



# 2018 Data Report for Highbanks Lake, Newaygo County

Site ID: 620337

43.7706°N, 85.8923°W

The CLMP is brought to you by:



Michigan Clean  
Water Corps



**About this report:**

This report is a summary of the data that have been collected through the Cooperative Lakes Monitoring Program. The contents have been customized for your lake. The first page is a summary of the Trophic Status Indicators of your lake (Secchi Disk Transparency, Chlorophyll-a, Spring Total Phosphorus, and Summer Total Phosphorus). Where data are available, they have been summarized for the most recent field season, five years prior to the most recent field season, and since the first year your lake has been enrolled in the program.

If you did not take 8 or more Secchi disk measurements or 4 or more chlorophyll measurements, there will not be summary data calculated for these parameters. These numbers of measurements are required to ensure that the results are indicative of overall summer conditions.

If you enrolled in Dissolved Oxygen/Temperature, the summary page will have a graph of one of the profiles taken during the late summer (typically August or September). If your lake stratifies, we will use a graph showing the earliest time of stratification, because identifying the timing of this condition and the depth at which it occurs is typically the most important use of dissolved oxygen measurements.

The back of the summary page will be an explanation of the Trophic Status Index and where your lake fits on that scale.

The rest of the report will be aquatic plant summaries, Score the Shore results, and larger graphs, including all Dissolved Oxygen/Temperature Profiles that you recorded. For Secchi Disk, Chlorophyll, and Phosphorus parameters, you need to have two years of data for a graph to make logical sense. Therefore if this is the first year you have enrolled in the CLMP, you will not receive a graph for these parameters.

Remember that some lakes see a lot of fluctuation in these parameters from year to year. Until you have eight years worth of data, consider all trends to be preliminary.

To learn more about the CLMP monitoring parameters or get definitions to unknown terms, check out the CLMP Manual, found at: [https://cdn.cloud1.cemah.net/wp-content/uploads/sites/63/2018/03/CLMP\\_Manual\\_2018.pdf](https://cdn.cloud1.cemah.net/wp-content/uploads/sites/63/2018/03/CLMP_Manual_2018.pdf)

**Thank you!**

The CLMP leadership team would like to thank you for all of your efforts over the past year. The CLMP would not exist without dedicated and hardworking volunteers!

The CLMP Leadership Team is made of: Marcy Knoll Wilmes, Jean Roth, Jo Latimore, Paul Steen, Mike Gallagher, Laura Kaminski, and Erick Elgin

**Questions?**

If you have questions on this report or believe that the tabulated data for your lake in this report are in error please contact:

**Paul Steen (psteen@hrwc.org), MiCorps Program Manager**

# Highbanks Lake, Newaygo County 2018 CLMP Results



## Secchi Disk Transparency (feet)

Year	# Readings	Min	Max	Average	Std. Dev	Carlson TSI
2018	8	12.0	20.0	15.2	2.6	38
2018 All CLMP Lakes	2949	2.0	52.0	12.3	2.7	42

No graph: Not enough data

## Chlorophyll-a (parts per billion)

Year	# Samples	Min	Max	Median	Std. Dev	Carlson TSI
2018	5	<1.0	9.2	2.1	3.5	38
2018 All CLMP Lakes	580	< 1.0	66.0	2.1	4.8	38

No graph: Not enough data

## Spring Phosphorus (parts per billion)

Year	# Samples	Min	Max	Average	Std. Dev
2018	1	7.0	7.0	7.0	NA
2018 All CLMP Lakes	193	<= 3	110.0	12.8	12.5

No graph: Not enough data

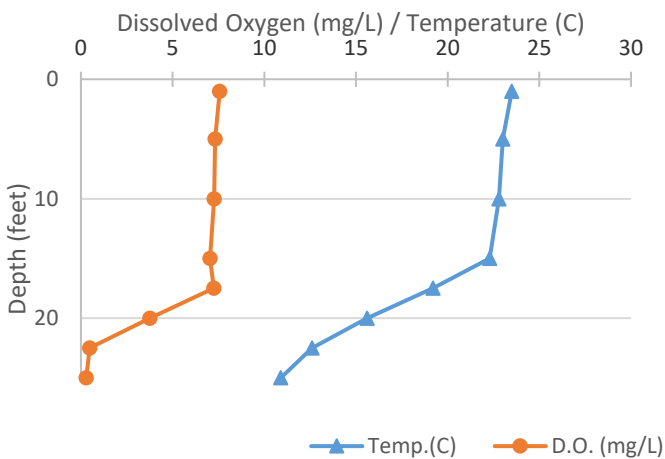
## Summer Phosphorus (parts per billion)

Year	# Samples	Min	Max	Average	Std. Dev	Carlson TSI
2018	1	8.0	8.0	8.0	NA	34
2018 All CLMP Lakes	248	<= 3	84.0	14.1	10.4	42

No graph: Not enough data

## Dissolved Oxygen and Temperature Profile

8/31/2018



## Summary

Average TSI	2018
Highbanks Lake	37
All CLMP Lakes	41

With an average TSI score of 37 based on 2018 Secchi transparency, chlorophyll-a, and summer total phosphorus data, this lake is rated between the oligotrophic and mesotrophic lake classification. The lake leans slightly more oligotrophic than mesotrophic.

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.

Welcome to the CLMP! The longer you stay in the program and the more parameters you monitor, the more interesting this report will become. Once you have eight years of data there will be enough history to analyze the long-term trend.

\* = No sample received W= Value is less than the detection limit (<3 ppb) T= Value reported is less than the reporting limit (5 ppb).  
<1.0 = Chlorophyll-a: Sample value is less than limit of quantification (<1 ppb).

# Trophic Status Index Explained

In 1977, limnologist Dr. Robert Carlson developed a numerical scale (0-100) where the numbers indicate the level of nutrient enrichment. Using the proper equations, we can convert results from Summer Total Phosphorus, Secchi Depth, and Chlorophyll-a to this Trophic Status Index (TSI). The TSI numbers are furthermore grouped into general categories (oligotrophic, mesotrophic, eutrophic, and hypereutrophic), to quickly give us a way to understand the general nutrient level of any lake.

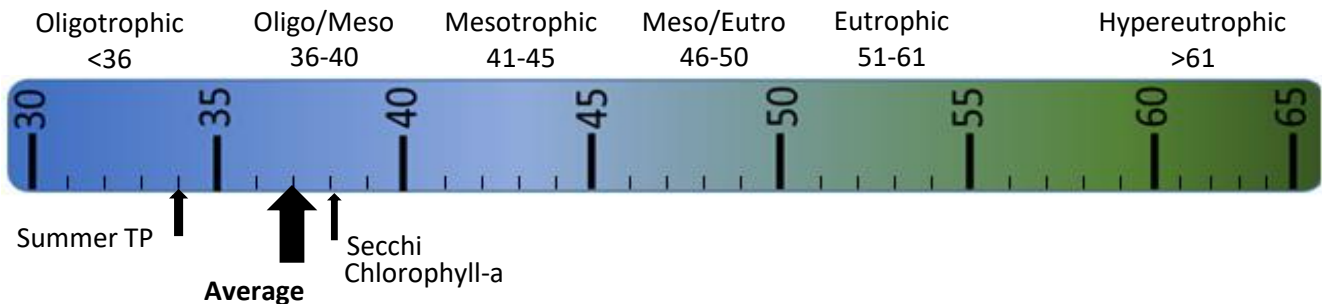
The tables below give the results-to-TSI conversions for the water quality data ranges normally seen in the CLMP. The formulas for this conversion can be found in the CLMP manual: [https://cdn.cloud1.cemah.net/wp-content/uploads/sites/63/2018/03/CLMP\\_Manual\\_2018.pdf](https://cdn.cloud1.cemah.net/wp-content/uploads/sites/63/2018/03/CLMP_Manual_2018.pdf)

Phosphorus (ppb)	TSI Value
<5	<27
6	30
8	34
10	37
12	40
15	43
18	46
21	48
24	50
32	54
36	56
42	58
48	60
>50	>61

Secchi Depth (ft)	TSI Value
>30	<28
25	31
20	34
15	38
12	42
10	44
7.5	48
6	52
4	57
<3	>61

Chlorophyll-a (ppb)	TSI Value
<1	<31
2	37
3	41
4	44
6	48
8	51
12	55
16	58
22	61
>22	>61

TSI for Highbanks Lake in 2018	
Average	37
Secchi Disk	38
Summer TP	34
Chlorophyll-a	38



**Oligotrophic:** Generally deep and clear lakes with little aquatic plant or algae growth. These lakes maintain sufficient dissolved oxygen in the cool, deep-bottom waters during late summer to support cold water fish, such as trout and whitefish.

**Mesotrophic:** Lakes that fall between oligotrophic and eutrophic. Mid-ranged amounts of nutrients.

**Eutrophic:** Highly productive eutrophic lakes are generally shallow, turbid, and support abundant aquatic plant growth. In deep eutrophic lakes, the cool bottom waters usually contain little or no dissolved oxygen. Therefore, these lakes can only support warm water fish, such as bass and pike.

**Hypereutrophic:** A specialized category of eutrophic lakes. These lakes exhibit extremely high productivity, such as nuisance algae and weed growth.

# Highbanks Lake, Newaygo County

## 2018 CLMP Aquatic Plant Results



The Aquatic Plant Identification and Mapping survey was conducted on Highbanks Lake in 2018.

This survey involves intensive sampling at multiple locations and depths around the lake produce a complete map of all aquatic plants present in a lake. A great deal of effort is involved both on the lake and back on shore to identify plants, compile data, and develop a detailed plant map, but the result is an extremely valuable record of the plant community of the lake.

Aquatic plants were sampled from a total of 21 locations (7 transects) in Highbanks Lake in 2018. Below is a list of species reported in order of relative abundance. Survey conducted August 24, 2018.

Highbanks Lake, Newaygo County		
2018 Aquatic Plant Identification and Mapping: Species Reported		
<u>Common Name</u>	<u>Latin name</u>	<u>Average Density*</u>
Variable pondweed	<i>Potamogeton gramineus</i>	2.6
Stonewort	<i>Chara</i> sp.	2.2
Watershield	<i>Brasenia schreberi</i>	1.6
White water lily	<i>Nymphaea odorata</i>	1.1
Bladderwort	<i>Utricularia</i> sp.	1.0
Illinois pondweed	<i>Potamogeton illinoensis</i>	0.7
Smartweed	<i>Pescaria amphibia</i>	0.5
Floating-leaf pondweed	<i>Potamogeton natans</i>	0.3
Pickerelweed	<i>Pontederia cordata</i>	0.3
Bulrushes		<0.1
Large-leaf pondweed	<i>Potamogeton amplifolius</i>	<0.1
Sago pondweed	<i>Stuckenia pectinata</i>	<0.1
Wild celery	<i>Vallisneria americana</i>	<0.1

\*Lakewide. Scale: 0 (absent) - 5 (dense)

Visit the MiCorps Data Exchange ([www.micorps.net](http://www.micorps.net)) or contact the lead volunteer on your lake for more details on the survey, including sampling locations, maps, and abundance information, and for information on past surveys.

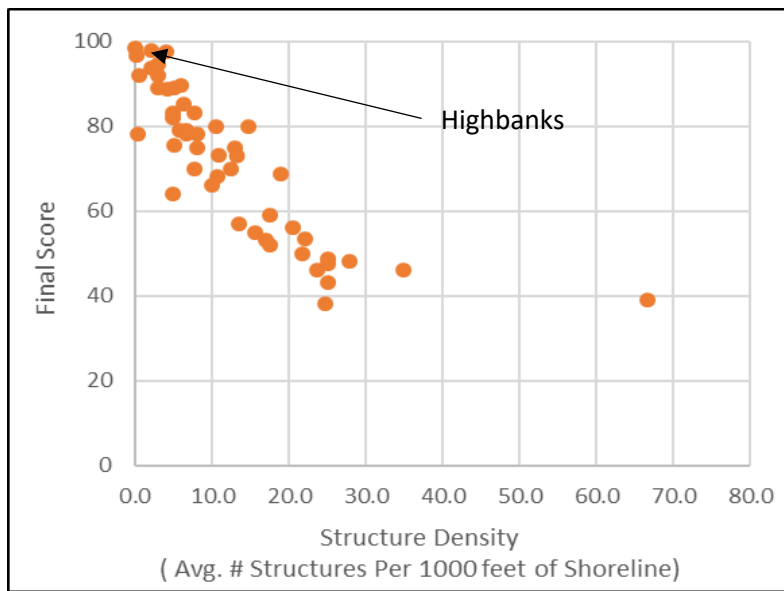
# Highbanks Lake, Newaygo County 2018 Score the Shore Results



The Score the Shore Habitat Assessment was conducted on Highbanks Lake in 2018.

This assessment involves rating 1000 foot sections of shoreline for aquatic vegetation, shoreline vegetation, erosion, and erosion control practices (like sea walls). Each shoreline section is given three scores ranging from 0-100 for the categories of Littoral, Riparian, and Erosion Management. The three scores are averaged to produce a average section score. Then a total score is given to the entire lake by averaging all of the average section scores. A score of 0 indicates a shoreline that has been extremely disturbed by human impacts and no natural shoreline remains. A score of 100 indicates a shoreline that is nearly pristine.

### How does your lake compare to others in the program?



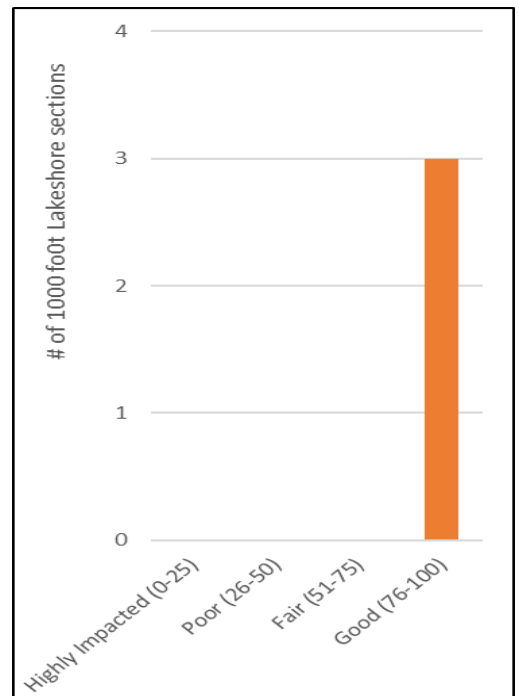
<b>Highbanks Lake:</b>	
Number of Sections:	3
Number of Structures:	12
Structure Density:	4
Final Score:	97.5

<b>All 42 Participating Lakes from 2015-2018:</b>	
Avg. Number of Sections:	16.3
Avg. Number of Structures:	248.5
Avg. Structure Density:	15.2
Avg. Final Score:	70.5

There is a very tight relationship between Final Score and Structure Density. It will be interesting to see if and how this changes as more lakes go through this scoring process.

### Analysis specific to Highbanks Lake:

Highbanks Lake has a very high shoreline score, with an average of 97.5, and one of the best rated lakes in the CLMP. The lake is nearly pristine, and based on the ratings, there are only three things that could be improved. Section 1 and 3 have some minor erosion, and there is a small section of maintained lawn or beach on Section 3 that slightly reduces the score. However, these are minor quibbles, as overall the lake is natural and the focus should be on keeping it that way!



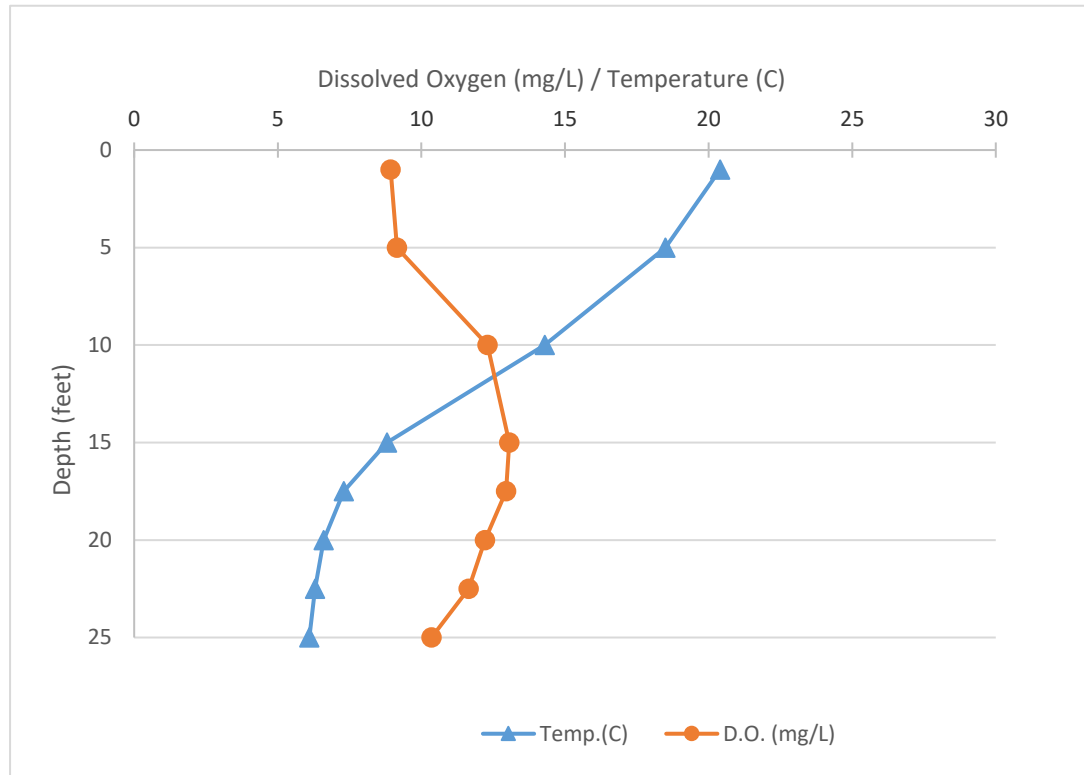
Name: Highbanks Lake  
County: Newaygo  
Site ID: 620337  
Date: 5/17/2018

### Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	20.4	8.93
5	18.5	9.15
10	14.3	12.3
15	8.8	13.06
17.5	7.3	12.95
20	6.6	12.21
22.5	6.3	11.65
25	6.1	10.35

Lake: Highbanks Lake (Newaygo Co.)

5/17/2018



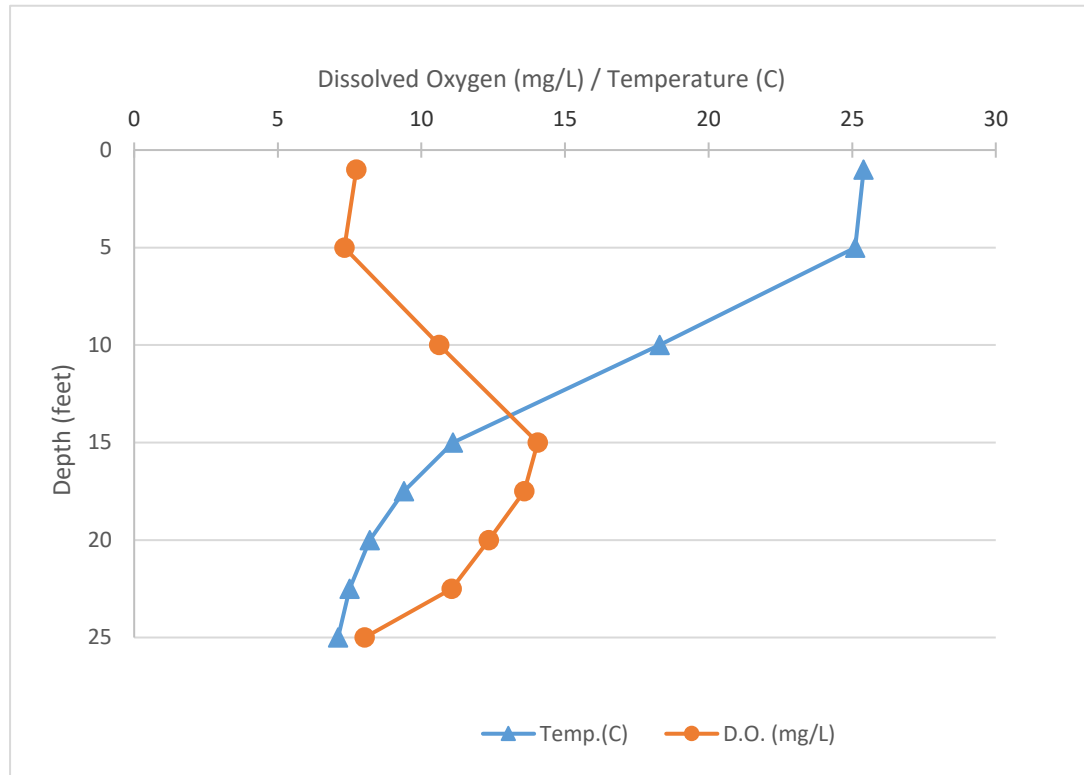
Name: Highbanks Lake  
County: Newaygo  
Site ID: 620337  
Date: 5/31/2018

### Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	25.4	7.74
5	25.1	7.32
10	18.3	10.62
15	11.1	14.05
17.5	9.4	13.58
20	8.2	12.35
22.5	7.5	11.05
25	7.1	8.02

Lake: Highbanks Lake (Newaygo Co.)

5/31/2018





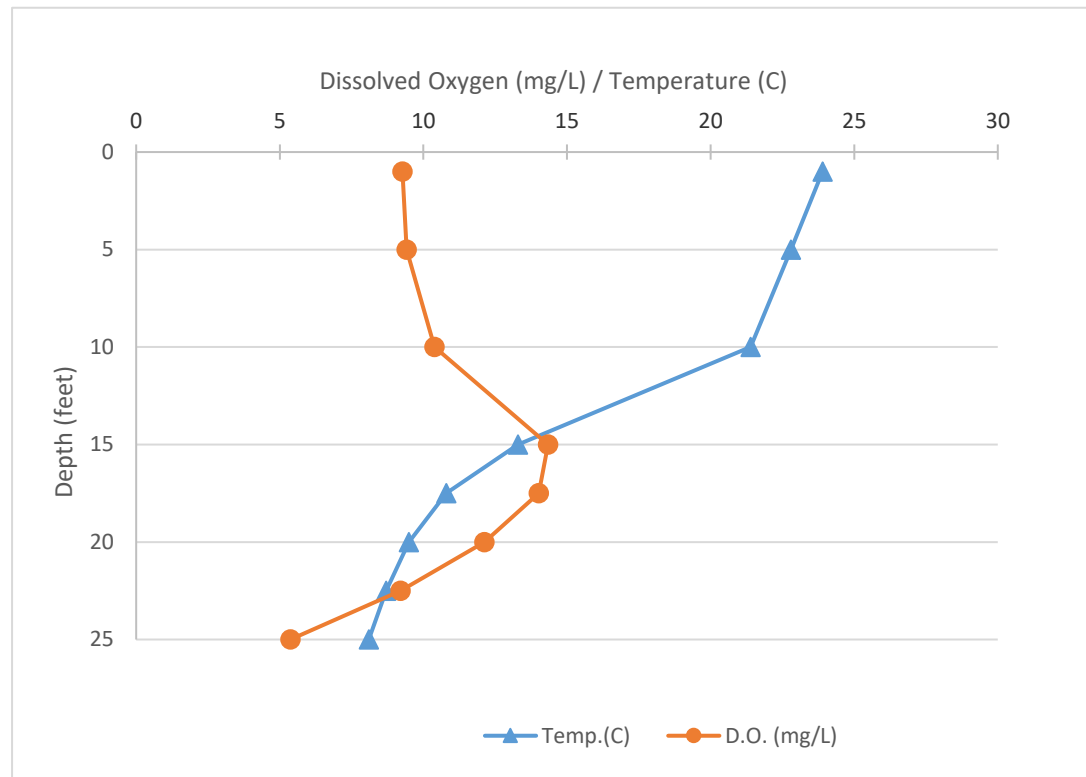
Name: Highbanks Lake  
County: Newaygo  
Site ID: 620337  
Date: 6/14/2018

### Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	23.9	9.27
5	22.8	9.42
10	21.4	10.39
15	13.3	14.34
17.5	10.8	14.02
20	9.5	12.13
22.5	8.7	9.21
25	8.1	5.37

Lake: Highbanks Lake (Newaygo Co.)

6/14/2018



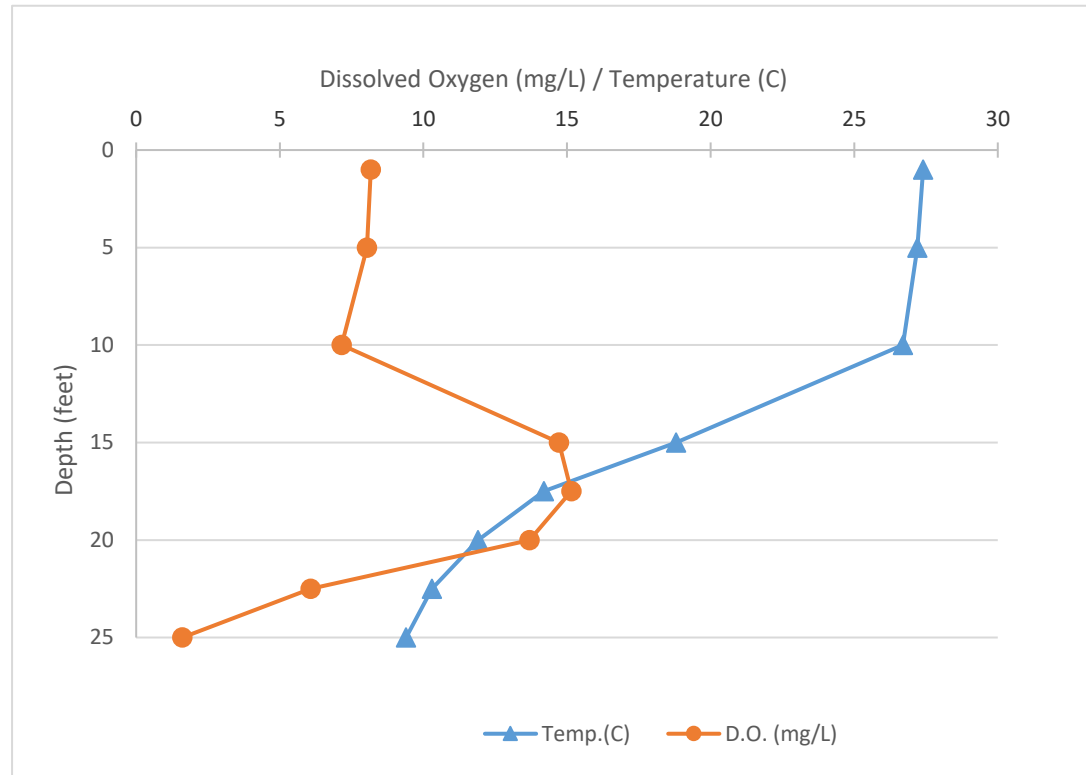
Name: Highbanks Lake  
County: Newaygo  
Site ID: 620337  
Date: 7/17/2018

### Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	27.4	8.17
5	27.2	8.04
10	26.7	7.16
15	18.8	14.72
17.5	14.2	15.15
20	11.9	13.7
22.5	10.3	6.08
25	9.4	1.61

Lake: Highbanks Lake (Newaygo Co.)

7/17/2018



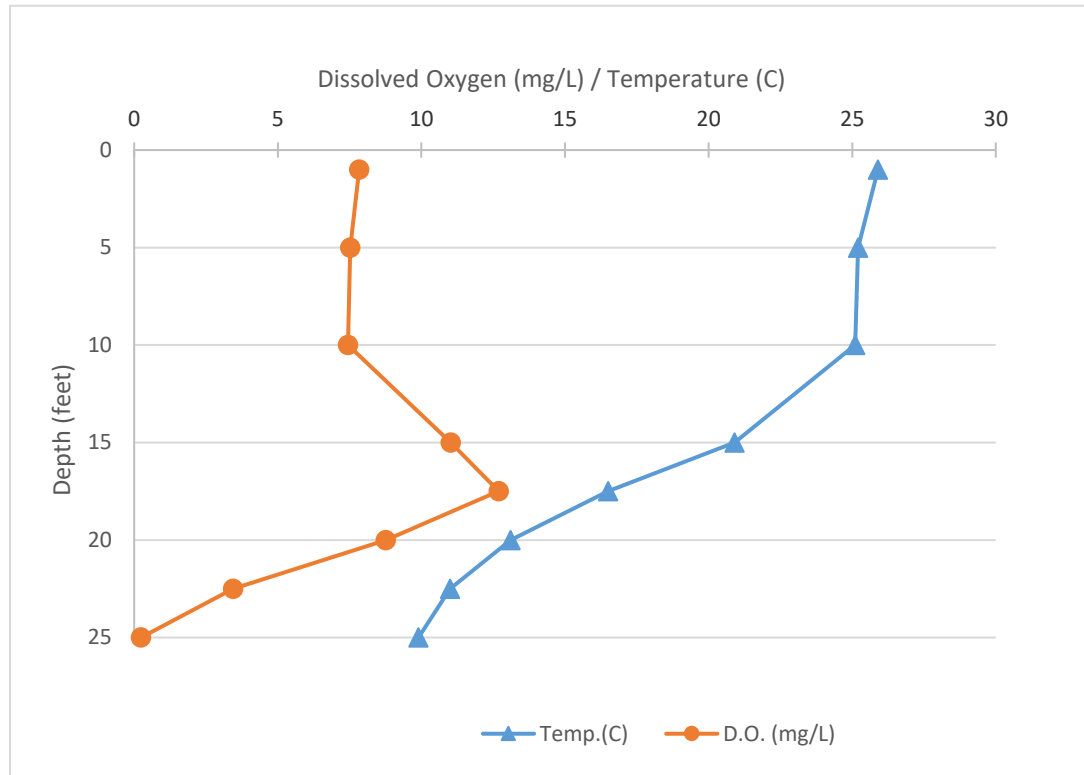
Name: Highbanks Lake  
County: Newaygo  
Site ID: 620337  
Date: 8/3/2018

### Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	25.9	7.84
5	25.2	7.52
10	25.1	7.45
15	20.9	11.02
17.5	16.5	12.69
20	13.1	8.76
22.5	11	3.44
25	9.9	0.24

Lake: Highbanks Lake (Newaygo Co.)

8/3/2018



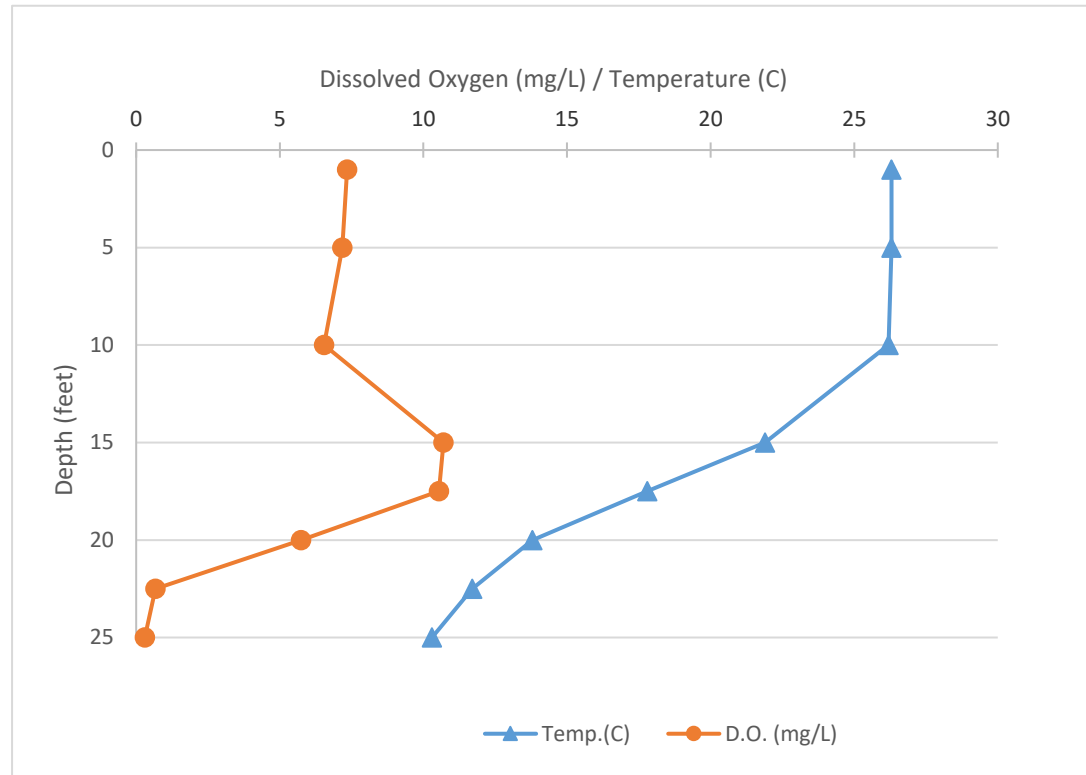
Name: Highbanks Lake  
County: Newaygo  
Site ID: 620337  
Date: 8/17/2018

### Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	26.3	7.35
5	26.3	7.18
10	26.2	6.54
15	21.9	10.7
17.5	17.8	10.54
20	13.8	5.74
22.5	11.7	0.67
25	10.3	0.3

Lake: Highbanks Lake (Newaygo Co.)

8/17/2018



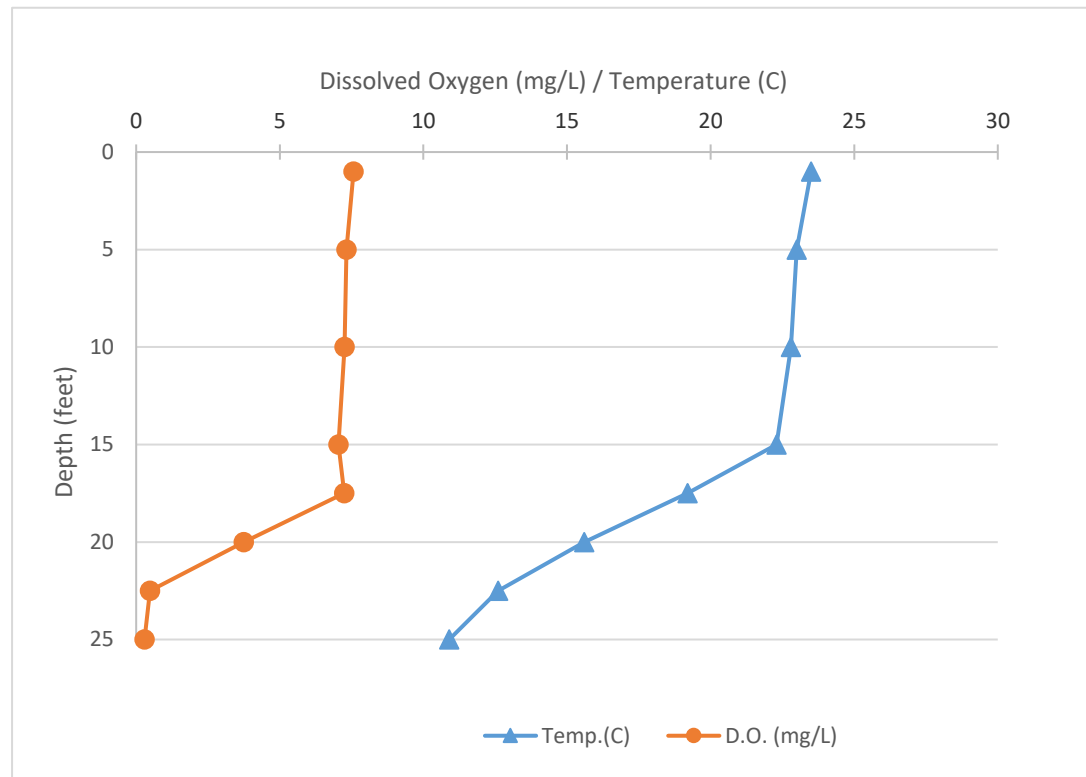
Name: Highbanks Lake  
County: Newaygo  
Site ID: 620337  
Date: 8/31/2018

### Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	23.5	7.57
5	23	7.32
10	22.8	7.26
15	22.3	7.04
17.5	19.2	7.25
20	15.6	3.75
22.5	12.6	0.48
25	10.9	0.29

Lake: Highbanks Lake (Newaygo Co.)

8/31/2018



Name: Highbanks Lake  
County: Newaygo  
Site ID: 620337  
Date: 9/13/2018

### Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	21.8	8.03
5	21.6	7.98
10	21.4	7.96
15	21	7.07
17.5	19.5	3.96
20	16.3	0.72
22.5	13	0.2
25	11.4	0.15

Lake: Highbanks Lake (Newaygo Co.)

9/13/2018

