

Welcome to MiCorps Cooperative Lakes Monitoring Program's Annual Training.

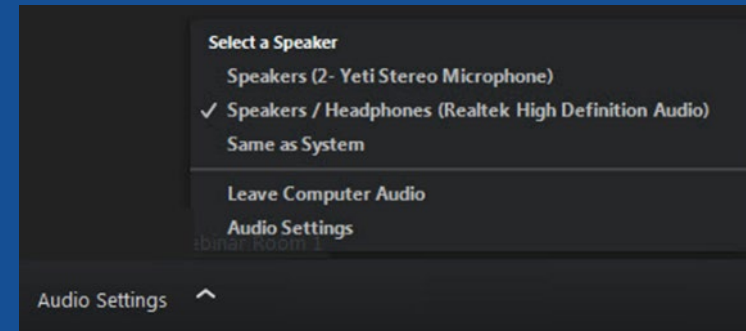
- For CLMP procedures and data forms please visit: micorps.net/lake-monitoring/clmp-documents/ and then click on the name of the parameter.

Today's Agenda:

9:00 AM – 9:15 AM	Welcome and CLMP Review
9:15 – 10:15 AM	Secchi Disk & Phosphorus
10:15 - 10:30 AM	BREAK
10:30 – 11:30 AM	Dissolved Oxygen & Temperature
11:30 AM – 1:00 PM	LUNCH BREAK
1:00 – 2:00 PM	Chlorophyll-a
2:00 – 3:00 PM	Score the Shore
3:00 – 3:15 PM	BREAK
3:15 PM – 4:30 PM	Exotic Aquatic Plant Watch

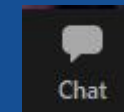
Getting Started

- Audio is through your computer speakers or headset: **You may not hear sound until training begins.**
- Use the **Audio Settings** option to do a sound check.
- During the webinar if you do not hear audio, make sure your sound is turned on then contact the **Help Desk.**



How to Ask Questions

1. Click on the Chat Icon to submit a question to the presenters.

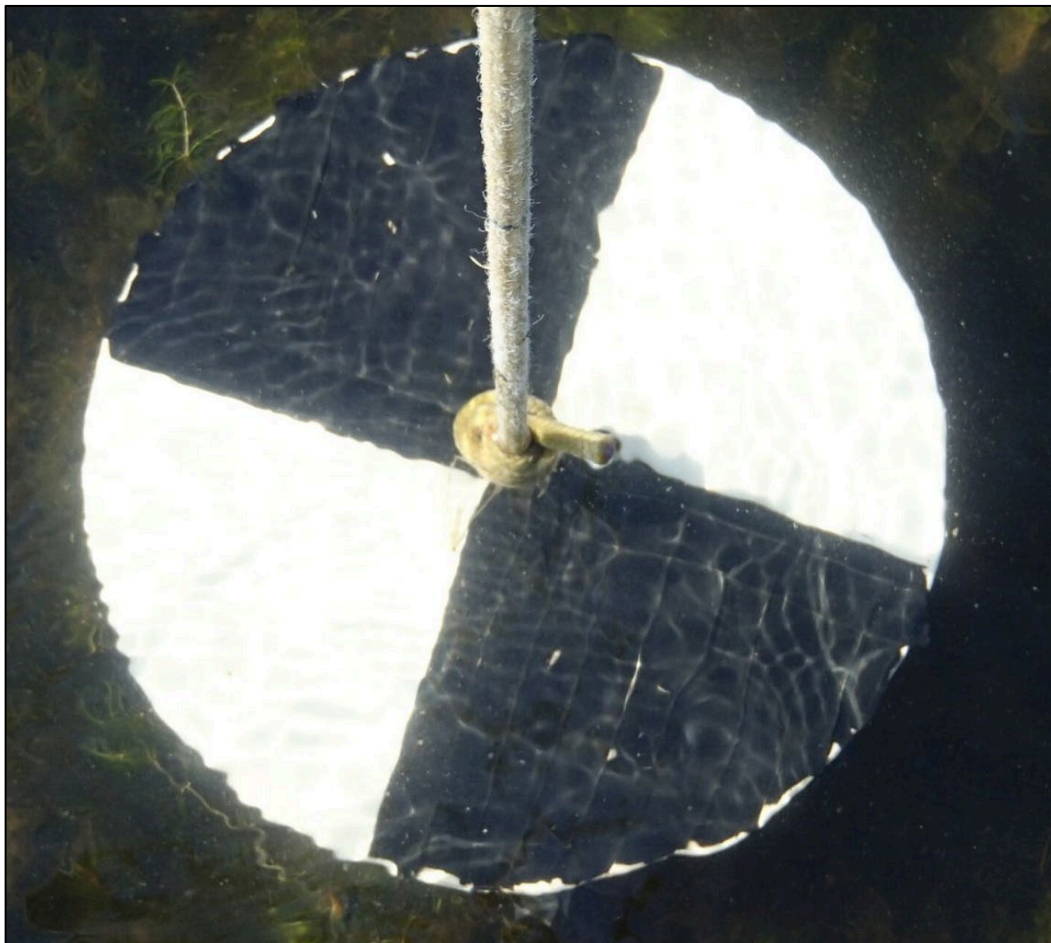


Help Desk

Call the Distance Learning Help Desk (800) 500-1554 for technical support.

Training Agenda

9:00 AM – 9:15 AM	Welcome to CLMP
9:15 AM – 10:15 AM	Secchi Disk & Phosphorus
10:15 AM – 10:30 AM	BREAK
10:30 AM – 11:30 AM	Dissolved Oxygen & Temperature
11:30 AM – 1:00 PM	Lunch
1:00 PM – 2:00 PM	Chlorophyll-a
2:00 PM – 3:00 PM	Score the Shore
3:00 PM – 3:15 PM	BREAK
3:15 PM – 4:30 PM	Exotic Aquatic Plant Watch



Secchi Disk and Total Phosphorus

Erick Elgin



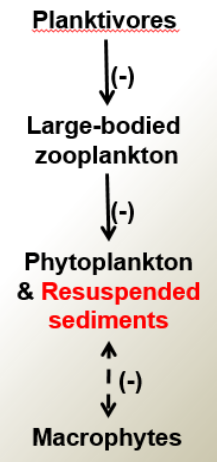
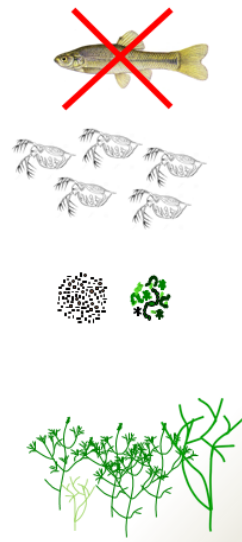
Erick Elgin,
CLMP Lake Program Manager

Michigan State University Extension

Contact:

218-340-5731

elgineri@msu.edu





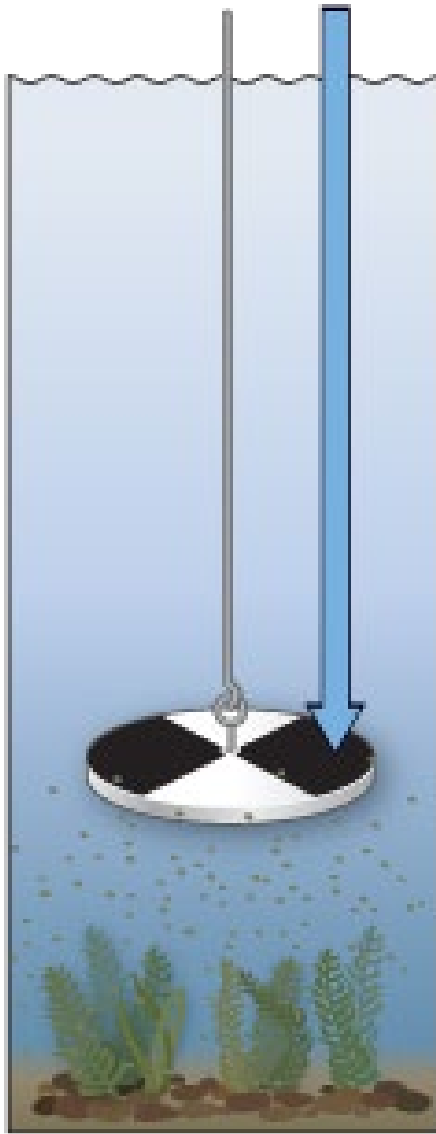
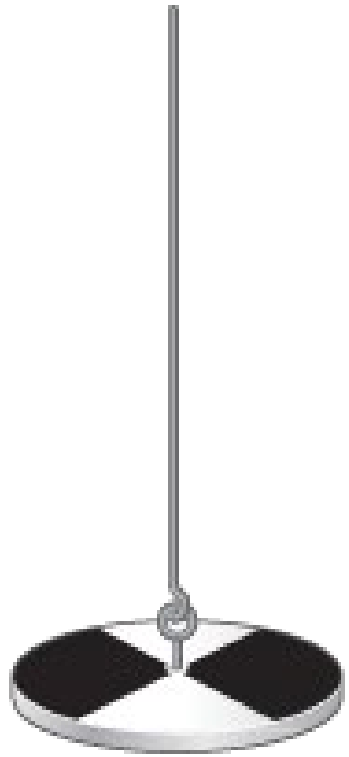
Secchi Disk Water Transparency



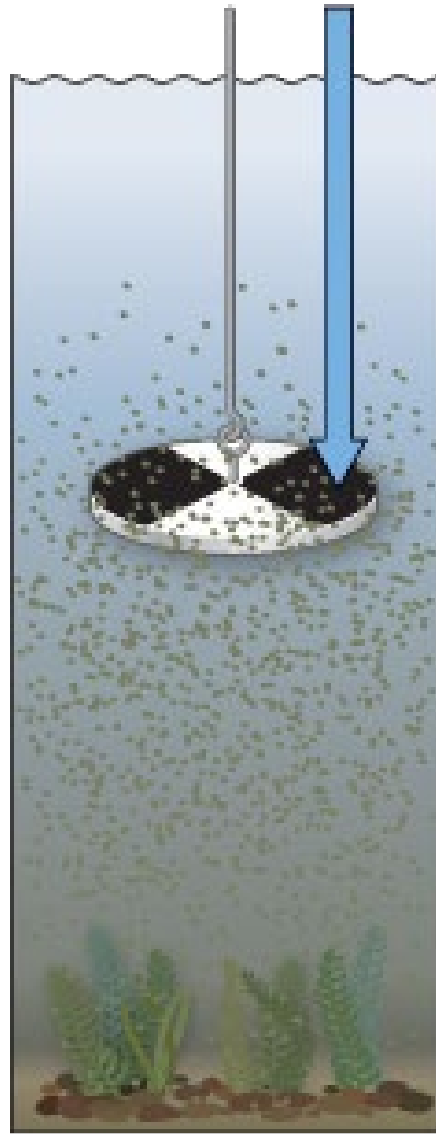
What is a Secchi Disk?



Secchi disk



clear water



cloudy water

How does it work?

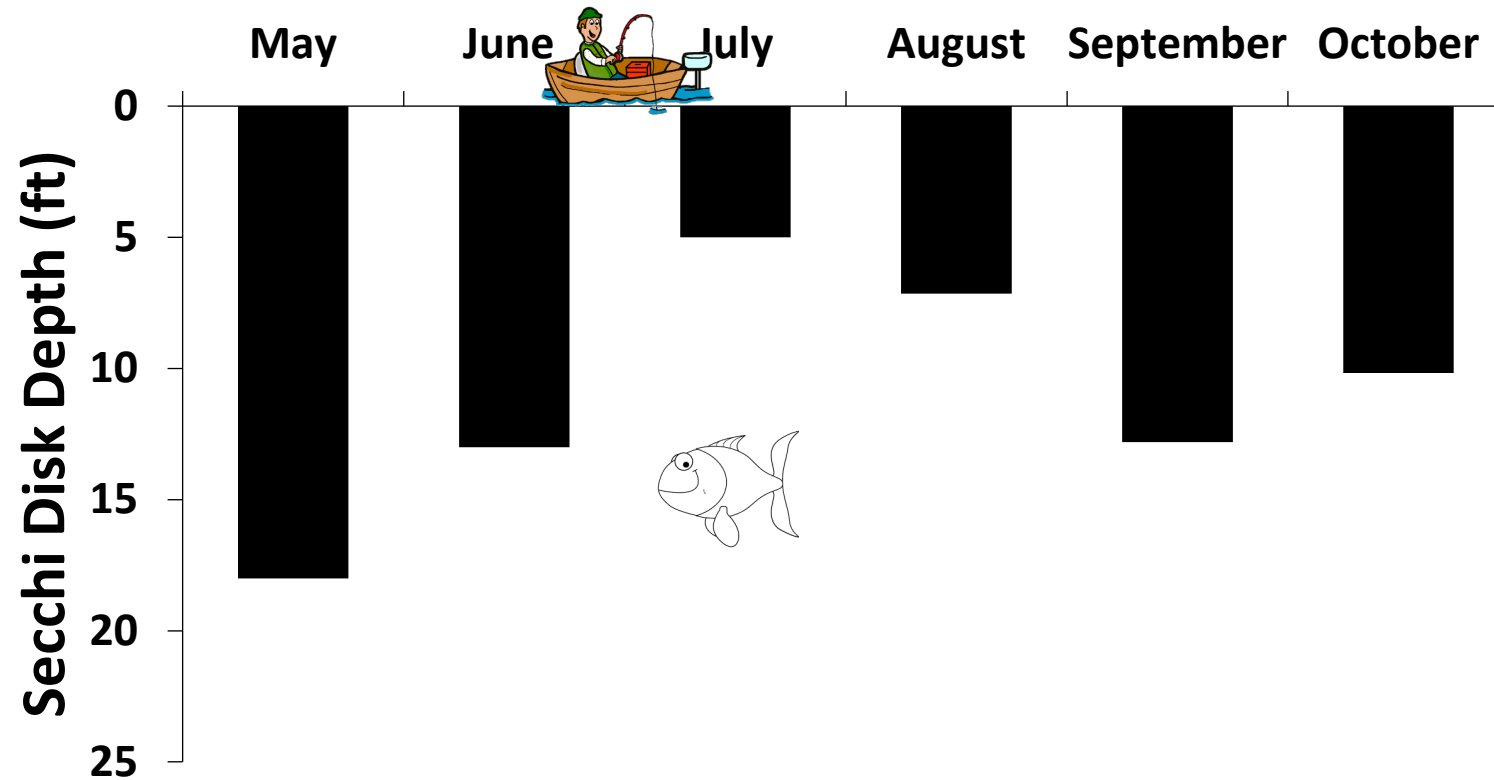
- Water clarity is affected by
 - Water color
 - Algae
 - Suspended solids (organic, sediment, etc...)

What does Secchi transparency tell us?

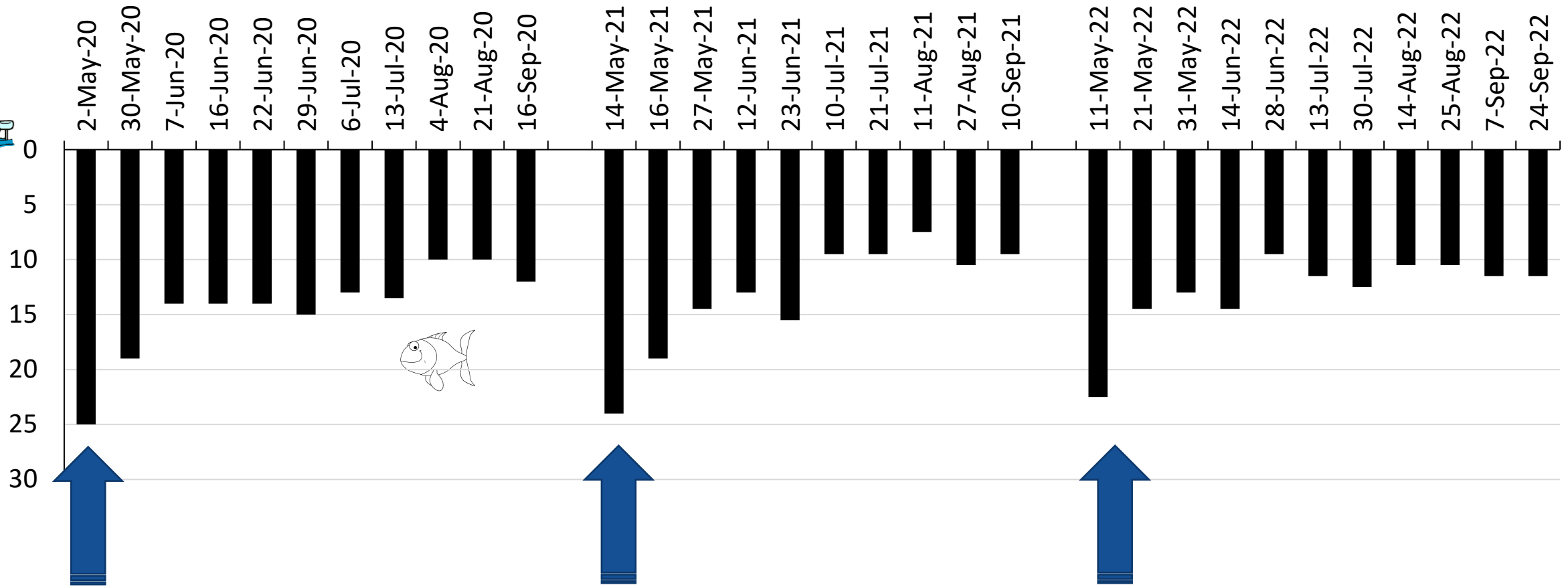
- Indicator of natural processes and human changes
 - Spring clear water state
 - Eutrophication, Re-oligotrophication, and Browning



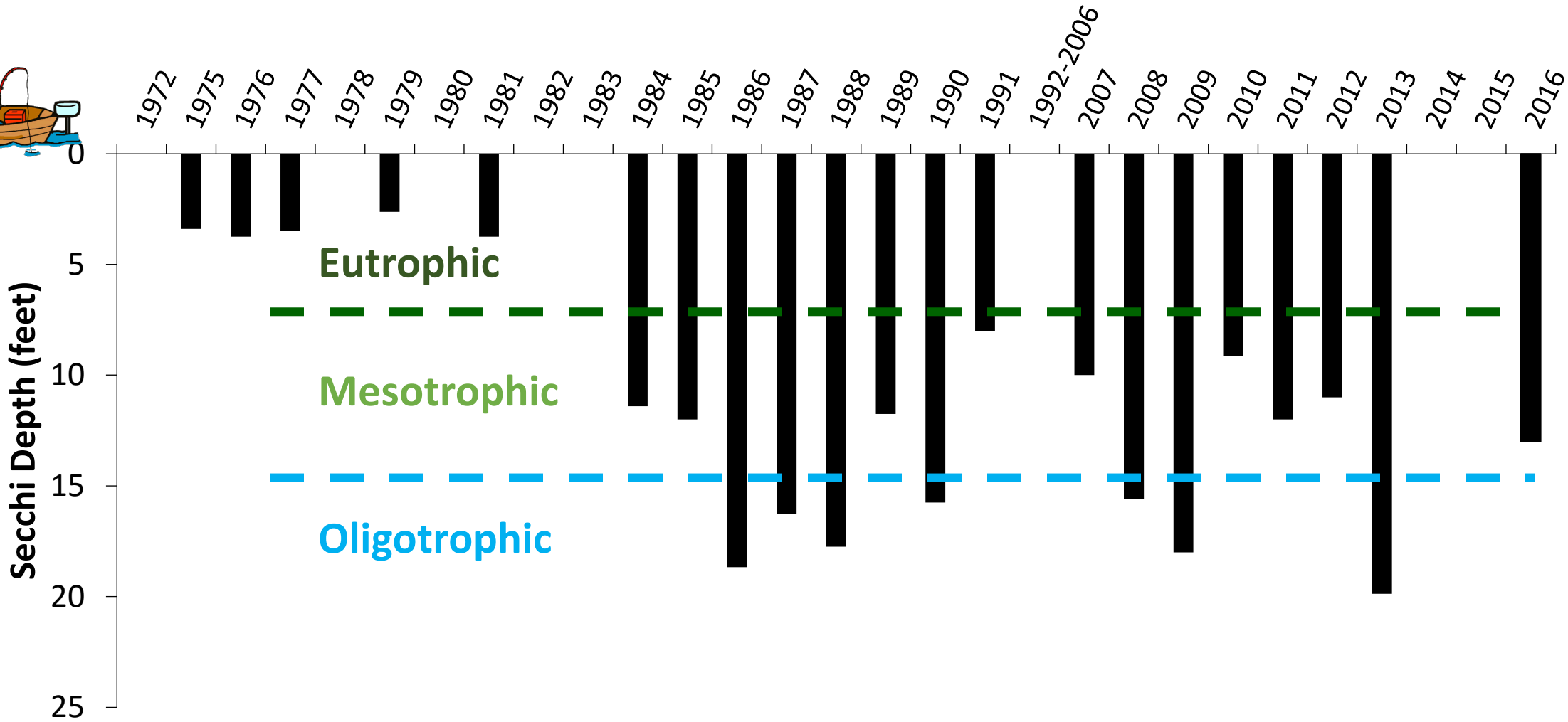
Monitoring water clarity through a season



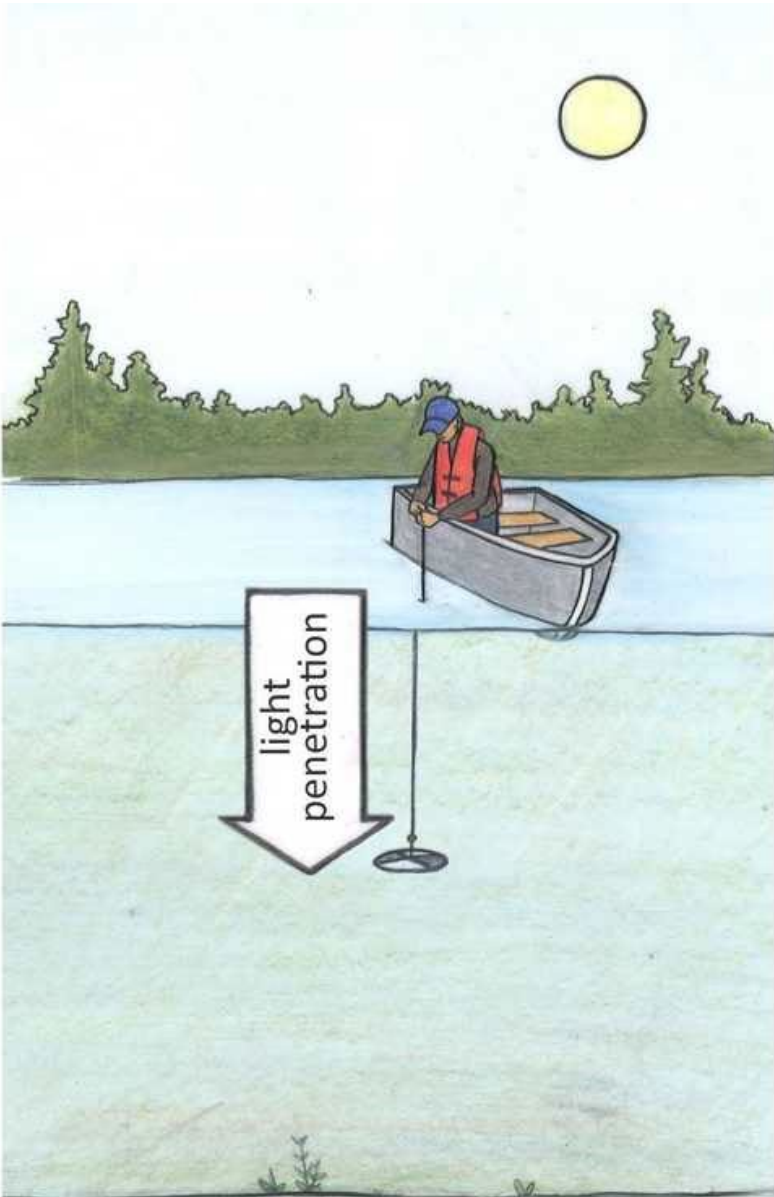
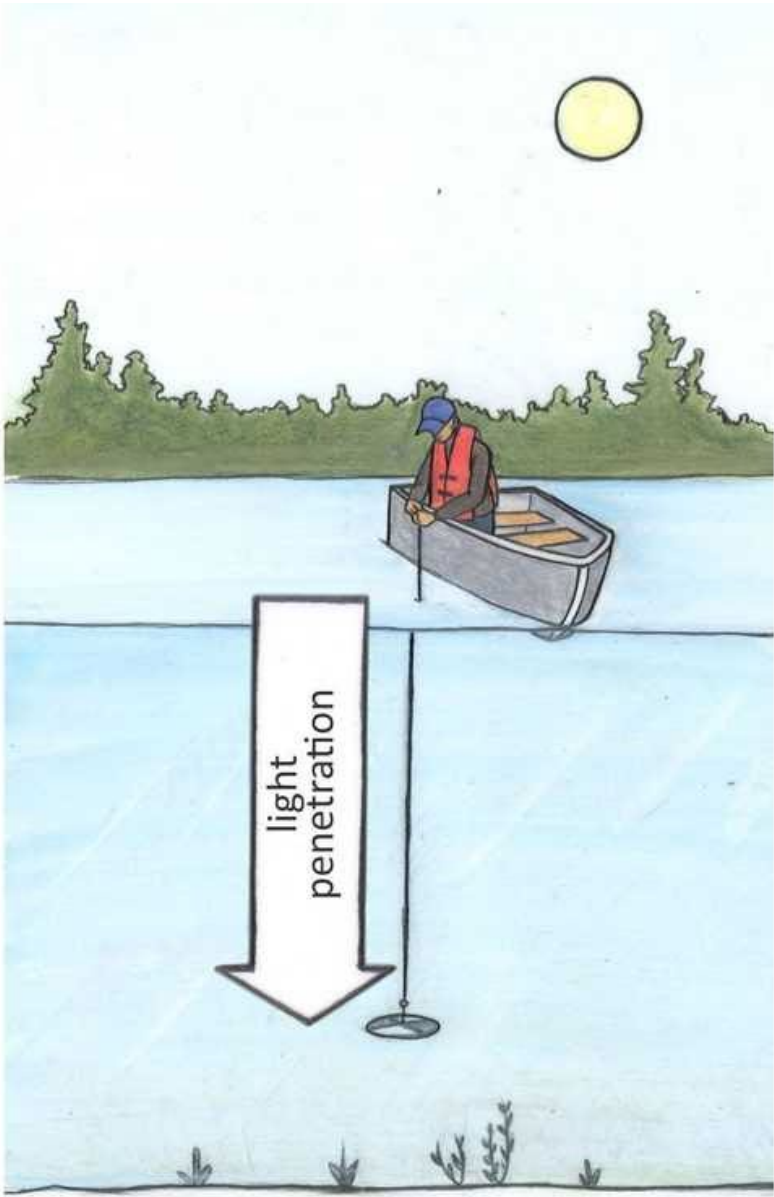
Monitoring water clarity through the seasons



Monitoring Water Clarity: Summarized Historical Trends



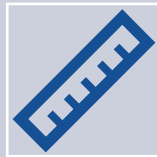
Protocol



CLMP Secchi Sampling Requirements



Evenly spaced monitoring through middle of May to middle of September

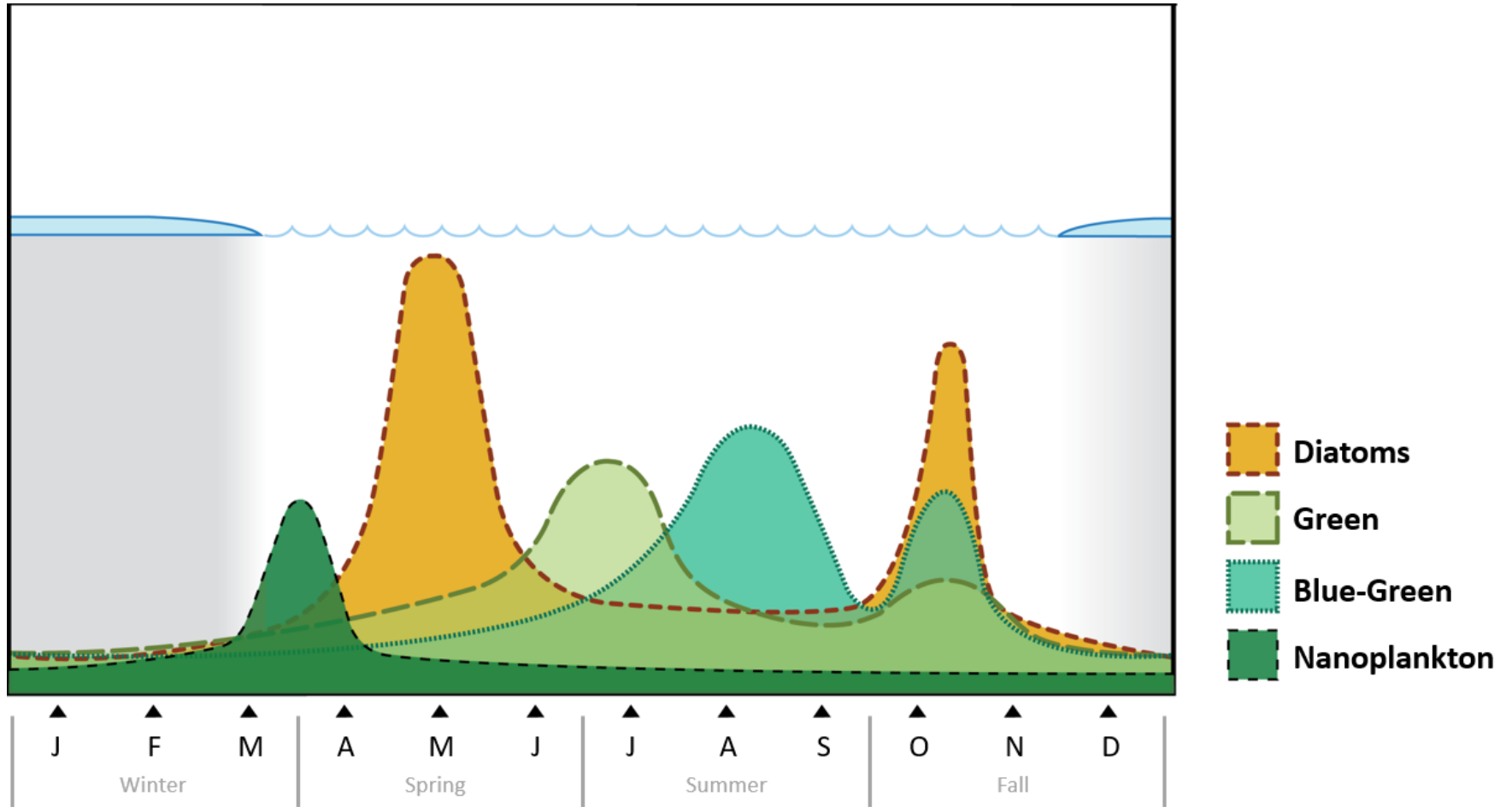


At least 8 measurements



One a week or every other week

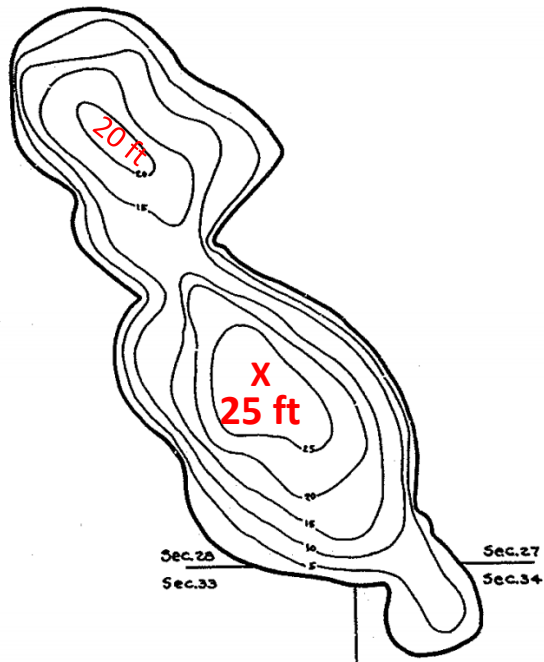
Why 8 measurements spaced evenly through summer? Lakes Change Through Time!



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



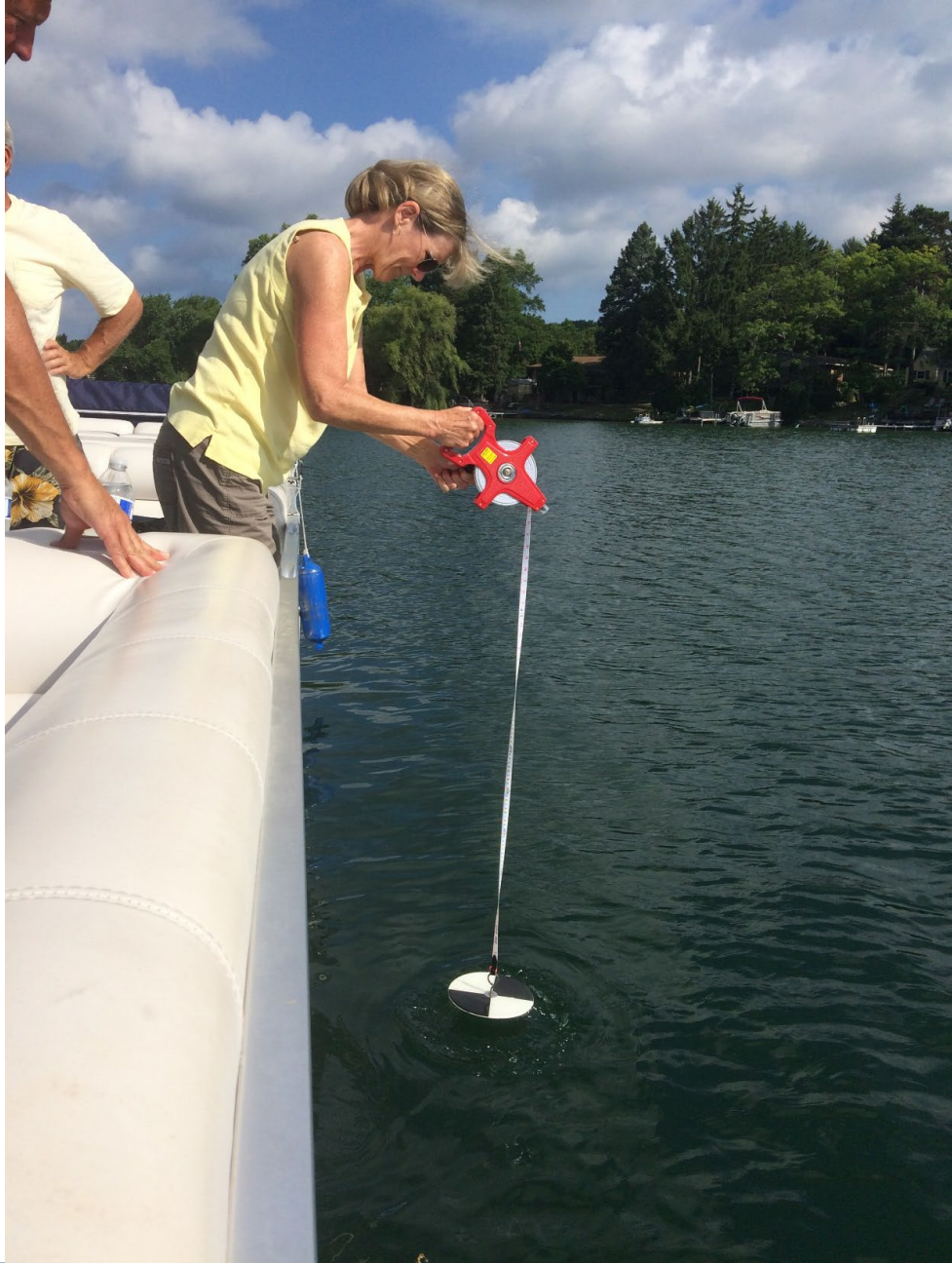
Where to monitor – Find the deepest basin



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. 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.



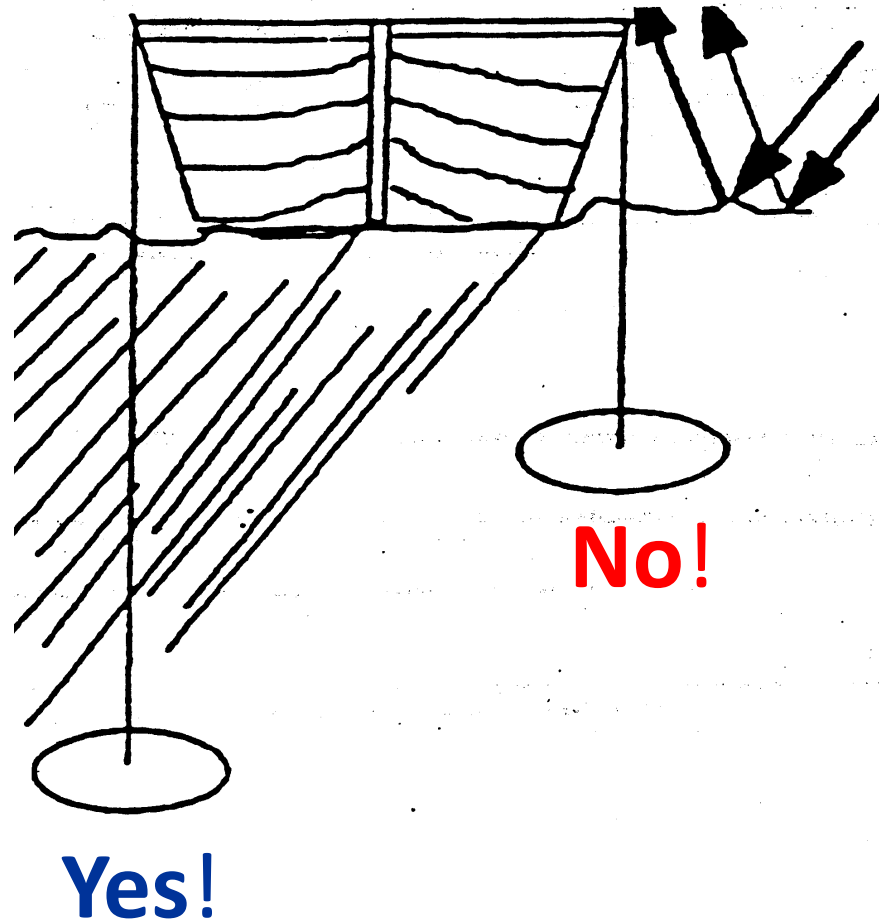
Step 4. The official measurement is the average of the 2 depths.

- 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



Lake Name: _____ County: _____ Township: _____

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

Latitude: _____ Longitude: _____

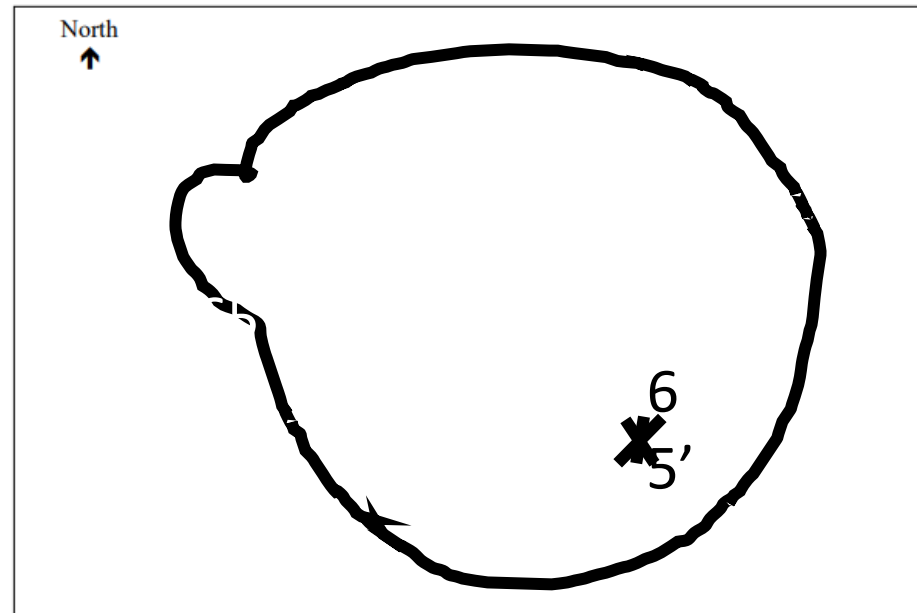
Volunteer Monitor Name(s): _____

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

- ❖ 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

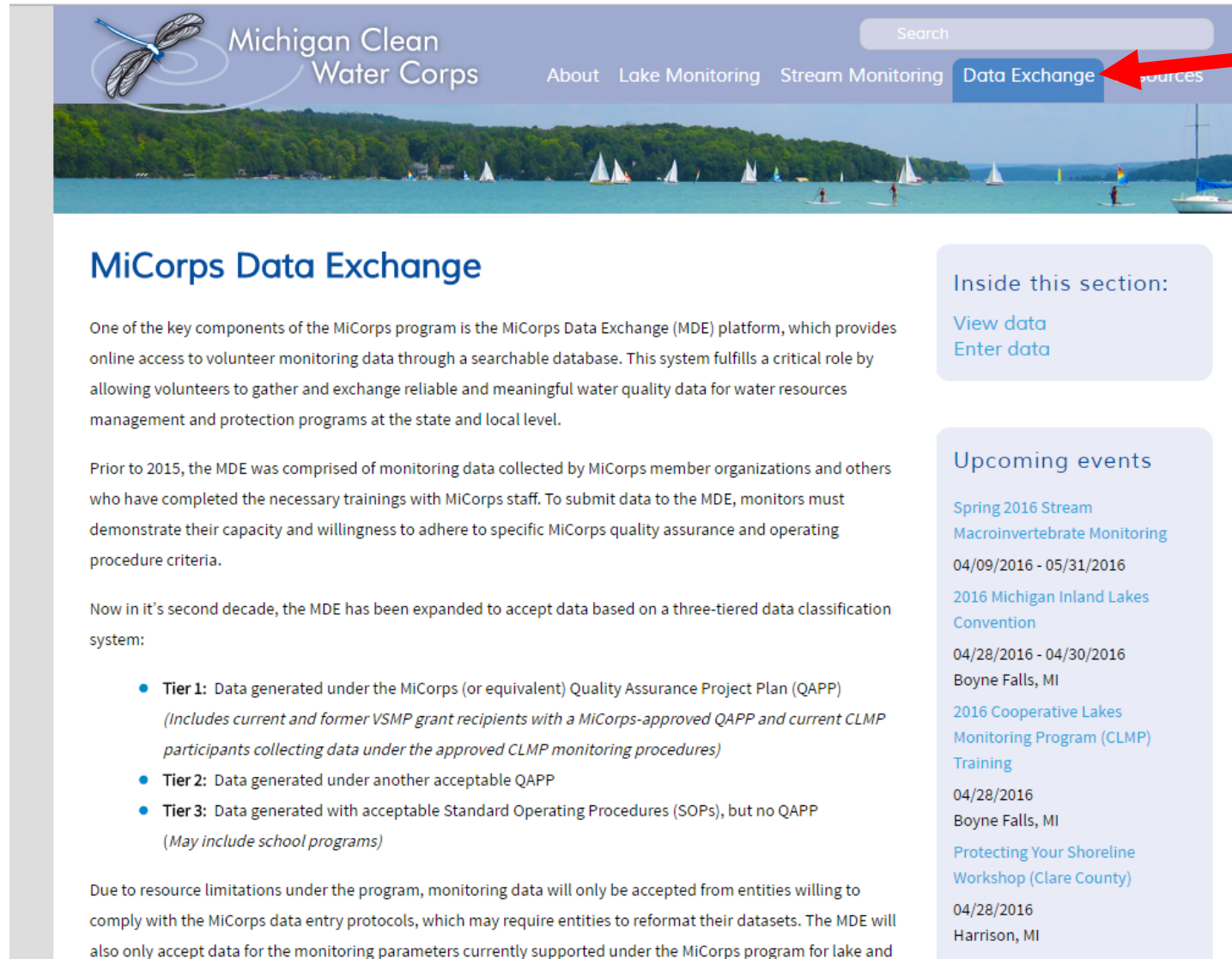
Please do the following:

- (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



The screenshot shows the Michigan Clean Water Corps website. The navigation menu includes 'About', 'Lake Monitoring', 'Stream Monitoring', 'Data Exchange', and 'Resources'. A red arrow points to the 'Data Exchange' link. Below the navigation is a banner image of a lake with sailboats. The main content area is titled 'MiCorps Data Exchange' and contains three paragraphs of text, a list of three data tiers, and two sidebars. The first sidebar is titled 'Inside this section:' and contains links for 'View data' and 'Enter data'. The second sidebar is titled 'Upcoming events' and lists several events with dates and locations.

MiCorps Data Exchange

One of the key components of the MiCorps program is the MiCorps Data Exchange (MDE) platform, which provides online access to volunteer monitoring data through a searchable database. This system fulfills a critical role by allowing volunteers to gather and exchange reliable and meaningful water quality data for water resources management and protection programs at the state and local level.

Prior to 2015, the MDE was comprised of monitoring data collected by MiCorps member organizations and others who have completed the necessary trainings with MiCorps staff. To submit data to the MDE, monitors must demonstrate their capacity and willingness to adhere to specific MiCorps quality assurance and operating procedure criteria.

Now in its second decade, the MDE has been expanded to accept data based on a three-tiered data classification system:

- **Tier 1:** Data generated under the MiCorps (or equivalent) Quality Assurance Project Plan (QAPP) *(Includes current and former VSMP grant recipients with a MiCorps-approved QAPP and current CLMP participants collecting data under the approved CLMP monitoring procedures)*
- **Tier 2:** Data generated under another acceptable QAPP
- **Tier 3:** Data generated with acceptable Standard Operating Procedures (SOPs), but no QAPP *(May include school programs)*

Due to resource limitations under the program, monitoring data will only be accepted from entities willing to comply with the MiCorps data entry protocols, which may require entities to reformat their datasets. The MDE will also only accept data for the monitoring parameters currently supported under the MiCorps program for lake and

Inside this section:

- [View data](#)
- [Enter data](#)

Upcoming events

- [Spring 2016 Stream Macroinvertebrate Monitoring](#)
04/09/2016 - 05/31/2016
- [2016 Michigan Inland Lakes Convention](#)
04/28/2016 - 04/30/2016
Boyne Falls, MI
- [2016 Cooperative Lakes Monitoring Program \(CLMP\) Training](#)
04/28/2016
Boyne Falls, MI
- [Protecting Your Shoreline Workshop \(Clare County\)](#)
04/28/2016
Harrison, MI

Receive a
data report
in early 2024



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

Site ID: 020127

46.48016°N, 86.98277°W

The CLMP is brought to you by:



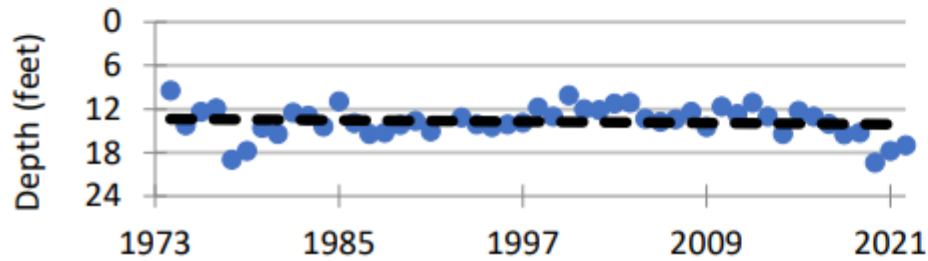
Site ID: 750142

Corey Lake, St. Joseph County 2022 CLMP Results



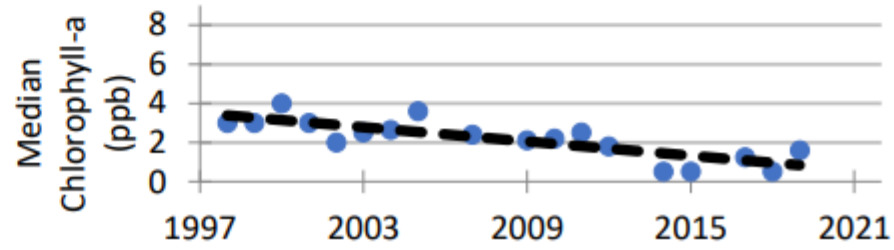
Secchi Disk Transparency (feet)

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 2022 All CLMP Lakes	742 3178	5.5 1.0	39.0 63.0	13.4 11.6	5.5 2.5	40 43

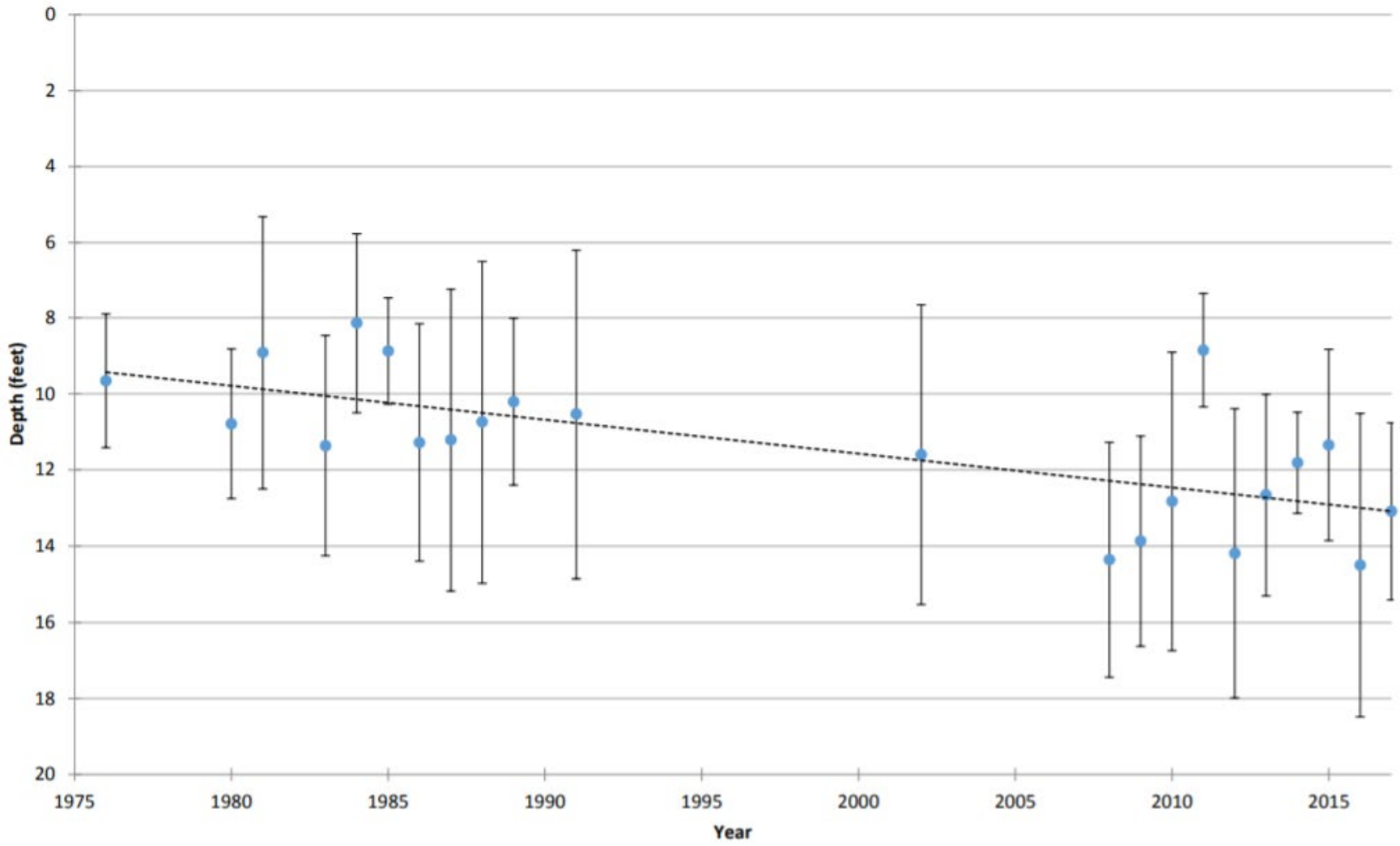


Chlorophyll-a (parts per billion)

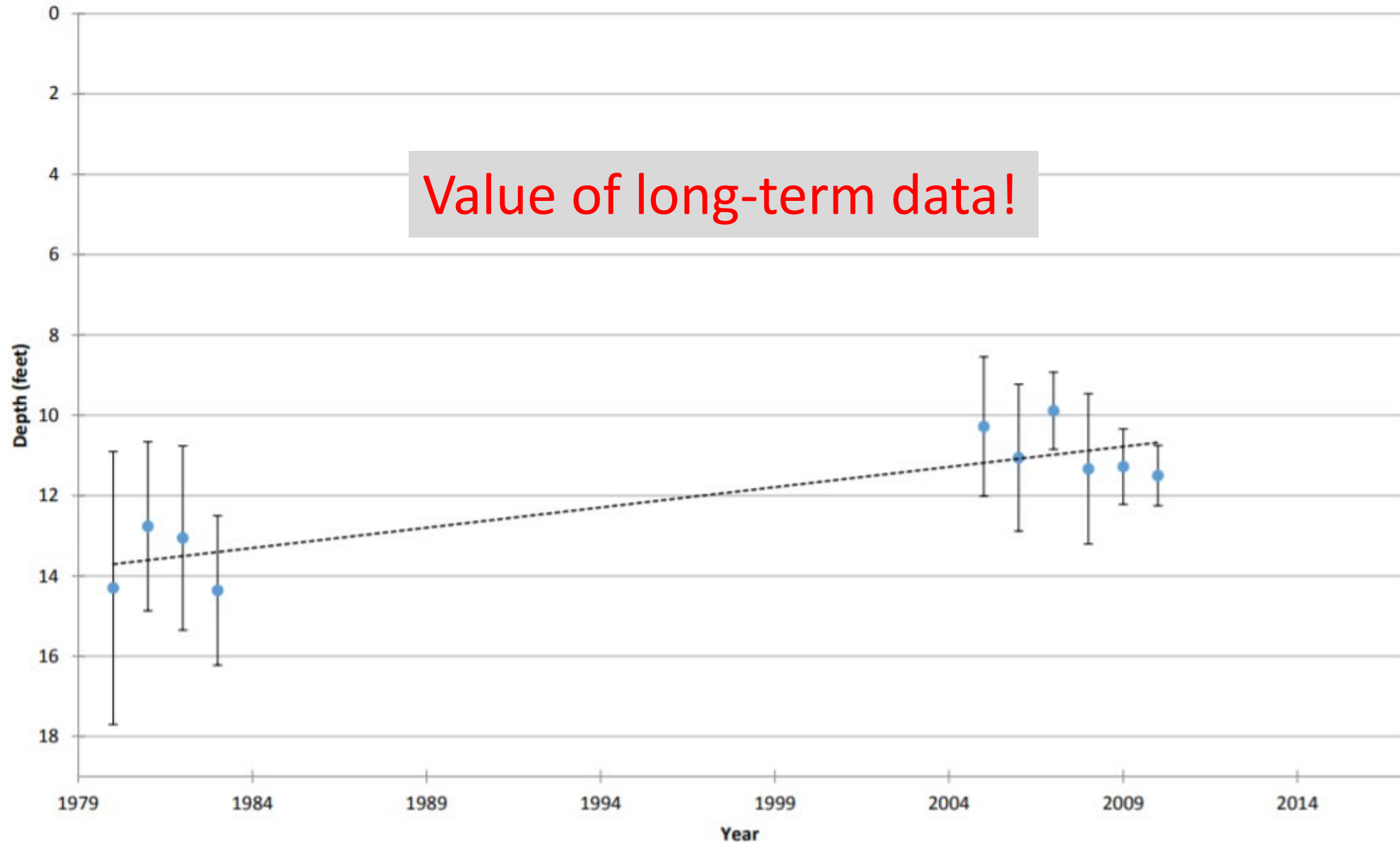
Year	# Samples	Min	Max	Med	Std. Dev	Carlson TSI
2019	5	<1.0	3.9	1.6	1.4	35
2014-2018	20	<1.0	2.7	<1.0	0.5	<31
1998-2013	71	<1.0	4.2	<1.0	0.8	40
2022 All CLMP Lakes	687	< 1.0	43.0	3.7	5.3	43



Portage Lake (Washtenaw Co.), 810248



Perch Lake (Otsego Co.), 690150



Questions?

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

MiCorps.net



MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY



Huron
River
Watershed
Council



Working Together to Protect Lakes





Spring and Summer Phosphorus

Erick Elgin

Phosphorus is an essential nutrient, but can cause issues

CULTURAL EUTROPHICATION IMPACTS

- Higher algal biomass and possible HABS
- Reduced aesthetics
- Increased anoxia
- Reduced economic value



Harmful and Nuisance Algal Blooms

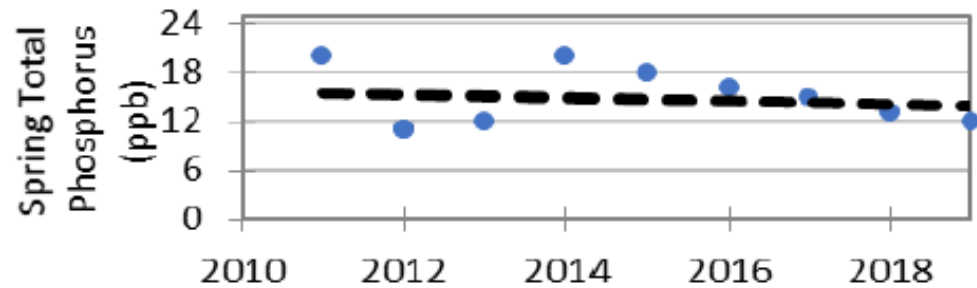
- Can Produce Toxins
- Potential Health Risk to People and Animals



Valuable data through time

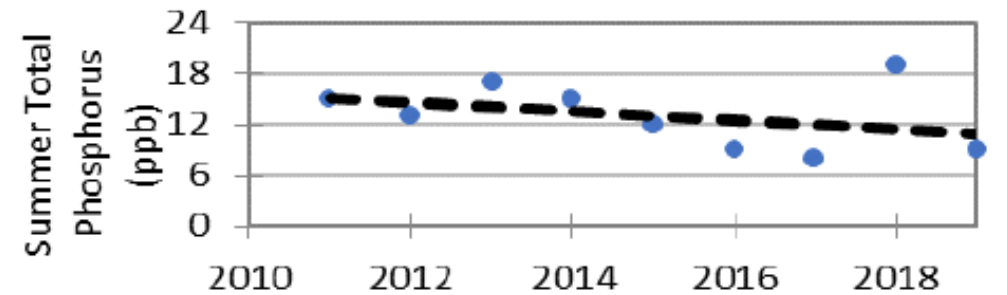
Spring Phosphorus (parts per billion)

Year	# Samples	Min	Max	Average	Std. Dev
2019	1	12.0	12.0	12.0	NA
2014-2018	5	13.0	20.0	16.4	2.7
2011-2013	4	11.0	20.0	13.5	4.4
2019 All CLMP Lakes	220	<= 3	100.0	14.9	11.0



Summer Phosphorus (parts per billion)

Year	# Samples	Min	Max	Average	Std. Dev	Carlson TSI
2019	1	9.0	9.0	9.0	NA	36
2014-2018	5	8.0	19.0	12.6	4.5	40
2011-2013	3	13.0	17.0	15.0	2.0	43
2019 All CLMP Lakes	281	<= 3	65.0	12.8	9.3	38



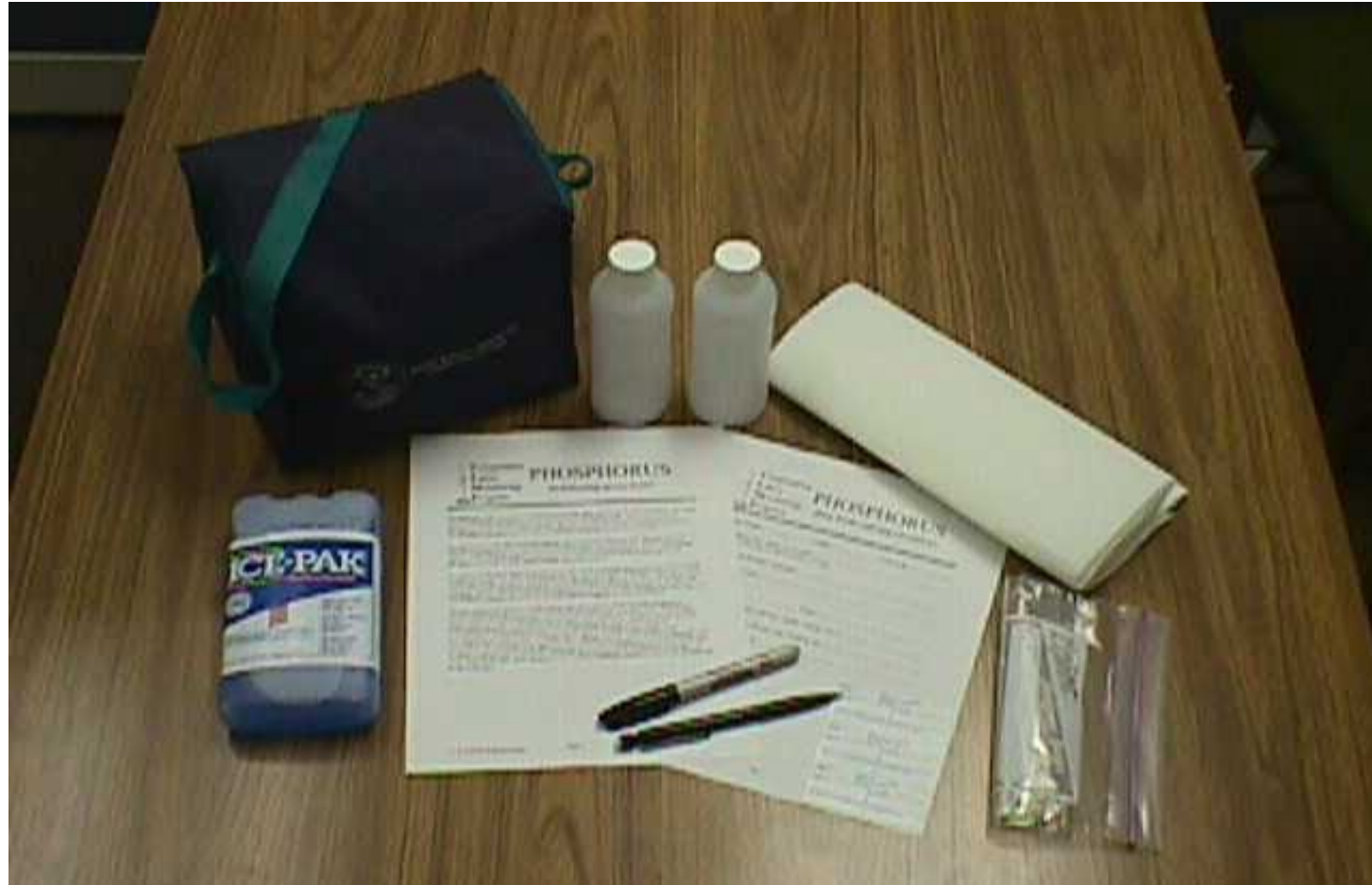
Phosphorus Protocol



What you get in the mail

- Monitoring instructions
- Sampling and sample turn-in schedule and locations
- Data form
- Bottle labels (3)
- Two 250ml sampling bottles with caps on
 - One is the actual sample and the other is a replicate

Other materials needed: Cooler bag, ice pack, zip lock baggies of different sizes, a pencil/Sharpee



Spring phosphorus is measured during spring mixing

- Within **14 days after ice-out**
(March/April/May)
- Volunteer determines ice-out
- Surface grab sample
- Representative of whole lake
- Shows nutrient enrichment trends

Summer phosphorus is measured during summer stratification

- Late summer - early fall (Aug. - Sept.)
 - Depends on latitude
- Surface grab sample
- Indicates the phosphorus available to plants/algae in the growing season.
- Used to calculate trophic state

When: Phosphorus Schedule



SUMMER PHOSPHORUS 2023 Sample Collection and Turn-in Schedule



Spring P: Turn in June 27th

Summer P: Sampling and drop off dates depend on your location

- UP lakes sample in August; southern counties: end of September

COUNTY	TURN-IN ADDRESS (EGLE unless noted otherwise)	SAMPLING DATES	TURN-IN DATES
Allegan, Kalamazoo, Barry, Van Buren, Berrien, Cass, St. Joseph	EGLE Kalamazoo District Office 7953 Adobe Road Kalamazoo, MI 48909 Deana Mercks: 269-330-8571	Sept 21-25	8 am-Noon September 26
Calhoun, Jackson, Washtenaw, Branch, Hillsdale, Lenawee	EGLE Jackson District Office 301 E. Louis B. Glick Hwy. Jackson, MI 49201 Kathy David: 517-257-0251	Sept 21-25	8 am-Noon September 26
St. Clair, Macomb, Oakland, Wayne, Monroe	EGLE Warren District Office 27700 Donald Court Warren, MI 48092 Jack Cotrone: 248-763-1994	Sept 21-25	8 am-Noon September 26
Ottawa, Kent, Montcalm, Ionia, Muskegon, Oceana, Newaygo, Mecosta	EGLE Grand Rapids District Office 350 Ottawa St. NW, Unit 10, 5th Floor Grand Rapids, MI 49503 Lucy Robinson or Mercedes Alvarado: 616-250-7915	Sept 14-18	8 am-Noon September 19

Step 1: Fill out labels

- Fill out and stick to bottle before you sample
- Use pencil or permanent marker

NOTE: On second label for replicate sample, include all above plus “REP” in the Location box along with the Lake Name.

Collector's Initials TP	DEQ	Date 4-20-2013
Field ID 555432	Location DEAD SWEDEE LAKE	
Analysis or Parameter Code GA	Chemicals Added	

Collector's Initials TP	DEQ	Date 4-20-2013
Field ID 555432	Location REP DEAD SWEDEE LAKE	
Analysis or Parameter Code GA	Chemicals Added	

Step 2. Drift your boat over the deepest part of the lake

- Remove cap and rinse the bottle twice

NOTE

- Only use the bottle we provided
- Make sure not to contaminate bottle or cap



Step 3. Collect sample

Holding the bottle upside down, lower the bottle below the surface to 1-2 foot depth and then tilt upward. Hold until bottle is full.

- Repeat with second bottle





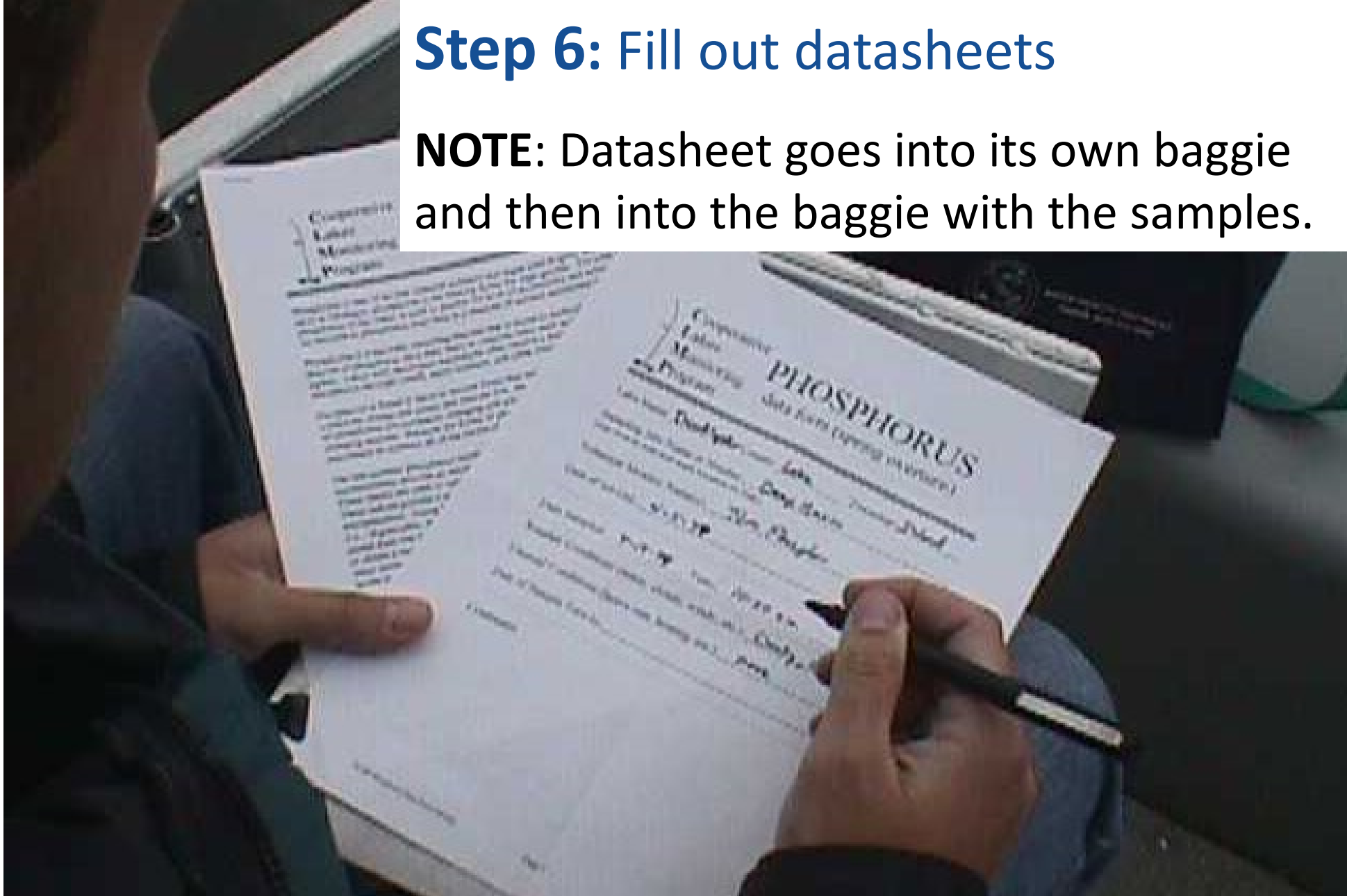
Step 4. Pour water out until bottle is filled to $\frac{3}{4}$ full to avoid cracking the bottle when frozen.

Step 5. Place bottles in labeled baggie and place in cooler.



Step 6: Fill out datasheets

NOTE: Datasheet goes into its own baggie and then into the baggie with the samples.





SPRING TOTAL PHOSPHORUS 2023 Data Form



Lake Name: _____ County: _____ Township: _____

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

Latitude: _____ Longitude: _____ Circle
GPS / Map

Volunteer Monitor Name(s): _____

Date of Ice-Out: _____

Date Sampled: _____ Time: _____

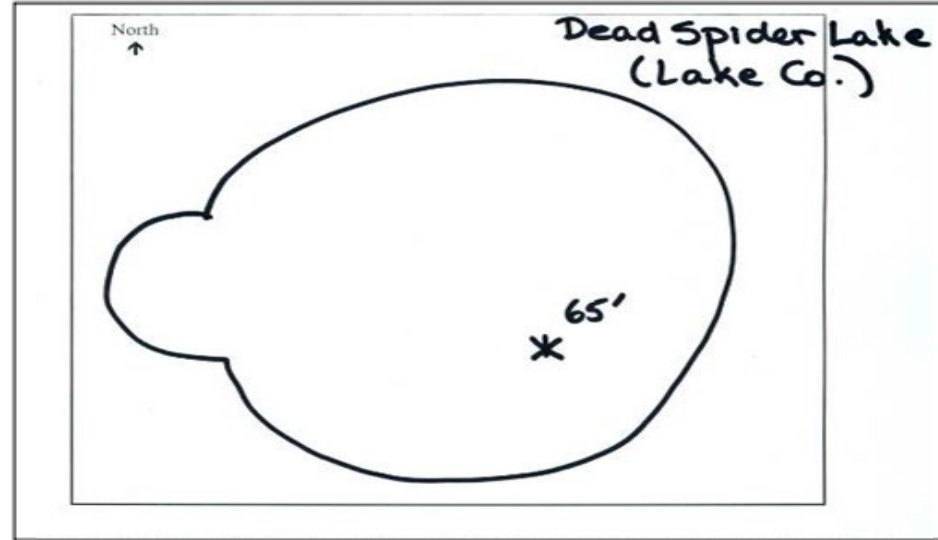
Weather Conditions (sunny, cloudy, windy, etc.): _____

Unusual Conditions? (heavy rain, boating, etc.): _____

Date of Sample Turn-In: _____

Comments:

- ❖ 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 total phosphorus sampling location (this should be at the deepest location in your lake) and write the LAKE DEPTH at this location. (**Note:** If you sample at more than one location in the lake, use a separate data form for each location.)
- ❖ 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) Put **one copy** in a baggie to keep it dry and
- (3) Deliver the frozen total phosphorus samples together with the data sheet copy to the designated drop-off location on the designated turn-in date (according to the Spring Phosphorus Sampling Schedule).

Step 7: Store in freezer until Turn-in Date





Step 8. Turn in:

Turn in your **frozen bottles** with your data forms to the designated location.

Drop off location and time in Phosphorus Schedule

Common Reasons for Sample Rejection

- Sample collected at the wrong time
 - Spring P– samples collected >2 weeks after ice-out will be flagged for error, >4 weeks will be rejected.
 - Summer P – samples collected more than a week outside the assigned interval will be rejected
- Incorrect delivery
 - If you forget or can't turn your samples to the drop-off location on the assigned date, that can cause problems. CONTACT US for instructions on safe shipping. Unexpected shipments will thaw and be rejected.
- Cracked bottles/caps
 - Be sure to leave headroom in the bottle for expansion

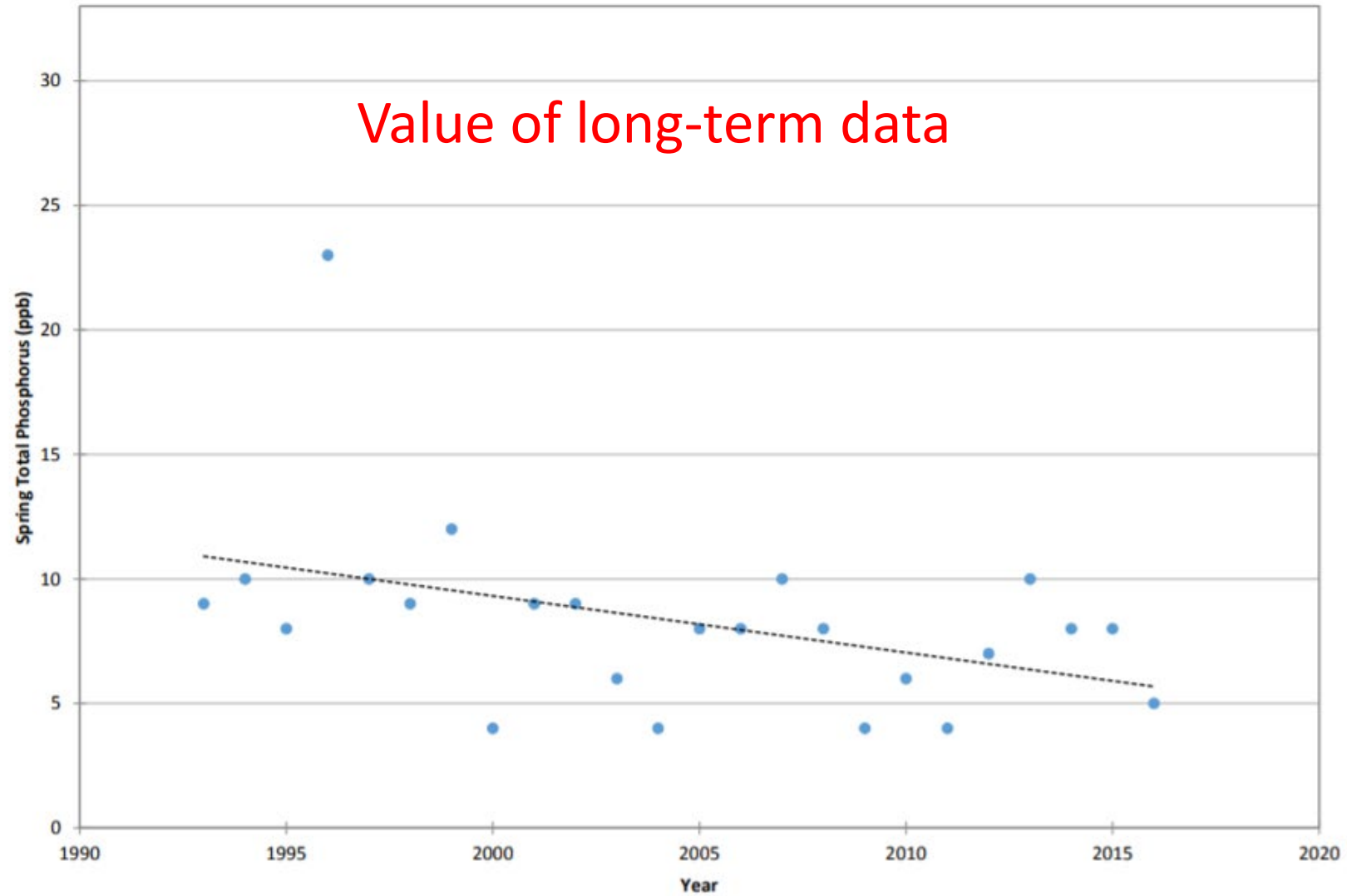
Common Reasons for Sample Rejection

Wrong bottles used

- We ONLY accept samples in the sterile bottles we send you

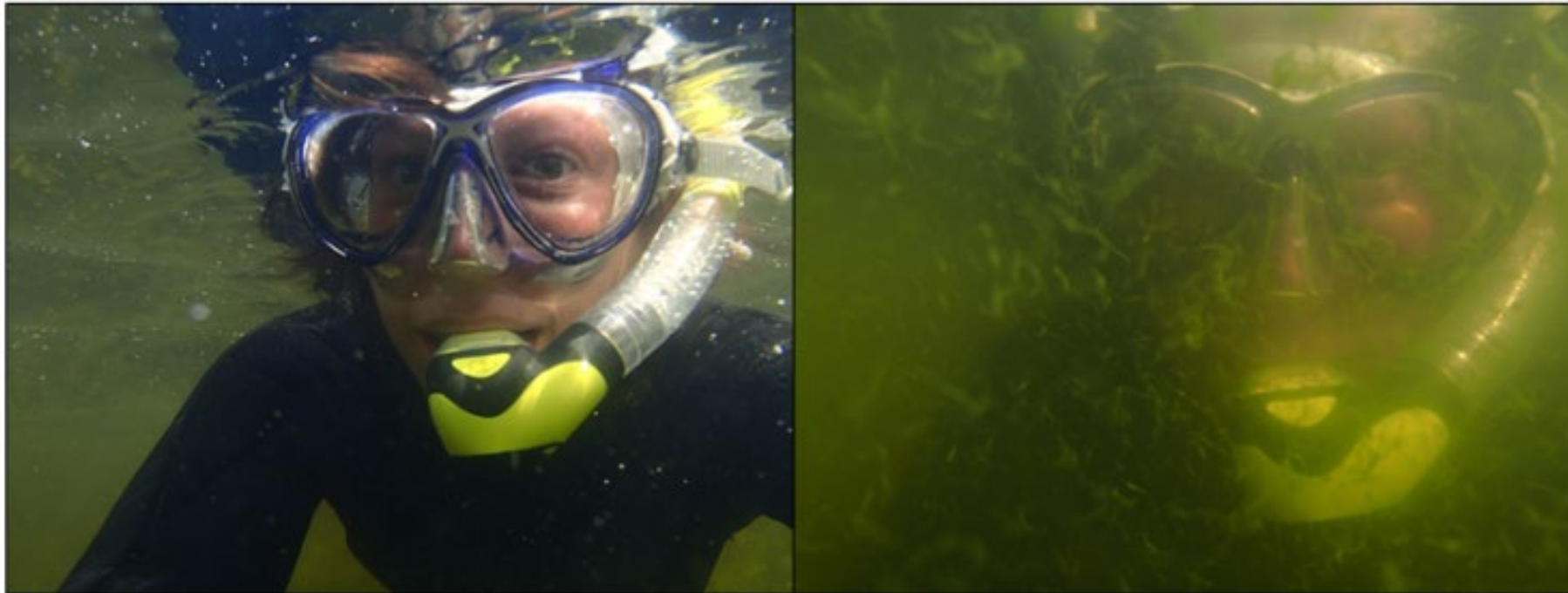


Corey Lake (St. Joseph Co.), 750142

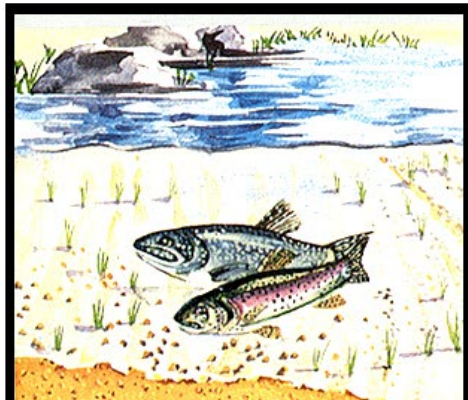
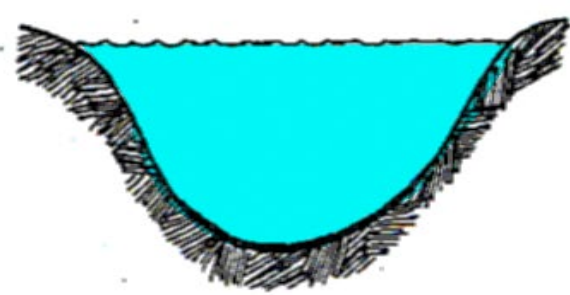


Secchi and Phosphorus data used to calculate trophic status

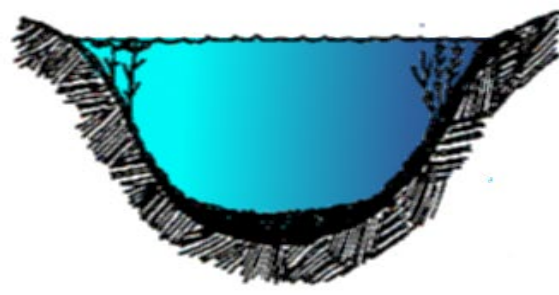
- **Trophic Status**: description of how productive a lake is.
- **Productivity**: the amount of plant or animal life that a lake can support
- **Indicators**: Transparency, Total phosphorus, and Chlorophyll a



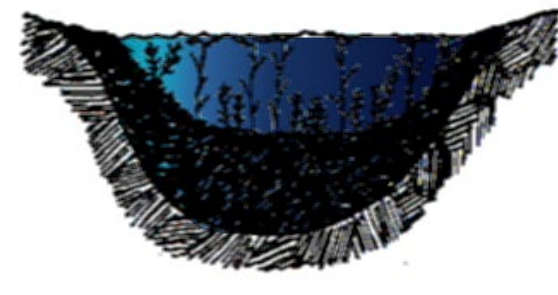
TROPHIC STATUS



Oligotrophic



Mesotrophic



Eutrophic

No Data is better than Bad Data

Questions?

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

MiCorps.net



MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY



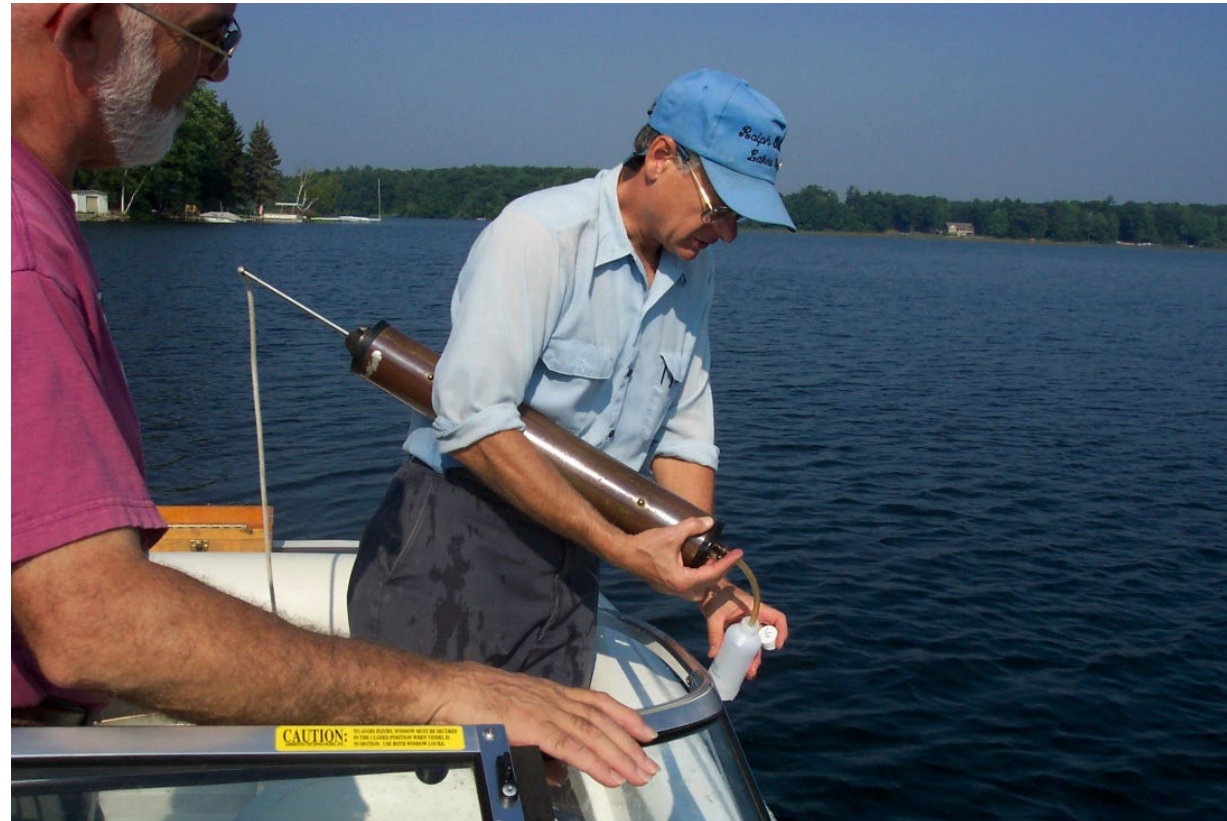
Huron
River
Watershed
Council



Working Together to Protect Lakes



Working together to protect lakes!



Questions?