Minutes of the Lake Oakland
Lake Improvement Board Meeting
October 24, 2022

Mr. Sabina called the meeting to order at 3:02 p.m. at the Oakland County Water Resources Commissioner 1st Floor Meeting Room.

PRESENT: Rick Sabina, Citizen Member/Chairperson
George Nichols, Oakland County WRC, Secretary
Kimberly Markee, Waterford Township Clerk (virtual)
Terri Nallamothu, Independence Township Trustee (virtual)
Karen Joliat, Oakland County Board of Commissioners
Paul Hausler, Progressive AE
Michael Perzyk, Resident

Open Meeting

All participates stated their name and affiliation for the record.

Mr. Sabina reminded everyone to sign the attendance sheet (see Attachment 'A').

Approval of the Meeting Agenda:

Karen Joliat, supported by George Nichols, moved to accept the meeting agenda as presented (see Attachment 'B').

Motion Carried Unanimously

Approval of Meeting Minutes:

Karen Joliat, supported by George Nichols, moved to accept the minutes as submitted for the meeting of August 29, 2022.

Motion Carried Unanimously

Paul Hausler will post the meeting minutes on the Lake Oakland website.

Old Business:

A. Project Work Journal

Paul Hausler provided a Project Work Journal (see Attachment 'C') dated October 24, 2022, that outlines the services regarding plant control and associated costs to date for the 2022 calendar year. Since the last meeting it is noted that a second harvesting was performed

from August 29, 2022 through September 2, 2022. A final survey was done on September 1, 2022.

Due to the additional harvesting, the Project Work Journal shows a negative $3,201.23 within the Nuisance Aquatic Plant Control fund balance. Karen Joliat, supported by Terri Nallamothu, to move $3,201.23 from the Administration and Contingency line item into the Nuisance Aquatic Plant Control line item, to bring the Nuisance Aquatic Plant Control fund balance to zero dollars.

Motion Carried Unanimously

B. Herbicide Treatment Update

Paul Hausler stated that there were no new herbicide treatments that occurred since the last meeting and no more are scheduled for this year.

C. Plant Harvesting Update

Paul Hausler stated that a harvesting treatment took place August 29, 2022, through September 2, 2022. A final survey of the harvesting was done immediately afterwards.

D. Aquatic Plant Control Program Annual Report

Paul Hausler stated that the aquatic plants are an important component of lakes. The summary provides an explanation of the plant surveys and plant controls within Lake Oakland. There were six (6) surveys performed, six (6) herbicide treatments performed, and two (2) harvesting that occurred. There was more harvesting done this year compared to last year. A vegetation survey of Lake Oakland was conducted on August 9, 2022, to evaluate the type and abundance of all plants in the lake. At the time of the survey, nineteen (19) submersed species, two (2) free-floating species, three (3) floating-leaved species, and nine (9) emergent species were found in the lake. (see Attachment ‘D’). Paul Hausler stated that there should be more educational items on the website.

George Nichols, supported by Karen Joliat moved to Receive, Note and File the Aquatic Plant Control Program 2022 Activity Summary and post this information on the website.

Motion Carried Unanimously

E. Lake Oakland 2022 Water Quality Report

Paul Hausler presented the Lake Oakland 2022 Water Quality Report (see Attachment ‘E’). The report describes how the lakes are classified as either Oligotrophic, Eutrophic or Mesotrophic. Key parameters used to evaluate a lake’s productivity or trophic state include total phosphorus, chlorophyll-a and Secchi transparency. Lake Oakland typically falls into the Mesotrophic state. Temperature and dissolved oxygen strongly influence lake water quality and are very important to a lake’s fishery. Lake Oakland’s thermocline set up between 20-30 feet in the summer of 2022.

Karen Joliat, supported by Terri Nallamothu moved to Receive, Note and File the Lake Oakland 2022 Water Quality Report and post this information on the website.

Motion Carried Unanimously

F. Catch Basin Cleaning

George Nichols reported that he reached out to the Road Commission of Oakland County again to find out if the catch basins have been cleaned. Unfortunately, the contact person has not responded with any information. Any new information will be distributed to the board as it becomes available.

New Business

A. Plant Harvesting Bid Proposals

Paul Hausler stated that they sent out four proposals but only received two bids from PLM Lake & Land Management and Oakland Harvesters (see Attachment 'F'). The bid contained only two line items, native plant harvesting and starry stonewort harvesting. Paul Hausler stated that both companies are responsive and reliable. Oakland Harvester does have newer equipment and machinery.

Karen Joliat, supported by George Nichols, moved to accept the bids as submitted and award the harvesting contract to Oakland Harvester as outlined above.

Motion Carried Unanimously

B. Laminar Flow Aeration (LFA)

Rick Sabina spoke to the chairperson on Duck Lake where they have a Laminar Flow Aeration. It is used to stimulate and combat the aerobic bacteria in the lake by adding oxygen to the water. Duck Lake purchased their LFA about 4 years ago which came with bubblers but have to treat and monitor it regularly. They hired a company to this work for them. Since using the LFA, Duck Lake has cut their treatment costs in half, from $100,000 to $50,000 per year. First three years they noticed a reduction in the muck of the water and an increase in the clarity, but it can also produce a stimulation of new plant growth.

First need to hire a professional to do a study on the lake that would tell you the pros and cons of purchasing an LFA. Would need to place compressors throughout the lake area that require electricity to operate. It cost Duck Lake $1.5M for installation and electrical hook-up, and costs them $40,000 per year in maintenance fees. The equipment can be rented or bought outright.

Discussion occurred between the Board members stating that this process would be too expensive and involved for Lake Oakland to administer.

C. 2022 Chairman Lake Board Report

Rick Sabina presented his 2022 Chairman Lake Board Report (see Attachment 'G'). He summarized the treatment and harvesting dates and operations. He also mentioned the police presence that occurred on the lake over the July 4th holiday. His report also discussed the purple loosestrife update, the water quality monitoring and the fish survey. He also mentioned that usage of the AIS mobile devise for 2021 and is awaiting the data for the 2022 usage. He also mentioned the on-going catch basin cleaning and the stencil that is available for labeling the drains.

George Nichols, supported by Karen Joliat moved to Receive, Note and File the 2022 Chairman Lake Board Report and post this information on the website.

Motion Carried Unanimously

Public Comments:

Michael Perzyk commented that he was glad to know that Savin Lake Services did not bid on the harvesting project for 2023. He and his neighbors have not been pleased with the work they have been doing on the lake.

Michael Perzyk stated that he liked the water quality report that was provided previously. He said it would be appreciated if the cove areas could also be tested. Paul Hausler commented that the Board would have to take action to increase the number of samples taken. He suggested 3-4 additional sites would be sufficient and would cost about $500 more per year.

George Nichols, supported by Karen Joliat to increase the number of water testing sample sites from one site to a total of 3-4 sites and to incorporate the cost into the future assessments.

Motion Carried Unanimously

Michael Perzyk commented that he appreciated the report on the laminar flow aeration discussion and information from Duck Lake that Rick Sabina shared earlier in the meeting.

Lake Oakland Invoice Approval:

Rick Sabina outlined invoice #18166 from Aqua-Weed Control (dated September 5, 2022) in the amount of $3,542.50 for the August 16th treatment of invasive weeds and algae, as noted in Item '7a'.

Karen Joliat, supported by Terri Nallamothu, to pay invoice #18166 in the amount of $3,542.50 to Aqua-Weed Control.

Motion Carried Unanimously

Rick Sabina outlined invoice #8655 from Savin Lake Service (dated September 14, 2022) in the amount of $13,112.50 for harvesting work performed on September 2nd, as noted in Item '7b'.

Terri Nallamothu, supported by Karen Joliat, to pay invoice #8655 in the amount of $13,112.50 to Savin Lake Service.

Motion Carried Unanimously

Rick Sabina outlined invoice #189427 from Progressive AE (dated October 3, 2022) in the amount of $5,000 for Lake Management Administration and Oversight Quarterly Services thru September 30, 2022, as noted in Item '7c'.

Karen Joliat, supported by Terri Nallamothu, to pay invoice #089427 in the amount of $5,000.

Motion Carried Unanimously

Board Member Comments

Rick Sabina wanted to thank everyone for their services this past year.

Meeting Schedule:

The next Lake Board meeting will be held on Monday, April 17, 2023, at 3:00 p.m. The meeting will take place at Oakland County Water Resources Commissioner office 1st Floor Lunchroom. The address is One Public Works Drive, Building 95W, Waterford, Michigan. This will be posted on the website.

Adjournment:

Karen Joliat, supported by George Nichols, moved to adjourn the meeting at 4:45 p.m.

Motion Carried Unanimously

George P. Nichols

George P. Nichols
Lake Improvement Board Secretary
For Lake Oakland

STATE OF MICHIGAN)
) ss:
COUNTY OF OAKLAND)

I hereby certify that the foregoing is a true and complete copy of the minutes of the Lake Improvement Board for Lake Oakland, Oakland County, Michigan held on the 24th day of October 2022 and that the said minutes are on file in the Office of the Oakland County Water Resources Commissioner and are available to the public.

I further certify that notice of the meeting was posted at least 18 hours before the meeting at the Office of the Oakland County Water Resources Commissioner, which is the principal office of the Lake Improvement Board for Lake Oakland.

George P. Nichols

George P. Nichols
Lake Improvement Board Secretary
For Lake Oakland

Dated: March 8, 2023

Attachment ‘A’

Form DC–107

OAKLAND COUNTY WATER RESOURCES COMMISSIONER
ATTENDANCE SHEET

DATE: October 24, 2022 @ 3:00 p.m. **FACILITATOR:**

TYPE Lake Improvement Board Meeting (WRC 1st Floor Meeting Room)

TOPIC: **Lake Oakland Lake Improvement Board Meeting**

PRINTED NAME	E-MAIL	ADDRESS	CONTACT NUMBER
George Nichols	nicholsg@oakgov.com		248.841.3006
Rick Sabina	sabina@oakland.edu		248-877-0150
Karen Joliat	joliatk@yahoo.com		2489356133
Michael Perzyk	Baker785@Hotmail.com		248-892-3518
Paul Hausler	hauslerpe@progressiveae.com		Cell 248-490-4716
Terri Nallamothu	(virtual)		
Kimberly MacKee	(virtual)		

Attachment ‘B’

AGENDA

LAKE OAKLAND LAKE IMPROVEMENT BOARD

Monday, October 24, 2022 – 3:00 p.m.

Oakland County Water Resources Commissioner Building Lunch Room

1. Open Meeting
    a. Introductions and Attendance

2. Approval of the Meeting Agenda for October 24, 2022

3. Approval of Meeting Minutes from August 29, 2022

4. Old Business
    a. Project Work Journal
    b. Herbicide Treatment Update
    c. Plant Harvesting Update
    d. Catch Basin cleaning update

5. New Business
    a. Plant Harvesting Bid Proposals
    b. Laminar Flow Aeration (LFA)
    c. 2022 Chairman Lake Board Report

6. Public Comments

7. Lake Oakland Invoice Approval
    a. Approve payment of invoice #18166 (dated September 5, 2022) from Aqua Weed Control Inc. in the amount of $3,542.50 for the August 16th nuisance aquatic plant control work treatment.

b. Approve payment of invoice #8655 (dated September 14, 2022) from Savin Lake Services in the amount of $13,112.50 for harvesting work performed on Lake Oakland on September 2nd.
c. Approve payment of Progressive AE Invoice #189427 (dated 10/3/22) for Lake Management Administration and Oversight Quarterly Services thru September 30, 2022.

8. Board Member Comments

9. All Else
    a. Schedule next meeting date

10. Adjournment

Attachment ‘C’

progressive ae

Project Work Journal

Lake Oakland

2022 — **Beginning Balance: $70,000.00**

Date	Type	Results
1/3/2022	Permit	Reimbursement for 2022 EGLE permit fee

Application Date	Type	Target Species	Qty	Dose Rate	Cost	Remaining Balance
1/10/2022	Permit Fee		1.00 each		$1,500.00	$68,500.00
				Invoice 17078 Total	**$1,500.00**	**$68,500.00**

Date	Type	Results
5/4/2022	Survey	Found some milfoil. Very little curly-leaf pondweed. Water temp. = 55F.

Treatment Date	Type	Target Species	Qty	Dose Rate	Cost	Remaining Balance
5/12/2022	Algae control (filamentous and planktonic)	Filamentous or Planktonic Algae	4.00 acre(s)		$160.00	$68,340.00
5/12/2022	Triclopyr liquid	Eurasian Milfoil	7.50 acre(s)	4.00 gallons/acre	$2,499.98	$65,840.02
5/12/2022	ProcellaCOR	Eurasian Milfoil	11.75 PDU		$1,351.25	$64,488.77
5/12/2022	Diquat dibromide @ 1 gal/acre + 4 PDU ProcellaCOR	Eurasian Milfoil	11.75 acre(s)		$6,110.00	$58,378.77
				Invoice 17702 Total	**$10,121.23**	**$58,378.77**

Date	Type	Results
6/1/2022	Survey	JML, CMD - Some milfoil found along shore, water clarity was good. Pondweeds starting to come in.

2022 **Beginning Balance: $70,000.00**

Treatment Date	Type	Target Species	Qty	Dose Rate	Cost	Remaining Balance
6/8/2022	2,4-D ester	Eurasian Milfoil	1.25 acre(s)	150.00 lbs/acre	$600.00	$57,778.77
6/8/2022	Algae control (filamentous and planktonic)	Filamentous or Planktonic Algae	12.00 acre(s)		$480.00	$57,298.77
6/8/2022	Flumioxazin	Curly-leaf Pondweed Eurasian Milfoil	0.50 acre(s)	200.00 ppb	$245.00	$57,053.77
6/8/2022	ProcellaCOR	Eurasian Milfoil	22.50 PDU		$2,587.50	$54,466.27
6/8/2022	Diquat dibromide @ 2 gal/acre	Curly-leaf Pondweed Eurasian Milfoil	4.50 acre(s)		$810.00	$53,656.27
6/8/2022	Diquat dibromide @ 1 gal/acre + 4 PDU ProcellaCOR	Curly-leaf Pondweed Eurasian Milfoil	1.50 acre(s)		$780.00	$52,876.27
6/8/2022	Diquat dibromide @ 1 gal/acre + 4 PDU ProcellaCOR	Curly-leaf Pondweed Eurasian Milfoil	11.25 acre(s)		$5,850.00	$47,026.27
				Invoice 17836 Total	**$11,352.50**	**$47,026.27**

6/13/2022 Other

Response to algae complaints.

Treatment Date	Type	Target Species	Qty	Dose Rate	Cost	Remaining Balance
6/16/2022	Algae control (filamentous and planktonic)	Filamentous or Planktonic Algae	16.00 acre(s)		$640.00	$46,386.27
				Invoice 17837 Total	**$640.00**	**$46,386.27**

6/30/2022 Survey

JML, CMD, Rick S. - Lake clarity was good. Macro-algae and pondweeds ready for harvesting.

Project Work Journal

Lake Oakland

2022 **Beginning Balance: $70,000.00**

Treatment Date	Type	Target Species	Qty	Dose Rate	Cost	Remaining Balance
7/6/2022 - 7/14/2022	Harvesting	Nuisance Native Plants	13.25 acre(s)		$5,962.50	$40,423.77
7/6/2022 - 7/14/2022	Harvesting of starry stonewort	Chara Starry Stonewort	37.50 acre(s)		$21,562.50	$18,861.27
				Invoice 8373 Total	**$27,525.00**	**$18,861.27**
7/7/2022	Algae control (filamentous and planktonic)	Filamentous or Planktonic Algae	3.75 acre(s)		$150.00	$18,711.27
				Invoice 18060 Total	**$150.00**	**$18,711.27**
7/11/2022	2,4-D ester	Eurasian Milfoil	1.00 acre(s)	150.00 lbs/acre	$480.00	$18,231.27
7/11/2022	Macro-algae control: copper and monoamine salt of endothall	Starry Stonewort	18.25 acre(s)		$1,277.50	$16,953.77
7/11/2022	Macro-algae control: copper products only	Chara	1.50 acre(s)		$67.50	$16,886.27
7/11/2022	ProcellaCOR	Eurasian Milfoil	27.50 PDU		$3,162.50	$13,723.77
7/11/2022	Diquat dibromide @ 2 gal/acre	Eurasian Milfoil	1.50 acre(s)		$270.00	$13,453.77
				Invoice 18061 Total	**$5,257.50**	**$13,453.77**

7/13/2022	Survey	JML, CMD - Harvest inspection, some areas still need to be harvested. Additional harvested areas added.
8/9/2022	Survey	JML, CMD - AVAS survey. Some milfoil found. Celery and pondweed growth starting to take off.

2022 **Beginning Balance: $70,000.00**

Treatment Date	Type	Target Species	Qty	Dose Rate	Cost	Remaining Balance
8/16/2022	Flumioxazin	Eurasian Milfoil	2.50 acre(s)	200.00 ppb	$1,225.00	$12,228.77
8/16/2022	Macro-algae control: copper and monoamine salt of endothall	Starry Stonewort	8.75 acre(s)		$612.50	$11,616.27
8/16/2022	Triclopyr liquid	Eurasian Milfoil	2.50 acre(s)	3.00 gallons/acre	$625.00	$10,991.27
8/16/2022	Diquat dibromide @ 2 gal/acre	Eurasian Milfoil	6.00 acre(s)		$1,080.00	$9,911.27
				Invoice 18166 Total	**$3,542.50**	**$9,911.27**
8/29/2022 - 9/2/2022	Harvesting	Nuisance Native Plants	22.75 acre(s)		$10,237.50	($326.23)
8/29/2022 - 9/2/2022	Harvesting of starry stonewort	Chara Starry Stonewort	5.00 acre(s)		$2,875.00	($3,201.23)
				Invoice 8655 Total	**$13,112.50**	**($3,201.23)**

9/1/2022 Survey JML, CMD, Rick S. - Harvested areas look good

Attachment ‘D’

Lake Oakland Aquatic Plant Control Program Annual Report

A publication of the Lake Oakland Improvement Board

October 2022

Lake Oakland Improvement Board
One Public Works Drive
Building 95 West
Waterford, MI

Rick Sabina, Chair
Lake Oakland Resident Representative

George Nichols, Secretary
Water Resources Commissioner's Office Representative

Kim Markee, Clerk
Waterford Township Representative

Theresa Nallamothu, Trustee
Independence Township Representative

Karen Joliat
Oakland County Commissioner

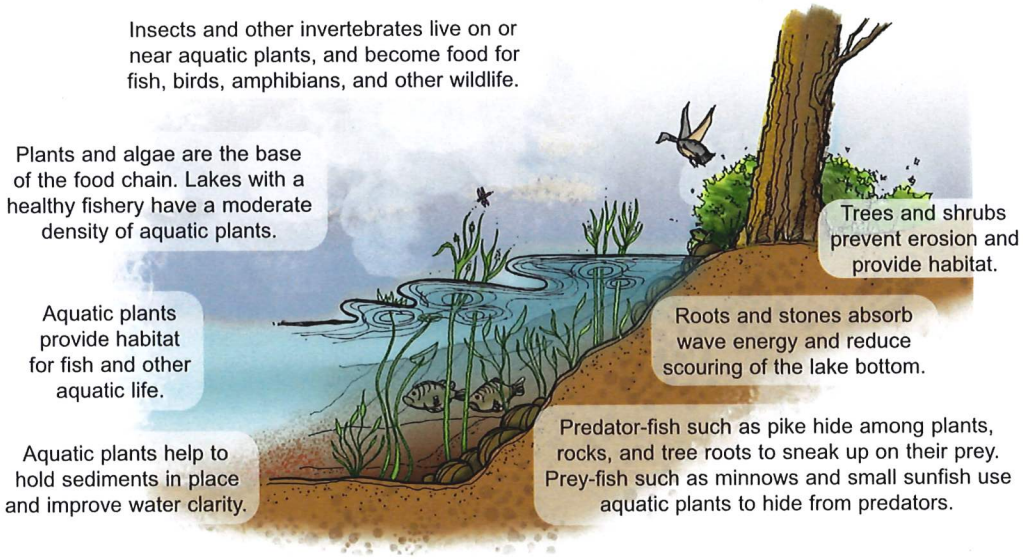
Environmental Consultant
Progressive AE

Herbicide Applicator
Aqua-Weed Control, Inc.

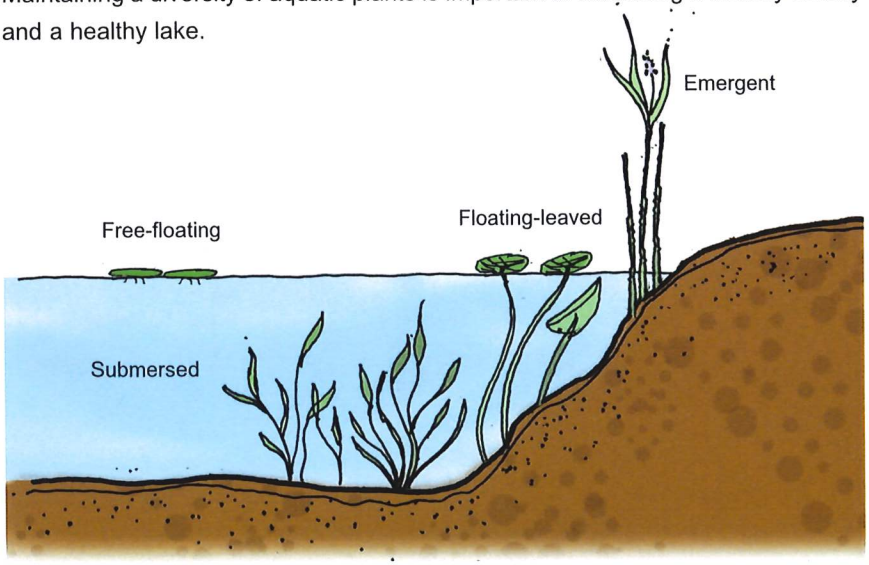
Harvesting Contractor
Savin Lakes Services

For the past several years, a nuisance plant control program has been ongoing on Lake Oakland. The primary objective of the program is to prevent the spread of invasive aquatic plants while preserving beneficial plant species. The program is financed through special assessment of lake residents in accordance with Part 309, Inland Lake Improvements, of the Natural Resources and Environmental Protection Act. This report contains an overview of plant control activities conducted on Lake Oakland in 2022.

Aquatic plants are an important component of lakes. They produce oxygen during photosynthesis, provide food, habitat and cover for fish, and help stabilize shoreline and bottom sediments.

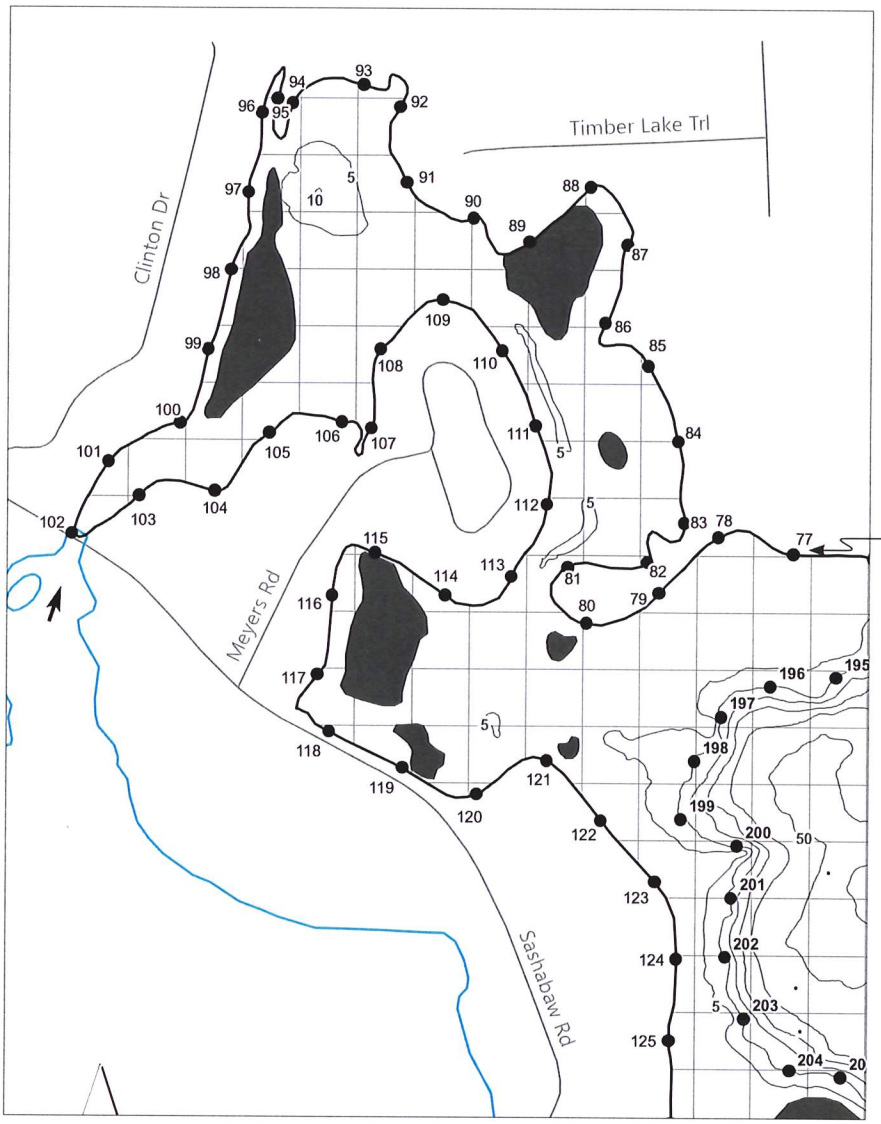


There are four main aquatic plant groups: submersed, floating-leaved, free-floating, and emergent. Each plant group provides important ecological functions. Maintaining a diversity of aquatic plants is important to sustaining a healthy fishery and a healthy lake.



Plant Surveys

Plant control activities are coordinated under the direction of an environmental consultant, Progressive AE. Biologists from Progressive conduct GPS-guided surveys of the lake to identify problem areas, and detailed treatment maps are provided to the plant control contractor. Follow-up surveys are conducted throughout the growing season to evaluate results and the need for additional treatments. In 2022, surveys of the lake were conducted on May 4, June 1, June 30, July 13, August 9, and September 1.



GPS reference points established along the shoreline and dropoff of Lake Oakland are used to guide plant surveys and to accurately identify the location of nuisance plant growth areas.

Plant Control

Plant control in Lake Oakland involves the select use of herbicides to control invasive plants and mechanical harvesting to control nuisance growth of native plants. Primary plants targeted for control in Lake Oakland include Eurasian milfoil and starry stonewort. Both of these plants are non-native (exotic) species that tend to be highly invasive and have the potential to spread quickly if left unchecked.

Eurasian milfoil (*Myriophyllum spicatum*)

Starry stonewort (*Nitellopsis obtusa*)

Plant control activities conducted on Lake Oakland in 2022 are summarized in the table below.

LAKE OAKLAND
2022 NUISANCE AQUATIC PLANT CONTROL SUMMARY

Date	Work Type	Acres Treated
May 4	Aquatic Plant Survey	
May 12	Herbicide treatment: E. milfoil, algae	23
June 1	Aquatic Plant Survey	
June 8	Herbicide treatment: E. milfoil, curly-leaf, algae	31
June 16	Herbicide treatment: Algae	16
June 30	Aquatic Plant Survey	
July 6	Harvest	51
July 7	Herbicide treatment: Algae	4
July 11	Herbicide treatment: E. milfoil, starry stonewort	27
July 13	Aquatic Plant Survey	
August 9	Aquatic Plant Survey	
August 16	Herbicide treatment: E. milfoil, starry stonewort	20
August 29	Harvest	28
September 1	Aquatic Plant Survey	
Total		**200**

End-of-year Aquatic Plant Survey

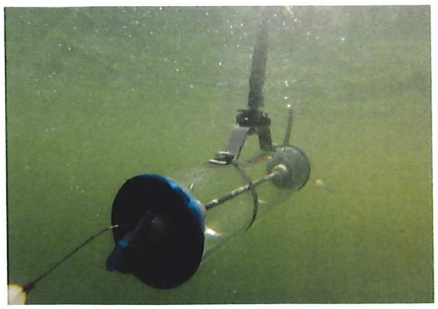
In addition to the surveys of the lake to identify invasive plant locations, a comprehensive vegetation survey of Lake Oakland was conducted on August 9 to evaluate the type and abundance of all plants in the lake. The table below lists each plant species observed during the survey and the relative abundance of each. At the time of the survey, 19 submersed species, two free-floating species, three floating-leaved species, and nine emergent species were found in the lake. Lake Oakland maintains a good diversity of beneficial, native plants species.

LAKE OAKLAND AQUATIC PLANTS
AUGUST 9, 2022

Common Name	Scientific Name	Group	Percent of Sites Where Present
Wild celery	*Vallisneria americana*	Submersed	64
Chara	*Chara* sp.	Submersed	62
Illinois pondweed	*Potamogeton illinoensis*	Submersed	54
Starry stonewort*	*Nitellopsis obtusa*	Submersed	39
Large-leaf pondweed	*Potamogeton amplifolius*	Submersed	31
Thin-leaf pondweed	*Potamogeton* sp.	Submersed	29
Eurasian milfoil*	*Myriophyllum spicatum*	Submersed	23
Bladderwort	*Utricularia vulgaris*	Submersed	20
Whitestem pondweed	*Potamogeton praelongus*	Submersed	20
Richardson's pondweed	*Potamogeton richardsonii*	Submersed	17
Slender naiad	*Najas flexilis*	Submersed	16
Flat-stem pondweed	*Potamogeton zosteriformis*	Submersed	8
Variable pondweed	*Potamogeton gramineus*	Submersed	8
Brittle-leaf naiad*	*Najas minor*	Submersed	4
Curly-leaf pondweed*	*Potamogeton crispus*	Submersed	3
Water stargrass	*Heteranthera dubia*	Submersed	2
Coontail	*Ceratophyllum demersum*	Submersed	2
American pondweed	*Potamogeton americanus*	Submersed	1
Northern milfoil	*Myriophyllum sibiricum*	Submersed	1
Duckweed	*Lemna minor*	Free-floating	8
Watermeal	*Wolffia punctata*	Free-floating	2
White waterlily	*Nymphaea odorata*	Floating-leaved	53
Yellow waterlily	*Nuphar* sp.	Floating-leaved	22
Floating-leaf pondweed	*Potamogeton natans*	Floating-leaved	1
Purple loosestrife*	*Lythrum salicaria*	Emergent	21
Swamp loosestrife	*Decodon verticillatus*	Emergent	16
Cattail	*Typha* sp.	Emergent	10
Bulrush	*Schoenoplectus* sp.	Emergent	6
Pickerelweed	*Pontederia cordata*	Emergent	1
Iris	*Iris* sp.	Emergent	1
Arrowhead	*Sagittaria latifolia*	Emergent	1
Lake sedge	*Carex lacustris*	Emergent	1
Phragmites*	*Phragmites australis*	Emergent	1

** Invasive exotic species*

Attachment ‘E’



Lake Oakland
2022 Water Quality Report

A publication of the Lake Oakland Improvement Board

Lake Oakland Improvement Board
One Public Works Drive
Building 95 West
Waterford, MI

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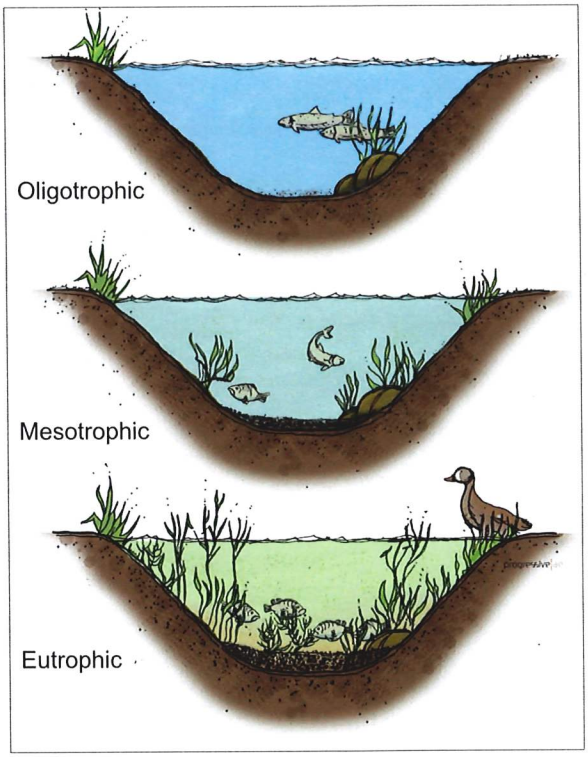
Independence Township Representative

Karen Joliat
Oakland County Commissioner

Water quality monitoring on Lake Oakland has been ongoing since 2018. This report provides background information on lake water quality and a discussion of sampling results.

Lakes can be classified into three broad categories based on their productivity or ability to support plant and animal life. The three basic lake classifications are oligotrophic, mesotrophic, and eutrophic.

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 cold water fish such as trout and whitefish.



Lake trophic states.

Eutrophic lakes have poor clarity, 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 warm water fish such as bass and pike.

Lakes that fall between the two extremes of oligotrophic and eutrophic are called *mesotrophic* lakes.

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 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*.

For more information, visit:
www.michiganlakeinfo.com/trophic-state

Environmental Consultant
Progressive AE

Trophic State Indicators

Key parameters used to evaluate a lake's productivity or trophic state include total phosphorus, chlorophyll-*a*, and Secchi transparency.

Phosphorus is the nutrient that most often stimulates excessive growth of aquatic plants and causes premature lake aging. By measuring phosphorus levels, it is possible to gauge the overall health of a lake.

Chlorophyll-a is a pigment that imparts the green color to plants and algae. A rough estimate of the quantity of algae present in the water column can be made by measuring the amount of chlorophyll-*a* in the water column.

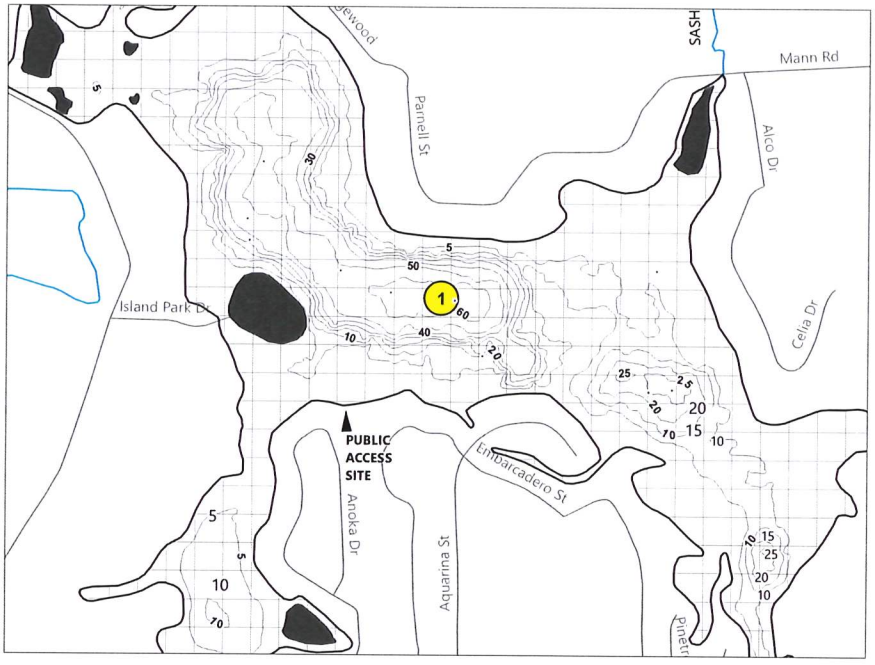
A *Secchi disk* is a round, black and white, 8-inch disk that is used to estimate water clarity. Generally, it has been found that plants can grow to a depth of about twice the Secchi disk transparency.

Generally, as phosphorus inputs to a lake increase, algae growth and chlorophyll-*a* increase and Secchi transparency decreases.

Composite sampler used to collect chlorophyll-*a* samples.

TROPHIC 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



In 2022, samples were collected during April and August at ten-foot intervals over the deepest basin on the lake.

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

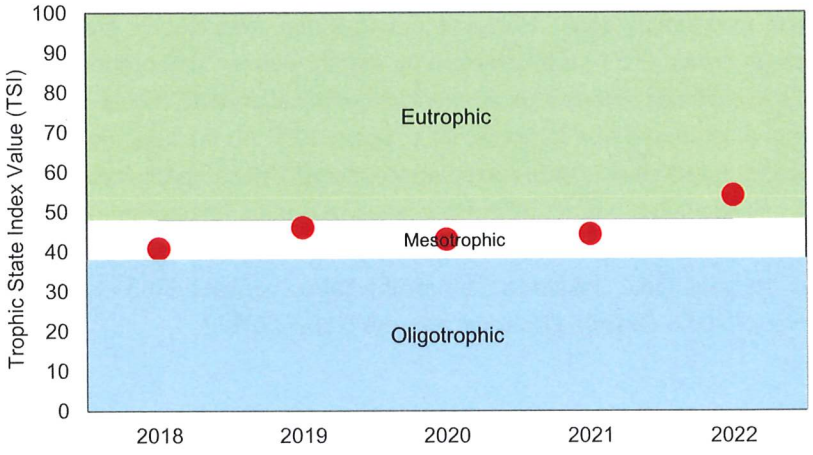
Lake Oakland Trophic State

Carlson's Trophic State Index (TSI) was developed from mathematical relationships that allowed phosphorus, chlorophyll-*a*, and Secchi transparency readings to be converted to a numerical scale from 0 to 100, with increasing numbers indicating more productive lakes. The TSI can be used to rate the trophic state of Michigan lakes as follows:

TSI INDEX FOR MICHIGAN

Trophic State	TSI Value
Oligotrophic	Less than 38
Mesotrophic	38 to 48
Eutrophic	Greater than 48

The average TSI values for Lake Oakland based on spring phosphorus and summer chlorophyll-*a* and Secchi transparency data collected between 2018 and 2022 are shown below.



Lake Oakland average Trophic State Index (TSI) values.

Based upon TSI values calculated during this timeframe, Lake Oakland is mesotrophic. In 2022, spring phosphorus was within the eutrophic range, however, the lake has low summer chlorophyll-*a* and good Secchi transparency.

Temperature and Dissolved Oxygen

Temperature and dissolved oxygen strongly influence lake water quality and are very important to a lake's fishery.

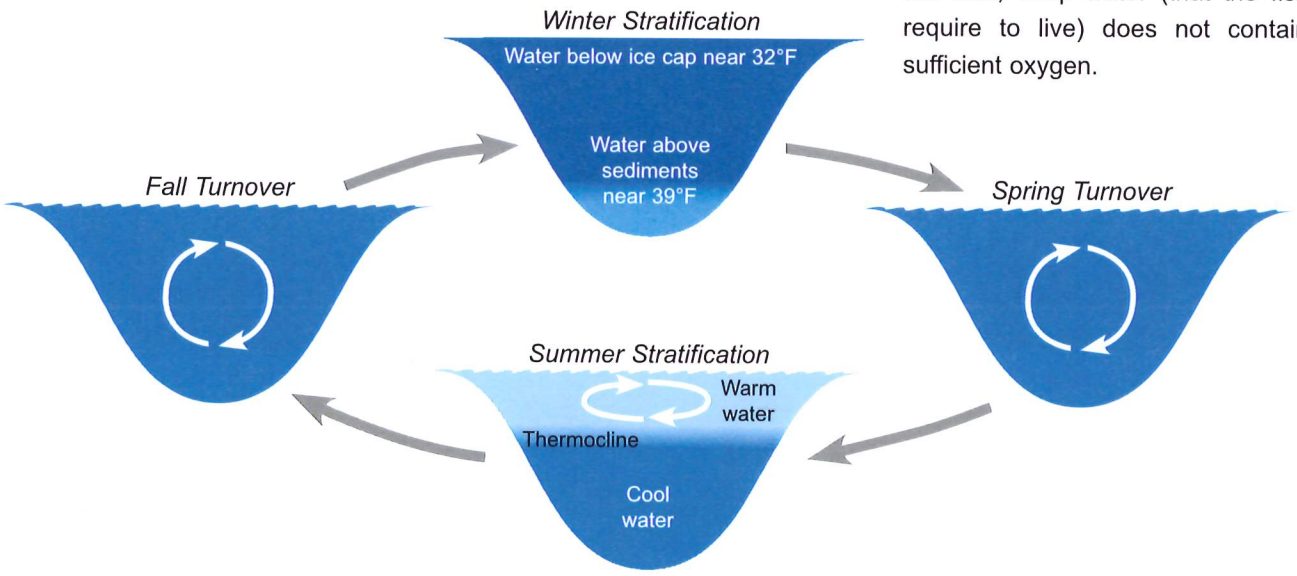
For more information, visit:
michiganlakeinfo.com/turnover-and-stratification

Temperature

Temperature is important in determining the type of organisms that 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 layer of water. This process is called thermal stratification. In deeper lakes during summer there are three distinct layers. This is referred to as *summer stratification*. 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. These stratification cycles occur in deep lakes but not in shallow lakes or ponds. Lakes that are about 15 to 30 feet deep may stratify and destratify with storm events several times during the year. Lake Oakland's thermocline set up between 20-30 feet in the summer of 2022. Oxygen depletion occured below 20 feet.

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 warm-water 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 deep water is cut off from plant photosynthesis and the atmosphere, and oxygen is consumed 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 cold-water fish because the cool, deep water (that the fish require to live) does not contain sufficient oxygen.



Seasonal thermal stratification. Stratification cycles occur in deep lakes but not in shallow lakes or ponds.

Attachment ‘F’

Lake Oakland, Oakland County
Harvesting Bid Tabulation
Bid Date: October 21, 2022

progressive ae

Bidder	Acres Native Plant Harvesting	Bid Price	Subtotal	Acres Starry Stonewort Harvesting	Bid Price	Subtotal	Total
PLM Lake & Land Management	25	$600.00	$15,000.00	20	$675.00	$13,500.00	$28,500.00
Oakland Harvesters	25	$600.00	$15,000.00	20	$700.00	$14,000.00	$29,000.00

Attachment ‘G’

2022 LAKE OAKLAND LAKE IMPROVEMENT BOARD REPORT

Treatment of Invasive and Nuisance Weeds

May 4 Survey – May 12 Treatment
June 1 Survey – June 8 Treatment
June 13 Survey – June 16 Treatment
June 30 Survey – July 7 & July 11 Treatments
August 9 Survey – August 16 Treatment

The late spring of 2022 promoted robust aquatic plant growth in Lake Oakland that required 3 treatments through the middle of June. Additional treatments in July and August followed. Immediately ahead of all treatment dates, Aqua-Weed Control posted markers on the lakefront areas that were to be directly treated. It is important to mention that these postings do not specifically identify what chemicals were added at each site. In order to determine which chemicals were added near to your shoreline, lake riparians can refer to treatment maps posted on the "News" page of the lake board website (www.lakeoaklandboard.org). Alternatively, lake riparians can sign-up for emails to receive communications with attached treatment/harvesting maps that will alert them to upcoming treatments, harvests, and board meetings (form can be found on the front page of the website; **60 riparians are now enrolled**). It is also important to recall that many Lakeshore Drive lakefront properties are located within 1000 feet of the Lake Oakland dams and are not allowed to be directly treated according to Michigan DNR policy, although these lakefront properties do receive some downstream effect from treated areas.

That being stated, the most problematic invasive weed in Lake Oakland continues to be milfoil, both Eurasian and a native/Eurasian hybrid species. Other treatments largely focused on algae blooms throughout the summer. A detailed Lake Oakland Plant Control Summary for 2021, prepared by ProgressiveAE is also posted on the website: https://www.lakeoaklandboard.org/_files/ugd/bbfa81_d85dc33ff56f4fcbb35a230e9932477c.pdf

Harvest of invasive and Nuisance Weeds

June 28 - July 8
August 25 - 31

Beginning in 2019, the lake board decided to delay the initial harvest until after the July 4th holiday. The historic reason for an earlier harvest had been to ensure that the lake is in good shape for the festivities surrounding that holiday. However, late season growth of nuisance weeds has become a problem, so the lake board has worked to reserve funds for a second late-season harvest that was initiated in 2020. Outcomes of these combined changes have resulted in much greater quantities of weeds harvested during the past three years refer to previous year's reports to see the data). Since the lake board pays for harvesting by the acre, it is now evident that we are receiving quite a bit more bang for the buck by harvesting later in the season. It is also important to point out that those who reside close to the Lake Oakland dams are included in both harvests.

However, the warm, late summer of 2022 produced a robust crop of celery grass and pond weed and the second harvest did not capture the vast quantity of these nuisance weeds, with many riparians seeing larger than normal quantities of floating plant material accumulate along their shorelines during the month of September, which was largely created by boat traffic after the second harvest. Consequently, we are going to schedule the second harvest after Labor Day in 2023 in order to better capture these late-season nuisance weeds. Finally, a severe windstorm on August 31 that knocked power out to nearly 400,000 residents in southeast Michigan, also capsized one of the harvesters near the Dill Road launch site. Fortunately, nobody was injured, but the submerged harvester spilled oil into Lake Oakland and many riparians subsequently observed slicks on their shorelines. While this oil was plant-based and biodegradable, it still caused concern.

POLICE PRESENCE ON LAKE OAKLAND

Thanks to the Oakland County Board of Commissioners, we had Oakland County Sheriffs on Lake Oakland throughout the July 4 holiday weekend. After consulting the Sheriff's office, the Commissioners identified the 5 busiest Oakland County lakes that did not fund police presence and Lake Oakland was included for a one-time stipend to pay for police presence.

PURPLE LOOSESTRIFE UPDATE

The lake board was unable to continue with additional seeding of beetles in 2022 that feast on this invasive weed due to a scheduling conflict that prevented receipt of shipment. We intend to continue with this biological approach aimed at keeping Purple Loosestrife in check (see previous Lake Oakland Lake Improvement Board Reports for more information). Once established, these beetles will spread out over other parts of the lake to areas that are beginning to experience purple loosestrife infestation. In the meantime, lake riparians are asked to be on the lookout for blooms in their properties and to remove them before they get too large to do so manually. **I would be glad to help you remove these invasive weeds!**

Lake Oakland Water Quality Monitoring

The lake board is contracted with ProgressiveAE to conduct annual testing of lake water quality (clarity, chlorophyll, phosphorous, oxygen, pH) and a data base is being developed for our lake. A final report on 2021 Lake Oakland water quality is available for review on the website: https://www.lakeoaklandboard.org/_files/ugd/bbfa81_d85dc33ff56f4fcbb35a230e9932477c.pdf

Lake Oakland Fish Survey

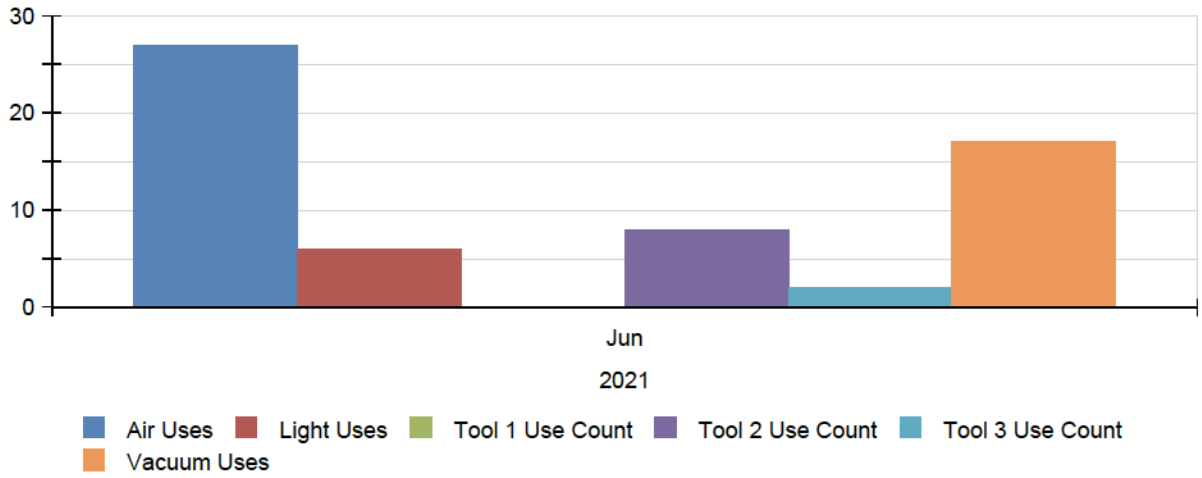
The Michigan DNR conducted a fish survey on Lake Oakland from May 10-13, 2021. The last survey was conducted in 2001 and an update was needed to help inform the lake board about past fish stocking and the need for future fish stocking. A final report should be available for Lake Oakland in about one year, but I am providing a pdf file of the preliminary data along with this report that was compiled from the combined survey of Lake Oakland and Woodhull Lake, which indicates a good biodiversity of predator and prey species. Interested riparians can

compare these data to those in the 2005 Michigan DNR Status of the Fishery Resource report that is also posted on the Lake Board website:
https://www.michigan.gov/-/media/Project/Websites/dnr/Documents/Fisheries/Status/folder1/2005-1.pdf?rev=cb6f6bf7a9ba47d6bf498027b9d491e6

Aquatic Invasive Species (AIS) Mobile Unit at Lake Oakland

In 2021, the Oakland County Board of Commissioners purchased two AIS mobile units and have made them available for stationing at Oakland County lakes at no cost. This is a WATERLESS, solar powered resource for users of the Dill Road launch site to wash and remove invasive species from their watercraft. No hookups or other amenities are required, just space adjacent to the driving route of boats/trailers (not within the flow of traffic). Three hand tools allow for manual removal of non-native plants and animals, and solar panels power a vacuum and air blower that prevent accidental transport of organisms in water left on boats. The Lake Board requested to have one of these units placed at the Dill Road access site and our request was granted. One of these units was on-site from Thursday June 17-Thursday July 1, 2021 and received the following usage:

Location	Month Name	Air Uses	Light Uses	Tool 1 Use Count	Tool 2 Use Count	Tool 3 Use Count	Vacuum Uses
Oakland County Trailer 2	Jun	27	6	0	8	2	17



The Lake Board also requested a unit to be placed again this year and our request was again granted for Thursday June 16-Thursday June 30, 2022. A usage report will be forthcoming.

Storm Drain Cleanout & Labeling

George Nichols (Water Commissioner's Office representative on the lake board) submitted a request to the Road Commission for Oakland County (RCOC) for catch basin cleaning in that subdivision in 2021 and continues to monitor his requests, but to date this has not yet been

done. These are catch basins that drain directly into Lake Oakland and photo maps of these drains in the Lake Oakland Estates and the neighboring Lake Oakland Heights subdivision have been created and submitted long with Mr. Nichols' requests. Mr. Nichols will be providing an update to the Board during our October meeting.

Relatedly, the lake board has purchased a 12" x 30" stencil for use in labeling catch basin drains in response to a request from a lake riparian.

This stencil is available to all Lake Oakland riparians and the lake board recommends that white paint be used to label these drains and to first contact the homeowners where these drains are located in order to inform them of the labeling and to gain their acknowledgment of the work.

Respectfully submitted,

Rick Sabina
Chair, Lake Oakland Lake Improvement Board

Species	Total caught	Min length (in)	Max length (in)	Average length (in)
Bluegill	1648	1	8	4.6
Pumpkinseed	231	1	8	6.0
Rock bass	97	1	10	5.9
Largemouth bass	67	4	18	13.3
Brown bullhead	44	8	13	11.1
Yellow perch	40	2	10	5.5
Hybrid sunfish	36	3	8	6.8
Black crappie	23	5	13	9.2
Redear sunfish	16	2	9	6.7
Bluntnose minnow	12	1	3	2.3
Bowfin	12	18	26	23.4
Yellow bullhead	11	7	12	9.8
Smallmouth bass	8	3	19	11.4
Northern pike	7	20	31	26.4
Blacknose shiner	6	1	2	2.3
Iowa darter	6	1	2	2.2
Common carp	5	17	30	24.8
Logperch	5	3	4	3.8
Blackchin shiner	2	1	2	2.0
Brook silverside	2	3	3	3.5
Warmouth	2	5	6	6.0
Golden shiner	1	8	8	8.5
Longnose gar	1	22	22	22.5
Fathead minnow	1	3	3	3.5
Longear sunfish	1	3	3	3.5
Spotfin shiner	1	3	3	3.5
Grand Total	2285			