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

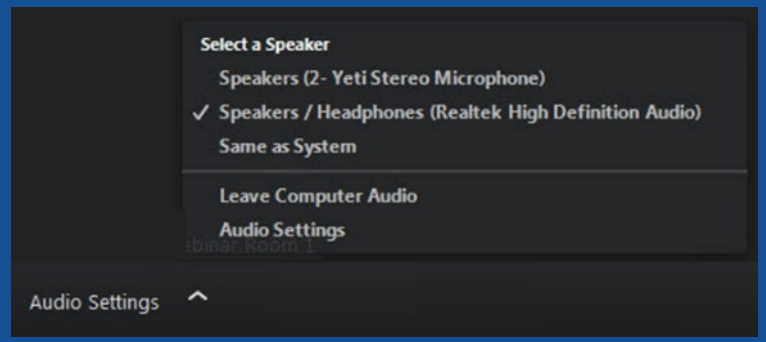
- For CLMP procedures and data forms please visit: micorps.net/lake-monitoring/clmp-documents/ and then click on the name of the parameter.

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

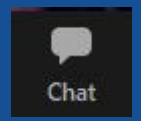
Getting Started

- 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.

Dissolved Oxygen and Temperature

Tamara Lipsey

EGLE

MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

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Dissolved Oxygen (DO) and Temperature

- Why Important
- Program Overview
- Equipment
- Procedure
- End of Year

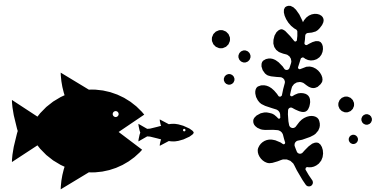
What D.O. and Temperature Measure?

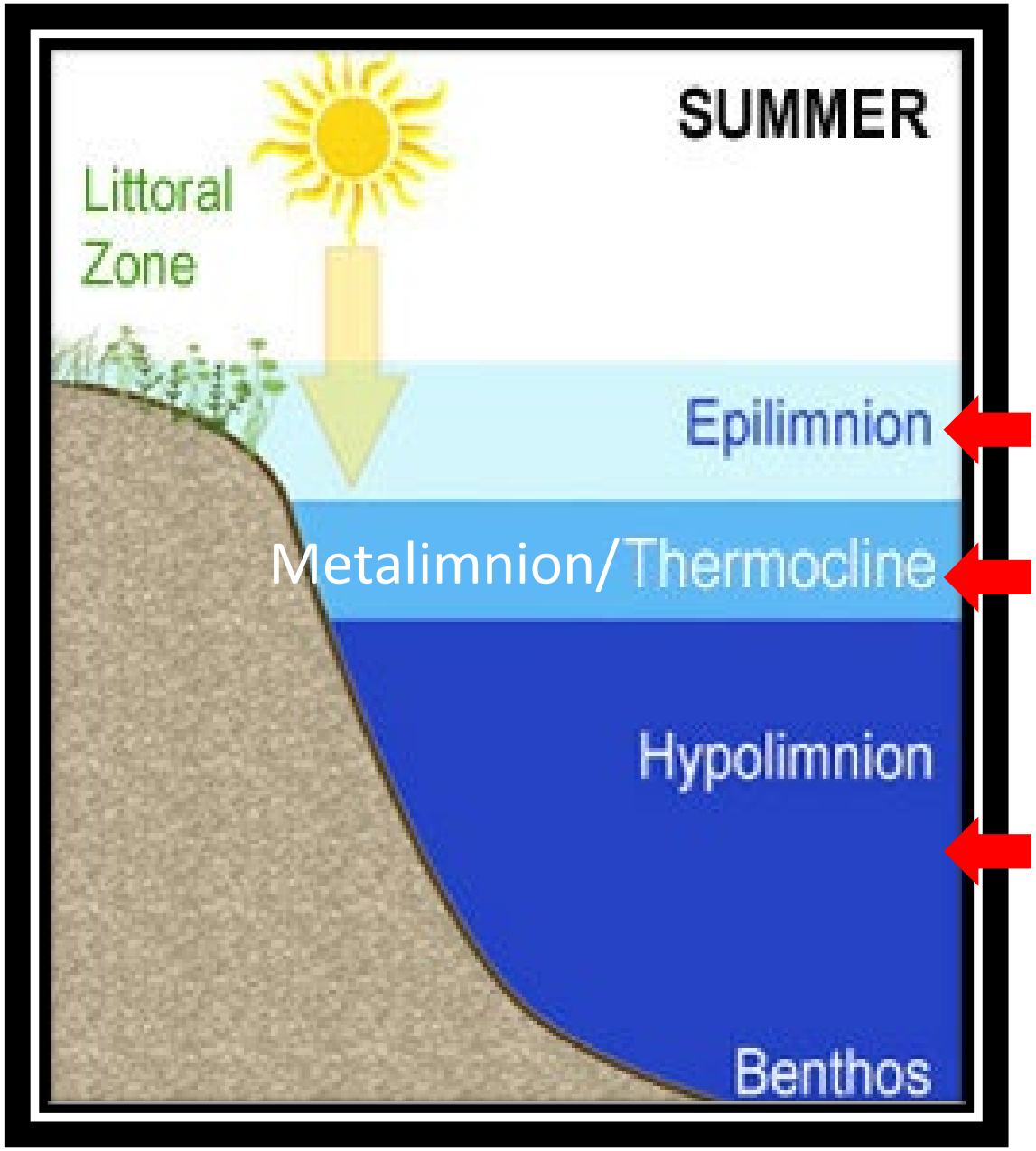
How much oxygen is dissolved in the water and is available for aquatic organisms to use

How warm or cold the water is

Why is D.O. and Temperature Important?

- Effects and is affected by many Physical, Chemical, and Biological Components of a Lake





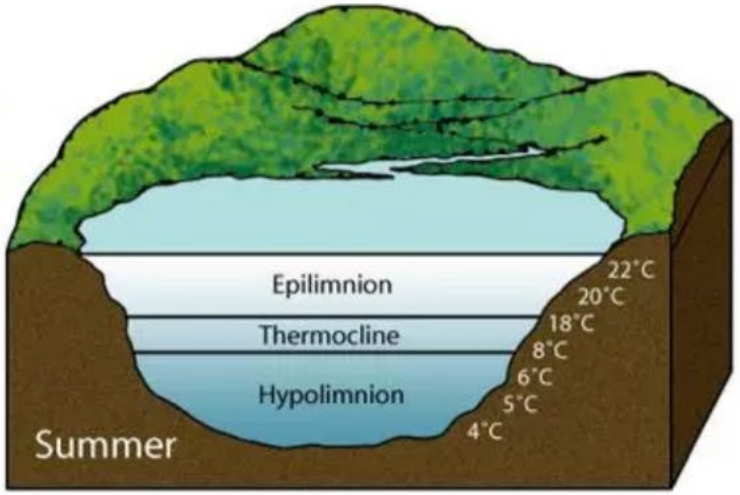
Thermal Stratification

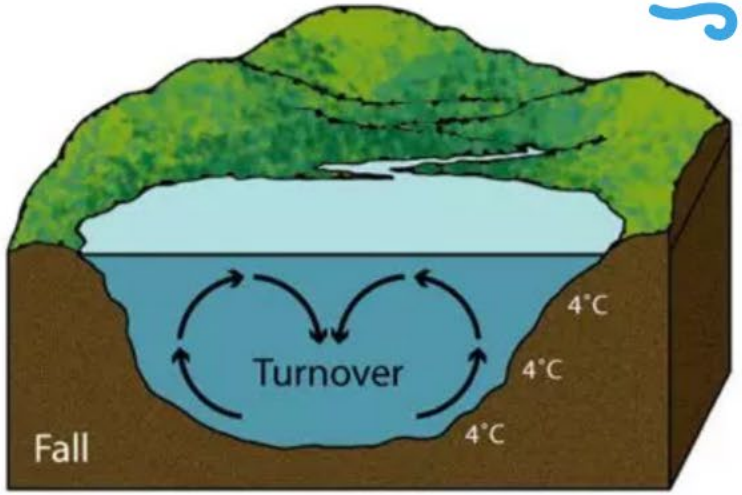
Lake Temperature/Density Zones

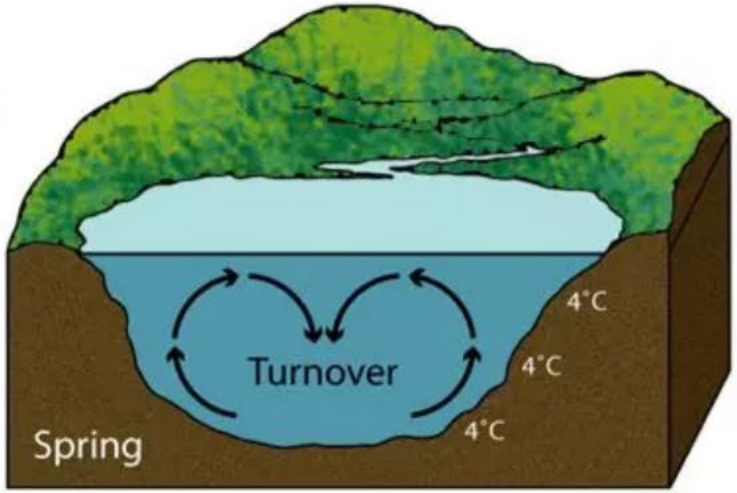
- Warm upper zone
- Metalimnion; rapid decrease in temperature and increase in water density (Thermocline)
- Cold bottom zone

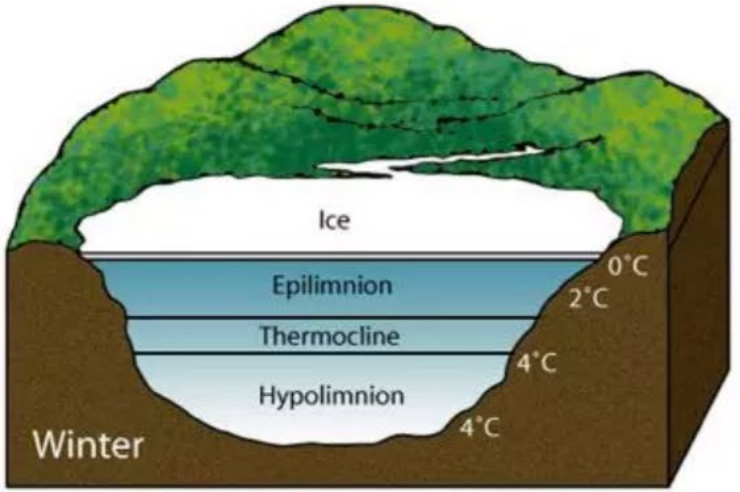
Lake Stratification Video by: Wisconsin Center for Limnology

Lake Turnover



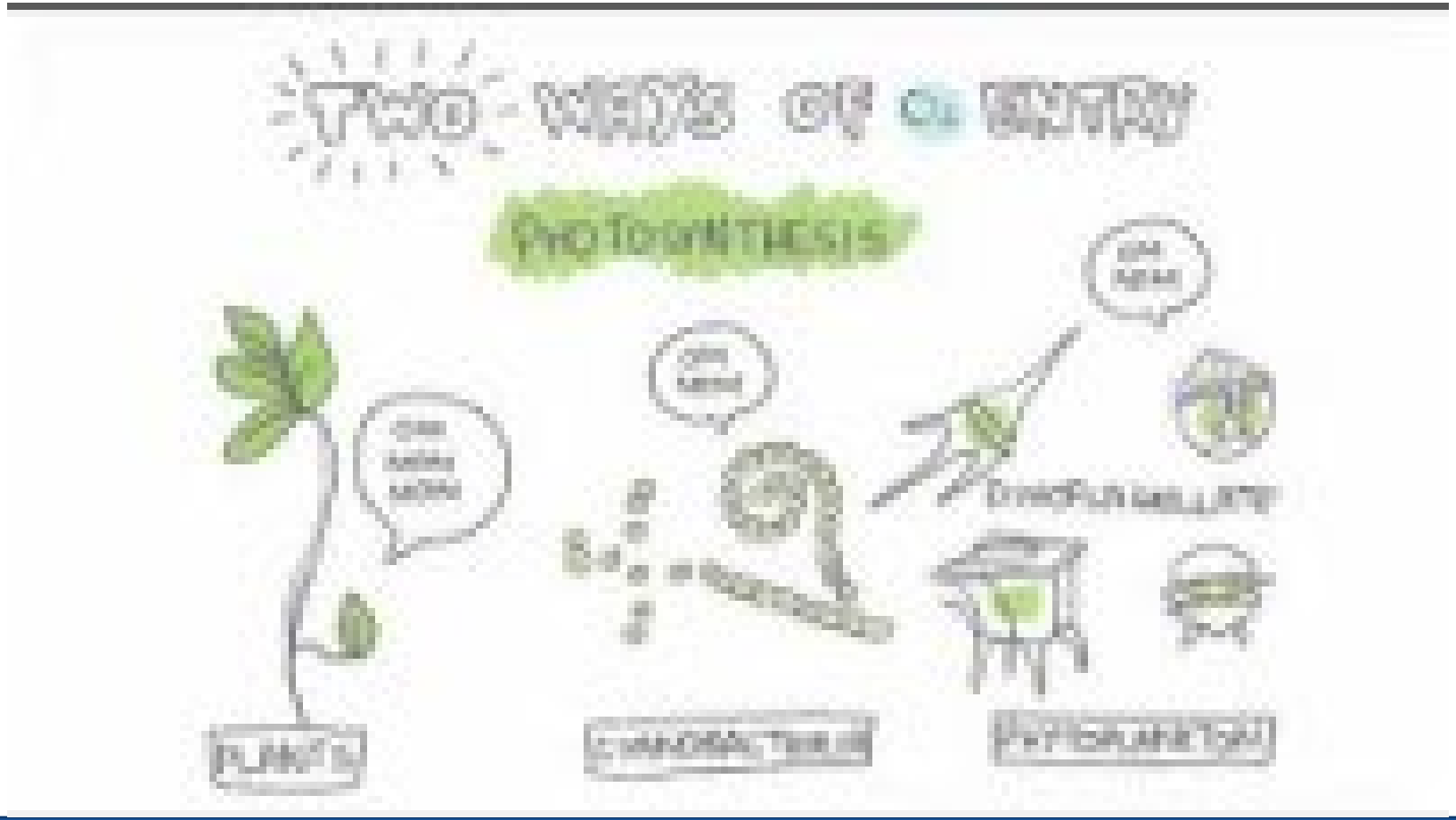


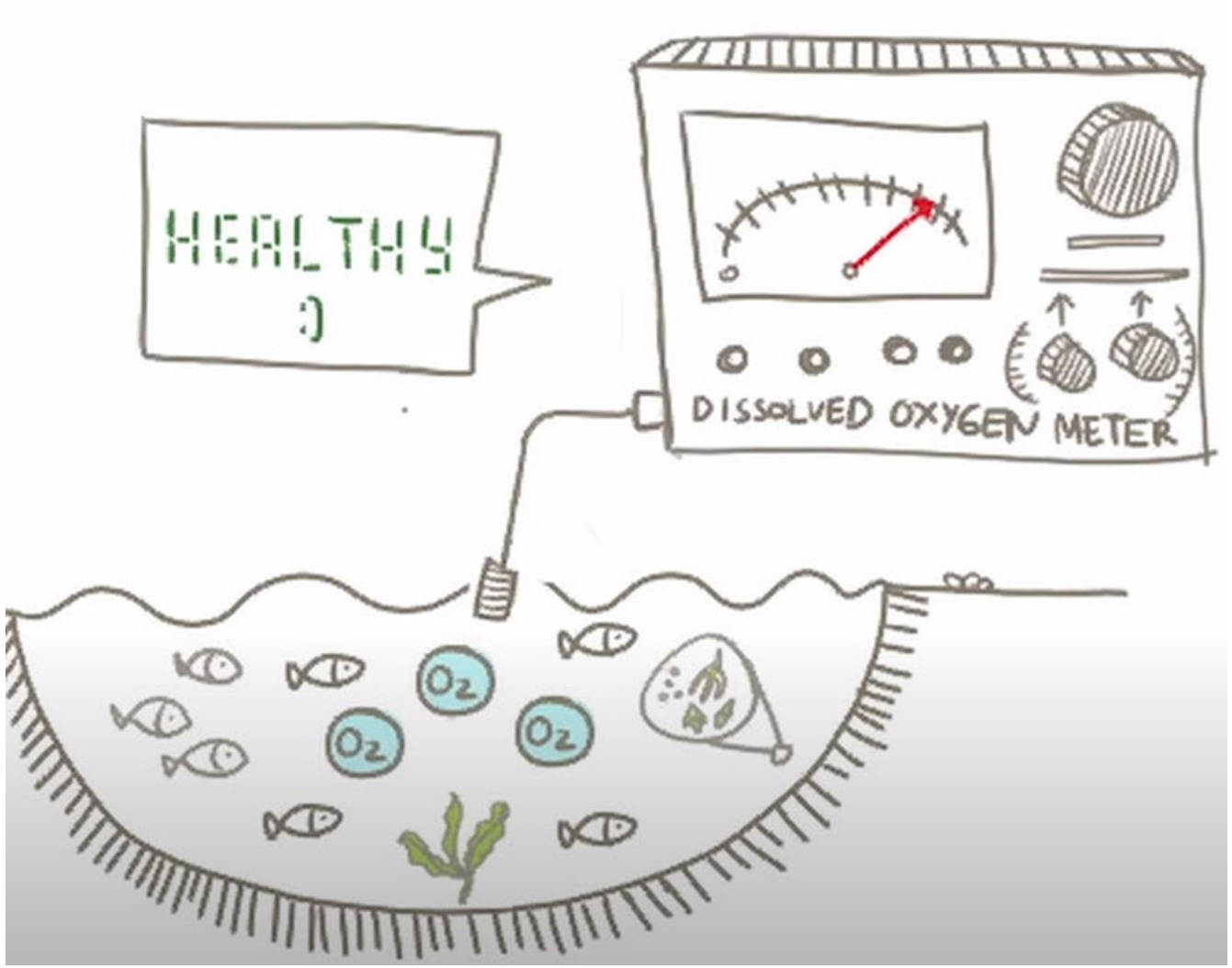




Https:// media.nationalgeographic.org/assets/photos/000/292/29293.jpg

Dissolved Oxygen http://k12videos.mit.edu/





Dissolved Oxygen Take Home Points

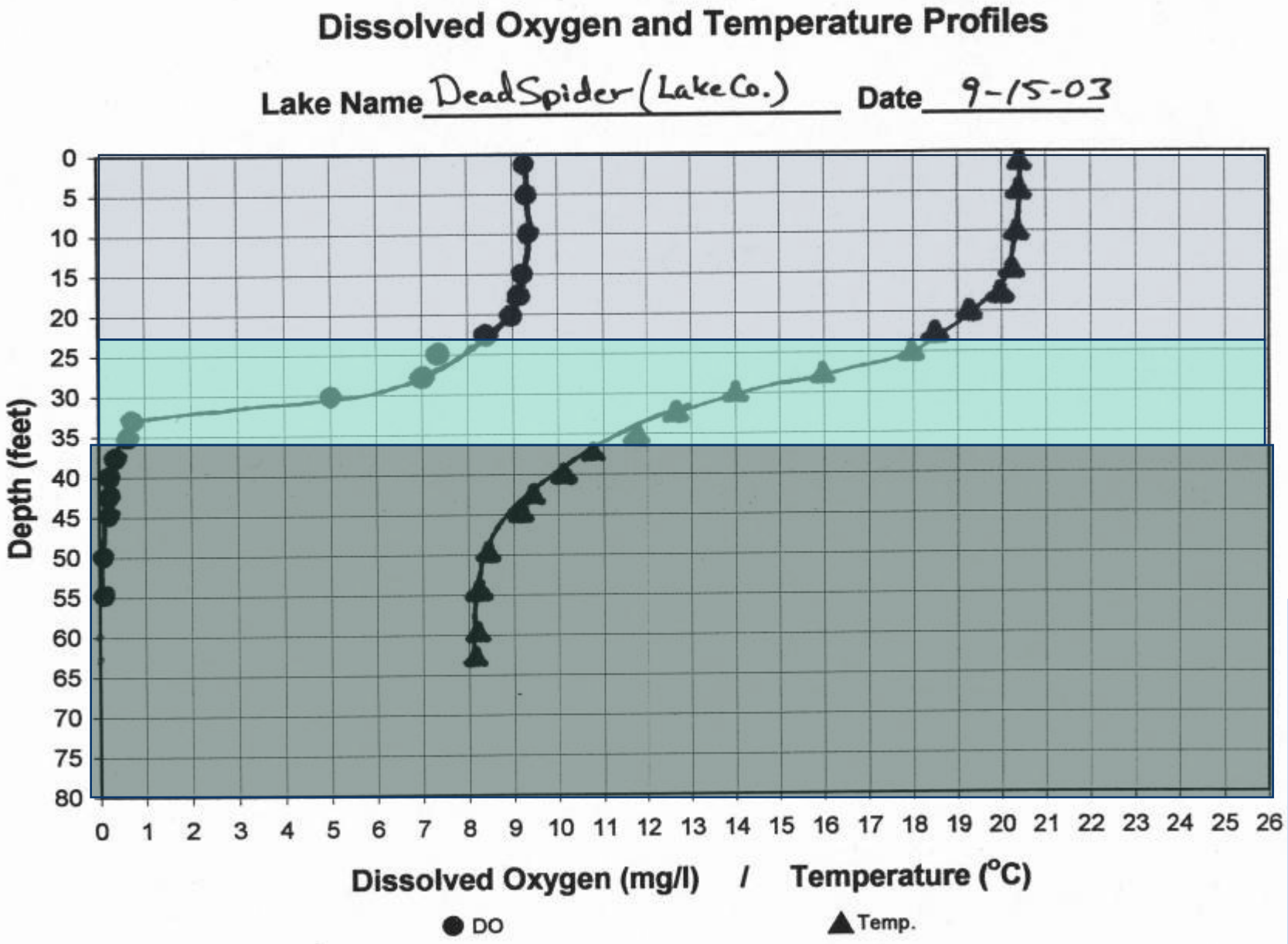
- The amount of salt and the temperature of the water impact the amount of DO in the water
- Oxygen enters the water through the air or by photosynthesis from plants and algae
- Too much algae/cyano bacteria leads to low DO when they die
- Nutrients speed up growth of plants and algae and the Eutrophication process

Understanding DO levels in your lake, is one more tool to understanding the health of your lake.

Why is D.O. and Temperature Important?

- Define where thermal layers are and classify your lake as a warm or cold-water lake
- Determine what types of fish the DO levels will support and what depths they can live
- DO levels can indicate if nutrients have the potential to be released by sediment

https://micorps.net/wp-content/uploads/CLMP-DO-Temp-DataPlottingForm.pdf



Epilimnion

Metalimnion/Thermocline

Hypolimnion

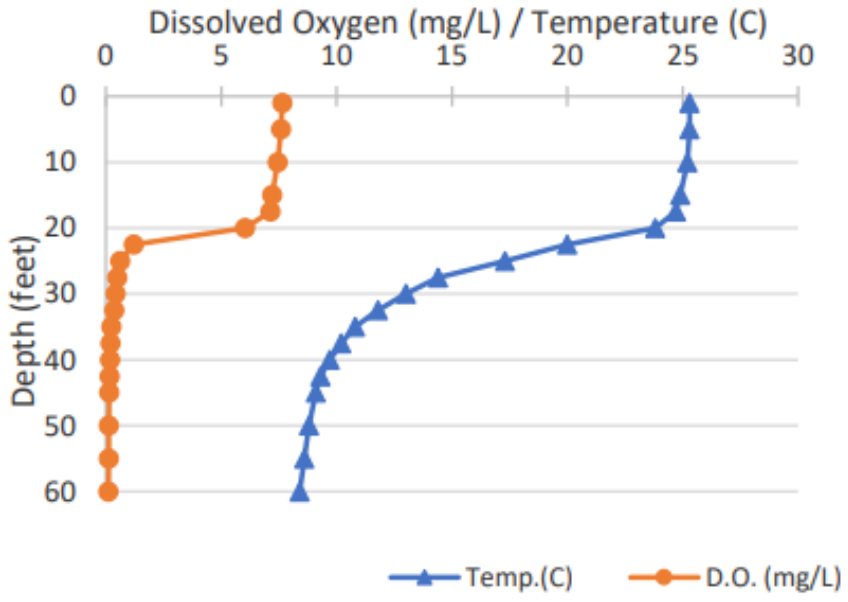
- Warmwater fish need 4-5 mg/l oxygen
- Coldwater fish need 8 mg/L

- 8° C = 46° F
- 20 ° C= 68° F

Lakeville Lake, Oakland Co.

8/3/2022

Dissolved Oxygen and Temperature Profile



Summary

Average TSI	2022	2017-2021	1980-2016
Lakeville Lake	43	41	40
All CLMP Lakes	44	40	42

With an average TSI score of 43 based on 2022 Secchi transparency, chlorophyll-a, and summer total phosphorus data, this lake is rated as a mesotrophic lake.

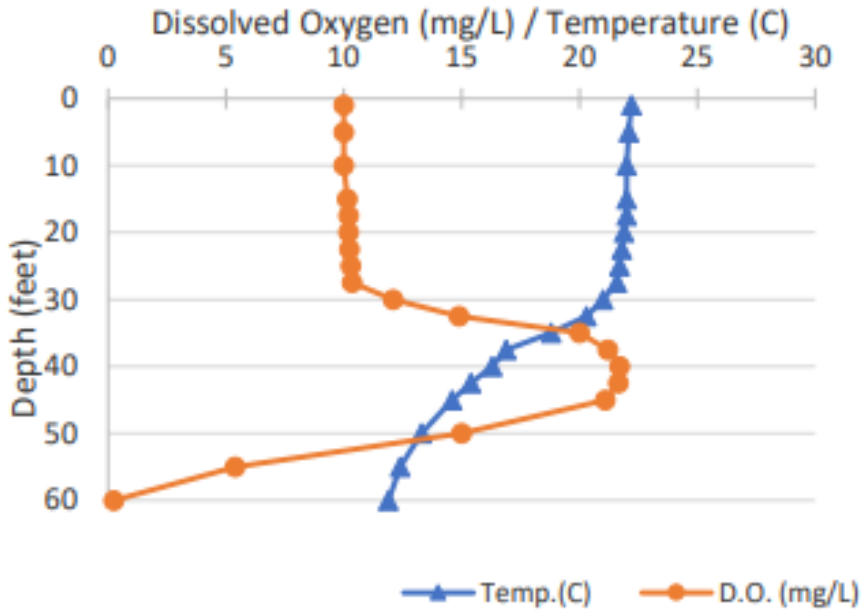
The lake keeps some dissolved oxygen in the bottom waters through mid-summer, but by late summer the lake has stratified and the bottom water is devoid of oxygen.

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

Bear Lake, Kalkaska County

1994 2001 2008 2015 2022 | 1997 2003 2009 2015 2021

Dissolved Oxygen and Temperature Profile 9/9/2022



Summary

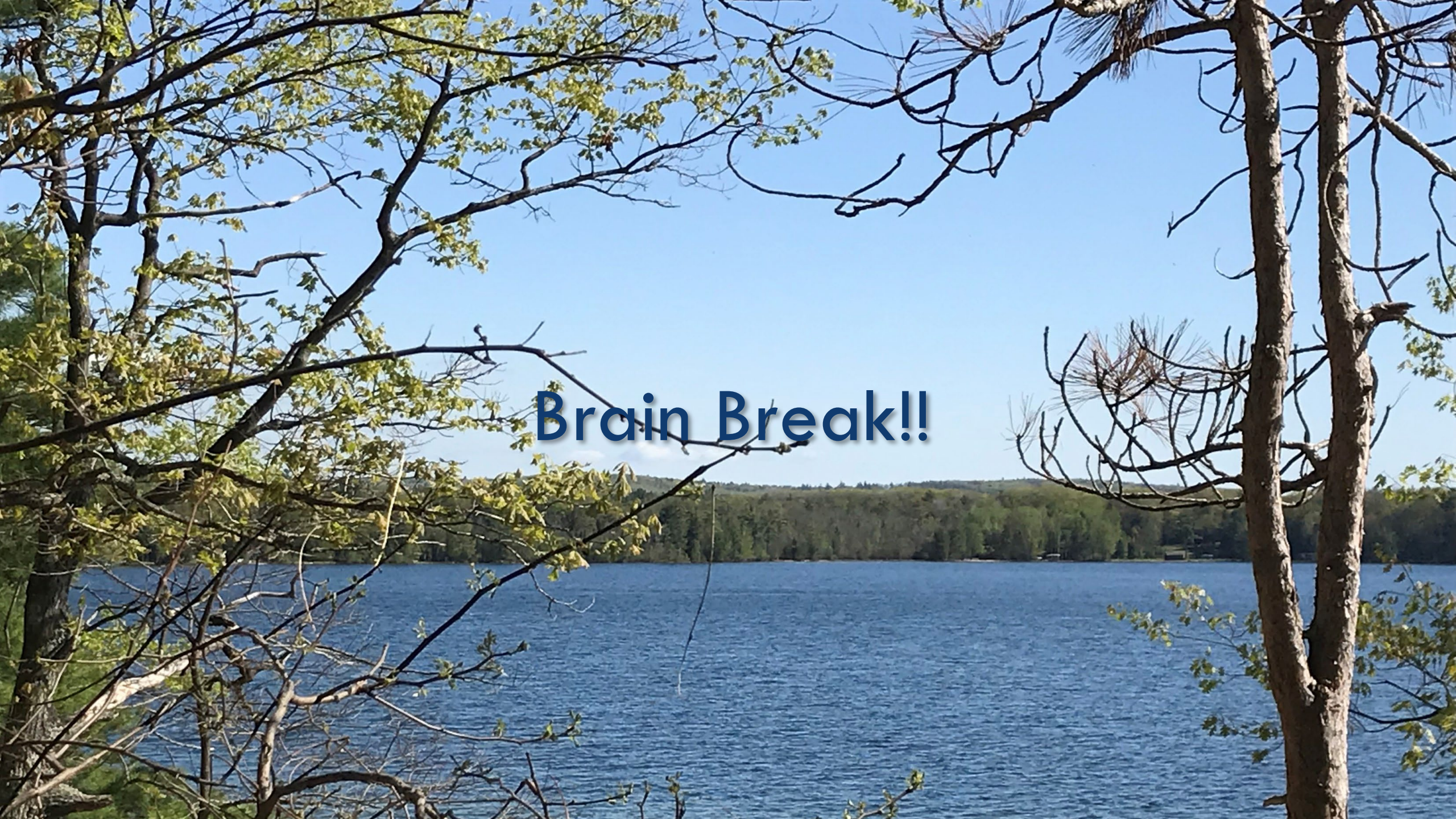
Average TSI	2022	2017-2021	1975-2016
Bear Lake	31	28	30
All CLMP Lakes	44	40	43

With an average TSI score of 31 based on 2022 Secchi transparency, chlorophyll-a, and summer total phosphorus data, this lake is rated as an oligotrophic lake.

Due to its very low nutrient level, the lake is able to maintain dissolved oxygen throughout the most of the water column for the entire summer, though dissolved oxygen gets low or anoxic on the very bottom waters at the end of the summer.

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

* = Minimum # samples not met for average/median/TSI value


Brain Break!!

D.O./Temperature Program Overview

- Borrow a Meter
- May purchase own meter**
- Meters will be distributed ASAP
- Measure 2 X per month May-September

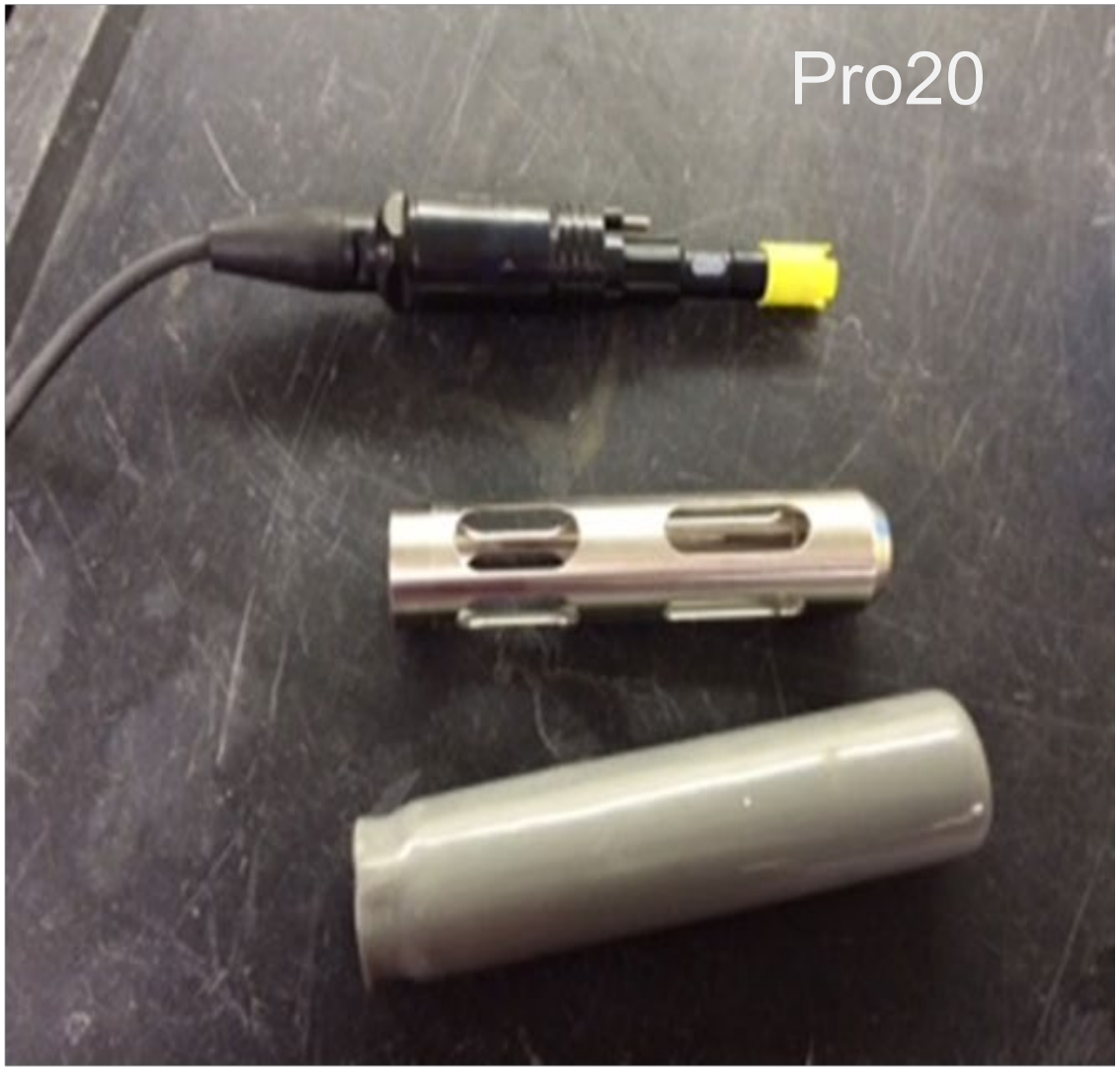
DO/Temperature Equipment
YSI Oxygen Meter (550A or Pro-20)

550A

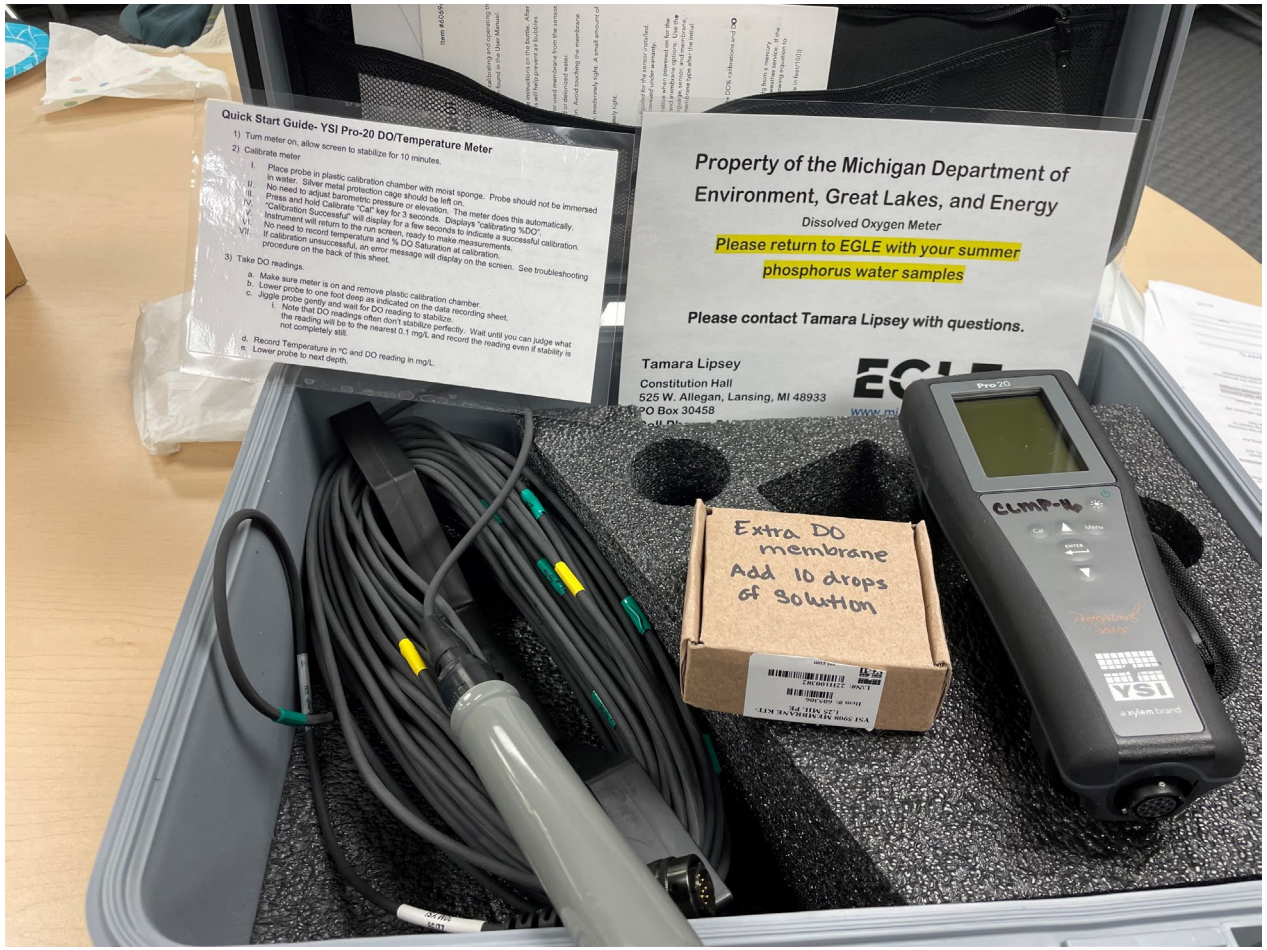
Pro20

DO Meter Probe

Probe of Each Meter



Example of DO/Temperature Meter Kit



- Equipment storage box
- DO/Temp probe & cable (various lengths)
- Batteries/Spare batteries
- Quick-start calibration card
- Extra DO membrane and electrolyte solution
- Agreement letter to sign and return

Prepare for Sampling

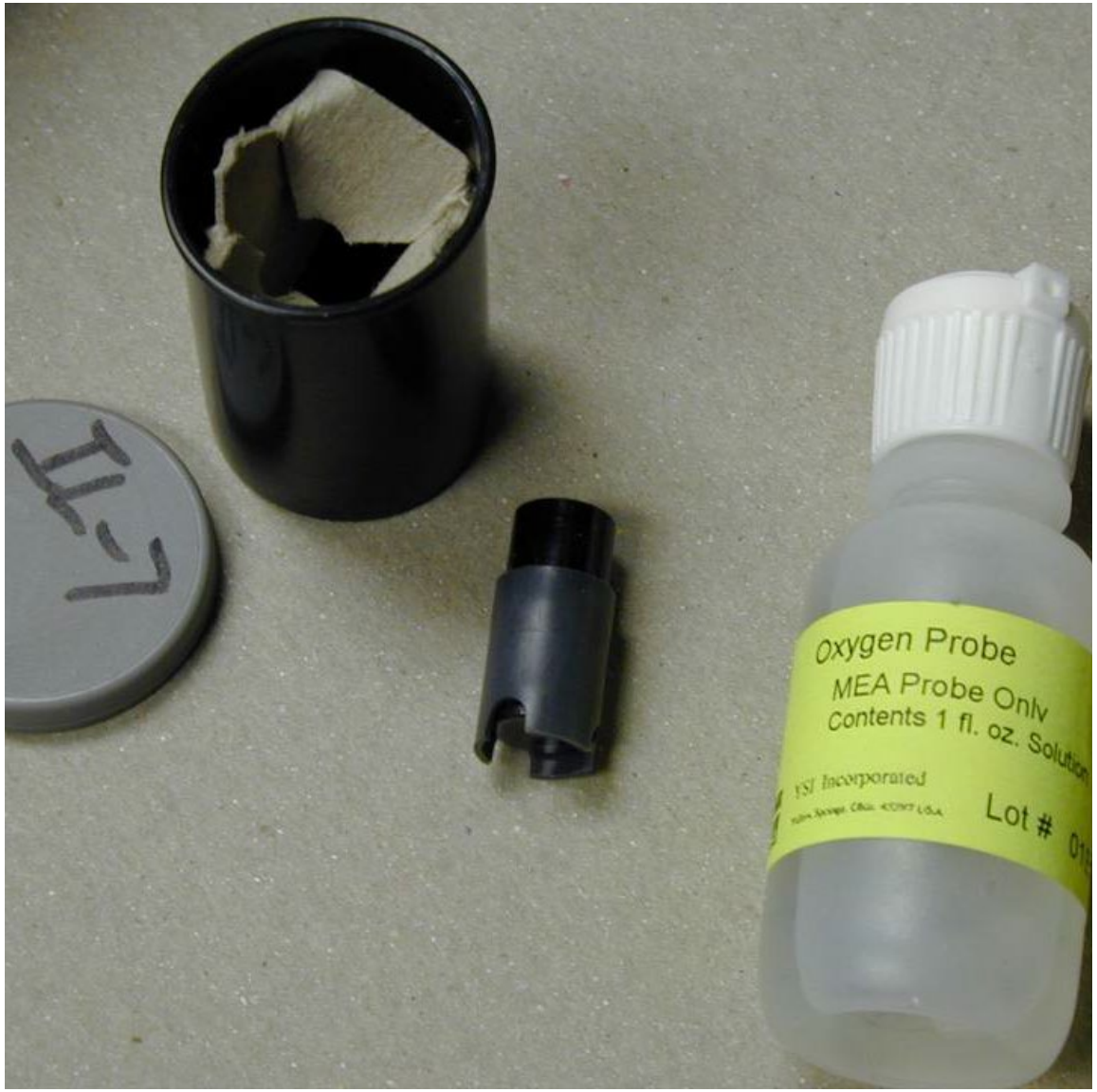
- Make sure you have calm and dry weather conditions
- Pack up your equipment, including safety equipment and a friend to help with data recording
- Check the Quick Reference Procedure Checklist
- Make sure you have your data forms
- Connect Probe Cable to Meter (Pro20)
- Turn on your meter for 15 minutes and calibrate using Quick Start Guide

Calibration of Pro 20-Video Available

Calibration of 550A

Replacement DO Membrane & Solution

- Check Quick Start Calibration Guide
- Only use for replacing membrane
- Only needed if monitor will not calibrate
- Throw out old membrane if replace
- Call Tamara to see if she can help out



Proceed to Sampling Location

- Anchor just upwind of deep basin and drift back over deepest spot, as with other parameters
- Check for actual basin depth with depth finder or weighted line or secchi disk
- Turn on the meter.
- Take the Cap off. Leave the guard.
- Begin at 1 foot deep for 1st measurement.

Cooperative Lakes Monitoring Program

Michigan Clean Water Corps

Dissolved Oxygen and Temperature

2021 Data Form

Cooperative Lakes Monitoring Program

Lake Name: _____ County: _____ Township: _____

Lake Sampling Site (Field ID) Number: _____ (mark location on map below)

Page 1 Data Sheet

Latitude: _____ Longitude: _____

Volunteer Monitor Name(s): _____

_____

Date Sampled: _____ Time: _____

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

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

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

Sampling Station Depth (measured): _____ feet

DO/Temp. Meter (circle one): YSI Model 550A YSI Pro20

CLMP Meter ID# :_____ (If this is your meter, enter, "Our Meter")

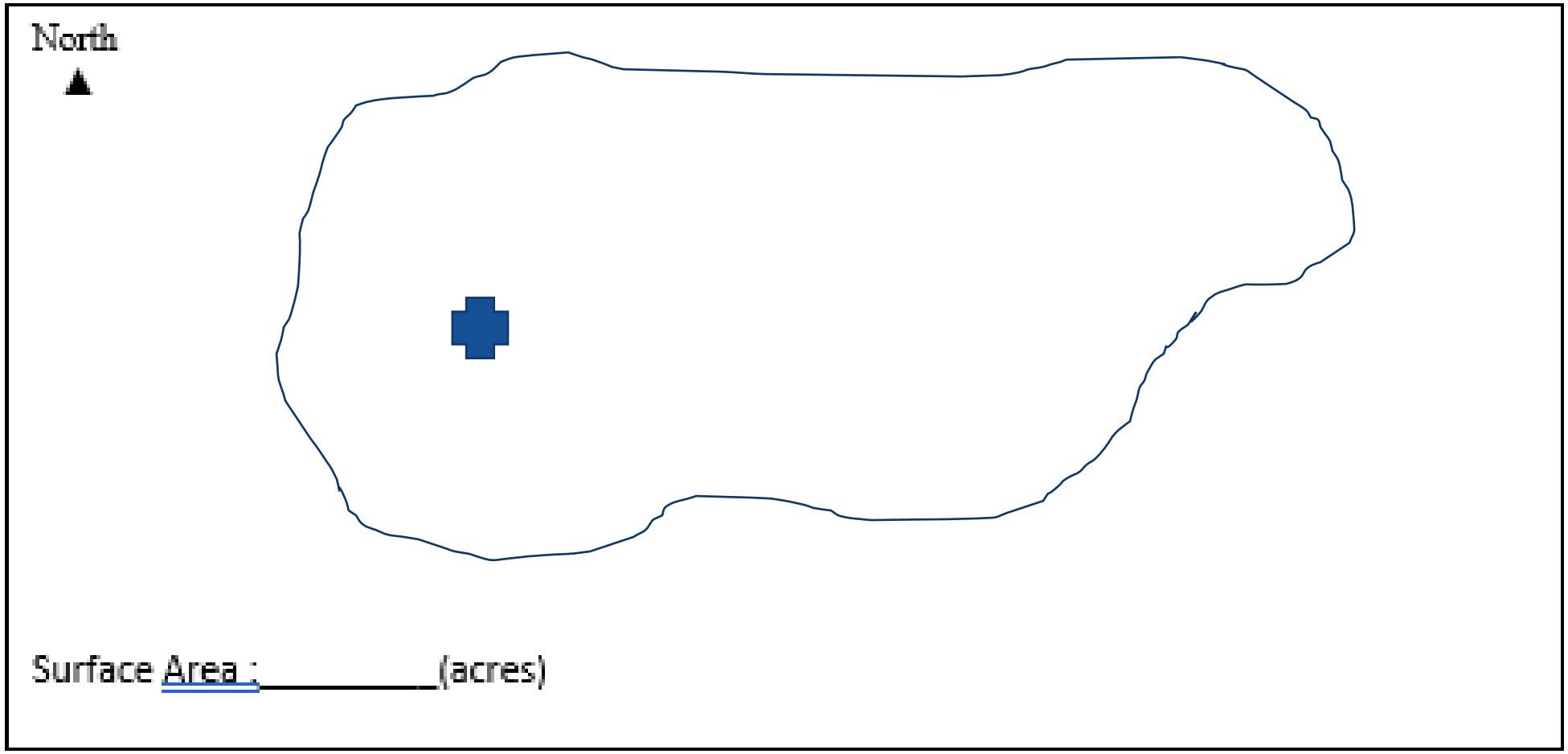
Calibration Values (Only for 550A; Skip if using a Pro20):

DO: _____% air saturation (Must be 93-103%; Troubleshoot if out-of-range)

Lake Elevation Value: _____ (x100 ft.)

Page 1 Data Sheet Continued

In the box below draw an outline of your lake (or attach a copy of a lake map). Mark your DO/temperature sampling location (this should be at the deepest location in your lake) and write the total lake depth.



Page 1 Data Sheet Continued

Taking a measurement

- Start at 1 foot deep
- Move probe with slight jigging motion
- The DO reading will drift-judge the nearest mg/l.
- Go to the next depth on your data sheet.
- Stop about 2-3 feet above sediment to protect probe

** REMEMBER** make sure you are measuring oxygen in **mg/l** before making oxygen measurements.**

Depth (ft.)	Temp (°C)	DO (mg/l)	Depth (ft.)	Temp (°C)	DO (mg/l)
1			55		
5			60		
10			65		
15			70		
17½			75		
20			80		
22½			85		
25			90		
27½			95		
30			100		
32½			105		
35			110		
37½			115		
40			120		
42½			125		
45			130		
50			**Note**: Take last measurement 2½-3 ft. above bottom sediments of the lake.		

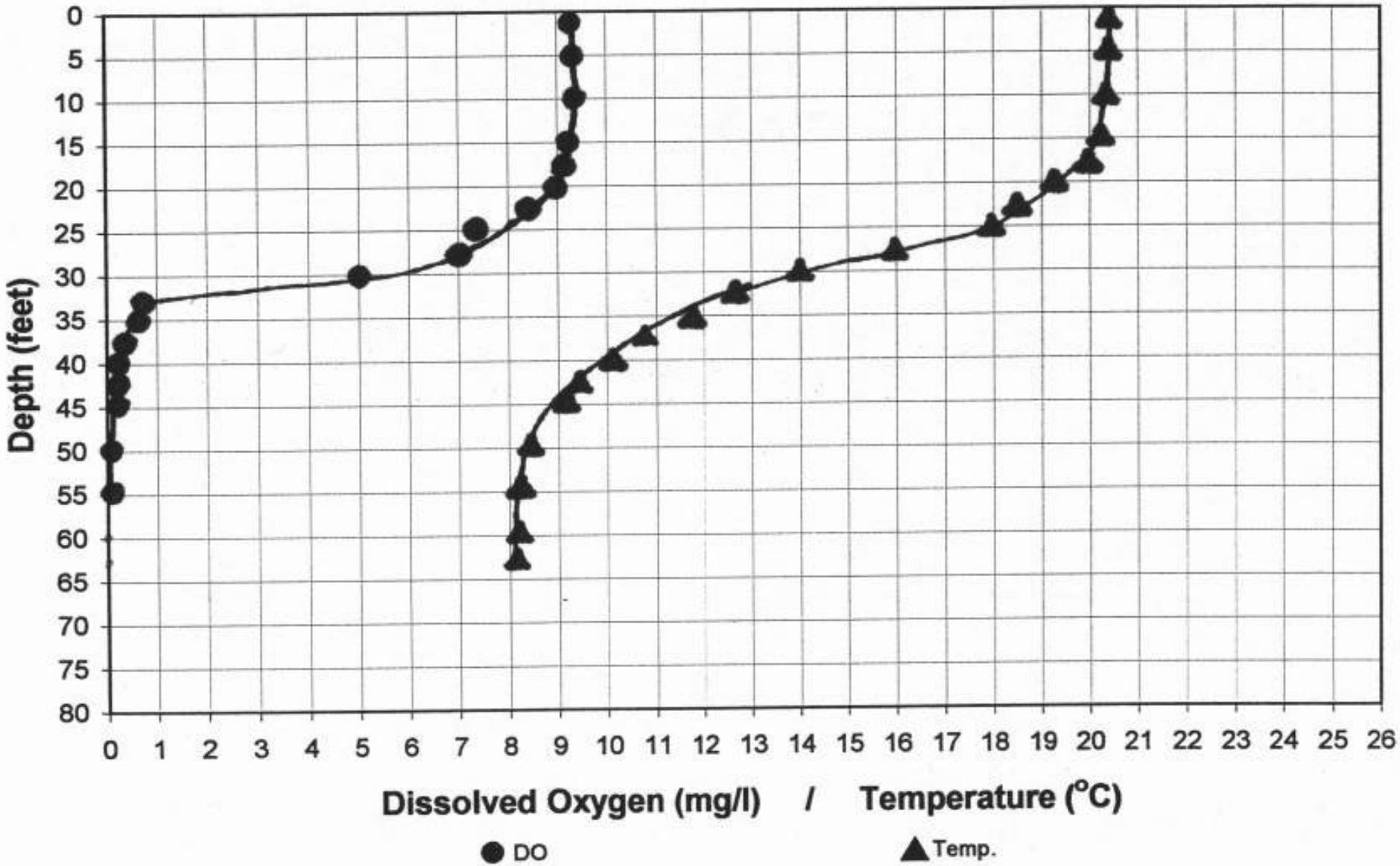
Data Sheet Page 2

- Temperature units are mg/L not %
- Temperature in Celsius

Cooperative Lakes Monitoring Program

Dissolved Oxygen and Temperature Profiles

Lake Name Dead Spider (Lake Co.) Date 9-15-03



Submit data using instructions found on www.micorps.net

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**

End of the year- Don't Forget-Return the Meters

With last water chemistry sample drop off date

If forget? Need more time? Call Tamara to make arrangements.

Damp Sponge-No pooled water,

Videos available: https://micorps.net/lake-monitoring/lake-training/

Questions?

Tamara Lipsey
Aquatic Biologist
Water Resources Division
lipseyt@michigan.gov
517-342-4372

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

MiCorps.net

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MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

MICHIGAN STATE UNIVERSITY | Extension

Huron River Watershed Council

MICHIGAN LAKES AND STREAMS ASSOCIATION

Michigan Clean Water Corps

Working Together to Protect Lakes

Cooperative Lakes Monitoring Program