Annual Report

Lake Lansing
Special Assessment District
2020 Annual Report

Prepared for:

Charter Township of Meridian
and
Lake Lansing Special Assessment District Advisory Committee

Prepared by:

Progressive AE
1811 4 Mile Road, NE
Grand Rapids, MI 49525-2442
616/361-2664

December 2020

Project No: 53260102

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Executive Summary

The Lake Lansing Special Assessment District (SAD) was formed in 1998 to improve conditions in Lake Lansing. In 2017, public hearings were held and the Charter Township of Meridian approved continuing the project for a ten-year period. The project includes an update of the lake and watershed management plan, water quality sampling, nuisance aquatic plant control, watershed improvements, educational programs, and grant applications. The project is overseen by the Lake Lansing SAD Advisory Committee, whose members include representatives of residents within the SAD, Meridian Township, Ingham County Parks, and the Ingham County Drain Commissioner's Office. A summary of project activities is as follows:

Water Quality Sampling: In 2020, samples were collected from Lake Lansing in late summer and fall. Lake Lansing is borderline between mesotrophic (moderately productive) and eutrophic (nutrient-enriched and productive). During the 2020 sampling period, phosphorus levels were moderately high, with the exception of the deepest samples in late summer which were high. Water clarity was poor and algae growth was moderate in summer and fall.

Nuisance Aquatic Plant Control: The 2019 fluridone whole-lake herbicide treatment to control Eurasian milfoil provided carryover effects into 2020; only a modest treatment was required, and not until August. Additional treatments and mechanical harvesting were used to control the non-native plants curly-leaf pondweed and starry stonewort along with nuisance native plants (Figure 1).

Information and Education: A newsletter was mailed to update all residents on project activities, since the LLPOA annual meeting was cancelled due to Covid-19. The seventh annual aquatic invasive species "Landing Blitz" was held at the Lake Lansing public boat launch on July 1 to raise awareness about preventing the spread of aquatic invasive species (AIS) through recreational boating and related activities.

Figure 1. Mechanical harvesting on Lake Lansing.

Introduction

Lake Lansing is located in Meridian Township, Ingham County, Michigan (Figure 2). The lake is 456 acres in surface area with a maximum depth of 35 feet and a mean (average) depth of 8.7 feet. In 1998, the Charter Township of Meridian established a special assessment district (SAD) under provisions of Public Act 188 of 1954 for the purposes of studying water quality, planning and implementing aquatic plant control, and developing a lake and watershed management plan for Lake Lansing. In March of 2002, a management plan was prepared for Lake Lansing and its watershed. Public hearings were held in the summers of 2002, 2007, and 2017 to continue the management program for the lake. Ongoing management is overseen by the Lake Lansing Special Assessment District Advisory Committee (hereinafter, the Advisory Committee) with assistance from the Advisory Committee's professional consultant. The Advisory Committee includes representatives from each of the tiers in the special assessment district, Lake Lansing Property Owners Association, Meridian Township Engineering Department, Ingham County Parks Department, and Ingham County Drain Commissioner's Office. This report includes information on 2020 Lake Lansing management activities.

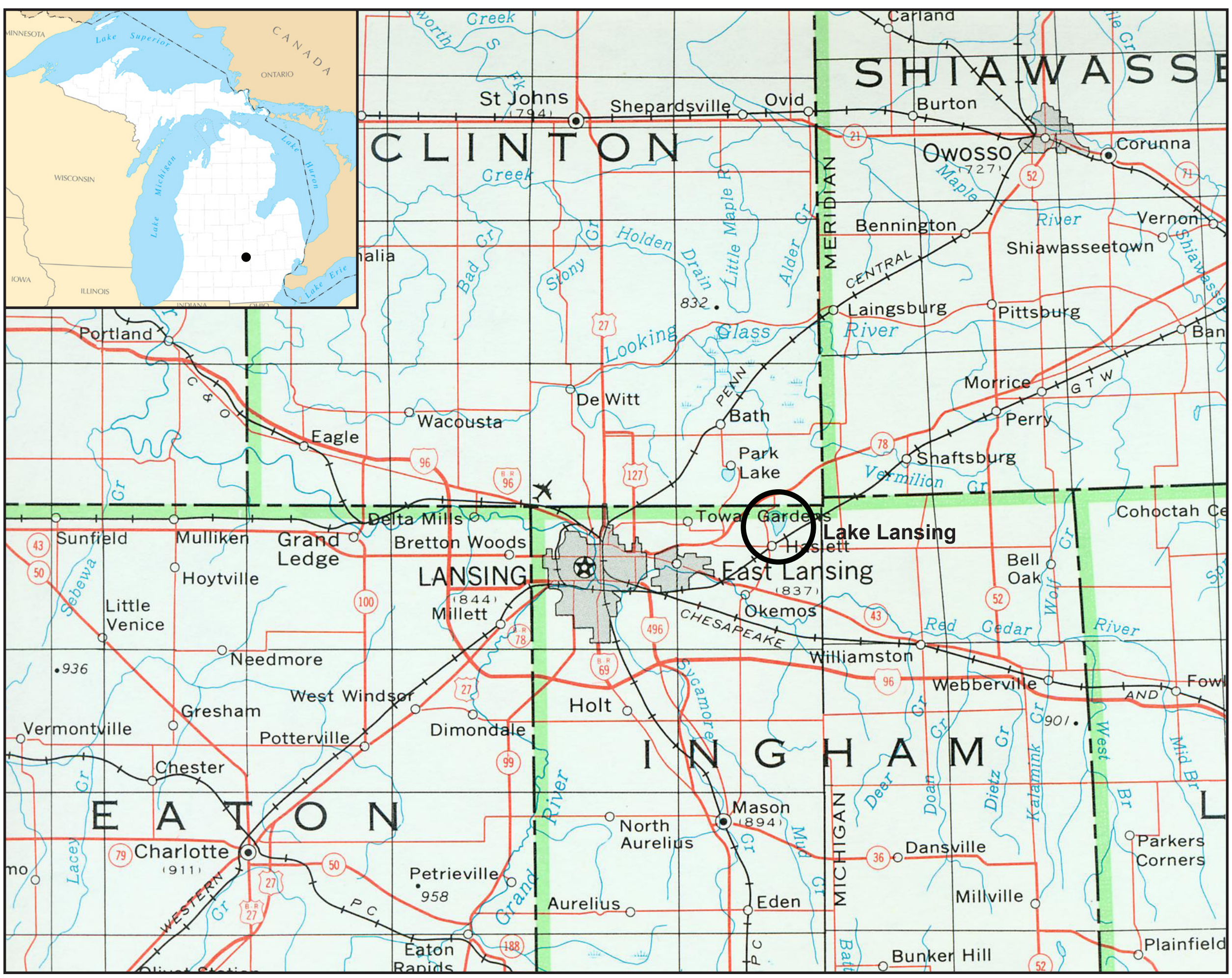

Figure 2. Lake Lansing location map. Source: United States Geological Survey.

Water Quality

Lake Water Quality

Lake water quality is determined by a unique combination of processes that occur both within and outside of the lake. In order to make sound management decisions, it is necessary to have an understanding of the current physical, chemical, and biological condition of the lake, and the potential impact of drainage from the surrounding watershed.

Lakes are commonly classified as oligotrophic, mesotrophic, or eutrophic (Figure 3). Oligotrophic lakes are generally deep and clear with little aquatic plant growth. These lakes maintain sufficient dissolved oxygen in the cool, deep bottom waters during late summer to support coldwater fish such as trout and whitefish. By contrast, eutrophic lakes are generally shallow, turbid, and support abundant aquatic plant growth. In deep eutrophic lakes, the cool bottom waters usually contain little or no dissolved oxygen. Therefore, these lakes can only support warmwater fish such as bass and pike. Lakes that fall between these two extremes are called mesotrophic lakes.

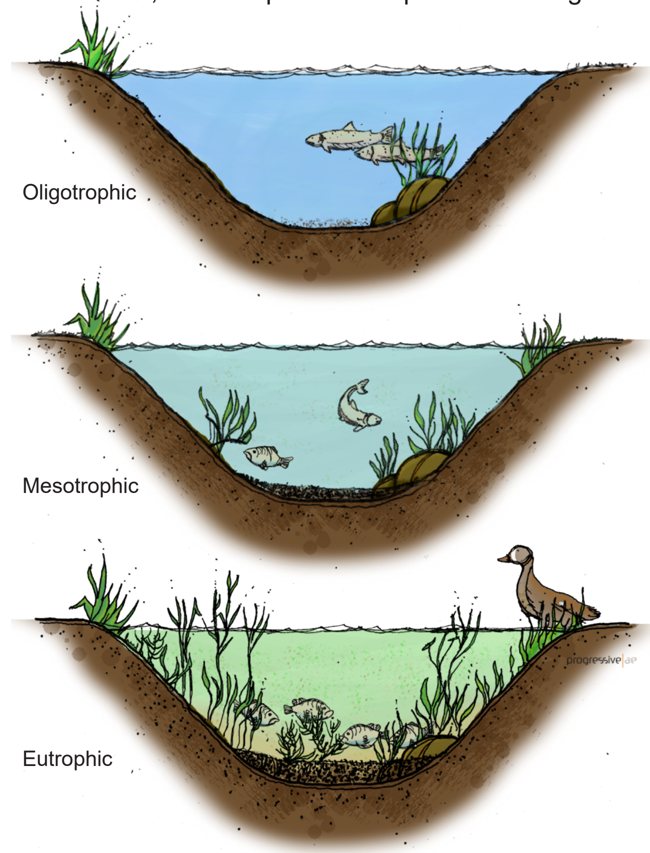

Figure 3. Lake classification.

Under natural conditions, most lakes will ultimately evolve to a eutrophic state as they gradually fill with sediment and organic matter transported to the lake from the surrounding watershed. As the lake becomes shallower, the process accelerates. When aquatic plants become abundant, the lake slowly begins to fill in as sediment and decaying plant matter accumulate on the lake bottom. Eventually, terrestrial plants become established and the lake is transformed to a marshland. The aging process in lakes is called "eutrophication" and may take anywhere from a few hundred to several thousand years, generally depending on the size of the lake and its watershed. The natural lake aging process can be greatly accelerated if excessive amounts of sediment and nutrients (which stimulate aquatic plant growth) enter the lake from the surrounding watershed. Because these added inputs are usually associated with human activity, this accelerated lake aging process is often referred to as "cultural eutrophication." The problem of cultural eutrophication can be managed by identifying sources of sediment and nutrient loading (i.e., inputs) to the lake and developing strategies to halt or slow the inputs. Thus, in developing a management plan, it is necessary to determine the limnological (i.e., the physical, chemical, and biological) condition of the lake and the physical characteristics of the watershed as well. Key parameters used to evaluate the limnological condition of a lake include temperature, dissolved oxygen, total phosphorus, pH and alkalinity, chlorophyll-*a*, and Secchi transparency.

TEMPERATURE

Temperature is important in determining the type of organisms which may live in a lake. For example, trout prefer temperatures below 68°F. Temperature also determines how water mixes in a lake. As the ice cover breaks up on a lake in the spring, the water temperature becomes uniform from the surface to the bottom. This period is referred to as "spring turnover" because water mixes throughout the entire water column. As the surface waters warm, they are underlain by a colder, more dense strata of water. This process is called thermal stratification (Figure 4). Once thermal stratification occurs, there is little mixing of the warm surface waters with the cooler bottom waters. The transition layer that separates these layers is referred to as the "thermocline." The thermocline is characterized as the zone where temperature drops rapidly with depth. As fall approaches, the warm surface waters begin to cool and become more dense. Eventually, the surface temperature drops to a point that allows the lake to undergo complete mixing. This period is referred to as "fall turnover." As the season progresses and ice begins to form on the lake, the lake may stratify again. However, during winter stratification, the surface waters (at or near 32°F) are underlain by slightly warmer water (about 39°F). This is sometimes referred to as "inverse stratification" and occurs because water is most dense at a temperature of about 39°F. As the lake ice melts in the spring, these stratification cycles are repeated.

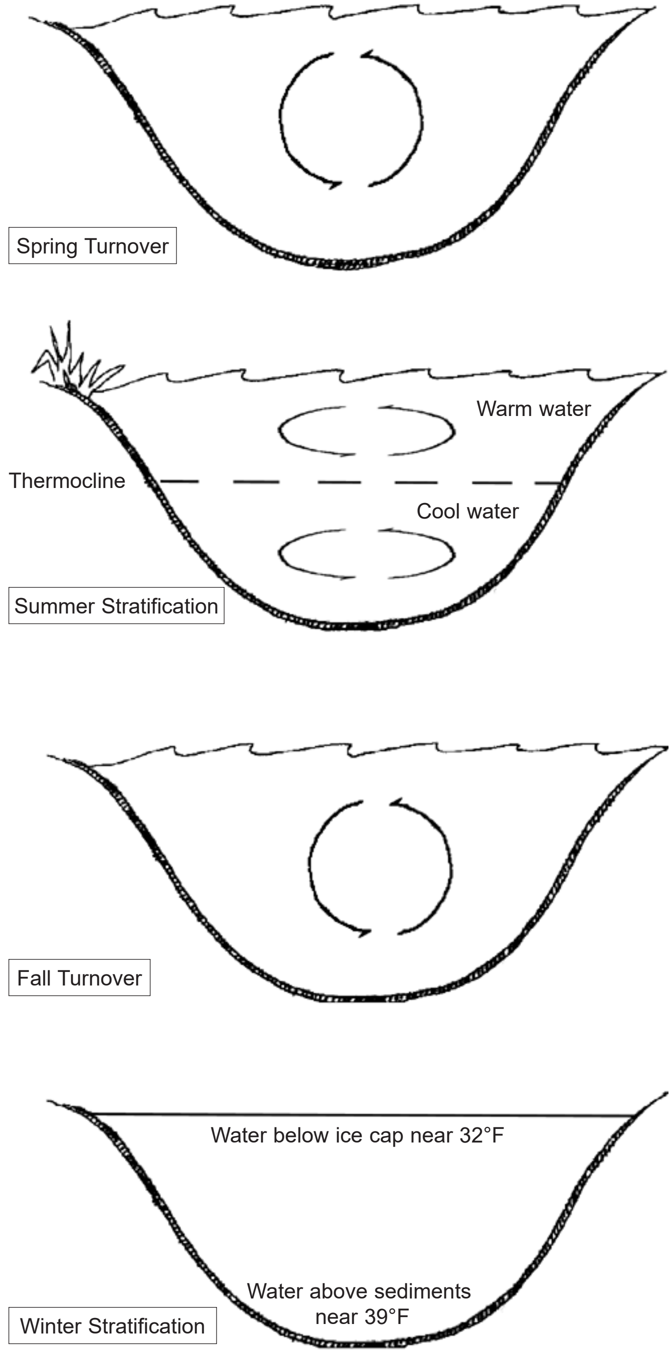

Figure 4. Seasonal thermal stratification cycles.

DISSOLVED OXYGEN

An important factor influencing lake water quality is the quantity of dissolved oxygen in the water column. The major inputs of dissolved oxygen to lakes are the atmosphere and photosynthetic activity by aquatic plants. An oxygen level of about 5 mg/L (milligrams per liter, or parts per million) is required to support warmwater fish. In lakes deep enough to exhibit thermal stratification, oxygen levels are often reduced or depleted below the thermocline once the lake has stratified. This is because the oxygen has been consumed, in large part, by bacteria that use oxygen as they decompose organic matter (plant and animal remains) at the bottom of the lake. Bottom-water oxygen depletion is a common occurrence in eutrophic and some mesotrophic lakes. Thus, eutrophic and most mesotrophic lakes cannot support coldwater fish because the cool, deep water (that the fish require to live) does not contain sufficient oxygen.

PHOSPHORUS

The quantity of phosphorus present in the water column is especially important since phosphorus is the nutrient that most often controls aquatic plant growth and the rate at which a lake ages and becomes more eutrophic. By reducing the availability of phosphorus in a lake, it is often possible to control the amount of aquatic plant growth. In general, lakes with a phosphorus concentration of 20 µg/L (micrograms per liter, or parts per billion) or greater are able to support abundant plant growth and are classified as nutrient-enriched or eutrophic.

Phosphorus enters the lake water either from the surrounding watershed, or from the sediments in the lake itself, or both. The input of phosphorus from the watershed is called "external loading," and from the sediments is called "internal loading." External loading occurs when phosphorus washes into the lake from sources such as fertilizers, septic systems, and eroding land. Internal loading occurs when bottom-water oxygen is depleted, resulting in a chemical change in the water near the sediments. The chemical change causes phosphorus to be released from the sediments into the lake where it becomes available as a nutrient for aquatic plants.

CHLOROPHYLL-*a*

Chlorophyll-*a* is a pigment that imparts the green color to plants and algae. A rough estimate of the quantity of algae present in lake water can be made by measuring the amount of chlorophyll-*a* in the water column. A chlorophyll-*a* concentration greater than 6 µg/L is considered characteristic of a eutrophic condition.

SECCHI TRANSPARENCY

A Secchi disk is often used to estimate water clarity. The measurement is made by fastening a round, black and white, 8-inch disk to a calibrated line (Figure 5). The disk is lowered over the deepest point of the lake until it is no longer visible, and the depth is noted. The disk is then raised until it reappears. The average between these two depths is the Secchi transparency. Generally, it has been found that aquatic plants can grow at a depth of at least twice the Secchi transparency measurement. In eutrophic lakes, water clarity is often reduced by algae growth in the water column, and Secchi disk readings of 7.5 feet or less are common.

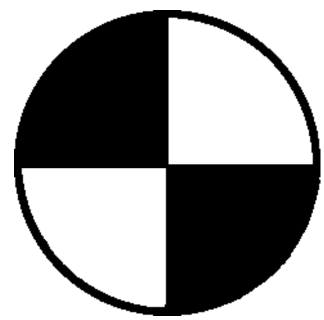

Figure 5. Secchi disk.

Ordinarily, as phosphorus inputs (both internal and external) to a lake increase, the amount of algae the lake can support will also increase. Thus, the lake will exhibit increased chlorophyll-*a* levels and decreased transparency. A summary of lake classification criteria developed by the Michigan Department of Natural Resources (Warbach et al. 1990) is shown in Table 1.

TABLE 1
LAKE CLASSIFICATION CRITERIA

Lake Classification	Total Phosphorus (µg/L)[1]	Chlorophyll-*a* (µg/L)[1]	Secchi Transparency (feet)
Oligotrophic	Less than 10	Less than 2.2	Greater than 15.0
Mesotrophic	10 to 20	2.2 to 6.0	7.5 to 15.0
Eutrophic	Greater than 20	Greater than 6.0	Less than 7.5

1 µg/L = micrograms per liter = parts per billion.

pH and TOTAL ALKALINITY

pH is a measure of the amount of acid or base in the water. The pH scale ranges from 0 (acidic) to 14 (alkaline or basic) with neutrality at 7. The pH of most lakes in the Upper Midwest ranges from 6.5 to 9.0 (Michigan Department of Environmental Quality (MDEQ) 2012; Table 2). In addition, according to the Michigan Department of Environment, Great Lakes, and Energy (EGLE 2020):

> While there are natural variations in pH, many pH variations are due to human influences. Fossil fuel combustion products, especially automobile and coal-fired power plant emissions, contain nitrogen oxides and sulfur dioxide, which are converted to nitric acid and sulfuric acid in the atmosphere. When these acids combine with moisture in the atmosphere, they fall to earth as acid rain or acid snow. In some parts of the United States, especially the Northeast, acid rain has resulted in lakes and streams becoming acidic, resulting in conditions which are harmful to aquatic life. The problems associated with acid rain are lessened if limestone is present, since it is alkaline and neutralizes the acidity of the water.
>
> Most aquatic plants and animals are adapted to a specific pH range, and natural populations may be harmed by water that is too acidic or alkaline. Immature stages of aquatic insects and young fish are extremely sensitive to pH values below 5. Even microorganisms which live in the bottom sediment and decompose organic debris cannot live in conditions which are too acidic. In very acidic waters, metals which are normally bound to organic matter and sediment are released into the water. Many of these metals can be toxic to fish and humans. Below a pH of about 4.5, all fish die.

The Michigan Water Quality Standard (Part 4 of Act 451) states that pH shall be maintained within the range of 6.5 to 9.0 in all waters of the state.

Alkalinity, also known as acid-neutralizing capacity or ANC, is the measure of the pH-buffering capacity of water in that it is the quantitative capacity of water to neutralize an acid. pH and alkalinity are closely linked and are greatly impacted by the geology and soil types that underlie a lake and its watershed. According to MDEQ (2012):

> Michigan's dominant limestone geology in the Lower Peninsula and the eastern Upper Peninsula contributes to the vast majority of Michigan lakes being carbonate-bicarbonate dominant [which increases alkalinity and moderates pH] and lakes in the western Upper Peninsula having lower alkalinity and thus lesser buffering capacity.

The alkalinity of most lakes in the Upper Midwest is within the range of 23 to 148 milligrams per liter, or parts per million, as calcium carbonate (MDEQ 2012; Table 2).

TABLE 2
pH AND ALKALINITY OF UPPER MIDWEST LAKES

Measurement	Low	Moderate	High
pH (in standard units)	Less than 6.5	6.5 to 9.0	Greater than 9.0
Total Alkalinity or ANC (in mg/L as $CaCO_3$[1])	Less than 23	23 to 148	Greater than 148

1 mg/L $CaCO_3$ = milligrams per liter as calcium carbonate.

SAMPLING METHODS

Due to Covid-19 restrictions, springtime water quality sampling was rescheduled for fall, and late summer samples were collected as normal at the two deep basins within Lake Lansing (Figure 6). Temperature was measured using a YSI Model 550A probe. Samples were collected at the surface, mid-depth, and just above the lake bottom with a Van Dorn bottle to be analyzed for dissolved oxygen, pH, total alkalinity, and total phosphorus. Dissolved oxygen samples were fixed in the field and then transported to Progressive AE for analysis using the modified Winkler method (Standard Methods procedure 4500-O C). pH was measured in the field using a Oakton EcoTestr pH2 pH meter. Total alkalinity and total phosphorus samples were placed on ice and transported to Progressive AE and to Prein and Newhof[1], respectively, for analysis. Total alkalinity was titrated at Progressive AE using Standard Methods procedure 2320 B, and total phosphorus was analyzed at Prein and Newhof using Standard Methods procedure 4500-P E. In addition to the depth-interval samples at each deep basin, Secchi transparency was measured and composite chlorophyll-*a* samples were collected from the surface to a depth equal to twice the Secchi transparency. Chlorophyll-*a* samples were analyzed by Prein and Newhof using Standard Methods procedure 10200 H.

Tributaries were monitored in summer and fall for the most significant storm drains and inlet streams (Figure 6). When streams were flowing, discharge was estimated using the U.S. Geological Survey midsection method (Buchanan and Somers 1969). Stream velocity was measured with a Pygmy Gurley flow meter. Prein and Newhof analyzed samples for total phosphorus.

Sampling Results and Discussion

Sampling results are provided in Tables 3 through 4. A graphic summary of water quality data compiled to date is shown in Figures 7 through 9 and summary statistics are included in Table 5.

During the August sampling period, Lake Lansing was stratified; the lake was warm and well-oxygenated at the surface, and was cool with low oxygen at the bottom. In 2020, total phosphorus concentrations were moderately high, with the exception of the deepest samples in late summer which were high. The elevated bottom-water phosphorus is likely due to internal release of phosphorus from the lake sediments. However, sediment phosphorus release occurs in only a very small portion of the lake and, therefore, it is unlikely to be a significant loading source to Lake Lansing. pH and total alkalinity were generally within the moderate range for Upper Midwest lakes.

During fall sampling, Lake Lansing was well-mixed, well-oxygenated, and water temperatures were cool. The average total phosphorus concentration was 29 parts per billion, which is moderately high. pH and total alkalinity remained within the moderate range for Upper Midwest lakes.

1 Prein and Newhof Environmental and Soils Laboratory, 3260 Evergreen, NE, Grand Rapids, MI.

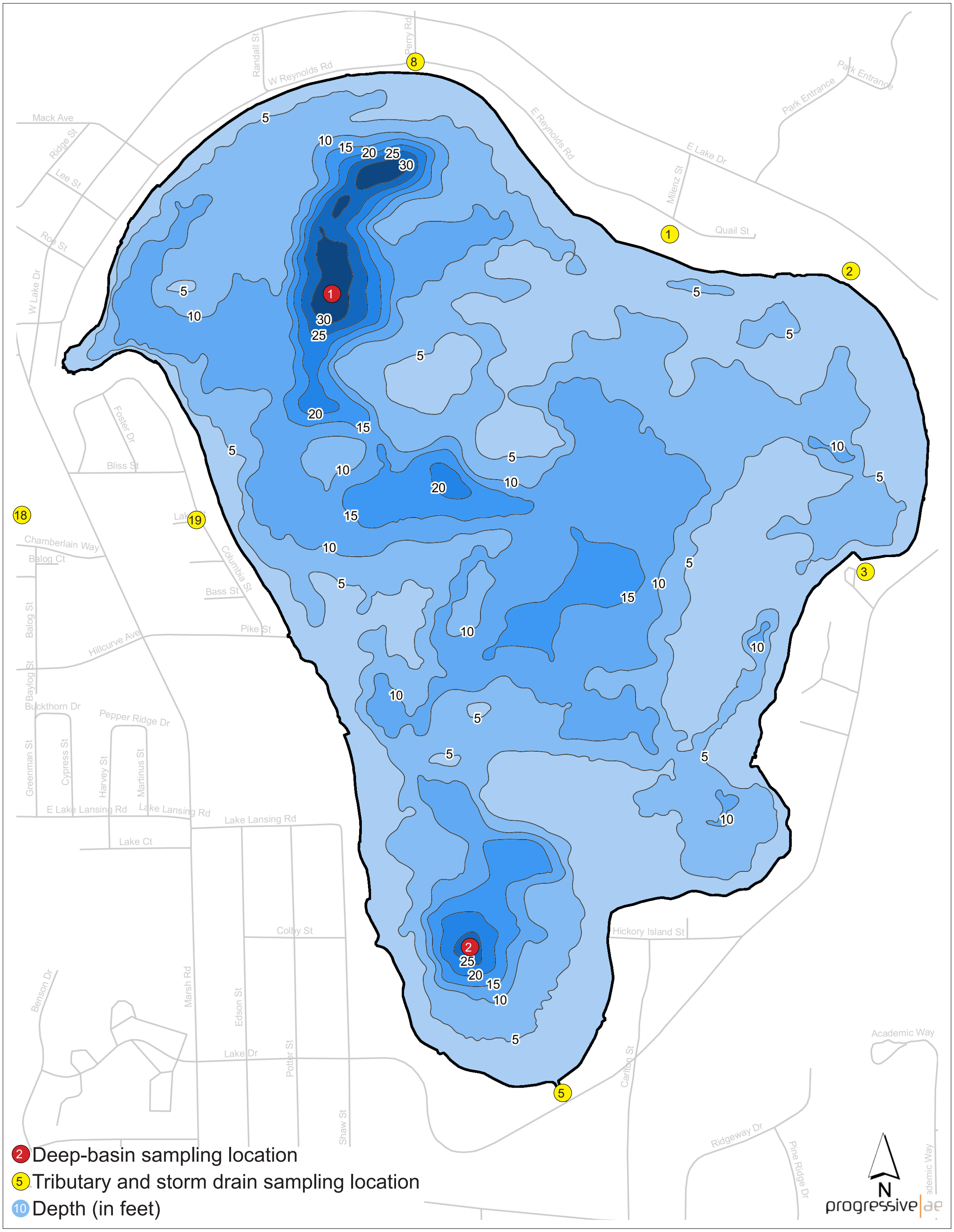

Figure 6. Lake Lansing sampling location map.

TABLE 3
LAKE LANSING
2020 DEEP BASIN WATER QUALITY DATA

Date	Station	Sample Depth (feet)	Temperature (°F)	Dissolved Oxygen (mg/L)[1]	Total Phosphorus (µg/L)[2]	pH (S.U.)[3]	Total Alkalinity (mg/L $CaCO_3$)[4]
6-Aug-20	1	1	82	7.8	23	8.5	102
6-Aug-20	1	15	79	7.0	27	8.4	103
6-Aug-20	1	30	65	0.7	126	7.5	162
6-Aug-20	2	1	77	8.5	22	8.4	96
6-Aug-20	2	12	74	7.7	27	8.2	102
6-Aug-20	2	24	54	0.7	87	7.3	169
20-Oct-20	1	1	51	10.4	32	8.8	115
20-Oct-20	1	16	51	10.2	29	8.7	113
20-Oct-20	1	31	51	10.4	27	8.7	114
20-Oct-20	2	1	51	10.6	28	8.8	112
20-Oct-20	2	12	51	10.5	28	8.8	114
20-Oct-20	2	24	51	10.4	27	8.8	115

TABLE 4
LAKE LANSING
2020 SURFACE WATER QUALITY DATA

Date	Station	Secchi Transparency (feet)	Chlorophyll-*a* (µg/L)[2]
6-Aug-20	1	7.0	3
6-Aug-20	2	7.0	2
20-Oct-20	1	6.5	3
20-Oct-20	2	7.0	3

1 mg/L = milligrams per liter = parts per million.
2 µg/L = micrograms per liter = parts per billion.
3 S.U. = standard units.
4 mg/L $CaCO_3$ = milligrams per liter as calcium carbonate.

Chlorophyll-*a* levels indicate algae growth was moderate and water clarity was poor in summer and fall (Table 4). Since 1999, water clarity has fluctuated from poor to excellent (Figure 9). Water clarity fluctuations are likely related to the presence of zebra mussels which consume algae and often increase water clarity; when the zebra mussel population decreases, water clarity decreases as well. Water clarity is also likely impacted by wave action from wind or from boating activity that stirs the shallow lake sediments into the water column. In general, plants can grow to a depth of about twice the Secchi transparency reading. With this year's Secchi transparency averaging about 7 feet, the clarity of Lake Lansing was sufficient to allow sunlight to penetrate to about 14 feet of depth, which is over 90 percent of the lake bottom, making nearly all of Lake Lansing habitable for plant growth.

Stream measurements can only be made in spring when Lake Lansing's tributaries are flowing. Due to Covid-19 restrictions, the streams could not be sampled in spring, and all tributary in-flow to Lake Lansing ceased by late summer. Therefore, no tributary data could be collected in 2020. Tributary monitoring is planned for 2021.

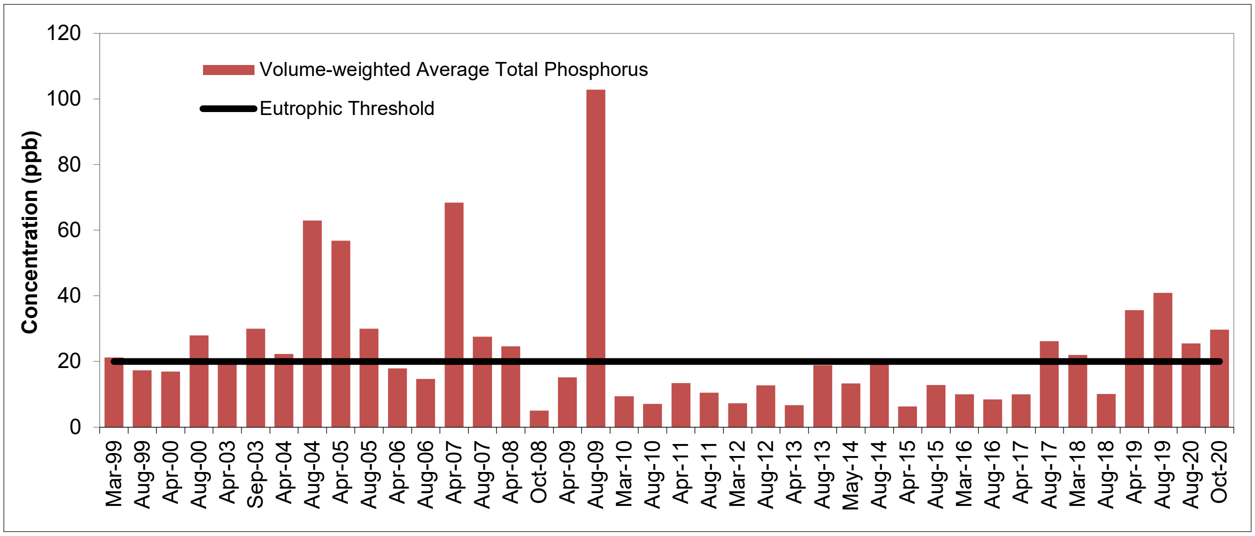

Figure 7. Volume-weighted average total phosphorus concentrations, 1999-2020.

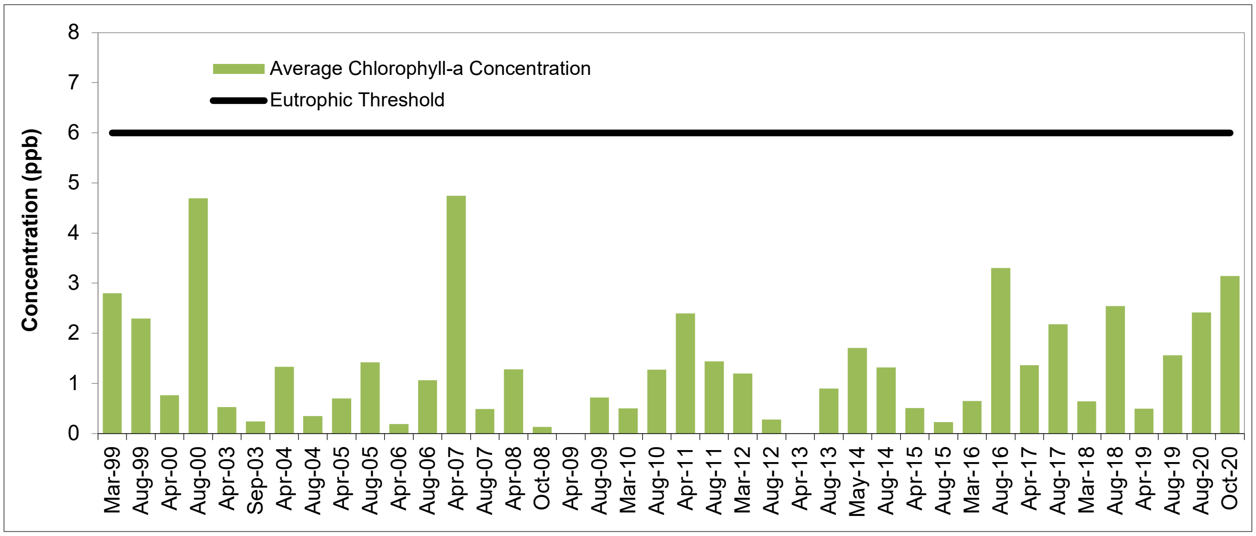

Figure 8. Average chlorophyll-*a* concentrations, 1999-2020.

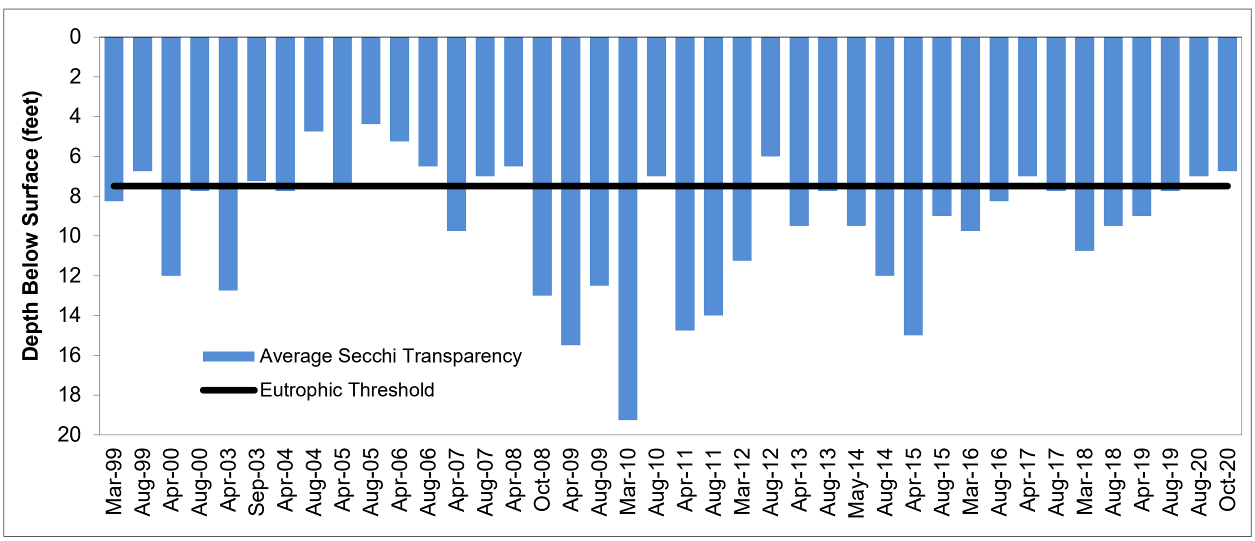

Figure 9. Average Secchi transparency measurements, 1999-2020.

TABLE 5
LAKE LANSING
SUMMARY STATISTICS (1999-2020)[1]

	Total Phosphorus (µg/L)[2]	Chlorophyll-*a* (µg/L)[2]	Secchi Transparency (feet)
Mean	36	1	9.3
Standard deviation	55	2	3.3
Median	20	1	8.5
Minimum	5	0	4.3
Maximum	364	9	19.5
Number of samples	251	80	80

Summary statistics indicate Lake Lansing is borderline between mesotrophic (moderately productive) and eutrophic (nutrient-enriched and productive). Phosphorus levels range from moderate to high with the median phosphorus concentration at the 20-ppb eutrophic threshold. Bottom-water oxygen is reduced, and water clarity appears to fluctuate with the zebra mussel population. Rooted plant growth in Lake Lansing is moderate to dense, and algae growth is generally moderate or low, thus it would appear that phosphorus is more readily used by rooted plants in the lake rather than algae.

1 Summary statistics include data from sampling stations 1 and 2 only. Historically, samples were also collected from two additional stations near the shoreline, but only deep basin data is included in this analysis.
2 µg/L = micrograms per liter = parts per billion.

Nuisance Aquatic Plant Control

The focus of the plant control program in Lake Lansing is control of exotic (i.e., non-native) plants (Eurasian milfoil, curly-leaf pondweed, and starry stonewort) and control of native plants that reach nuisance densities. In 2019, the herbicide fluridone was applied in a whole-lake treatment to control Eurasian milfoil. Although milfoil was slow to die back in 2019, the treatment provided carryover effects into 2020; only 22 acres of milfoil required treatment in 2020, and not until mid-August. Curly-leaf pondweed was treated in early June and then was harvested, along with starry stonewort and nuisance native plants, from mid to late June. A follow-up treatment of starry stonewort occurred in early July.

On August 6, the lake was surveyed using the Department of Environment Quality's Procedures for Aquatic Vegetation Surveys. With these procedures, the type and relative abundance of all plants species present in the lake are evaluated. Lake Lansing was segmented into 70 survey sites and the type and density of plants at each site was recorded (Table 6).

TABLE 6
LAKE LANSING AQUATIC PLANT FREQUENCY
August 6, 2020

Common Name	Scientific Name	Classification	Percent of Survey Sites Where Plant Was Found
Large-leaf pondweed	*Potamogeton amplifolius*	Submersed	81
Chara	*Chara* sp.	Submersed	74
Wild celery	*Vallisneria americana*	Submersed	67
Starry stonewort	*Nitellopsis obtusa*	Submersed	64
Flat-stem pondweed	*Potamogeton zosteriformis*	Submersed	29
Eurasian milfoil	*Myriophyllum spicatum*	Submersed	29
Richardson's pondweed	*Potamogeton richardsonii*	Submersed	20
Slender naiad	*Najas flexilis*	Submersed	19
Sago pondweed	*Stuckenia pectinata*	Submersed	16
Whitestem pondweed	*Potamogeton praelongus*	Submersed	16
Thin-leaf pondweed	*Potamogeton* sp.	Submersed	11
Elodea	*Elodea canadensis*	Submersed	9
Illinois pondweed	*Potamogeton illinoensis*	Submersed	4
Curly-leaf pondweed	*Potamogeton crispus*	Submersed	4
White waterlily	*Nymphaea odorata*	Floating-leaved	6
Yellow waterlily	*Nuphar* sp.	Floating-leaved	6
Cattail	*Typha* sp.	Emergent	11
Purple loosestrife	*Lythrum salicaria*	Emergent	7
Lake sedge	*Carex lacustris*	Emergent	6
Swamp loosestrife	*Decodon verticillatus*	Emergent	4
Bulrush	*Schoenoplectus* sp.	Emergent	1

During the August survey, twenty-one aquatic plant species were found, indicating Lake Lansing maintains a healthy diversity of aquatic plants. The native species large-leaf pondweed, Chara, and wild celery were the most common species found during the late-season survey, all of which are beneficial species for fish and wildlife.

Information and Education

The Lake Lansing Property Owners Association (LLPOA) and the Lake Lansing Advisory Committee participated in several educational efforts in 2020.

LLPOA Annual Meeting: Due to Covid-19 restrictions, the 2020 LLPOA annual meeting at the Lake Lansing Park South pavilion was cancelled. Instead, a newsletter was mailed to all residents within the special assessment district and included information on aquatic plant control, the Lake Lansing dam, and the Nemoka drain project (Appendix A).

Landing Blitz. The seventh annual aquatic invasive species "Landing Blitz" was held on July 1st at Lake Lansing, coordinated by the Michigan Department of Environment, Great Lakes, and Energy (EGLE), the Mid-Michigan Cooperative Invasive Species Management Area, and Michigan State University's Mobile Boat Wash crew. The Landing Blitz is a collaborative outreach campaign to raise awareness about preventing the spread of aquatic invasive species (AIS) through recreational boating and related activities (Figure 10).

Figure 10. Landing Blitz volunteers.

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Appendix A

Lake Lansing

Special Assessment District Advisory Committee Newsletter

July 2020

Lake Lansing Special Assessment District Advisory Committee Newsletter

July 2020

Lake Lansing Special Assessment District Advisory Committee
c/o Meridian Charter Township
5151 Marsh Road
Okemos, MI 48864

For a complete report on last years Special Assessment District Advisory Committee activities please see our Annual Report, as well as maps, minutes, and notices at the SAD advisory committee section of the Meridian Township website.

Environmental Consultant
Progressive AE

Nuisance Aquatic Plant Control

With cooler-than-normal temperatures earlier this spring, plant growth was slow to get started in Lake Lansing this year. To date, only minimal herbicide treatments have been necessary to control the exotic (non-native) plant curly-leaf pondweed. Last year's whole-lake treatment for Eurasian milfoil was very slow to take effect but, thus far, is carrying over to this year. Biologists will survey Lake Lansing again in mid-June, looking for exotic plants along with native plants that may be growing to nuisance densities. Depending on the type and density of plants that are found, additional treatments and harvesting will be scheduled.

The harvesting contractor who worked on Lake Lansing for the past several years retired at the end of last season. Over this past winter, the harvesting contract was bid out and awarded to PLM Lake and Land Management Corp., which happens to be the same contractor that applies herbicides to Lake Lansing. We're looking forward to improved harvesting efficiency with a second off-load site located at Lake Lansing Park South and "donation" of harvested plants to MSU's Anaerobic Digestion Research and Education Center.

For the latest updates, be sure to check **www.lakelansing.org** and **www.meridian.mi.us/government/boards-and-commissions/lake-lansing-advisory-committee**.

State Laws to Prevent the Spread of Invasives

In late 2018, the Michigan legislature passed laws affecting both motorized and nonmotorized watercraft, trailers and other conveyances used to move watercraft. State law now requires the following, prior to transporting any watercraft over land:

- Remove all aquatic plants from boats and trailers before launching.
- Remove all drain plugs from bilges, ballast tanks, and live wells.
- Drain all water from any live wells and bilges.
- Ensure the watercraft, trailer, and any conveyance used to transport the watercraft or trailer are free of aquatic organisms, including plants.

There is also new state law that impacts fishing as well:

- Whether purchased or collected, unused baitfish should be disposed of on land or in the trash, never in the water. Any baitfish an angler collects may be used only in the waters where it was originally collected.
- Anglers are allowed to catch and release fish. Anglers who are catching and releasing fish should only release the fish back into the same water or in a connecting body of water the fish could have reached on its own.

To enhance control of invasives, the Lake Advisory committee is working with County parks to secure grants to improve the boat washing process, with project implementation in 2022.

2

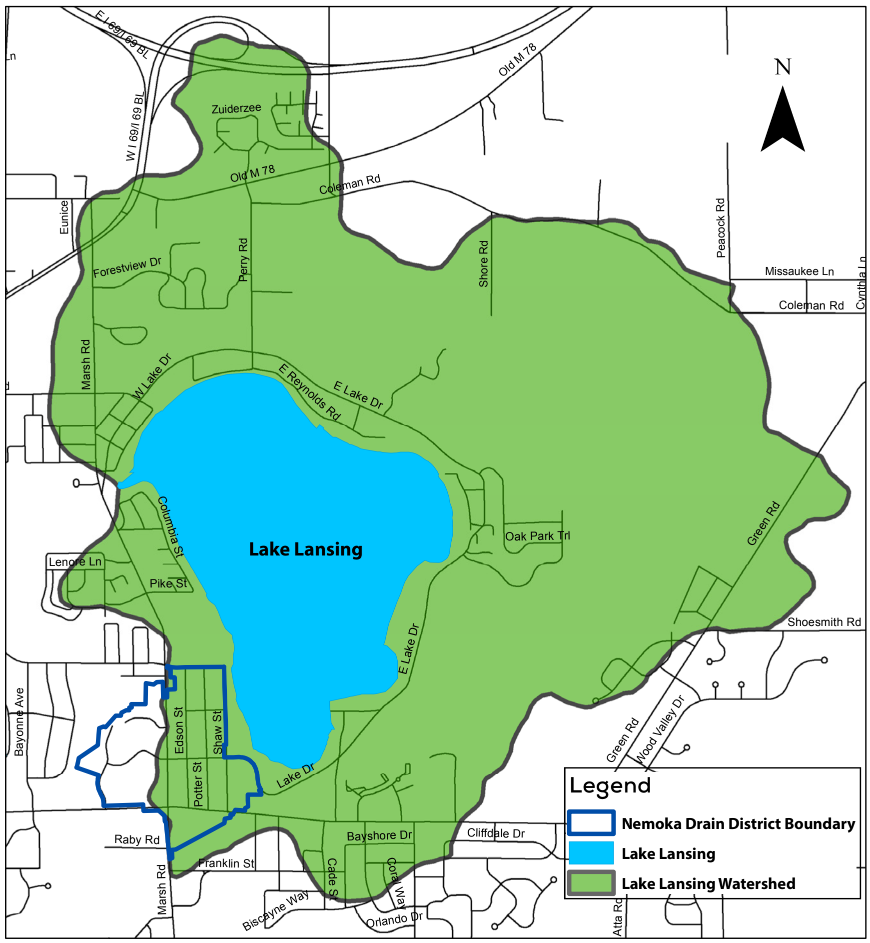
Lake Lansing Dam Conditions

The Drain Commissioner oversees the required inspection of the dam by a licensed engineer every three years. The conclusion of the most recent report filed with EGLE (dated 1/7/2020), is as follows: "There is no immediate failure potential to the dam, but repairs and improvements should be considered and incorporated."

The Drain Commissioner plans to act on the report's recommendations in coming years.

Nemoka Drain Project—No Expected Impact on the Lake

There are no direct connections between the Drain and Lake Lansing. The one exception is the existing Shaw Condominiums storm drainage system which is now being added as a relief branch to the Nemoka Drain system. This branch will continue to discharge INTO the lake at Lake Drive. It will also act as a relief for surface runoff from the area of Lake Drive and Shaw Street. It does NOT flow in the opposite direction, taking flow out of the lake. Although no hydrogeological modeling was done, it is unlikely that there is sufficient hydraulic gradient to cause water to flow through the soil from the lake to the drain.



The level of Lake Lansing is set by Court Order, and controlled by Drain Commissioner Patrick Lindemann. The level is physically controlled by Drain Commissioner staff putting boards in slots on the top of the dam, and removing them, as appropriate.

Respectfully submitted by Drain Commissioner Patrick Lindemann.