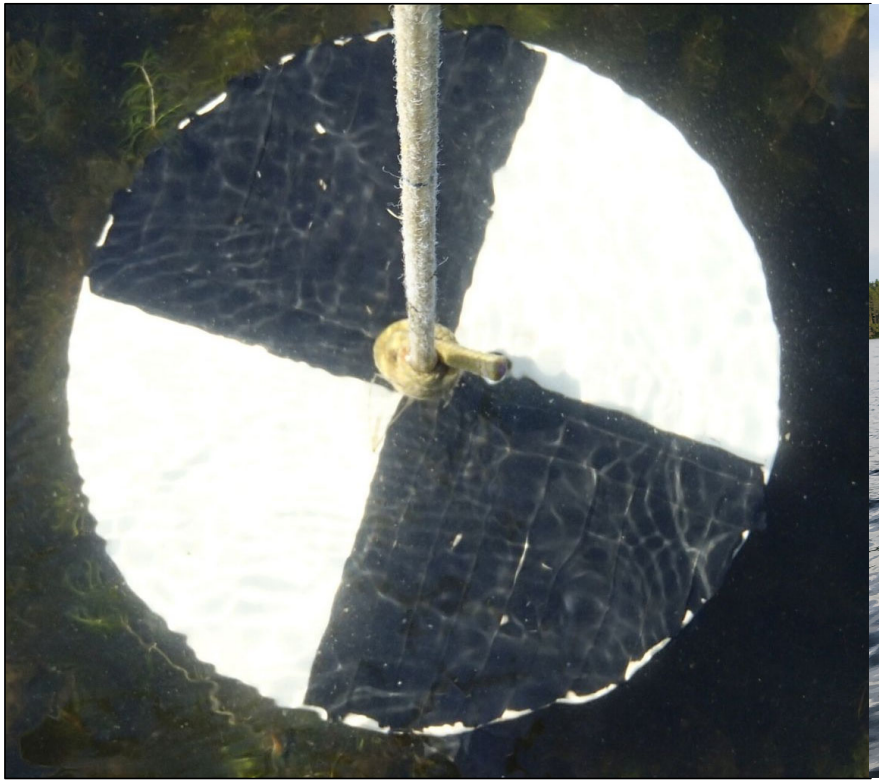


Secchi Disk Water Transparency

Erick Elgin

Erick Elgin,

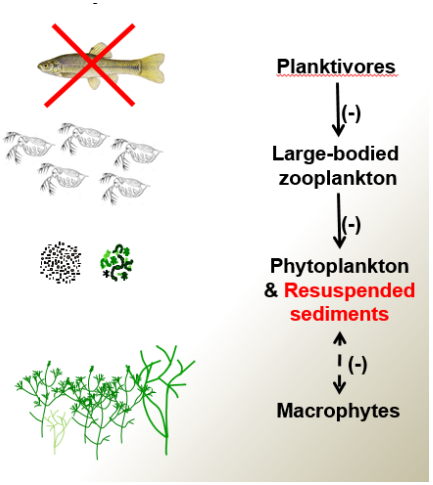
CLMP Lake Program Manager

Michigan State University Extension

Contact:

218-340-5731

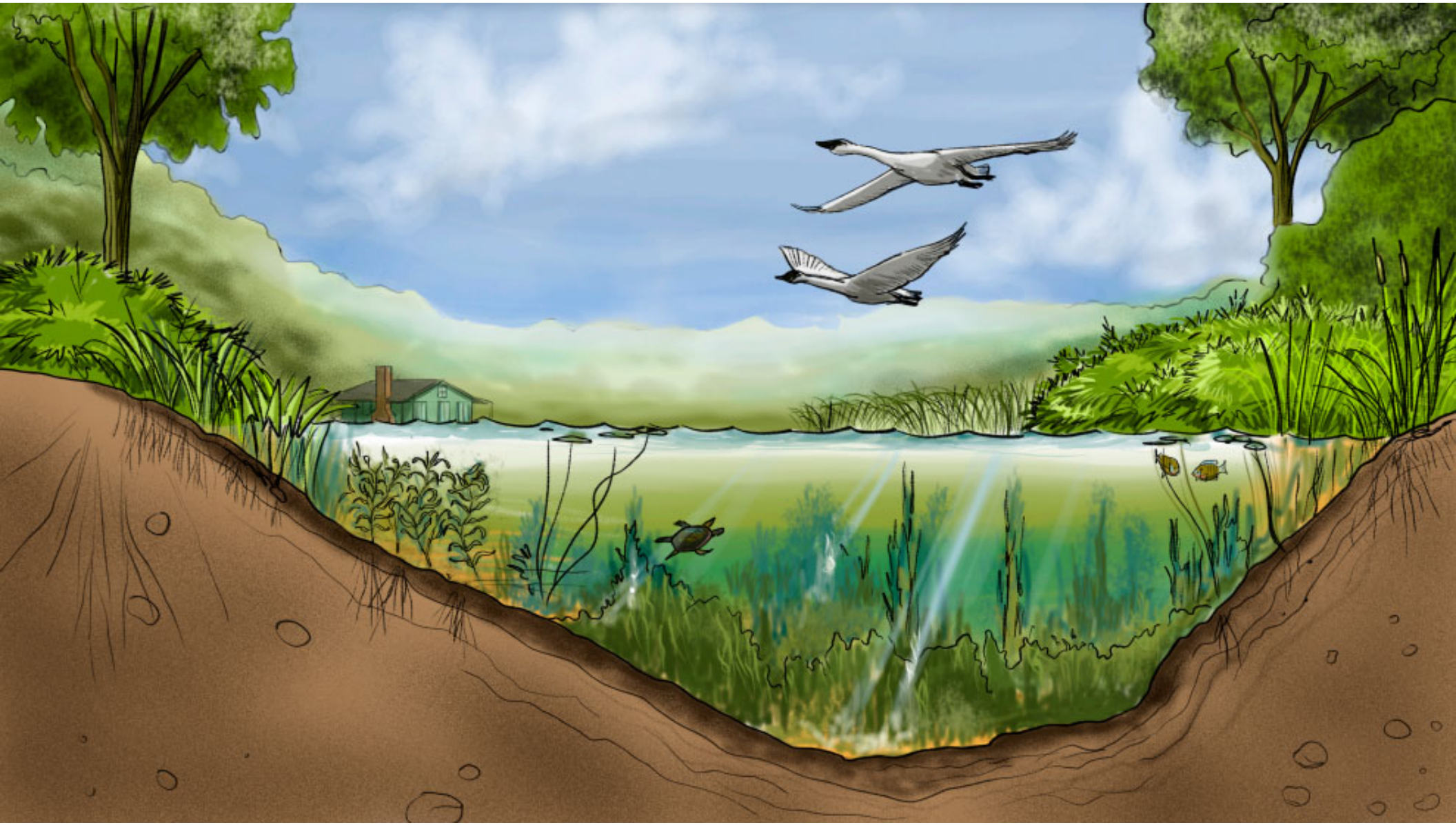
elgineri@msu.edu


Planktivores
(-)
Large-bodied zooplankton
(-)
Phytoplankton & Resuspended sediments
(-)
Macrophytes

Secchi disk water transparency

Michigan Clean Water Corps

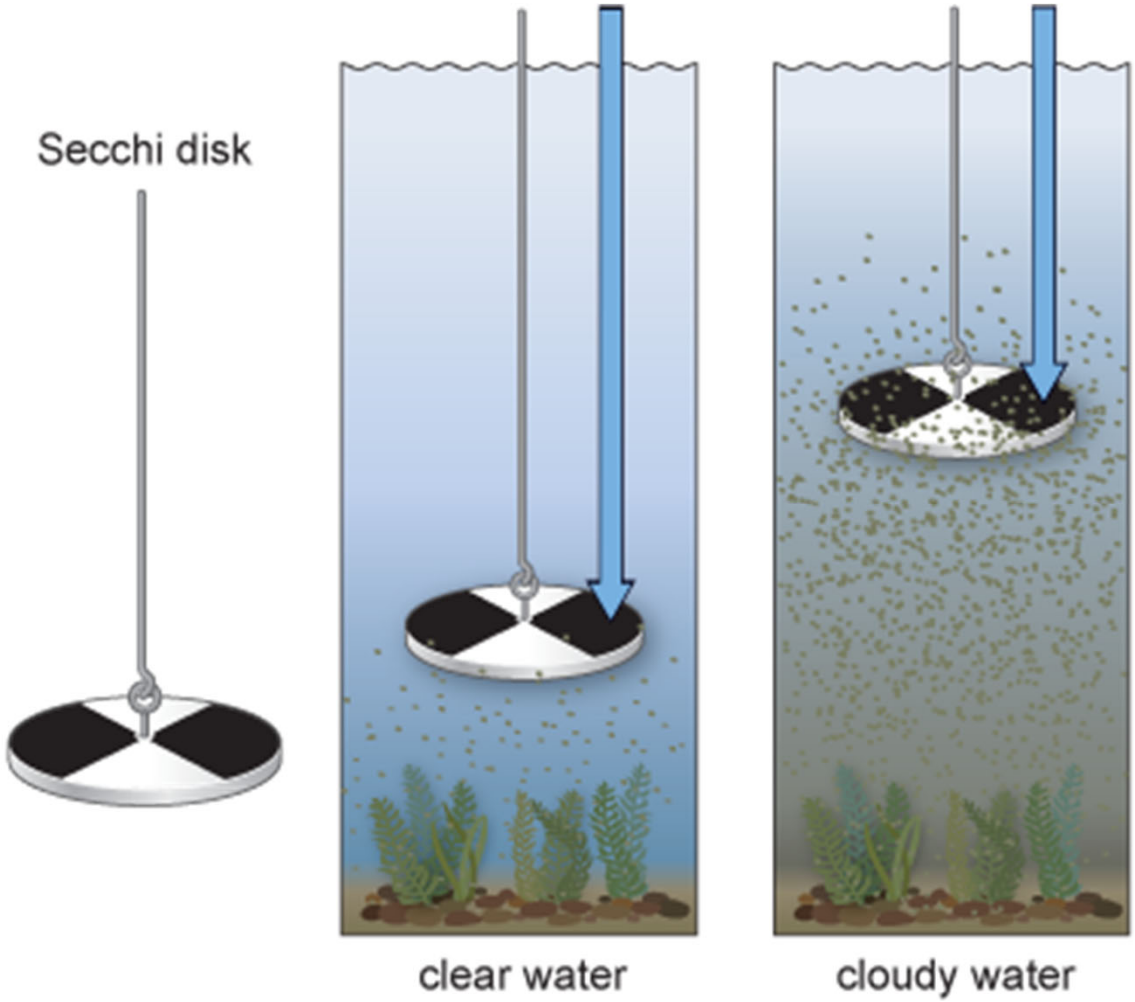
Cooperative Lakes Monitoring Program



What is a Secchi Disk?

Michigan Clean Water Corps

Cooperative Lakes Monitoring Program



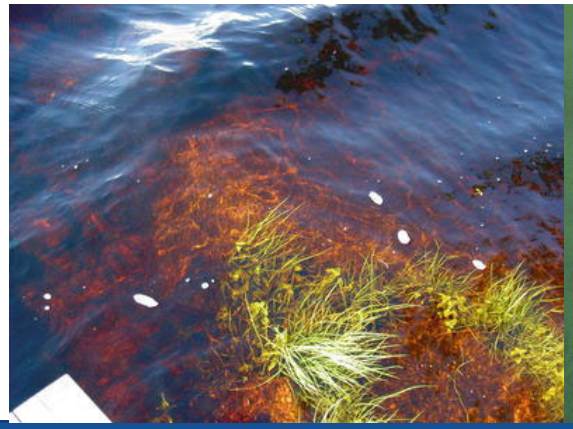
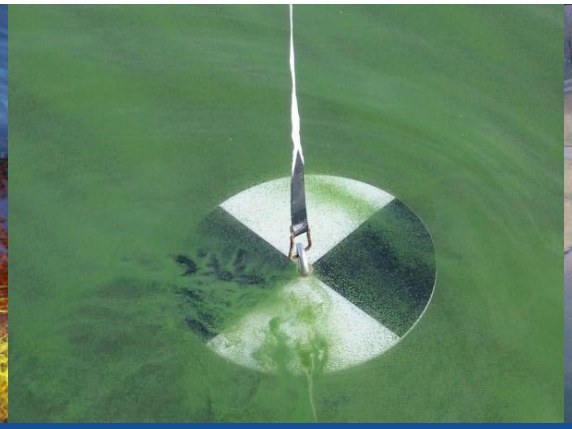
How does it work?

Water clarity is affected by

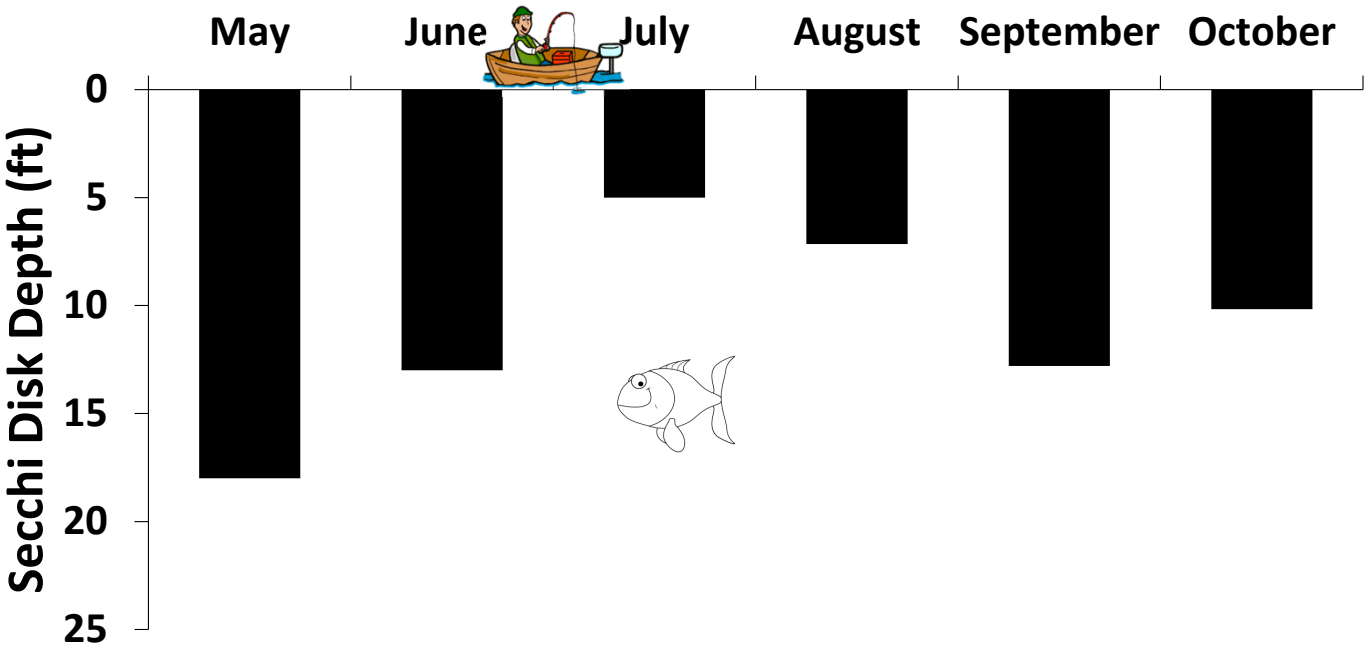
- Water color
- Algae
- Suspended solids (organic, sediment, etc…)

What does Secchi transparency tell us?

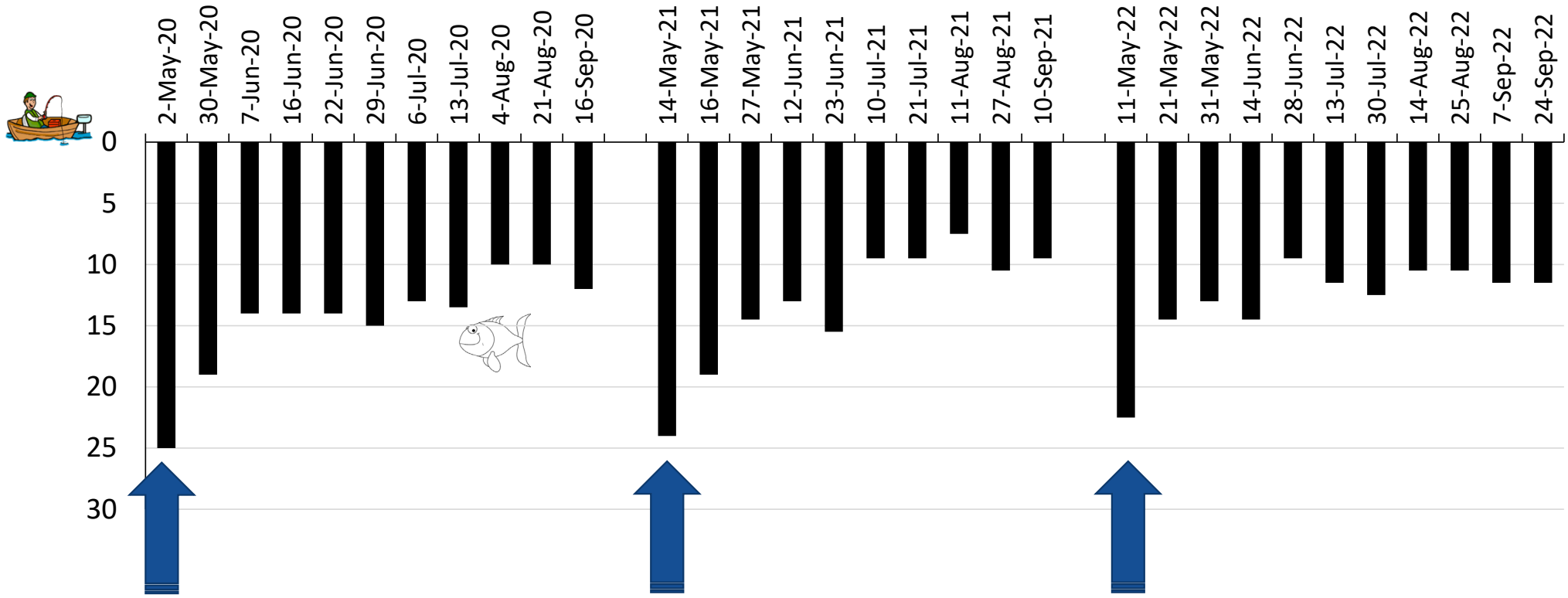
- Indicator of natural processes and human changes
  - Spring clear water phase
  - Eutrophication, Oligotrophication, and Browning

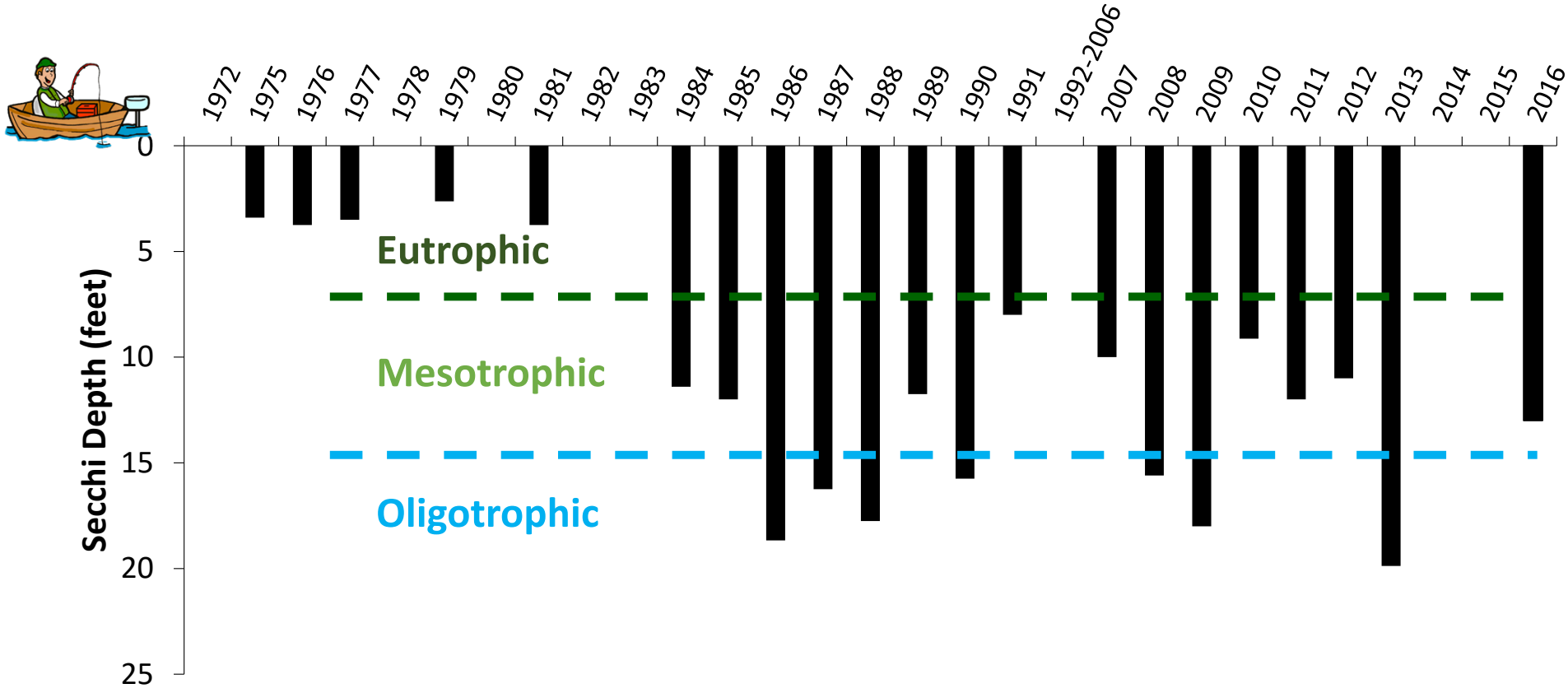

Monitoring water clarity through a season



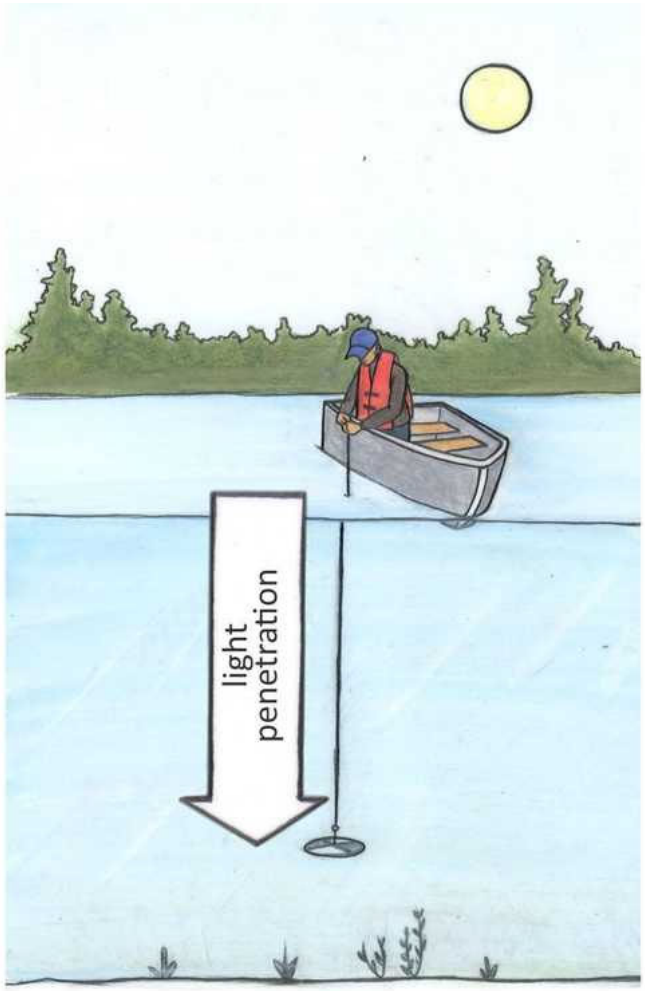
Monitoring water clarity through the seasons

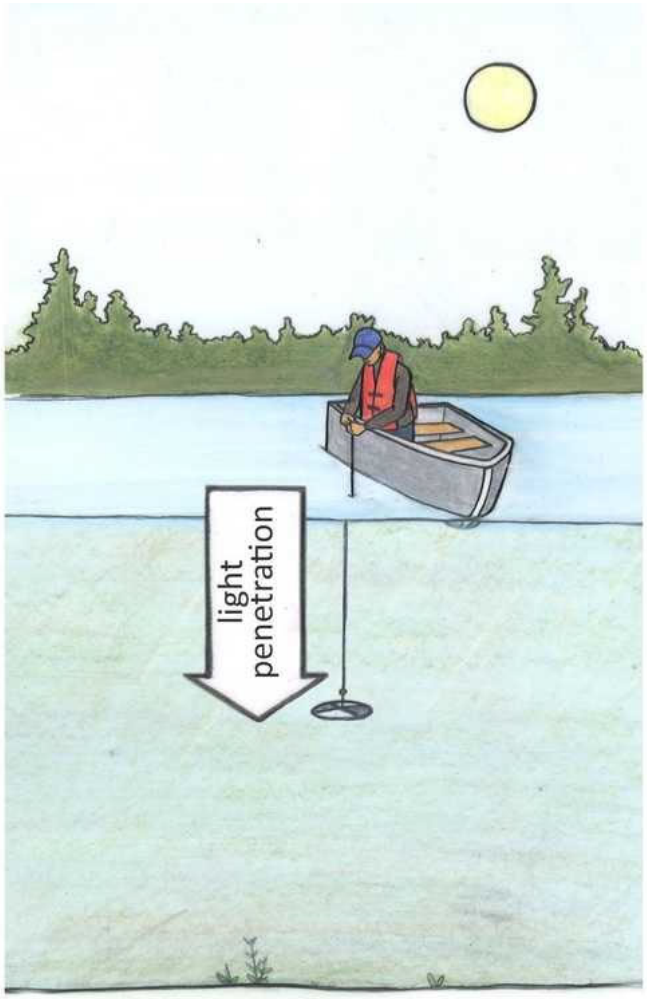


Monitoring Water Clarity: Summarized Historical Trends



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

Michigan Clean Water Corps

SECCHI DISK TRANSPARENCY

2023 Data Form

Cooperative Lakes Monitoring Program

Lake Name: _____ County: _____ Township: _____

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

Latitude: _____ Longitude: _____

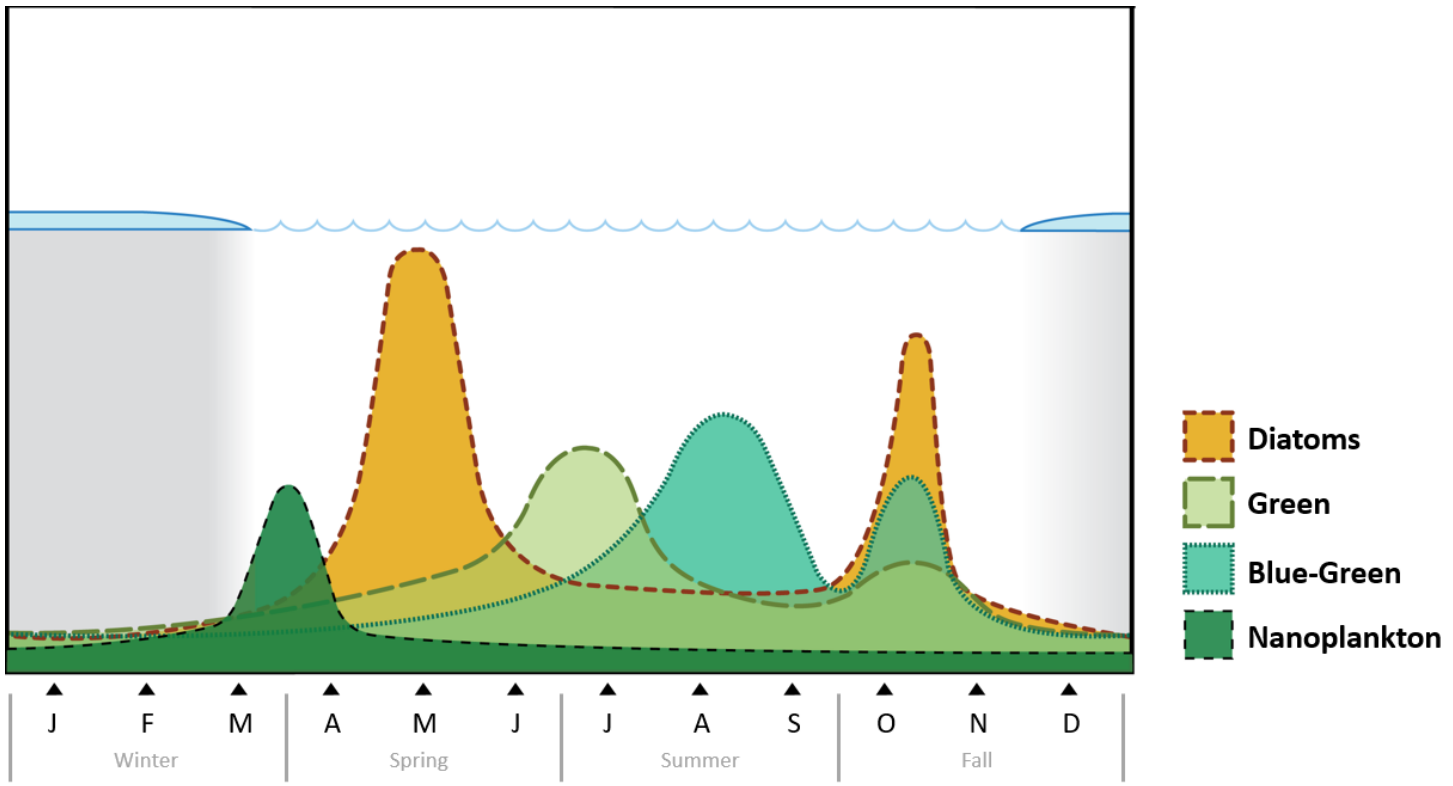
Volunteer Monitor Name(s): _____

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					

Dates

Note if secchi is on bottom of lake

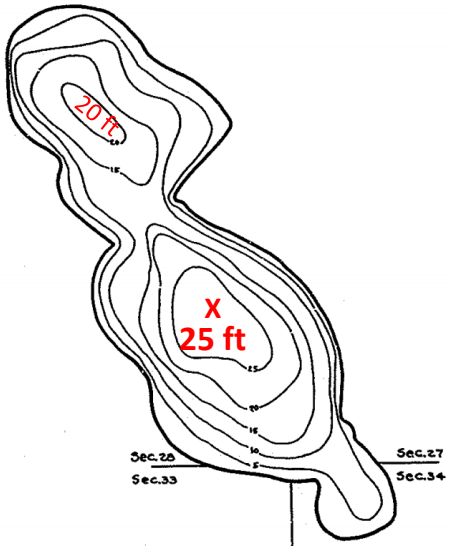
Why 8 measurements spaced evenly through summer?
Lakes Change Through Time!



Michigan Clean Water Corps

Cooperative Lakes Monitoring Program

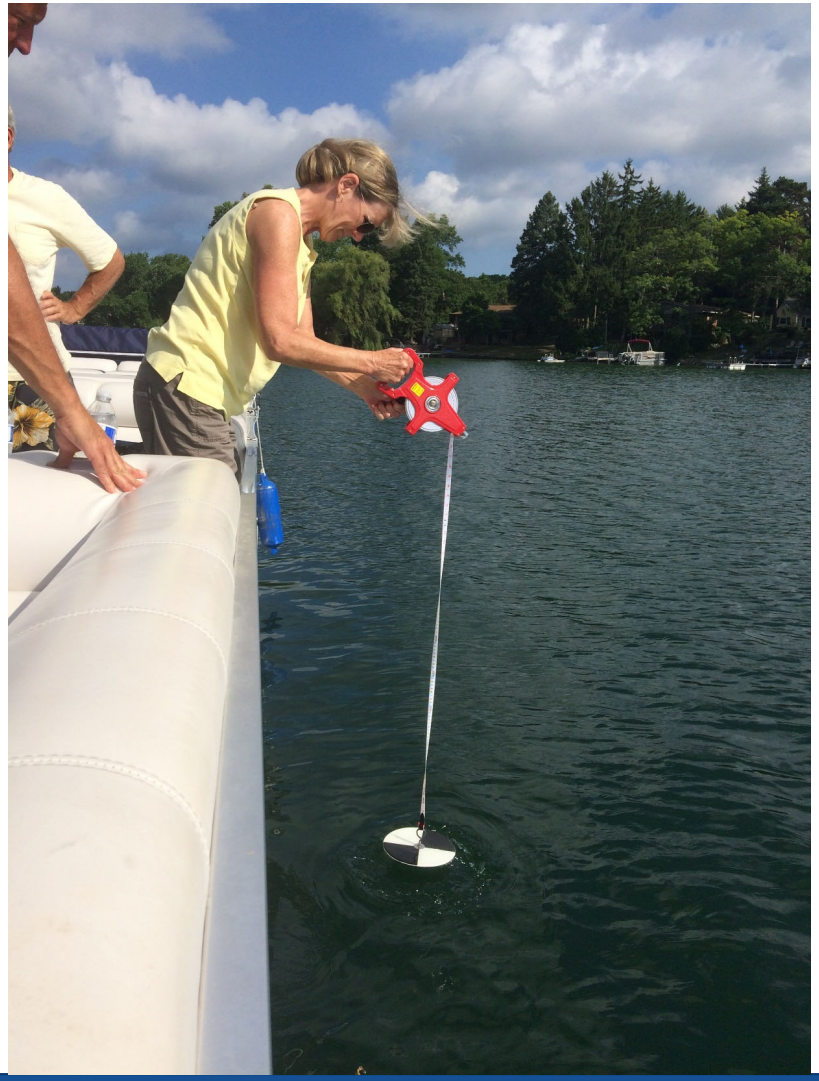
Where to monitor – Find the deepest basin



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

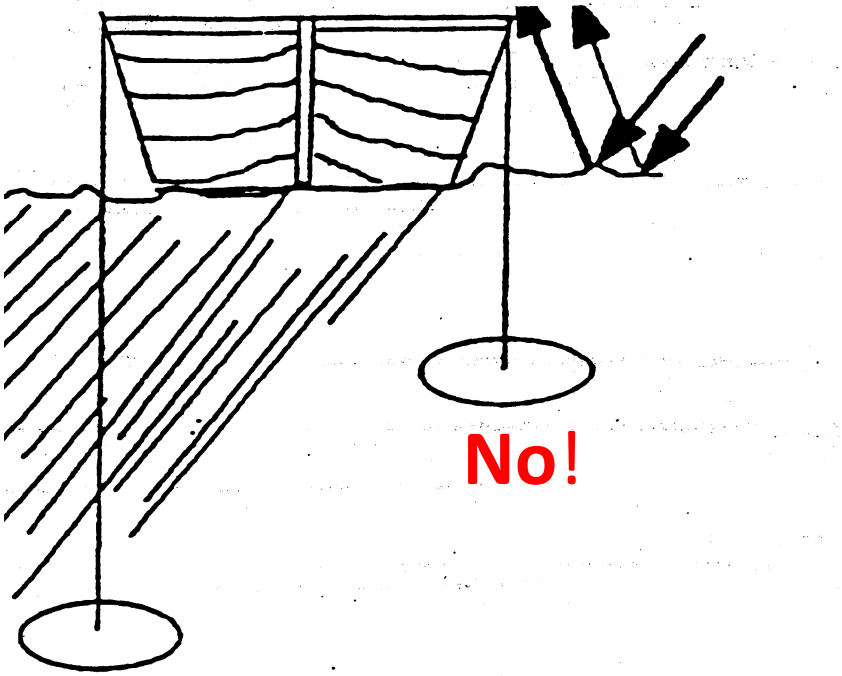
- Note this depth also.

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

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

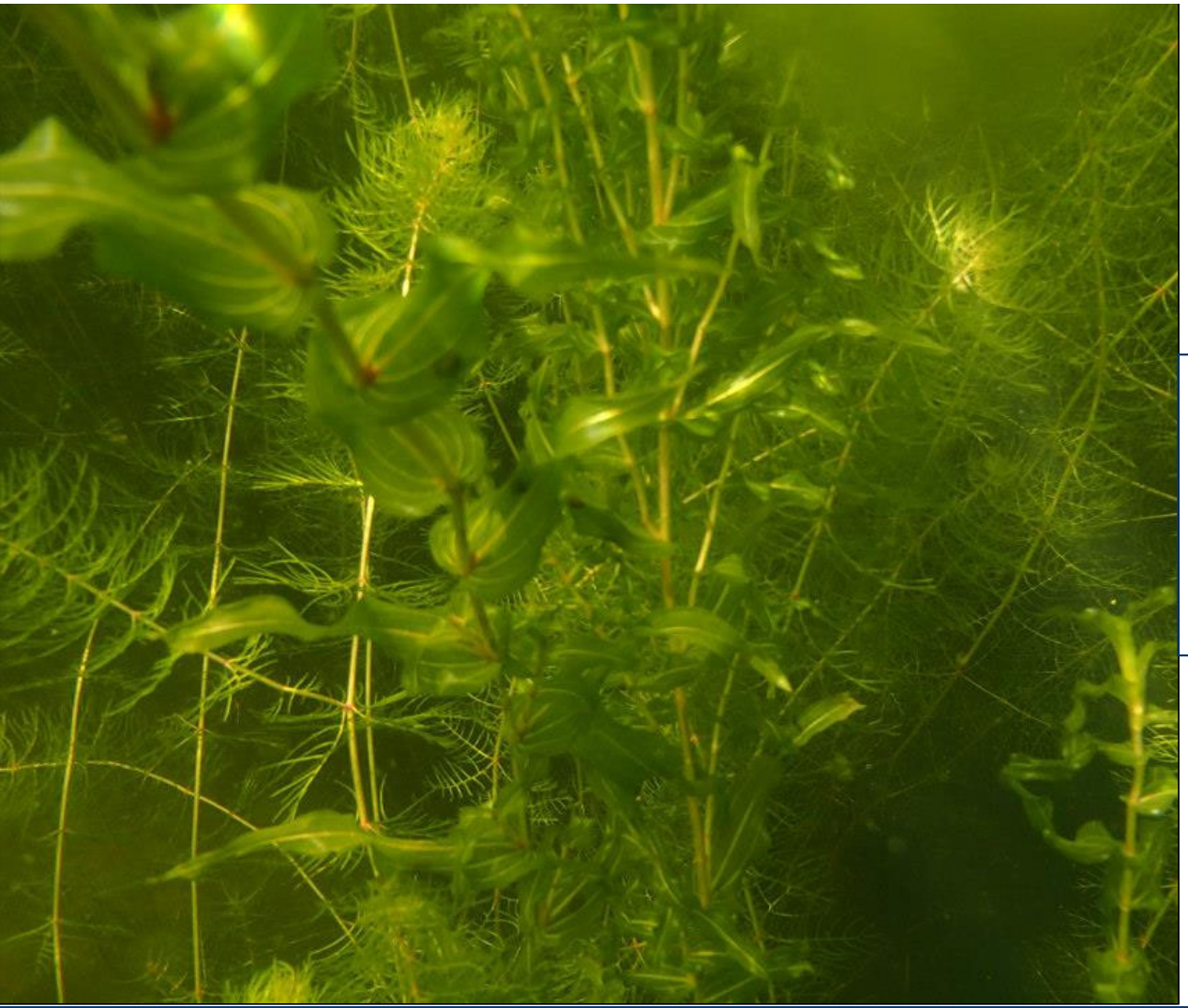
A couple things to remember:
1. Don't wear sunglasses!

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

Michigan Clean Water Corps

SECCHI DISK TRANSPARENCY

2023 Data Form

Cooperative Lakes Monitoring Program

Lake Name: _____ County: _____ Township: _____

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

Latitude: _____ Longitude: _____

Volunteer Monitor Name(s): _____

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.)
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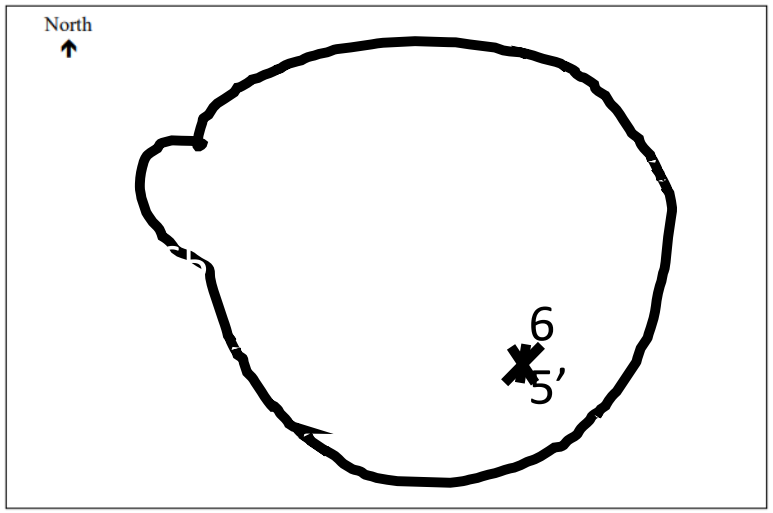
May 21-27					
May 28-June 3					
June 4-10					
June 11-17					
June 18-24					
June 25-July 1					
July 2-8					
July 9-15					

Dates

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)



DATA ENTRY

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

DATA SHEET TURN IN Protocol

Please do the following:

(1) Make a copy of your field data sheets to keep for your records,

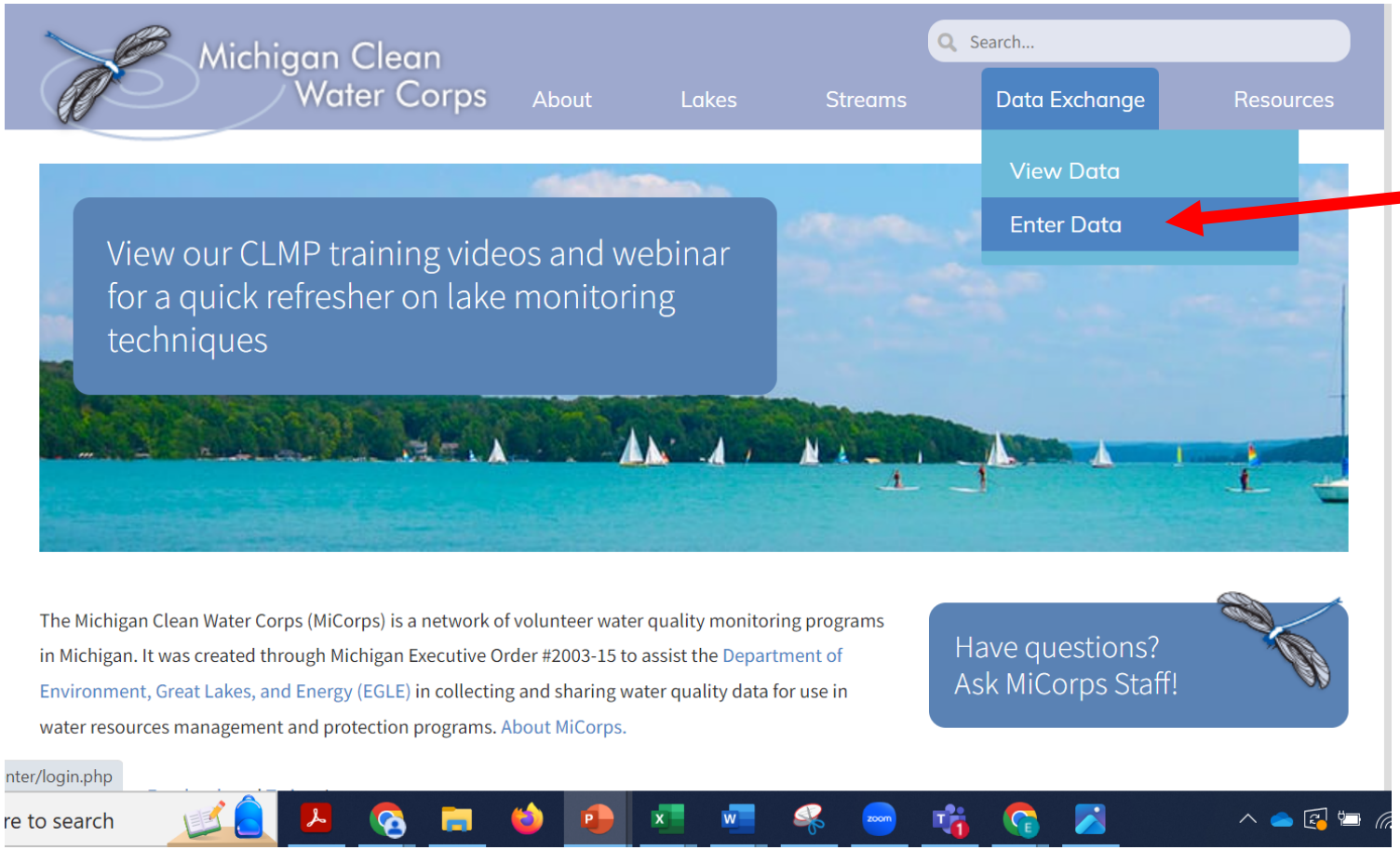
(2) Mail one copy by October 31st to: **MLSA, P.O. Box 303, Long Lake, MI 48743**

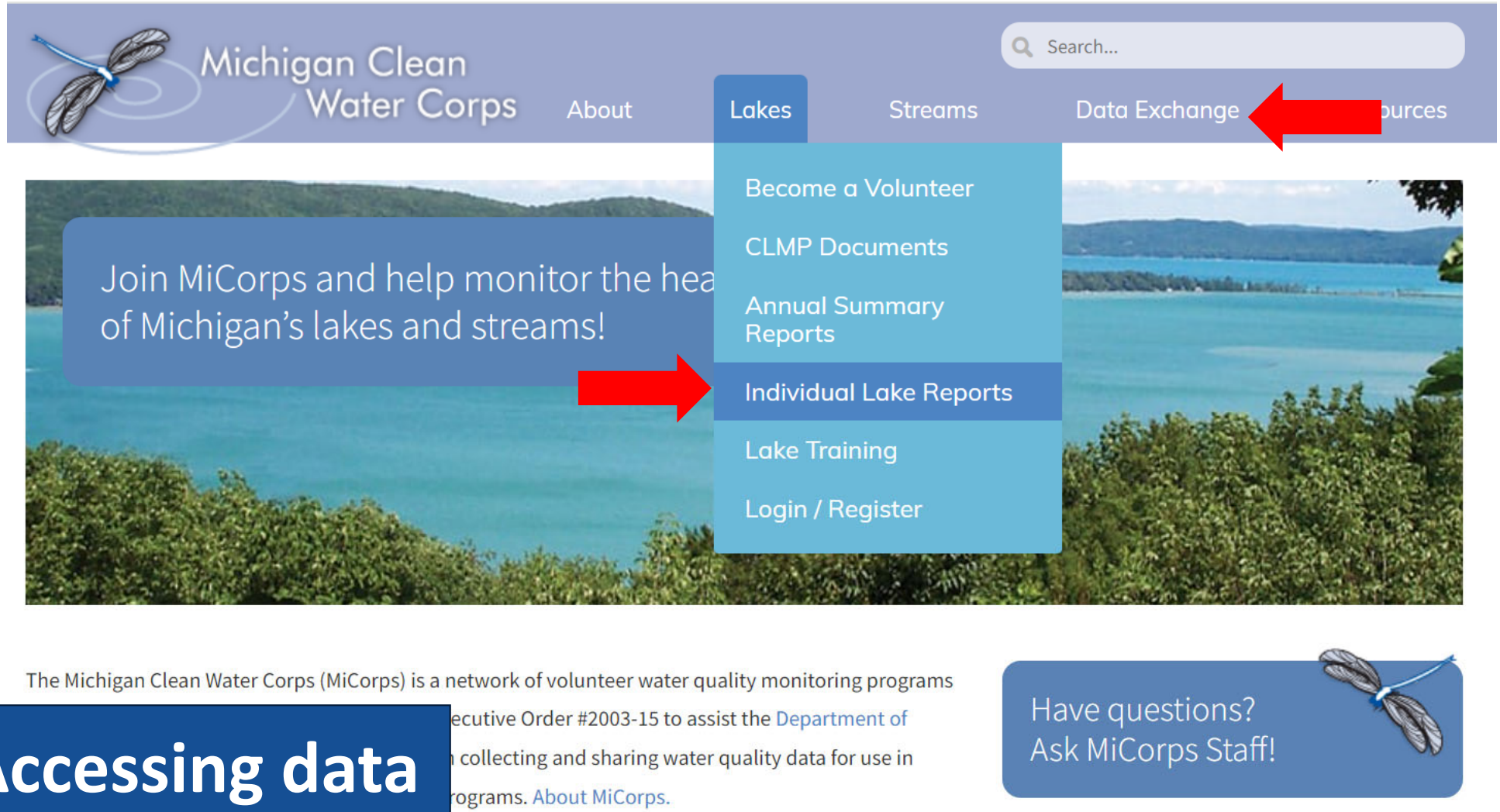
a. For electronic submission, send to: MiCorps@msu.edu

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.

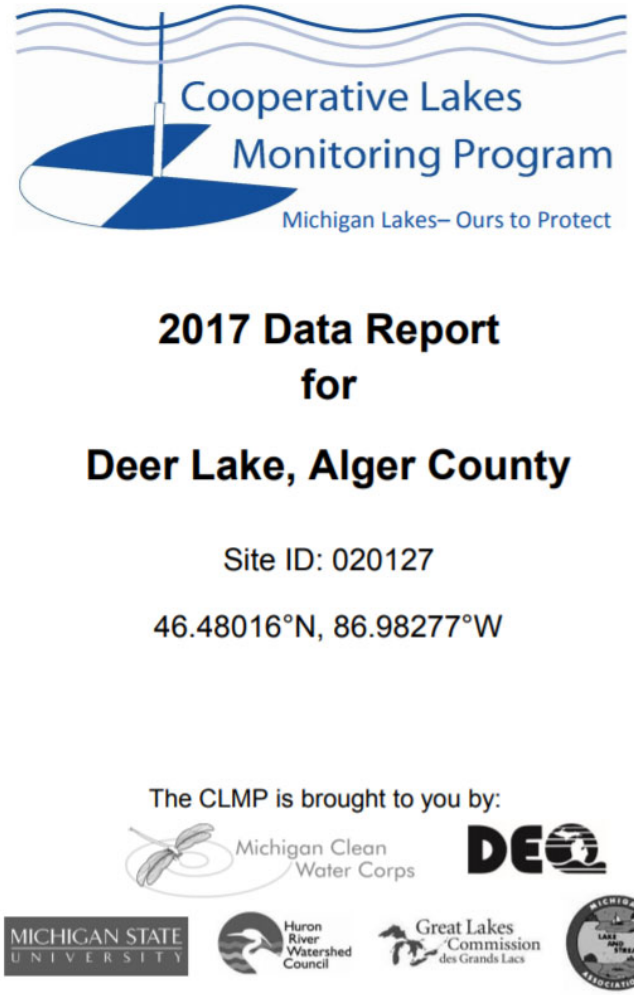
MiCorps Data Exchange Entry Point





Accessing data

Receive a data report in early 2026



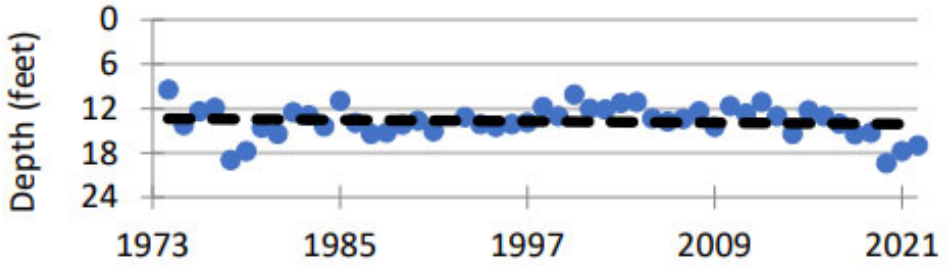
Site ID: 750142

Corey Lake, St. Joseph County
2022 CLMP Results

Cooperative Lakes Monitoring Program

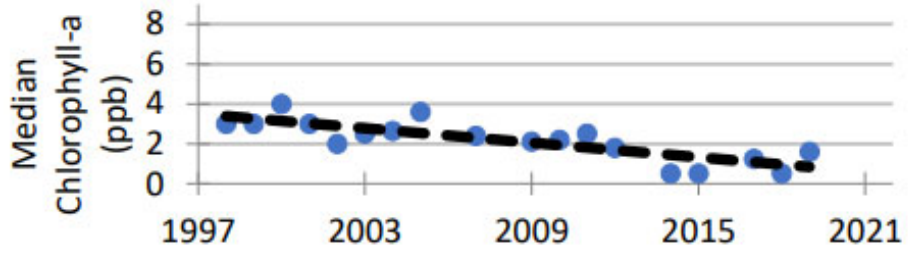
Secchi Disk Transparency (feet)

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



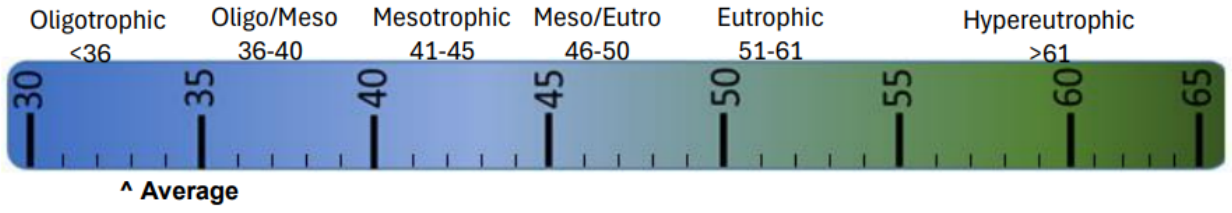
The tables below give the results-to-TSI conversions for the water quality data ranges normally seen in the CLMP. The formulas for this conversion can be found in the CLMP manual (link is on page 2 of this report).

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

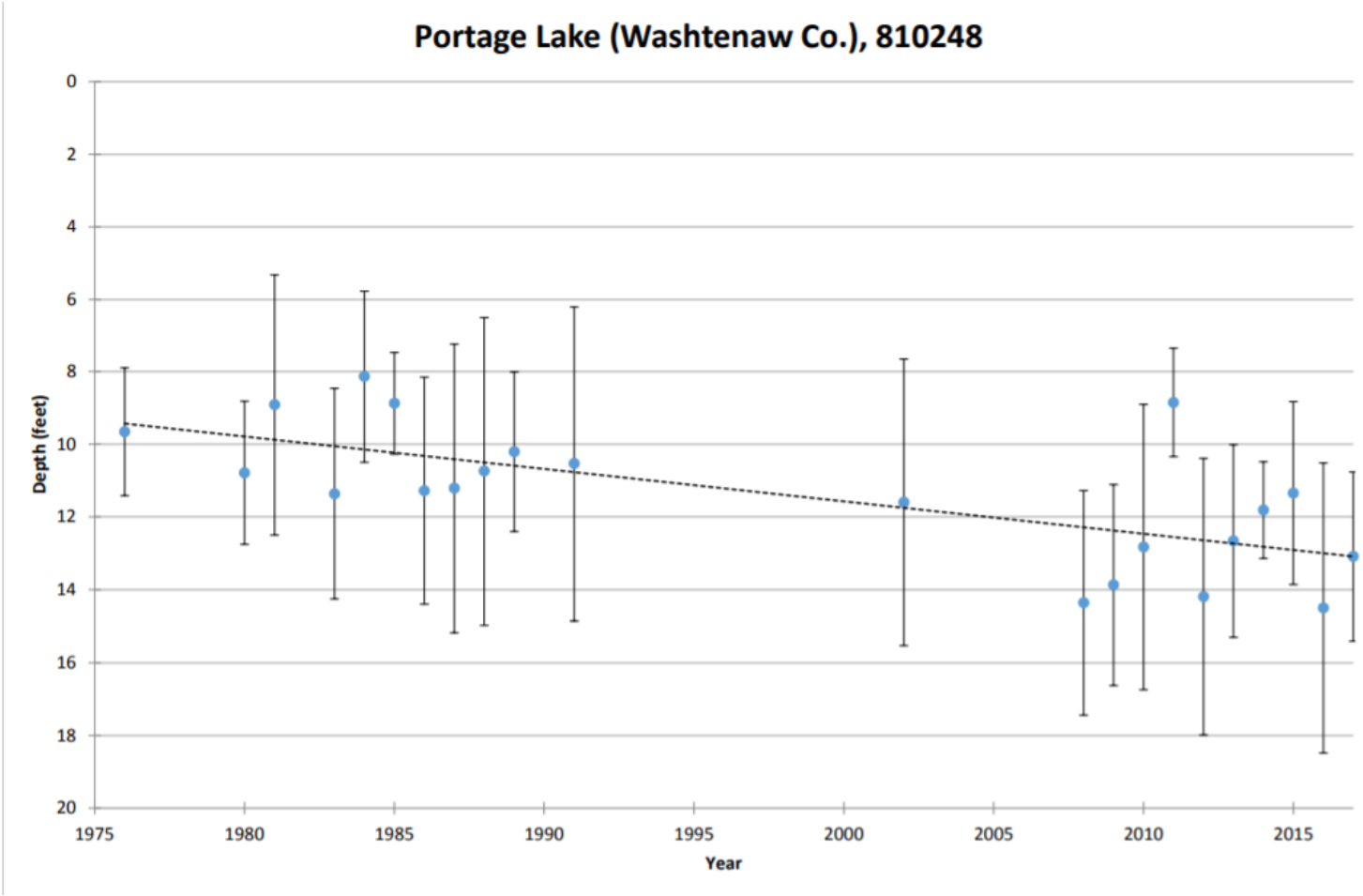
TSI for Cedar Lake in 2023	
Average	33
Secchi Disk	
Summer TP	30
Chlorophyll-a	37

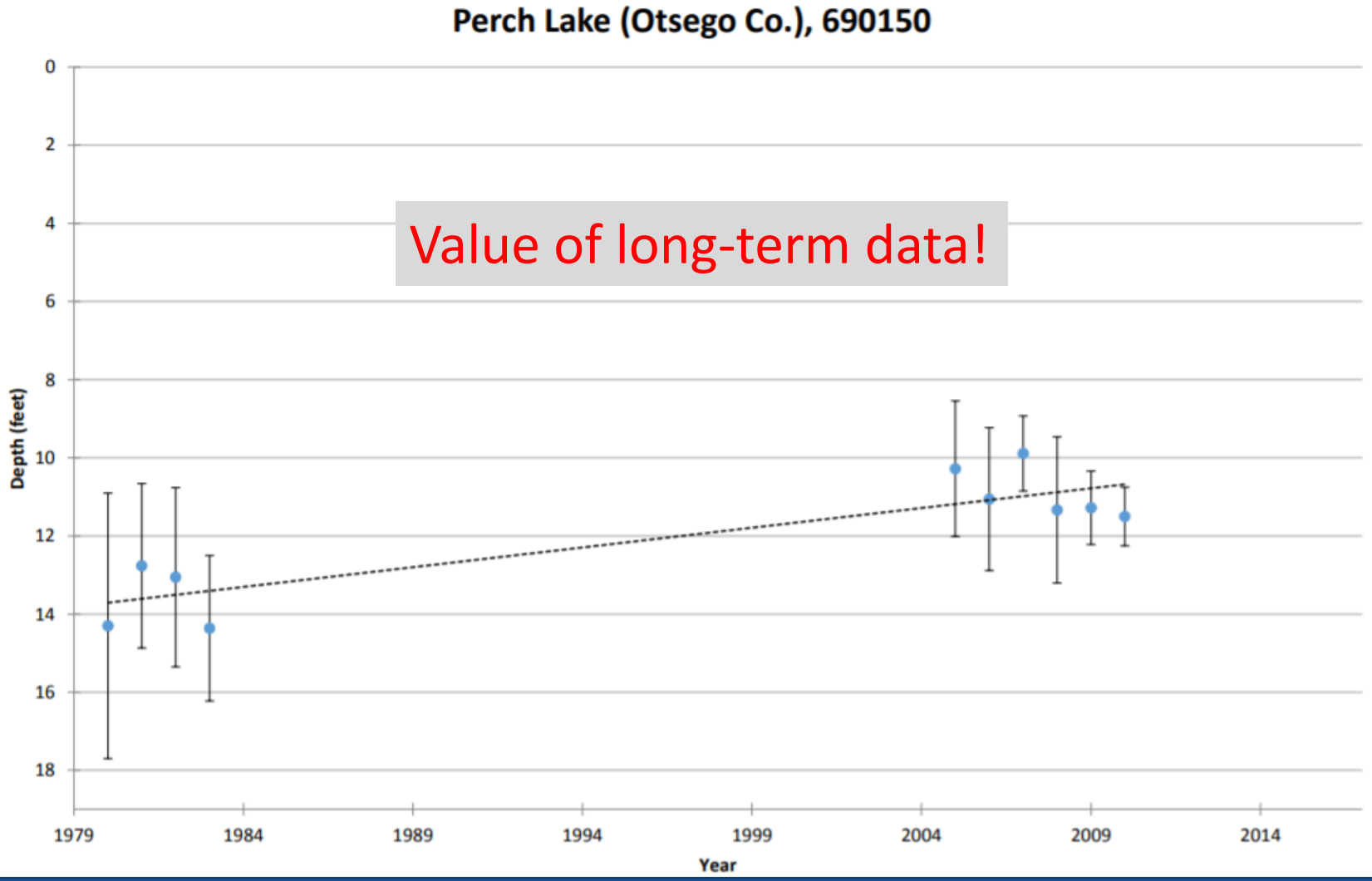


^ Average

^ Total Phosphorus

^ Chlorophyll-a


Portage Lake (Washtenaw Co.), 810248
Depth (feet)
0
2
4
6
8
10
12
14
16
18
20
1975
1980
1985
1990
1995
2000
2005
2010
2015
Year


Perch Lake (Otsego Co.), 690150
Value of long-term data!
Depth (feet)
0
2
4
6
8
10
12
14
16
18
1979
1984
1989
1994
1999
2004
2009
2014
Year

New procedure video!

Questions?

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

MiCorps.net

EGLE
MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

MICHIGAN STATE UNIVERSITY | Extension

Huron River Watershed Council

MICHIGAN LAKES AND STREAMS ASSOCIATION