



# 2023 Data Report for

# Greenes Lake, Charlevoix County

Site ID: 150262

45.6341°N, 85.5855°W

The CLMP is brought to you by:



**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](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**

# Greenes Lake, Charlevoix County 2023 CLMP Results



## Secchi Disk Transparency (feet)

Year	# Readings	Min	Max	Average	Std. Dev	Carlson TSI
2022	10	2.0	2.5	2.1	0.2	66
2023 All CLMP Lakes	2817	1.0	50.0	12.7	2.9	42

No graph: Not enough data

## Chlorophyll-a (parts per billion)

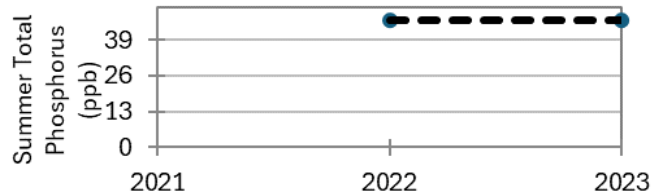
Greenes Lake does not have Chlorophyll-a data available. Consider enrolling in this parameter next year. Chlorophyll-a is the green photosynthetic pigment in the cells of plants. The amount of algae in a lake can be estimated by measuring the chlorophyll-a concentration in the water. As an algal productivity indicator, chlorophyll-a is used to determine the trophic status of a lake.

## Spring Phosphorus (parts per billion)

Greenes Lake does not have spring total phosphorus data available. Consider enrolling in this parameter next year. Phosphorus is one of several essential nutrients that algae need to grow and reproduce. An increase in phosphorus over time is a measure of nutrient enrichment in a lake. A surface water sample taken in the spring, shortly after spring turnover, will be a representative sample for estimating the total amount of phosphorus in the lake.

## Summer Phosphorus (parts per billion)

Year	# Samples	Min	Max	Average	Std. Dev	Carlson TSI
2023	1	46.0	46.0	46.0	NA	59
2022	1	46	46	46.0	NA	59
2023 All CLMP Lakes	234	<= 3	150.0	17.4	15.3	45



## Dissolved Oxygen and Temperature Profile

This lake does not have recent (within 5 years) dissolved oxygen/water temperature data available. Consider enrolling in this parameter next year. Fish, insects, mollusks, and crustaceans need dissolved oxygen to live in water. By late summer, many lakes stratify, with cold anoxic water on the bottom and warm, oxygen rich water on the surface. Anoxic (oxygen-depleted) water occurring too close to the surface is a sign of nutrient enrichment. Understanding the pattern of dissolved oxygen and water temperature in a lake is important for assessing nutrient problems as well as the health of the biological community.

## Summary

Average TSI	2023	2022
Greenes Lake	59	63
All CLMP Lakes	44	44

With a TSI score of 59 based on 2023 summer phosphorus data, this lake is rated as eutrophic.

There is too little data to assess long term trends. CLMP recommends eight years of consistent monitoring in order to develop a strong data baseline.

However, given this lake's eutrophic status, residents should be encouraged to take measures to reduce nutrient input into this lake, including minimizing the use of fertilizers and having their septic fields examined, if applicable; and to continue monitoring efforts to establish trends and track lake health over time.

\* = Minimum # samples not met for average/median/TSI value  
 <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 (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 Greenes Lake in 2023	
Average	59
Secchi Disk	
Summer TP	59
Chlorophyll-a	



Average ^

Total Phosphorus ^

**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.

# Greenes Lake, Charlevoix County 2022 Exotic Aquatic Plant Watch Results



The Exotic Aquatic Plant Watch was conducted on Greenes Lake in 2022.

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 five highly invasive species: Eurasian watermilfoil (*Myriophyllum spicatum*), starry stonewort (*Nitellopsis obtusa*), curly-leaf pondweed (*Potamogeton crispus*), European Frogbit (*Hydrocharis morsus-ranae*), and Hydrilla (*Hydrilla verticillata*).

The table below summarizes the results of the 2022 Exotic Aquatic Plant Watch on Greenes Lake.

<b>Greenes Lake, Charlevoix County</b>		
<b>2022 Exotic Aquatic Plant Watch Results</b>		
<b>Survey Date(s): July 19</b>		
<b><u>Species</u></b>	<b><u>Status</u></b>	<b><u>Comments</u></b>
Eurasian watermilfoil	not found	No invasive plants found in any of the 6 sites surveyed.
Starry stonewort	not found	
Curly-leaf pondweed	not found	
European Frogbit	not found	
Hydrilla	not found	

Visit the MiCorps Data Exchange (<https://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.

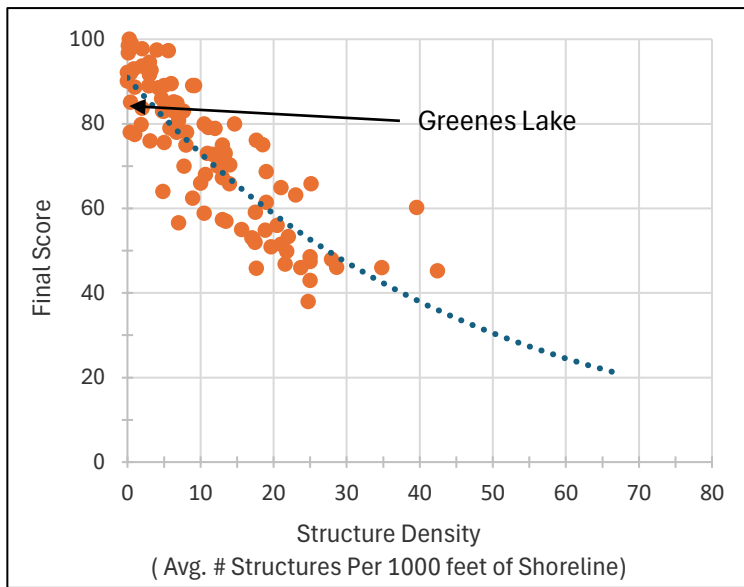
# Greenes Lake, Charlevoix County 2022 Score the Shore Results



The Score the Shore Habitat Assessment was conducted on Greenes Lake in 2022.

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?



Greenes Lake	
Number of Sections:	7
Number of Structures:	3
Structure Density:	0.43
Final Score:	85.1

All 97 Participating Lakes from 2015-2022:	
Avg. Number of Sections:	16
Avg. Number of Structures:	228
Avg. Structure Density:	12
Avg. Final Score:	73

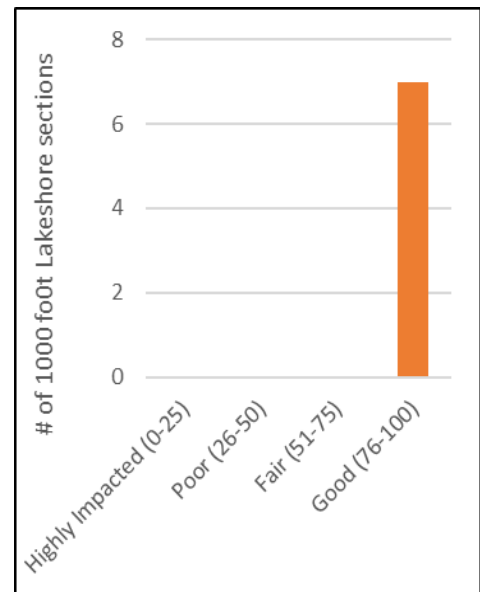
Note about graph to the left: The dotted line sets your average expectation of the score of your lake. If your lake is lower than the dotted line, then your shoreline health is lower than average compared to lakes with similar amount of shoreline development. And vice-versa in regards to a lake above the dotted line.

### Analysis specific to Greenes Lakes:

Overall, the lakeshore habitat of Greenes Lake is quite healthy (all 7 sections scored Good) but the lake habitat is below average when compared to the other lakes in the program with similar amount of development. With a Structure Density of only 0.43 buildings/docks per section, we would expect Greenes Lake to have an average Final Score of closer to 95 than the realized 85.

Analysis of the section scores shows that Riparian and Erosion control scores are all 100s, and so achieving perfect scores in this regard, and indicative of a nearly pristine lake.

Yet the Littoral conditions do not reflect this pristine nature; and while there may be an explanation for this that goes beyond what our data can show (perhaps from depth, sediment, or transparency reasons), the Littoral lake habitat is not scoring well due to no submerged vegetation and few trees or woody habitat submerged along the edge. You can get plenty of other ideas for improving Littoral shoreline health from the Michigan Natural Shoreline Partnership <https://www.shorelinepartnership.org/>.



COOPERATIVE LAKES MONITORING PROGRAM  
SUMMER TOTAL PHOSPHORUS

**Greenes Lake (Charlevoix Co.), 150262**

