

COOPERATIVE LAKES MONITORING PROGRAM TRAINING FOR

Dissolved Oxygen and Temperature



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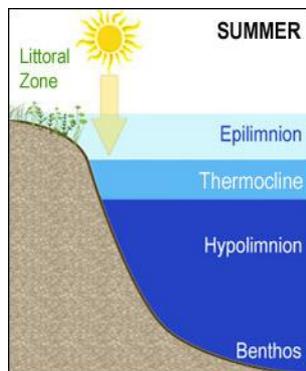
Dissolved Oxygen and Temperature

What does this data tell you:

- Does my lake stratify (separate into layers in the summer)?
- Is oxygen present at the bottom of my lake?
- At what depths will I find fish in my lake?
- What is my lake's trophic status?

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Lake Temperature/Density Zones



Warm upper zone; light and nutrients

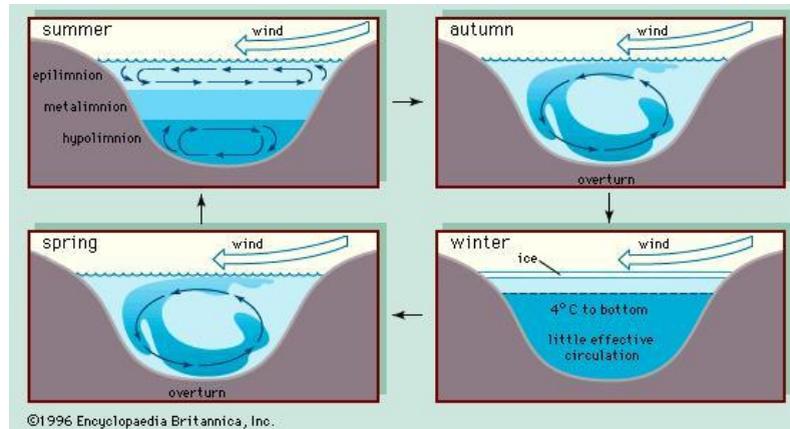
Metalimnion: rapid decrease in temperature and increase in water density

Cold bottom zone; low oxygen

http://mbel.info/wp-content/uploads/2013/04/Lake_layers_summer.jpg

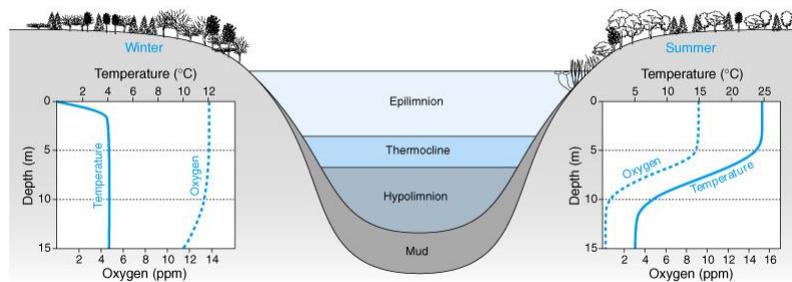
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How Does Wind Affect the Lake



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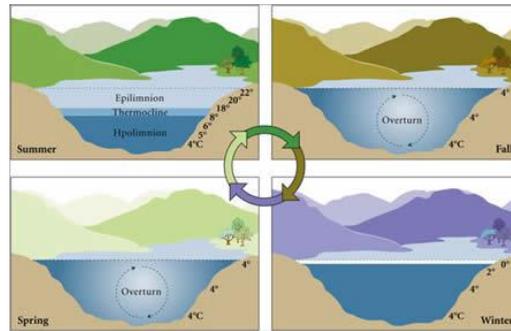
Temperature Profiles



http://wps.prenhall.com/wps/media/objects/3042/3116027/CH12/FG12_15.JPG

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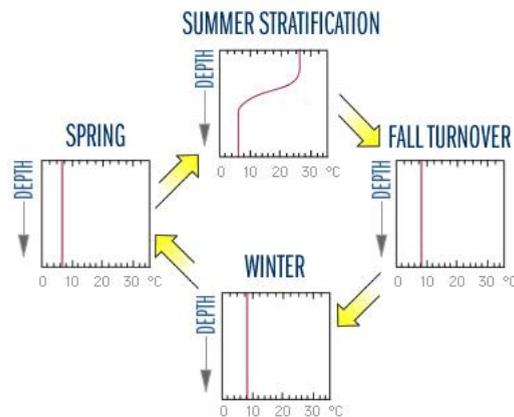
Lake Temperatures During the Seasons



Annual Pattern of Mixing from Young, M. (2004). Thermal Stratification in Lakes. Baylor College of Medicine, Center For Educational Outreach.

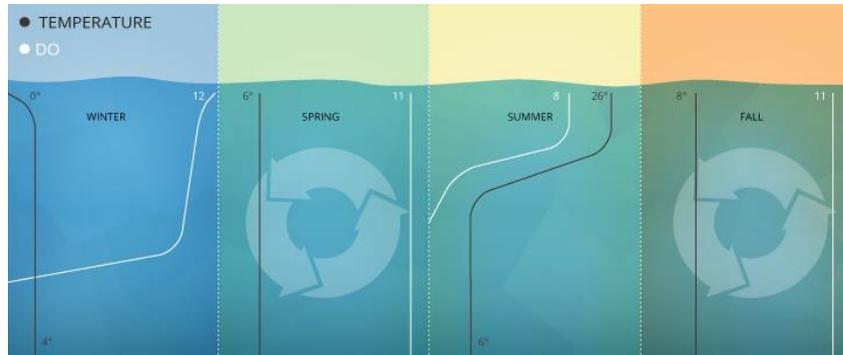
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Temperature Profiles - Seasonally



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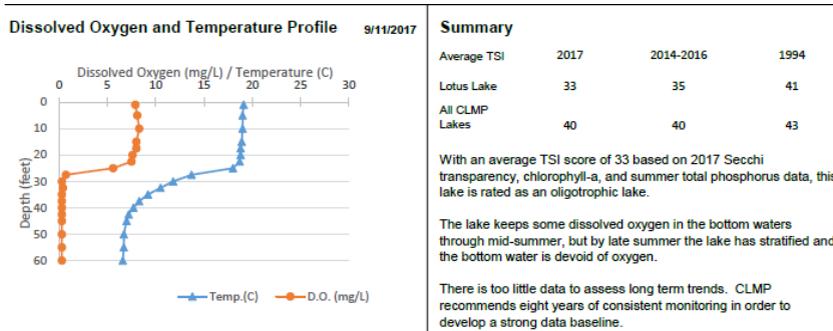
Dissolved Oxygen Profiles - Seasonally



<https://www.fondriest.com/environmental-measurements/parameters/water-quality/dissolved-oxygen/>

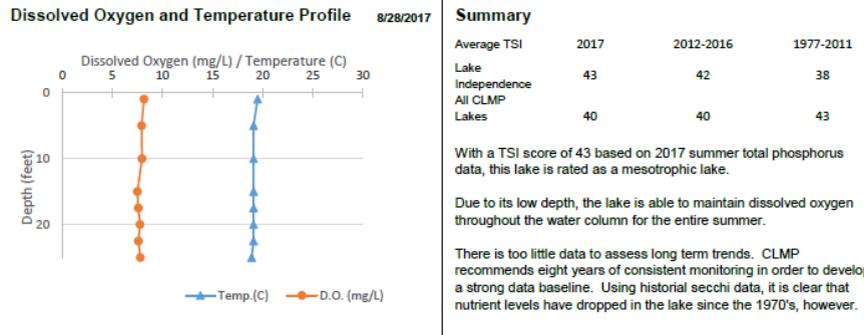
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Lotus Lake, Oakland County



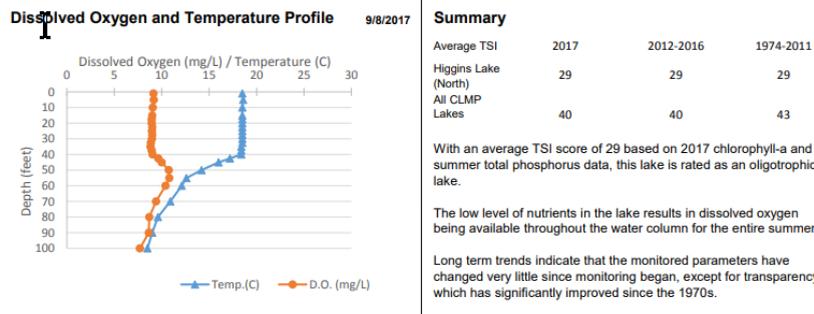
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Lake Independence, Marquette Co.



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Higgins Lake, Roscommon County



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How Does the DO Program Work?

- You may get matched with 2-3 other groups to share a DO meter. We leave the sharing logistics to you.
- Some lake groups purchase their own meter; if interested talk to us so you know which type to get.
- How often to measure? Your goal should be twice a month May-September, as evenly divided as you can.

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DO/Temperature Equipment Kit

- Oxygen Meter (550A or Pro-20)
- DO probe/cable (various lengths)
- Probe electrolyte solution bottle
- Probe membrane cap (in film canister)
- Quick-start calibration card
- Equipment storage box
- Spare batteries



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Probe of Each Meter



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Prepare for Sampling

- ❑ Turn on your meter and calibrate it
- ❑ Pack up your equipment
- ❑ Check for your data forms
- ❑ Bring boating safety equipment and a friend for data recording
- ❑ Calm and dry weather conditions



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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
- Take the measurements and fill out the data form!



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Cooperative Lakes
Monitoring Program

Dissolved Oxygen and Temperature



Michigan Clean
Water Corps

Lake Name: _____ County: _____ Township: _____

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

Latitude: _____ Longitude: _____

Volunteer Monitor Name(s): _____

Date Sampled: _____ Time: _____

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 (For 550A only; Pro20 does not give calibration values):
 DO: _____ % air saturation (Must be 99-103%; Troubleshoot if out-of-range)

Temperature: _____ °C Lake Altitude Value: _____ (x100 ft.)

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

North
▲

Lake Name: _____ Surface Area: _____ (acres)

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<https://www.mytopo.com/Michigan>

Michigan Placenames by County

Find topographic maps, aerial photos, and satellite images for every place named by the US Geological Survey. Choose a county to see the full place name listings.

County	USGS Placenames	County	USGS Placenames	County	USGS Placenames
Alcona County	328 places	Hillsdale County	602 places	Montcalm County	671 places
Alcona County	621 places	Houghton County	794 places	Montmorency County	299 places
Alcona County	1028 places	Huron County	745 places	Muskegon County	930 places
Alcona County	347 places	Ingham County	1097 places	Newaygo County	812 places
Antrim County	465 places	Ionia County	488 places	Oakland County	2503 places
Arenac County	283 places	Iosco County	410 places	Oceana County	493 places
Baraga County	397 places	Iron County	741 places	Ogemaw County	440 places
Barry County	629 places	Isabella County	535 places	Ontonagon County	616 places
Bay County	688 places	Jackson County	959 places	Osceola County	445 places
Benzie County	430 places	Kalamazoo County	930 places	Oscoda County	257 places
Berrien County	1252 places	Kalamazoo County	346 places	Ottawa County	403 places
Branch County	463 places	Kent County	2171 places	Ottawa County	1109 places
Calhoun County	994 places	Keweenaw County	652 places	Presque Isle County	393 places
Cass County	639 places	Lake County	378 places	Roscommon County	336 places
Charlevoix County	567 places	Leelanau County	763 places	Saginaw County	1176 places
Cheboygan County	570 places	Leelanau County	450 places	Sanilac County	800 places
Chippewa County	1206 places	Lenawee County	1027 places	Schoolcraft County	563 places
Clara County	448 places	Livingston County	752 places	Shiawassee County	586 places
Clinton County	626 places	Luce County	371 places	St. Clair County	1046 places
Crawford County	314 places	Mackinac County	809 places	St. Joseph County	590 places
Delta County	721 places	Macomb County	1571 places	Tuscola County	720 places
Dickinson County	461 places	Manistee County	494 places	Van Buren County	848 places
Eaton County	678 places	Marquette County	1244 places	Washtenaw County	1363 places
Emmet County	558 places	Mason County	452 places	Wayne County	3879 places
Genesee County	1477 places	Mecosta County	516 places	Wexford County	427 places
Gladwin County	358 places	Monominee County	562 places		
Gosport County	865 places	Midland County	556 places		
Grand Traverse County	654 places	Missaukee County	273 places		
Gratiot County	423 places	Monroe County	977 places		

Thompsonville
(Crystal
Mountain) area
is 794 feet

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****CAUTION: Remember to switch to mg/l mode before making oxygen measurements.****

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

Graphing: If you want to graph your data, you can print the graph from this website:
<https://micorps.net/wp-content/uploads/CLMP-DO-Temp-DataPlottingForm.pdf>

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Data Entry and Data Turn in

DATA ENTRY

Check **ONE** box:

- A volunteer has entered the field notes into the MiCorps Data Exchange (before October 30!)
Volunteer Name _____ Date entered _____.
- The field notes have not been entered into the MiCorps Data Exchange.

DATA SHEET TURN IN

No matter what box you check above, please do the following:

Make a copy for your records, and mail data form(s) by October 30 to:
MLSA, P.O. Box 303, Long Lake, MI 48743

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End of the year- returning the meters

- Please return the meter directly to Marcy Knoll Wilmes (EGLE-Lansing), or to an EGLE District Office.
- Contact me at (517) 342-4348 or knollm@michigan.gov to arrange the drop-off
- Please be sure to have the meter returned by the end of October
- Upon returning it, just have the calibration chamber sponge damp-no pooled water in the chamber, please.

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Calibration Step by Step

Pro20



550A



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Pro20 Calibration

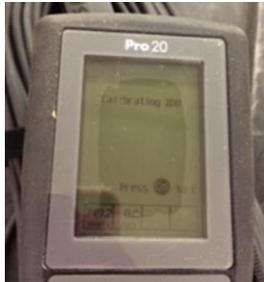


Turn On the Meter

Panel When On
– Let Meter
Stabilize for 5
MinutesPush Calibrate Button –
Hold 3 Seconds

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Pro20 Calibration



Screen Will Show
"Calibrating %DO"



If the Meter Calibrated
Properly, Screen Will Show
"Calibration Successful"

If the Meter Does Not
Show Previous
Screen, Allow More
Time to Stabilize and
Retry Calibration

29

550A Calibration



Turn On the Meter



Panel When On –
Let Meter Stabilize
for 10 Minutes



To Calibrate – Push the
Up and Down Buttons at
the Same Time

30

550A Calibration



"CAL" Will Appear on the Screen, Hit Enter



Adjust the Elevation Based on Your Location Using the Up and Down Arrow Keys and Hit Enter (9 would be appropriate for an area of 900 ft in elevation)



The Percent Air Saturation Needs to Display 93-103%. If it is, Press Enter. If Over or Under, turn the Meter Off and On and Allow it to Re-Stabilize

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550A Calibration



The Salinity Should Always Read 0.0 Since We Only Sample Freshwater. Hit Enter.



The Display Will Show % Saturation, Hit the Mode Button to Show mg/L



Display Screen Showing mg/L. Your Dissolved Oxygen Readings Should be Recorded in mg/L

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Let's Calibrate our Meters

- We'll separate by DO meter type
 - 550A
 - Pro20
- Follow along using laminated calibration card

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Take a practice measurement!

- Set the meter on mg/L
- Try it out in a bucket lake
- Remember to use a slight jiggling motion.
- Fill out an evaluation and leave when you are ready!

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