Pickerel Lake
Kalkaska County
Manistee River Watershed, last surveyed 2023

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Environment

Pickerel Lake is a 100-acre glacial lake in Cold Springs Township in Kalkaska County, Michigan (Figures 1 and 2). The lake is located approximately 10 miles northeast of the Village of Kalkaska. Pickerel Lake lies within the Manistee River watershed, and the North Branch of the Manistee River flows out of the south end of the lake. Pickerel Lake has a maximum depth of 72 feet and a shoreline length of 2.2 miles. The substrates in Pickerel Lake consist of sand out to the 20-foot depth contour and organic beyond that, although there are some marl patches along the west shore as well. The southern tip of the lake is mostly separated from the main lake by a shallow sandbar that becomes dry during periods of low water. The southern portion of the lake is relatively shallow and not much deeper than 3 or 4 feet. One island is also present in the southern part of the lake.

The surrounding landscape consists of forested rolling hills, with some wetlands intermixed. Land use is primarily forest, with northern hardwoods and conifers. While land ownership around the lake is mostly private, the southeastern corner of the lake is a State Forest Campground maintained by the Michigan Department of Natural Resources (MDNR). The campground provides the only public access to Pickerel Lake, with a boat launch and parking for 15 vehicles with trailers. Despite the private ownership of most of the lakeshore, shoreline armoring, and alteration is moderate, with some natural shoreline remaining intact.

Since 1969, Pickerel Lake has had a local watercraft ordinance in place that states: "On the waters of Pickerel Lake, Township of Cold Springs, County of Kalkaska, state of Michigan, no operator of any motorboat, during the period from 6:30 p.m. to 10:00 a.m. of the following day, shall:
(a) Operate such motorboat at high speed.
(b) Have in tow, or otherwise assist in the propulsion of, a person on water skis, water sled, surfboard, or other similar contrivance."

There is one known citizen-based group that advocates for Pickerel Lake- the Pickerel Lake Association, which was incorporated in 1996. The mission statement for the group is as follows:
1) This organization shall promote the education of Riparian property owners and other lake users about water quality and supply.
2) This Association shall morally support issues which concern the welfare of the lake in general, including conservation of the water supply in the lake and watershed, and maintaining the quality of the water so as to be safe for swimming and conducive to the renewal of fish and wildlife resources. The group also oversees treatments for Eurasian milfoil (Robert Fueri, Pickerel Lake Association, personal communication).

History

The first recorded fish stockings of Pickerel Lake took place in 1929, when adult Largemouth Bass and Yellow Perch fry were stocked (Table 1). Bluegill, Smallmouth Bass, and Yellow Perch were stocked in 1930, and then Bluegill were again stocked in 1931. Walleye were first stocked in 1935 and were stocked in most years between then and 1942. Yellow Perch were stocked once more in 1938. After that, no more stocking of consequence occurred until 1990, when Walleye were again stocked. Since then, Walleye have been stocked by MDNR on a fairly regular basis, with the most recent stocking occurring in 2022 (Table 1).

The first fisheries investigation of Pickerel Lake was in 1930, conducted by R. W. Eschmeyer from the Institute for Fisheries Research (MDNR files, Cadillac). No formal report was created, but survey notes indicate that Largemouth Bass, Northern Pike, Rock Bass, "sunfish" (likely Pumpkinseed), and Yellow Perch were present (Table 2). Non-game species mentioned included Bluntnose Minnow and Blacknose Shiner. Species mentioned as noticeably absent included Cisco and White Sucker. Gear utilized in the survey is not mentioned in detail. Management recommendations included the introduction of gravel to the shorelines of the lake and construction of brush shelters for fish cover. Stocking of Largemouth Bass, Smallmouth Bass, and Bluegill was also recommended.

Another fisheries survey of Pickerel Lake was conducted in 1957 (Lievense 1957). Although all gear utilized in the survey isn't entirely clear, gill nets and seines were mentioned. In that survey, 9 fish species were caught (Table 2). Largemouth Bass, Smallmouth Bass, Northern Pike, and Walleye were the most abundant species in the survey. Lievense discusses that unlike most natural lakes, which are dominated numerically by panfish, Pickerel Lake seems to be dominated by predators. Of particular interest was the strong Walleye catch, since Walleye had not been stocked since 1942. Therefore, it was assumed that the Walleye caught in the 1957 survey were reproduced naturally. While no Bluegill were caught in the survey, Lievense mentions that numerous sources informed him that Bluegill are indeed present in Pickerel Lake.

After the 1957 survey that documented the presence of Walleye in Pickerel Lake, there was vigorous discussion (MDNR files, Cadillac) among Fisheries Division staff regarding the potential construction of a Walleye spawning reef on Pickerel Lake. Despite the discussion, no Walleye spawning habitat project was ever completed on Pickerel Lake. This was likely because Walleye spawning habitat projects on other lakes had showed only mixed success, with some projects exhibiting no favorable results despite considerable financial investment.

The next fisheries survey of Pickerel Lake was conducted in 1966 by the Michigan Department of Conservation (the precursor to the MDNR of today). Gear used included trap nets, fyke nets, and inland gill nets, and it appears that the gear was only set for one night. A total of 66 fish representing 7 species were caught (Table 2). This survey marked the first time that Bluegill were caught in a fisheries survey of Pickerel Lake. Bluegill and Yellow Perch were the most numerous fish caught in the survey. No report was produced from this survey.

In 1987, angler reports were received regarding continued sporadic catches of Walleye even though no stocking was occurring. This led to the next fisheries survey of Pickerel Lake, which was conducted by MDNR in late summer, 1988. Gear used in this survey included six fyke nets and two inland gill nets set for two nights. Eight species were caught in the survey (Table 2). Numerically, Bluegill and Rock Bass

dominated the catch. Predator species caught included Largemouth Bass, Northern Pike, Smallmouth Bass, and Walleye. The Walleye catch consisted of one fish, 24 inches in length. No report was written for the survey, but Walleye stocking was commenced in 1990 as a direct result of the survey. In a Fisheries Prescription from 1998, MDNR Fisheries Biologist Ralph Hay states that anglers have been reporting "very good fishing for Walleye" from Pickerel Lake (MDNR files, Cadillac).

In 1999, the first fall electrofishing survey targeting juvenile Walleye was conducted by MNDR according to protocols outlined by Ziegler and Schneider (2000), and by Serns (1982 and 1983). Results were inconclusive, as only two juvenile Walleye were caught. Other fall Walleye electrofishing surveys were conducted in 2003 and 2006. No Walleye were caught in the 2003 survey, while 5 juvenile Walleye were caught in the 2006 survey. Even though five were caught in the survey, that was not enough to make any conclusive determinations about survival of the stocked Walleye.

A netting survey of Pickerel Lake was conducted by MDNR from May 9-12, 2005. Gear utilized included four trap nets (12 net-nights), two l nets (4 net-nights), and one small-mesh fyke net (1 net-night). A total of 749 fish representing 12 species were caught (Tables 3 and 4). Age and growth analysis was conducted by counting growth rings present in cross sections of spines or scales (Table 5). Weighted age compositions of gamefish populations were calculated as described by Schneider (2000b). Mean length at age was used to obtain a growth index by calculating the difference from the state average length (Schneider et al. 2000a). The mean growth indices for a given gamefish species was generated by averaging the growth indices for each age class that was represented by at least five fish.

Rock Bass and Bluegill were the most numerous species encountered (Tables 3 and 4). Bluegill ranged up to 10 inches in length and more than 50% of the Bluegill captured in the survey exceeded the minimum acceptable size of six inches. Rock Bass reached 11 inches in length, and 85% exceeded six inches. Both species were growing faster than the state average (Table 5). The most abundant predator species was Largemouth Bass, although most of them were under 12 inches in length. Northern Pike, Smallmouth Bass, and Walleye were also present in the catch. The Largemouth Bass were growing well (Table 5), while the Smallmouth Bass showed slower growth rates. In terms of biomass, predator species accounted for approximately 53.7% of the catch by weight.

Eight Walleye were caught in the 2005 survey, ranging from 20 to 24 inches in length. Age and growth analysis showed that three Walleye year classes were present in the catch. Five of the Walleye were from the 1996-year class and two others were from the 1999-year class, which were both stocked. One Walleye came from an unstocked year class (1998), indicating that the fish was likely produced naturally. The Walleye from the 1996-year class (the only class in which enough samples were aged to make statistical inferences) were growing well, at more than one inch larger than the state average.

The 2005 survey marked the first time that Black Crappie, Mimic Shiner, Sand Shiner, and White Sucker were documented in Pickerel Lake. One curiosity of the 2005 survey was the lack of Pumpkinseed in the catch, because they had been present in every previous survey of Pickerel Lake. Zebra mussels were also documented for the first time in Pickerel Lake during the 2005 survey.

Since 1994, a total of 15 exceptional fish of six different species caught from Pickerel Lake have been entered in the MDNR Fisheries Division Master Angler program (Table 6). Bluegill was the most numerous species entered, with six entries, followed by Pumpkinseed with three entries.

Current Status

The most recent comprehensive fisheries survey of Pickerel Lake was conducted by MDNR during the summer of 2023. The netting portion of the survey was conducted from May 22-25, 2023. Gear used included two trap nets (six net-nights), two large-mesh fyke nets (six net-nights), one small-mesh fyke net (three net-nights), and two inland gill nets (five net-nights). Seining and electrofishing were conducted on June 29, and included three seine hauls and three ten-minute electrofishing transects with an 18' electrofishing boat. Appropriate age structures (scales and spines) were collected from game and panfish species for age and growth analysis. Weights for all fish species were calculated using the length-weight regression equations compiled by Schneider et al. (2000b). Mean length at age was used to obtain a growth index by calculating the difference from the state average length (Schneider et al. 2000a). The mean growth indices for a given gamefish species was generated by averaging the growth indices for each age class that was represented by at least five fish.

In the 2023 survey, a total of 1,713 fish, representing 18 different species were caught (Tables 7 and 8). Numerically, non-game species such as Bluntnose Minnow (n=1,079) and Iowa Darter (n=135) were the most numerous species. Other well-represented species included Bluegill (n=109), Largemouth Bass (n=123), Rock Bass (n=93), and Yellow Perch (n=63). Predator species included Largemouth Bass, Northern Pike, Smallmouth Bass, and Walleye. A total of nine Walleye, ranging from 20.6 to 28.1 inches and representing five different age classes were caught in the 2023 survey. Of the five different age classes represented in the catch, four of them (2019, 2017, 2015, 2012) were stocked. Only the 2016-year class (age-VII) was not stocked.

Growth rates for Bluegill and Pumpkinseed were near the state average, while Yellow Perch and Largemouth Bass exceeded the state average (Table 9). The catches of Bluegill and Pumpkinseed in the 2023 survey were relatively low, although some larger individuals of both species were caught (Table 8). There were many large Largemouth bass captured, with 76% of catch being at or greater than the minimum legal size of 14 inches (Table 8). Although 58% of Northern Pike were above the minimum legal size of 24 inches, they had slower than average growth rates (Tables 7 & 9). Not enough Smallmouth Bass or Walleye were collected to make statistical inferences regarding growth rates.

A temperature/dissolved oxygen profile was also collected from Pickerel Lake on August 23, 2023. The profile was taken in the deepest part of the lake. Oxygen levels suitable for fish were found to a depth of 45 feet (Table 10).

Analysis and Discussion

Pickerel Lake continues to be an excellent fishing destination for anglers, particularly for those seeking larger predator fish, such as Largemouth Bass or Northern Pike. Fishing for panfish is also possible, and anglers have reported good catches at times. However, Pickerel Lake does not currently support panfish population levels that are numerically on par with other area panfish lakes. This may be due to the high predator biomass in Pickerel Lake. In the 2023 survey catch, predator fish species (Largemouth Bass, Northern Pike, Smallmouth Bass, Walleye) comprised 81.7% of the catch biomass. This was up from 53.7% of the catch in the 2005 survey. Schneider (2000a) observed that predators typically compose 20-50% of the biomass in lakes with strong fisheries.

Largemouth Bass were extremely abundant in the 2023 survey, comprising nearly half of the total biomass. Adult Largemouth Bass of legal size comprised most of the catch. Conversely, the Smallmouth Bass catch was relatively low, with only 10 individuals caught. This was a switch from the 2005 survey (and earlier surveys as well), in which fewer Largemouth Bass and more Smallmouth Bass were caught. The reason for this is phenomenon is unclear. A warming climate could be favoring Largemouth Bass over species like Smallmouth Bass and Walleye. Reductions in Smallmouth Bass abundance accompanied by increases in Largemouth Bass abundance has been observed in recent years in other northern Lower Peninsula lakes, including Lake Cadillac (Tonello 2012), and Fife Lake (Tonello 2014).

Walleye stocking in Pickerel Lake has clearly been successful, as the fish are surviving and showing up in fisheries survey catches, both in 2005 and 2023. Although not enough Walleye were caught in the 2023 survey to make statistical inferences about growth rates, they are clearly growing well and thriving in Pickerel Lake. While not a "limit-out" type of fishery, the Walleye add variety to the catch opportunities for Pickerel Lake anglers. It is possible that the Walleye are contributing to the limited panfish population of Pickerel Lake. Walleye are known to be very effective predators on panfish like Bluegill. If anglers desired a better panfish fishery on Pickerel Lake, halting (or reducing the frequency of) Walleye stocking might be the preferred alternative. If anglers are happy with the current panfish population and the occasional opportunity to catch a Walleye, then stocking should continue.

While there is some artificial shoreline hardening and development on Pickerel Lake, much of the shoreline is relatively intact and in a natural state. Also, the submerged aquatic plants in Pickerel Lake provide excellent cover and habitat for both the panfish and gamefish species in the lake. Although no formal plant surveys were conducted in the 2023 fisheries survey, the submerged aquatic plants appeared to be well below nuisance levels.

Management Direction

As long as anglers and riparian landowners continue to support the Walleye stocking program on Pickerel Lake, stocking should continue at 3,300 (33/acre) spring fingerlings on an every-other year rotation. The primary goal of the Pickerel Lake Walleye stocking program is to provide a Walleye fishing opportunity for anglers. While Pickerel Lake will likely never be a "destination" Walleye fishery, having adult Walleye in the lake for anglers to catch occasionally adds diversity to the Pickerel Lake angling experience.

Most of the Walleye that have been stocked into Pickerel Lake (and many other lakes in the northwestern Lower Peninsula) over the years have come from the Mason County Walleye Association (MCWA) rearing pond. MCWA is a non-profit organization that raises Walleye fingerlings in its privately-owned pond in cooperation with MDNR. MCWA has long been a valuable partner to MDNR, and the mutually beneficial relationship should continue indefinitely. The Pickerel Lake Association should consider supporting MCWA in their walleye rearing efforts.

The submerged aquatic plants currently found in Pickerel Lake should be allowed to continue to thrive, as they provide valuable habitat for a number of desirable fish species. The Pickerel Lake Association should continue to be very judicious about when and how aquatic nuisance plant treatments are conducted. Submerged and emergent aquatic vegetation is critical to maintaining healthy fish populations in inland lakes such as Pickerel Lake. Aquatic nuisance plant treatments should only be

conducted when invasive species like Eurasian milfoil are taking over large areas of the lake and interfering with recreational activities such as fishing, swimming, tubing, etc. If that occurs, the Eurasian milfoil beds should be carefully spot treated, with effort made to avoid treating native aquatic plants. Emergent vegetation along the shoreline of the lake should also be carefully protected.

The shoreline of Pickerel Lake should be protected and considered critical to the continued health of the lake's aquatic community. Human development in the form of seawalls, artificial beaches, and riprap do not provide a healthy environment for aquatic life. Appropriate watershed management is necessary to sustain healthy biological communities, including fish, invertebrates, amphibians, reptiles, birds and aquatic mammals. Generally, for inland lakes this includes maintenance of good water quality, especially for nutrients; preservation of natural shorelines, especially shore contours and vegetation; and preservation of bottom contours, vegetation, and wood structure within a lake. Guidelines for protecting fisheries habitat in inland lakes can be found in Fisheries Division Special Report 38 (O'Neal and Soulliere 2006). Also, the Michigan Natural Shoreline Partnership, an organization dedicated to promoting natural shoreline landscaping to protect Michigan's inland lakes (http://www.mishorelinepartnership.org/), can provide guidance and training on how best to manage the land/water interface for the benefit of Pickerel Lake.

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Table 1. Fish stocked in Pickerel Lake, Kalkaska County, 1929-2023.

Year	Species	Number	Size	Strain
1929	Largemouth Bass	600	adults	
	Yellow Perch	32,000	fry	
1930	Bluegill	2,400	unk	
	Smallmouth Bass	2,000	fry	
	Yellow Perch	85,000	fry	
1931	Bluegill	500	5 mo.	
1935	Walleye	85,000	fry	
1936	Walleye	150,000	fry	
1937	Walleye	150,000	fry	
1938	Yellow Perch	12,000	7 mo.	
1939	Walleye	140,000	fry	
1940	Walleye	40,000	fry	
1942	Walleye	60,000	fry	
1969	Largemouth Bass	4	adults	
1990	Walleye	4,100	spring fingerlings	Muskegon
1992	Walleye	4,404	spring fingerlings	Muskegon
1996	Walleye	14,180	spring fingerlings	Muskegon
1999	Walleye	3,928	spring fingerlings	Muskegon
	Walleye	4,000	fall fingerlings	Muskegon
2003	Walleye	8,125	spring fingerlings	Muskegon
2006	Walleye	5,022	spring fingerlings	Muskegon
2012	Walleye	7,343	spring fingerlings	Muskegon
2015	Walleye	22,189	spring fingerlings	Muskegon
2017	Walleye	2,817	spring fingerlings	Muskegon
2019	Walleye	3,386	spring fingerlings	Muskegon
2022	Walleye	3,300	spring fingerlings	Muskegon

Table 2. Presence/absence of fish species in historical fisheries surveys of Pickerel Lake, Kalkaska County.

Species	1930	1957	1966	1988	2005	2023
Banded Killifish		x				x
Black Crappie					x	x
Blacknose Shiner	x					x
Bluegill			x	x	x	x
Bluntnose Minnow	x	x			x	x
Central Mudminnow						x
Golden Shiner						x
Green Sunfish		x				
Iowa Darter						x
Largemouth Bass	x	x	x	x	x	x
Mimic Shiner					x	x
Northern Pike		x	x	x	x	x
Pumpkinseed	x	x	x	x		x
Rock Bass	x	x	x	x	x	x
Sand Shiner					x	x
Smallmouth Bass			x	x	x	x
Walleye		x		x	x	x
White Sucker					x	x
Yellow Perch	x	x	x	x	x	x
Total number of species present:	6	9	7	8	12	18

Table 3. Number, weight, and length of fish collected from Pickerel Lake, Kalkaska County, with trap nets, inland gillnets, and small mesh fyke nets, May 9-12, 2005.

Species	Number	Percent by number	Weight (pounds)	Percent by weight	Length range (inches)[1]	Average length	Percent legal size[2]
Black Crappie	2	0.3	2.6	0.6	12-13	13.0	100 (7")
Bluegill	137	18.3	29.1	6.5	1-10	5.3	53 (6")
Bluntnose Minnow	20	2.7	0.2	0.0	2-3	3.0	
Largemouth Bass	78	10.4	72.6	16.1	2-18	11.7	12 (14")
Mimic Shiner	150	20.0	0.4	0.1	1-2	1.8	
Northern Pike	14	1.9	54.6	12.1	19-32	25.4	64 (24")
Rock Bass	234	31.2	82.5	18.3	3-11	7.4	85 (6")
Sand Shiner	20	2.7	0.1	0.0	2-2	2.5	
Smallmouth Bass	51	6.8	82.7	18.4	2-18	13.6	55 (14")
Walleye	8	1.1	31.8	7.1	20-24	22.9	100 (15")
White Sucker	29	3.9	93.3	20.7	16-25	20.0	
Yellow Perch	6	0.8	0.1	0.0	2-4	3.3	0 (7")
Total	749	100	450.0	100			

[1]Note some fish were measured to 0.1 inch, others to inch group: e.g., "5"=5.0 to 5.9 inch, "12"=12.0 to 12.9 inches; etc.

[2]Percent legal size or acceptable size for angling. Legal size or acceptable size for angling is given in parentheses.

Table 4. Length frequency distribution for fish species caught from Pickerel Lake, Kalkaska County, with trap nets, inland gillnets, and small mesh fyke nets, May 9-12, 2005.

Inch Class	Black Crappie	Bluegill	Bluntnose Minnow	Large-mouth Bass	Mimic Shiner	Northern Pike	Rock Bass	Sand Shiner
1		30			100			
2		30	10	2	50			20
3			10				1	
4							2	
5		5					31	
6		13		1			76	
7		20					54	
8		29					40	
9		7		4			13	
10		3		15				
11				27			17	
12	1			17				
13	1			3				
14				2				
15				3				
16				2				
17								
18				2				
19						1		
20								
21						1		
22						2		
23						1		
24						3		
25						2		
26								
27								
28								
29						2		
30						1		
31								
32						1		
Total	2	137	20	78	150	14	234	20

Table 4. continued

Inch Class	Smallmouth Bass	Walleye	White Sucker	Yellow Perch
1				
2	1			3
3				1
4				2
5	1			
6				
7	3			
8	2			
9	3			
10	5			
11	6			
12	2			
13				
14	1			
15	5			
16	6		2	
17	14		2	
18	2		4	
19			8	
20		1	5	
21		1	5	
22		2	1	
23		2	1	
24		2		
25			1	
26				
27				
28				
29				
30				
31				
32				
Total	51	8	29	6

Table 5. Average total weighted length (inches) at age, and growth relative to the state average, for fish sampled from Pickerel Lake, Kalkaska County, with trap nets, inland gill nets, and small mesh fyke nets, May 2005. Number of fish aged is given in parenthesis. A minimum of five fish per age group is statistically necessary for calculating a Mean Growth Index, which is a comparison to the State of Michigan average.

	Age											Mean Growth
Species	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Index
Black Crappie						12.0			13.3			--
						(1)			(1)			
Bluegill			6.8	7.7	8.4	9.0			10.6	10.7		+1.1
			(21)	(8)	(14)	(6)			(1)	(1)		
Largemouth Bass	6.3	11.3	11.5	14.2	15.3	16.0	16.7		18.5			+0.9
	(1)	(9)	(29)	(3)	(3)	(1)	(1)		(2)			
Northern Pike	21.0	22.1		30.2	25.0	27.3	29.9					--
	(1)	(4)		(1)	(2)	(4)	(1)					
Rock Bass		4.9	6.4	7.3	8.6	9.5	11.0	11.3	11.2			+0.5
		(5)	(14)	(22)	(12)	(2)	(1)	(6)	(3)			
Smallmouth Bass	5.6	8.5	11.1		15.1	15.9	16.8	17.5	17.5	17.6	18.4	-1.2
	(1)	(9)	(14)		(2)	(5)	(7)	(3)	(4)	(1)	(1)	
Walleye					21.3	24.6		23.4				+1.0
					(2)	(1)		(5)				
Yellow Perch	4.2	4.0										--
	(2)	(1)										

Table 6. Michigan DNR Master Angler awards issued for fish caught from Pickerel Lake, Kalkaska County, Michigan, 1994-2023.

Species	Number of Master Angler awards issued
Bluegill	6
Pumpkinseed	3
Largemouth Bass	2
Rock Bass	2
Black Crappie	1
Smallmouth Bass	1
Total:	15

Table 7. Number, weight, and length of fish collected from Pickerel Lake, Kalkaska County, with trap nets, large mesh fyke nets, small mesh fyke nets, inland gill nets, seining, and electrofishing, May 22- June 29, 2023.

Species	Number	Percent by number	Weight (pounds)	Percent by weight	Length range (inches)[1]	Average length	Percent legal size[2]
Banded Killifish	15	0.9	0.1	0.0	1-2	2.2	
Black Crappie	4	0.2	7.7	1.6	14-15	14.8	100 (7")
Blacknose Shiner	1	0.1	0.0	0.0	2-2	2.5	
Bluegill	109	6.4	13.1	2.8	1-9	5.5	27 (6")
Bluntnose Minnow	1,079	63.0	5.8	1.2	1-3	2.6	
Central Mudminnow	2	0.1	0.0	0.0	1-2	2.0	
Golden Shiner	3	0.2	0.1	0.0	2-6	3.8	
Iowa Darter	135	7.9	0.3	0.1	1-2	2.1	
Largemouth Bass	123	7.2	227.4	48.5	2-20	12.2	76 (14")
Mimic Shiner	19	1.1	0.1	0.0	2-3	2.5	
Northern Pike	31	1.8	101.9	21.7	16-32	24.8	58 (24")
Pumpkinseed	13	0.8	2.5	0.5	4-8	6.0	38 (6")
Rock Bass	93	5.4	47.9	10.2	1-11	6.9	74 (6")
Sand Shiner	3	0.2	0.0	0.0	2-2	2.5	
Smallmouth Bass	10	0.6	12.2	2.6	3-19	11.4	40 (14")
Walleye	9	0.5	41.7	8.9	20-28	23.6	100 (15")
White Sucker	1	0.1	5.8	1.2	24-24	24.5	
Yellow Perch	63	3.7	2.7	0.6	1-9	4.4	6 (7")
Total	1,713	100	469.3	100			

[1]Note some fish were measured to 0.1 inch, others to inch group: e.g., "5"=5.0 to 5.9 inch, "12"=12.0 to 12.9 inches; etc.

[2]Percent legal size or acceptable size for angling. Legal size or acceptable size for angling is given in parentheses.

Table 8. Length frequency distribution for fish species caught from Pickerel Lake, Kalkaska County, with trap nets, large mesh fyke nets, small mesh fyke nets, inland gillnets, seining, and electrofishing, May and June 2023.

Inch Class	Banded Killifish	Black Crappie	Blacknose Shiner	Bluegill	Blunt-nose Minnow	Central Mud-minnow	Golden Shiner	Iowa Darter
1	5			21	107	1		77
2	10		1	7	946	1	2	58
3				16	26			
4				20				
5				16				
6				10			1	
7				7				
8				10				
9				2				
10								
11								
12								
13								
14		3						
15		1						
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
Total	15	4	1	109	1,079	2	3	135

Table 8, continued

Inch Class	Large-mouth Bass	Mimic Shiner	Northern Pike	Pumpkin-seed	Rock Bass	Sand Shiner	Smallmouth Bass	Walleye	White Sucker	Yellow Perch
1					4					2
2	7	17			3	3				2
3	2	2			7		2			29
4				6	3					18
5				2	7		1			6
6	1			1	3					2
7				3	9		1			2
8	1			1	7		1			1
9	1				22					1
10	5				23					
11	4				5					
12	5									
13	4						1			
14	29						2			
15	21									
16	23		1							
17	9									
18	4						1			
19	5						1			
20	2		1					1		
21			3					1		
22			6					4		
23			2					2		
24			7						1	
25			6							
26			2							
27			1							
28								1		
29										
30			1							
31										
32			1							
Total	123	19	31	13	93	3	10	9	1	63

Table 9. Average total weighted length (inches) at age, and growth relative to the state average, for fish sampled from Pickerel Lake, Kalkaska County, with trap nets, large mesh fyke nets, small mesh fyke nets, inland gill nets, electrofishing, and seining, May and June 2023. Number of fish aged is given in parenthesis. A minimum of five fish per age group is statistically necessary for calculating a Mean Growth Index, which is a comparison to the State of Michigan average.

	Age												Mean Growth
Species	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Index
Black Crappie					14.4				15.9				--
					(2)				(1)				
Bluegill			4.5	6.4	6.8	8.0							+0.0
			(14)	(20)	(16)	(3)							
Largemouth Bass		9.6	11.6	14.2	14.9	16.5	16.5	16.6	18.1	18.5	20.2	18.8	+1.3
		(6)	(12)	(7)	(13)	(5)	(10)	(5)	(6)	(2)	(3)	(2)	
Northern Pike		16.2	23.3	22.0	23.7	25.0	28.9	29.0		22.2			-1.8
		(1)	(1)	(7)	(7)	(9)	(4)	(2)		(1)			
Pumpkinseed	4.0	4.1	4.8	5.6	7.2	7.5	7.1						-0.1
	(1)	(3)	(5)	(1)	(1)	(3)	(1)						
Smallmouth Bass			8.7	14.4						18.5	19.8		--
			(4)	(2)						(1)	(1)		
Walleye				20.6		23.2	21.5	24.7	26.0				--
				(1)		(2)	(1)	(3)	(2)				
Yellow Perch	4.6		6.4	6.9	8.8								+0.6
	(9)		(5)	(4)	(1)								

Table 10. Temperature and dissolved oxygen profile for Pickerel Lake, Kalkaska County, on 8/23/2023.

Depth (feet)	Temperature (F)	O2 (ppm)
0	70.4	9.94
3	70.4	10.00
6	70.4	9.93
9	70.4	9.94
12	70.4	9.96
15	70.4	9.93
18	70.3	8.89
21	68.5	68.50
22	67.2	12.32
23	65.0	13.95
24	63.4	14.91
25	61.2	14.93
26	59.9	14.82
27	58.2	14.76
30	55.8	13.96
33	52.7	13.08
36	50.7	12.18
39	49.2	11.04
42	47.8	8.10
45	46.4	4.00
48	45.1	1.56
51	44.5	0.00
54	43.5	0.00
57	43.3	0.00
60	43.1	0.00
63	43.1	0.00
66	43.1	0.00
69	43	0.00
72	42.9	0.00

Figure 1. Lakeshed map for Pickerel Lake, Kalkaska County, MI

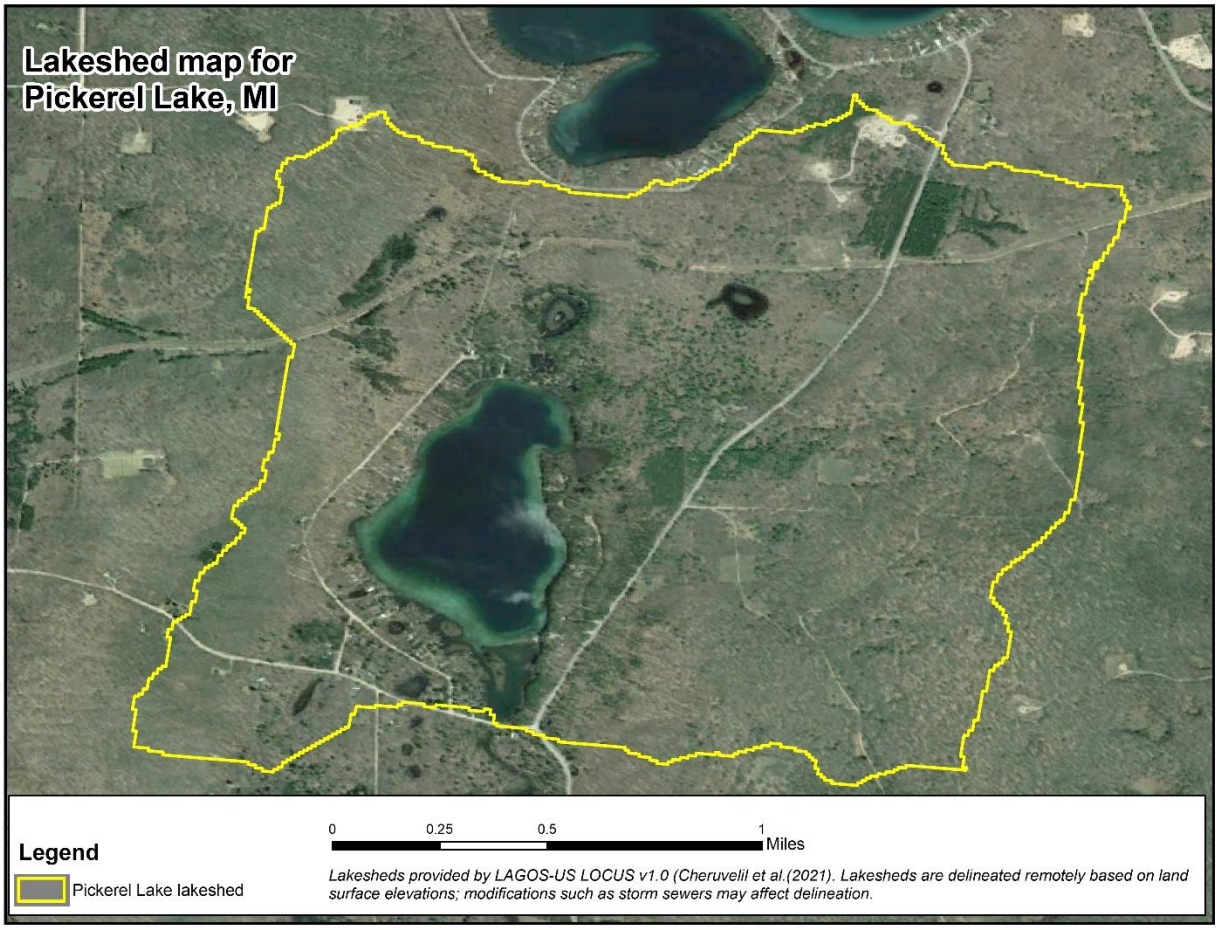
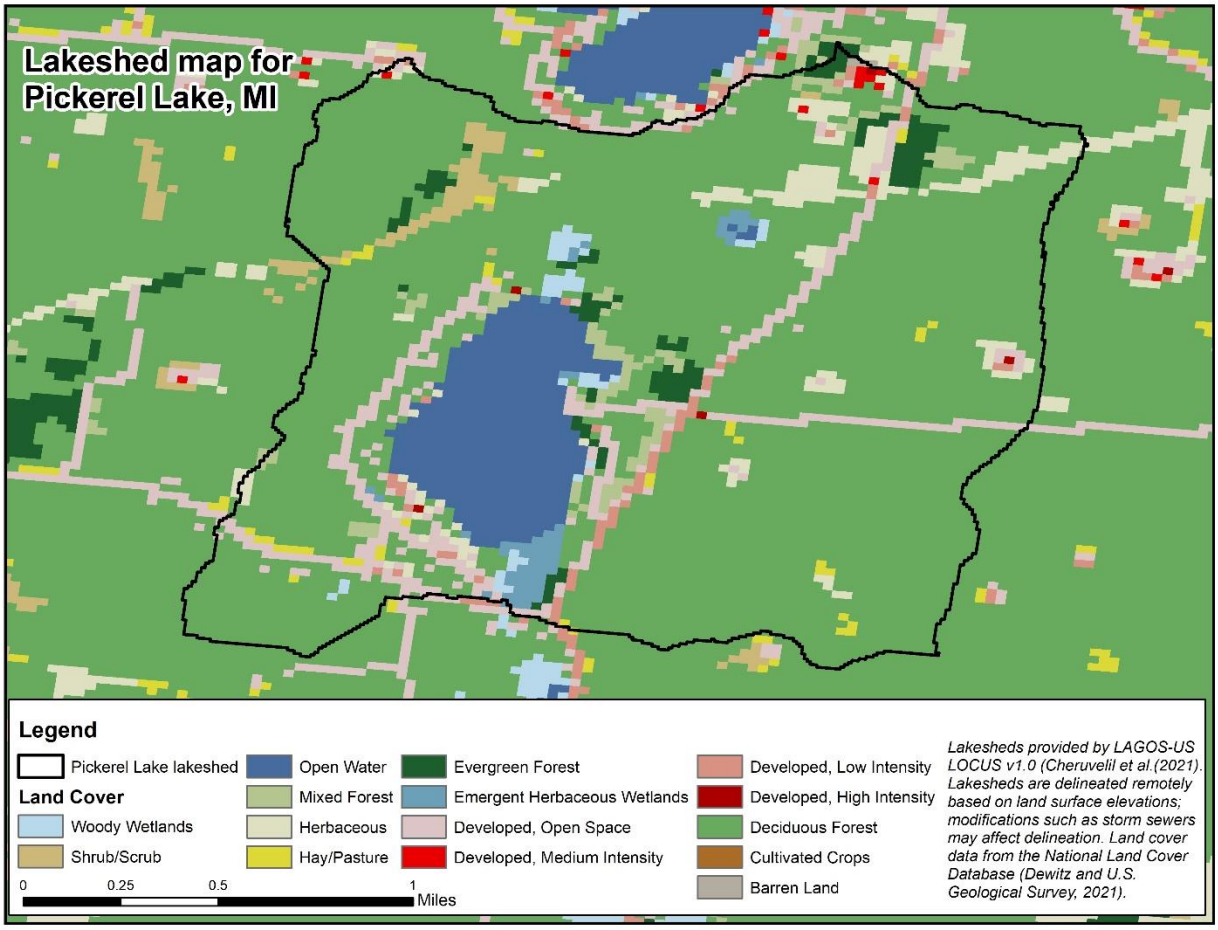


Figure 2. Lakeshed landcover map for Pickerel Lake, Kalkaska County, MI



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