Cooperative Lakes Monitoring Program

Michigan Lakes– Ours to Protect

2021 Data Report
for
Rennie Lake, Grand Traverse County

Site ID: 280430

44.669703138°N, 85.463901374°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

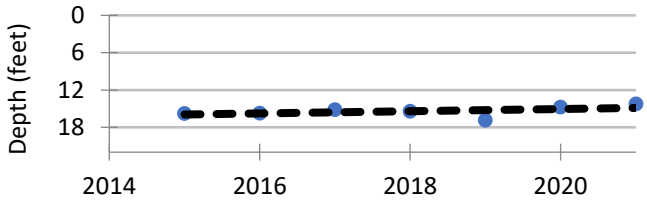
Site ID: 280430

Rennie Lake, Grand Traverse County
2021 CLMP Results

Cooperative Lakes Monitoring Program

Secchi Disk Transparency (feet)

Year	# Readings	Min	Max	Avg	Std. Dev	Carlson TSI
2021	19	11.0	19.5	14.2	2.4	39
2016-2020	68	10.5	22.0	14.2	2.4	38
2015-2015	19	12.0	18.5	15.8	2.1	37
2021 All						



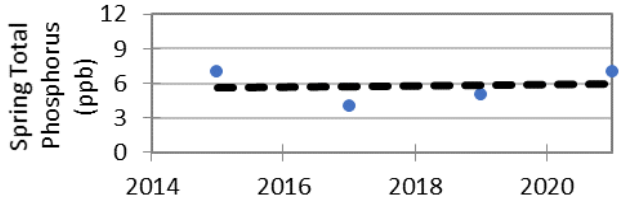
Chlorophyll-a (parts per billion)

Year	# Samples	Min	Max	Med	Std. Dev	Carlson TSI
2021	5	2.1	3.8	3.4	0.7	43
2016-2019	2	<1.0	1.3			
2021 All CLMP Lakes	635	< 1.0	42.0	2.2	3.4	39

No graph: Not enough data

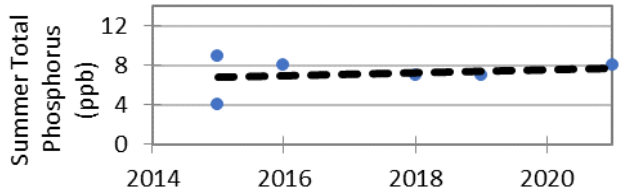
Spring Phosphorus (parts per billion)

Year	# Samples	Min	Max	Avg	Std. Dev
2021	1	7.0	7.0	7.0	NA
2016-2019	2	<5 T	5.0	4.5	0.7
2015-2015	1	7.0	7.0	7.0	NA
2021 All CLMP Lakes	220	<= 3	100.0	14.9	11.0



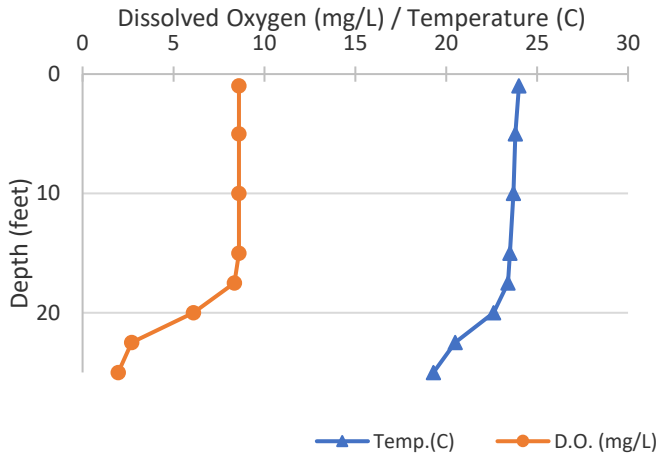
Summer Phosphorus (parts per billion)

Year	# Samples	Min	Max	Avg	Std. Dev	Carlson TSI
2021	1	8.0	8.0	8.0	NA	34
2016-2019	3	7.0	8.0	7.3	0.6	33
2015-2015	2	<5 T	9.0	6.5	3.5	30
2021 All CLMP Lakes	281	<= 3	65.0	12.8	9.3	38



Dissolved Oxygen and Temperature Profile

7/16/2021



Summary

Average TSI	2021	2016-2019	2015
Rennie Lake	39	35	34
All CLMP Lakes	42	40	40

With an average TSI score of 39 based on 2021 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 mesotrophic than oligotrophic.

Due to its low depth, the lake is able to maintain dissolved oxygen throughout the water column for the entire summer, though there are days when dissolved oxygen gets low or anoxic on the bottom waters.

Long term trends indicate that the trophic status parameters have not changed beyond minor year-to year variation since monitoring began.

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.

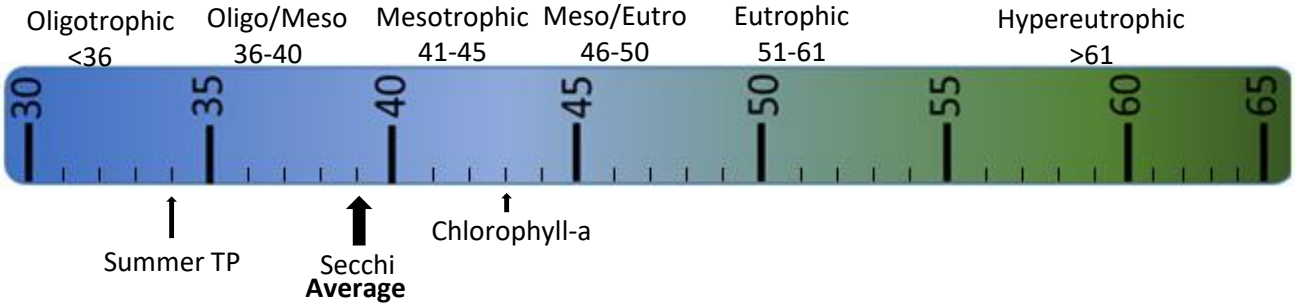
The tables below give the results-to-TSI conversions for the water quality data ranges normally seen in the CLMP. The formulas for this conversion can be found in the CLMP manual (link is on page 2 of this report).

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 Rennie Lake in 2021	
Average	39
Secchi Disk	39
Summer TP	34
Chlorophyll-a	43



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: 280430

Rennie Lake, Grand Traverse County
2021 Exotic Aquatic Plant Watch Results

The Exotic Aquatic Plant Watch was conducted on Rennie Lake in 2021.

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 2021 Exotic Aquatic Plant Watch.

Rennie Lake, Grand Traverse County

2021 Exotic Aquatic Plant Watch Results

Survey Date(s): August 13 & 15

Species	Status	Comments
Eurasian watermilfoil	not found	
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.

Site ID: 280430

Rennie Lake, Grand Traverse County
2021 Score the Shore Results

Rennie Lake does not have shoreline habitat assessment results for 2021. Consider enrolling in this parameter next year!

Why is the Score the Shore parameter important?

Healthy shorelines are an important and valuable component of the lake ecosystem. The shoreline area is a transition zone between water and land, and should be a very diverse environment that provides habitat for a great variety of fish, plants, birds, and other animals. A healthy shoreline area is also essential for maintaining water quality, slowing runoff, and limiting erosion.

However, Michigan's inland lake shorelines are threatened. Extensive development, often combined with poor shoreline management practices, can reduce or eliminate natural shoreline habitat and replace it with lawn and artificial erosion control such as sea walls and rock. As a result, shoreline vegetation is dramatically altered, habitat is lost, and water quality declines.

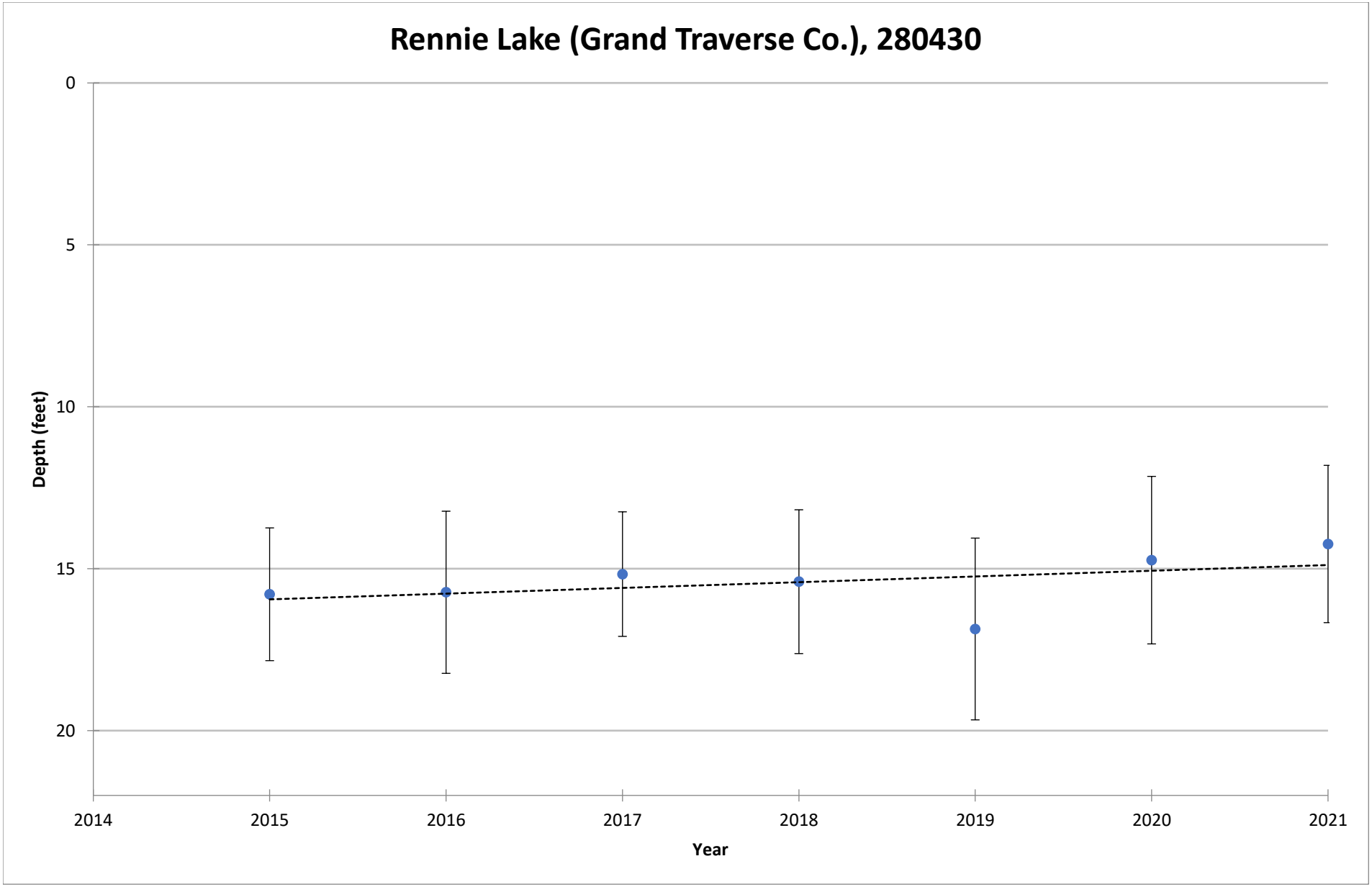
Therefore, in 2015 the MiCorps Cooperative Lakes Monitoring Program introduced a new monitoring program – Score the Shore – that enables volunteers to assess the quality of their lake's shoreline habitat.

The information gathered during this assessment will allow lake communities to identify high-quality areas that can be protected, as well as opportunities for improvement. Score the Shore data, combined with educational resources describing the value of healthy shorelines and how to restore and maintain them, can be incorporated into lake management planning and used for educating lakefront property owners. The Michigan Natural Shoreline Partnership (MNSP) is a collaboration of agencies and professionals that promotes natural shoreline practices to protect Michigan's inland lakes. The MNSP website (www.mishorelinepartnership.org) includes materials and information that can be used in educational efforts. MNSP also offers training for professional educators and landscape contractors, and maintains a list of trained educators who may be available to speak to your community about natural shorelines.

Score the Shore data, just like all CLMP data, will also be available to any interested parties through the MiCorps Data Exchange (https://micorps.net). State agency staff and researchers regularly access CLMP data to better understand and manage Michigan's inland lakes.

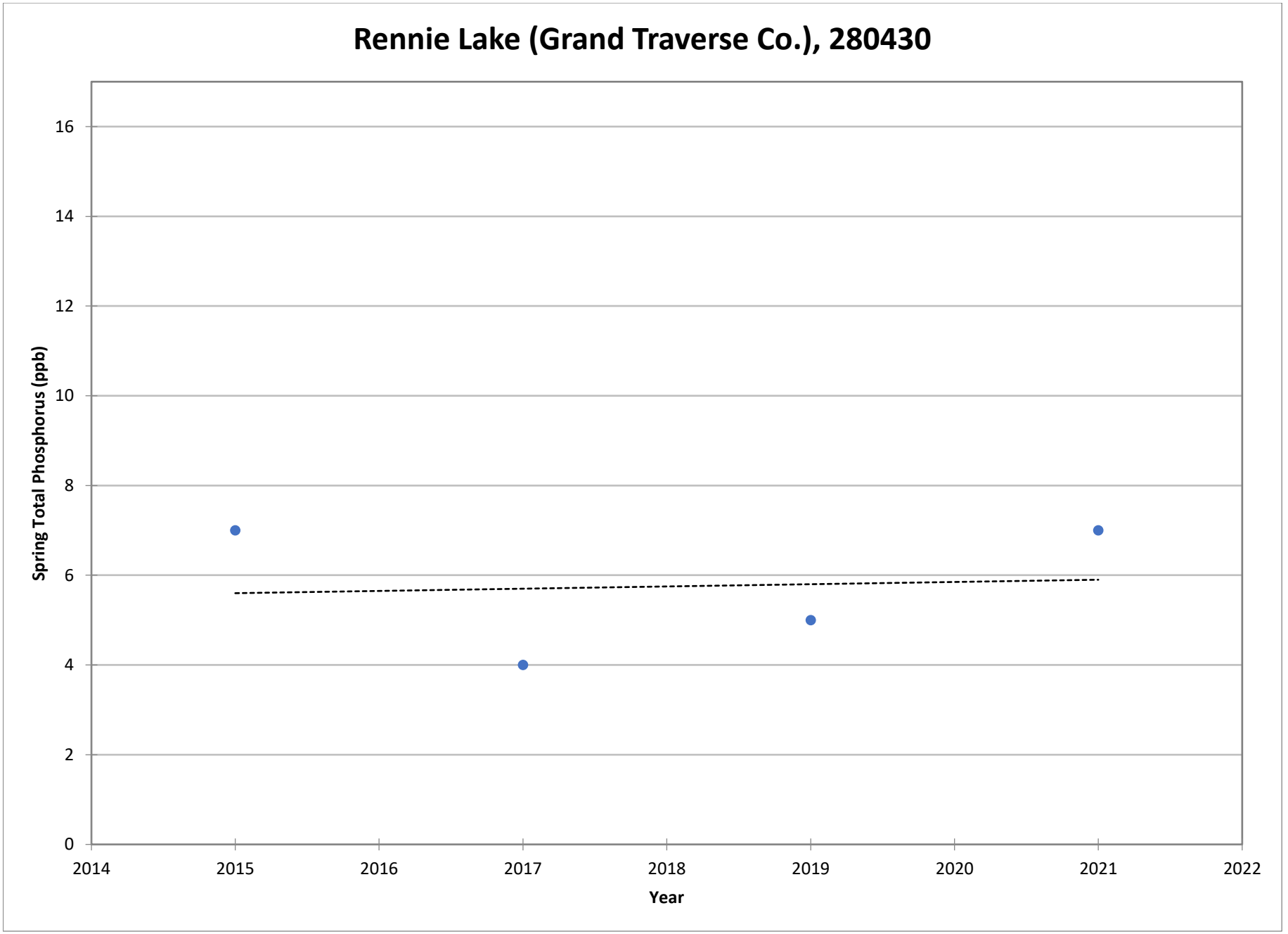
Score the Shore is a descriptive process for assessing shoreline quality on Michigan's inland lakes. It is also a valuable educational tool. Score the Shore is not a regulatory program, nor is it intended to tell people what they can and cannot do on their property. The Michigan Department of Environmental Quality's Inland Lakes and Streams Program has responsibility for shoreline protection on public lakes. To learn about their shoreline protection program, including construction permitting and recommendations for shoreline management, visit www.mi.gov/deqinlandlakes.

COOPERATIVE LAKES MONITORING PROGRAM
SUMMER MEAN TRANSPARENCY

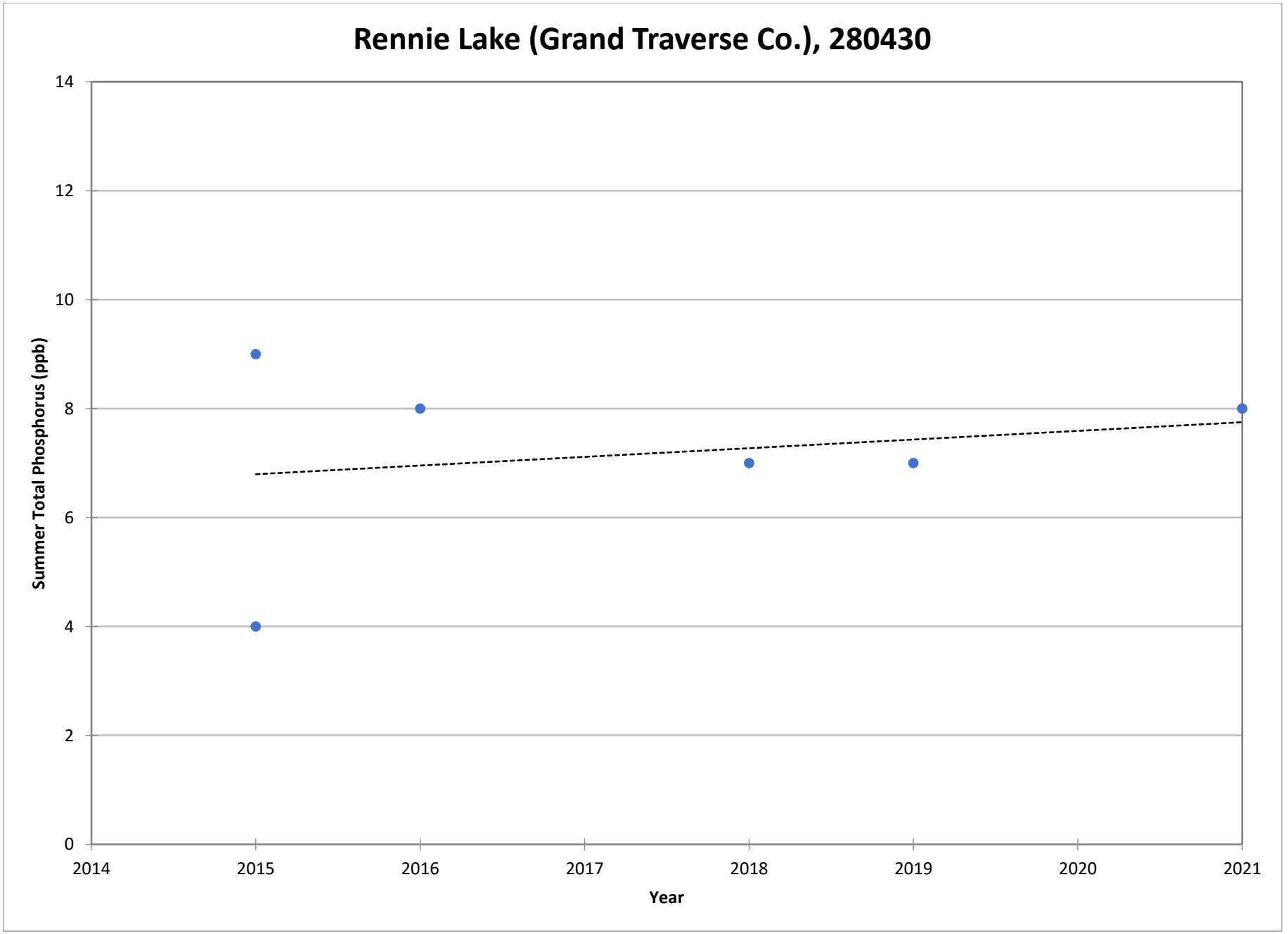


Vertical bars indicate standard deviation

COOPERATIVE LAKES MONITORING PROGRAM
SPRING TOTAL PHOSPHORUS



COOPERATIVE LAKES MONITORING PROGRAM
SUMMER TOTAL PHOSPHORUS

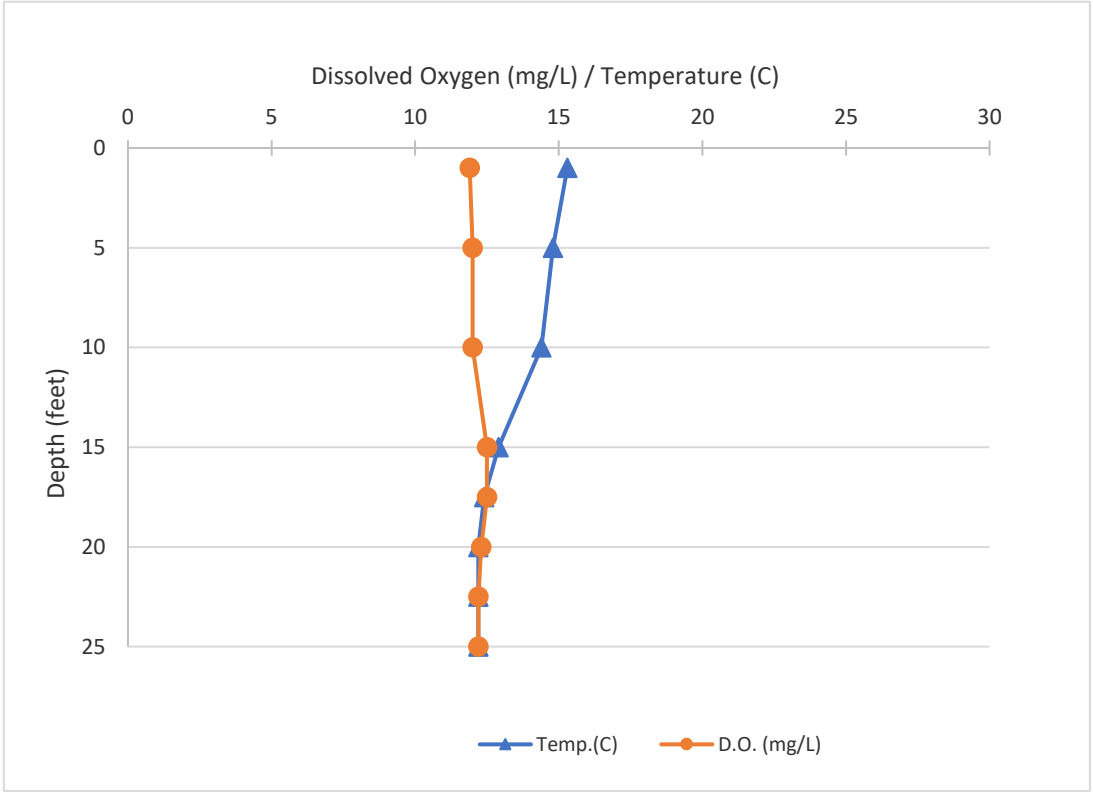


Name: Rennie Lake
County: Grand Traverse
Site ID: 280430
Date: 5/17/2021

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	15.3	11.9
5	14.8	12
10	14.4	12
15	12.9	12.5
17.5	12.4	12.5
20	12.2	12.3
22.5	12.2	12.2
25	12.2	12.2

Lake: Rennie Lake (Grand Traverse Co.) **5/17/2021**

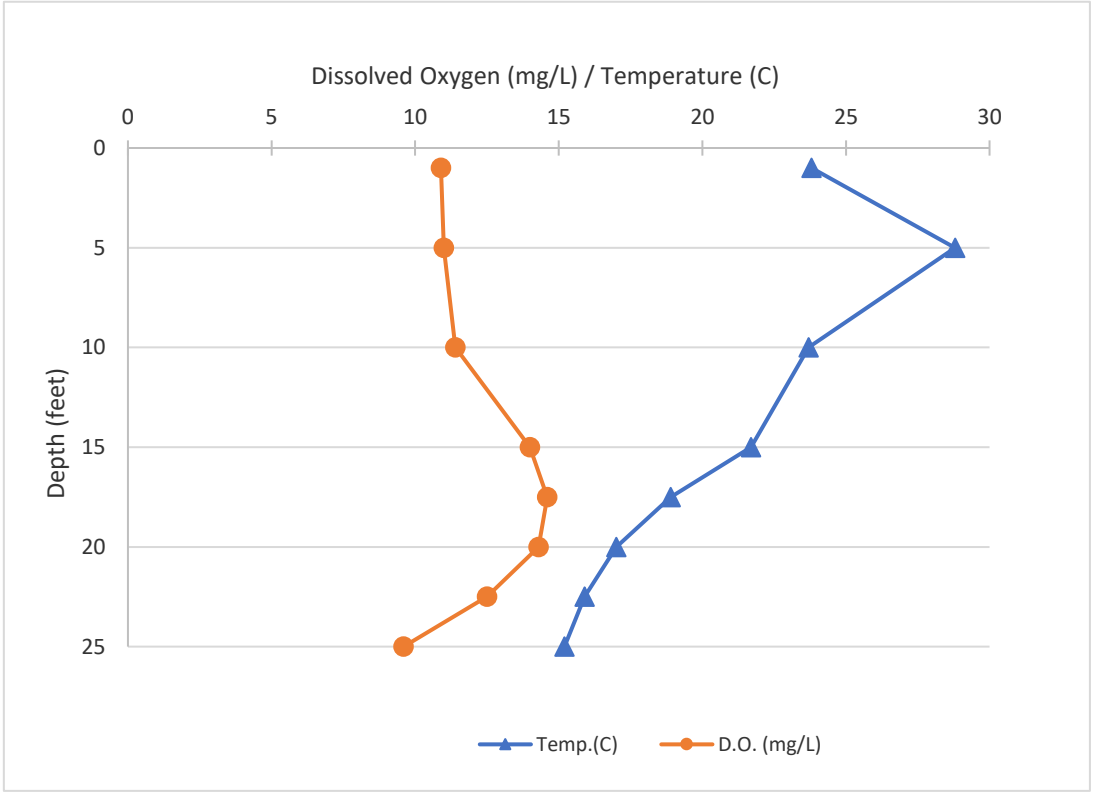


Name: Rennie Lake
County: Grand Traverse
Site ID: 280430
Date: 6/17/2021

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	23.8	10.9
5	28.8	11
10	23.7	11.4
15	21.7	14
17.5	18.9	14.6
20	17	14.3
22.5	15.9	12.5
25	15.2	9.6

Lake: Rennie Lake (Grand Traverse Co.) **6/17/2021**

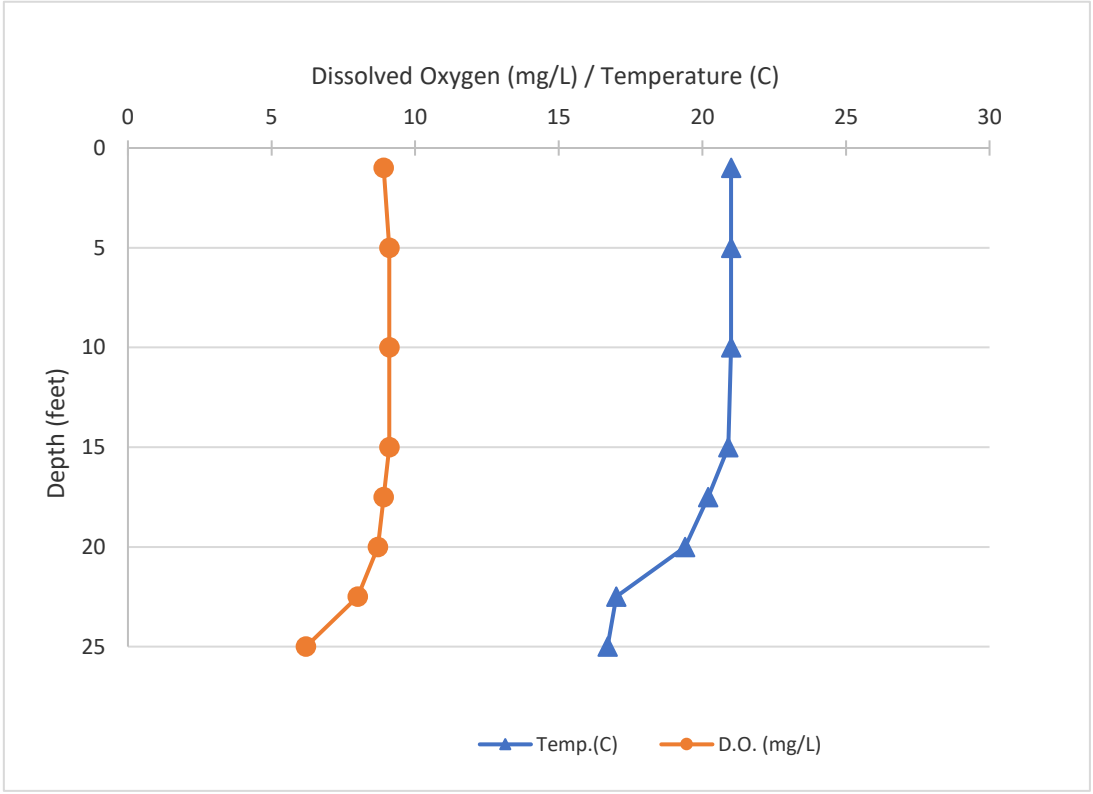


Name: Rennie Lake
County: Grand Traverse
Site ID: 280430
Date: 6/23/2021

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	21	8.9
5	21	9.1
10	21	9.1
15	20.9	9.1
17.5	20.2	8.9
20	19.4	8.7
22.5	17	8
25	16.7	6.2

Lake: Rennie Lake (Grand Traverse Co.) **6/23/2021**

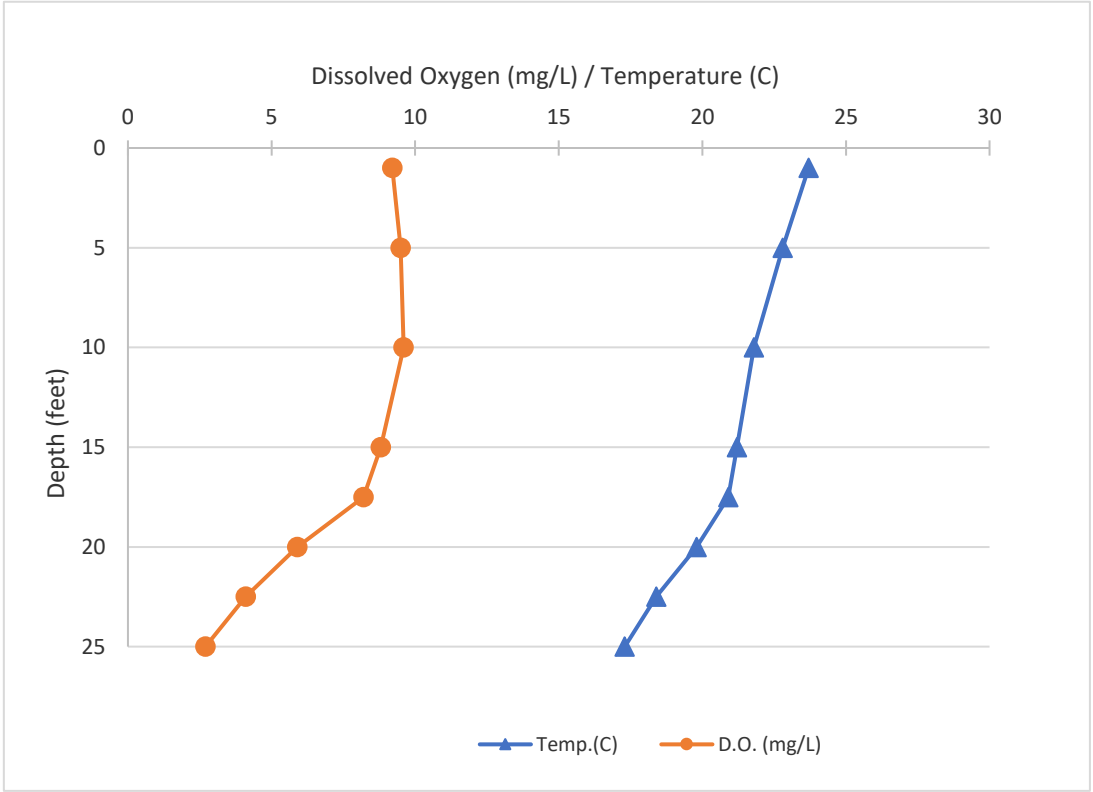


Name: Rennie Lake
County: Grand Traverse
Site ID: 280430
Date: 6/30/2021

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	23.7	9.2
5	22.8	9.5
10	21.8	9.6
15	21.2	8.8
17.5	20.9	8.2
20	19.8	5.9
22.5	18.4	4.1
25	17.3	2.7

Lake: Rennie Lake (Grand Traverse Co.) **6/30/2021**

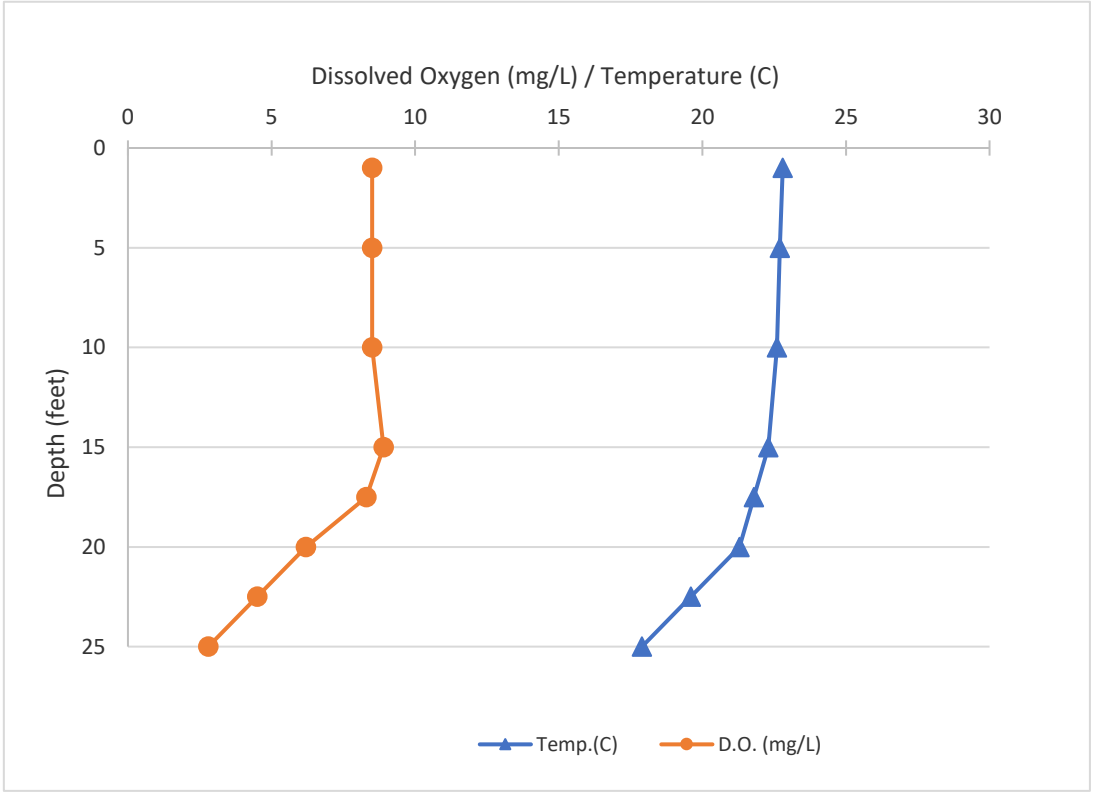


Name: Rennie Lake
County: Grand Traverse
Site ID: 280430
Date: 7/9/2021

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	22.8	8.5
5	22.7	8.5
10	22.6	8.5
15	22.3	8.9
17.5	21.8	8.3
20	21.3	6.2
22.5	19.6	4.5
25	17.9	2.8

Lake: Rennie Lake (Grand Traverse Co.) **7/9/2021**

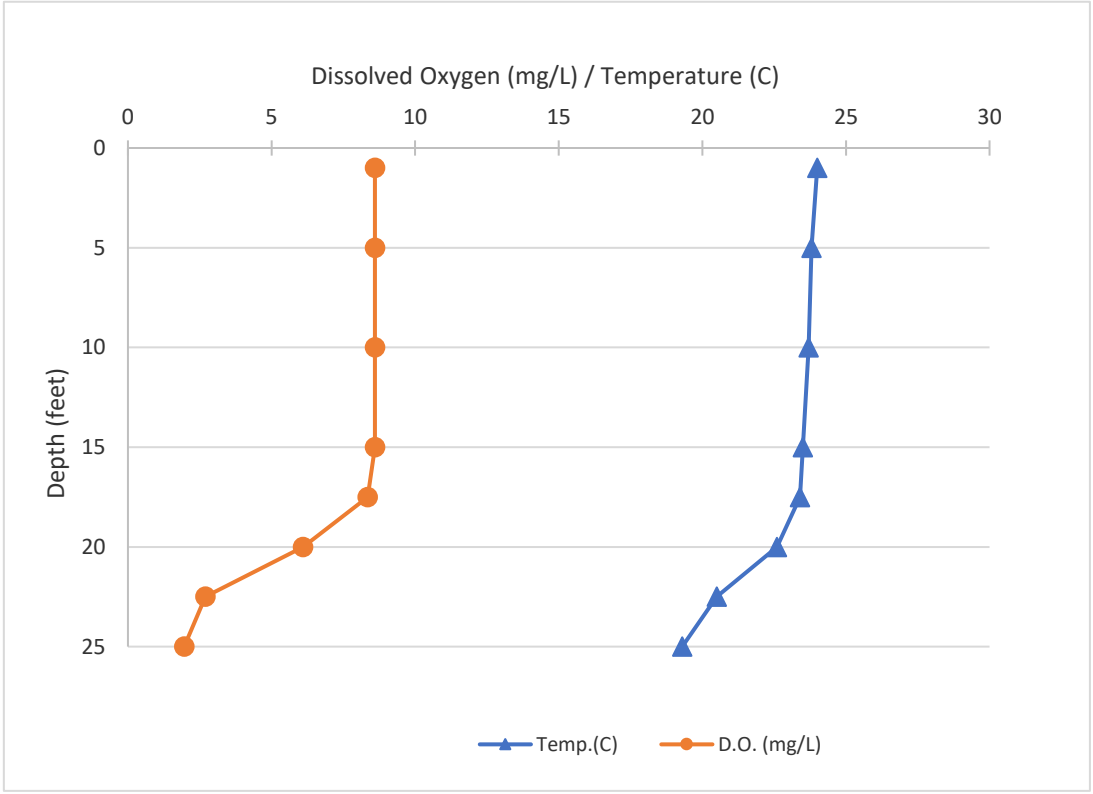


Name: Rennie Lake
County: Grand Traverse
Site ID: 280430
Date: 7/16/2021

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	24	8.6
5	23.8	8.6
10	23.7	8.6
15	23.5	8.6
17.5	23.4	8.35
20	22.6	6.1
22.5	20.5	2.7
25	19.3	1.96

Lake: Rennie Lake (Grand Traverse Co.) **7/16/2021**

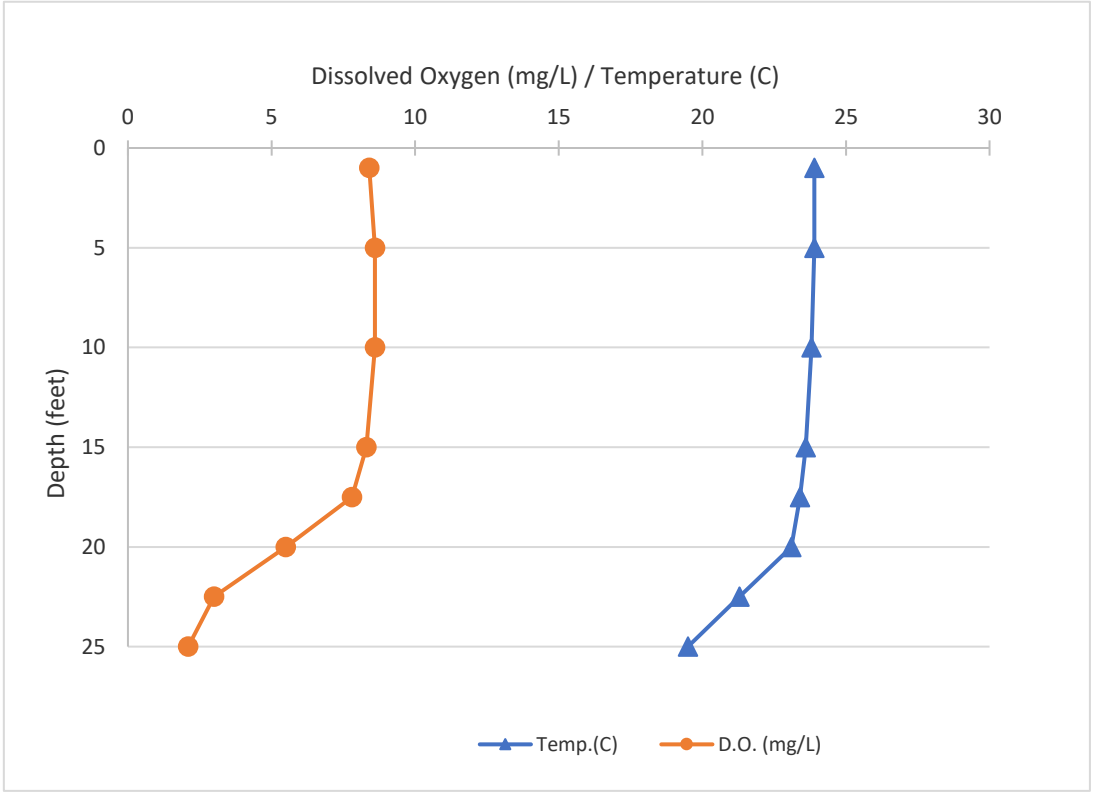


Name: Rennie Lake
County: Grand Traverse
Site ID: 280430
Date: 7/21/2021

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	23.9	8.4
5	23.9	8.6
10	23.8	8.6
15	23.6	8.3
17.5	23.4	7.8
20	23.1	5.5
22.5	21.3	3
25	19.5	2.1

Lake: Rennie Lake (Grand Traverse Co.) **7/21/2021**

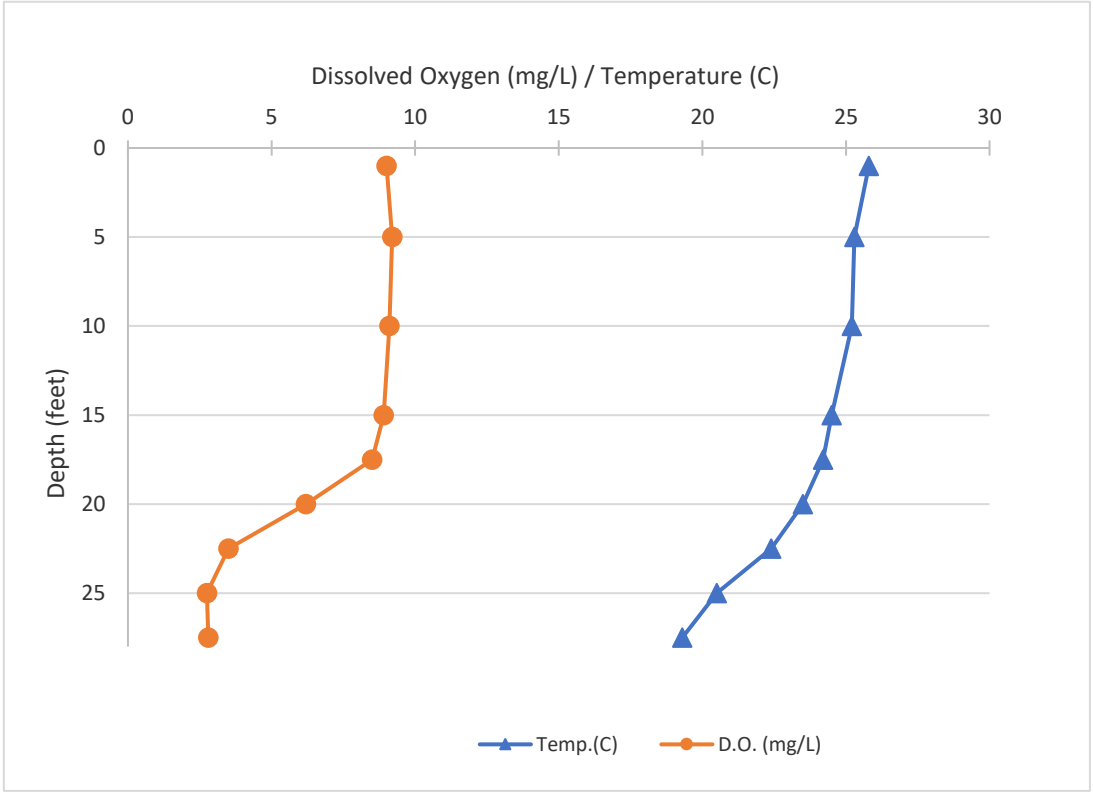


Name: Rennie Lake
County: Grand Traverse
Site ID: 280430
Date: 7/28/2021

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	25.8	9
5	25.3	9.2
10	25.2	9.1
15	24.5	8.9
17.5	24.2	8.5
20	23.5	6.2
22.5	22.4	3.5
25	20.5	2.75
27.5	19.3	2.8

Lake: Rennie Lake (Grand Traverse Co.) **7/28/2021**

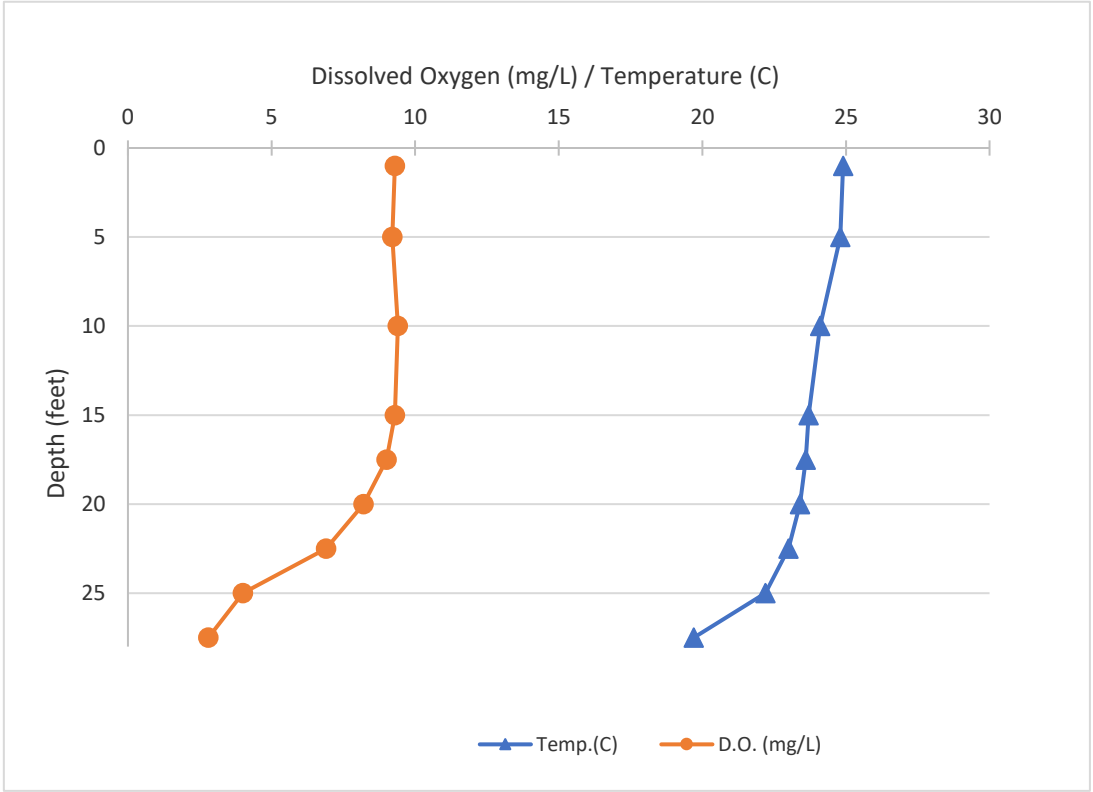


Name: Rennie Lake
County: Grand Traverse
Site ID: 280430
Date: 8/5/2021

Dissolved Oxygen and Temperature Profile

Lake: Rennie Lake (Grand Traverse Co.) 8/5/2021

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	24.9	9.3
5	24.8	9.2
10	24.1	9.4
15	23.7	9.3
17.5	23.6	9
20	23.4	8.2
22.5	23	6.9
25	22.2	4
27.5	19.7	2.8

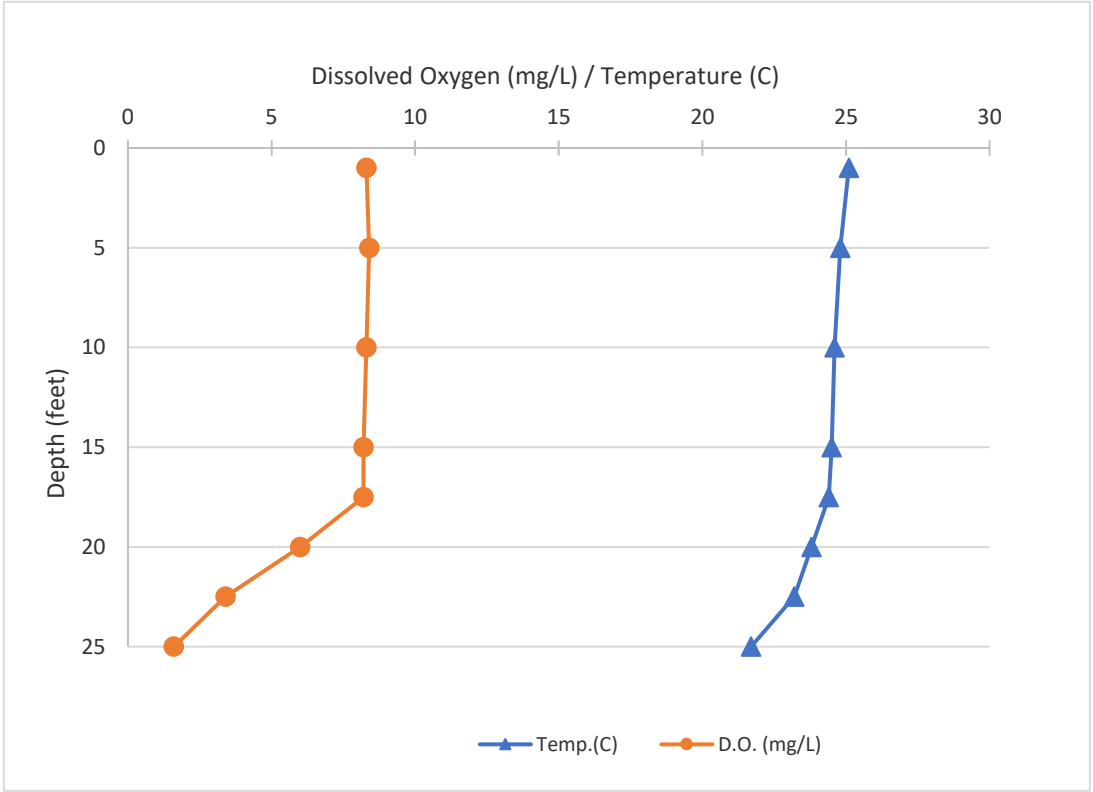


Name: Rennie Lake
County: Grand Traverse
Site ID: 280430
Date: 8/13/2021

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	25.1	8.3
5	24.8	8.4
10	24.6	8.3
15	24.5	8.2
17.5	24.4	8.2
20	23.8	6
22.5	23.2	3.4
25	21.7	1.6

Lake: Rennie Lake (Grand Traverse Co.) **8/13/2021**

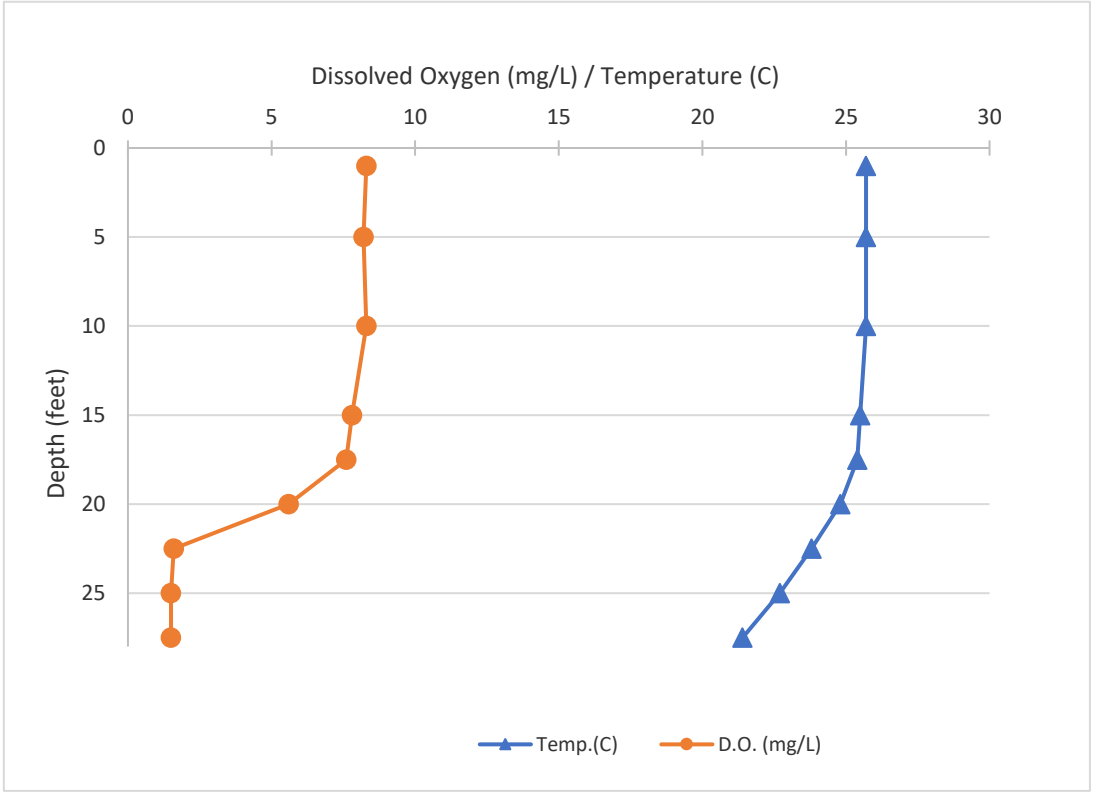


Name: Rennie Lake
County: Grand Traverse
Site ID: 280430
Date: 8/26/2021

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	25.7	8.3
5	25.7	8.2
10	25.7	8.3
15	25.5	7.8
17.5	25.4	7.6
20	24.8	5.6
22.5	23.8	1.6
25	22.7	1.5
27.5	21.4	1.5

Lake: Rennie Lake (Grand Traverse Co.) **8/26/2021**

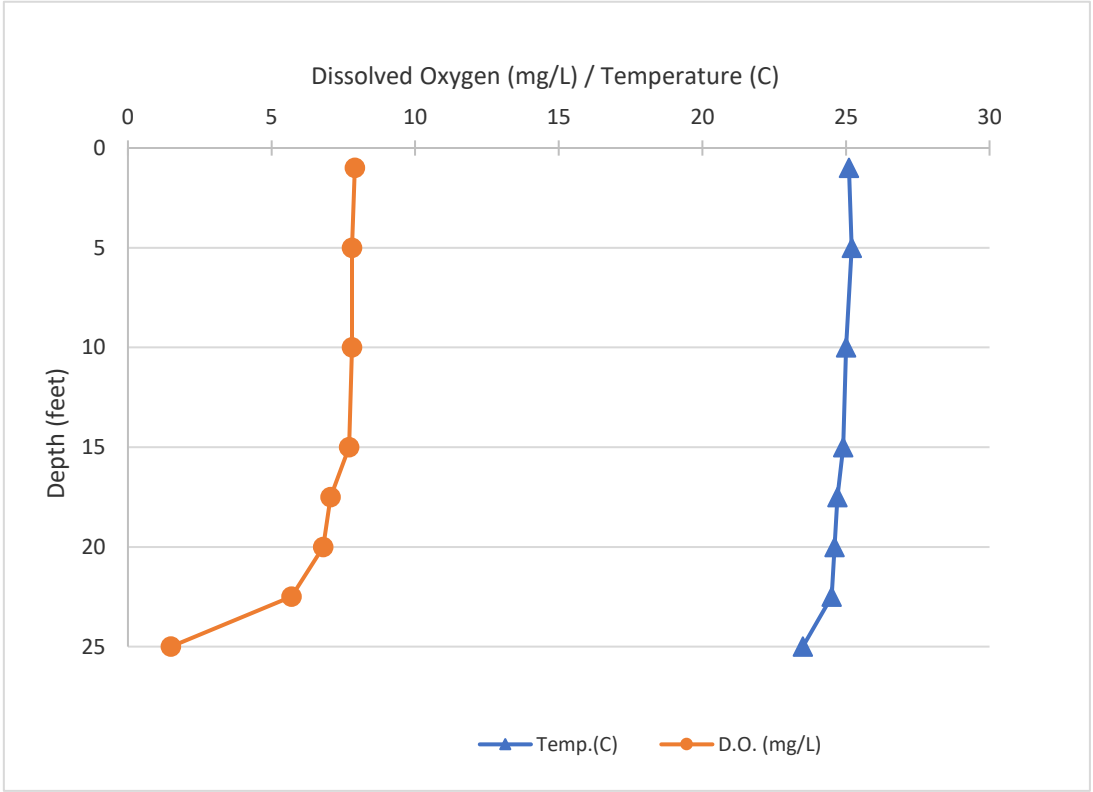


Name: Rennie Lake
County: Grand Traverse
Site ID: 280430
Date: 8/31/2021

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	25.1	7.9
5	25.2	7.8
10	25	7.8
15	24.9	7.7
17.5	24.7	7.05
20	24.6	6.8
22.5	24.5	5.7
25	23.5	1.5

Lake: Rennie Lake (Grand Traverse Co.) **8/31/2021**

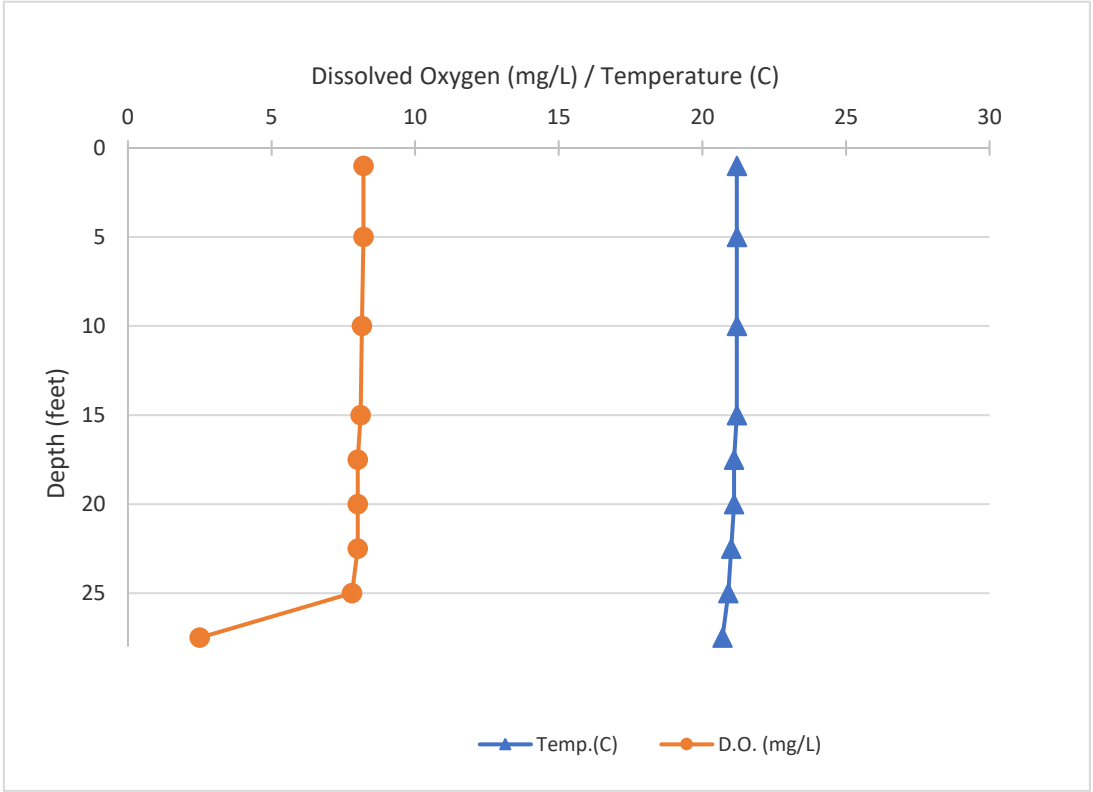


Name: Rennie Lake
County: Grand Traverse
Site ID: 280430
Date: 9/9/2021

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	21.2	8.2
5	21.2	8.2
10	21.2	8.15
15	21.2	8.1
17.5	21.1	8
20	21.1	8
22.5	21	8
25	20.9	7.8
27.5	20.7	2.5

Lake: Rennie Lake (Grand Traverse Co.) **9/9/2021**



Name: Rennie Lake
County: Grand Traverse
Site ID: 280430
Date: 9/13/2021

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	20.9	9
5	20.7	9
10	20.6	8.9
15	20.5	8.8
17.5	20.5	8.75
20	20.4	8.75
22.5	20.3	8.6
25	20.3	8.6
27.5	20.2	5.4

Lake: Rennie Lake (Grand Traverse Co.) **9/13/2021**