Chlorophyll Training

- If you registered for Chlorophyll--- get your equipment NOW from Jean (out in the hall) before the training starts.

1

COOPERATIVE LAKES MONITORING PROGRAM
TRAINING FOR

Chlorophyll-a

2

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Huron River Watershed Council

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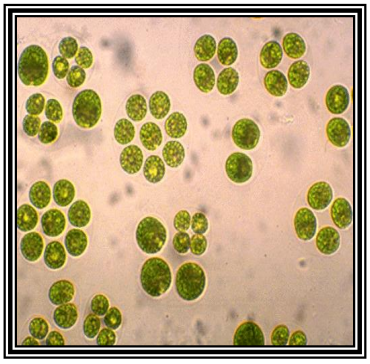
Trophic State Indicators

- Transparency
- Total Phosphorus
- Chlorophyll *a*
- Dissolved Oxygen and Temperature

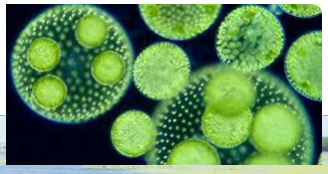
Chlorophyll a Training Outline

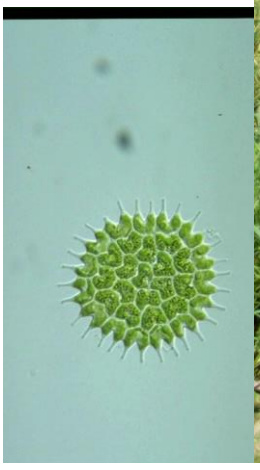
- What is chlorophyll?
- Schedule
- Water Collection
- Sample Handling
  - preservative (MgCO3)
  - field filtering
  - freezer storage
- Trophic state indicator
- Variability and trends



CHLOROPHYLL-A

What is Chlorophyll-a?





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CHLOROPHYLL-A

Sampling Schedule

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micorps.net → Lake Monitoring → CLMP documents

Cooperative Lakes Monitoring Program

CHLOROPHYLL

2019 sampling dates and sample turn-in dates and locations

Michigan Clean Water Corps

COUNTY	TURN-IN ADDRESS (DEQ unless noted otherwise)	SAMPLING DATES	TURN-IN DATES
Allegan, Kalamazoo, Barry, Van Buren, Berrien, Cass, St. Joseph	7953 Adobe Road Kalamazoo, MI 49009-5025 Deana Mercs 269-567-3570	Sample #1 May 10-20 Sample #2 June 10-20 Sample #3 July 10-20 Sample #4 Aug 10-20 Sample #5 Sept 19-23	8 am-Noon June 18 8 am-Noon September 24
Calhoun, Jackson, Washtenaw, Branch, Hillsdale, Lenawee	301 E. Louis B. Glick Hwy Jackson, MI 49201-1535 Kris Coffey 517-780-7904	Sample #1 May 10-20 Sample #2 June 10-20 Sample #3 July 10-20 Sample #4 Aug 10-20 Sample #5 Sept 19-23	8 am-Noon June 18 8 am-Noon September 24

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Cooperative Lakes Monitoring Program

CHLOROPHYLL

Data Form 1

Michigan Clean Water Corps

Lake Name:_____ County:_____ Township:_____

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

Circle

Latitude: _____ Longitude: _____

Volunteer Monitor Name(s):_____

Sampling Event #1 (May) Date Sampled:_____ Time:_____

Secchi Depth:_____(feet) Composite Sample Depth:_____(feet)

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

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

Filtering Sample (if 50 cc could not be filtered for this sample, indicate amount filtered):

Sample 1: _____(cc) Sample 2: _____(cc)

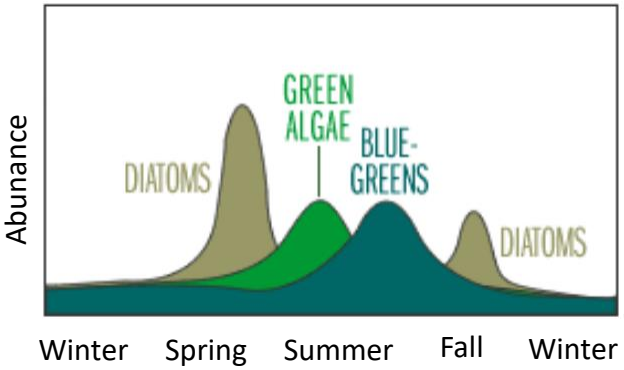
Sampling Event #2 (June) Date Sampled:_____ Time:_____

Secchi Depth:_____(feet) Composite Sample Depth:_____(feet)

10

NEED 4-5 months sampled per year.
Lakes change over time!

Seasonal Succession of Lake Algae in a Mesotrophic Lake



Credit: Water on the Web

Chlorophyll Equipment

- Bag of equipment contains
  - -60 cc (ml) syringe
  - -filter holder
  - -filters (12-13) (in a baggy)
  - -tygon tube
  - -vials with caps (11)
  - -tweezers
  - -amber bottles (2)
  - -dropper bottle with $MgCO_3$ (labeled)
  - -zip-lock bags
  - -labels (11)
  - -clothes pin
- Weighted composite sampler
- Keep a copy of the quick procedures handy

Chlorophyll Sampling Re-supply Kit

- Filters (11- 12) with warning label (in envelope)
- Vials with caps (11)
- Dropper bottle with $MgCO_3$ (labeled)
- Zip-lock bags
- Labels (11)

Chlorophyll Sampling Equipment

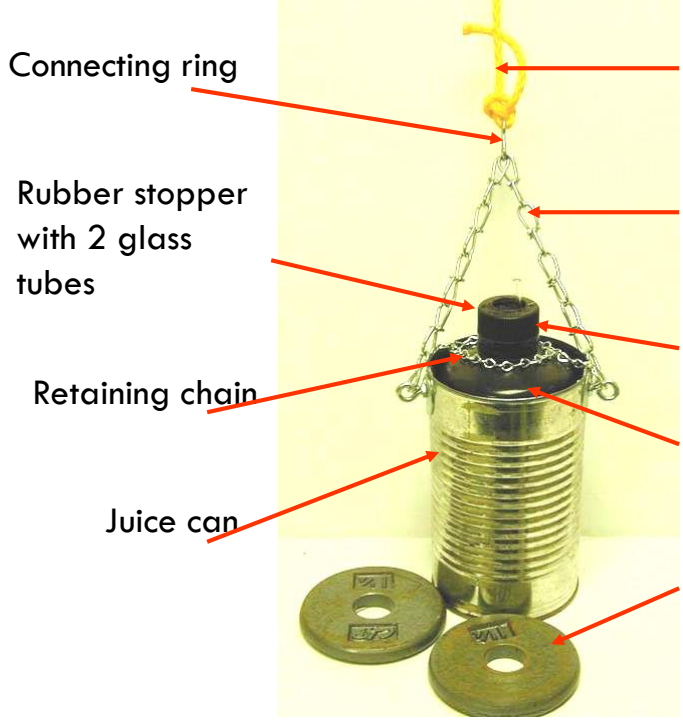
Provided by volunteer:

- boating safety equipment
- anchor
- pencil or indelible ink pen
- measured line for sampler
- freezer ice pack

CHLOROPHYLL-A

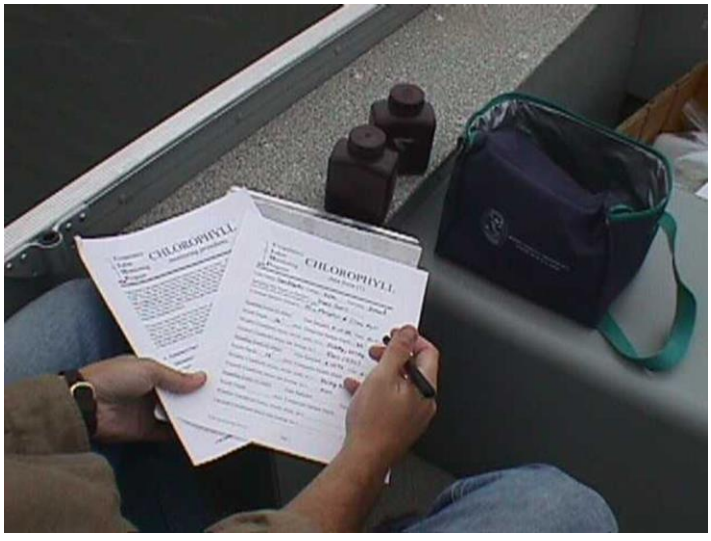
Step 1. Getting a depth integrated water sample

15



16

17



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Cooperative Lakes Monitoring Program

CHLOROPHYLL

2016 Data Form (1)

Michigan Clean Water Corps

Reminder: New in 2016. May and June chlorophyll samples get turned in with Spring Phosphorus on June 21.

Lake Name: Dead Spider County: Lake Township: Inland

Lake Sampling Site (Field ID) Number: 380137 (see reverse and mark location on map)

Latitude: 44.6712°N Longitude: 85.4967°W

Volunteer Monitor Name(s): Clora Fyll & Barry Turbid

Sampling Event #1 (May) Date Sampled: 5·15·16 Time: 12:35 pm

Secchi Depth: 12.5 (feet) Composite Sample Depth: 25 (feet)

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

Unusual Conditions (heavy rain, boating, etc.): -

Filtering Sample (if 50 cc could not be filtered for this sample, indicate amount filtered): — (cc)

Sampling Event #2 (June) Date Sampled: 6·17·16 Time: 12:00 pm

Secchi Depth: 9 (feet) Composite Sample Depth: 18 (feet)

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

Unusual Conditions (heavy rain, boating, etc.): heavy rain on 6·16

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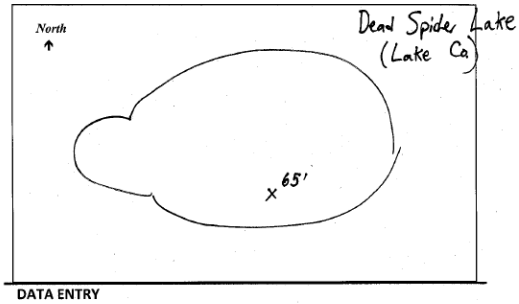
- In the box below draw an outline of your lake (i.e lake map)
- On the lake map outline, mark your chlorophyll sampling location (this should be at the deepest basin in the lake) and write in the total LAKE DEPTH at this location.
- Surface Area of Lake (if known): 321 (acres)



DATA ENTRY

Check **ONE** box:

☒ A volunteer has entered the field notes into the MiCorps Data Exchange (before October 30!)
Volunteer Name Barry Turbid Date entered 6-17-16.

☐ The field notes **have not** been entered into the MiCorps Data Exchange.

DATA SHEET AND SAMPLE TURN IN

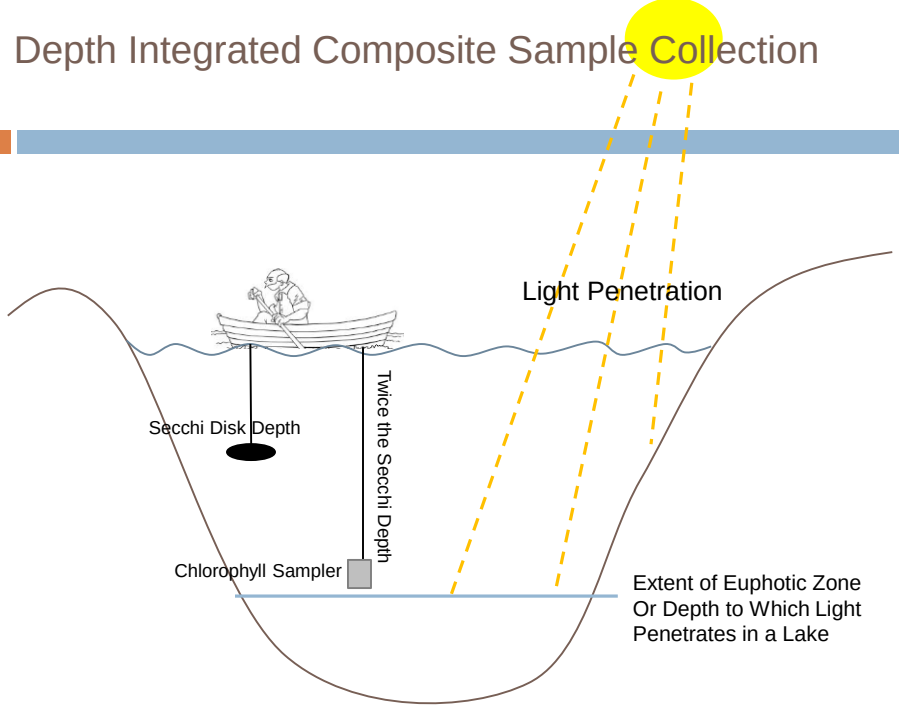
No matter what box you check above, please do the following:
Make a copy for your records, put the data sheet in a baggie, and turn in the frozen samples and data sheet as directed by your procedures sheet and chlorophyll schedule.

20

Secchi Disk Measurement

1. Disk lowered slowly until it disappears from view
2. Disk raised slowly to point where it reappears
3. Record: the secchi depth is average

Depth Integrated Composite Sample Collection



What if my lake is too shallow to go 2x the Secchi depth

- Drop it down to about a foot off the bottom
- Don't hit the bottom

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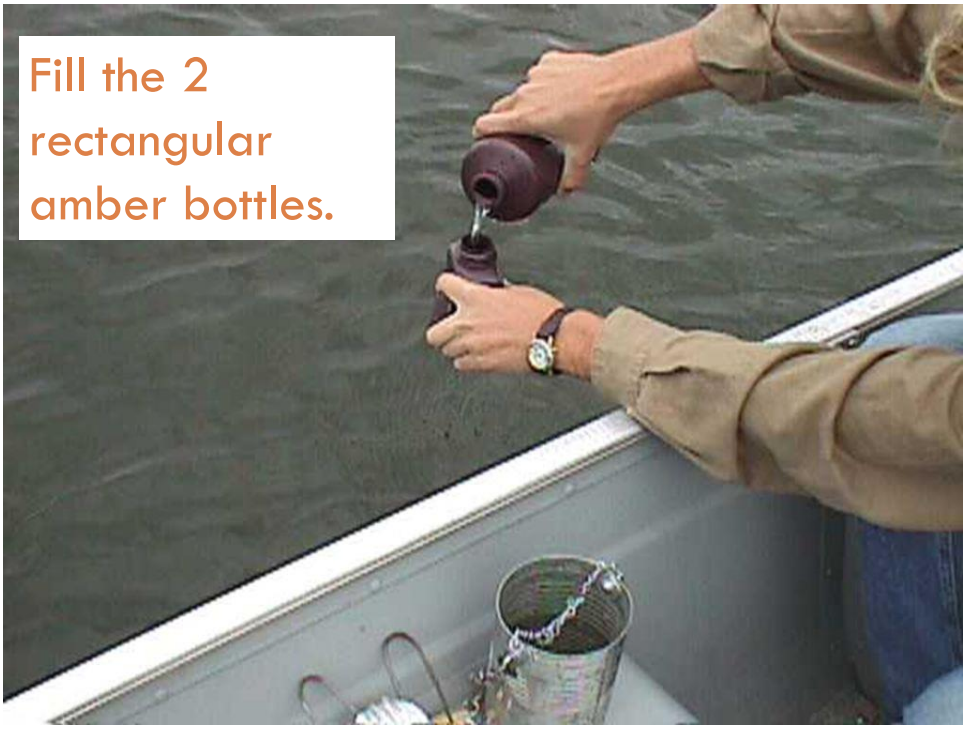
Want bottle 2/3 to 3/4 full

27


Fill the 2 rectangular amber bottles.

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29

Cold storage until returning to shore

30

CHLOROPHYLL-A

Step 2.
Filtering the water sample

Chlorophyll Filtering Equipment

- 60 cc plastic syringe
- flexible plastic tube
- filter holder
- membrane filter disks
- tweezers
- sample storage vials and caps (2)
- chlorophyll sample labels (2)

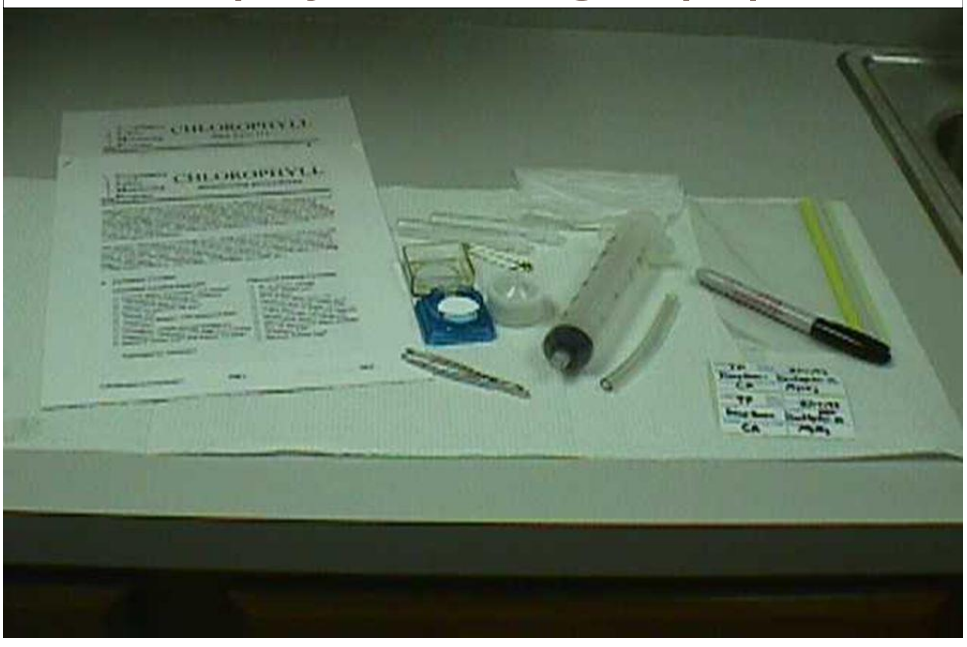
Chlorophyll Filtering Equipment Provided by Volunteer

- fine-tip permanent black marker
- aluminum foil
- zip-lock freezer bag
- large safety pin
- coffee filter or paper towel

Let's go to the video tape!

- Filtering section starts at 5:50.

Chlorophyll filtering equipment



Collector's Initials	DEQ	Date
TP		6-15-2013
Field ID	**Location**	
555432	DEAD SPIDER LAKE	
Analysis or Parameter Code	**Chemicals Added**	
CA	$MgCO_3$	

Collector's Initials	DEQ	Date
TP		6-15-2013
Field ID	**Location** REP	
555432	DEAD SPIDER LAKE	
Analysis or Parameter Code	**Chemicals Added**	
CA	$MgCO_3$	

Remove translucent separator sheets

(your filters may not have these)

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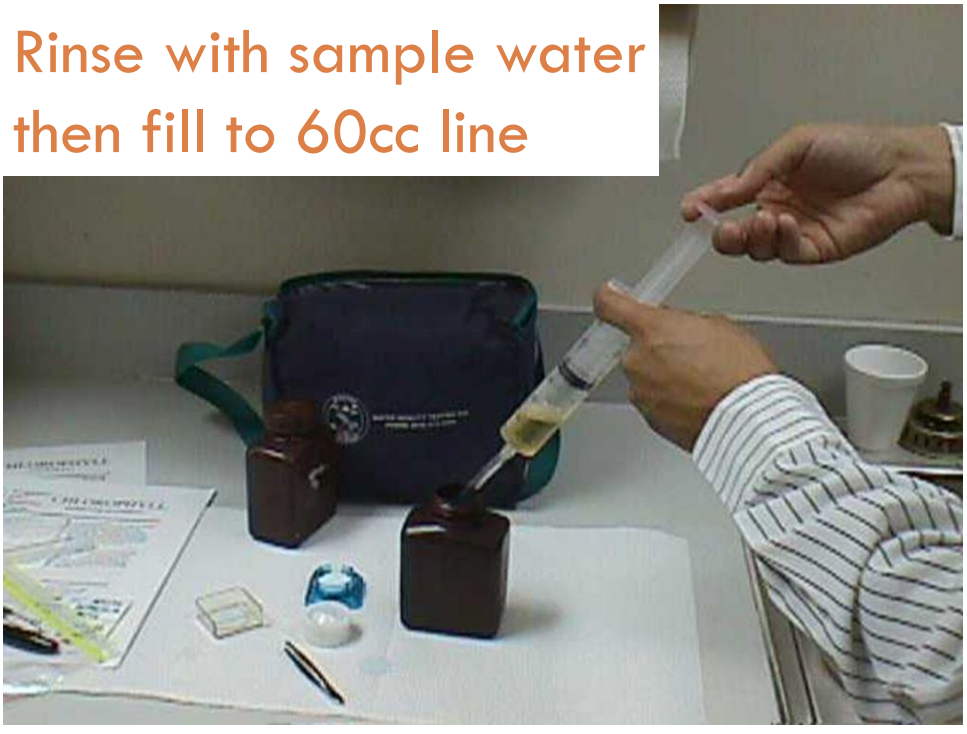
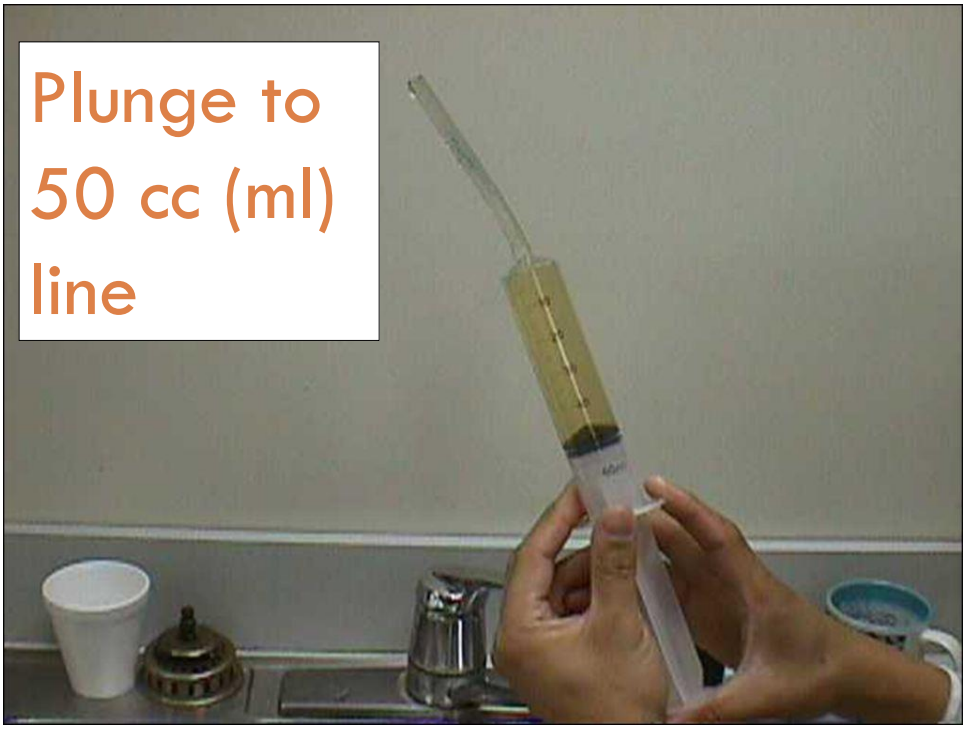
Rinse with sample water then fill to 60cc line



38



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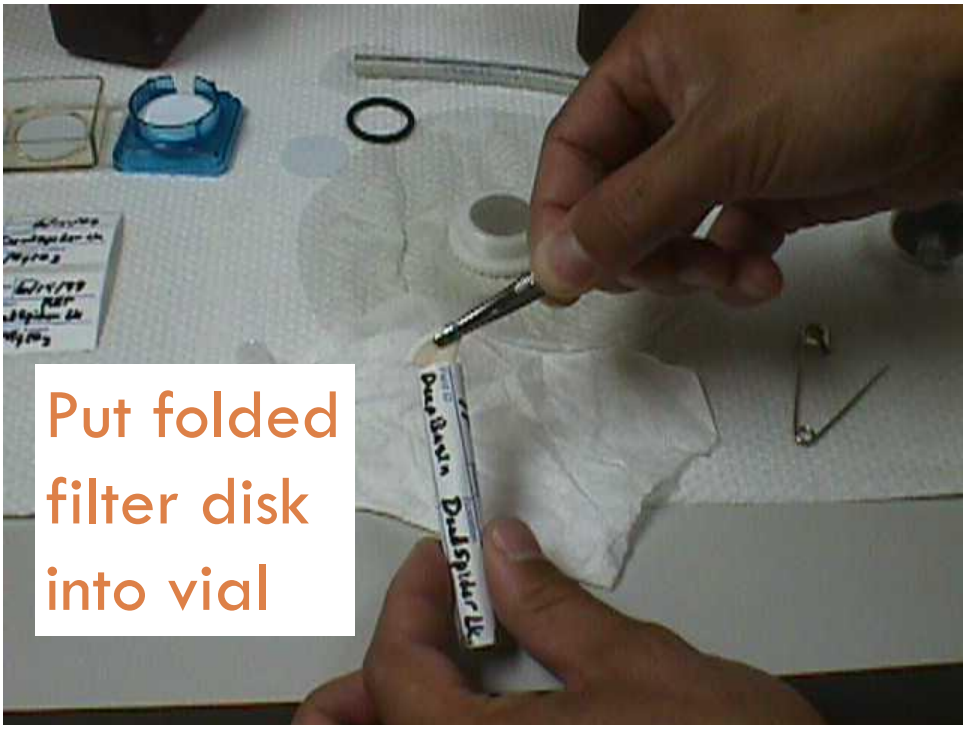
40

Tweezers and safety pin

41

Carefully fold filter paper

42



43

44

Freezer storage until turn-in date

45

46

Sample turn-in and submitting your data

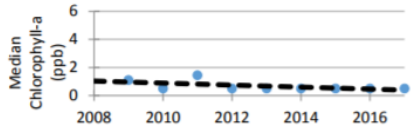
1. Make copies of your data forms for your records.
2. Include originals with your frozen samples.
3. Turn in frozen-sample per the schedule.
4. Enter your field data into the online MDE by October 30.
5. MDE login: Get it from midata@glc.org

Common Reasons for Sample Rejection

- Sample collected at the wrong time
  - Samples collected far outside the assigned interval will be rejected
- **Samples collected on cover slip. You need to use the opaque white filter disk.**
- Samples not wrapped in foil
- Incorrect delivery
  - If you forget or can't turn your samples in to the drop-off location on the assigned date – CONTACT US for instructions on safe shipping. Unexpected shipments will thaw and be rejected.

Chlorophyll-a (parts per billion)

Year	# Samples	Min	Max	Median	Std. Dev	Carlson TSI
2017	5	<1.0	1.1	<1.0	0.3	<31
2012-2016	24	<1.0	3.3	<1.0	0.7	<31
2008-2011	17	<1.0	2.5	<1.0	0.6	32
2017 All CLMP Lakes	628	< 1.0	28.0	1.8	4.3	36



Year End Report

Summary

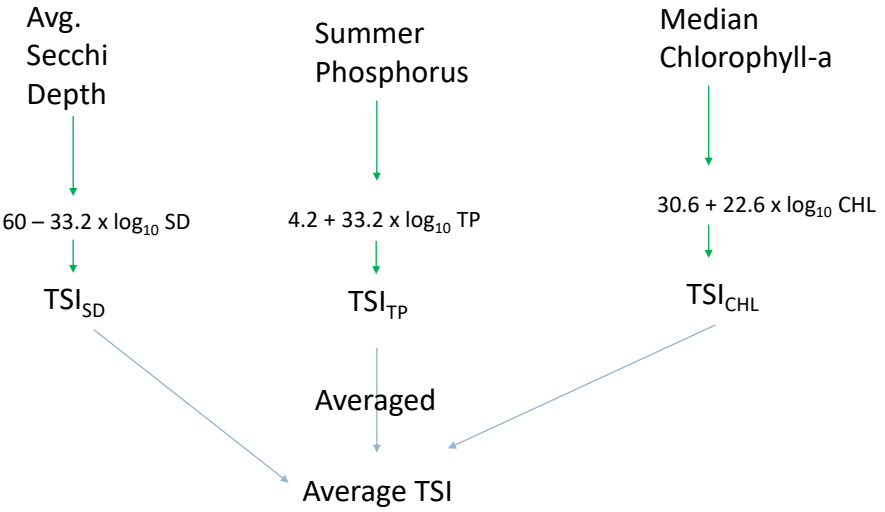
Average TSI	2017	2012-2016	2008-2011
Deer Lake	35	35	35
All CLMP Lakes	40	40	41

With an average TSI score of 35 based on 2017 Secchi transparency, chlorophyll-a, and summer total phosphorus data, this lake is rated as an oligotrophic lake.

The low level of nutrients in the lake results in dissolved oxygen being available throughout the water column for the entire summer.

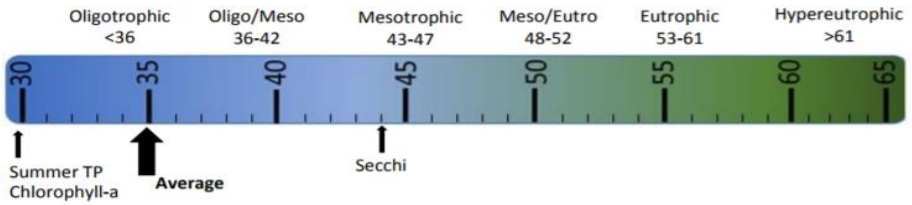
Long term trends indicate that the trophic status parameters have not changed beyond minor year-to year variation since monitoring began.

What is Trophic Status Index?



Trophic Status

TSI for Deer Lake in 2017	
Average	35
Secchi Disk	44
Summer TP	30
Chlorophyll-a	<31



Low Oligotrophic | Medium Mesotrophic | High Eutrophic | Very High Hypereutrophic

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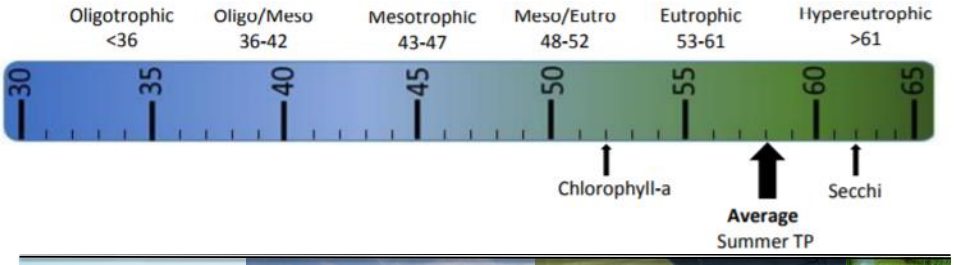
Trophic Status

TSI for Lake Diane in 2017	
Average	58
Secchi Disk	62
Summer TP	58
Chlorophyll-a	52



Low Oligotrophic | Medium Mesotrophic | High Eutrophic | Very High Hypereutrophic

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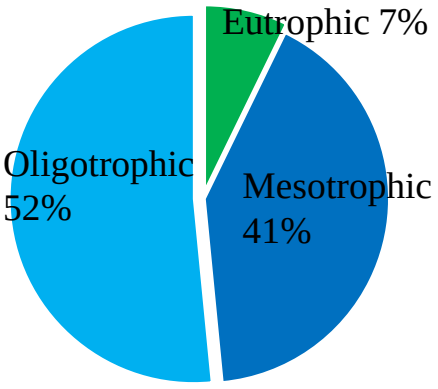
Current snapshot: Trophic Status (2018)

- Based on full participation in Secchi, Chlorophyll, Total Summer Phosphorus in 2018
- N = 97

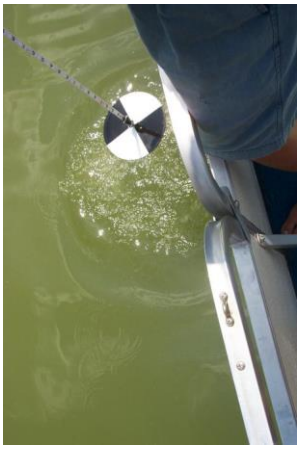


Note: 2018, first time ever we saw more oligotrophic than mesotrophic lakes; remember these aren't representative of Michigan as a whole

Evaluation Form

- Yellow form
- You can leave them in the box by door when you are done.

Working together to protect lakes…



Questions?

Hands on Demos!