Lily Lake

Schoolcraft County, T45N, 17W, Section 21
Manistique River watershed, last surveyed: 2008

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Environment

Lily Lake is located in west-central Schoolcraft County, about 5 miles south of the village of Shingleton (Figure 1). It is 155 surface acres with a maximum depth of about 9 feet. An un-named, intermittent stream forms the outlet in the southwest corner of the lake, connecting to Sand Lake.

The littoral zone of Lily Lake is extensive with limited areas of deeper water. The lake substrate consists of mostly organic material with limited areas of sand. Areas of emergent, submerged, and floating aquatic vegetation are very extensive, with typically over 50% of the lake surface covered. Pondweed (Potamogeon spp.), cattails (Typha spp.), waterweed (Elodea spp.) lily pads (Nymphaea spp.), bulrush (Scirpus spp.), water shield (Brasenia spp.), and eelgrass (Vallisneria spp.) have been observed during fisheries surveys.

The watershed is 562 acres in size and is over 90% forested. The immediate shoreline and surrounding country consists of low hills of sandy loam soils (United States Department of Agriculture 2008). The forest community consists of beech, red maple, white birch, white pine, tamarack, black spruce, and white cedar. Original logging took place shortly after 1900 for much of the area; white and red pine were logged from the uplands, and northern white-cedar was logged from wetland margins. Current land management is primarily for timber, recreation, and wildlife.

Much of Lily Lake shoreline is undeveloped, as the United States Forest Service owns approximately 80% of the lake frontage. Several seasonal and year-round dwellings are found on the southeastern shore. Access to the lake is walk-in or carry-in of small watercraft as a public-access boat launch is not available.

Limnological characteristics were last measured on August 28, 2008. The water was moderately stained brown with a Secchi disk reading of 6.0 feet. The water temperature did not vary from the surface of the lake (68.0° F) to the bottom (68.0° F), a depth of 9 feet. Dissolved oxygen ranged from 9.4 to 9.1 parts per million, which is sufficient to support aquatic life throughout the entire water column during summer. The pH ranged from 8.3 (surface) to 7.8 (5 foot depth) indicating that the water is slightly basic. Alkalinity was 8 mg/L, indicative of a softwater lake with limited buffering capacity, and the cholorphyll-a concentration, an index of algal biomass, was 0.006 mg/L. Values for ammonia-N, nitrate, nitrite, and total phosphorus were below the limits of detection. Water chemistry values indicate good water quality and a trophic status meso-oligotrohic (medium to low productivity).

History

Lily Lake has a history of fisheries management including stocking and fish community assessments. File records indicate that Lily Lake was stocked by the state with bluegill, largemouth bass, northern

pike, smallmouth bass, and yellow perch from 1937 to 1960 (Table 1). No additional fish stocking has occurred since 1960.

In 1957, a cursory fish and first survey was conducted to determine species in the fish community and guide further management efforts. Fish captured included golden shiner, pumpkinseed sunfish, white sucker, and yellow perch. Management recommendations included stocking legal-sized northern pike when fish were available. Subsequently, northern pike (N=210) were stocked in 1959. File records indicate that northern pike were also stocked in 1960. This however was an accidental stocking as they were requested for neighboring Sand Lake (Table 1).

Other fishery investigations were conducted in 1966, 1974, 1976, 1979, and 1991 to determine the composition of the fish community, collect specimens for identification, and determine growth rates of game species. A total of 10 species have been captured in all fisheries surveys conducted by the state and the US Forest Service (Table 2).

Current Status

In June and August of 2008, Fisheries Division completed a fish community survey on Lily Lake. An assessment using fyke, gill, and mini-fyke nets was conducted during June while an electrofishing boat was used for the August survey.

During June 16-19, 2008, 5 fyke nets were fished at 6 locations over 3 nights. Two experimental gill nets were fished at 6 locations over 3 nights, and two mini-fyke nets were fished at 4 locations for 2 nights. On August 28, 3 ten-minute night electrofishing runs were conducted around the shoreline. All fish captured were measured for length and a sample of scales was collected from common sport fish for age and growth analysis.

A total of 533 fish representing 4 species were collected from the combined June and August efforts (Table 3). Pumpkinseed sunfish and yellow perch were the most abundant composing 75% of the total catch by number. Other fish species collected included golden shiner and northern pike.

Northern pike (N=51) average 24.7 inches total length and compose 9.5% of the total survey catch by number (Table 3). Northern pike range from 16 to 28 inches (Table 4) with 73% of fish meeting or exceeding the minimum harvest length of 24 inches. Age-growth data indicates that northern pike are growing above state average, having a mean growth index of +0.9 inches (Table 5). The age distribution indicates good representation of northern pike aged 1 through 5 (Table 5).

Pumpkinseed sunfish (N=121) average 4.0 inches total length and compose 22.7% of the total survey catch by number (Table 3). Pumpkinseed sunfish range from 1 to 6 inches (Table 4) with 2% of the fish meeting or exceeding acceptable harvest lengths of 6 inches. Age-growth data indicates that pumpkinseed sunfish are growing slightly below state average having a mean growth index of -0.6 inches (Table 5). The age distribution indicates good representation of pumpkinseed sunfish aged 1 through 5 (Table 5).

Yellow perch (N=281) average 4.9 inches total length and compose 52.7% of the total survey catch by number (Table 3). Yellow perch range from 1 to 9 inches (Table 4) with 11% of fish meeting or

exceeding acceptable harvest lengths of 7 inches. Age-growth data indicates that yellow perch are growing below state average having a mean growth index of -1.5 inches (Table 5). The age distribution indicates good representation of yellow perch aged 0 through 7 (Table 5).

The only other fish species collected was golden shiner. Golden shiner (N=80) average 4.3 inches total length and compose 15% of the total survey catch by number (Table 3). Golden shiners range from 3 to 5 inches.

Analysis and Discussion

Lily Lake presently supports a simple fish community of golden shiners, northern pike, pumpkinseed sunfish, and yellow perch. This community is endemic to the central upper peninsula and is found in lakes which possess similar habitat characteristics. Various habitat factors found at the landscape (i.e. climate, biogeography, etc.) and local (i.e. lake morphology, land cover, etc.) level influence the presence or absence of fish species found in a lake environment. Other species that have been previously documented in Lily Lake (Table 2) were likely the result of authorized or un-authorized fish stocking or migration through the small stream connection with Sand Lake. Lack of suitable spawning habitat for bass or bluegill most likely explains their absence in Lily Lake.

The fyke net catch per unit effort (CPUE) for northern pike in Lily Lake is approximately 2 times above the average of other Upper Peninsula lakes sampled with Status and Trends survey protocols. Northern pike are growing well on a forage base of golden shiners, pumpkinseed sunfish, and yellow perch. Growth of pike in other NLMMU lakes tends to be slow when large, soft-rayed forage species (such as white suckers) are either absent or in low abundance in the fish community. Pike in Lily Lake are able to maintain good growth due to consistent natural reproduction of the aforementioned forage species and the absence of competition from any other predators typically found in many other lakes (i.e. largemouth bass, smallmouth bass, walleye, etc.). Growth rates of older age groups (i.e. age 4 and 5) are slower than younger age groups (i.e. age 3) indicating that perhaps growth of older and larger pike are limited by the small-bodied forage available in Lily Lake. However, older northern pike are still growing above the state average so this is not a concern.

The fyke net catch per unit effort (CPUE) for yellow perch in Lily Lake is approximately 3.5 times above the average of other Upper Peninsula lakes sampled with Status and Trends survey protocols. Slow growth characteristics are likely exacerbated by heavy weed growth which limits predation by northern pike. Yellow perch are thus sufficiently protected to allow good survival of fish to older age classes. Competition for forage resources amongst the yellow perch population may also be a contributing factor to slow growth. Growth trends tend to be slow for almost all age classes in the population (ages 2-7) except for age 1.

The fyke net catch per unit effort (CPUE) for pumpkinseed sunfish in Lily Lake is slightly above average as compared to other upper peninsula lakes sampled with the Status and Trends survey protocol. Growth is slightly below the state average and few fish in the population are considered of acceptable size (6+ inches) for the angler. High rates of natural mortality or predation by northern pike may be cropping off older and larger individuals in the population as many other lakes in the NLMMU will support pumpkinseed sunfish through age 10 and beyond.

Management Direction

Lily Lake provides a modest fishery for northern pike and yellow perch. Northern pike are growing well, and legal-size fish are present. Yellow perch, while growing slowly, are providing fish up to 9 inches. Overall, Lily Lake currently offers a quiet setting with a lightly-used fishery.

Management should focus on protecting and maintaining the integrity and health of the aquatic ecosystem and habitat conditions for fish. It is vital that all wetlands be protected from development. Such wetlands are a critical component of lake ecosystems and they should remain in a natural state. Additionally, preservation of aquatic vegetation is important to the overall health of the fish community.

Protection of critical habitats is the highest priority as these habitats are currently mostly intact. Additional fish stocking or habitat enhancements (i.e., installation of fish cribs) would have negligible positive benefit to the fish community or anglers.

References

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Official soil series descriptions (Online WWW). Available at "http://soils.usda.gov/technical/classification/osd/index.html. USDA-NRCS, Lincoln, NE.

Figure 1. -Locator map of Lily Lake, Schoolcraft County.

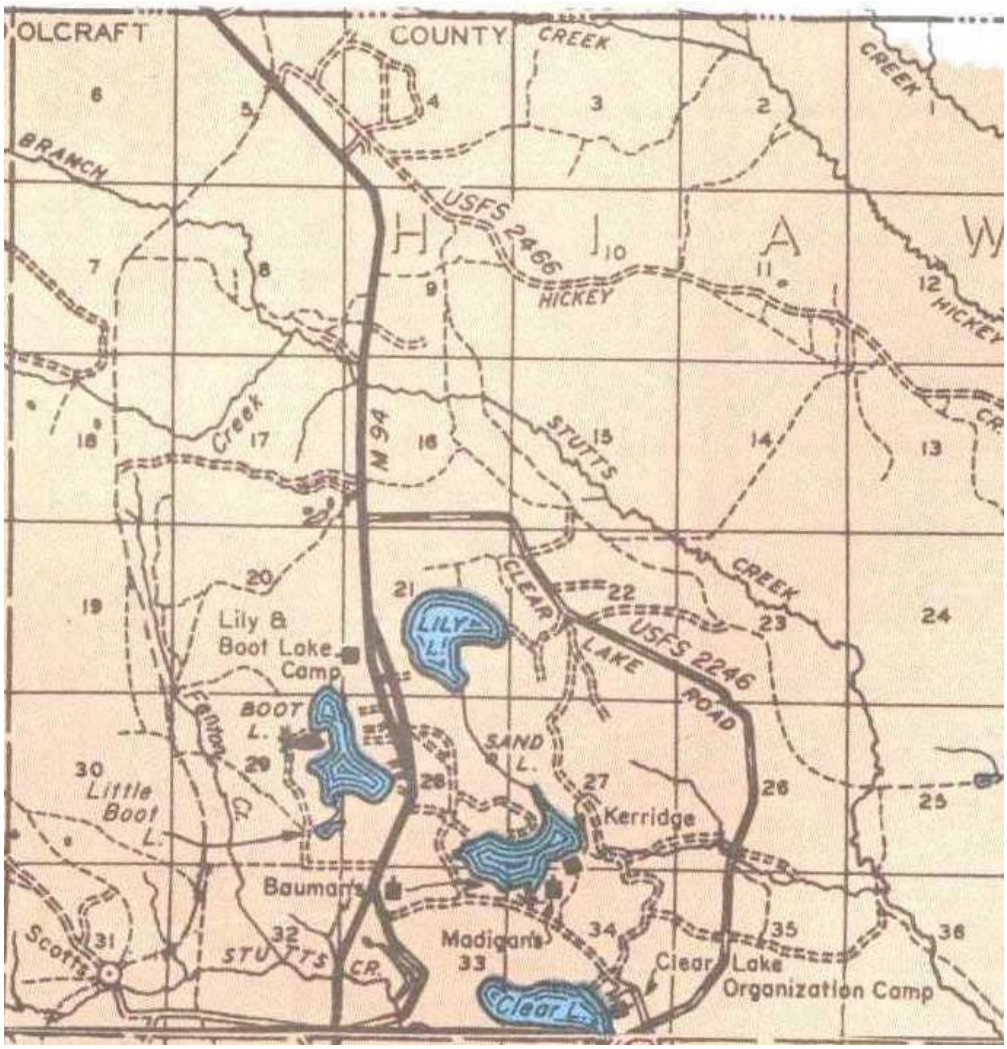

Table 1.-Fish stocked into Lily Lake, Schoolcraft County (1936 to present). Data from DNRE, Fisheries Division records.

Year	Species	Number	Rate (#/acre)	Size (in.) or Age
1937	Smallmouth bass	200	1.4	4”
	Yellow perch	2000	13.9	adults
	Bluegill	1500	10.4	5 months
1938	Bluegill	5000	34.7	3 months
1940	Bluegill	3000	20.8	4 months
1942	Smallmouth bass	600	4.2	4 months
	Bluegill	1200	8.3	4 months
1945	Largemouth bass	1000	6.9	3.5”
1959	Northern pike	210	1.5	legal
1960	Northern pike	176	1.2	legal

Table 2.-List of fishes (1957 to 2008) in Lily Lake, Schoolcraft County. Origin: Native=N, I=Introduced. Status: P (present)=recent observations (latest survey). Data from MDNRE, Fisheries Division records.

Common Name	Scientific Name	Origin	Status
Bluegill	*Lepomis machrochirus*	I	
Bluntnose minnow	*Pimephales notatus*	N	
Common shiner	*Luxilus cornutus*	N	
Golden shiner	*Notemigonus crysoleucas*	N	P
Johnny darter	*Etheostoma nigrum*	N	
Largemouth bass	*Micropterus salmoides*	I	
Northern pike	*Esox lucius*	I	P
Pumpkinseed sunfish	*Lepomis machrochirus*	N	P
White sucker	*Catostomus commersoni*	N	
Yellow perch	*Perca flavescens*	N	P

Table 3.-Number, weight, length, and affiliated percentages of fishes collected with fyke, gill, and mini-fyke nets and electrofishing gear from Lily Lake, Schoolcraft County in June and August, 2008. Data from MDNRE, Fisheries Division records.

Common name	Number	Total weight (lbs.)	Average length (in.)	Length range (in.)	Percent by Number	Percent by weight	Percent legal size
Golden shiner	80	2.0	4.3	3-5	15.0	1.0	--
Northern pike	51	173.7	24.7	16-28	9.5	86.8	73 (≥ 24”)
Pumpkinseed sunfish	121	7.9	4.0	1-6	22.7	4.0	2 (≥ 6”)
Yellow perch	281	16.5	4.9	1-9	52.7	8.2	11 (≥ 7”)

Table 4.-Length range of select fishes collected with fyke, gill, and mini-fyke nets and electrofishing gear from Lily Lake, Schoolcraft County in June and August, 2008. Data from MDNRE, Fisheries Division records.

	Species			
Inch group	Golden shiner	Northern pike	Pumpkinseed sunfish	Yellow perch
0				
1			19	1
2			2	9
3	25		19	67
4	49		59	108
5	6		19	48
6			3	17
7				21
8				7
9				3
10				
11				
12				
13				
14				
15				
16		1		
17				
18				
19				
20		2		
21		1		
22		2		
23		8		
24		19		
25		5		
26		6		
27		4		
28		3		
29				
30				

Table 5.-Weighted mean length (inches) at age, and growth relative to the state average for select species of fish sampled from Lily Lake, Schoolcraft County with fyke, gill, and mini-fyke nets and electrofishing gear, June and August, 2008. Number of fish aged is in parentheses. Data from MDNRE, Fisheries Division records.

	Age/Length								
Species	0	1	2	3	4	5	6	7	Mean growth index[1]
Northern pike		16.7 (1)	21.8 (1)	23.2 (14)	25.0 (22)	26.6 (11)			+0.9
Pumpkinseed		1.6 (12)	3.8 (11)	4.7 (14)	5.1 (5)	6.2 (3)			-0.6
Yellow perch	2.1 (9)	3.7 (10)	4.5 (12)	5.3 (9)	6.1 (14)	6.7 (6)	7.8 (11)	8.7 (6)	-1.5

[1]Mean growth index is the average deviation from the state average length at age.