Wakeley Lake
Crawford County, T26N R02W Sec. 23
last surveyed 2017, Au Sable River Watershed

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Environment

Wakeley Lake is a 108-acre lake in eastern Crawford County, located approximately 10 miles east of the town of Grayling. The lake has a perimeter of 1.81 miles, and drains an area of 1,788 acres. The catchment is primarily forested (75%), with some urban (12%), grass/shrub/scrub (7%), and wetland and water (6%) landuse. Surficial geology of the watershed is entirely coarse-textured ice contact/outwash/alluvium. Wakeley Lake is a natural lake, but the water level is augmented by a small dam (with an approximate head of 5-feet) at the outlet. The lake is shallow, with a maximum depth of nine feet and most of the lake is less than 5 feet deep. The lake drains to Wakeley Creek, which flows into the mainstem Au Sable River just upstream of Chase Bridge. The lake is surrounded by Huron-Manistee National Forest, and access is walk-in only via a 0.5-mile trail from the parking area to the lake.

History

Wakeley Lake is located within the Huron-Manistee National Forest and is part of a 1,415-acre tract of land acquired by the United States Forest Service (USFS) in 1986. The lake had good populations of bluegill, pumpkinseed, northern pike, and largemouth bass, and did not receive much fishing pressure when it was under private ownership. Because of this unique situation, the lake was closed to fishing until a management plan could be developed with the USFS and MDNR. Ultimately, a plan was developed using a successful plan from the Sylvania Tract in the Ottawa National Forest as a model (Schneider and Juetten 1989). Goals were to maintain high densities and proportions of large fish, excellent catch rates for anglers while allowing modest fishing pressure, and a semi-wilderness atmosphere (Schneider 2001).

To help meet plan objectives, special regulations were adopted for Wakeley Lake when it was opened to public fishing in 1987. Those special regulations are: catch-and-release fishing for all species of fish (no possession); a shortened fishing season, June 15-August 31; artificial lures only; walk-in access only; no gasoline motors; and a portion of the lake was to be closed during loon nesting. The restrictive fishing regulations remain in effect today.

Angling (creel) surveys were conducted on Wakeley Lake in the first year it was open to the public for fishing (1987), and again in 1990, 1997. The lake was popular, as evidenced by the substantial amount of fishing effort (3,292-3,994 angler hours per year) despite the abbreviated fishing season of only 2.5 months. Anglers reported a high degree of satisfaction each year it was surveyed (Schneider 2001).

Netting and electrofishing surveys of the fish population were conducted in 1986, 1987, 1990, and 1997. These surveys showed an improvement in size structure of the Largemouth Bass population over time, with more fish over 15 inches in total length captured in later surveys. Largemouth Bass growth rates were variable, but showed a decreasing trend overall. Northern Pike numbers and sizes,

however, decreased over the time period surveyed and growth rates declined as well. Panfish populations improved under catch-and-release regulations, with numbers and proportions of larger fish increasing, as did angler catch rates. Bluegill growth rates declined over the time period, however.

In May 2011, the dam at the outlet of Wakeley Lake partially failed, and concerns were raised over the potential to washout Wakeley Bridge Road and the muddy water flowing into the Au Sable. The USFS made temporary repairs to address the problem in the short term, then followed up with more substantial repairs. No fish kills or other problems were observed.

Current Status

A fish community survey was done on Wakeley Lake in May 2017 by MDNR Fisheries Division. A variety of net types and sizes were deployed using Status and Trends protocol. Status and Trends is a methodology developed by Fisheries Division where gear is standardized and survey effort is a function of lake size. The variety of gear types and mesh sizes is intended to sample different species, life stages, and sizes of fish to give a complete overview of the fish community. Survey effort for this lake consisted of 9 large mesh fyke net lifts, 4 large mesh trap net lifts, 4 small mesh fyke net lifts, 3 seine hauls, and 3 boomshocking transects of 600 seconds each. Additionally, limnological parameters were measured in August of the same year.

A total of 835 fish were captured weighing approximately 443 pounds (Table 1). Thirteen fish species were encountered representing six families. Large predators included Largemouth Bass and Northern Pike. These predators comprised approximately 17% of the numerical catch and about 57% of the catch by weight. Panfish were represented by Bluegill, Pumpkinseed Sunfish, Rock Bass, and Yellow Perch. Panfish comprised about 72% of the numerical catch and 29% of the catch by weight.

Bluegill were the most abundant panfish species with 424 captured during this survey. They were well distributed across length groups with good numbers ≥7 inches (Table 2) but were on average about an inch smaller than the statewide average length at age for this species. Proportional stock density (PSD) and Relative Stock Density (RSD) are measures of the bigger-sized fish in a population (Table 3). The PSD for Bluegill was high (67) indicating a good proportion of quality-sized fish, as was the RSD-P (45), which indicates a relatively high proportion of preferred-size fish (Table 3). The RSDs for memorable and trophy sized Bluegills, however, were quite low (Table 4). Pumpkinseed Sunfish, Rock Bass, and Yellow Perch were present at much lower numbers than Bluegill in Wakeley Lake. Pumpkinseed Sunfish up to 9 inches were collected and the majority were > 6 inches.

The predator fish community in Wakeley Lake was represented by Largemouth Bass and Northern Pike. Largemouth Bass represented 12% of the numerical catch and 25% of the catch by weight. Bass were present up to 21 inches and were about an inch smaller than the statewide average length-at-age for this species (Table 1). PSD and RSD calculations show Largemouth Bass are well represented in the quality size range (PSD=74) and the preferred size (RSD-P = 23), but not at the memorable or trophy size classes (Table 4).

The 39 Northern Pike captured represented only 4.7% of the numerical catch of the survey, but accounted for the most biomass of any species caught in the survey with 31.5% of the catch by weight. Northern Pike up to 38 inches were captured. Stock density calculations for Northern Pike show good

proportions of quality-sized fish (PSD=81), preferred size (RSD-P=22), and memorable size (RSD-M=5) (Table 4).

Seven non-game fish species were captured during the survey. Among these, Yellow Bullhead and Brown Bullhead were the most abundant. Smaller-bodied prey fish were also present at lower densities, including Blackchin Shiners, Bluntnose Minnows, Golden Shiners, Iowa Darters, Central Mudminnows.

Nearshore habitat and limnological parameters were also measured later in the summer (August), at a time when seasonal lake temperatures and productivity have typically stabilized. Shoreline development was low, with zero docks recorded. Submerged trees were abundant (469 observed). The lake does not thermally stratify, as temperature and dissolved oxygen levels were uniform throughout the water column (Table 6). Water chemistry results are provided in Table 7. The Department of Environment, Great Lakes, and Energy (EGLE) also surveyed Wakeley Lake in July and documented the relative abundance of aquatic vegetation (Table 8, S. Holden, EGLE, unpublished data).

Analysis and Discussion

Wakeley Lake provides a unique fishing experience in a semi-wilderness setting. The catch-and-release fishing regulations have been in place for 30 years prior to this survey, as long the lake has been open to the public for fishing. Although not specifically identified as a "quality" lake in Fisheries Order 244, Wakeley Lake's fishing regulations are similar to the restrictive regulations of quality lakes. Wakeley Lake provides fisheries for Bluegill, Largemouth Bass, and Northern Pike.

Bluegill dominated the panfish population in Wakeley Lake Although Pumpkinseed were at lower abundance, they were present in sizes up to 9 inches. Bluegill averaged almost an inch smaller than the statewide average length at age, but Pumpkinseed averaged over an inch larger than the statewide average. Bluegill natural reproduction is consistent, with each age class from 1-13 represented in the catch. Pumpkinseed natural reproduction was fairly consistent as well, with only one age class (age-3) missing from age-2 to 10. Quality-sized and preferred-sized Bluegill are present in good proportion as evidenced by the PSD and RSD-P, but the proportion of memorable and trophy-sized is fairly low.

Both Largemouth Bass and Northern Pike shared the spotlight in the predator community of Wakeley Lake. Good proportions of Largemouth Bass were present in quality sizes (PSD), but the relative density of preferred and memorable-sized fish was low (RSD-P and RSD-M). No trophy-sized Largemouth Bass were present. Northern Pike, however, were present in a good proportion of quality sizes (PSD) and the relative density of preferred size (28 inches) and memorable sizes (34 inches) was good. These RSD-P and RSD-M values met or exceeded the threshold for Quality Lakes designation for Northern Pike.

Smaller-bodied prey fish (e.g., minnow species), were likely more abundant than our survey catch reflects. The lake bathymetry, bottom type, and amount of large woody material along the shoreline made it difficult to survey the prey fish populations.

The shoreline habitat and water chemistry results are indicative of a productive, undeveloped lake. Parameters such as total phosphorus and chlorophyll-a (Table 7) put this lake between the mesotrophic

and eutrophic classification. The temperature and dissolved oxygen profiles show that the lake does not stratify, and conditions are suitable for the warmwater fish community it supports.

Wakeley Lake provides an opportunity for catch-and-release only fishing in a setting not typically found in the Lower Peninsula of Michigan. Anglers have the opportunity to catch quality-sized Bluegill, Largemouth Bass, and Northern Pike, as well as the opportunity to catch some much larger Northern Pike.

Management Direction

1. Maintain catch-and-release only regulations and carry-in access only. This provides a unique fishing experience in a semi-wilderness setting and is consistent with the Huron-Manistee National Forest Plan for this area.
2. Extend the end of the fishing season to September 30. This will still be protective of spawning fish and nesting loons in the spring, but will allow an extra month of fishing at the end of the season. It will also be consistent with the season closure end date for other quality lakes in the area (e.g., Jones Lake).

References

Michigan Department of Natural Resources (MDNR). 2012. Fisheries Order FO-244. Guidelines for selection of quality non-trout fishing lakes. Michigan Department of Natural Resources, Fisheries Division, Ann Arbor, Michigan.

Schneider, J.C. 2001. Evaluation of catch-and-release regulations at Wakeley Lake, 1987-97. Fisheries Technical Report 2001-2, Michigan Department of Natural Resources Fisheries Division. Ann Arbor.

Schneider, J.S., and R.P. Juetten. 1989. An evaluation of special fishing regulations on Sylvania lakes. Michigan Department of Natural Resources, Fisheries Technical Report 89-9, Ann Arbor.

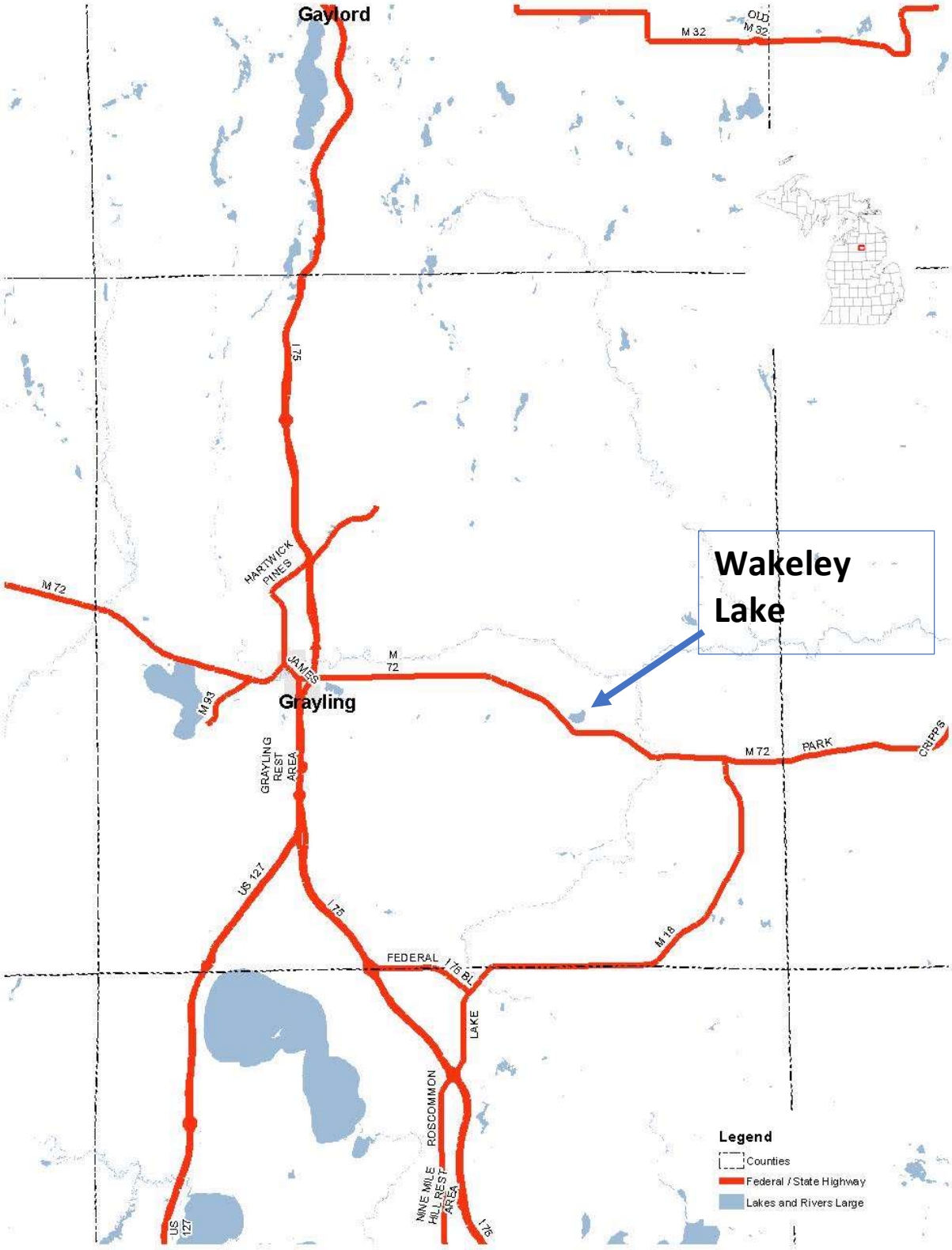

Figure 1. Location Map for Wakeley Lake, Crawford County.

Photo 1.

Photo 2.

Photo 3.

Wakeley Lake

Table 1. Number, percent by number, and length range by species for fish captured in the 2017 survey of Wakeley Lake (Crawford County). *Mean growth index is the average deviation from the state average length at age based on ages with at least five individuals aged.

Species	Number	Percent by Number	Weight (lb)	Percent by Weight	Length Range (in)	Growth Index*
Bluegill	524	62.8	97.5	22.0	1-10	-0.8
Largemouth Bass	101	12.1	111.3	25.1	2-21	-0.8
Pumpkinseed	69	8.3	27.8	6.3	2-9	+1.2
Yellow Bullhead	53	6.3	43.2	9.7	8-13	--
Northern Pike	39	4.7	139.4	31.5	1-38	-0.6
Brown Bullhead	18	2.2	21.4	4.8	11-17	--
Golden Shiner	9	1.1	0.1	0.0	3-4	--
Bluntnose Minnow	8	1.0	0.0	0.0	1-2	--
Rock Bass	6	0.7	2.2	0.5	3-9	--
Yellow Perch	3	0.4	0.1	0.0	3-3	--
Blackchin Shiner	2	0.2	0.0	0.0	1-2	--
Central Mudminnow	2	0.2	0.0	0.0	2-2	--
Iowa Darter	1	0.1	0.0	0.0	1-1	--

Table 2. Length-frequency of game fish captured during the 2017 survey of Wakeley Lake (Crawford County).

Inch Group	Bluegill	Largemouth Bass	Northern Pike	Pumpkinseed	Yellow Perch
1	104		1		
2	104	1		1	
3	33	1			3
4	46			2	
5	26	9		3	
6	37	11		12	
7	32	2		24	
8	88	6		20	
9	52	3		7	
10	2	4			
11		7			
12		10	1		
13		16			
14		13			
15		11			
16		3	2		
17		1			
18			2		

Table 2. – cont.

Inch Group	Bluegill	Largemouth Bass	Northern Pike	Pumpkinseed	Yellow Perch
19			2		
20		1	1		
21		2	1		
22			8		
23			7		
24			2		
25					
26			2		
27			2		
28			1		
29					
30			3		
31			1		
32					
33			1		
34			1		
35					
36					
37					
38			1		

Table 3. Minimum lengths (inches) of five size categories for bluegill, largemouth bass, northern pike, and walleye (FO-244).

	Bluegill	Largemouth bass	Northern pike
Minimum stock size	3	8	14
Quality stock size	6	12	21
Preferred stock size	8	15	28
Memorable stock size	10	20	34
Trophy stock size	12	25	44

Table 4. Preferred stock density (PSD) and relative stock density (RSD) values for three fish species captured during the 2017 survey of Wakeley Lake, Crawford County. RSD-P refers to RSD-preferred, RSD-M refers to RSD-memorable, and RSD-T refers to RSD-Trophy. For details on how these values are calculated, see Fisheries Order 244. Values with an asterisk (*) exceed the criteria for Quality Lakes designation in FO-244.

	Bluegill	Largemouth bass	Northern pike
PSD	67	74	81
RSD-P	45	23	22*
RSD-M	1	4	5*
RSD-T	0	0	0

Table 5. Mean length (inches) at age for various sport fishes captured at Wakeley Lake in 2017. Number in parentheses represents number of fish aged.

Age Group	Bluegill	Largemouth Bass	Northern Pike	Pumpkinseed
I	1.6 (6)	2.7 (2)	12.1 (1)	
II	2.4 (11)	6.0 (20)	17.6 (4)	2.6 (1)
III	3.1 (2)	9.5 (15)	21.4 (7)	
IV	3.8 (14)	11.6 (14)	22.7 (6)	6.8 (8)
V	5.1 (19)	13.3 (10)	23.8 (8)	7.4 (16)
VI	6.1 (15)	14.2 (8)	27.2 (3)	7.7 (11)
VII	7.4 (19)	14.4 (10)	26.9 (2)	8.1 (4)
VIII	8.4 (8)	15.8 (6)	30.5 (4)	9.4 (3)
IX	8.4 (8)	15.8 (3)	30.9 (1)	9.0 (1)
X	8.7 (7)		34.0 (1)	9.0 (2)
XI	9.2 (1)		38.0 (1)	
XII	9.3 (2)	20.8 (1)		
XIII	9.5 (2)			
XIV		21.1 (1)		
XV		21.6 (1)		

Table 6. Temperature, dissolved oxygen, and pH profile of Wakeley Lake, measured on August 22, 2017.

Reading Depth (ft)	Temperature (°F)	Dissolved Oxygen (mg/L)	pH
0	74.6	8.32	7.80
1	74.6	8.30	7.80
2	74.6	8.29	7.80
3	74.6	8.31	7.81
4	74.6	8.27	7.81
5	74.6	8.21	7.79
6	74.6	8.25	7.80
7	74.6	8.27	7.80
8	74.6	8.26	7.81

Table 7. Water chemistry parameters of Wakeley Lake, sampled on August 22, 2017.

Parameter	Value
Total Alkalinity (mg/L)	34
Chlorophyll a (ug/L)	7.06
Nitrogen, ammonia (mg/L)	0.12
Nitrogen, nitrate + nitrite (mg/L)	0.0067
Nitrogen, total Kjeldahl (mg/L)	0.9030
Phosphorus, total (mg/L)	0.0117

Table 8. Inventory of aquatic macrophytes in Wakeley Lake on July 17, 2017 (S. Holden, Department of Environment, Great Lakes, and Energy, unpublished data).

Direction	Macrophyte	Macrophyte Density
East	Muskgrass-Chara	sparse
East	Millfoil-Myriophyllum	sparse
East	Eurasian milfoil-M spicatum	dense
East	Mediumleafed Pondweed-Potamageton	sparse
East	Narrow-leafed Pondweed-Potamageton	sparse
East	YellowPondLillies-Nuphar	sparse
East	WhitePondLillies-Nymphea	dense
East	Rushes and sedges-Scirpus	sparse
East	Cattails-Typha	moderate
North	Millfoil-Myriophyllum	sparse
North	Mediumleafed Pondweed-Potamageton	sparse
North	Narrow-leafed Pondweed-Potamageton	sparse
North	Bladderwort-Utricularia	sparse
North	WhitePondLillies-Nymphea	moderate
North	Rushes and sedges-Scirpus	moderate
North	Cattails-Typha	found
North	Watershield-Brasenia schreberi	sparse
Overall	Muskgrass-Chara	sparse
Overall	Millfoil-Myriophyllum	moderate
Overall	Eurasian milfoil-M spicatum	moderate

Table 8.-cont.

Direction	Macrophyte	Macrophyte Density
Overall	Southern Naiad-Najas	Sparse
Overall	Broadleafed Pondweed-Potamageton	sparse
Overall	Mediumleafed Pondweed-Potamageton	sparse
Overall	Narrow-leafed Pondweed-Potamageton	sparse
Overall	Bladderwort-Utricularia	sparse
Overall	YellowPondLillies-Nuphar	moderate
Overall	WhitePondLillies-Nymphea	dense
Overall	Rushes and sedges-Scirpus	moderate
Overall	Cattails-Typha	sparse
Overall	Watershield-Brasenia schreberi	sparse
South	Muskgrass-Chara	sparse
South	Millfoil-Myriophyllum	moderate
South	Eurasian milfoil-M spicatum	dense
South	Broadleafed Pondweed-Potamageton	sparse
South	Mediumleafed Pondweed-Potamageton	sparse
South	Narrow-leafed Pondweed-Potamageton	sparse
South	Bladderwort-Utricularia	sparse
South	YellowPondLillies-Nuphar	sparse
South	WhitePondLillies-Nymphea	moderate

Table 8.-cont.

Direction	Macrophyte	Macrophyte Density
South	Rushes and sedges-Scirpus	Moderate
South	Watershield-Brasenia schreberi	Sparse
West	Muskgrass-Chara	Sparse
West	Southern Naiad-Najas	found
West	Mediumleafed Pondweed-Potamageton	sparse
West	Narrow-leafed Pondweed-Potamageton	sparse
West	Bladderwort-Utricularia	sparse
West	YellowPondLillies-Nuphar	sparse
West	WhitePondLillies-Nymphea	dense
West	Rushes and sedges-Scirpus	sparse
West	Cattails-Typha	moderate
West	Watershield-Brasenia schreberi	sparse