

Long Lake Water Quality Monitoring Program

Presented by

Abbey Hull & Michelle Preston

Long Lake Association Internship

- 2019 is the fourth year that NMC students have worked as water quality monitoring interns at Long Lake
- 2019 Interns were responsible for:
 - Obtaining water samples from Long, Mickey, and Ruth Lakes for water quality testing
 - Using specialized equipment to gather physical data from each of these lakes
 - Collecting plankton to be identified
 - Participating in a shoreline survey of Mickey Lake
 - Updating historical data and graph records
 - Submitting a completed 2019 Water Quality Report to the Long Lake Association

Meet the 2019 Interns

Michelle Preston

- Grew up in Metro Detroit
- Recently earned a Freshwater Studies Associate in Science and Arts degree through Northwestern Michigan College
- Plans to earn a Freshwater Science and Sustainability degree through Western Michigan University
- Cherishes and respects natural resources, especially freshwater bodies



Abbey Hull

- Grew up in Traverse City, and lived in Long Lake Township
- Currently completing a Freshwater Studies Associate in Applied Science degree through Northwestern Michigan College
- Plans to complete the Freshwater Studies & Sustainability bachelor program through Western Michigan University
- Extremely passionate for the environment and protecting freshwater
- Dreams of becoming a limnologist (Studier of freshwater lakes & streams)



Training and Protocols

Training and Protocols

- This internship began with training from the Cooperative Lakes Monitoring Program (CLMP) which falls within the Michigan Clean Water Corps (MiCorps) volunteer monitoring program network
- CLMP is a state-wide, volunteer-based lake monitoring program which has established protocols for data collection, entry, and reporting

Training and Protocols

- LLA Interns attended CLMP training at the Michigan Lake Stewardship Associations Annual Conference in May of 2019
- Interns learned CLMP protocols for:
 - Monitoring Dissolved Oxygen and Temperature
 - Obtaining Secchi Disk readings
 - Obtaining Phosphorus and Chlorophyll-a samples
 - Identifying Exotic Aquatic Plants
 - Conducting a Nearshore Habitat Assessment (Score the Shore)



Dissolved Oxygen and Temperature



Data Form 2013

Lake Name: Dead Spider County: Lake Township: Inland

Lake Sampling Site (Field ID) Number: 380317 (mark location on map below)

Latitude: 44.67°N Longitude: 85.49°W

Volunteer Monitor Name(s): Benny Tuckid

Date Sampled: 9-15-2013 Time: 12:30 pm

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

Unusual Conditions (heavy rain, boating, etc.): none

Sampling Station Depth (measured): 65 feet

DO/Temp. Meter (circle one): YSI Model 990 YSI Model 550A YSI Pro20

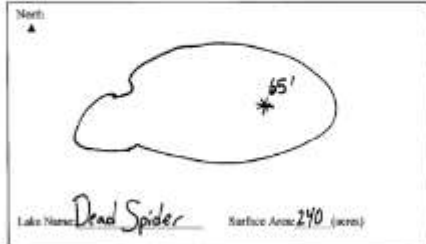
CLMP Meter ID#: MLSA-2 (if this is your meter, enter "Our Meters")

Calibration Values (for 990 and 550A only; Pro20 does not give calibration values)

DO: 96.3 % air saturation (Must be 95-98%; Troubleshoot if out-of-range)

Temperature: 20.1 °C Lake Altitude Value: 8 (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.



****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	20.4	9.2	37½	10.9	0.9
5	20.4	9.2	40	10.1	0.2
10	20.4	9.2	42½	9.5	0.1
15	20.3	9.1	45	9.2	0.0
17½	19.3	9.1	50	8.5	0.0
20	18.6	9.0	55	8.3	0.0
22½	18.0	8.5	60	8.2	0.0
25	16.0	7.4	65 625	8.1	0.0
27½	14.0	7.0	nd		
30	12.8	6.0	25		
32½	11.9	0.8	nd		
35	11.5	0.7			

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: <http://www.micorps.net/documents/DO-TempDataPlottingForm.pdf>

DATA ENTRY

Check **ONE** box:

- The data have been entered into the MiCorps Data Exchange (before October 30)
Date entered: 9-20-13
- The data 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 by October 30 to: ✓

The address here changes year to year.
Refer to the actual data sheet to get the current address.

2019 Sampling Adventures













Mickey Lake Shoreline Survey

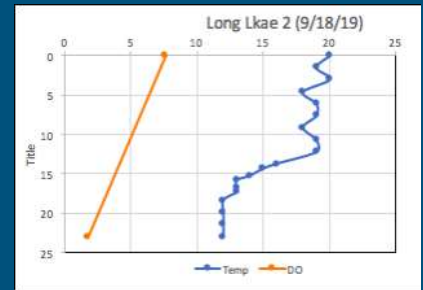
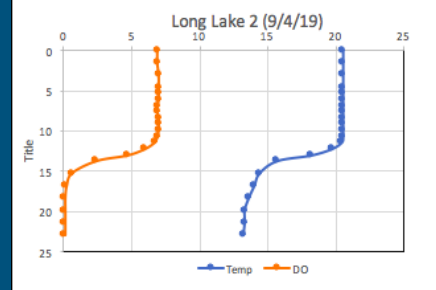
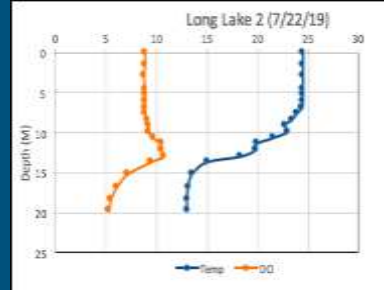
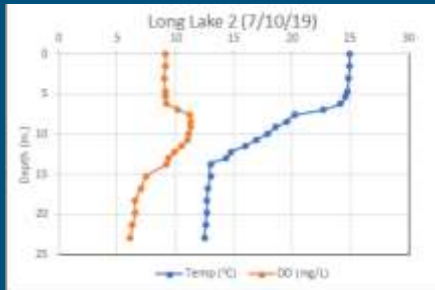
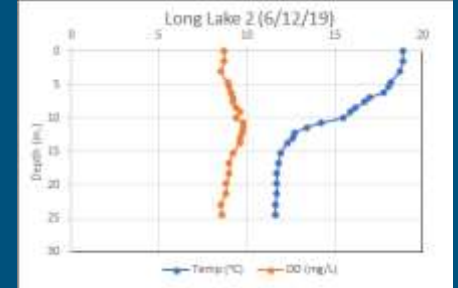
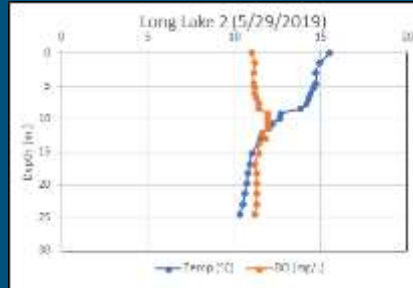
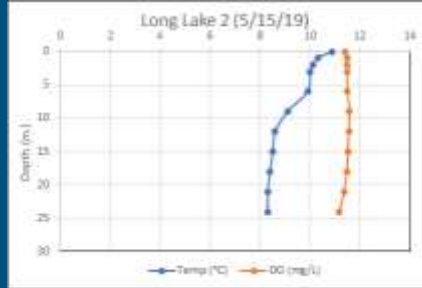
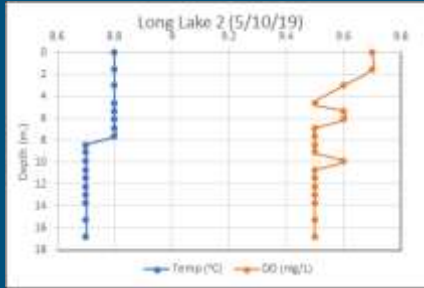


- Interns are analyzing 1000 ft. sections of Mickey Lake with high definition aerial footage recorded by Dennis Wiand (Zero Gravity Aerial)
- CLMP's Score the Shore standards include:
 - Total number of all buildings and docks
 - Littoral Zone Characteristics and Shoreline Erosion (vegetation/woody debris present?)
 - Riparian Zone Characteristics (vegetation belt present?)
 - Shoreline Erosion Control Practices (artificial vs. bioengineered structures, slope?)

Results

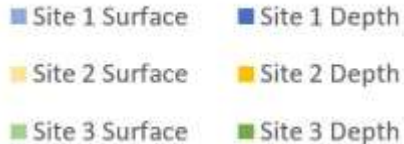
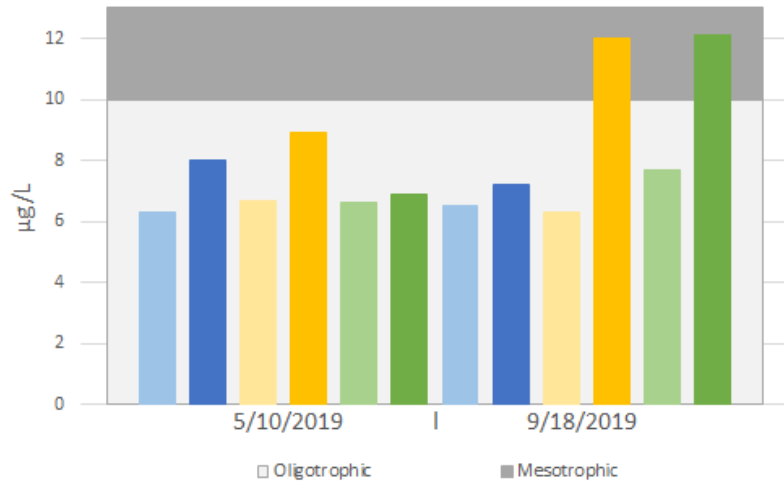


2019 Long Lake Stratification

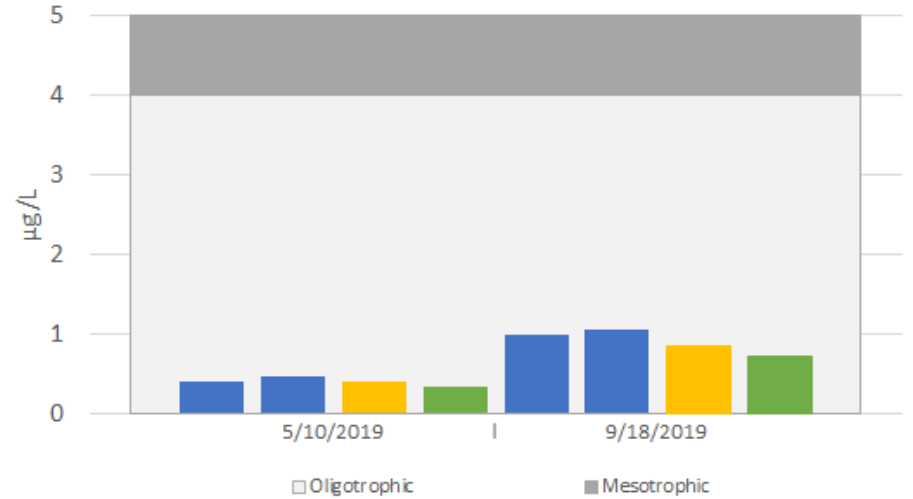


2019 Long Lake Graphs

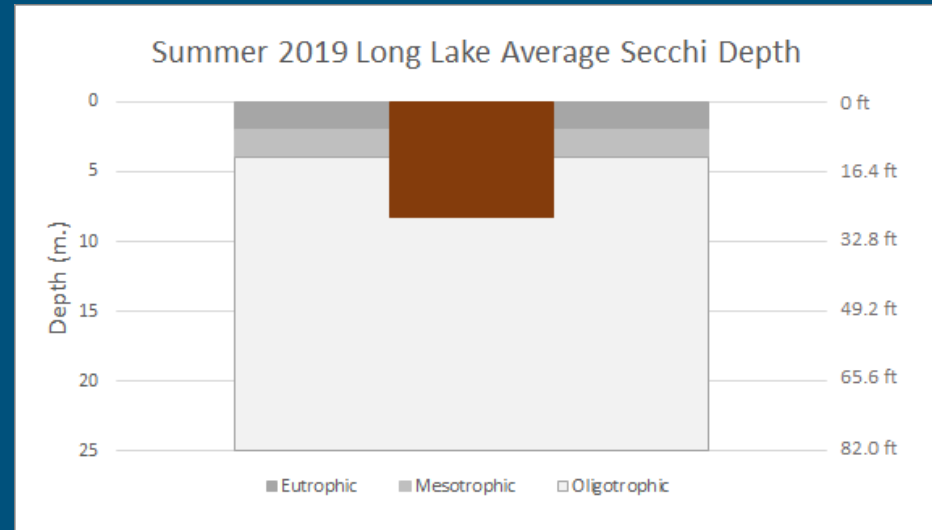
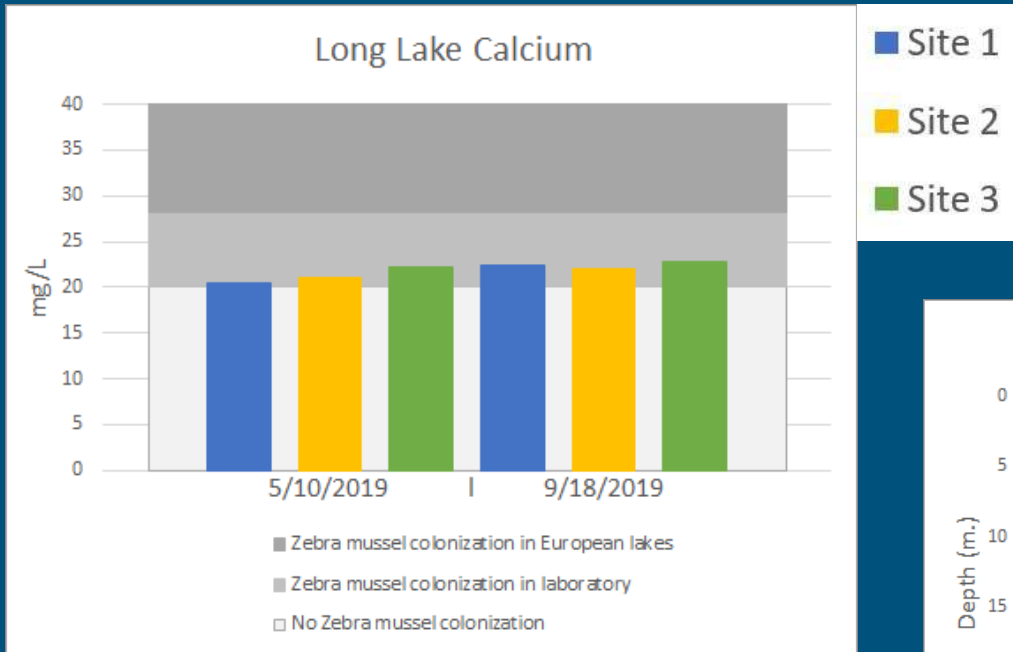
Long Lake Total Phosphorus



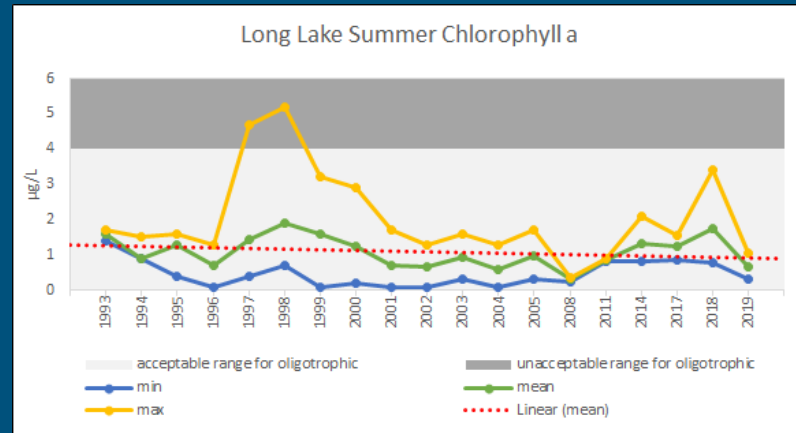
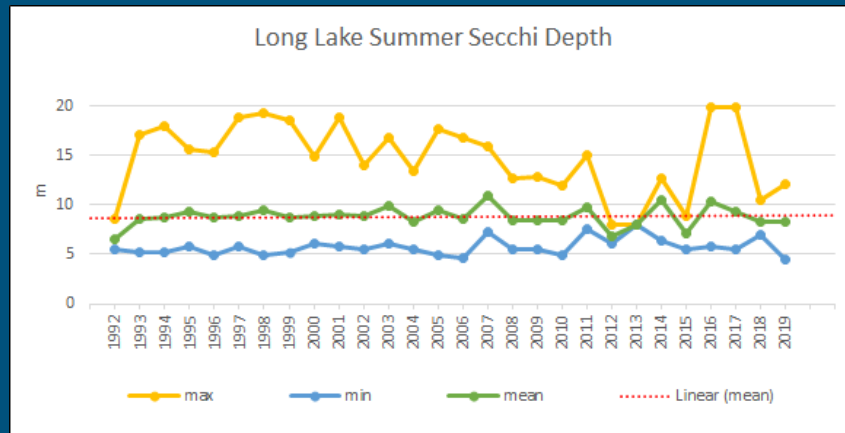
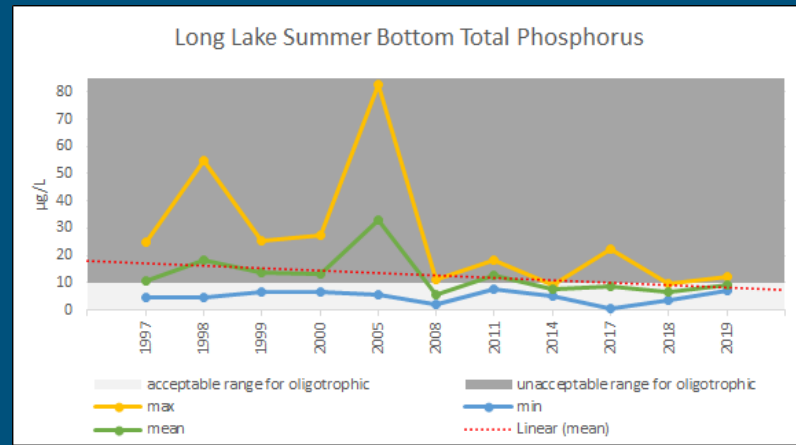
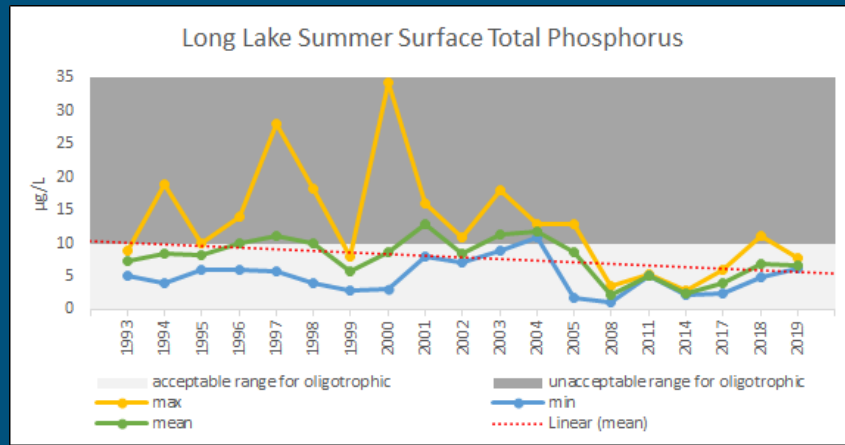
Long Lake Chlorophyll a



2019 Long Lake Graphs



Long Lake Historical Graphs



Thank you:

Long Lake Township

Oleson Foundation

Long Lake Foundation

Long Lake Association

Mentors: Len Klein, Barry Lishawa, Dr. Roeper,

Kathryn DePauw, Chelsea Cooper

Constanza Hazelwood

Northwestern Michigan College

Dennis Wiand, Zero Gravity

Freshwater Solutions

Great Lakes Environmental Center

Michigan Clean Water Corps