAY
  - GRAVEL
  - MUCK
  - DWELLING
  - ABANDONED DWELLING
  - RESORT