Cooperative Lakes Monitoring Program

Michigan Lakes - Ours to Protect

2024 Cooperative Lakes Monitoring Program Annual Summary Report

Managed By:
Michigan Department of Environment, Great Lakes, and Energy
Michigan State University Extension
Michigan Lakes and Streams Association, Inc.
Huron River Watershed Council

Michigan Clean Water Corps

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I. Introduction

The Michigan Department of Environment, Great Lakes, and Energy (EGLE), Michigan State University Extension, Michigan Lakes and Streams Association, and the Huron River Watershed Council partner to implement the MiCorps Cooperative Lakes Monitoring Program (CLMP).

This report summarizes the 2024 CLMP field season.

The goals of the CLMP are to:

- Provide baseline information and document trends in water quality for individual lakes.
- Educate lake residents, users, and interested residents in the collection of water quality data, lake ecology, and lake management practices.
- Build a constituency of community members to practice sound lake management at the local level and to build public support for lake quality protection.
- Provide a cost-effective process for EGLE to increase baseline data for lakes state-wide.

To learn more about the CLMP program, there are many other resources available:

1. The Michigan Clean Water Corps website includes a variety of resources such as our online database which contains all CLMP data. https://data.micorps.net/view/lake/

2. The CLMP Manual contains an overview of the program and the volunteer monitoring procedures: https://micorps.net/wp-content/uploads/2021/03/CLMP-Manual-2019update2_2021.pdf

3. Starting in 2014, each lake enrolled in the CLMP receives an individual report summarizing their data. https://micorps.net/lake-monitoring/individual-lake-reports/

4. The CLMP Quality Assurance Project Plan (QAPP) is a detailed report on how the CLMP collects and maintains high quality scientific data: https://micorps.net/wp-content/uploads/2018/06/QAPP_CLMP_2018.pdf

II. Map of 2024 CLMP Participating Lakes

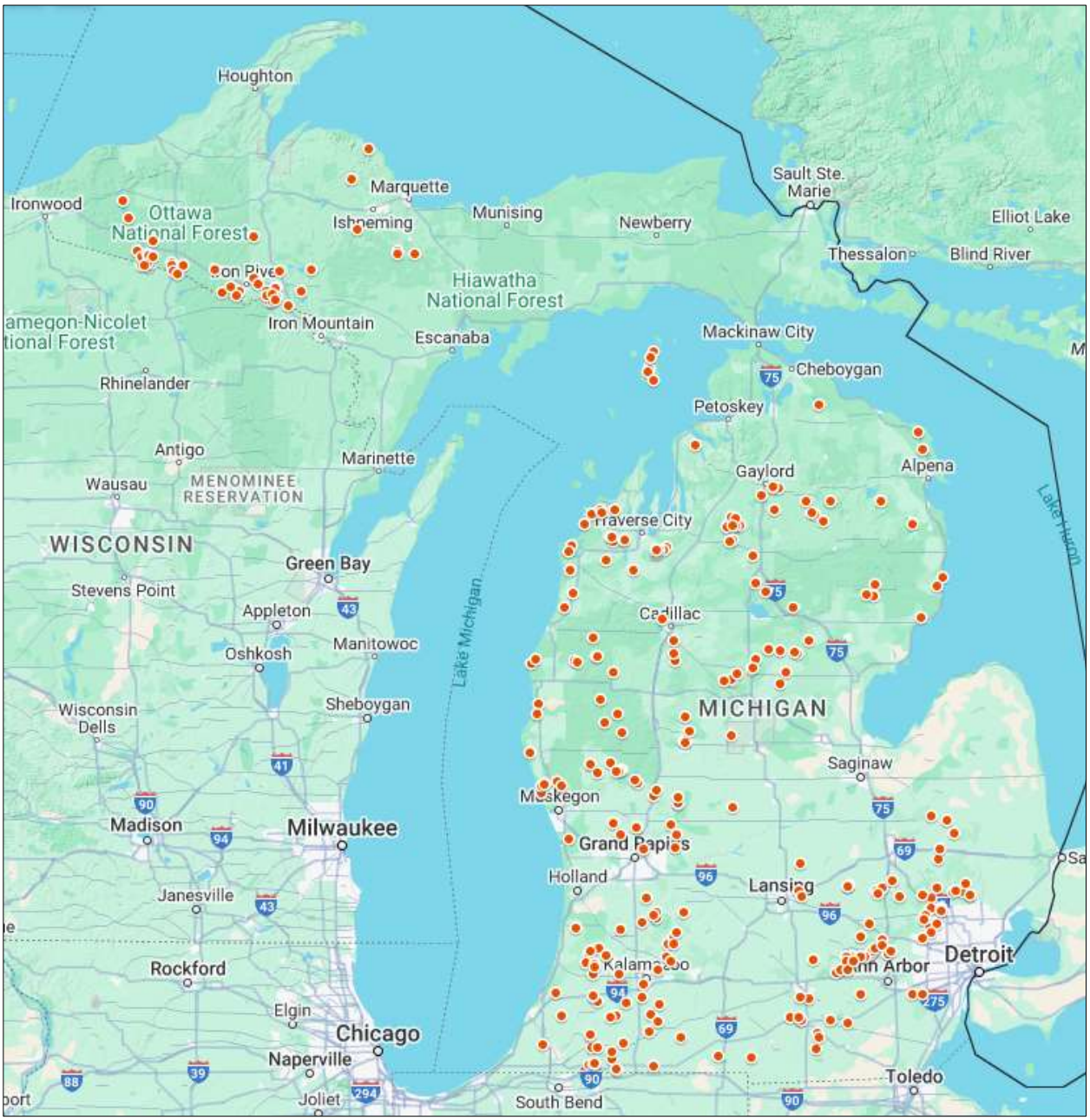

Figure 1. 2024 statewide distribution of participating lakes in the CLMP.

III. A Note About Trophic Status and Carlson's TSI

Trophic Status Index (TSI) is a lake classification system that rates water bodies on the amount of biological production they sustain. The CLMP uses the TSI scheme developed in 1977 by limnologist Dr. Robert Carlson, who created a numerical scale (0-100) where the numbers indicate the level of nutrient enrichment. Using the proper equations, the CLMP convert results from Summer Total Phosphorus, Secchi Depth, and Chlorophyll-a to this TSI scale.

There are 3 primary categories of Trophic Status:

Oligotrophic: Generally deep and clear lakes with little aquatic plant or algae growth. These lakes maintain sufficient dissolved oxygen in the cool, deep-bottom waters during late summer to support cold water fish, such as trout, whitefish, and cisco. Carlson TSI score: Equal to or less than 38.

Mesotrophic: Lakes that fall between oligotrophic and eutrophic have mid-ranged amounts of nutrients, algae, and plant life. Carlson TSI Score: Greater than 38 and less than or equal to 48.

Eutrophic: Highly productive eutrophic lakes are generally shallow, turbid, and support abundant algae and/or 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. Carlson TSI Score: Greater than 48.

Hypereutrophic: A specialized category of eutrophic lakes. These lakes exhibit extremely high productivity, such as nuisance algae and weed growth. Carlson TSI Score: Greater than 61.

IV. Summary Statistics of Monitored Parameters

A. 2024 General Statistics

Number of lakes enrolled in at least one parameter	319
Number of lakes meeting participation criteria for at least one parameter	299 (94%)
Number of lakes with full participation in all three parameters measuring trophic status (Secchi Disk, Summer Total Phosphorus, Chlorophyll-a):	115 (36%)
Average TSI of those lakes with full trophic participation	41.4 (Mesotrophic rating)

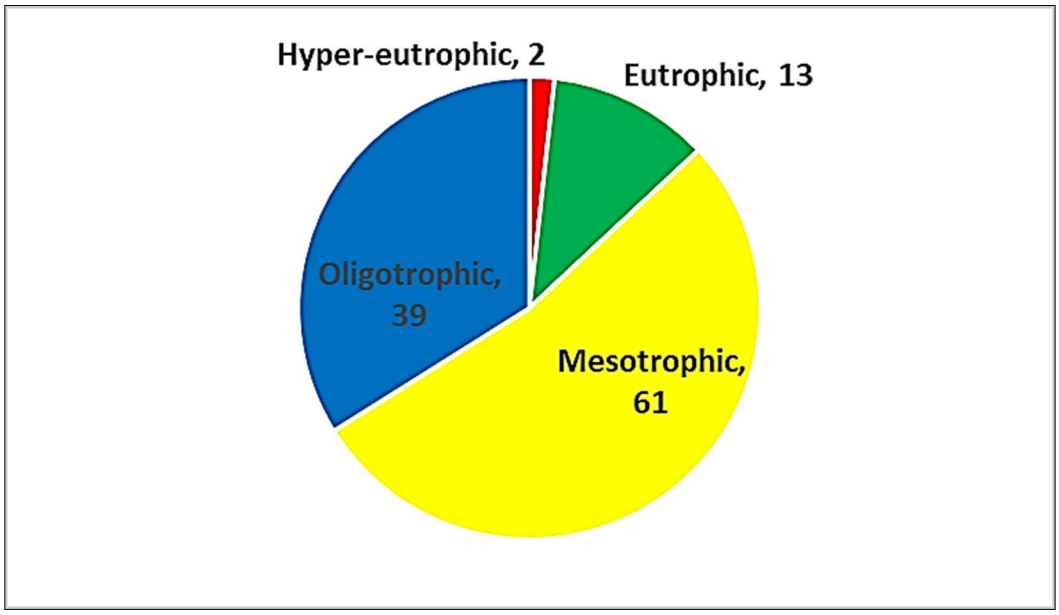

Figure 2. Trophic Status breakdown of 2024 CLMP lakes meeting full participation in all three parameters measuring trophic status. Measurements based on averaging the Trophic Status Index for Secchi Disk Transparency, Summer Total Phosphorus, and Chlorophyll-a.

B. Secchi Disk Transparency

CLMP volunteers measure water transparency using a Secchi disk from late spring to the end of the summer. Ideally, 18 weekly measurements are made from mid-May through mid-September. Full participation involves submitting at least 8 measurements.

2024 Secchi Disk Transparency Summary

Number of sites enrolled	315
Number of sites meeting participation criteria	242 (77%)
Total number of measurements reported	3426
Lake with lowest average transparency (in feet)	1.4 (Fox Lake, Muskegon)
Lake with highest average transparency (in feet)	34.8 (Bear Lake, Kalkaska)
Mean (average) measurement of all lakes (in feet)	11.6
Mean (average) TSI	43.0 (Mesotrophic)

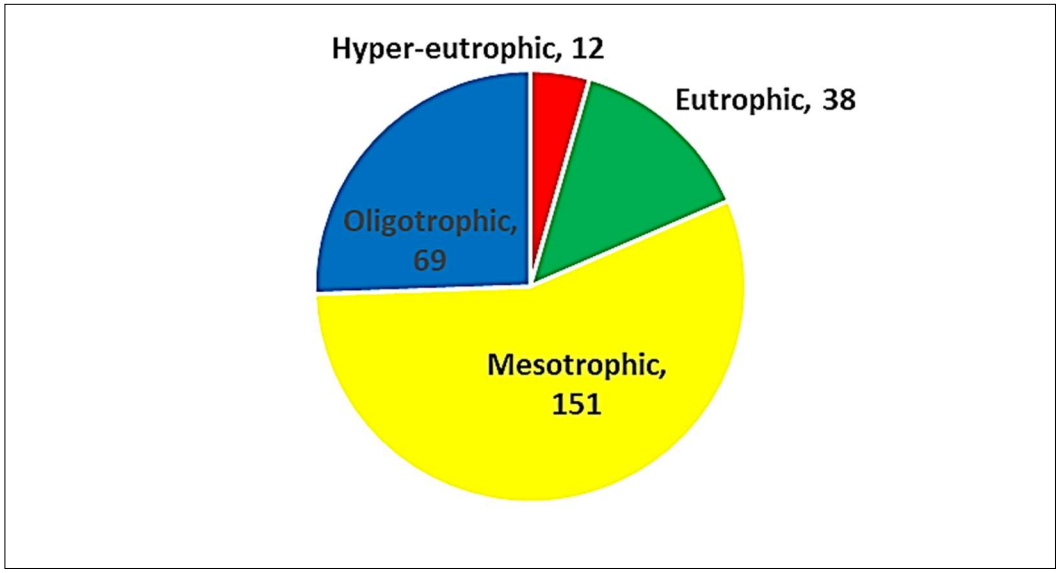

Figure 3. Trophic Status breakdown of 2024 CLMP lakes, based on Secchi Disk Transparency.

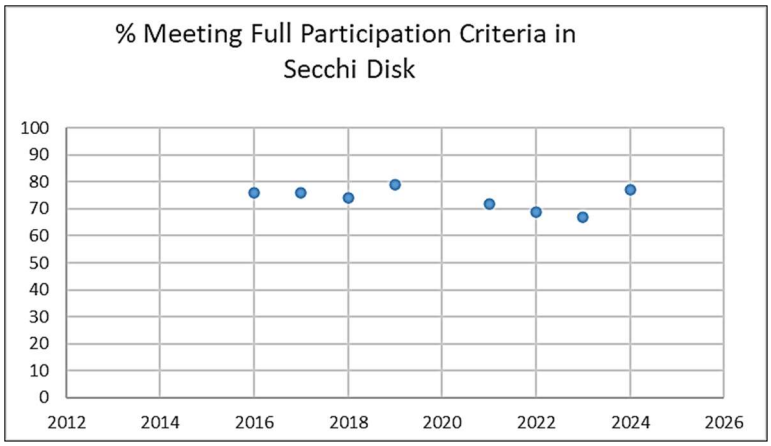

Figure 4. Percent of enrolled lakes over time meeting full participation in Secchi Disk Transparency (>= 8 evenly distributed measurements during the summer).

C. Total Phosphorus

CLMP volunteers collect water samples for total phosphorus during spring overturn, when the lake is generally well mixed from top to bottom, and during late summer, when the lake is at maximum temperature stratification from the surface to the bottom.

2024 Spring Phosphorus Summary

Number of sites enrolled	212
Number of sites submitting valid samples	198 (93%)
Minimum reported value	< 5 µg/L (41 lakes had < 5, which is the method detection limit)
Maximum reported value	190 µg/L (East Basin Twin Lakes, Oakland Co)
Mean (average) value	15 µg/L

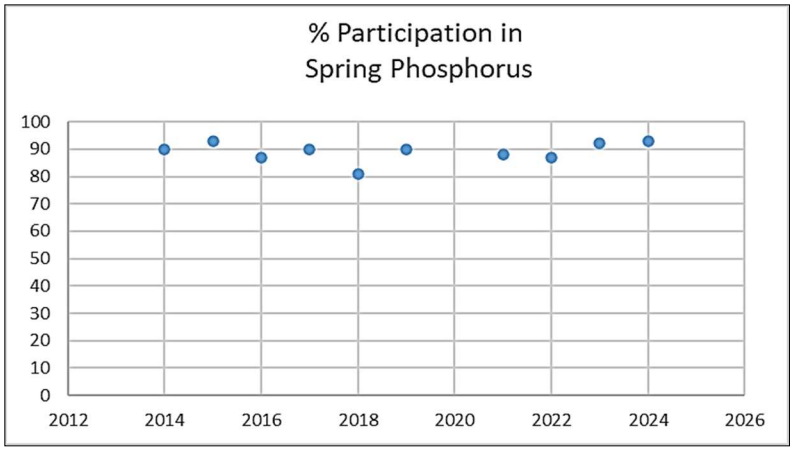

Figure 5. Percent of enrolled lakes over time meeting full participation in Spring Phosphorus (1 grab sample from surface of the lake).

2024 Summer Total Phosphorus Summary	
Number of sites enrolled	296
Number of sites submitting valid samples	257 (87%)
Minimum reported value	< 5 µg/L (28 lakes had < 5, which is the method detection limit)
Maximum reported value	140 µg/L (Cranberry Lake, Ottawa Co)
Mean (average value)	14.2 µg/L
Mean (average) TSI	40.0 (Mesotrophic)

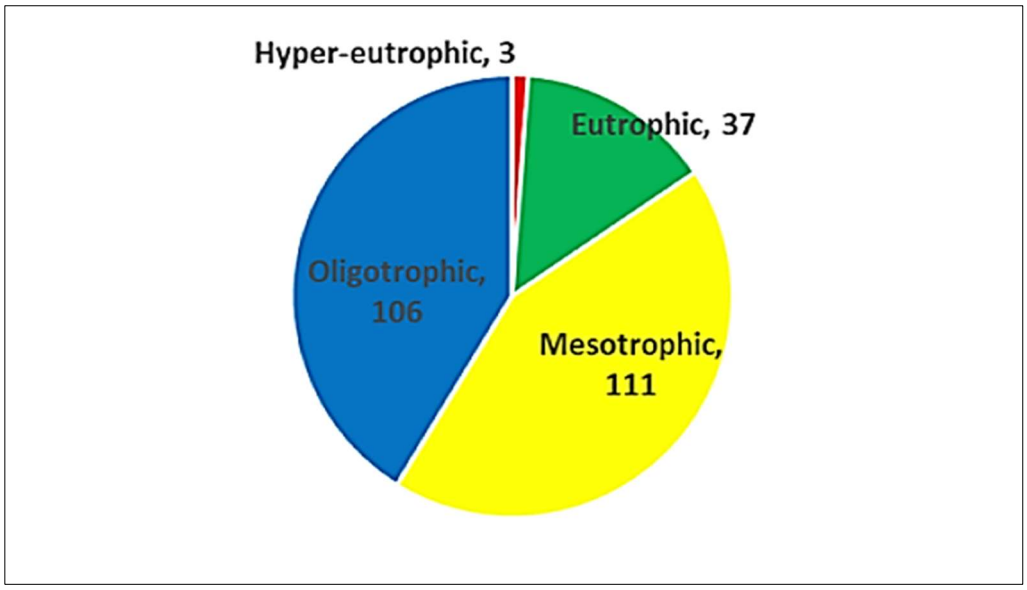

Figure 6. Trophic Status breakdown of 2024 CLMP lakes, based on Summer Phosphorus.

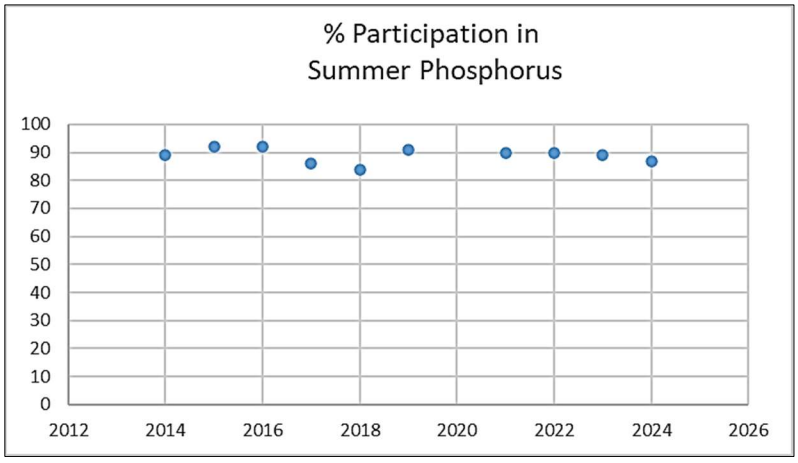

Figure 7. Percent of enrolled lakes over time meeting full participation in Summer Phosphorus (1 grab sample from surface of the lake)

D. Chlorophyll-a

Volunteers collect water samples for chlorophyll-a, an estimator of the amount of algae in the water column, once per month from May through September. At least four valid samples must be submitted to be considered full participation in this parameter.

2024 Chlorophyll-a Summary

Number of sites enrolled	162
Number of sites meeting full participation	135 (83%)
Total number of valid samples	694
Minimum median measurement	< 1 µg/L (15 lakes had all samples < 1 which is the method detection limit)
Maximum median measurement	34 µg/L (Lost Lake, Oakland)
Median Lake measurement	4.2 µg/L
Mean (average) TSI	41.2 (Mesotrophic)

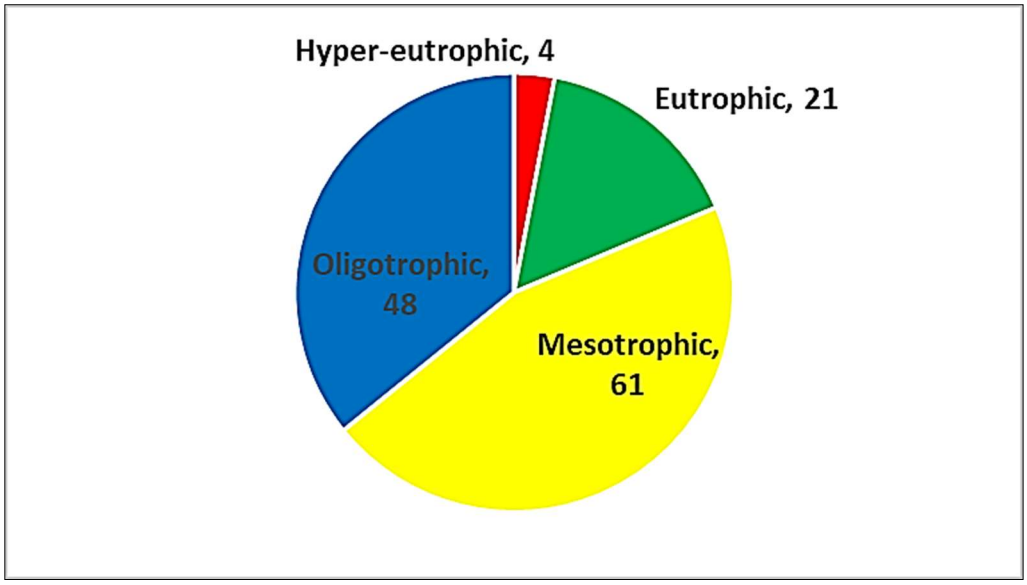

Figure 8. Trophic Status breakdown of 2024 CLMP lakes, based on Chlorophyll-a.

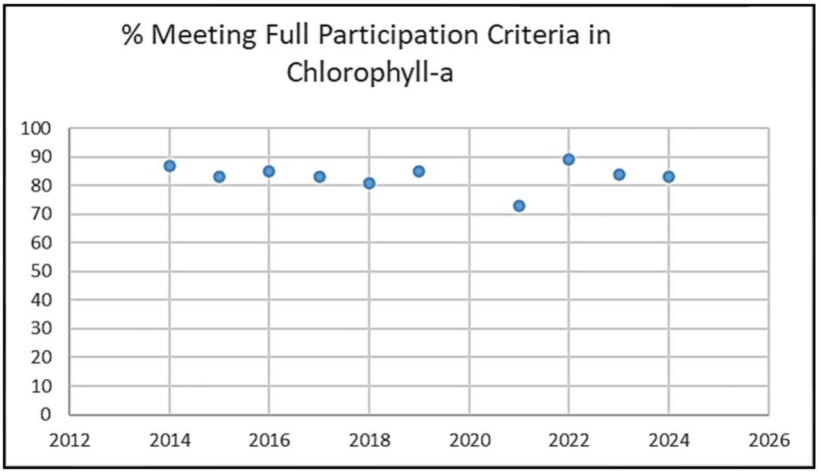

Figure 9. Percent of enrolled lakes over time meeting full participation in Chlorophyll-a (>=4 samples)

E. Dissolved Oxygen and Temperature

CLMP volunteers measure dissolved oxygen and temperature profiles for their lakes, measured from the surface to within 3 feet of the bottom, at the deepest point in the lake. These profile measurements are made with an electronic dissolved oxygen meter (YSI Pro20), ideally every two weeks from mid-May through mid-September.

2024 Dissolved Oxygen and Temperature Monitoring	
Number of sites enrolled	105
Number of sites submitting at least one profile	94 (90%)
Total number of profiles submitted	816
Average number of profiles per lake	8.7

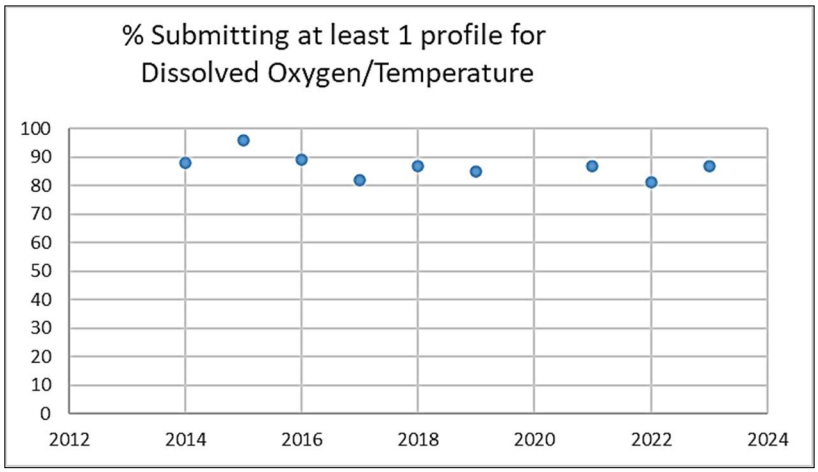

Figure 10. Percent of enrolled lakes over time meeting full participation in Dissolved Oxygen (1 profile).

F. Exotic Aquatic Plant Watch

Volunteers in this monitoring program survey their lakes for invasive aquatic plants of special concern for Michigan lakes: curly-leaf pondweed, Eurasian watermilfoil, Hydrilla, starry stonewort, and European frog-bit.

2024 Exotic Aquatic Plant Watch	
No. of sites enrolled	56
No. of sites submitting report	45 (80%)
No. of lakes reporting Eurasian water milfoil:	18 (40%)
No. of lakes reporting curly-leaf pondweed:	9 (20%)
No. of lakes reporting starry stonewort:	8 (18%)
No. of lakes reporting European frog-bit:	0 (0%)
No. of lakes reporting Hydrilla:	0 (0%)

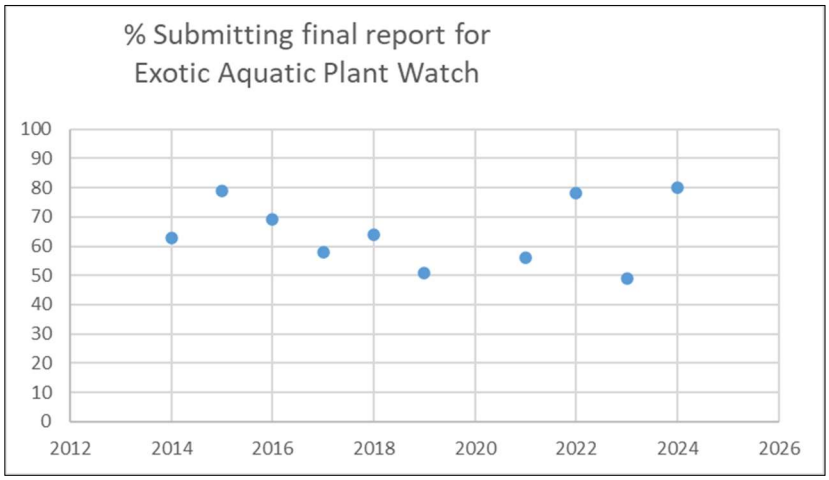

Figure 11. Percent of enrolled lakes over time meeting full participation in Exotic Aquatic Plant Watch (submitted final report)

G. Aquatic Plant Mapping

This program is the most labor-intensive volunteer activity within the CLMP. Typically, a team of volunteers from each enrolled lake is involved, with assistance from a MiCorps biologist. The end result is a plant distribution map and abundance report for all plants growing in the lake, including both native and, if found, invasive species.

2024 Aquatic Plant Mapping

No. of sites enrolled	6
No. of sites submitting report	5 (83%)
Lakes with a 2024 report	• Fishers, St. Joseph Co • Herendeene, Benzie Co • Fuller, Benzie Co • Wall, Barry Co • Lapeer, Lapeer Co

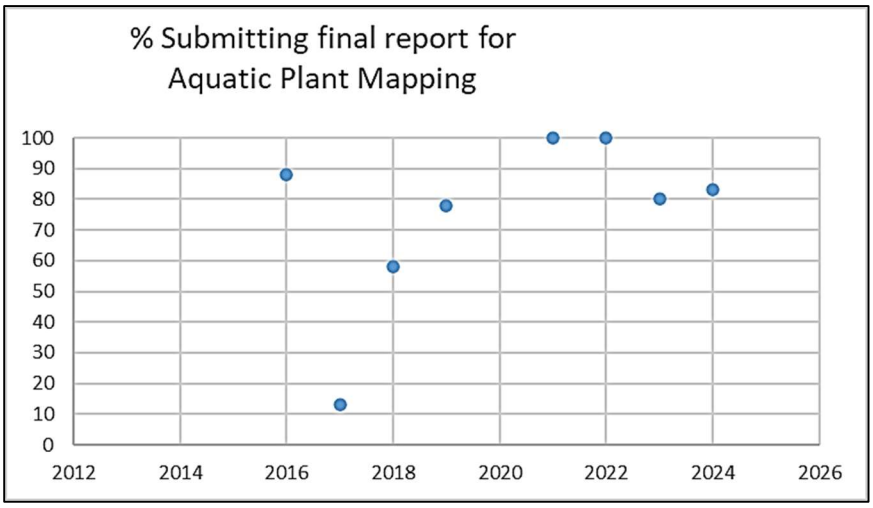

Figure 12. Percent of enrolled lakes over time meeting full participation in Aquatic Plant Mapping (submitted final report).

H. Score the Shore

Volunteers motor around their lake, reviewing 1000-foot sections of shoreline for littoral habitat, riparian habitat, and erosion control. Sections with natural habitat will have higher scores than ones with hardened shorelines. Each lake is scored on a 0-100 scale, with 100 having the highest quality habitat. Scores for each section as well as for the entire lake allow volunteers to review high quality areas as well as sections that would benefit from habitat enhancement.

2024 Score the Shore	
No. of sites enrolled	24
No. of sites submitting report	15 (63%)
Total No. of lake sections scored	255
Avg Score	72 out of 100

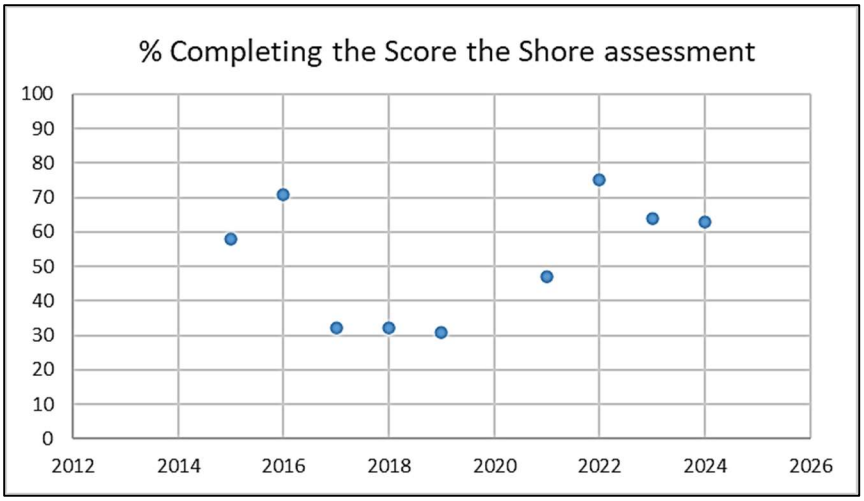

Figure 13. Percent of enrolled lakes over time meeting full participation in Score the Shore (submitted data for every 1000 ft lake section).

V. Thank you, CLMP Volunteers!

Kelly Adams
Lisa Adams
Tuntise Akintunde
Bil Alverson
Erika Anden
Sven Anden
Camilla Anden McGeehin
Michael Anderson
Tom Anderson
Kim Andrews
Hannah Ashmore
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Molly Bacon
Sue Bade
Karen Baker
Terry Bakewell
Karen Balch
Mark Balhorn
Jennifer Ball

Christie Balog
Douglas Bamfield
Jeff Banaszynski
Sherry Barber
Jerrold Baushke
Trevor Beardsley
Jerry Beattie
Patrice Beauvais
Ralph Bednarz
Bruce Beilfuss
Nancy Bellamy
Wayne Bellany
Deb Berkey

Martha Boetcher
John Boon
Mark Bradburn
Mike Bradley
Reagan Breitschuh
Mary Bremigan
Greg Bright
Robert Brown

Shawn Brown
Stephen C Brown
Douglas Buck
Wendy Buckingham
Ron Buczkiewicz
Daniel Burton
Joe Busby
Sarah Cain
Jim Cameron
Joel Campbell
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Adam Carey
Roy Carlson
Amanda Carpenter
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Nancy Carter
Dennis Cerney
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Wendy Charles
Jill Christensen
Matthew Church
Mike Cipriano
Greg Clark

Leslie Clark
Steven Clark
Eric Clemetsen
Chris Clifton
Brian Cline
Doug Collins
James Collins
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Nicole Cordoba
David Cornelius
Loretta Cornfield
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Richard Couch
Jeffrey Cousins
Adam Crandall
Joseph Crisante
Dan Cutler
Paul Dalpra
Kim Darrah
Jeffrey Davis
James DeBoer
Alicia DeCaria
Jack DeLee
Craig Denholm
Melissa DeSimone
Mike Devarenne
Mark Devers
Will Dew
Chelsea Dickerson
Daniel Diombala
Terry Dodds

Monique Domas
Brenda Donaldson
Lisa Donati
Kipp Donlon
Camille Donnelly
Carolyn Dostal
Christie Dostal
Shannon Downer
Richard Dueweke
Tyler Dula
Tom Dyjach
Meg Eaton
Steve Edwards
Buzz Elliott
James Elliott
Nancy Ellis
Susan English
John Etzcorn
Paul Fallon
Miryah Feliu
Michael Finney
Richard Flegel
Shannon Flynn
Brooke Fogt
Bridget Forster
Susan Foster
Courtney Fowler
Chris Freiburger
Alan Freid
Jack Frick
Travess Frisbey
Linda Frost
Martha Gabrielse
Barb Gajewski
Mike Gallagher
Sarah Gamache
Doug Ganger
Rachael Gardner
Rachael Garland
Hyacinth Garrett Engle
Tom Garrity
Larry Gavin
Michael Genther
Sandy Giaier
David Gian
Merrie Gillaspie
Mark Glaza
Michael Golas
Jimena Golcher-Benavides
Laura Grabowski
Carolyn Grace
Tim Green
Gregg Gustafson
Stan Haan
Alexander Haas
Beverly Haas
James Haas
Emily Haite
Connie Hansen
Andy Harrington
Julia Harris
Shelby Harris
Heidi Haskins
Kathryn Haughton
Florence Hawarden
Bill Hayhow
Ron Heady
Steve Healey
James Heaslip
Nanci Hengesbaugh
William Henning
Joel Henry-Fisher
Lori Hesprich
Sarah Heuer
Erie High
Tom Hobson
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Patrick Hooyman
Erin Horton
Autumn Hostetter
Harris Iler
Lynne Isenbarger
Erica Jackson
John Jackson
Genna Jago
Dan Johnson
Emily Johnson
Keith Jones
Kristi Judd
John Jungwirth
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Gregg Kabacinski
Mary Kaczinski
John Kaiser
Randy Kaja
Michelle Kanipes
Steve Karnes
Richard Kasowski
Margaret Kay
Michael Kellar
Patrick Kelly

Craig Kivi
Leonard Klein
Don Klobucar
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Jim Meyer
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Sandra Michalik
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Janet Miller
Tina Miller
James Minich
Mark Mitchell
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Bart Mol
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Lucas Moore
Jesse Morgan
John Morley
Rose Mudrovich
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Kenneth Muzzo
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Michael Needham
Sally Nelsen
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Jodi Nieschulz
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Mary Nuznov
Craig OBrien
Jill OConnor
Robert Ogren
Thomas Ollila
Jim Owens
Richard Paalman
Lisa Palmer
Dan Pampreen
James Panici
Jayne Papini
Nola Parkey
James Pedersen
Bruce Pelletier
Ken Perry

Peggy Pietrowicz
Chris Powers
Jeffrey Premetz
Alan Proulx
Dave Putt
Cheryl Pytlarz
Tina Rand
John Ransom
Arnold Redsicker
Ron Reimink
Diane Reinhardt
Bruce Reniger
Gale Rewa
Stacy Reynolds
Lynnette Rhodes
Kurt Richardson
Mike Roberts
Bryan Roles
Mike Rogers
Burns Rolland
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William Rossi
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Scott Saveraid
Jeff Schimp
Michael Schirott
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Timothy Lee Scott
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Brandy Shooks
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Robert Smart
Linda Smith
Mary Kay Smith
Richard Smith
Shaun Smith
Sherry Snyder
Wayne Snyder
John Solum
Marie Solum
Richard Sotolongo
Cyndy Southern
Joseph Southworth
Braydon Sprik
Justin Stafford
Carol Steinbrecher
Paul Steinbrecher
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Angie Stine
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George Stojic
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Amanda Stone
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Sarah Whitaker
Ellen Whitehead
Marquay Whitfield

Don Whitsitt
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Kim Wurschmidt
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VI. Thank You Sample Collection Center Staff!

These individuals help with the logistics of collecting samples, mailing them to Lansing, and distributing and collecting Dissolved Oxygen meters.

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The following EGLE staff:

Jack Cotrone
Lindsey Eveleth
Janelle Hohm
Sonya Hudson
Tamara Lipsey
Deana Mercs
Lucy Robinson
Teresa Salveta
Brittany Santure
Stevie Simon
Crystal Zielinski

VII. CLMP Contacts

If you have any questions about the CLMP, please contact Erick Elgin with Michigan State University Extension at elgineri@msu.edu, and subscribe to our email list to receive announcements and updates on these monitoring programs.