



2022 Data Report for

Portage Lake, St. Joseph County

Site ID: 750245

42.0522°N, 85.5072°W

The CLMP is brought to you by:



Michigan Clean
Water Corps

EGLE

MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

MICHIGAN STATE
UNIVERSITY



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:

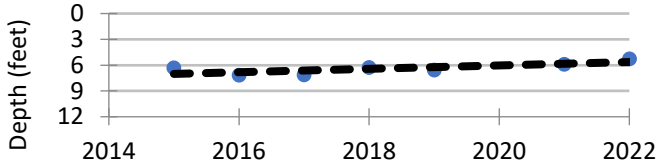
Paul Steen (psteen@hrwc.org), CLMP Data Analyst

Portage Lake, St. Joseph County 2022 CLMP Results



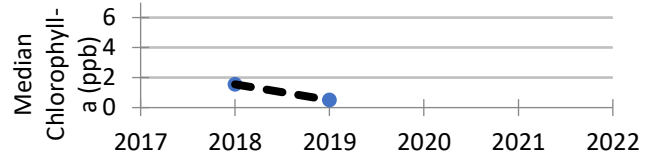
Secchi Disk Transparency (feet)

Year	# Readings	Min	Max	Average	Std. Dev	Carlson TSI
2022	18	3.5	9.5	5.3	1.4	53
2017-2021	63	3.0	14.0	5.3	2.1	50
2015-2016	52	3.0	10.0	6.7	1.7	50
2022 All CLMP Lakes	3178	1.0	63.0	11.6	2.5	43



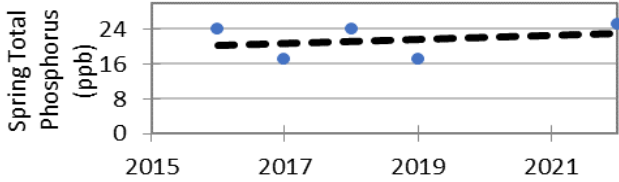
Chlorophyll-a (parts per billion)

Year	# Samples	Min	Max	Med	Std. Dev	Carlson TSI
2019	5	<1.0	3.1	<1.0	1.3	<31
2014-2018	10	<1.0	8.8	1.6	3.9	35
2022 All CLMP Lakes	687	< 1.0	43.0	3.7	5.3	43
2022 All CLMP Lakes	3178	< 1.0	43.0	3.7	5.3	43



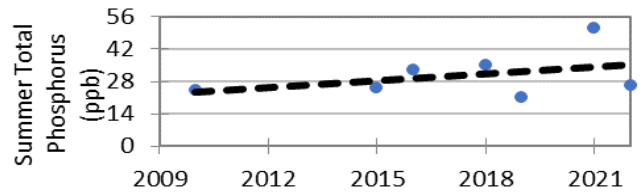
Spring Phosphorus (parts per billion)

Year	# Samples	Min	Max	Average	Std. Dev
2022	1	25.0	25.0	25.0	NA
2017-2021	3	17.0	24.0	19.3	4.0
2016	1	24.0	24.0	24.0	NA
2022 All CLMP Lakes	220	<5	220.0	20.7	21.3



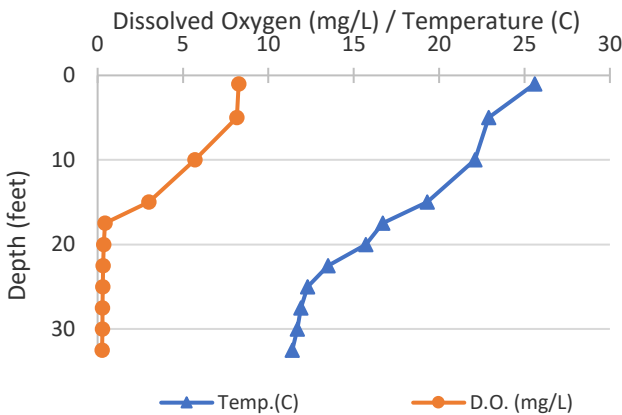
Summer Phosphorus (parts per billion)

Year	# Samples	Min	Max	Avg	Std. Dev	Carlson TSI
2022	1	26.0	26.0	26.0	NA	51
2017-2021	3	21.0	51.0	35.7	15.0	55
2010-2016	3	24.0	33.0	27.3	4.9	52
2022 All CLMP Lakes	234	<= 3	150.0	17.4	15.3	45



Dissolved Oxygen and Temperature Profile

6/26/2019



Summary

Average TSI	2022	2017-2021	2015-2016
Portage Lake	52	47	44
All CLMP Lakes	44	40	40

With an average TSI score of 52 based on 2022 Secchi transparency and summer total phosphorus data, this lake is rated as a eutrophic lake.

Due to the high levels of nutrients in this lake, the lake stratifies in early-summer, and the bottom water remains devoid of oxygen into late-summer and early-fall.

While the trends for individual parameters are mixed, the overall trend indicates that nutrient levels are increasing in this lake overtime. Given this lake's eutrophic rating, 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.

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

<1.0 = Chlorophyll-a: Sample value is less than limit of quantification (<1 ppb).

W= Value is less than the detection limit (<3 ppb) T = Value reported is less than the reporting limit (5 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.

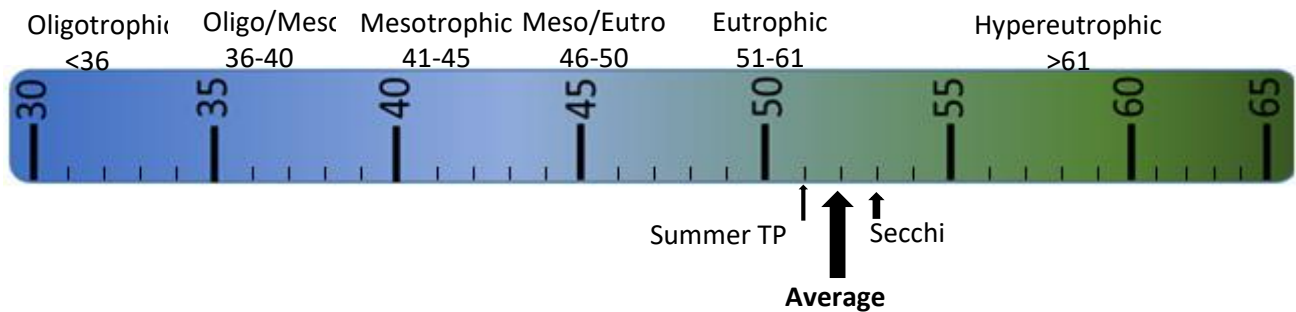
The tables below give the results-to-TSI conversions for the water quality data ranges normally seen in the CLMP. The formulas for this conversion can be found in the CLMP manual (link is on page 2 of this report).

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 Portage Lake in 2022	
Average	52
Secchi Disk	53
Summer TP	51
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 eutrophic lakes. These lakes exhibit extremely high productivity, such as nuisance algae and weed growth.

Portage Lake, St. Joseph County 2022 Aquatic Plant Mapping Results



Portage Lake was enrolled in Aquatic Plant Mapping but no survey results were reported in 2022.

Why is monitoring aquatic plants important?

A major component of the plant community in lakes is the large, leafy, rooted plants. Compared to the microscopic algae the rooted plants are large. Sometimes they are collectively called the “macrophytes” (“macro” meaning large and “phyte” meaning plant). These macrophytes are the plants that people sometimes complain about and refer to as lake weeds.

Far from being weeds, macrophytes or rooted aquatic plants are a natural and essential part of the lake, just as grasses, shrubs and trees are a natural part of the land. Their roots are a fabric for holding sediments in place, reducing erosion and maintaining bottom stability. They provide habitat for fish, including structure for food organisms, nursery areas, foraging and predator avoidance. Waterfowl, shore birds and aquatic mammals use plants to forage on and within, and as nesting materials and cover.

Though plants are important to the lake, overabundant plants can negatively affect fish populations, fishing and other recreational activities. Rooted plant populations increase in abundance as nutrient concentrations increase in the lake. As lakes become more eutrophic rooted plant populations increase. They are rarely a problem in oligotrophic lakes, only occasionally a problem in mesotrophic lakes, sometimes a problem in eutrophic lakes, and often a problem in hypereutrophic lakes.

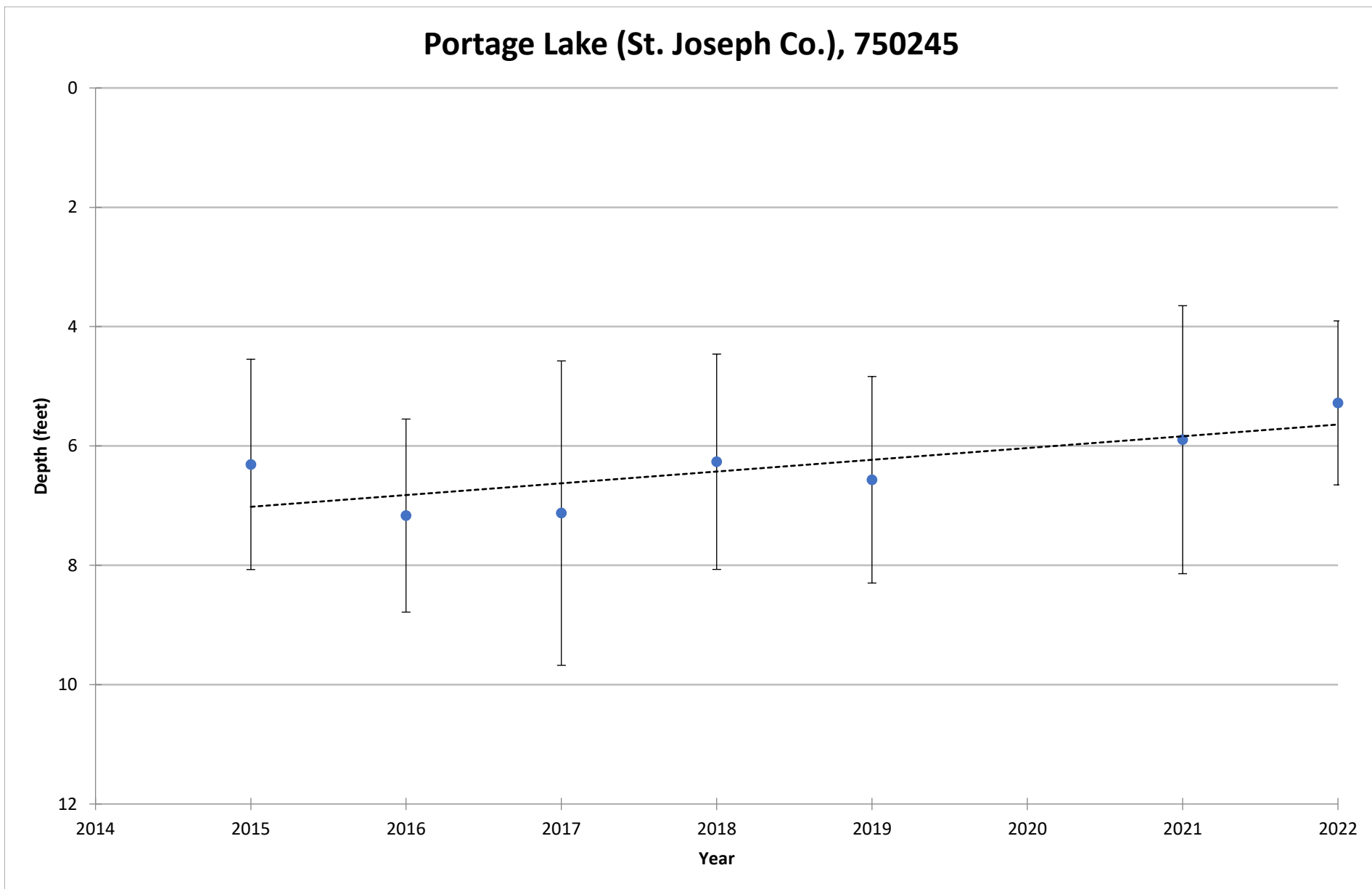
However, sometimes a lake is invaded by an aquatic plant species that is not native to Michigan. In these cases, even nutrient poor oligotrophic lakes can be threatened. Some of these exotic plants, like curly-leaf pondweed, Eurasian watermilfoil, starry stonewort, European frog-bit and Hydrilla can be extremely disruptive to the lake’s ecosystem and recreational activities.

To avoid a takeover by exotic plants, it is necessary to use Integrated Pest Management (IPM) strategies: monitoring, early detection, rapid response, maintenance control, and preventive management.

The CLMP offers two parameters on aquatic plants. In the Exotic Aquatic Plant Watch, volunteers concentrate on monitoring and early detection of exotic invasive plants only. In Aquatic Plant Mapping, volunteers identify all native and non-native plants. In both parameters, volunteers create lake maps or use digital tools to georeference where the plants are found.

COOPERATIVE LAKES MONITORING PROGRAM
SUMMER MEAN TRANSPARENCY

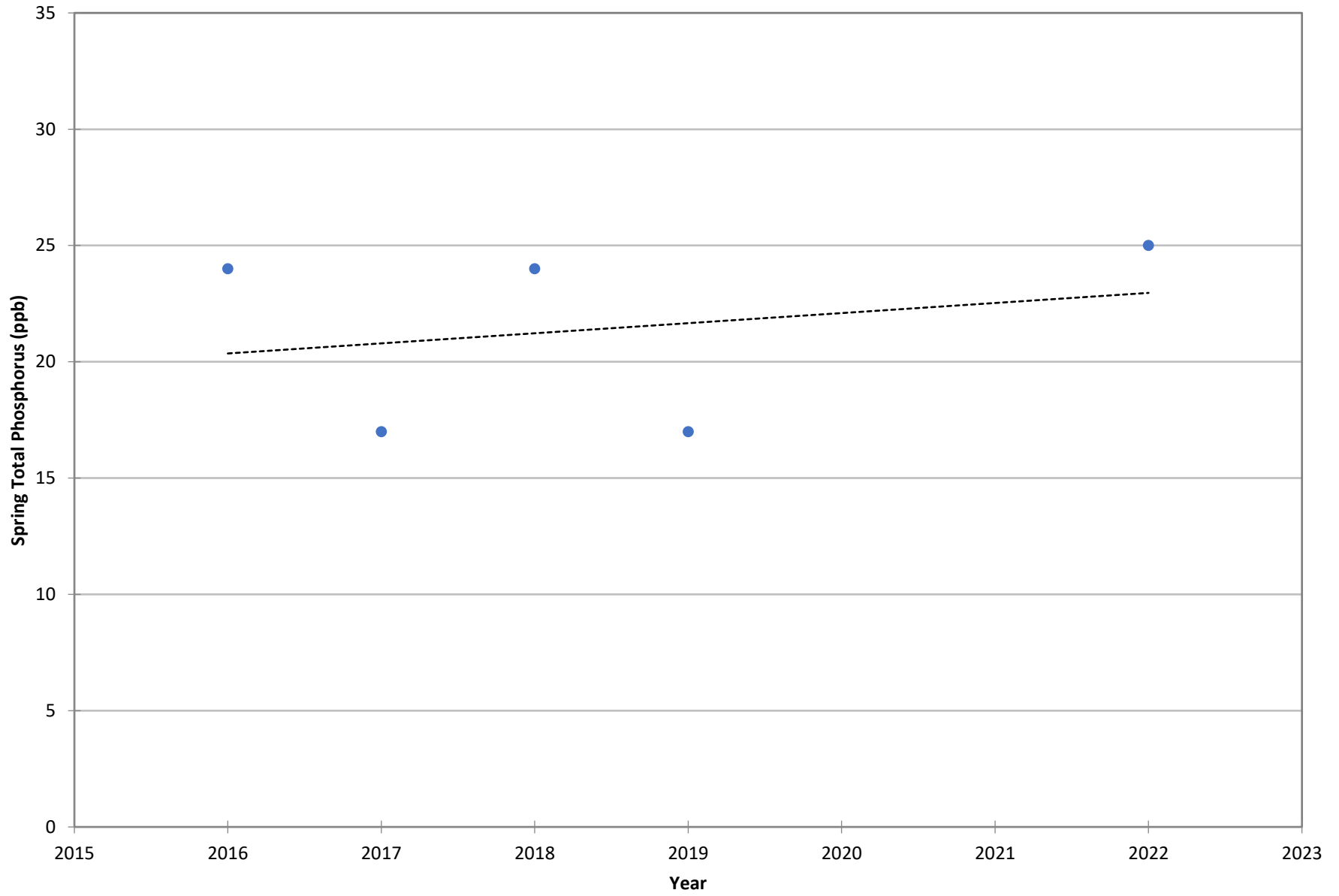
Portage Lake (St. Joseph Co.), 750245



Vertical bars indicate standard deviation

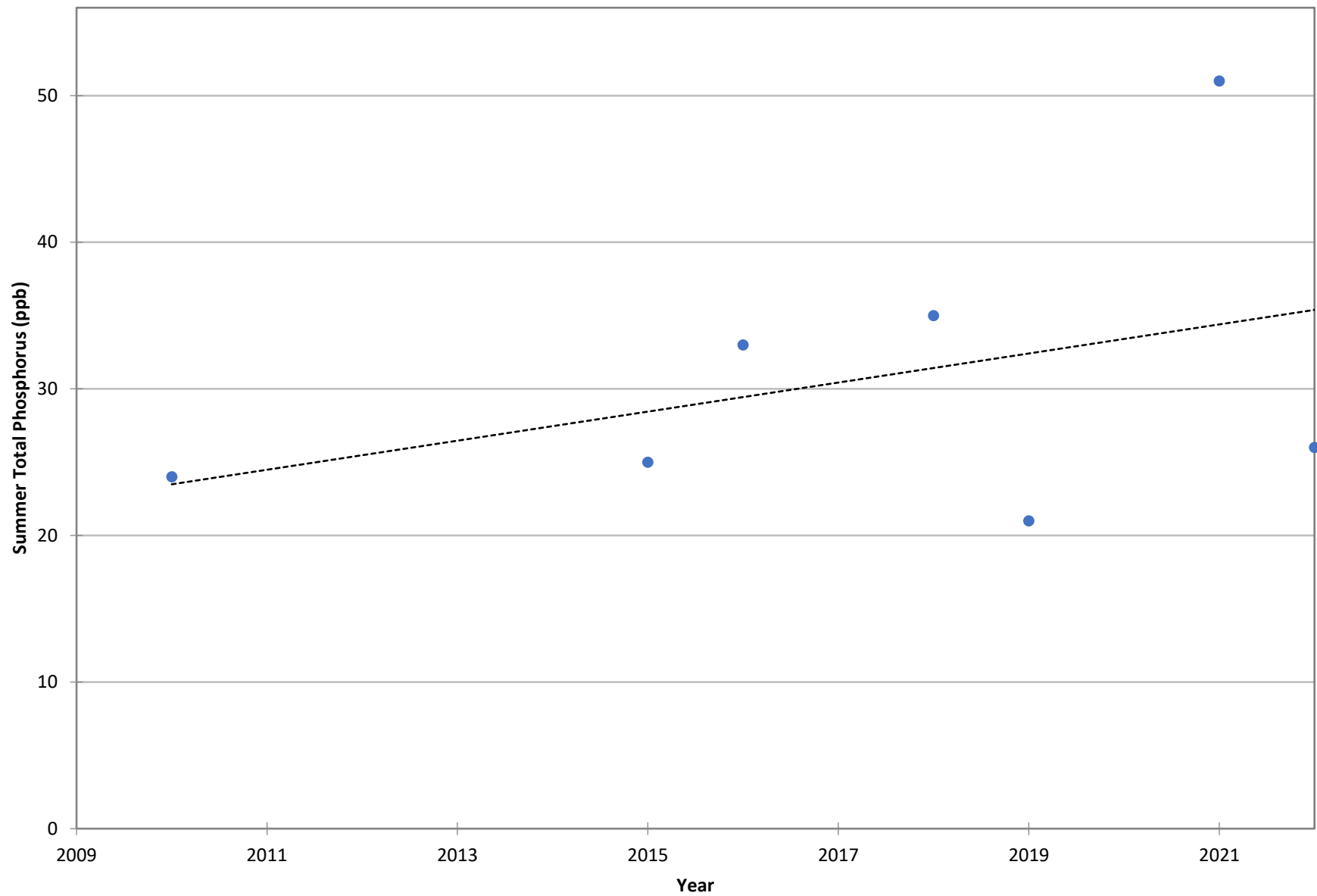
COOPERATIVE LAKES MONITORING PROGRAM
SPRING TOTAL PHOSPHORUS

Portage Lake (St. Joseph Co.), 750245



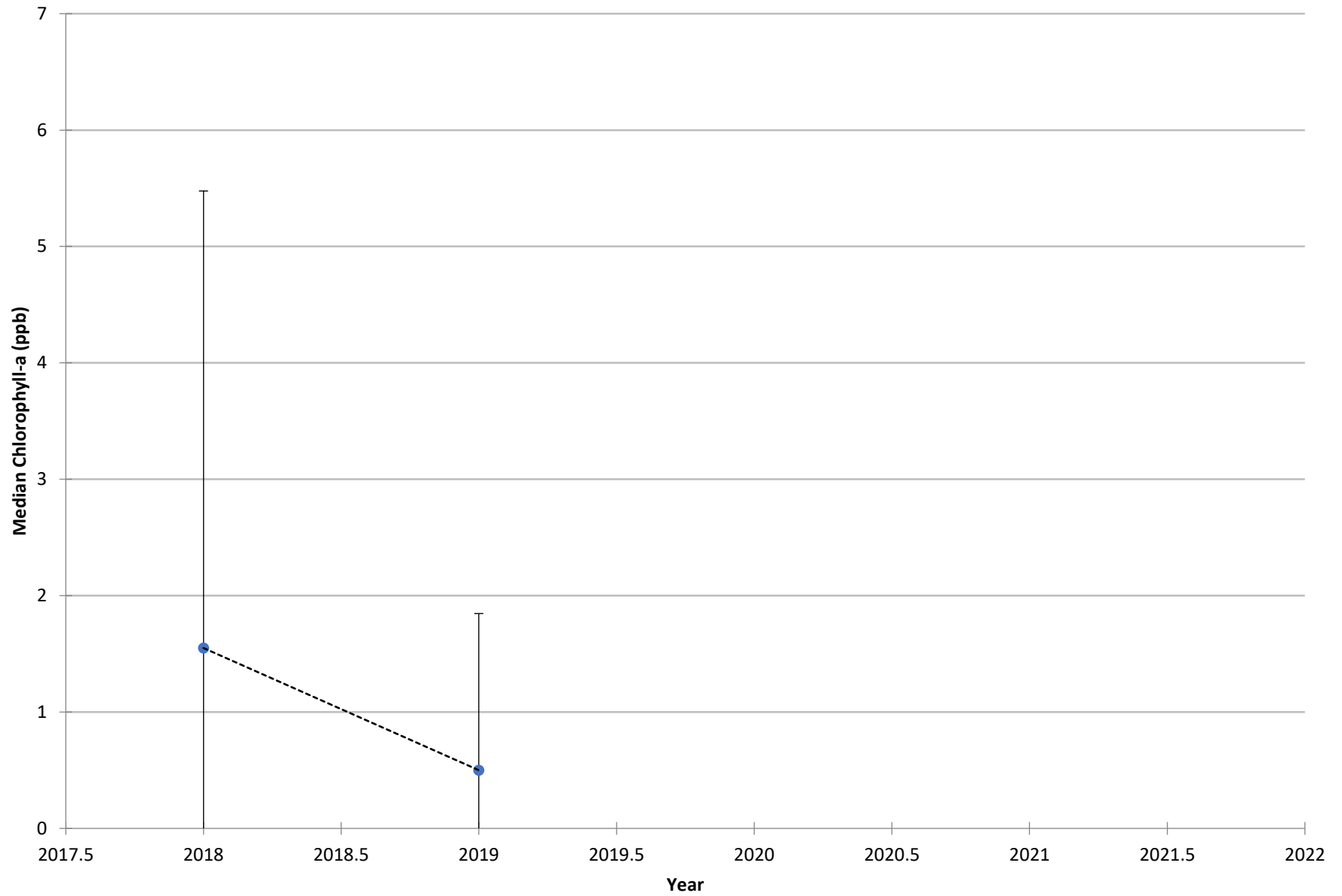
COOPERATIVE LAKES MONITORING PROGRAM
SUMMER TOTAL PHOSPHORUS

Portage Lake (St. Joseph Co.), 750245



COOPERATIVE LAKES MONITORING PROGRAM
SUMMER MEDIAN CHLOROPHYLL-A

Portage Lake (St. Joseph Co.)



Vertical bars indicate standard deviation

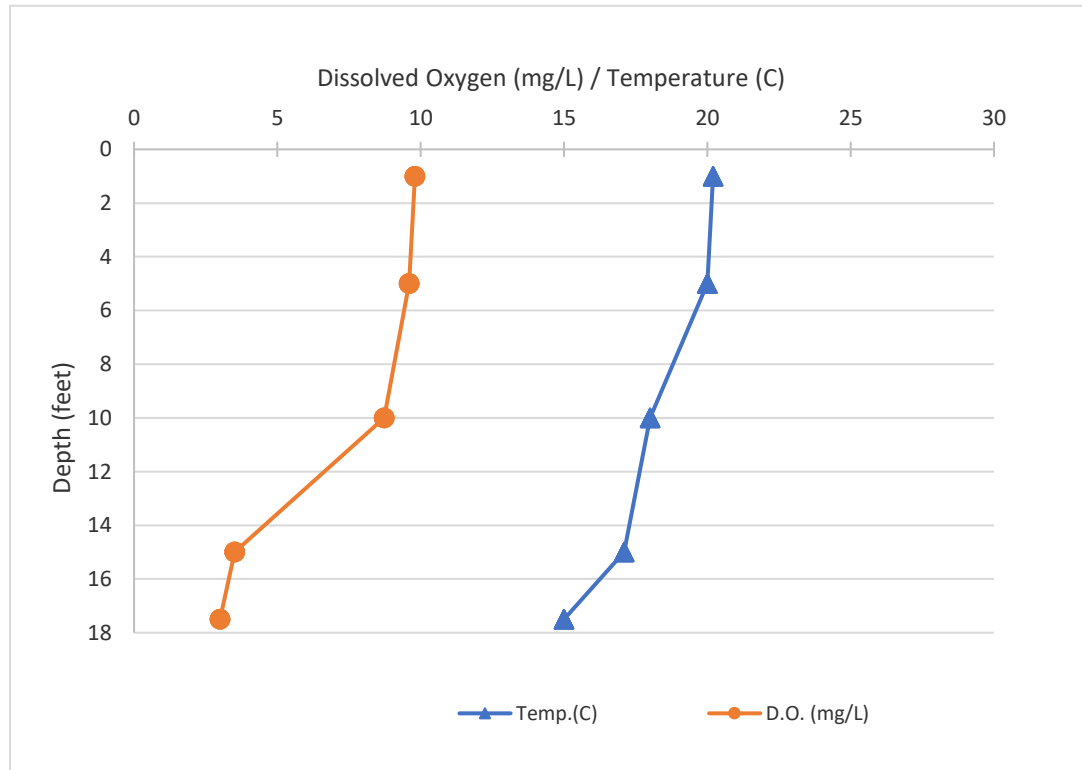
Name: Portage Lake
 County: St. Joseph
 Site ID: 750245
 Date: 5/13/2019

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	20.2	9.8
1	20.2	9.8
1	20.2	9.8
1	20.2	9.8
5	20	9.6
5	20	9.6
5	20	9.6
5	20	9.6
10	18	8.72
10	18	8.72
10	18	8.72
10	18	8.72
15	17.1	3.51
15	17.1	3.51
15	17.1	3.51
15	17.1	3.51
17.5	15	3
17.5	15	3
17.5	15	3
17.5	15	3

Lake: Portage Lake (St. Joseph Co.)

5/13/2019



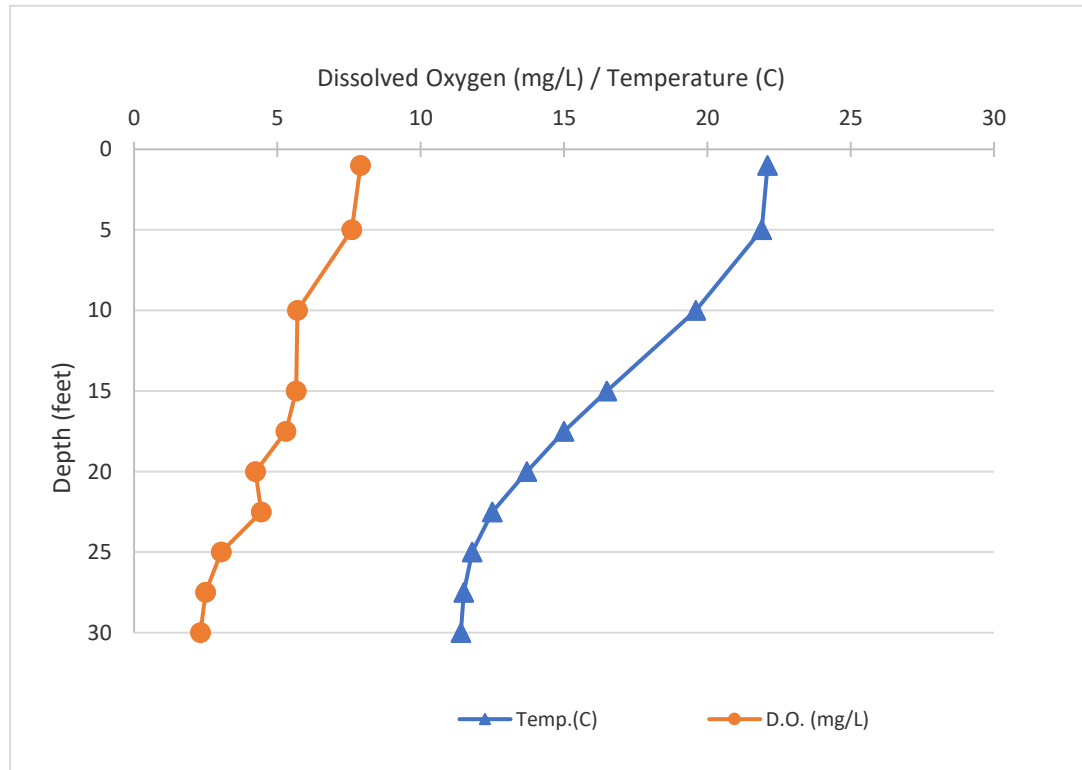
Name: Portage Lake
 County: St. Joseph
 Site ID: 750245
 Date: 5/30/2019

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	22.1	7.9
1	22.1	7.9
5	21.9	7.6
5	21.9	7.6
10	19.6	5.7
10	19.6	5.7
15	16.5	5.65
15	16.5	5.65
17.5	15	5.3
17.5	15	5.3
20	13.7	4.24
20	13.7	4.24
22.5	12.5	4.44
22.5	12.5	4.44
25	11.8	3.04
25	11.8	3.04
27.5	11.5	2.5
27.5	11.5	2.5
30	11.4	2.32
30	11.4	2.32

Lake: Portage Lake (St. Joseph Co.)

5/30/2019



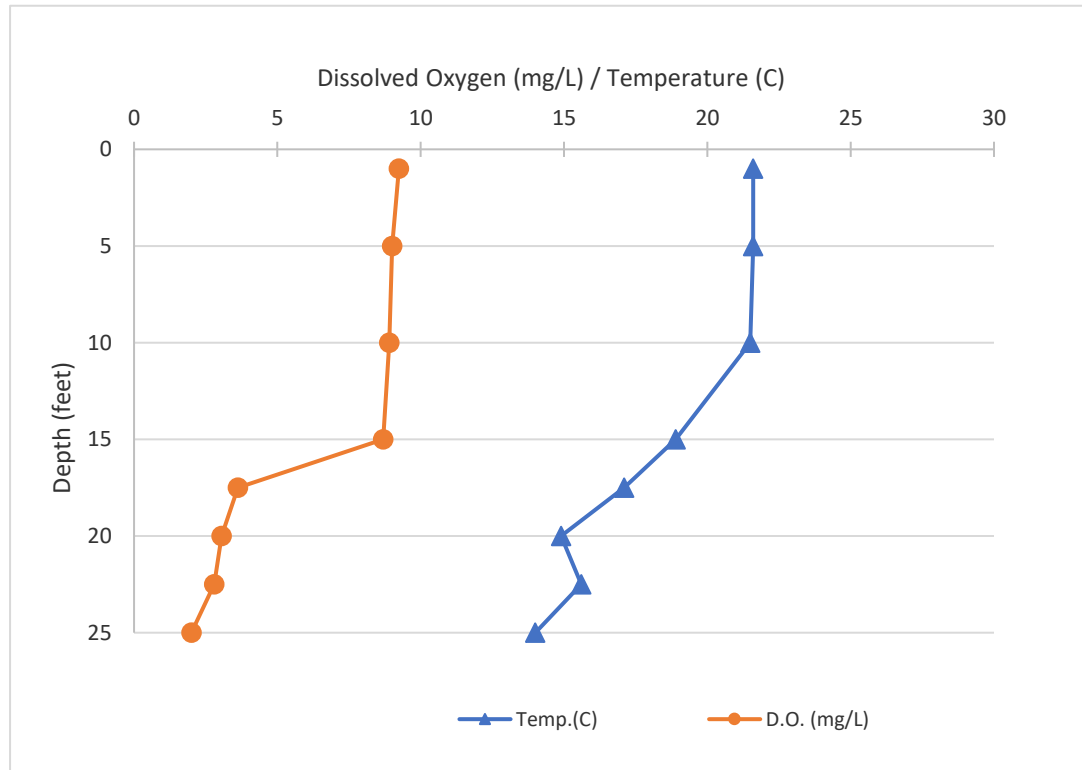
Name: Portage Lake
County: St. Joseph
Site ID: 750245
Date: 6/4/2019

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	21.6	9.24
5	21.6	9
10	21.5	8.9
15	18.9	8.69
17.5	17.1	3.62
20	14.9	3.06
22.5	15.6	2.8
25	14	2

Lake: Portage Lake (St. Joseph Co.)

6/4/2019



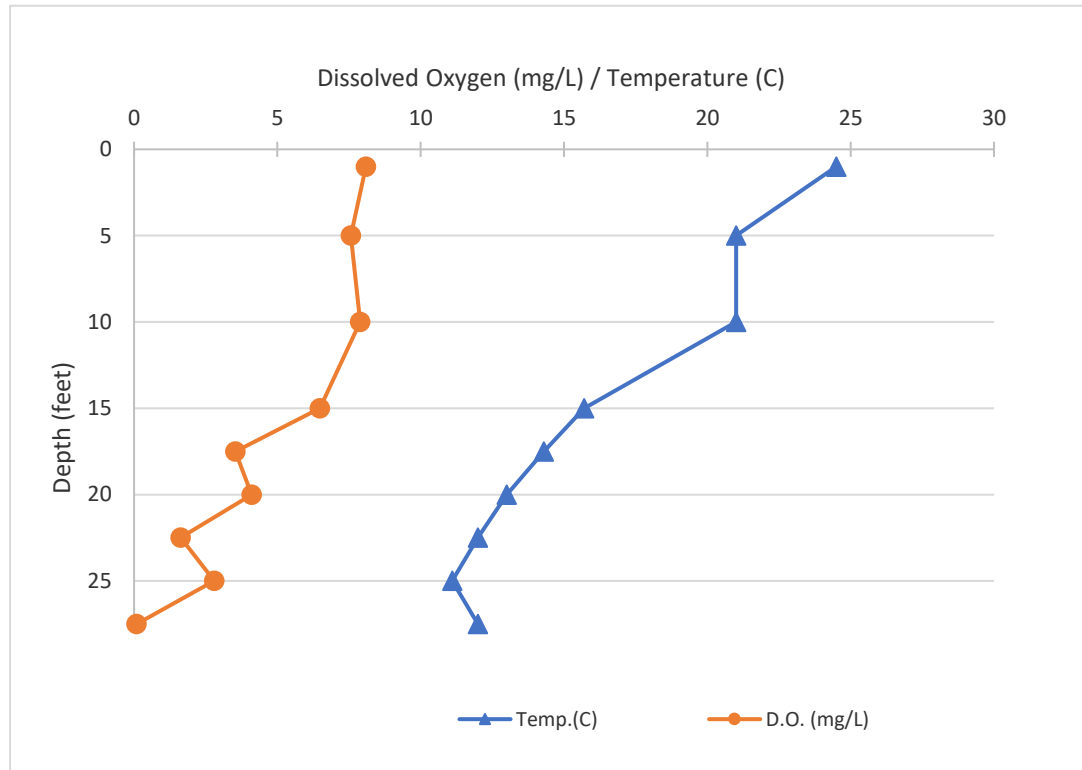
Name: Portage Lake
County: St. Joseph
Site ID: 750245
Date: 6/20/2019

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	24.5	8.09
5	21	7.56
10	21	7.89
15	15.7	6.48
17.5	14.3	3.54
20	13	4.1
22.5	12	1.62
25	11.1	2.8
27.5	12	0.09

Lake: Portage Lake (St. Joseph Co.)

6/20/2019



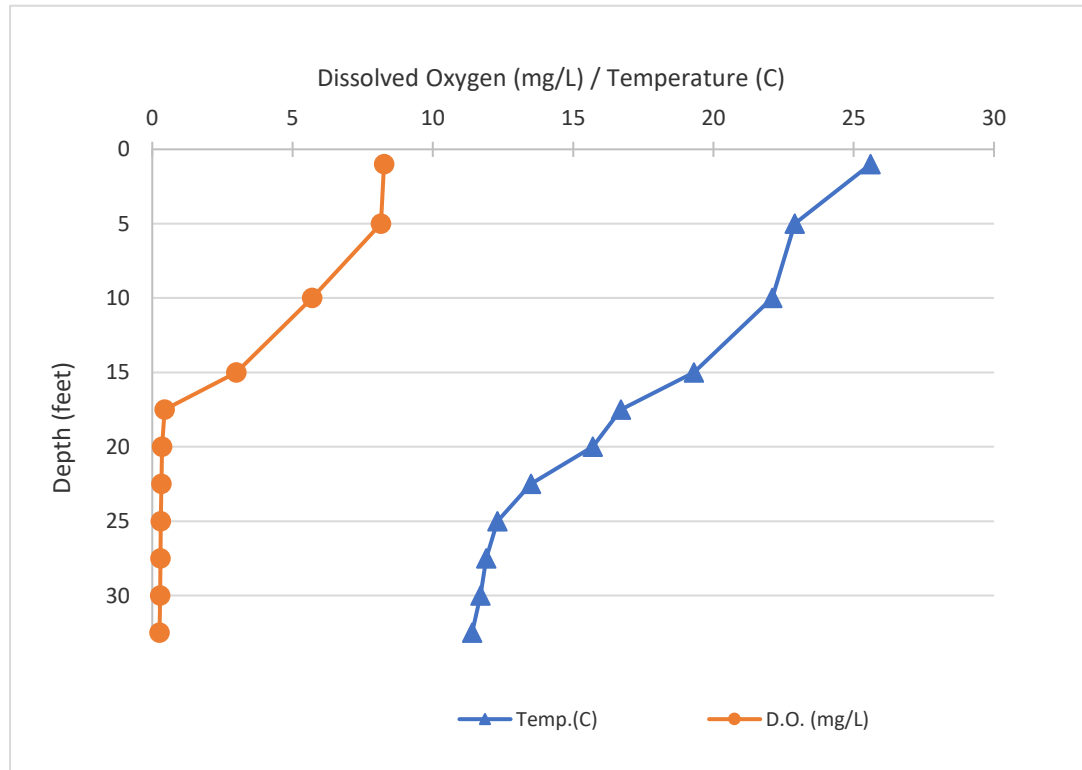
Name: Portage Lake
County: St. Joseph
Site ID: 750245
Date: 6/26/2019

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	25.6	8.26
5	22.9	8.15
10	22.1	5.7
15	19.3	3
17.5	16.7	0.44
20	15.7	0.35
22.5	13.5	0.33
25	12.3	0.31
27.5	11.9	0.29
30	11.7	0.28
32.5	11.4	0.26

Lake: Portage Lake (St. Joseph Co.)

6/26/2019



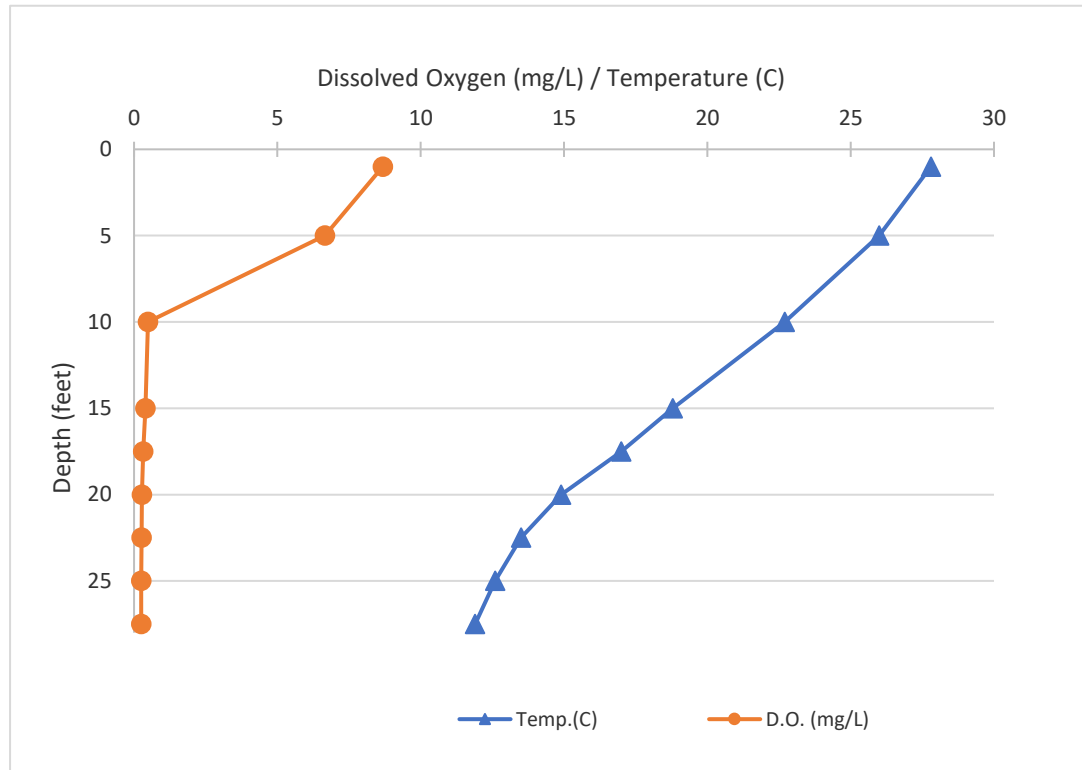
Name: Portage Lake
County: St. Joseph
Site ID: 750245
Date: 7/10/2019

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	27.8	8.68
5	26	6.66
10	22.7	0.49
15	18.8	0.4
17.5	17	0.32
20	14.9	0.27
22.5	13.5	0.26
25	12.6	0.25
27.5	11.9	0.25

Lake: Portage Lake (St. Joseph Co.)

7/10/2019



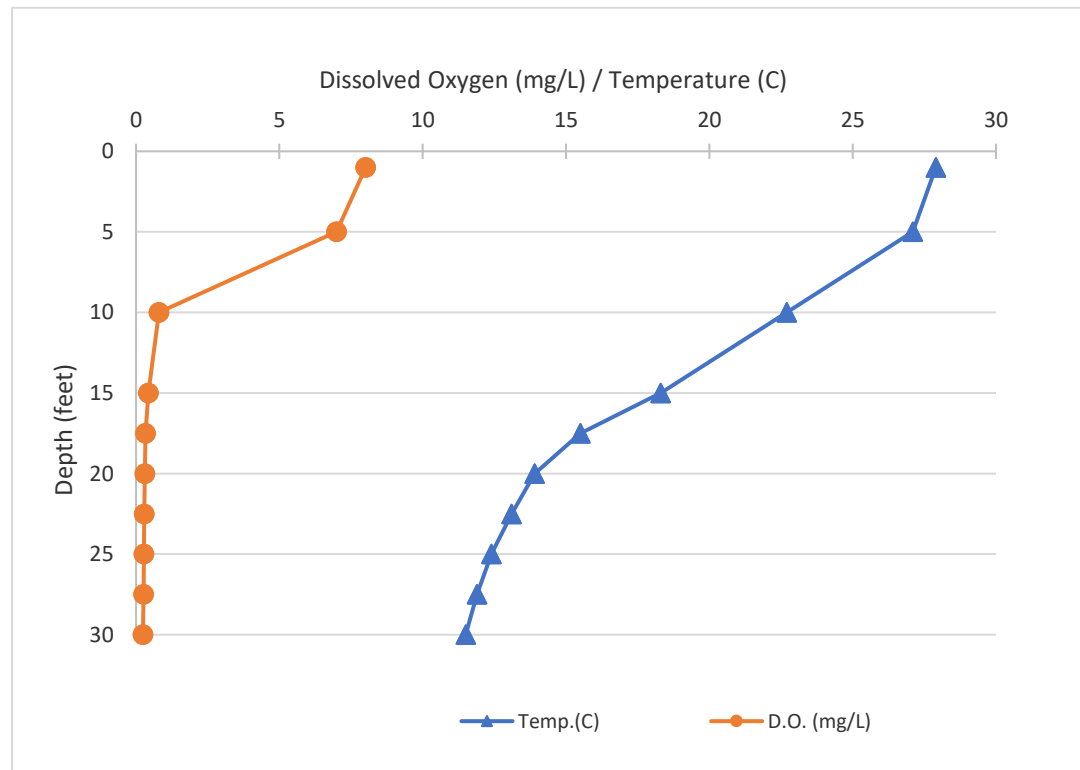
Name: Portage Lake
 County: St. Joseph
 Site ID: 750245
 Date: 7/17/2019

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	27.9	8.01
1	27.9	8.01
5	27.1	7
5	27.1	7
10	22.7	0.8
10	22.7	0.8
15	18.3	0.43
15	18.3	0.43
17.5	15.5	0.33
17.5	15.5	0.33
20	13.9	0.31
20	13.9	0.31
22.5	13.1	0.29
22.5	13.1	0.29
25	12.4	0.28
25	12.4	0.28
27.5	11.9	0.26
27.5	11.9	0.26
30	11.5	0.24
30	11.5	0.24

Lake: Portage Lake (St. Joseph Co.)

7/17/2019



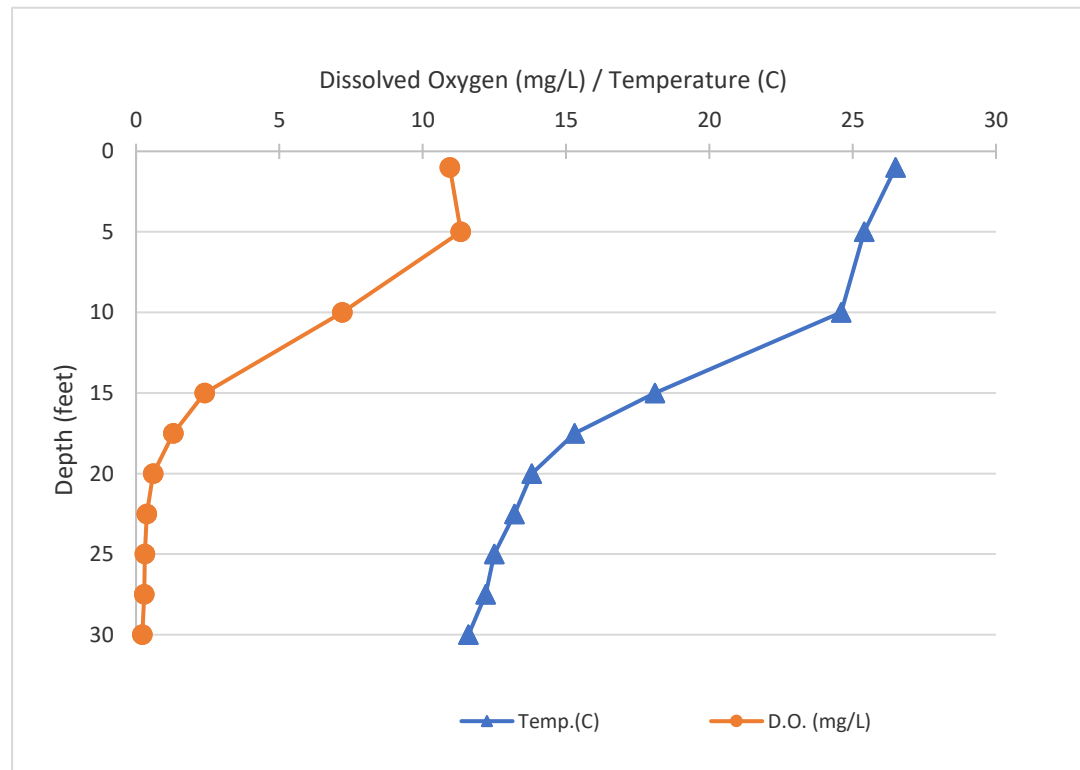
Name: Portage Lake
 County: St. Joseph
 Site ID: 750245
 Date: 8/1/2019

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	26.5	10.95
1	26.5	10.95
5	25.4	11.33
5	25.4	11.33
10	24.6	7.2
10	24.6	7.2
15	18.1	2.4
15	18.1	2.4
17.5	15.3	1.3
17.5	15.3	1.3
20	13.8	0.6
20	13.8	0.6
22.5	13.2	0.37
22.5	13.2	0.37
25	12.5	0.31
25	12.5	0.31
27.5	12.2	0.29
27.5	12.2	0.29
30	11.6	0.22
30	11.6	0.22

Lake: Portage Lake (St. Joseph Co.)

8/1/2019



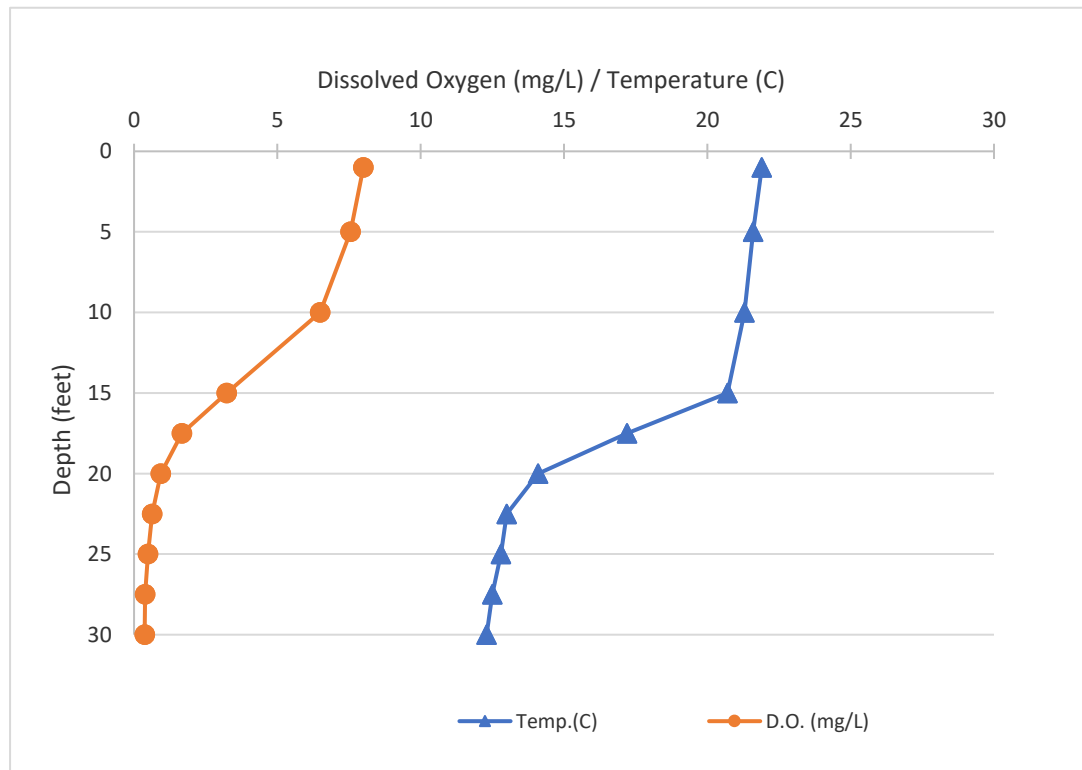
Name: Portage Lake
 County: St. Joseph
 Site ID: 750245
 Date: 8/29/2019

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	21.9	8
1	21.9	8
5	21.6	7.55
5	21.6	7.55
10	21.3	6.49
10	21.3	6.49
15	20.7	3.23
15	20.7	3.23
17.5	17.2	1.67
17.5	17.2	1.67
20	14.1	0.93
20	14.1	0.93
22.5	13	0.63
22.5	13	0.63
25	12.8	0.49
25	12.8	0.49
27.5	12.5	0.39
27.5	12.5	0.39
30	12.3	0.37
30	12.3	0.37

Lake: Portage Lake (St. Joseph Co.)

8/29/2019



Name: Portage Lake
County: St. Joseph
Site ID: 750245
Date: 9/6/2019

Dissolved Oxygen and Temperature Profile

Depth (ft)	Temp.(C)	D.O. (mg/L)
1	21.3	9.7
5	21.3	9.45
10	21.3	9.2
15	19.6	3.5
17.5	17.6	1.3
20	15.3	0.78
22.5	13.6	0.53
25	12.8	0.46
27.5	12.4	0.4

Lake: Portage Lake (St. Joseph Co.)

9/6/2019

