

# Secchi Disk Water Transparency

Erick Elgin



**Erick Elgin,**  
CLMP Lake Program Manager

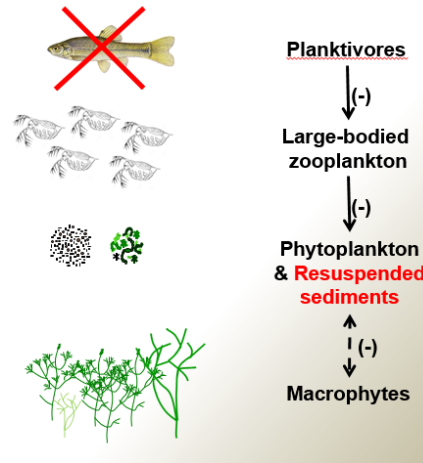
Michigan State University Extension

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218-340-5731

[elgineri@msu.edu](mailto:elgineri@msu.edu)







A photograph of a Secchi disk and a coil of white rope resting on a weathered log. The Secchi disk is oval-shaped, divided vertically into a white left half and a black right half, and is covered in water droplets. A white rope is coiled next to it, with one end attached to the disk's ring. The background shows a body of water with ripples under a blue sky.

# Secchi disk water transparency

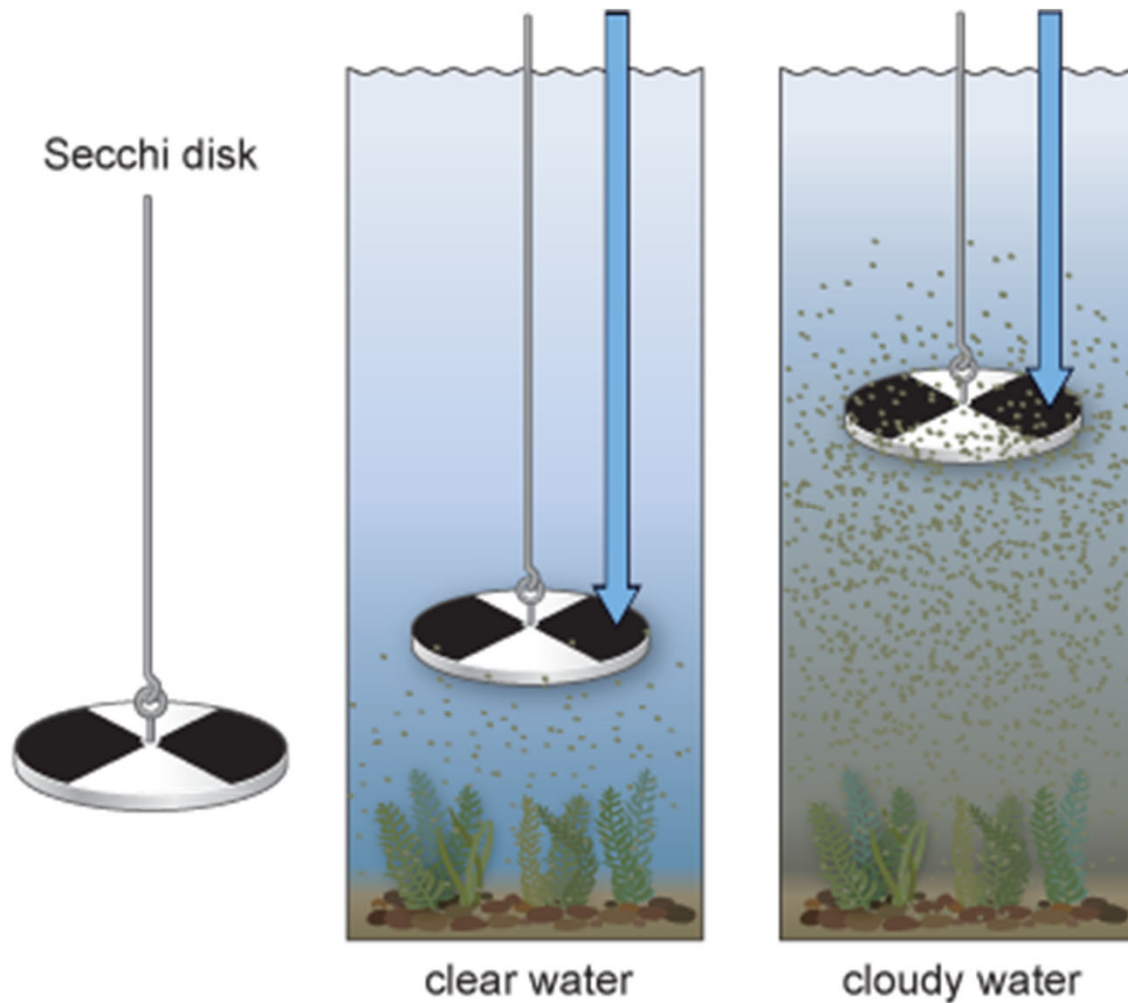






# What is a Secchi Disk?





## How does it work?

### Water clarity is affected by

- Water color
- Algae
- Suspended solids  
(organic, sediment, etc...)

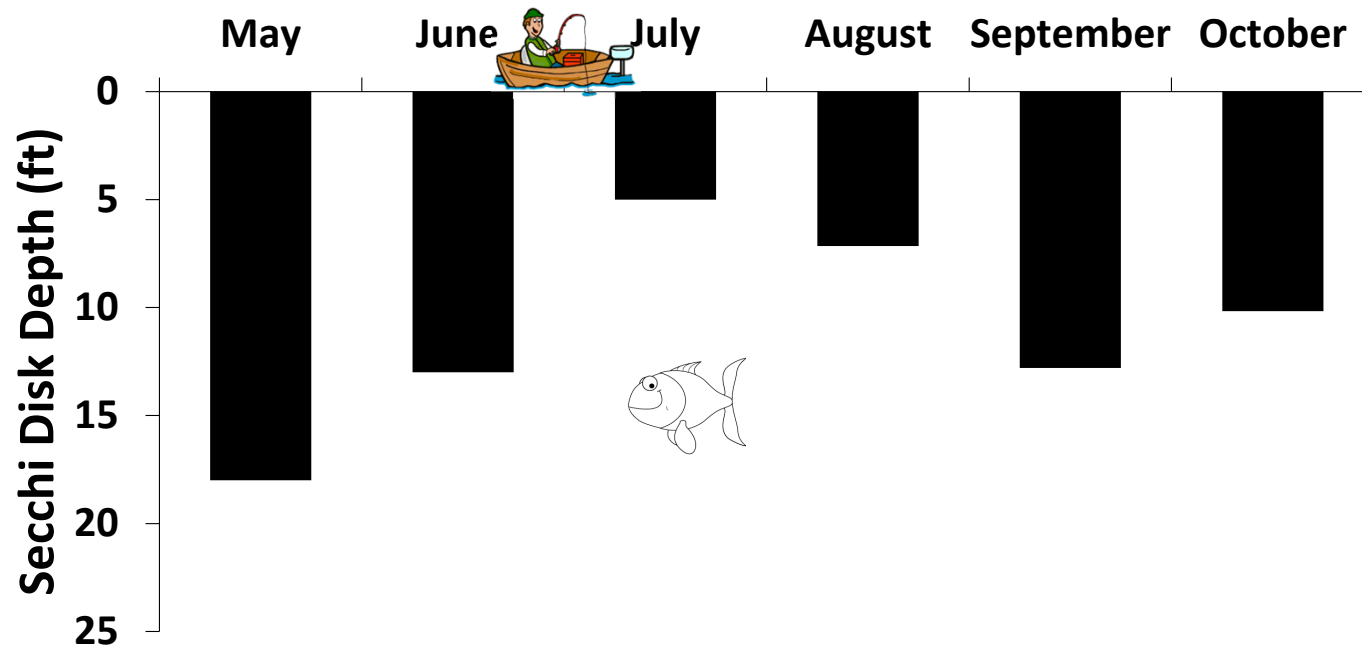
# What does Secchi transparency tell us?

- Indicator of natural processes and human changes
  - Spring clear water phase
  - Eutrophication, Oligotrophication, and Browning

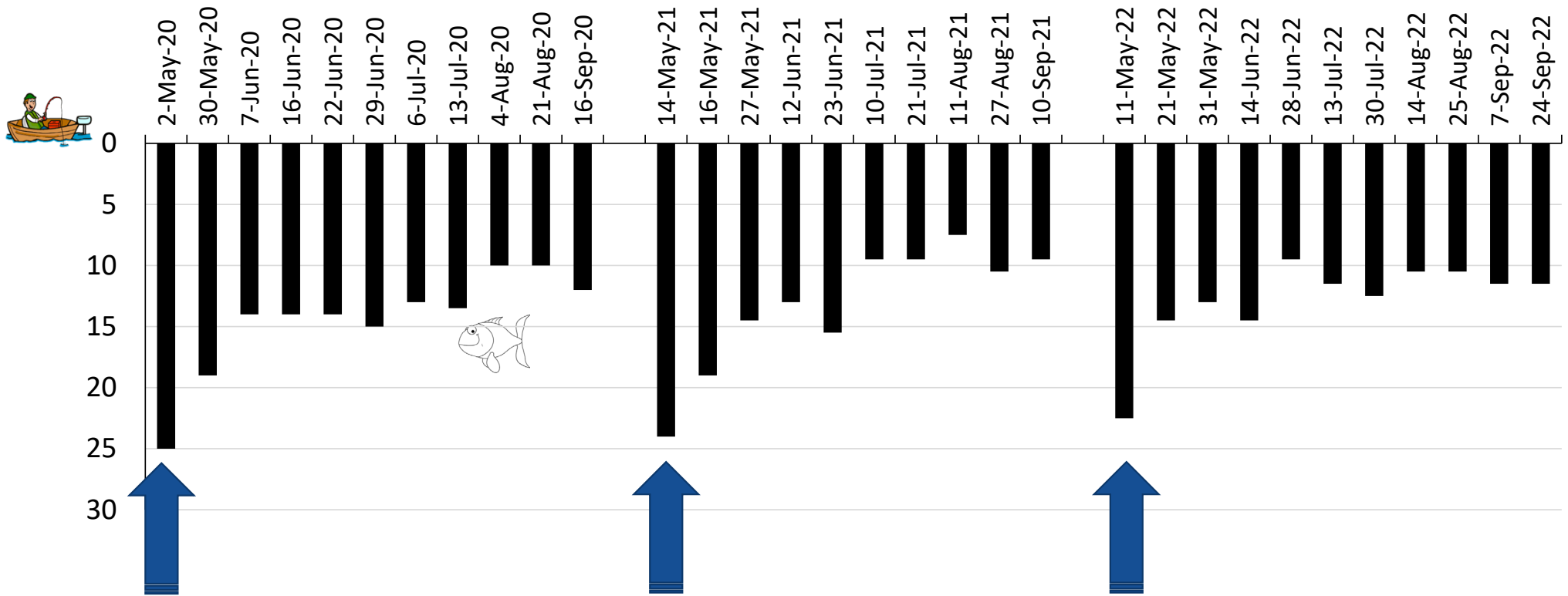




# Monitoring water clarity through a season

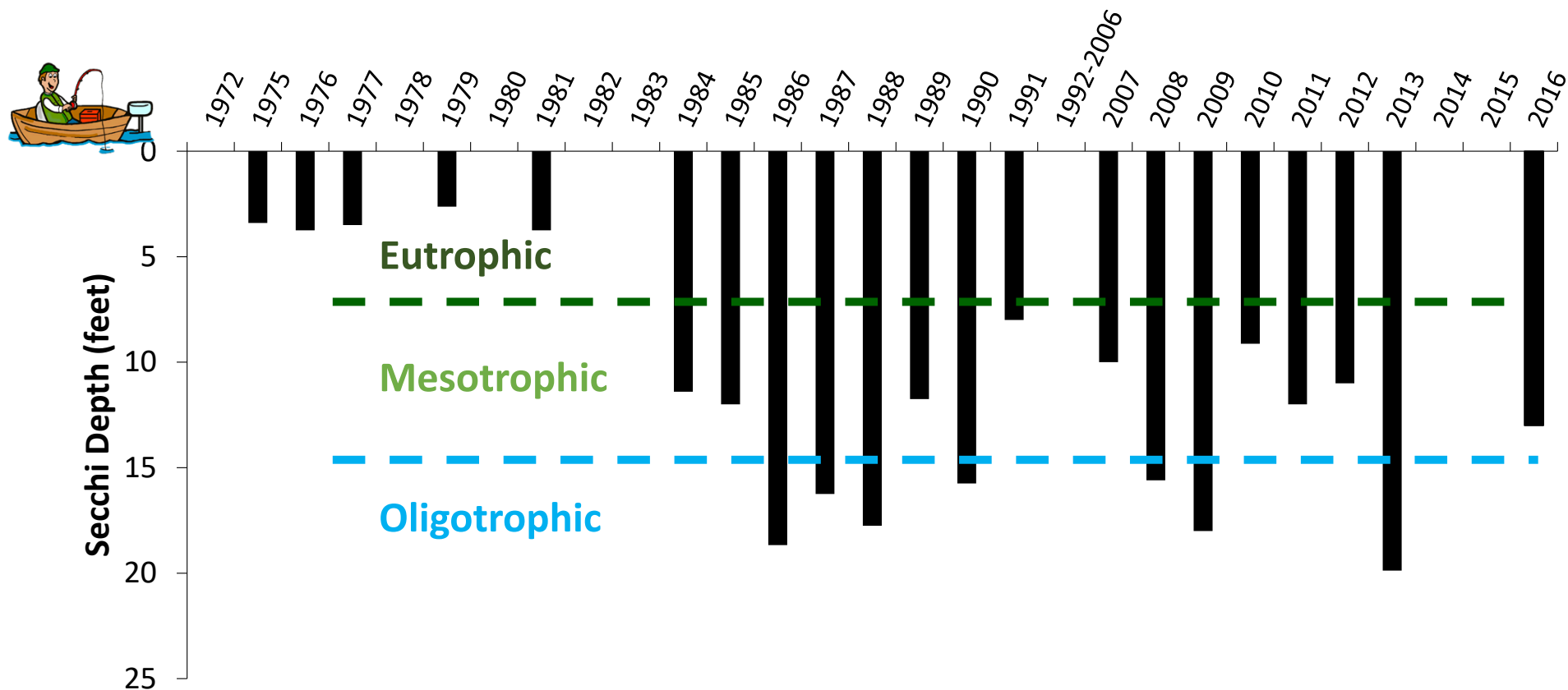


# Monitoring water clarity through the seasons

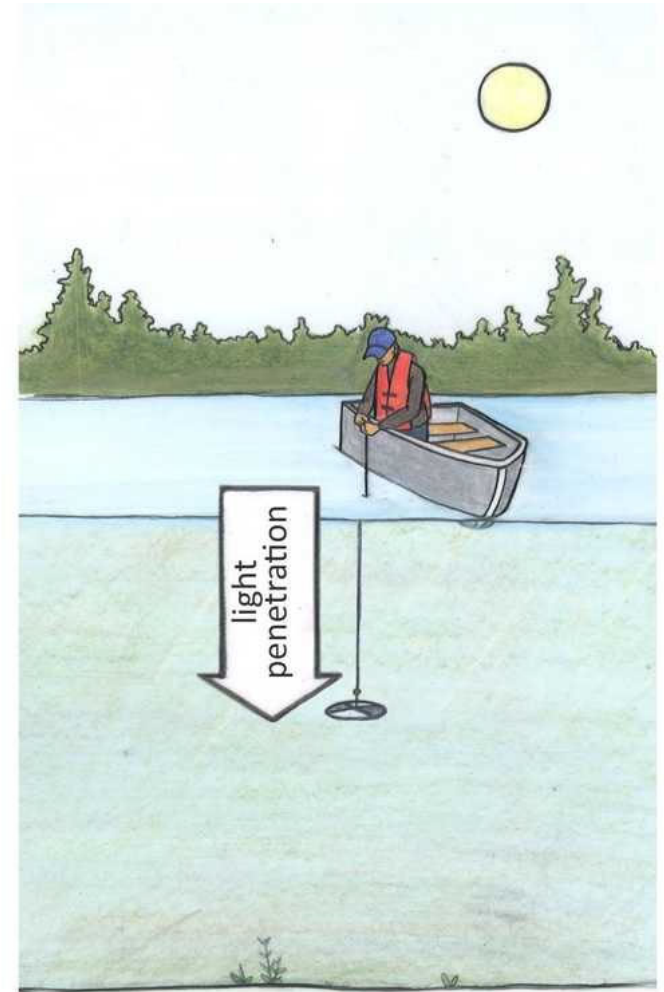
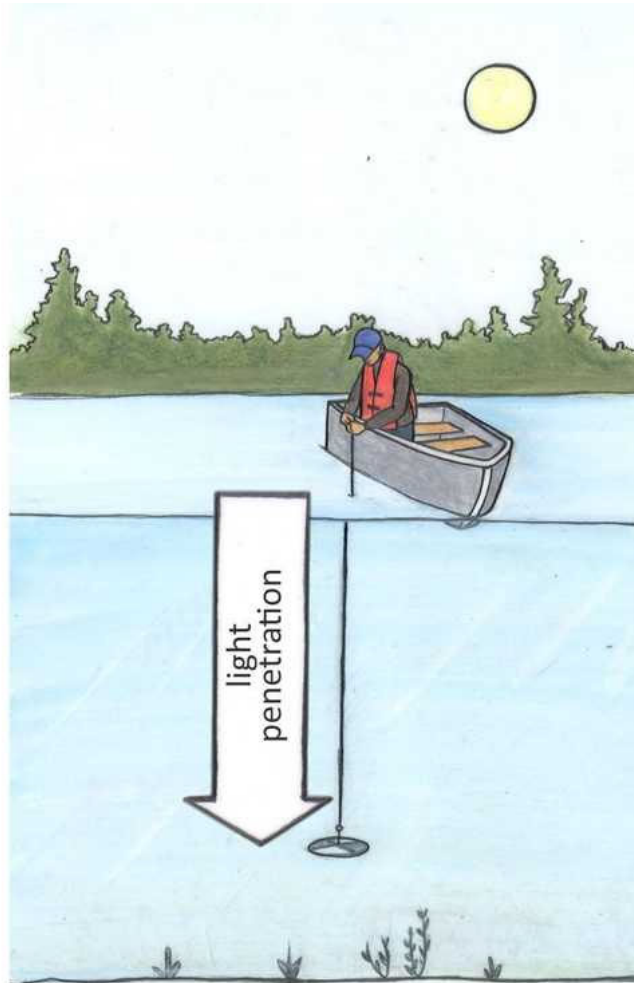




# Monitoring Water Clarity: Summarized Historical Trends



# Protocol





# CLMP Secchi Sampling Requirements



Evenly spaced monitoring through middle of May to middle of September



**\*At least 8 measurements\***



One a week or every other week



## SECCHI DISK TRANSPARENCY 2023 Data Form



Lake Name: \_\_\_\_\_ County: \_\_\_\_\_ Township: \_\_\_\_\_

Lake Sampling Site (Field ID) Number: \_\_\_\_\_ (see reverse and mark location on map)

Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_

Volunteer Monitor Name(s): \_\_\_\_\_

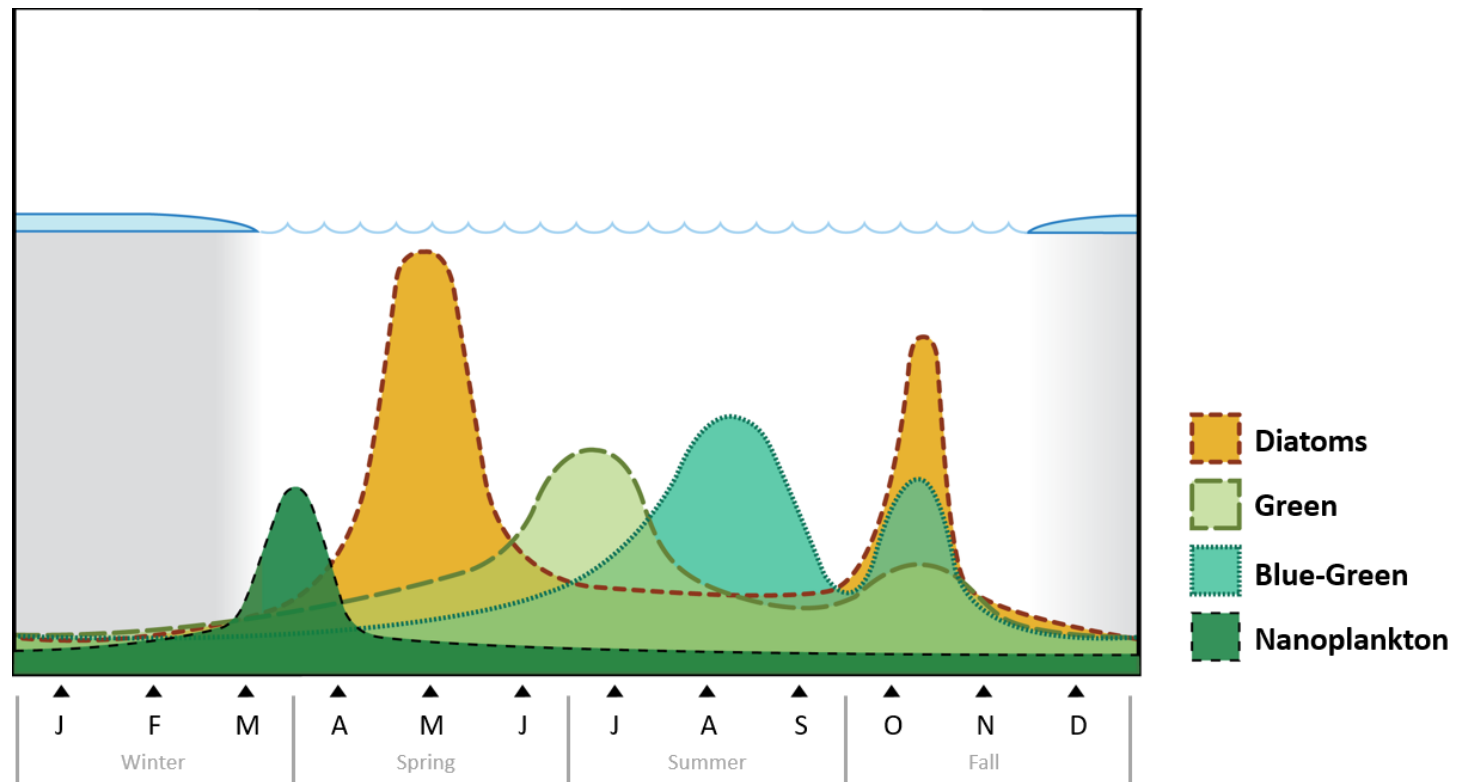
Dates

WEEKLY SAMPLING INTERVAL	DATE SAMPLED	TIME OF DAY	SECCHI DEPTH (to nearest ½ foot)	WEATHER CONDITIONS (sunny, cloudy, windy)	UNUSUAL CONDITIONS (Secchi disk on bottom of lake, heavy rain, boating, etc.)
May 14-20					
May 21-27					
May 28-June 3					
June 4-10					
June 11-17					
June 18-24					
June 25-July 1					
July 2-8					
July 9-15					

Note if secchi is  
on bottom of  
lake



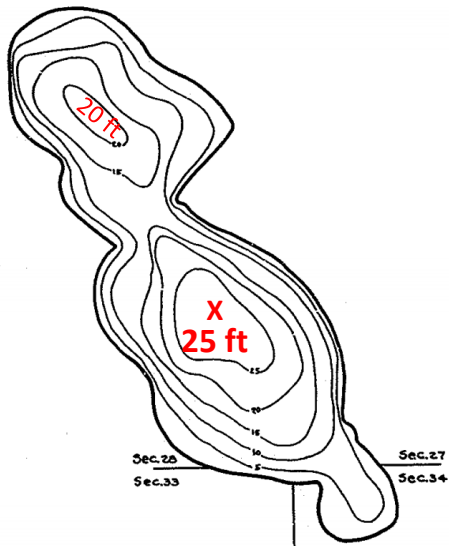
# Why 8 measurements spaced evenly through summer? Lakes Change Through Time!



**Step 1.** Drift your boat approximately over the deepest part of the lake



# Where to monitor – Find the deepest basin

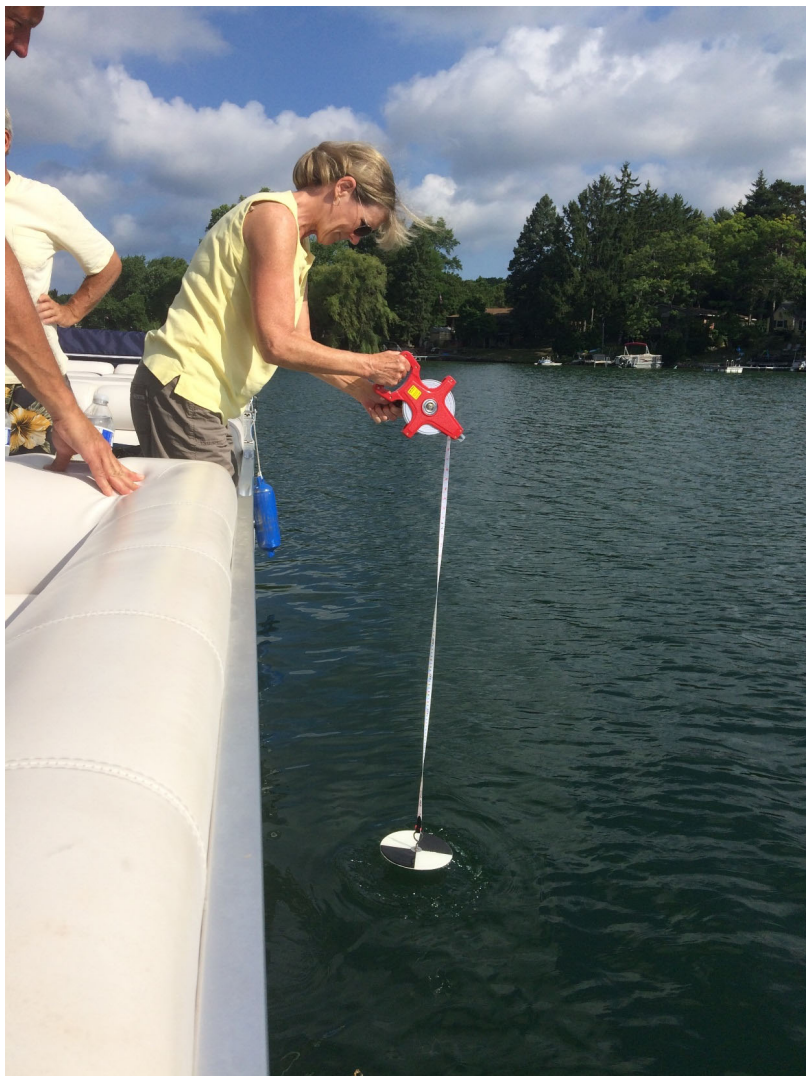


Mi DNR Lake Maps

010017 Cedar	Alcona	44.52751	-83.33195
010101 Hubbard (1)	Alcona	44.77224	-83.55287
010102 Hubbard (2)	Alcona	44.80941	-83.5468
010103 Hubbard (3)	Alcona	44.83379	-83.58163
010104 Hubbard (4)	Alcona	44.8483	-83.59922
010105 Hubbard (5)	Alcona	44.83168	-83.60152
010106 Hubbard (6)	Alcona	44.81146	-83.56633
010107 Hubbard (7)	Alcona	44.7943	-83.57416
020127 Deer	Alger	46.48016	-86.98277
030203 Hutchins	Allegan	42.58316	-86.13441
030259 Eagle	Allegan	42.425559	-85.930559
030263 Osterhout	Allegan	42.439448	-86.038892
050052 Bellaire	Antrim	44.95333	-85.21889
050055 Torch (North)	Antrim	45.027781	-85.31556
050101 Clam	Antrim	44.93612	-85.27334
050240 Torch (South)	Antrim	44.9159	-85.3028
080071 Crooked (Upper)	Barry	42.490281	-85.431392
080092 Bristol	Barry	42.484449	-85.248892
080096 Duncan	Barry	42.749448	-85.534448
080103 Payne	Barry	42.749448	-85.521115
080176 Barlow	Barry	42.670559	-85.52042
080259 Cobb	Barry	42.6525	-85.537626
080279 Long (Little)	Barry	42.6525	-85.537626
080294 Wall	Barry	42.5215	-85.3862
100066 Crystal	Benzie	44.668615	-86.186115

Micorps.net → Lake  
Monitoring → CLMP  
Documents





**Step 2.** On the shady side of the boat, slowly lower disk until it disappears from view.

- Note the depth of the water at which the disk disappears.



**Step 3.** Slowly raise disk until it reappears

- Note this depth also.



**Step 4.** The official measurement is the average of the 2 depths.

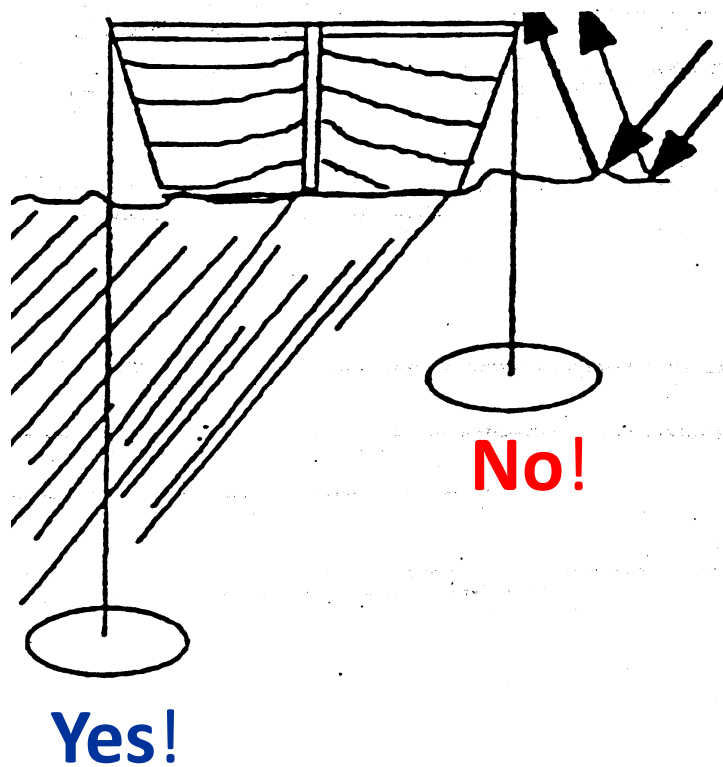
- Record that number on our datasheet.
- Round to the nearest half-foot



A couple things to remember:  
1. Don't wear sunglasses!



## 2. Pick the shady side

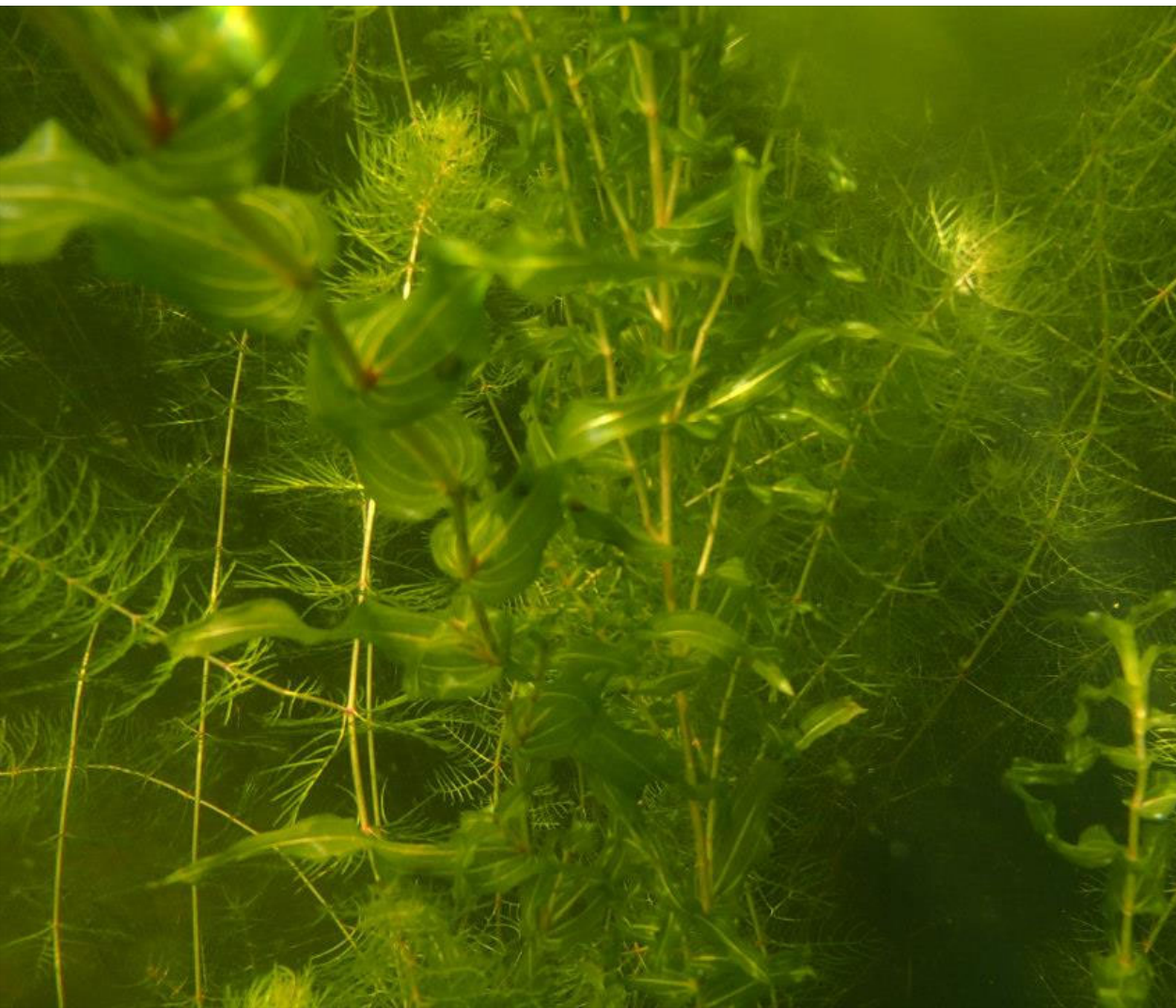


### 3. Be consistent in weather and timing!

- Measure between 10 am – 4 pm (try and be consistent)
- Sunny calm days are best
- Do not measure during heavy boating







4. For clear shallow lakes:  
Note if Secchi is on  
bottom of lake



## SECCHI DISK TRANSPARENCY 2023 Data Form



Lake Name: \_\_\_\_\_ County: \_\_\_\_\_ Township: \_\_\_\_\_

Lake Sampling Site (Field ID) Number: \_\_\_\_\_ (see reverse and mark location on map)

Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_

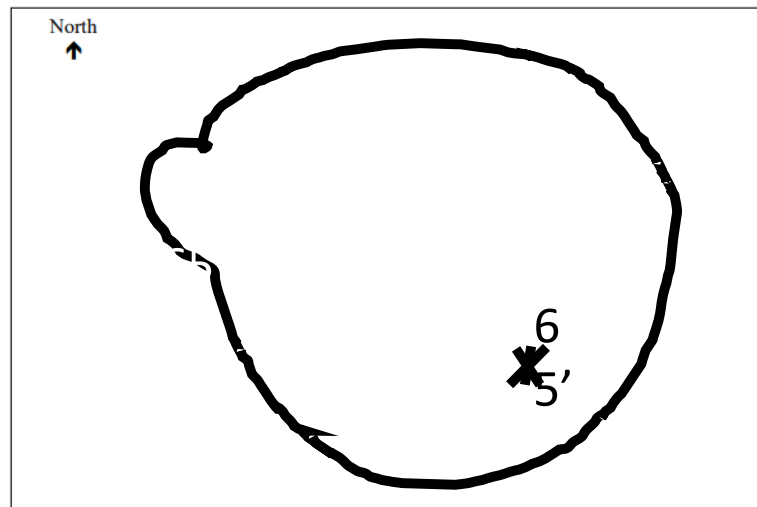
Volunteer Monitor Name(s): \_\_\_\_\_

Dates

WEEKLY SAMPLING INTERVAL	DATE SAMPLED	TIME OF DAY	SECCHI DEPTH (to nearest ½ foot)	WEATHER CONDITIONS (sunny, cloudy, windy)	UNUSUAL CONDITIONS (Secchi disk on bottom of lake, heavy rain, boating, etc.)
May 14-20					
May 21-27					
May 28-June 3					
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June 18-24					
June 25-July 1					
July 2-8					
July 9-15					

Note if secchi is  
on bottom of  
lake

- ❖ In the box below draw an outline of your lake (i.e. lake map). Or attach a copy of a lake map.
- ❖ On the lake map, mark your Secchi disk sampling location (this should be at the deepest location in your lake) and write the LAKE DEPTH at this location (not Secchi depth).
- ❖ Surface Area of Lake (if known): \_\_\_\_\_ (acres)



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### DATA ENTRY

If you can, please enter your data into the MiCorps Data Exchange by October 31<sup>st</sup>.

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### DATA SHEET TURN IN Protocol

Please do the following:

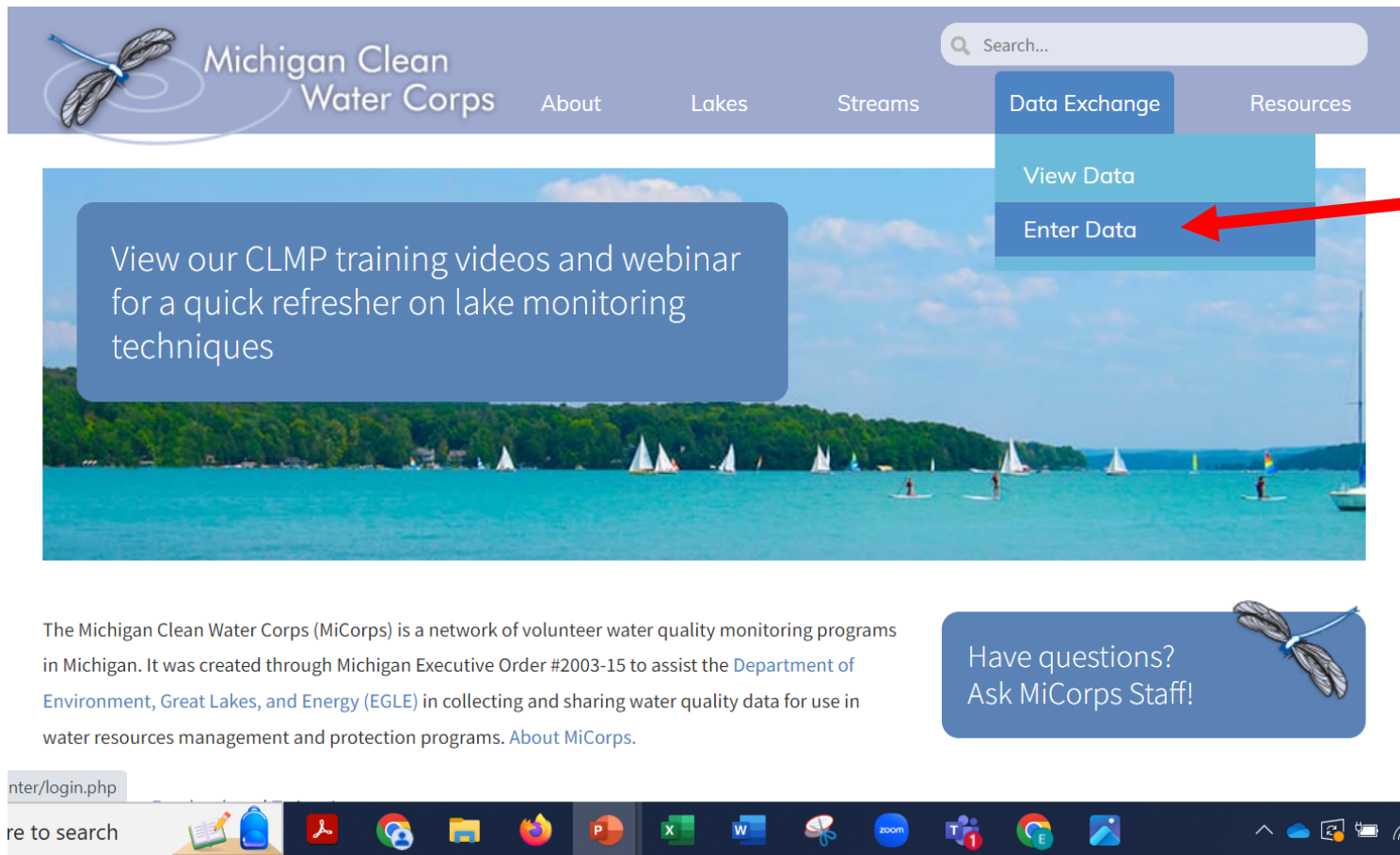
- (1) Make a copy of your field data sheets to keep for your records,
- (2) Mail one copy by October 31<sup>st</sup> to: **MLSA, P.O. Box 303, Long Lake, MI 48743**
  - a. For electronic submission, send to: [MiCorps@msu.edu](mailto:MiCorps@msu.edu)



# Data Entry

- All volunteers are encouraged to use the online data entry system
- Follow the instructions for data submission on our website, [www.micorps.net](http://www.micorps.net).

# MiCorps Data Exchange Entry Point



The screenshot shows the Michigan Clean Water Corps website. The header features the organization's logo (a dragonfly) and navigation links: About, Lakes, Streams, Data Exchange, and Resources. A search bar is located in the top right. The 'Data Exchange' menu is open, showing 'View Data' and 'Enter Data' options. A red arrow points to the 'Enter Data' link. Below the navigation bar, there is a large banner image of a lake with sailboats. A text box on the left of the banner reads: 'View our CLMP training videos and webinar for a quick refresher on lake monitoring techniques'. Below the banner, there is a paragraph of text about the Michigan Clean Water Corps (MiCorps) and a button that says 'Have questions? Ask MiCorps Staff!'. The bottom of the screenshot shows a Windows taskbar with various application icons.

Michigan Clean Water Corps

About Lakes Streams Data Exchange Resources

Search...

View Data

Enter Data

View our CLMP training videos and webinar for a quick refresher on lake monitoring techniques

The Michigan Clean Water Corps (MiCorps) is a network of volunteer water quality monitoring programs in Michigan. It was created through Michigan Executive Order #2003-15 to assist the [Department of Environment, Great Lakes, and Energy \(EGLE\)](#) in collecting and sharing water quality data for use in water resources management and protection programs. [About MiCorps.](#)

Have questions?  
Ask MiCorps Staff!

enter/login.php

re to search



Michigan Clean  
Water Corps

About

Lakes

Streams

Data Exchange

Resources

Search...

Join MiCorps and help monitor the health  
of Michigan's lakes and streams!

Become a Volunteer

CLMP Documents

Annual Summary  
Reports

Individual Lake Reports

Lake Training

Login / Register

The Michigan Clean Water Corps (MiCorps) is a network of volunteer water quality monitoring programs

# Accessing data

Executive Order #2003-15 to assist the Department of  
collecting and sharing water quality data for use in  
programs. [About MiCorps](#).

Have questions?  
Ask MiCorps Staff!





Receive a  
data report  
in early 2026



**2017 Data Report  
for  
Deer Lake, Alger County**

Site ID: 020127

46.48016°N, 86.98277°W

The CLMP is brought to you by:



Site ID: 750142

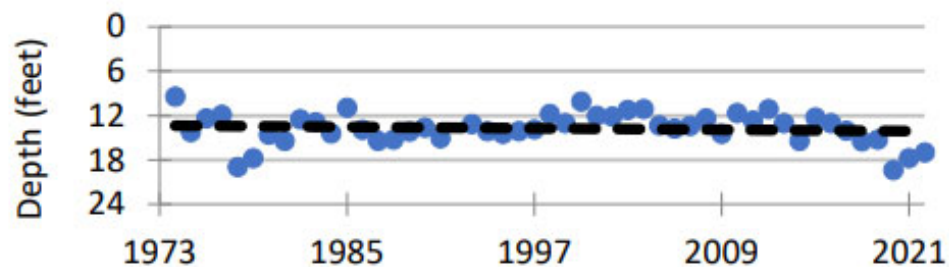
# Corey Lake, St. Joseph County

## 2022 CLMP Results



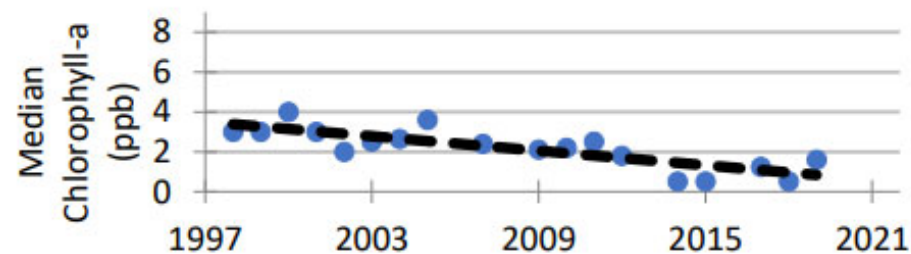
### Secchi Disk Transparency (feet)

Year	# Readings	Min	Max	Avg	Std. Dev	Carlson TSI
2022	17	13.0	26.0	17.0	3.6	36
2017-2021	97	8.0	27.0	16.4	4.2	37
1974-2016	742	5.5	39.0	13.4	5.5	40
2022 All CLMP Lakes	3178	1.0	63.0	11.6	2.5	43



### Chlorophyll-a (parts per billion)

Year	# Samples	Min	Max	Med	Std. Dev	Carlson TSI
2019	5	<1.0	3.9	1.6	1.4	35
2014-2018	20	<1.0	2.7	<1.0	0.5	<31
1998-2013	71	<1.0	4.2	<1.0	0.8	40
2022 All CLMP Lakes	687	< 1.0	43.0	3.7	5.3	43



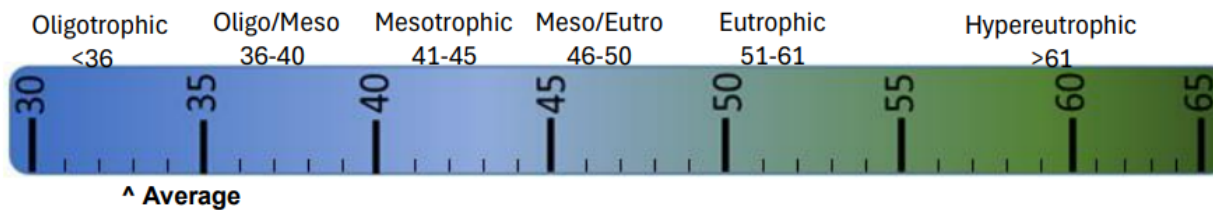
The tables below give the results-to-TSI conversions for the water quality data ranges normally seen in the CLMP. The formulas for this conversion can be found in the CLMP manual (link is on page 2 of this report).

Phosphorus (ppb)	TSI Value
<5	<27
6	30
8	34
10	37
12	40
15	43
18	46
21	48
24	50
32	54
36	56
42	58
48	60
>50	>61

Secchi Depth (ft)	TSI Value
>30	<28
25	31
20	34
15	38
12	42
10	44
7.5	48
6	52
4	57
<3	>61

Chlorophyll-a (ppb)	TSI Value
<1	<31
2	37
3	41
4	44
6	48
8	51
12	55
16	58
22	61
>22	>61

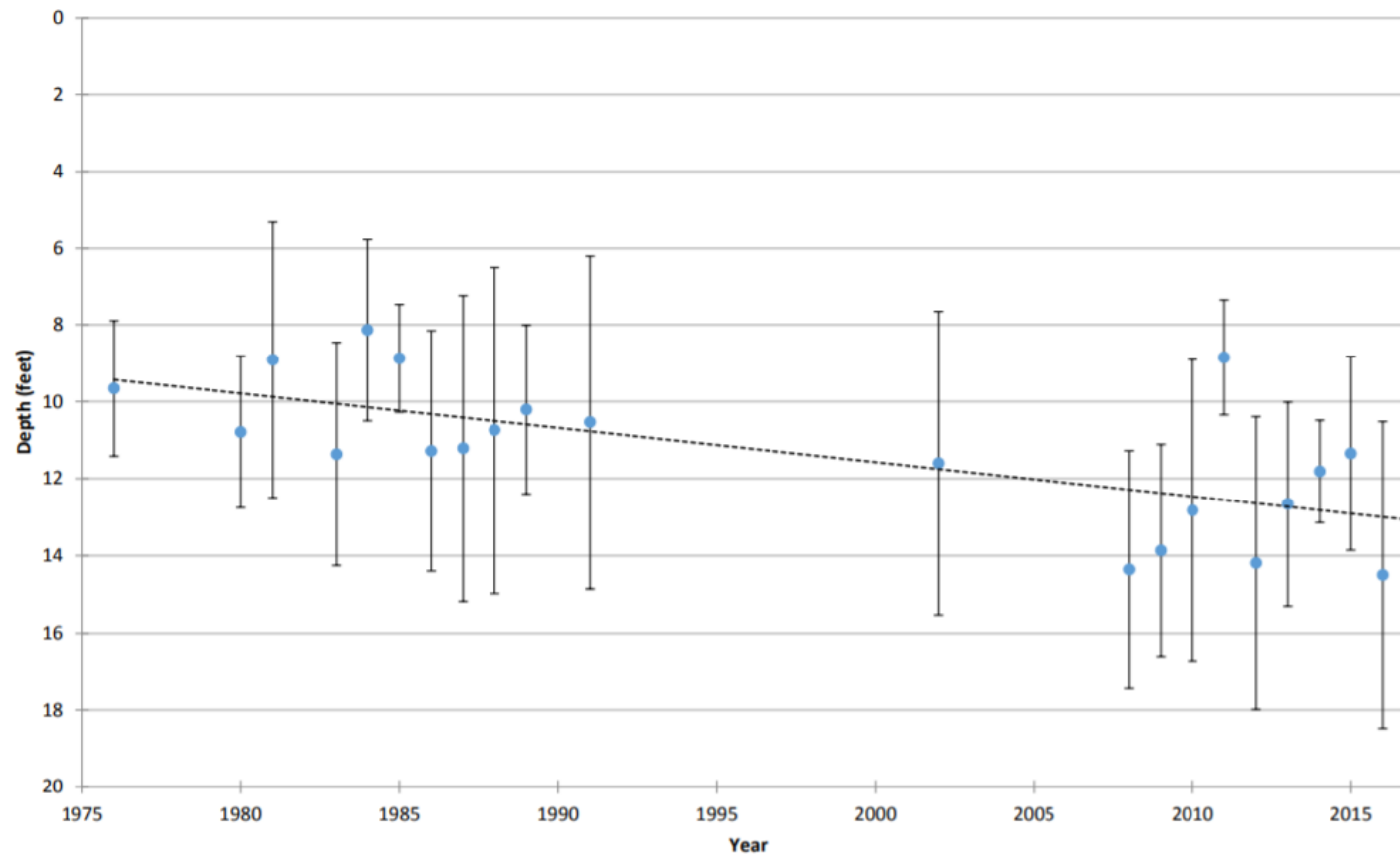
TSI for Cedar Lake in 2023	
Average	33
Secchi Disk	
Summer TP	30
Chlorophyll-a	37



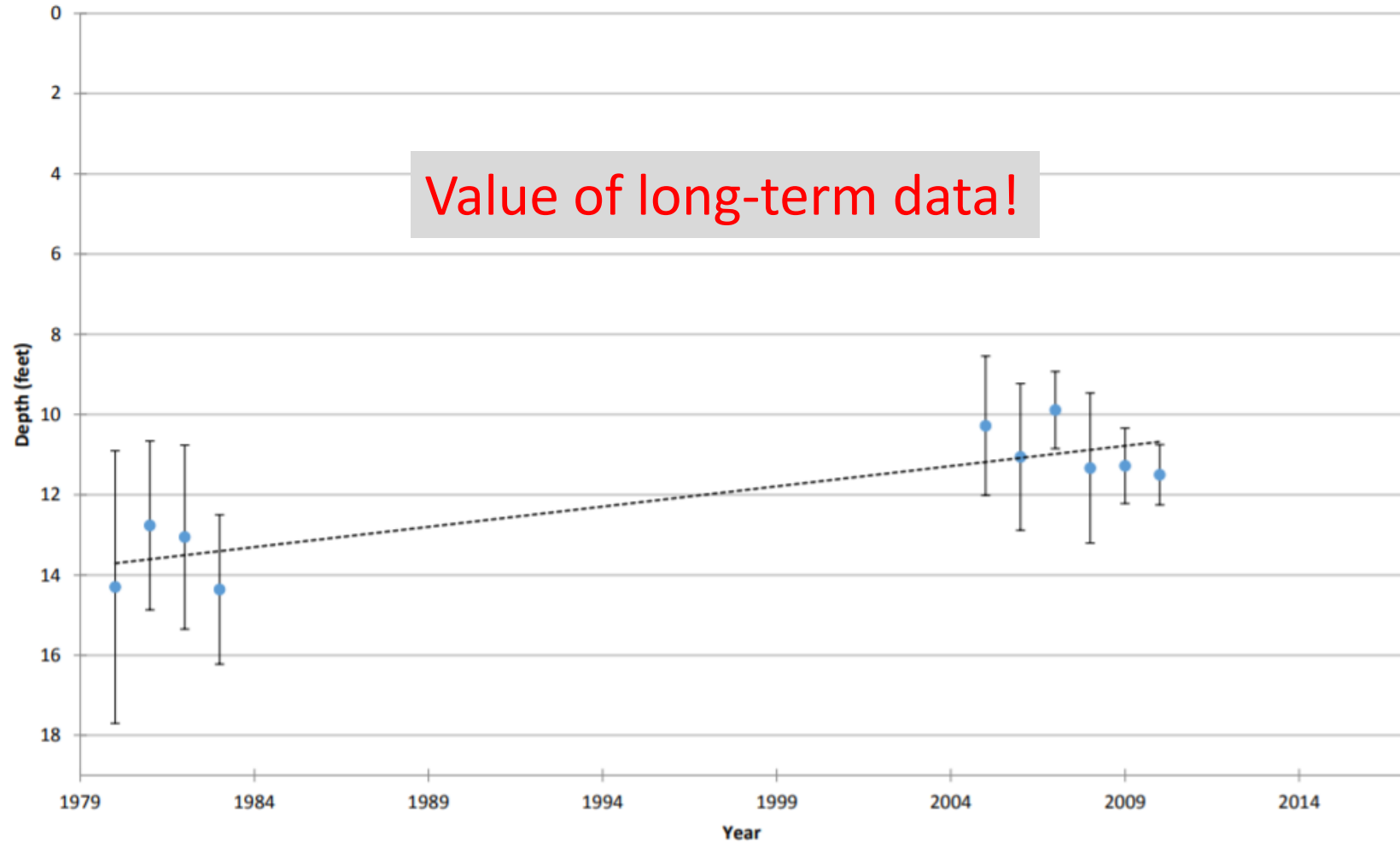
^ Total Phosphorus  
^ Chlorophyll-a



### Portage Lake (Washtenaw Co.), 810248



## Perch Lake (Otsego Co.), 690150



# New procedure video!





# Questions?

To learn more about the Cooperative Lakes Monitoring Program, visit:

[MiCorps.net](http://MiCorps.net)



MICHIGAN DEPARTMENT OF  
ENVIRONMENT, GREAT LAKES, AND ENERGY

MICHIGAN STATE  
UNIVERSITY | Extension



Huron  
River  
Watershed  
Council



**Working Together to Protect Lakes**

