Hoisington Lake
Livingston County, 04N, 06E, Section 06
Shiawassee River Watershed, last surveyed 2024

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Environment

Hoisington Lake, a 125-acre lake in northern Livingston County, Michigan (Figure 1), is a medium (100-1,000 ac), deep (thermally stratified), mesotrophic lake supporting warm- and cool-water fish species. It is one of four lakes (Lobdell, Bennett, Clough, and Hoisington) in a chain. Hoisington Lake lies within the Denton Creek sub-watershed of the North Ore Creek sub-watershed of the Shiawassee River watershed. The substrate in Hoisington Lake is primarily sand and marl in the littoral zone with localized deposits of gravel and cobble along the northeast shoreline. The main basin has a maximum depth of 62 ft, and a bottom comprised of organic material (Figure 2). The primary inlet is Denton Creek, and a secondary inlet comes from Clough Lake. The primary outlet flows into Bennett Lake.

The Argentine Dam (aka Wolcott Dam) at Lobdell Lake maintains water levels for all four lakes in the chain. Argentine Dam is an earth gravity dam built in 1929. The entire structure is 280 ft long, and the spillway is 21 ft wide. The structural and hydraulic height are 17 ft and head height is 12 ft. The dam was constructed for recreational purposes and is regulated by Part 315, Dam Safety, of The Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. The dam has significant downstream hazard potential and received a fair condition rating during the last inspection.

The Hoisington Lake catchment area covers 11.5 mi2. There are a variety of land cover types within the watershed, but the majority is forested (41%) or developed (24%). Hoisington Lake is a unique inland lake in southeast Michigan because there is very little development along the shoreland. It is estimated that 38% of the Hoisington Lake watershed and only 6% of the Hoisington Lake shoreland are disturbed according to the Midwest Glacial Lakes Partnership Conservation Planner (Midwest Glacial Lakes Partnership 2019; Figure 3). Most of the riparian area around Hoisington Lake is wetland, making development difficult.

History

Hoisington Lake was sampled in 1979, 1990, 1997, and 2010. All four surveys indicate a fish community dominated by Black Crappie *Pomoxis nigromaculatus*, Bluegill *Lepomis macrochirus*, and Largemouth Bass *Micropterus salmoides*. Since 1990, the Bluegill population has been monitored more closely by examining the size structure and calculating a Schneider Index (Schneider 1990). The index score was "acceptable" during 1990 and 2010 and "excellent" in 1997.

Some stocking events have occurred at Hoisington Lake but there is not currently a stocking program for the lake. Bluegill and Largemouth Bass were stocked in the 1930s and 1940s (Table 1). More extensive stocking efforts have occurred in Lobdell Lake and Bennett Lake. In addition to Bluegill and Largemouth Bass, there have been Black Crappie, Northern Pike *Esox lucius*, Tiger Muskellunge *Esox lucius x E. masquinongy*, Yellow Perch *Perca flavescens*, and Walleye *Sander vitreus* stocked into

Lobdell Lake or Bennett Lake at various times since the 1930s. Recently, Lobdell Lake has been annually stocked with Bluegill, Black Crappie, and Walleye.

Current Status

The most recent survey for Hoisington Lake was a fish community survey completed May 6 to May 9, 2024. This survey utilized three large-mesh fyke nets, two small-mesh fyke nets, two experimental gill nets, one trap net, seining, and nighttime boat electrofishing to capture a wide variety of the fish community (Wehrly et al. 2015; Table 2). Total effort for the survey was nine net-nights for large-mesh fyke nets, four net-nights for small-mesh fyke nets, four net-nights for experimental gill nets, three net-nights for trap nets, two seine hauls, and 55 min of electrofishing. The purpose of this survey was to collect information on a range of fish species and size classes by using multiple gear types in different habitats. The objectives were to determine fish species present and relative abundance, size-structure, and mean growth index for select sportfish species.

All fish captured were identified to species and measured for total length (TL; inch group). For game species, the ages of up to 10 fish per inch group were estimated from scale and spine samples. To estimate age from scales, four to six scales were pressed onto acetate film and the impressions were viewed under a microscope. For estimating age from dorsal spines, a thin cross-section of the dorsal spine was cut using a Dremel grinding and cutting tool. Mineral oil was added to the section for clarity when viewed under a microscope. Mean growth indices were calculated as described by Schneider et al. (2000) for age groups represented by five or more fish.

A total of 972 fish representing 23 species were collected during this survey (Table 3). A variety of panfish were captured including Black Crappie, Bluegill, Pumpkinseed Lepomis gibbosus, Redear Sunfish *Lepomis microlophus*, Rock Bass *Ambloplites rupestris*, Warmouth *Lepomis gulosus*, and Yellow Perch. Bluegill was the most frequently captured panfish species in the survey, with individuals ranging from 1 to 8 in (mean TL = 5.9 in; Table 3). Over 50% of the 207 Bluegill captured were larger than 6 in (Table 3), which is the assumed minimum length at which anglers typically consider them suitable for harvest. The mean growth index of Bluegill was -0.2, which suggests growth rates are similar to the statewide average, and the oldest individual captured was estimated to be 8 years old. The Bluegill population in Hoisington Lake scored a "good" rating using the Schneider Index for classifying Bluegill populations (Schneider 1990). Rock Bass, the next most frequently captured panfish species in the survey, ranged in size from 2 to 10 in (mean TL = 7.2 in; Table 3). Over 80% of the Rock Bass captured were above the angler-preferred 6 in minimum length for harvest (Table 3).

Bowfin *Amia calva*, Channel Catfish *Ictalurus punctatus*, Largemouth Bass, Longnose Gar *Lepisosteus osseus*, Northern Pike, Smallmouth Bass *Micropterus dolomieu* and Walleye were the top predators captured in Hoisington Lake. A total of 56 Largemouth Bass up to 19 in long (mean TL = 11.1 in; Table 3) were collected; 13% of the fish exceeded the 14 in minimum size limit (Table 3). Largemouth Bass had a mean growth index of -0.5, suggesting they are growing slightly slower than the statewide average. Furthermore, ten year classes of Largemouth Bass were present in the system, with the oldest individual estimated to be 12 years old. Eleven Walleye were captured, and TL ranged from 17 to 25 in (Table 3). All the Walleye captured exceeded the 15 in minimum length limit for harvest. Too few Walleye were collected to make inferences about growth rates, but age estimates for the fish captured ranged from 4 to 16 years old.

Several forage species were captured in the survey including Bluntnose Minnow *Pimephales notatus*, Brook Silverside *Labidesthes sicculus*, Central Mudminnow *Umbra limi*, Iowa Darter *Etheostoma exile*, Johnny Darter *Etheostoma nigrum*, Spotfin Shiner *Cyprinella spiloptera*, and White Sucker *Catostomus commersonii*.

Limnological data and shoreline features were also assessed in August 2024. Temperature and dissolved oxygen (DO) were collected using a multiprobe handheld sonde in the deepest part of the lake. Shoreline data were collected along 1,000 ft segments until the entire shoreline was surveyed. The number of dwellings, large (>2 boat slips) and small (1-2 boat slip) docks, submerged and partially submerged logs and large diameter tree limbs (≥3 in diameter, hereafter referred to as coarse woody material), and percent shoreline armoring were determined following methods described by Wehrly et al. (2015).

Limnological parameters were measured at the deepest basin of the lake on August 22, 2024. A thermocline was developed at this time around 18-20 ft and the dissolved oxygen concentration became limited (< 3 ppm) at depths greater than 23 ft (Figure 4).

Development is limited around the shoreline of Hoisington Lake. Overall, there were seven small docks, no large docks, and only five dwellings. Additionally, it was estimated that only about 3% of the entire shoreline was armored. Furthermore, no coarse woody material was observed along the shoreline.

Analysis and Discussion

The fish community of Hoisington Lake can be described as follows:

1. Panfish community dominated by Bluegill with growth rates like the statewide average. Older ages are present but no fish less than age-3.
2. Black Crappie, Pumpkinseed, Redear Sunfish, Rock Bass, Warmouth, and Yellow Perch are present at lower abundances.
3. Largemouth Bass population with consistent recruitment and average growth rates.
4. Low abundance of Channel Catfish, Northern Pike, Smallmouth Bass and Walleye but size distribution offers harvest opportunity.
5. Diverse forage population with various abundances across species.

The Hoisington Lake fish community continues to support warm- and cool-water fish species. The panfish community provides diversity with opportunities for harvest. Over half of the individuals captured across all the panfish species, except for Yellow Perch, exceeded the assumed harvestable size. Top predators in Hoisington Lake are all popular gamefish (e.g., Channel Catfish, Largemouth Bass, Smallmouth Bass, Northern Pike, and Walleye). Walleye were present in the catch although Walleye are not stocked in Hoisington Lake. However, Lobdell Lake has consistently been stocked with Walleye by the local lake association, and it appears some portion of those fish are migrating to Hoisington Lake. It is unclear if the Walleye reside in Hoisington Lake all year or are only present during part of the year. Two of the seven estimated age classes coincide with stocked years. Previous stocking attempts for Walleye in Lobdell Lake showed limited survival and success, therefore State plants were discontinued. The lake association stocks fall fingerling Walleye into Lobdell, and it seems survival is better compared to the spring fingerlings previously stocked by the State. It is unknown if any natural reproduction is also occurring in the chain of lakes.

Bluegill relative abundance estimates from large-mesh fyke nets and trap nets were between the 25th and 75th percentiles for lakes statewide. By contrast, estimates from electrofishing, seines, and small-mesh fyke nets were below the 25th percentile values. This suggests the Bluegill population has an average abundance of adults but lacks juveniles. Additionally, Largemouth Bass relative abundance estimates from electrofishing were average compared to statewide data and fell between the 25th and 50th percentile.

The forage fish community is diverse in Hoisington Lake and adds to the overall diversity of the fish community. Wehrly et al. (2015) reported that the mean number of species collected in other medium-sized, deep lakes sampled in the Southern Lake Huron Management Unit was 14.3, and this survey documented 23 species.

Management Direction

Future management ideas for Hoisington Lake include:

1. Protect undeveloped areas of watershed.
2. Protect natural shoreland areas.

No changes to fishing regulations are recommended. Natural recruitment is sustaining the fish community in this system and no stocking efforts are necessary.

The primary process to protect the natural, undeveloped areas of the shoreland and watershed of Hoisington Lake will occur through environmental permit review. Currently, regulations limit the amount and type of disturbances which can occur in wetland areas and most of the land adjacent to Hoisington Lake is considered wetland and unlikely to be developed.

References

Midwest Glacial Lakes Partnership. 2019. Midwest Glacial Lakes Partnership Conservation Planner. Available from: midwestglaciallakes.org/conservationplanner.

Schneider, J. C. 1990. Classifying Bluegill populations from lake survey data. Michigan Department of Natural Resources, Fisheries Technical Report No. 90-10. Ann Arbor.

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Wehrly, K. E., D. B. Hayes, and T. C. Wills. 2015. Status and trends of Michigan inland lake resources 2002-2007. Michigan Department of Natural Resources Fisheries Report 08. Institute for Fisheries Research, Ann Arbor, Michigan.

Table 1. Stocking year, species, and number stocked in Hoisington Lake, Livingston County, Michigan.

Year	Species	Number
1934	Bluegill	3,000
1940	Bluegill	5,000
	Largemouth Bass	500
1941	Bluegill	3,000
	Largemouth Bass	500
1942	Bluegill	3,000
	Largemouth Bass	500
1943	Bluegill	4,000
1945	Bluegill	3,200
	Largemouth Bass	270

Table 2. Gear specifications for the 2024 survey in Hoisington Lake, Livingston County, Michigan.

Gear Type	Stretch Mesh Size (in)	Pot Dimensions (length x width, ft)	Lead Dimensions (length x width, ft)	
Trap net	1.5	8 x 5	150 x 6	
Large-mesh fyke net	1.5	6 x 4	100 x 4	
Small-mesh fyke net	0.18	6 x 3.5	50 x 4	
	Stretch Mesh Size (in)	**Stretch Mesh Increment (in)**	**Panel Dimensions (length x width, ft)**	**No. of Panels**
Experimental gill net	1.5-4.0	0.5	25 x 6	5
	Stretch Mesh Size (in)	**Total Length (ft)**	**Height (ft)**	
Seine	0.18	25	5	
	Current	**Duty Cycle**	**Amps**	
Electrofishing	Pulse DC	60	7	

Table 3. Species, catch, length range (inches), and average length (inches) for all species collected during 2024 survey in Hoisington Lake, Livingston County, Michigan. Percent of individuals above legal size or estimated acceptable size for harvest for select species collected. Harvestable size is assumed to be 6 in for Bluegill, Pumpkinseed, Redear Sunfish, and Rock Bass, and 7 in for Black Crappie and Yellow Perch. Legal size for harvest is 14 in for Largemouth Bass and Smallmouth Bass, 12 in for Channel Catfish, 15 in for Walleye, and 24 in for Northern Pike.

Species	Catch	Length range (in.)	Avg. length (in.)	Percent harvestable
Black Crappie	20	5-12	9.1	90
Bluegill	207	1-8	5.9	56
Bluntnose Minnow	434	1-2	2.3	
Bowfin	3	17-23	19	
Brook Silverside	3	3-4	3.8	
Central Mudminnow	1	1-1	1.5	
Channel Catfish	9	11-21	19.4	89
Common Carp	11	18-28	22.2	
Iowa Darter	1	1-1	1.5	
Johnny Darter	1	1-1	1.5	
Largemouth Bass	56	5-19	11.1	13
Longnose Gar	5	23-31	25.8	
Northern Pike	9	20-35	29.4	89
Pumpkinseed	20	4-8	7.1	95
Redear Sunfish	58	5-8	7.5	97
Rock Bass	73	2-10	7.2	84
Smallmouth Bass	7	7-18	10.9	29
Spotfin Shiner	25	2-3	2.9	
Walleye	11	17-25	21.5	100
Warmouth	11	5-7	6	
White Sucker	1	15-15	15.5	
Yellow Bullhead	2	10-11	11	
Yellow Perch	4	2-2	2.5	0

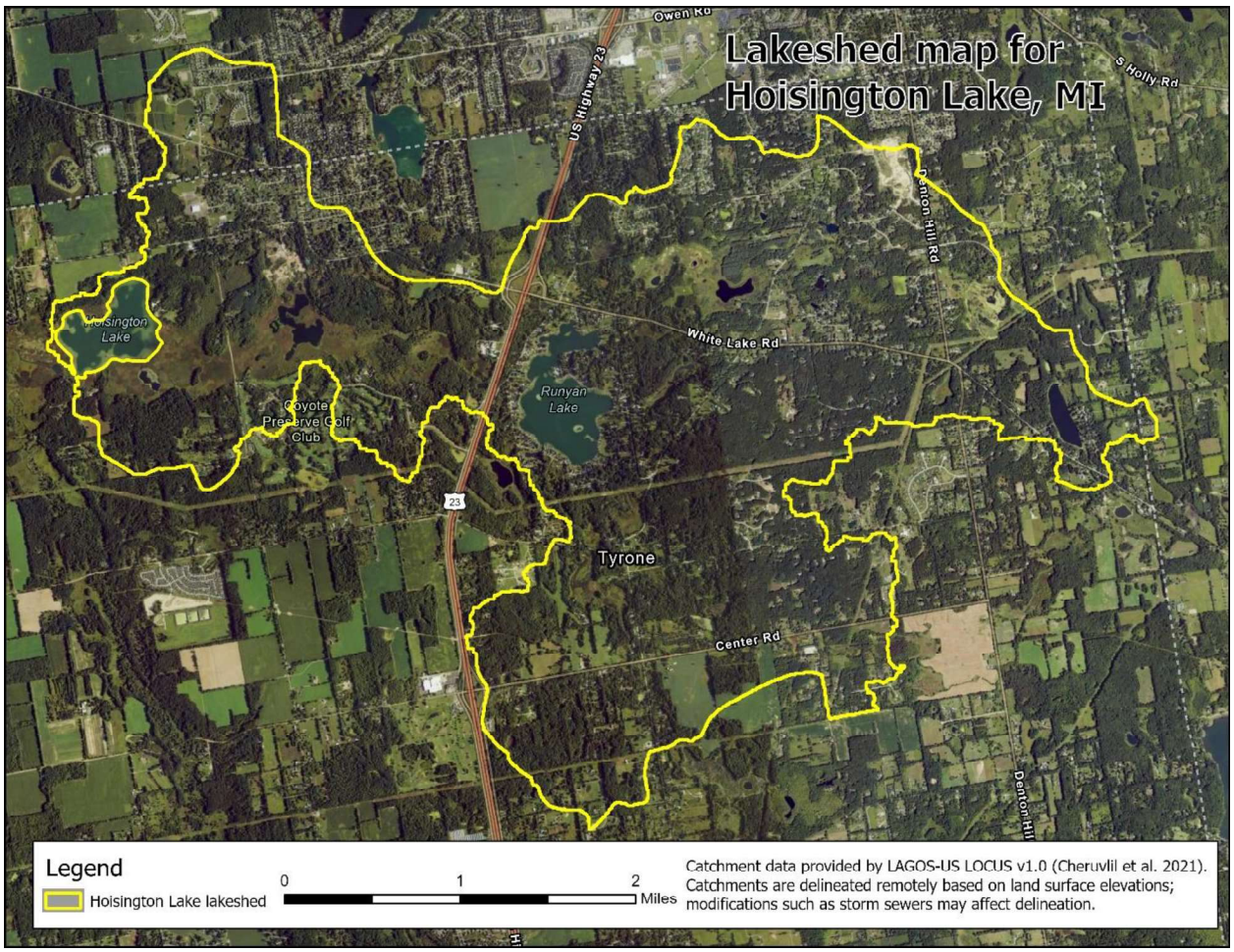

Figure 1. Lakeshed map for Hoisington Lake, Livingston County, Michigan.

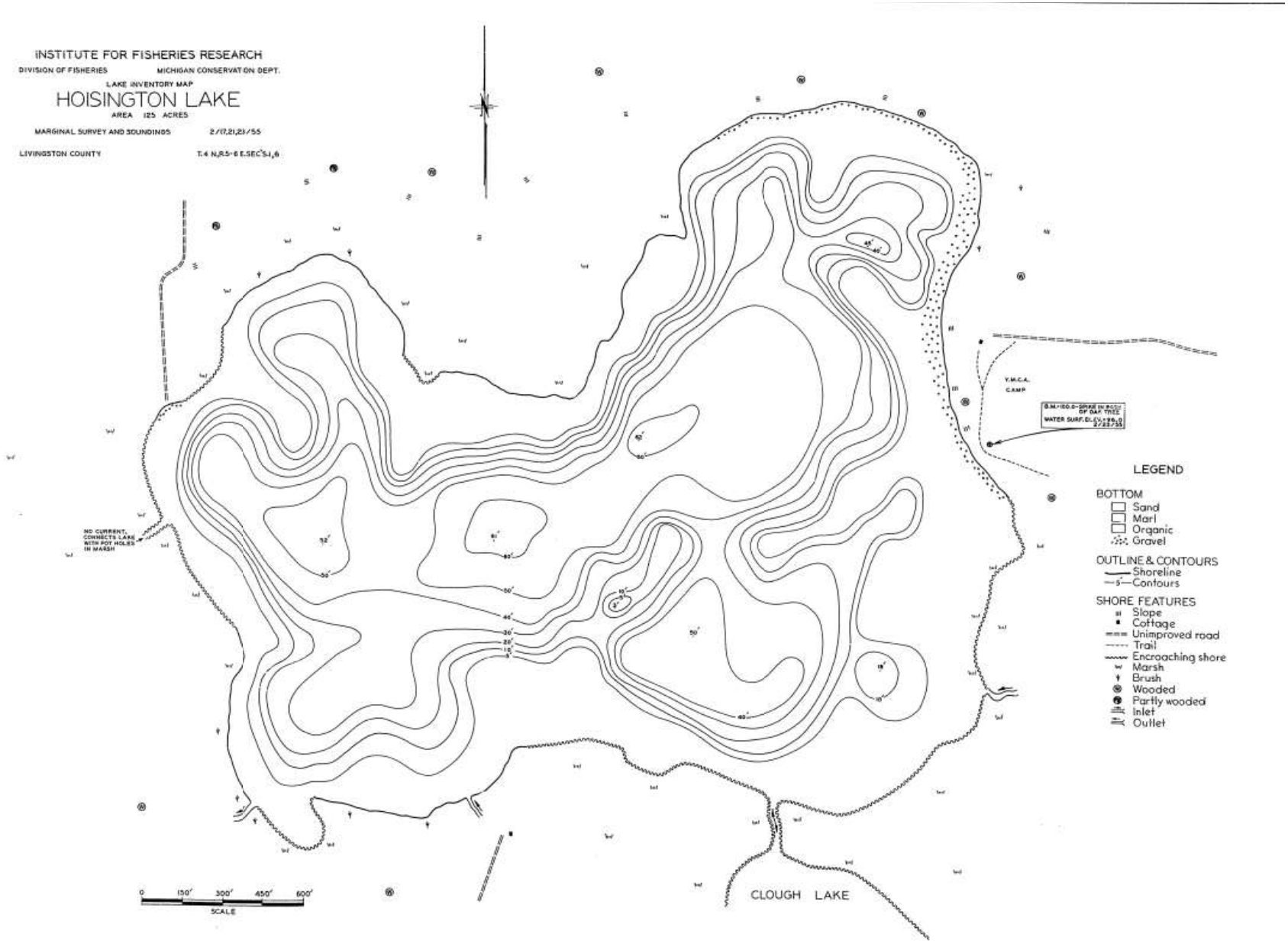

Figure 2. Hoisington Lake, Livingston County, Michigan bathymetric map.

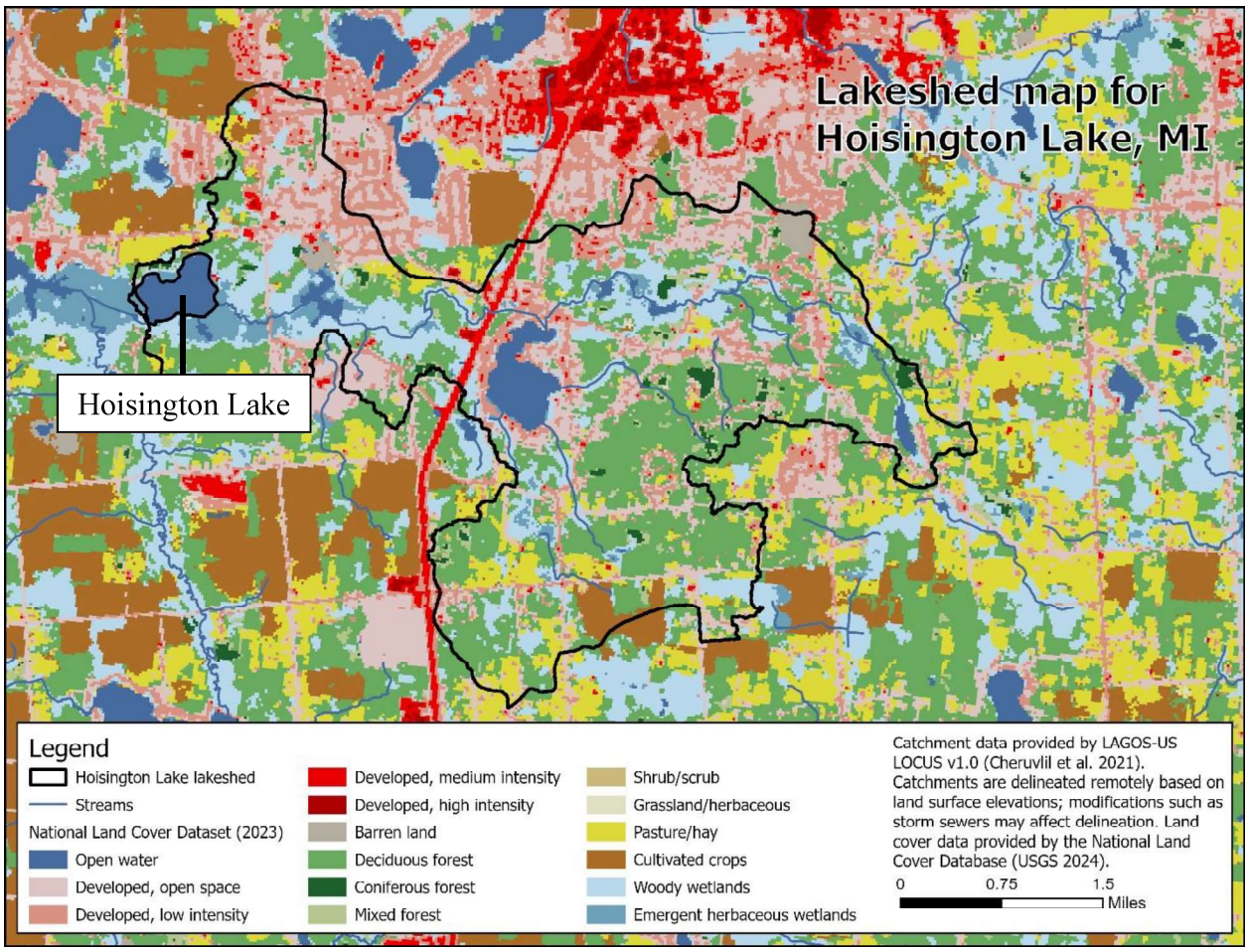

Figure 3. Land cover within the network catchment for Hoisington Lake, Livingston County, Michigan.

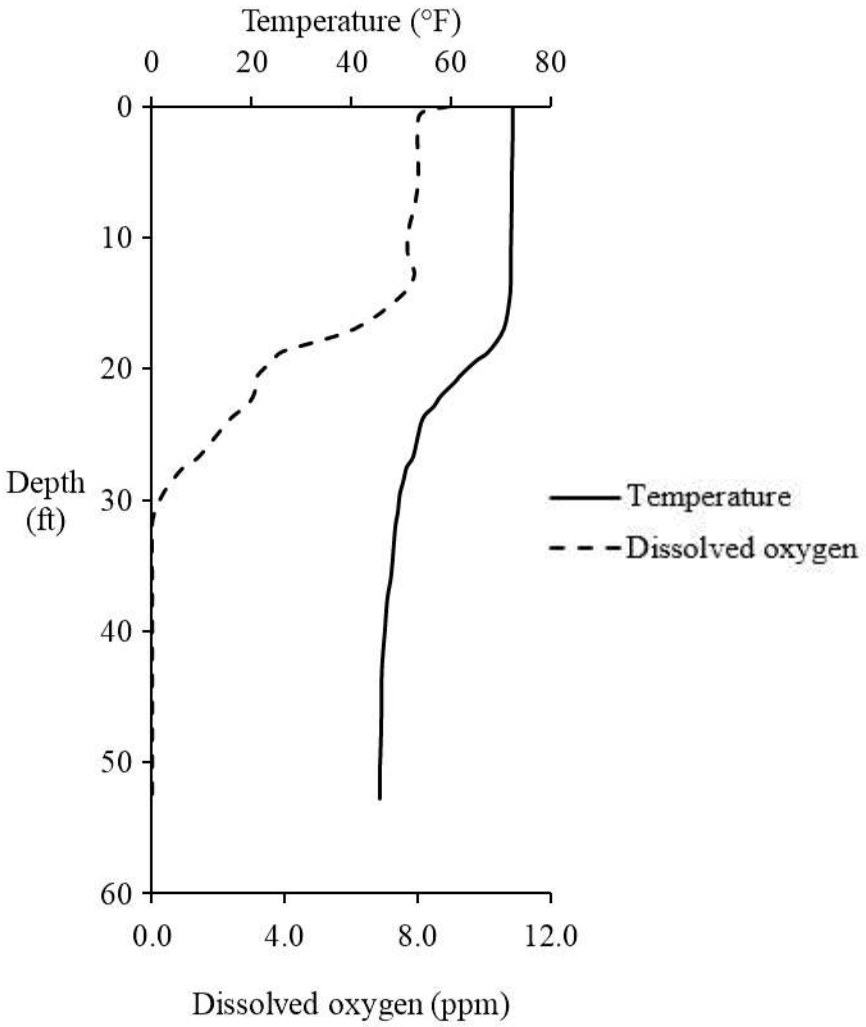

Figure 4. Temperature (°F; solid line) and dissolved oxygen concentration (parts-per-million [ppm]; dashed line) from the surface to bottom on August 22, 2024, in Hoisington Lake, Livingston County, Michigan.

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