Cooperative Lakes Monitoring Program

Michigan Lakes– Ours to Protect

2024 Data Report for Fremont Lake, Newaygo County

Site ID: 620029

43.4506°N, 85.9647°W

The CLMP is brought to you by:

Michigan Clean Water Corps

EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

MICHIGAN STATE UNIVERSITY

MICHIGAN LAKES AND STREAMS ASSOCIATION

Huron River Watershed Council

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://micorps.net/wp-content/uploads/2021/03/CLMP-Manual-2019update2_2021.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: Jo Latimore, Erick Elgin, Jean Roth, Tamara Lipsey, Mike Gallagher, Melissa DeSimone, and Paul Steen

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), CLMP Data Analyst

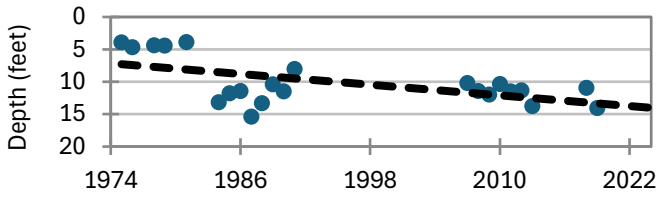
Site ID: 620029

Fremont Lake, Newaygo County
2024 CLMP Results

Cooperative Lakes Monitoring Program

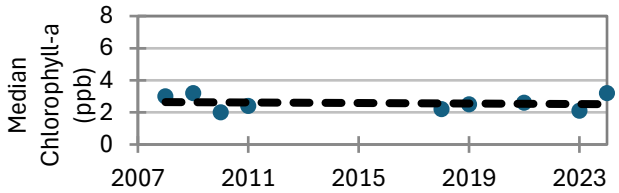
Secchi Disk Transparency (feet)

Year	# Readings	Min	Max	Average	Std. Dev	Carlson TSI
2024	7*	4.5	11.5			
2019-2023	28	7.0	21.5	14.1	5.4	39
1975-2018	335	2.0	28.0	9.9	4.0	45
2024 All CLMP Lakes	3348	0.5	85.0	11.7	6.2	43



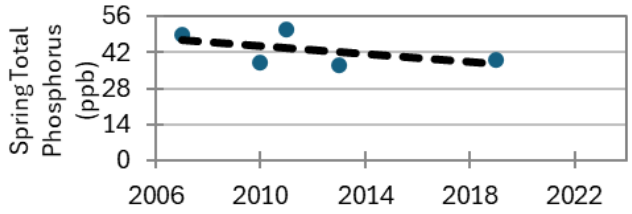
Chlorophyll-a (parts per billion)

Year	# Samples	Min	Max	Median	Std. Dev	Carlson TSI
2024	4	2.1	4.4	3.2	0.9	42
2019-2023	13	1.0	7.3	2.5	1.8	40
2008-2018	24	<1.0	7.6	2.5	1.9	39
2024 All CLMP Lakes	708	< 1.0	63.0	2.8	7.3	41



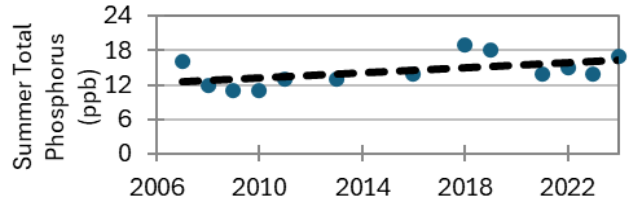
Spring Phosphorus (parts per billion)

Year	# Samples	Min	Max	Average	Std. Dev
2019	1	39.0	39.0	39.0	NA
2007-2013	4	37.0	51.0	43.8	7.3
2024 All CLMP Lakes	259	<= 5	140.0	14.3	39.7

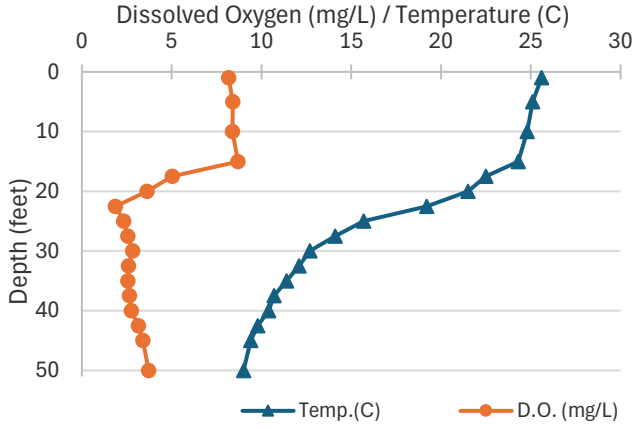


Summer Phosphorus (parts per billion)

Year	# Samples	Min	Max	Average	Std. Dev	Carlson TSI
2024	1	17.0	17.0	17.0	NA	45
2019-2023	4	14.0	18.0	15.3	1.9	43
2007-2018	8	11.0	19.0	13.6	2.7	42
2024 All CLMP Lakes	261	<= 5	140.0	14.6	11.9	43



Dissolved Oxygen and Temperature Profile



7/18/2024

Summary

Average TSI	2024	2019-2023	1975-2018
Fremont Lake	44	41	44
All CLMP Lakes	41	42	42

With an average TSI score of 44 based on 2024 summer total phosphorus and chlorophyll data, this lake is rated as mesotrophic.*

Monitoring data indicates that this lake maintains some dissolved oxygen throughout most of the water column for the entire summer. However, the lake stratifies and oxygen in the bottom waters decreases in mid-summer.

While the trends for individual parameters are mixed, monitoring data indicates that overall nutrient levels remain largely unchanged since data collection began.

*Reminder: 8 Secchi measurements are required to use the data in graphs and trends.

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

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.

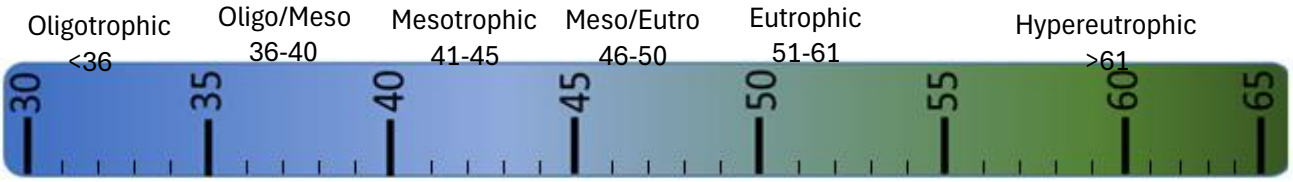
The tables below give the results-to-TSI conversions for the water quality data ranges normally seen in the CLMP. The formulas for this conversion can be found in the CLMP manual (link is on page 2 of this report).

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 Fremont Lake in 2024	
Average	44
Secchi Disk	
Summer TP	45
Chlorophyll-a	42



^ Average

^ Total Phosphorus

^ Chlorophyll-a

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 euthrophic lakes. These lakes exhibit extremely high productivity, such as nuisance algae and weed growth.

Site ID: 620029

Fremont Lake, Newaygo County
2016 Exotic Aquatic Plant Watch Results

The Exotic Aquatic Plant Watch was conducted on Fremont Lake in 2016.

This survey involves sampling at multiple locations around the lake to detect new invaders, and document the extent of known invaders. While notes on other plant species may be recorded during the survey, the effort focuses on four highly invasive species: Eurasian watermilfoil (*Myriophyllum spicatum*), starry stonewort (*Nitellopsis obtusa*), curly-leaf pondweed (*Potamogeton crispus*), and Hydrilla (*Hydrilla verticillata*).

The table below summarizes the results of the 2016 Exotic Aquatic Plant Watch on Fremont Lake.

Fremont Lake, Newaygo County

2016 Exotic Aquatic Plant Watch Results

Survey Date: May 16, 2016

Species	Status	Comments
Eurasian watermilfoil	FOUND	Lakewide density = 2.1 (scale 0-5; at 19 of 77 surveyed sites); 3rd most common plant in lake
Starry stonewort	not found	
Curly-leaf pondweed	FOUND	Lakewide density = 1.6; relatively uncommon. Found 8 of 77 surveyed sites.
Hydrilla	not found	

Visit the MiCorps Data Exchange (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.

Site ID: 620029

Fremont Lake, Newaygo County
2016 CLMP Aquatic Plant Results

The Aquatic Plant Identification and Mapping survey was conducted on Fremont in 2016.

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 77 locations in Fremont Lake in 2016. Below is a list of species reported [in order of relative abundance, if the volunteer calculated that like they are supposed to].

Fremont Lake, Newaygo County
2016 Aquatic Plant Identification and Mapping: Species Reported

Common Name	Latin Name	Relative Density Rating
Filamentous algae	--	2.9
Coontail	*Ceratophyllum demersum*	2.5
Eurasian watermilfoil	*Myriophyllum spicatum*	2.1
Waterweed	*Elodea canadensis*	1.8
Milfoil	*Myriophyllum* spp.	1.8
Muskgrass	*Chara* spp.	1.8
Northern watermilfoil	*Myriophyllum sibiricum*	1.6
Curly-leaf pondweed	*Potamogeton crispus*	1.6
Bushy pondweed	*Najas* spp.	1.4
Sago pondweed	*Stuckenia pectinata*	1.1
Pondweed species	*Potamogeton* spp.	1.0
Water stargrass	*Heterantha (Zosterella) dubia*	1.0

Visit the MiCorps Data Exchange (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.

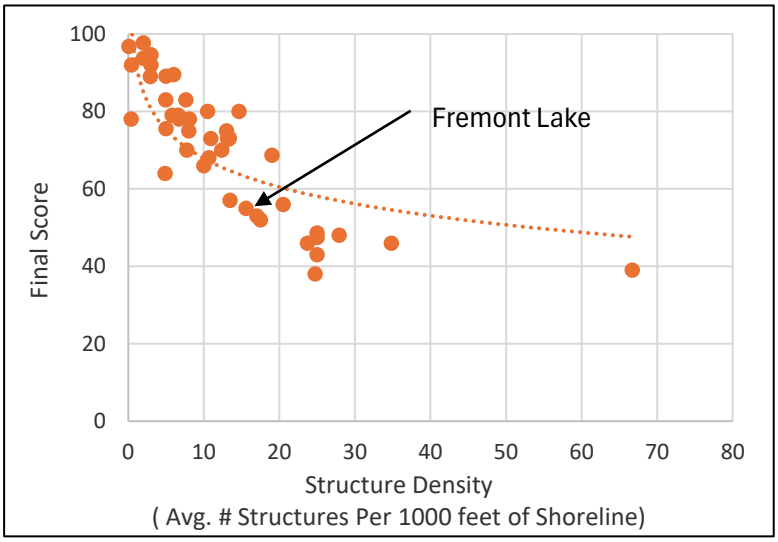
Site ID: 620029

Fremont Lake, Newaygo County
2016 Score the Shore Results

The Score the Shore Habitat Assessment was conducted on Fremont Lake in 2016.

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?



Fremont Lake:	
Number of Sections:	25
Number of Structures:	424
Structure Density:	17
Final Score:	53

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

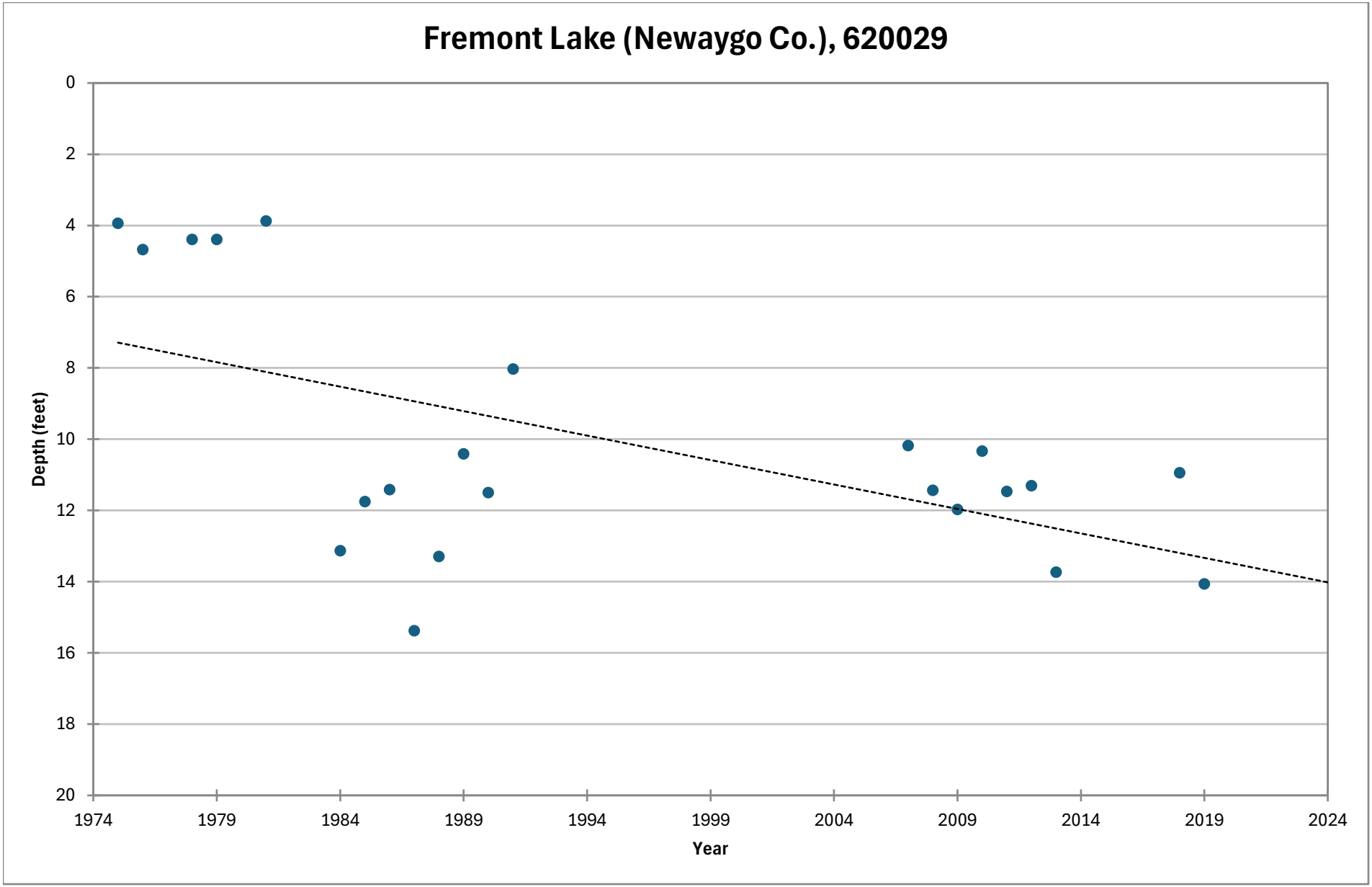
Analysis specific to Fremont Lake:

Overall, the lakeshore habitat of Fremont Lake is below average when compared to the other lakes in the program. 50% percent of the lake sections score poor or worse (1 highly impacted, 12 poor, 5 fair, 7 good).

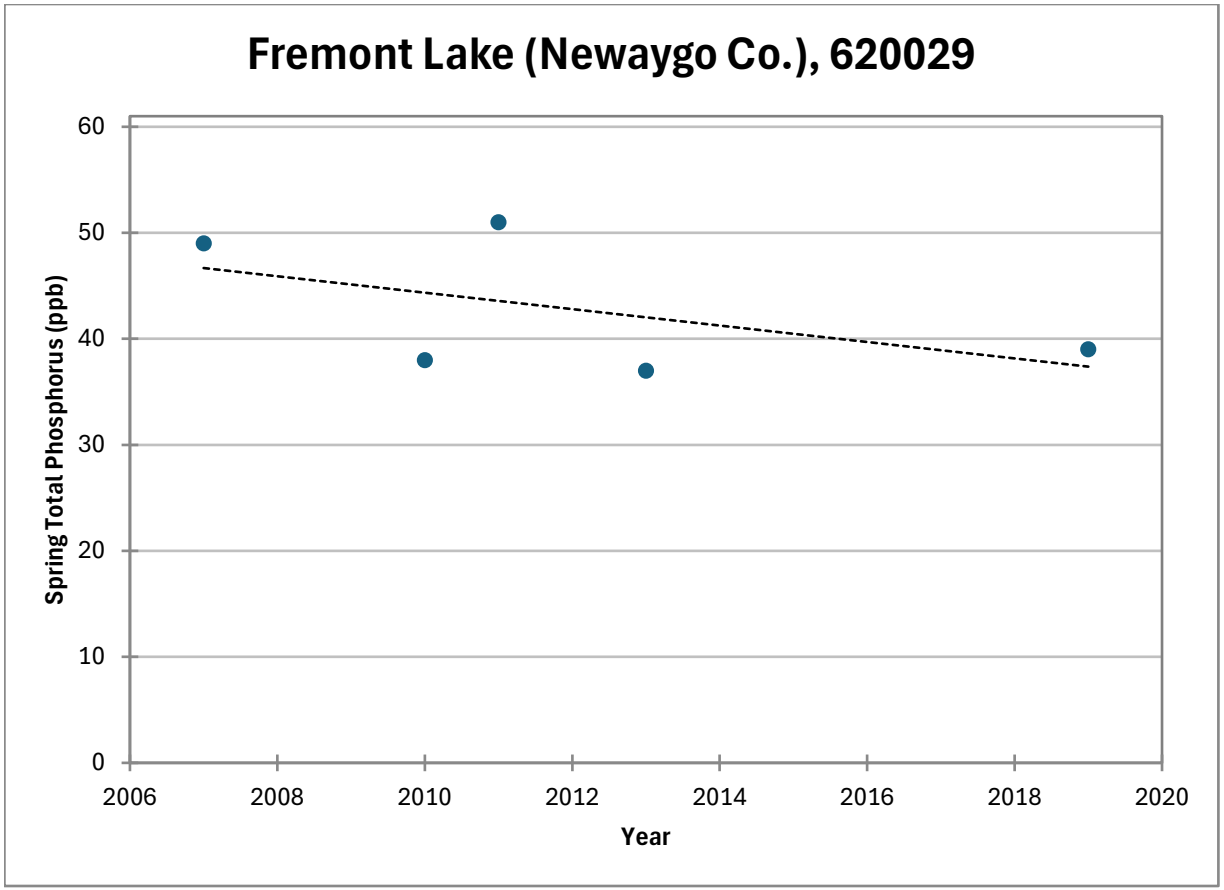
With an average score of 73.6, the lake sections scored highest in erosion control out of the 3 main categories, meaning that there only a moderate amount of sea walls and other shoreline erosion structures.

With an average score of 39.5, the poorest scoring category was the littoral zone. To improve the littoral zone score, leave woody debris in place and allow native aquatic vegetation to grow in the shallow waters. The worst scoring section of the lake was section 22, which scored badly in all three categories, but in particular scored a 0 in riparian zone, meaning that there was no unmowed vegetation on this section.

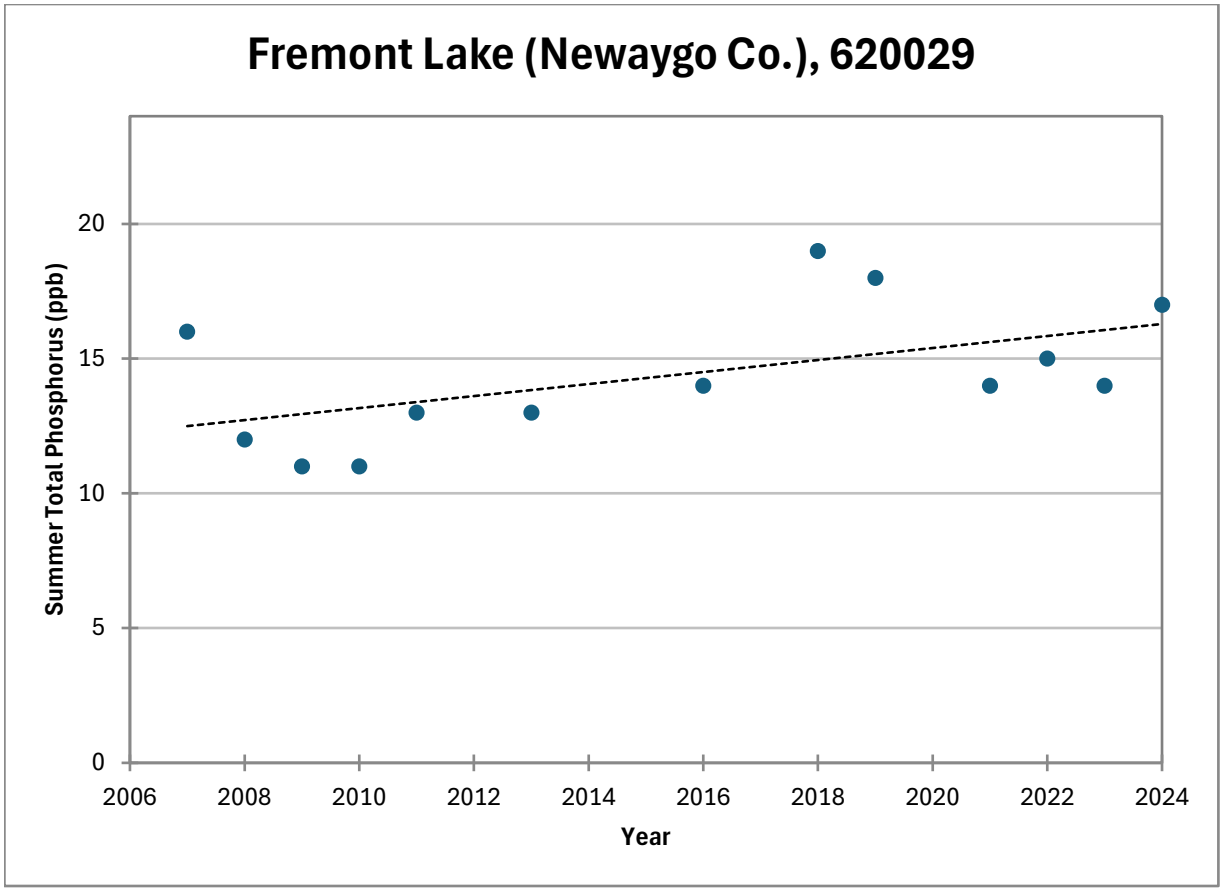
COOPERATIVE LAKES MONITORING PROGRAM
SUMMER MEAN TRANSPARENCY



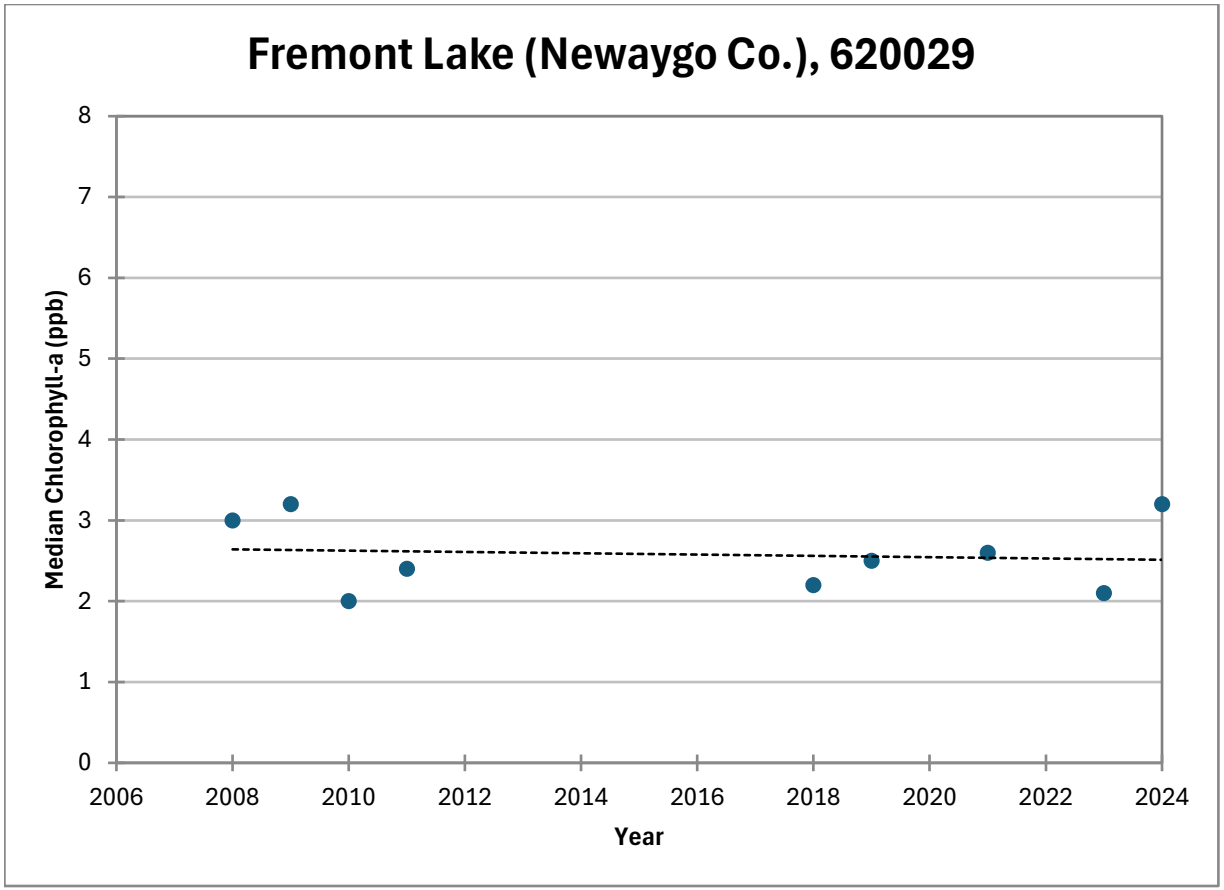
COOPERATIVE LAKES MONITORING PROGRAM
SPRING TOTAL PHOSPHORUS



COOPERATIVE LAKES MONITORING PROGRAM
SUMMER TOTAL PHOSPHORUS



COOPERATIVE LAKES MONITORING PROGRAM
SUMMER MEDIAN CHLOROPHYLL-A

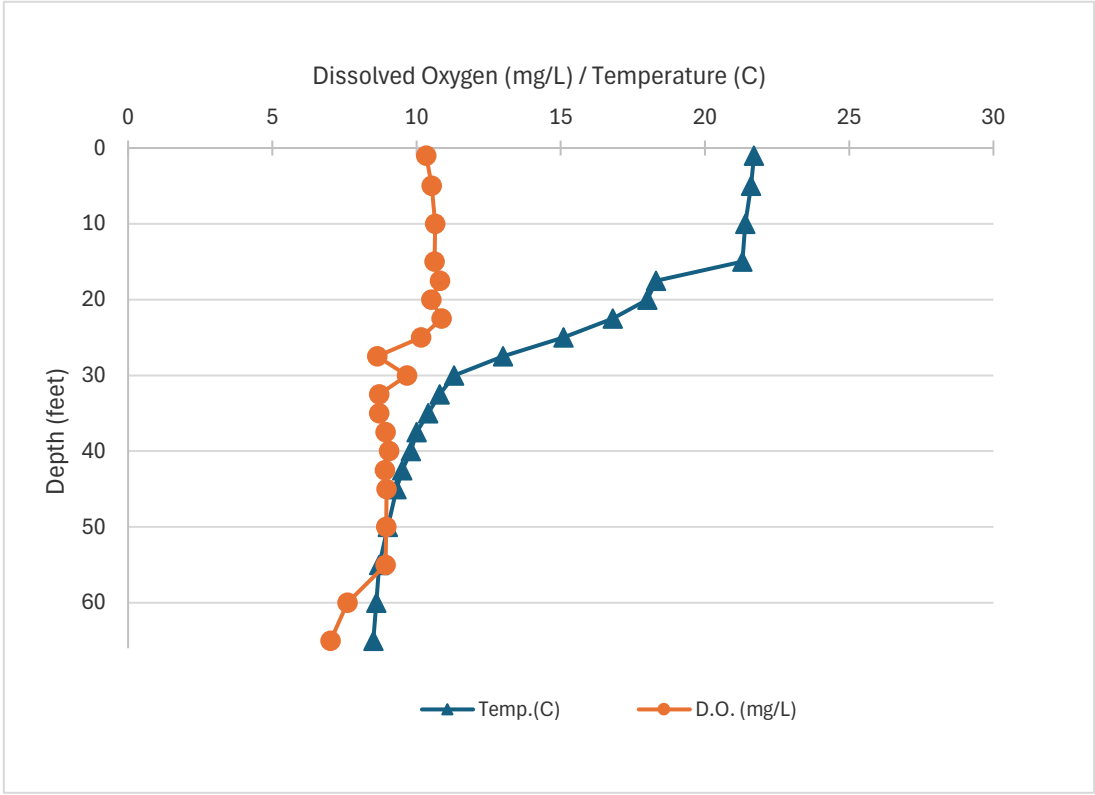


Name: Fremont Lake
County: Newaygo
Site ID: 620029
Date: 6/3/2024

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	21.7	10.34
5	21.6	10.53
10	21.4	10.65
15	21.3	10.62
17.5	18.3	10.81
20	18	10.51
22.5	16.8	10.87
25	15.1	10.16
27.5	13	8.64
30	11.3	9.67
32.5	10.8	8.71
35	10.4	8.7
37.5	10	8.93
40	9.8	9.05
42.5	9.5	8.91
45	9.3	8.96
50	9	8.95
55	8.7	8.93
60	8.6	7.61
65	8.5	7.02

Lake: Fremont Lake (Newaygo Co.) **6/3/2024**

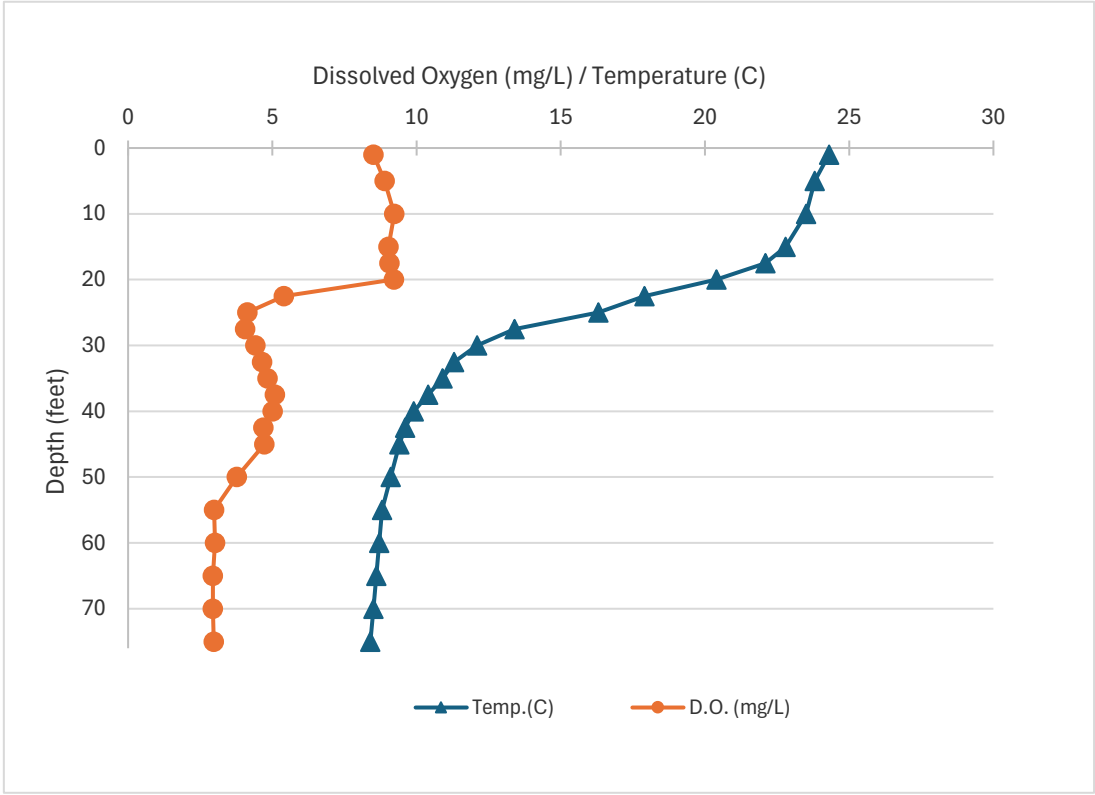


Name: Fremont Lake
County: Newaygo
Site ID: 620029
Date: 6/27/2024

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	24.3	8.5
5	23.8	8.89
10	23.5	9.23
15	22.8	9.03
17.5	22.1	9.06
20	20.4	9.21
22.5	17.9	5.4
25	16.3	4.13
27.5	13.4	4.06
30	12.1	4.41
32.5	11.3	4.64
35	10.9	4.83
37.5	10.4	5.09
40	9.9	5.01
42.5	9.6	4.69
45	9.4	4.72
50	9.1	3.77
55	8.8	2.98
60	8.7	3.01
65	8.6	2.94
70	8.5	2.94
75	8.4	2.97

Lake: Fremont Lake (Newaygo Co.) **6/27/2024**

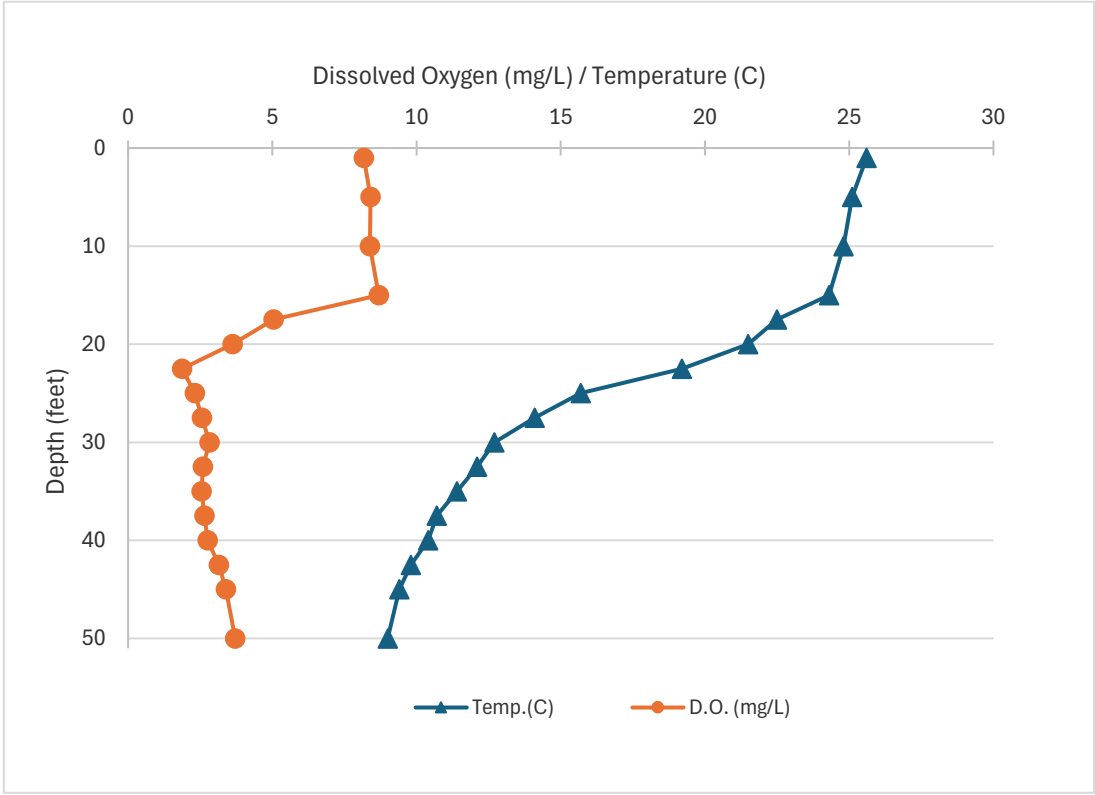


Name: Fremont Lake
County: Newaygo
Site ID: 620029
Date: 7/18/2024

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	25.6	8.17
5	25.1	8.41
10	24.8	8.38
15	24.3	8.69
17.5	22.5	5.04
20	21.5	3.62
22.5	19.2	1.87
25	15.7	2.32
27.5	14.1	2.56
30	12.7	2.83
32.5	12.1	2.59
35	11.4	2.55
37.5	10.7	2.65
40	10.4	2.76
42.5	9.8	3.15
45	9.4	3.39
50	9	3.71

Lake: Fremont Lake (Newaygo Co.) **7/18/2024**

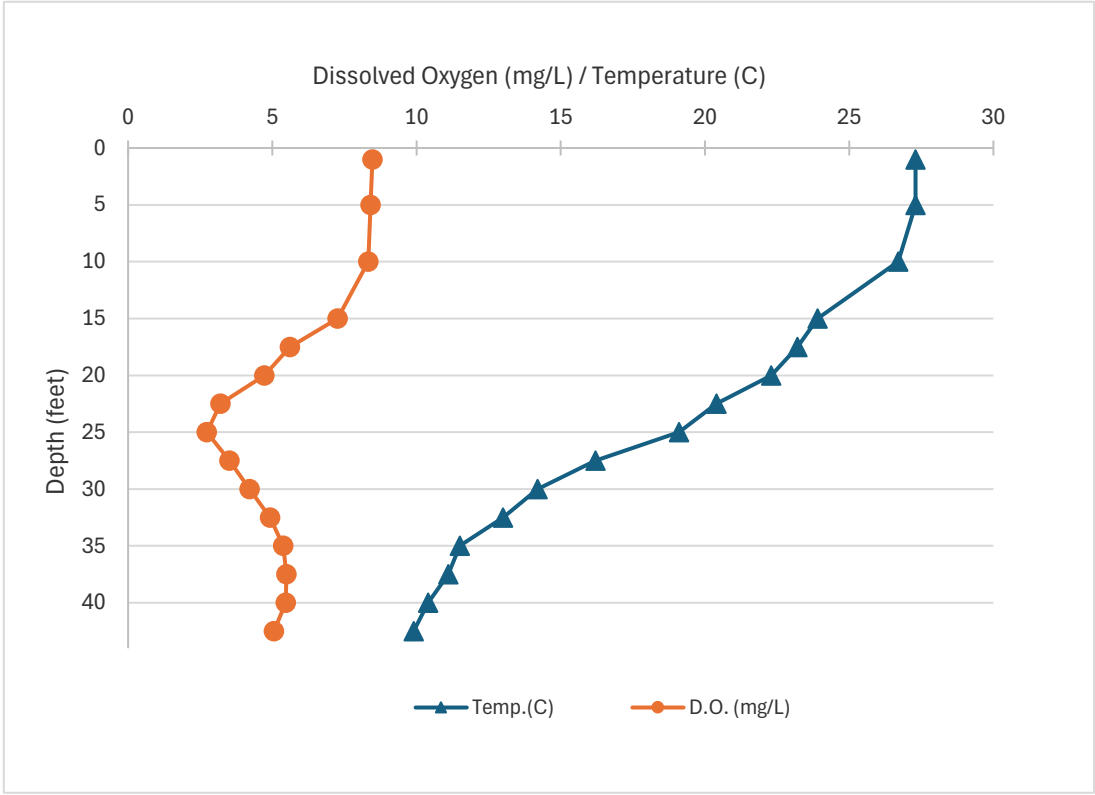


Name: Fremont Lake
County: Newaygo
Site ID: 620029
Date: 8/1/2024

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	27.3	8.47
5	27.3	8.41
10	26.7	8.33
15	23.9	7.26
17.5	23.2	5.61
20	22.3	4.72
22.5	20.4	3.2
25	19.1	2.73
27.5	16.2	3.51
30	14.2	4.21
32.5	13	4.92
35	11.5	5.38
37.5	11.1	5.49
40	10.4	5.47
42.5	9.9	5.05

Lake: Fremont Lake (Newaygo Co.) **8/1/2024**

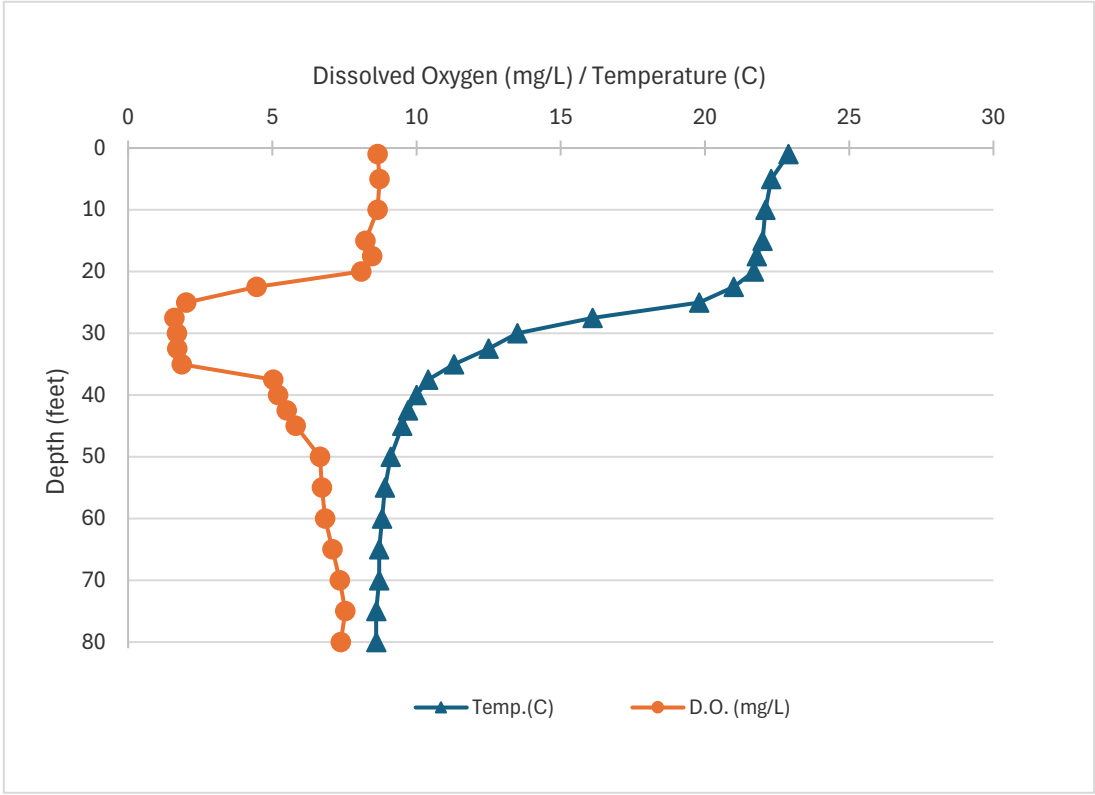


Name: Fremont Lake
County: Newaygo
Site ID: 620029
Date: 8/21/2024

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	22.9	8.65
5	22.3	8.72
10	22.1	8.65
15	22	8.23
17.5	21.8	8.46
20	21.7	8.08
22.5	21	4.46
25	19.8	2.02
27.5	16.1	1.61
30	13.5	1.69
32.5	12.5	1.7
35	11.3	1.86
37.5	10.4	5.03
40	10	5.2
42.5	9.7	5.5
45	9.5	5.81
50	9.1	6.65
55	8.9	6.72
60	8.8	6.83
65	8.7	7.08
70	8.7	7.34
75	8.6	7.53
80	8.6	7.37

Lake: Fremont Lake (Newaygo Co.) **8/21/2024**



Name: Fremont Lake
County: Newaygo
Site ID: 620029
Date: 9/16/2024

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	23.2	9.75
5	22.4	9.93
10	22.1	9.91
15	21.3	9.68
17.5	20.8	9.1
20	20.5	8.55
22.5	20.3	7.87
25	19.7	6.59
27.5	18.4	5.24
30	16.2	3.98
32.5	12.7	3.63
35	11.3	3.92
37.5	10.7	4.24

Dissolved Oxygen and Temperature Profile

Lake: Fremont Lake (Newaygo Co.) **9/16/2024**