Lake Memphremagog
Steering Committee Meeting
Update on In-Lake Monitoring

November 10, 2020

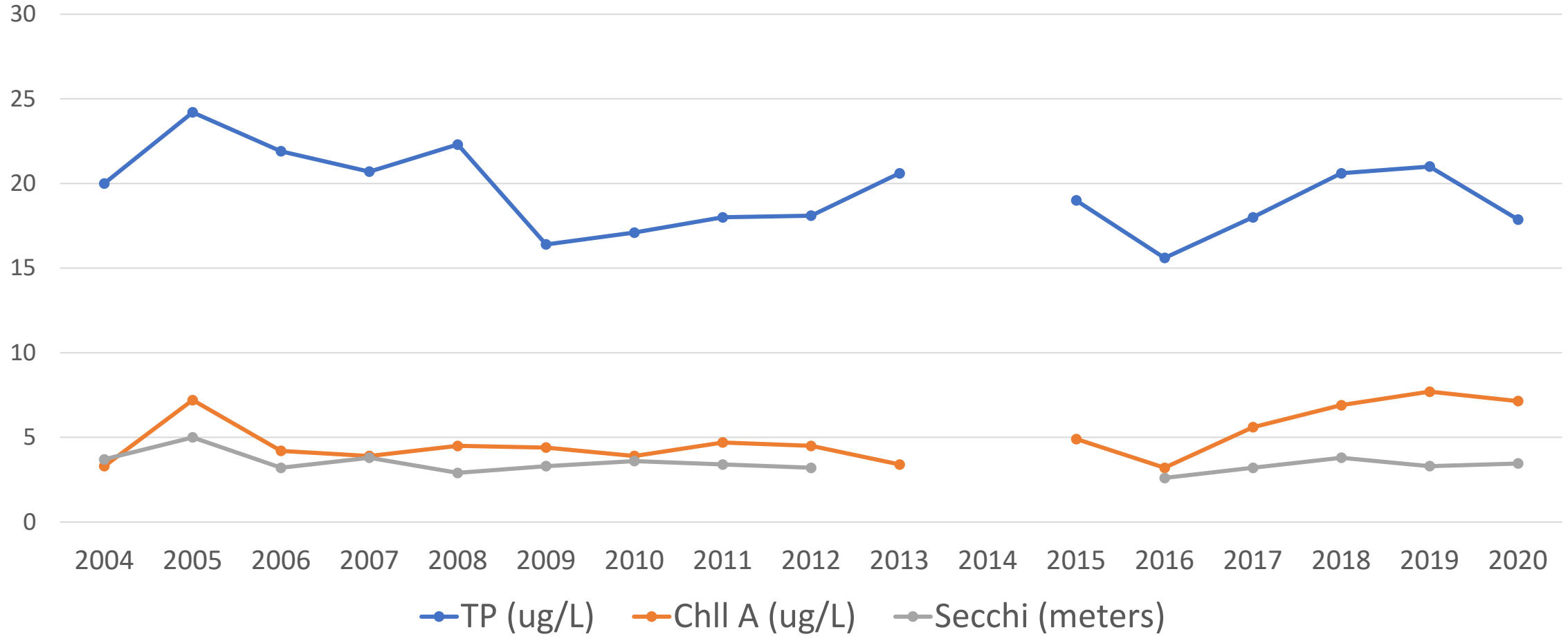
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION
LAKES & PONDS PROGRAM

Presentation Overview

I. Lake Memphremagog Data
- Lay Monitoring Program Data from 1984 – 2020 (Red circles)
- TMDL Monitoring from Summer 2020 (Green Circle)

II. Future Monitoring Efforts

Lake Memphremagog Main Lake LMP Data 2004-2020



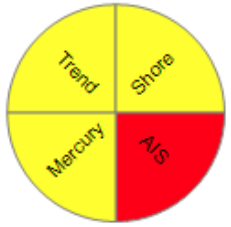
Lake ID MEMPHREMAGOG

View Report

1 of 1 Find | Next

MEMPHREMAGOG - data through 2019

Learn How Lakes Are Scored



Lake Area:
5929.3 acres

Basin Lake Area Ratio:
69

Max Depth:
107 meters

Mean Spring TP:
18.4 ug/L

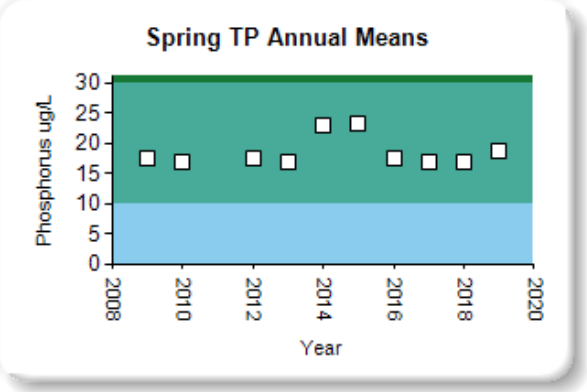
Mean Summer TP:
19.2 ug/L

Mean Summer Chla:
4.8 ug/L

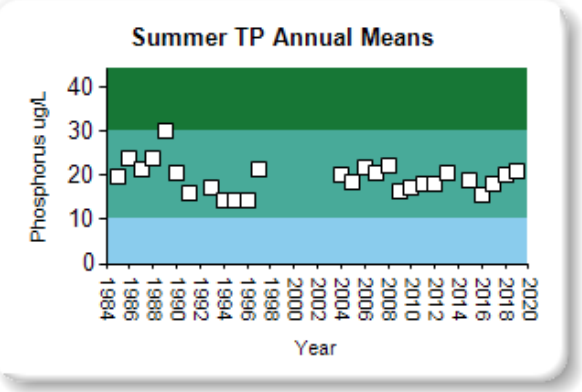
Mean Summer Secchi:
3.6 meters

Hypereutrophic
Eutrophic
Mesotrophic
Oligotrophic

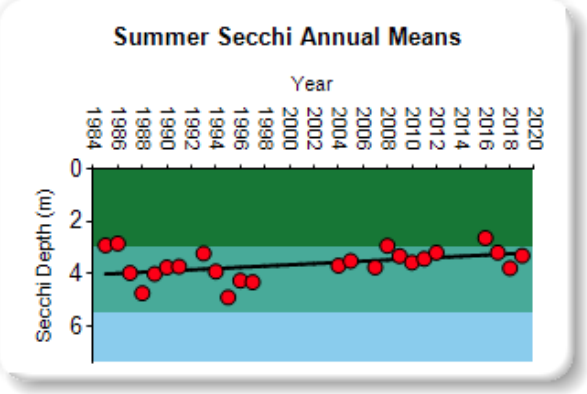
Spring TP Trend: p = 0.59 | CV = 13
Stable



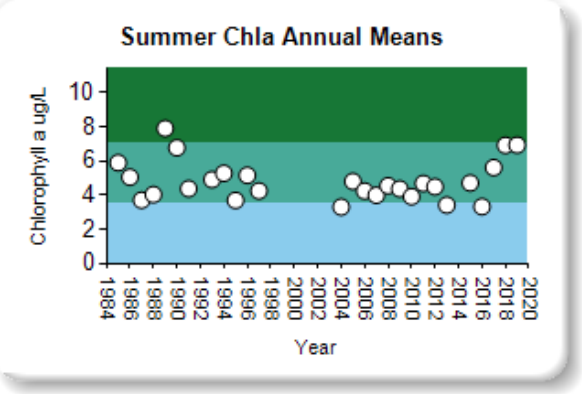
Summer TP Trend: p = 0.245 | CV = 19
Stable



Summer Secchi Trend: p = 0.0499 | CV = 16
Significantly decreasing



Summer Chla Trend: p = 0.5911 | CV = 25
Stable

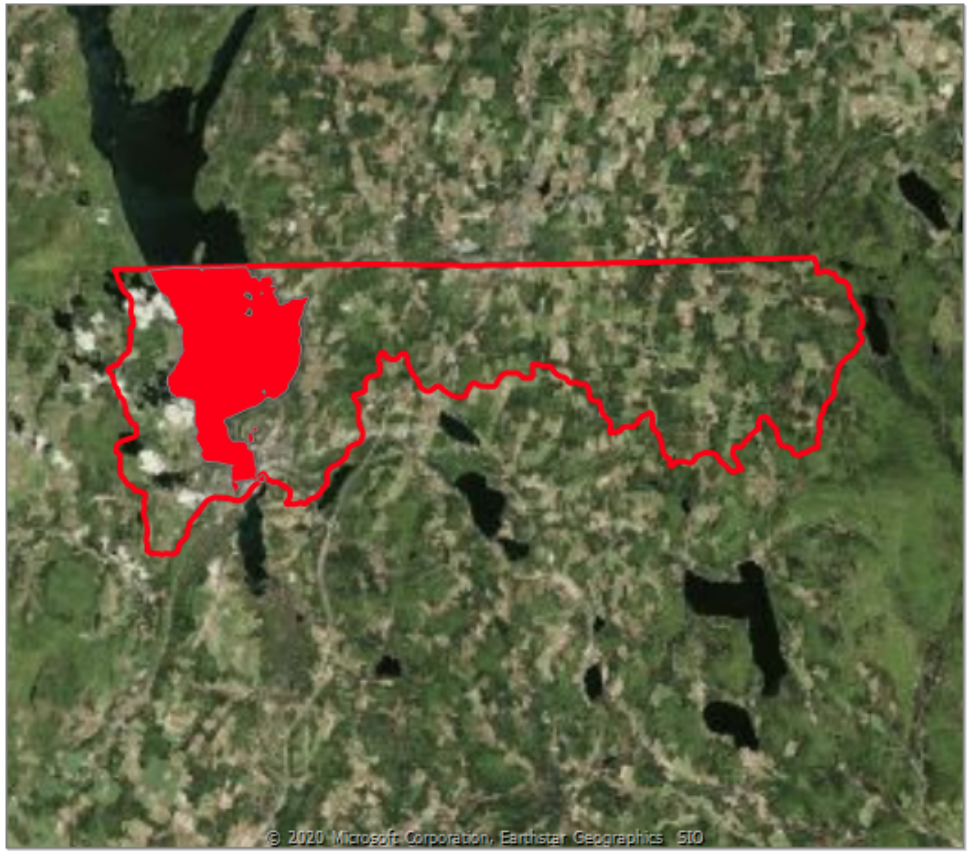


Stresses / Impairments
Impaired -- Phosphorus
Altered -- flow

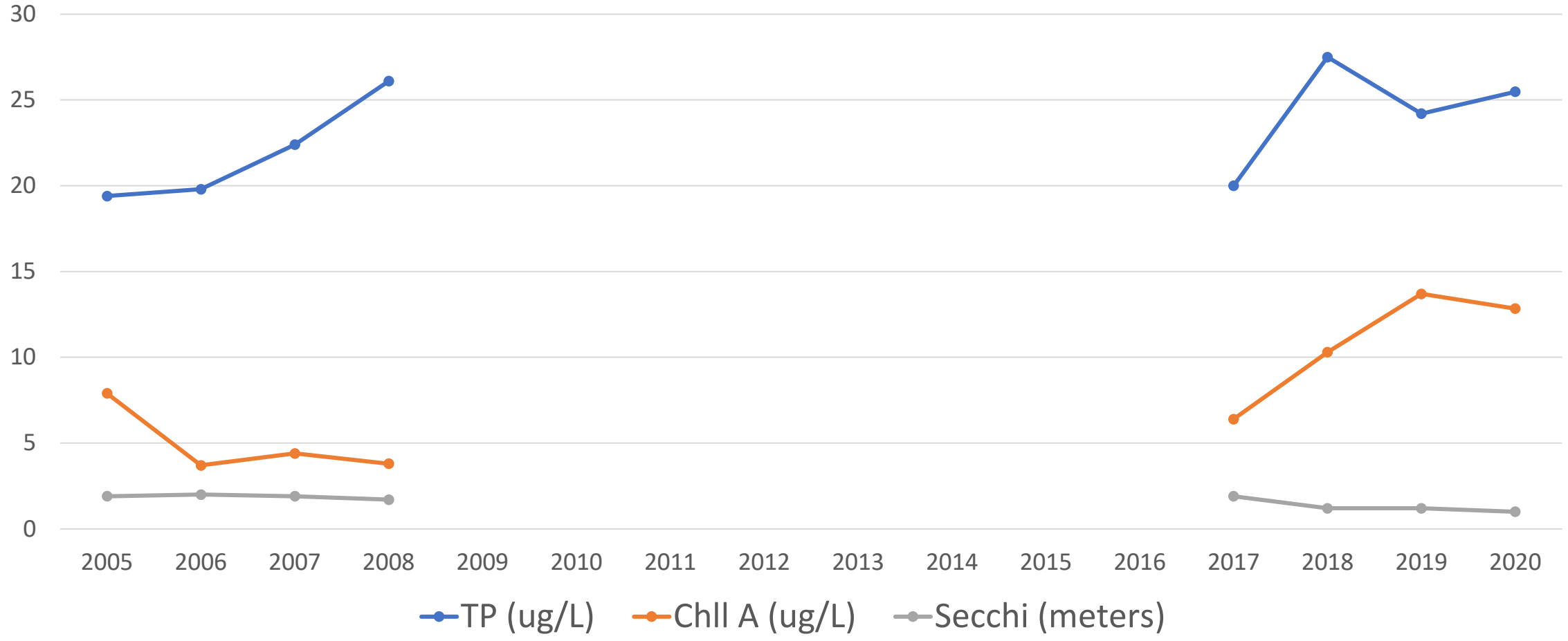
Trend Score: Fair

WQ Standards Status: Impaired

Watershed Score: Highly Disturbed



Lake Memphremagog South Bay LMP Data 2005-2020



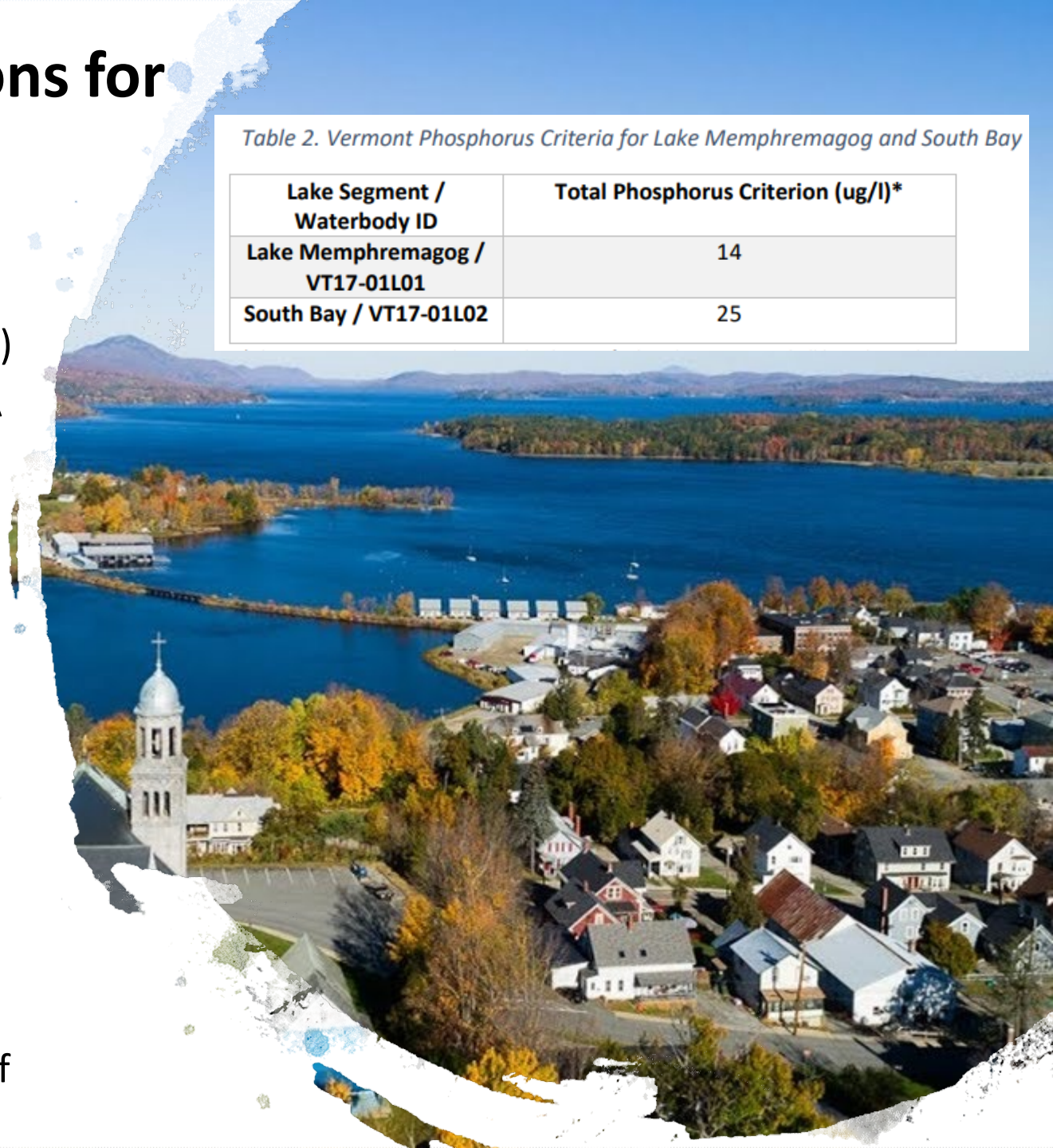
Summary of LMP Data Observations for Lake Memphremagog

- Main Lake:
  - Trend from 1984 to Present: TP and Chll A are stable, Secchi significantly decreasing (less clear)
  - 2018 and 2019 saw above average TP and Chll A concentrations, 2020 saw a return to normal
  - Mean Summer TP at 19 ug/L, not yet achieved TMDL Target of 14 ug/L
  - Quiet Summer for Cyanobacteria (1d on 7/2)

- South Bay:
  - No statistically significant trends for LMP data
    - However, Spring TP is stable at 20.1 ug/L
  - Chll A tripled since 2008 from 4 ug/L to 13 ug/L and Secchi decreased from 1.9 m to 1 m
    - *Nutrient Response Conditions deteriorating*
  - Mean Summer TP at 22.7, below TMDL Target of 25, slight increase from 2008

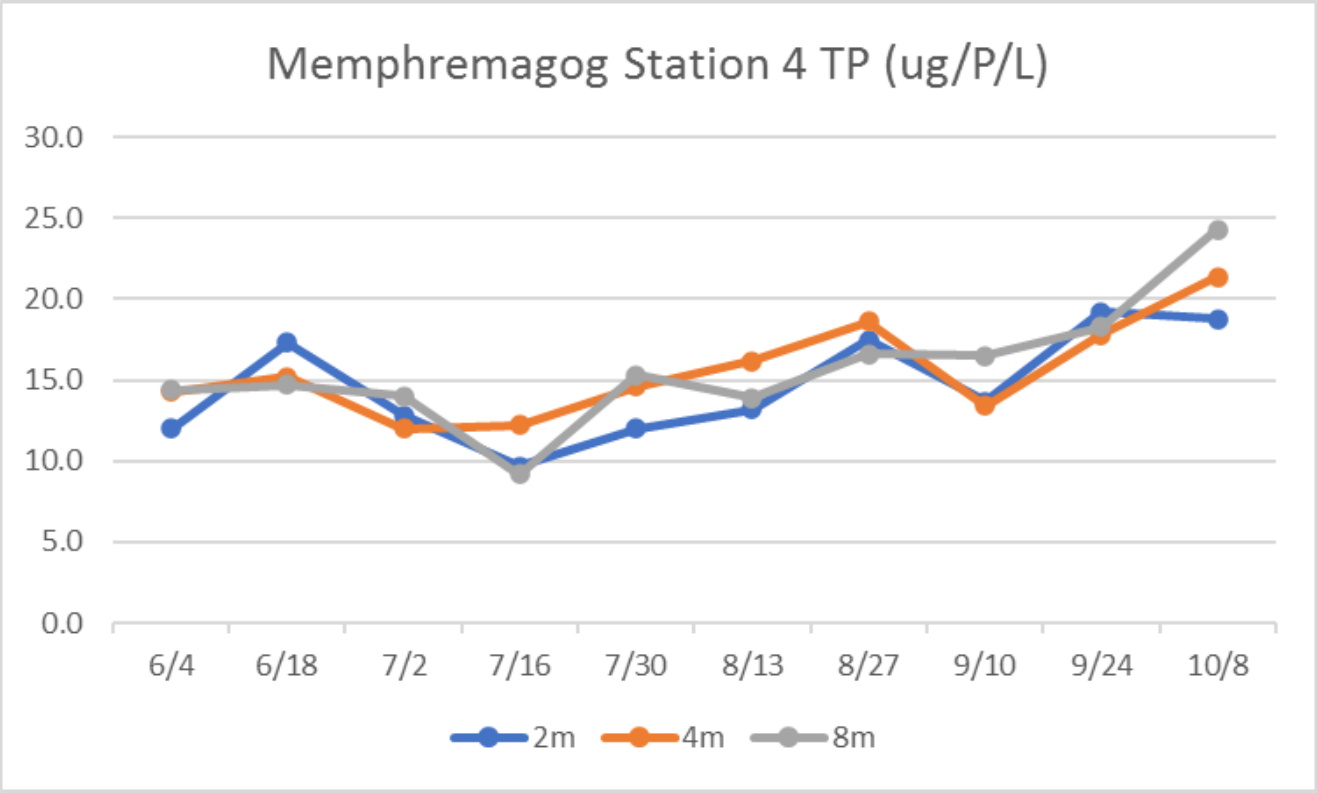
Table 2. Vermont Phosphorus Criteria for Lake Memphremagog and South Bay

Lake Segment / Waterbody ID	Total Phosphorus Criterion (ug/l)*
Lake Memphremagog / VT17-01L01	14
South Bay / VT17-01L02	25

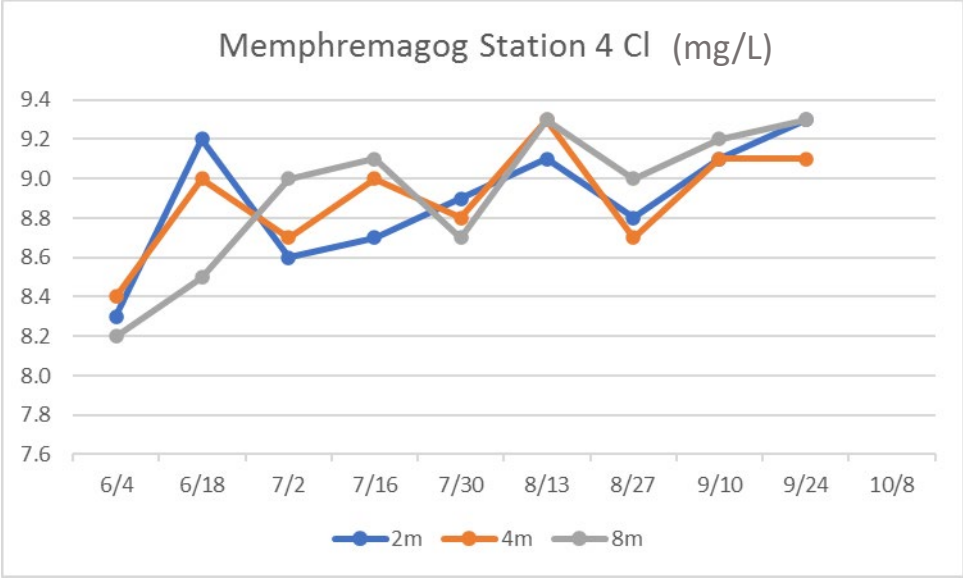


TMDL Monitoring at Station 4

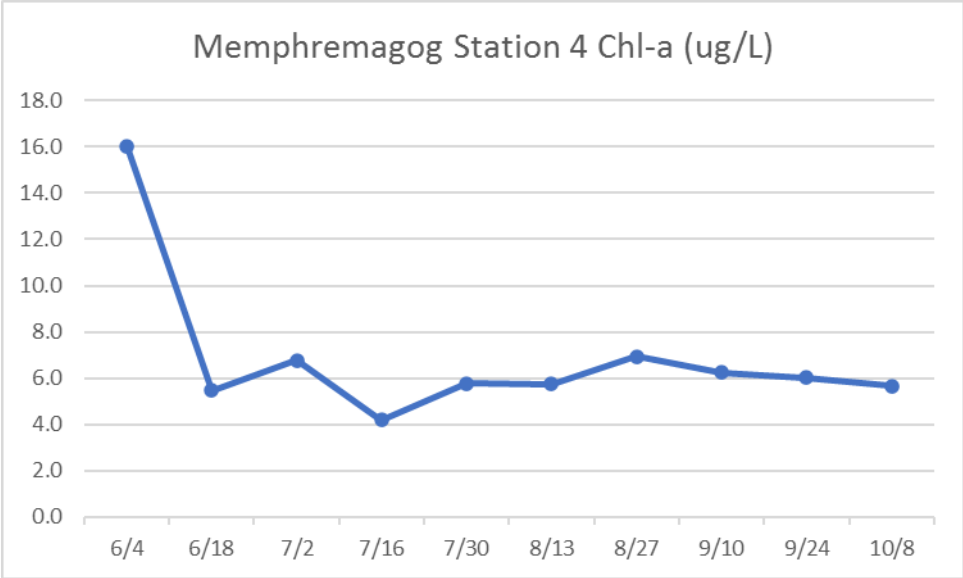
- Bi-Weekly Data Collection for Multiple Parameters



TP data similar to Station 3, increased in Sept / Oct due to rain?

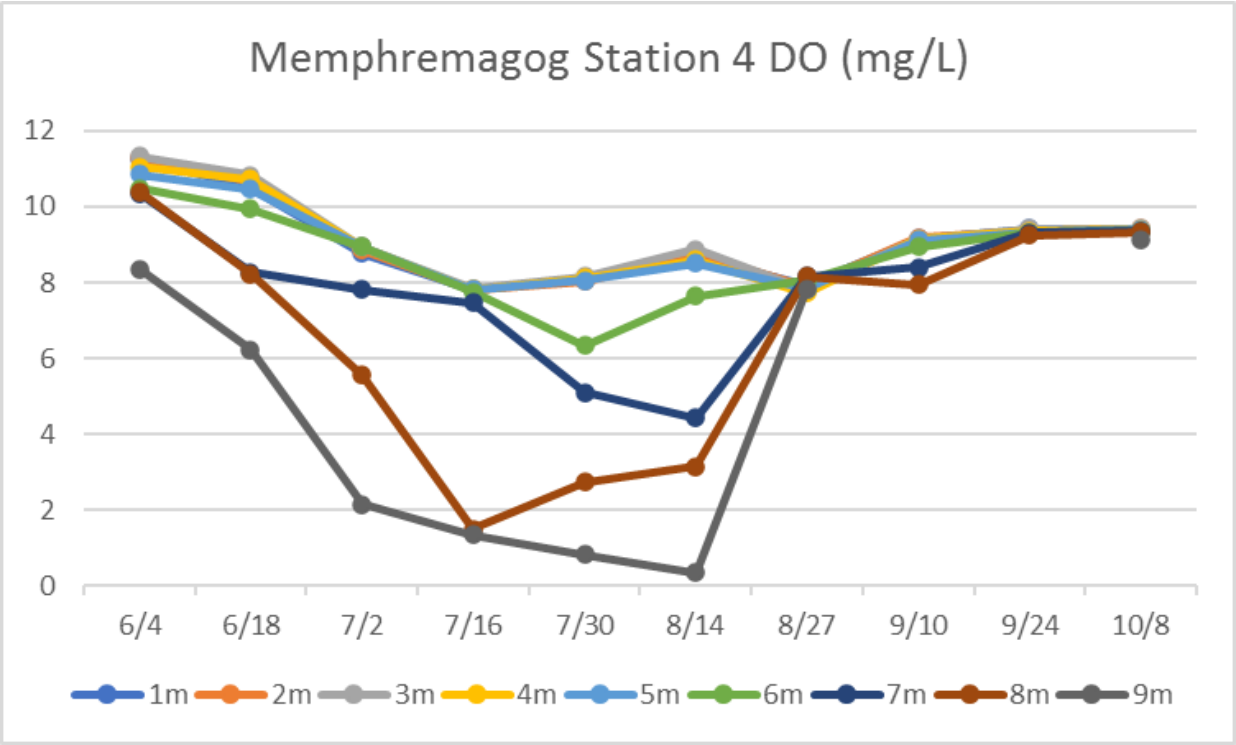


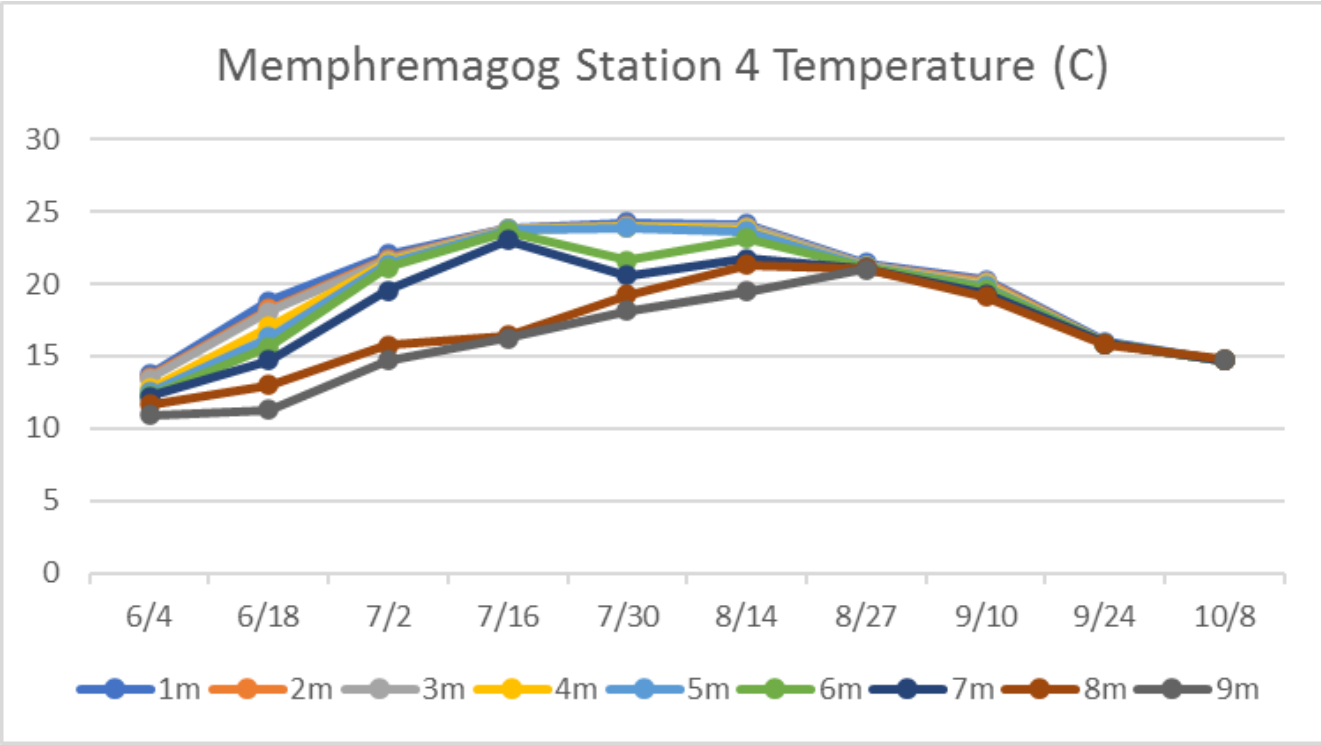
Slightly increasing Chloride trend, below Lake Champlain, which is also increasing, between 15 and 18



Very stable from June 18 on…

TMDL Monitoring at Station 4





- Lake was stratified through August 14, and then it fully mixed for rest of summer / fall sampling period
  - Early Fall Turnover? Unusual if Epilimnion is still at 24 C…

Future In-Lake Monitoring Efforts

- Lay Monitoring in Main Lake and South Bay (looking for volunteers!)
- Continue TMDL Monitoring Visits
- Train additional Cyanobacteria Monitors
- Participate in Dr. Celine Gueguen's *QUAlité des eaux du Lac Memphrémagog (QUALM)*" project
    - Deploy 3 passive samplers in US portion of lake and6 in Quebec to assess metals, phosphorus, and organic contaminants during the ice-free season

Merci pour votre attention!