2017 Canandaigua Lake Sampling and Monitoring Program

Report to the Canandaigua Lake Watershed Council

April 4, 2018

Patty Thompson

Bruce Gilman

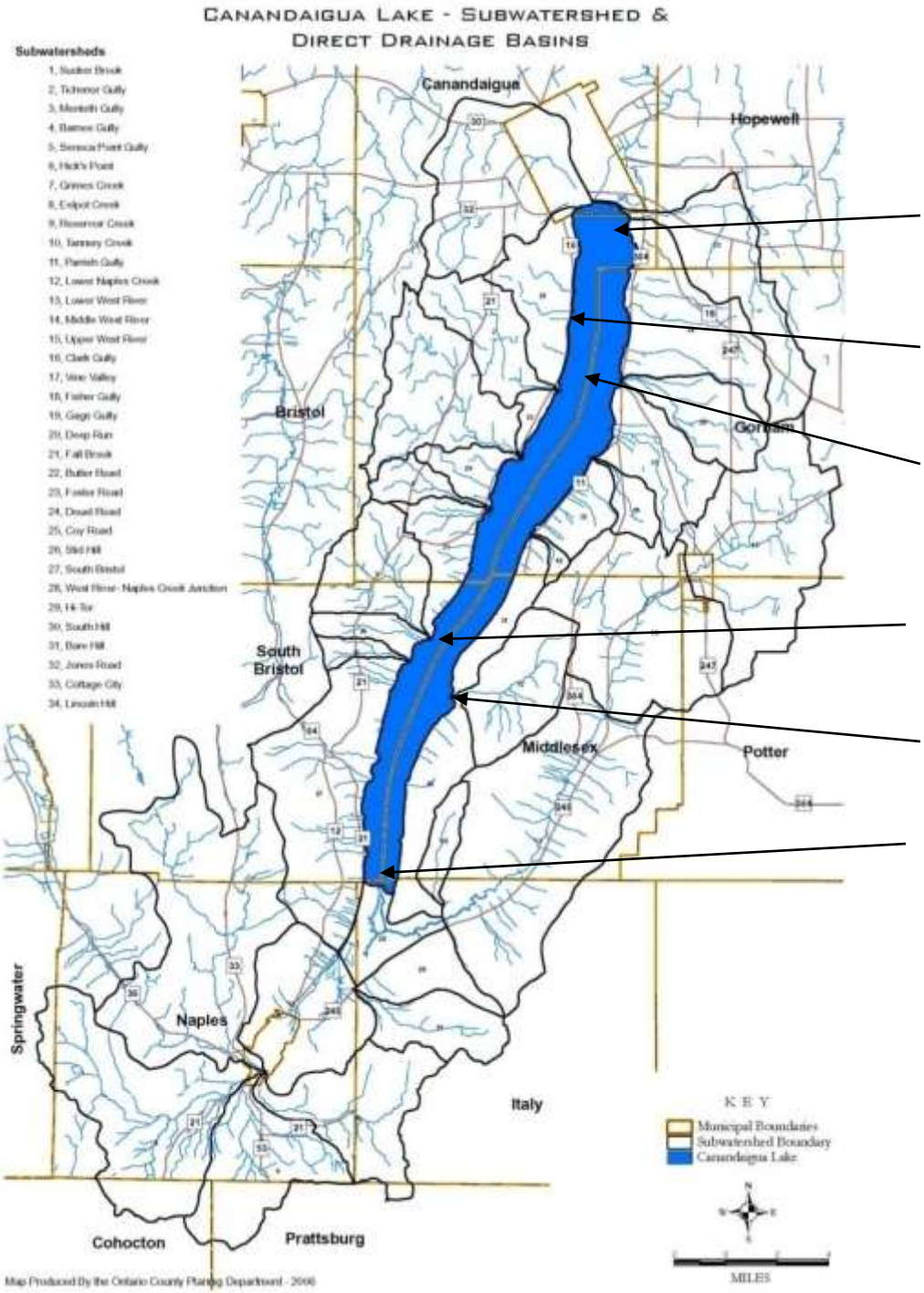
Finger Lakes Community College
3325 Marvin Sands Drive
Canandaigua, New York 14424

Goals of the Sampling and Monitoring Program

- Add to the long-term database, critical for trend analyses of changes in the health and quality of Canandaigua Lake
- Lake attributes that are monitored each year since 1996
  - Water quality profiles: temperature, dissolved oxygen, pH, conductivity, blue-green algal cell counts (added 2016)
  - Water clarity
  - Lake nutrients
  - Lake algal productivity
- Special projects completed in 2017
  - Macrophyte rake toss survey
  - Population status of *Dreissenid* mussels
  - active watch for harmful algal blooms (HABs)

Discussed at the February 7 Watershed Council meeting

- Provide advice to the Watershed Program Manager and Technician



Fallbrook (FB)

Hope Point (HP)

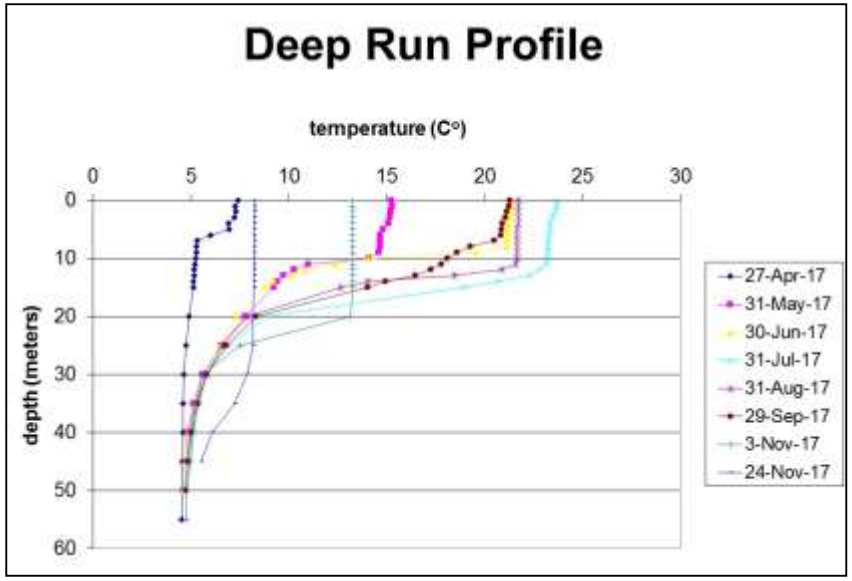
Deep Run (DR)

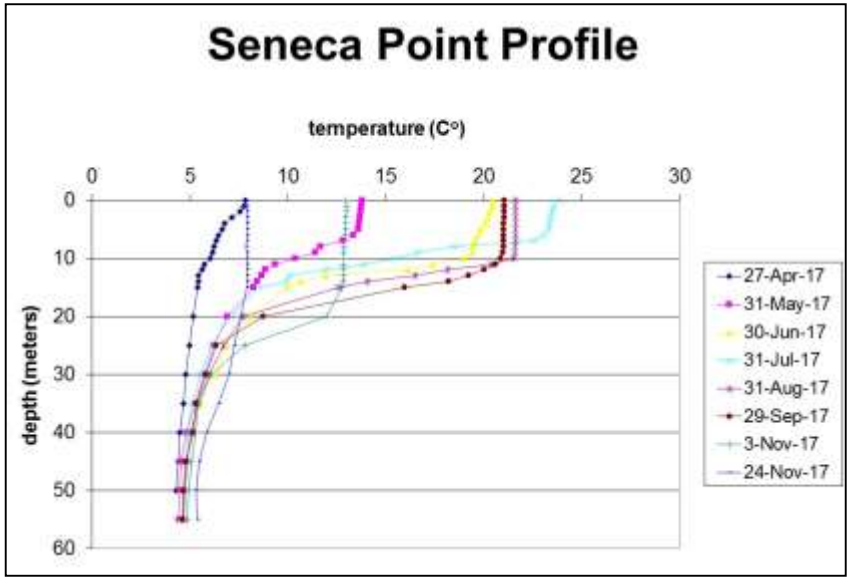
mid-lake locations

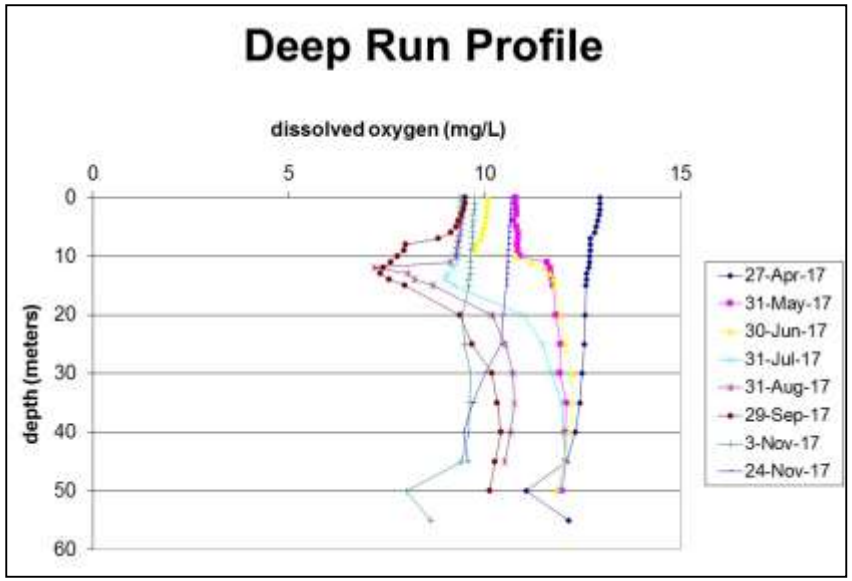
Seneca Point (SP)

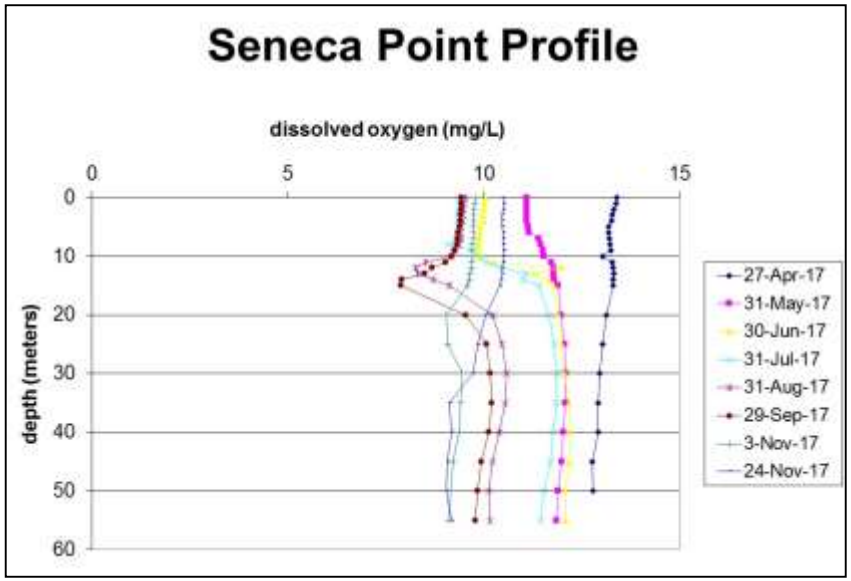
Vine Valley (VV)

West River (WR)


Deep Run Profile
temperature (C°)
0
5
10
15
20
25
30
depth (meters)
0
10
20
30
40
50
60
27-Apr-17
31-May-17
30-Jun-17
31-Jul-17
31-Aug-17
29-Sep-17
3-Nov-17
24-Nov-17


Seneca Point Profile
temperature (C°)
0
5
10
15
20
25
30
depth (meters)
0
10
20
30
40
50
60
27-Apr-17
31-May-17
30-Jun-17
31-Jul-17
31-Aug-17
29-Sep-17
3-Nov-17
24-Nov-17


Deep Run Profile
dissolved oxygen (mg/L)
0
5
10
15
depth (meters)
0
10
20
30
40
50
60
27-Apr-17
31-May-17
30-Jun-17
31-Jul-17
31-Aug-17
29-Sep-17
3-Nov-17
24-Nov-17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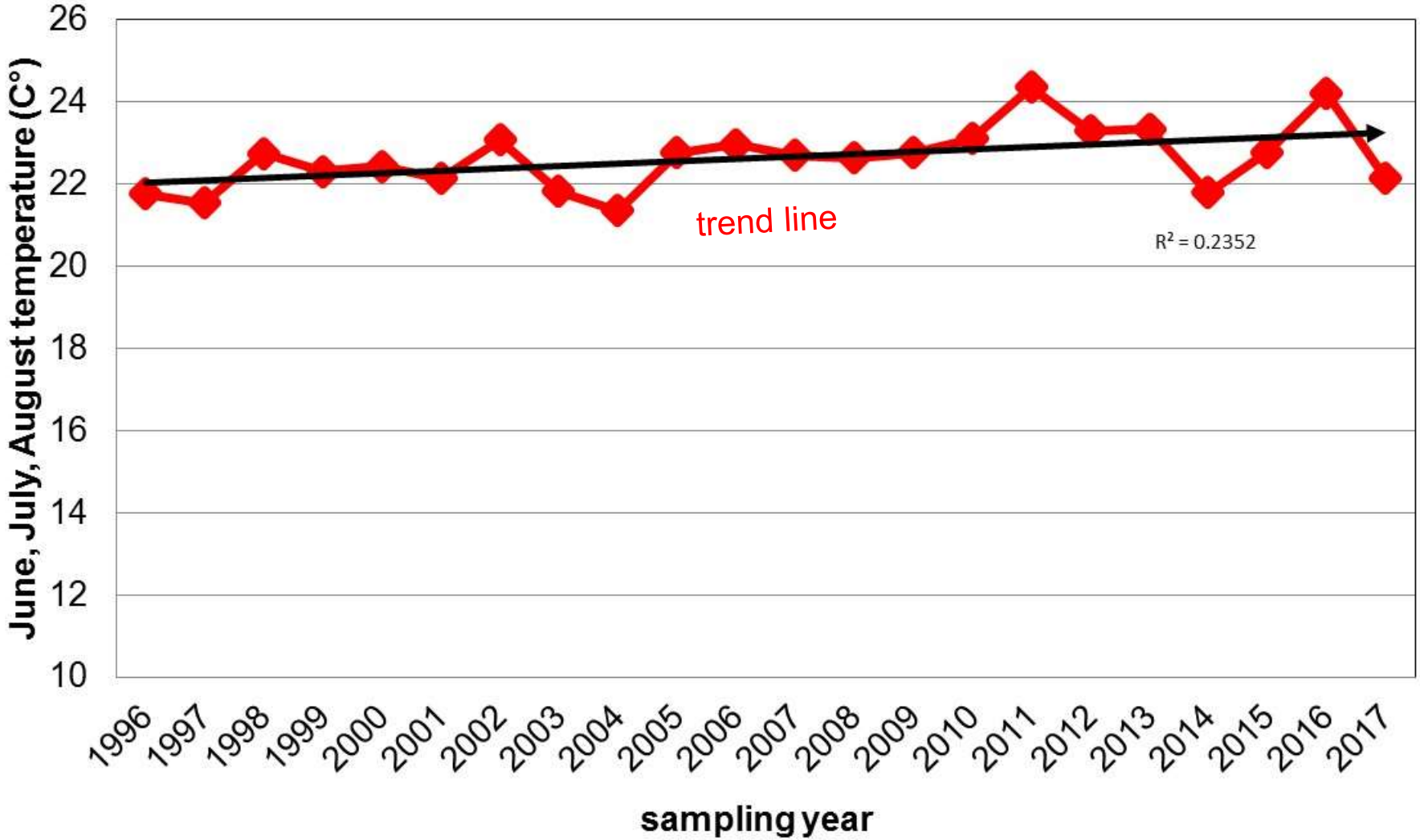
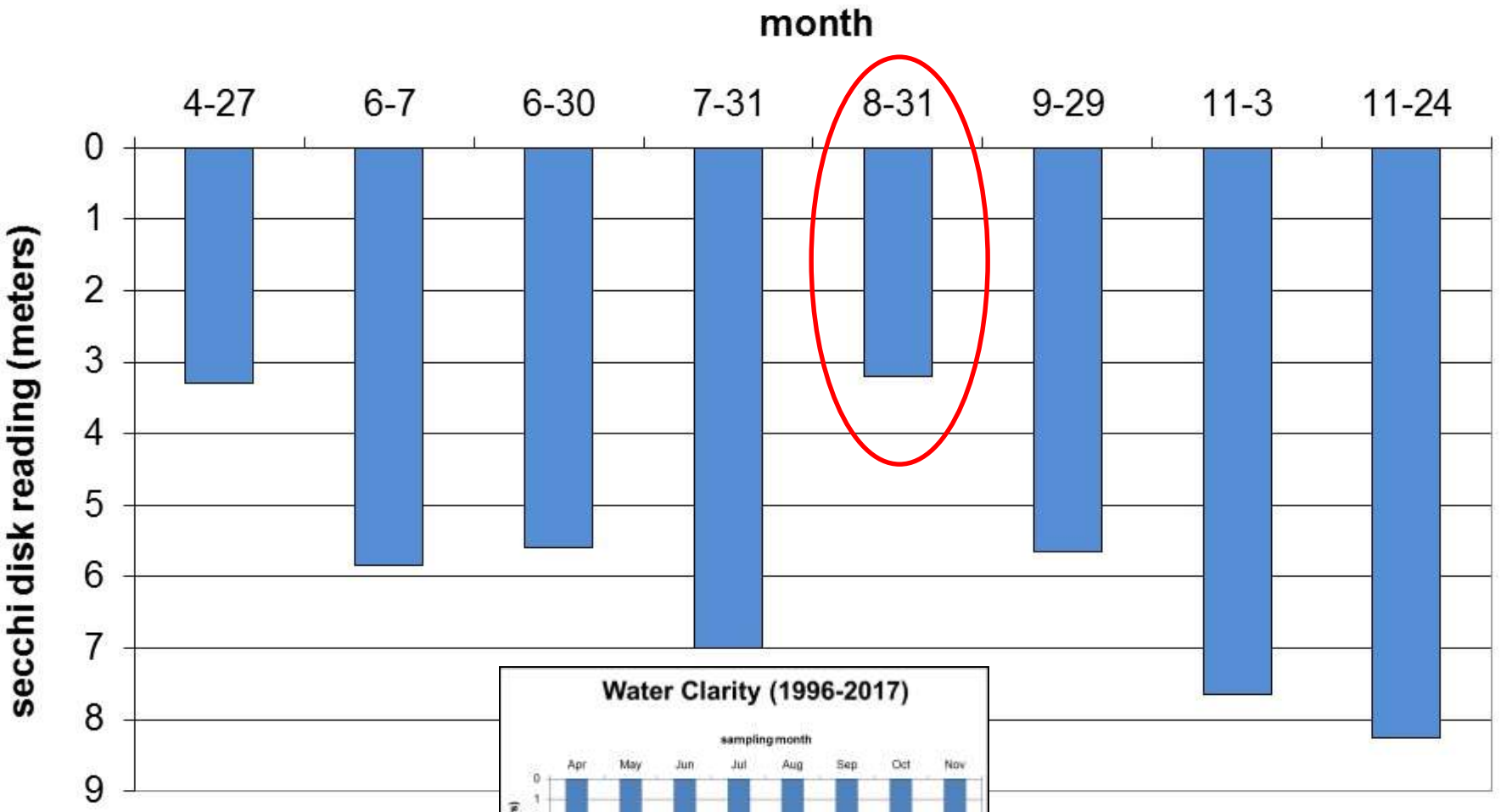
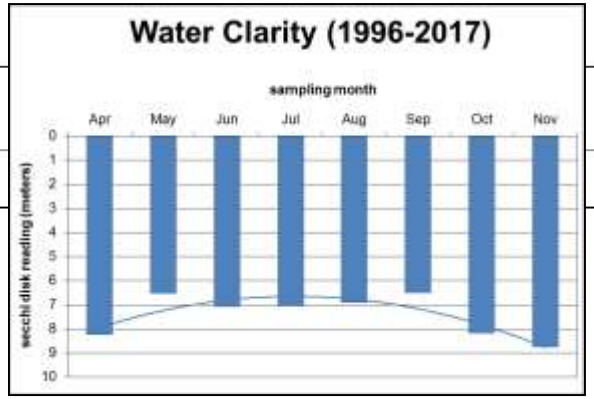
3-Nov-17
24-Nov-17

Summer Surface Temperatures (1996-2017)

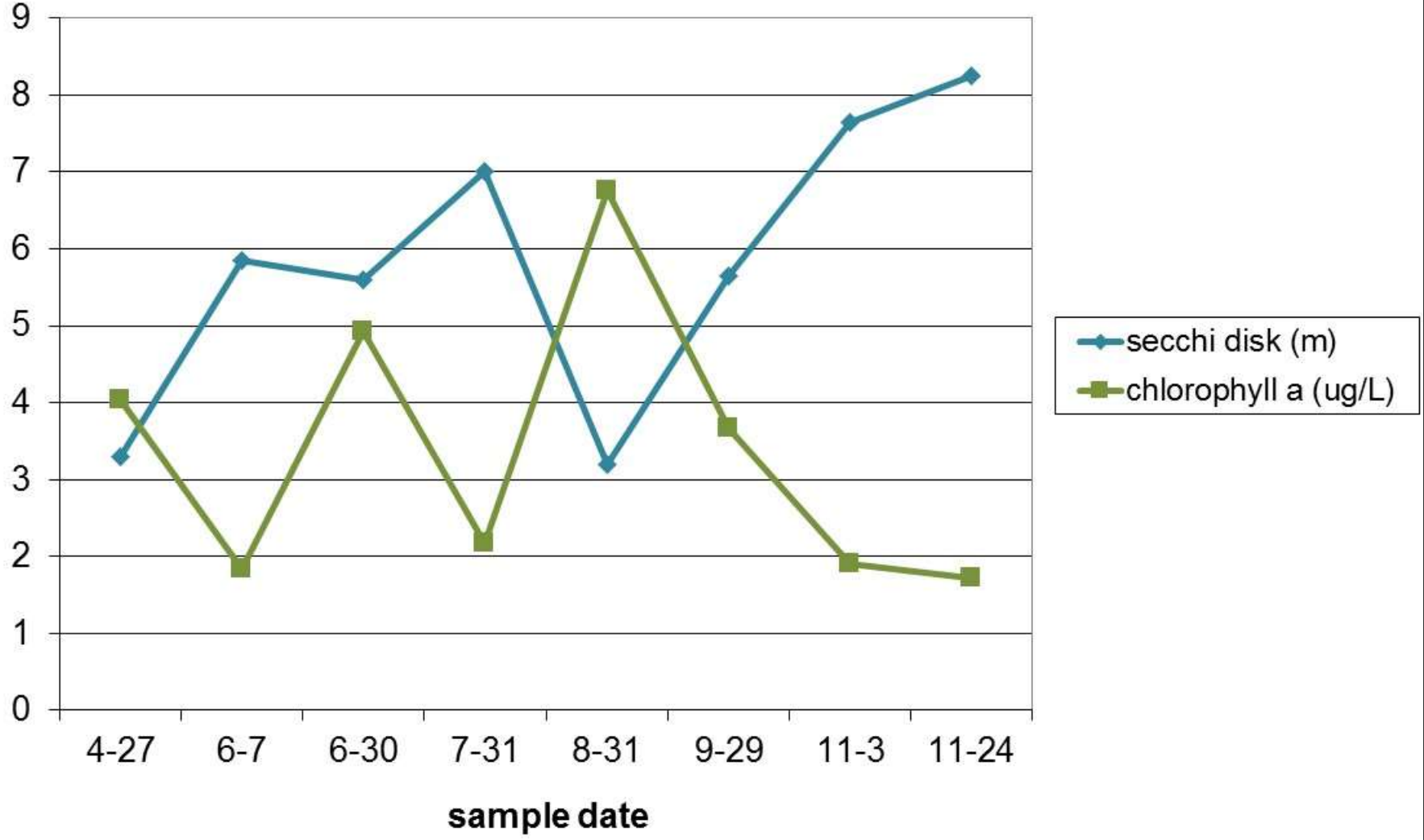


Lake Clarity (2017)

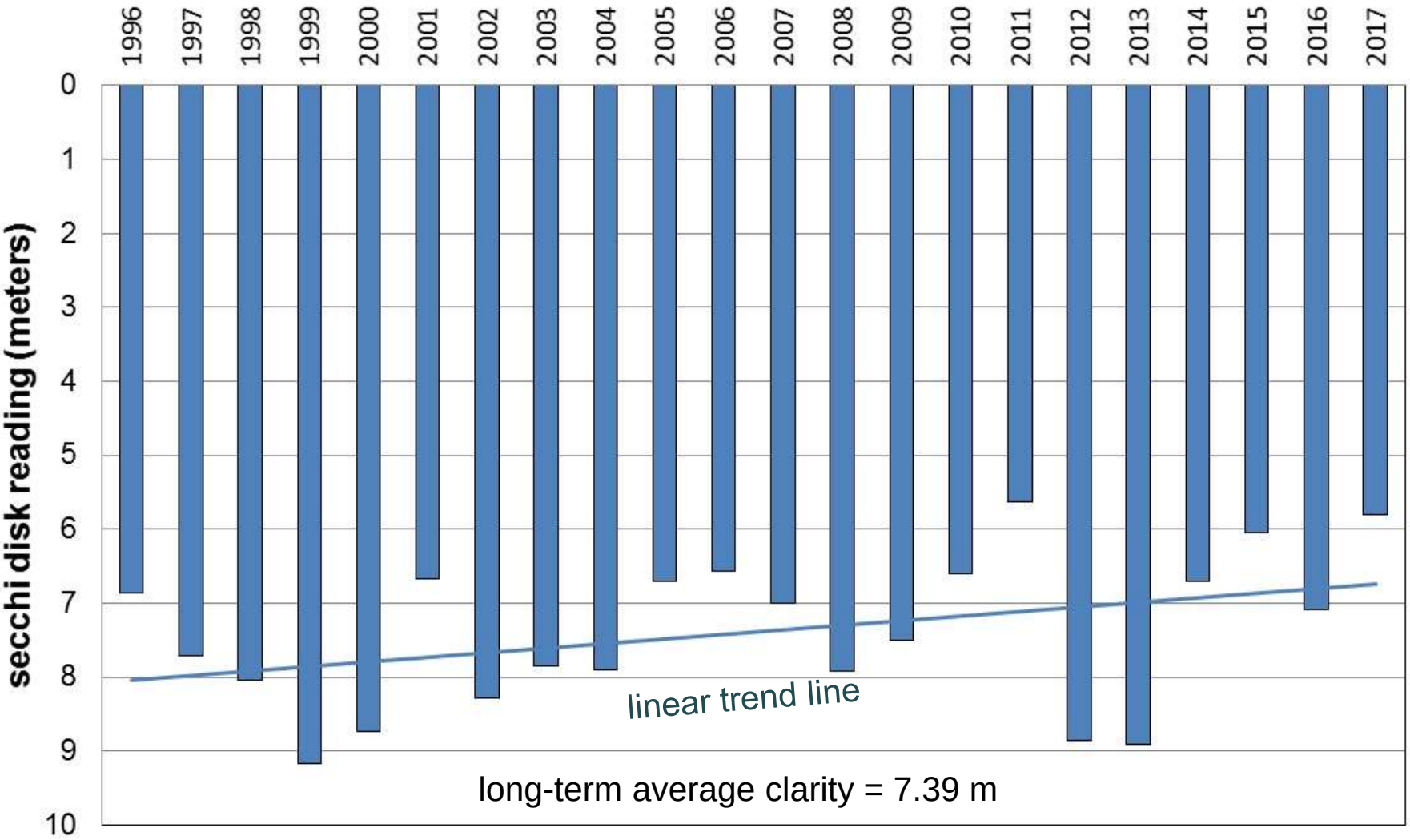




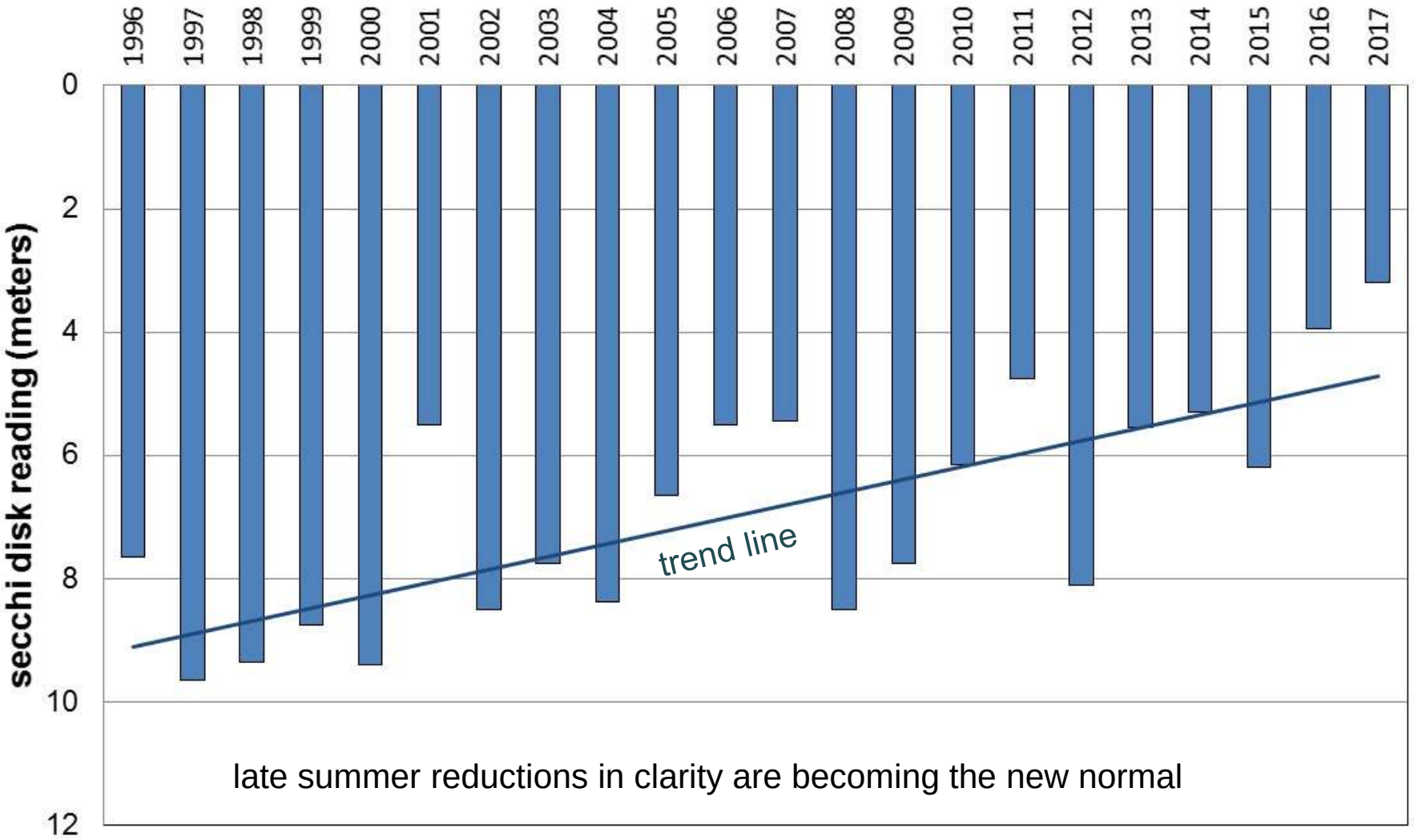
Water Quality Trends (2017)



Long-term Mean Annual Water Clarity (1996-2017)

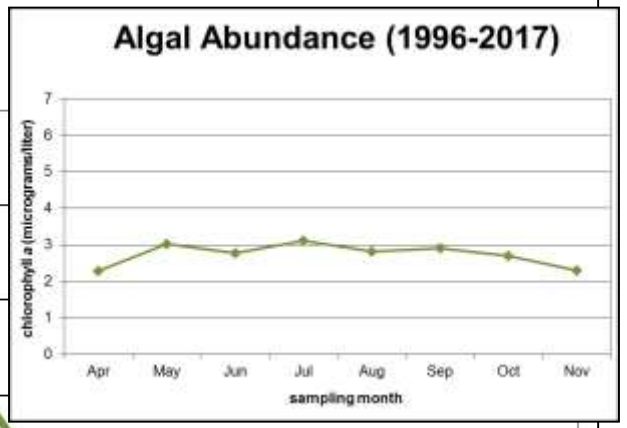


August Mean Water Clarity (1996-2017)



late summer reductions in clarity are becoming the new normal

Mean Algal Abundance (2017)



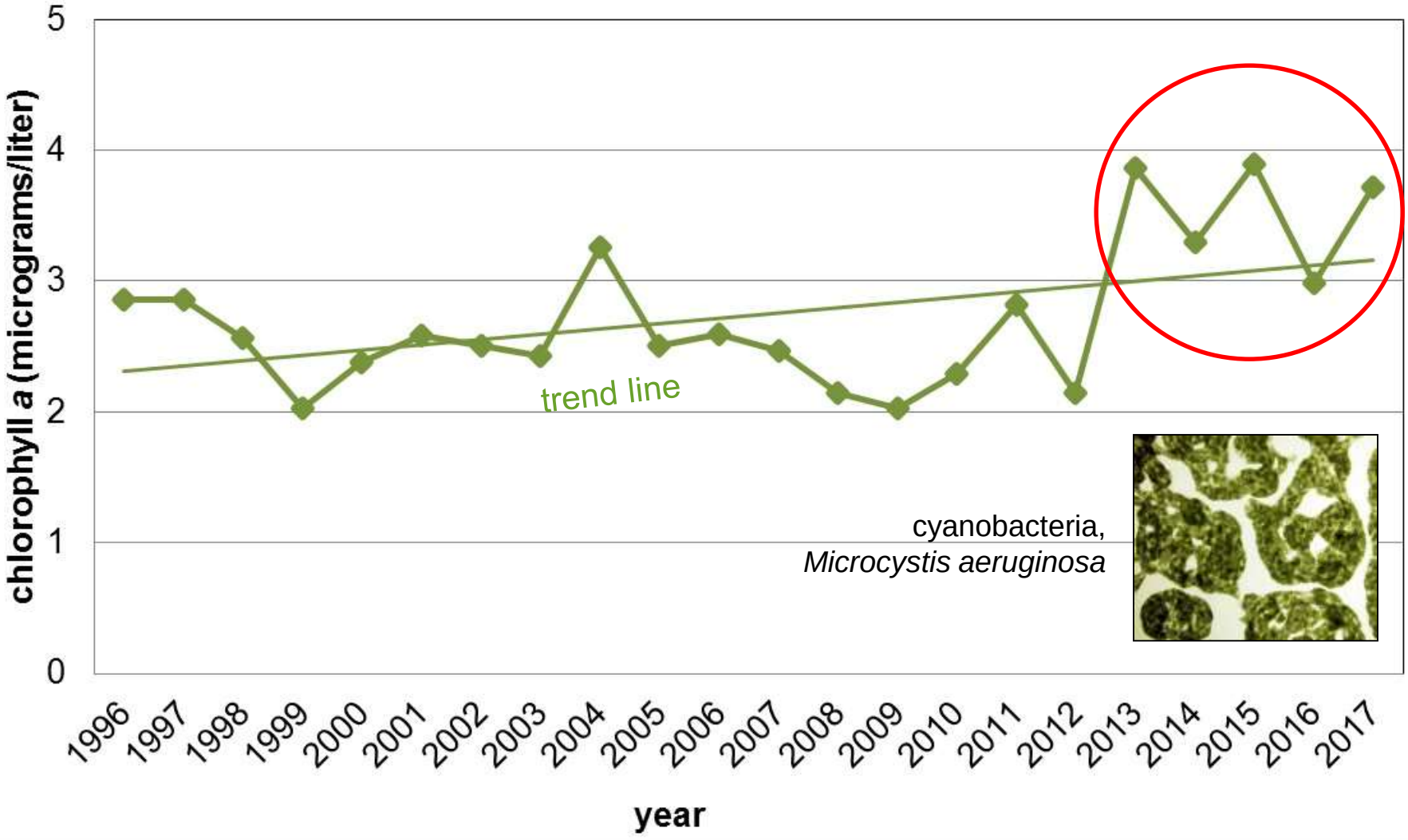
chlorophyll a (micrograms/liter)

0
1
2
3
4
5
6
7
8

4-27
6-7
6-30
7-31
8-31
9-29
11-3
11-24

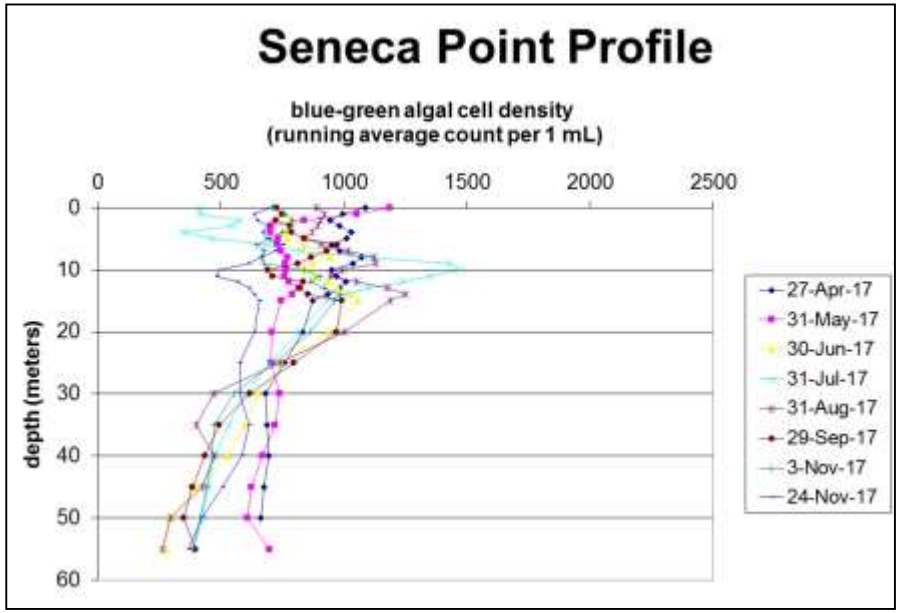
sampling date

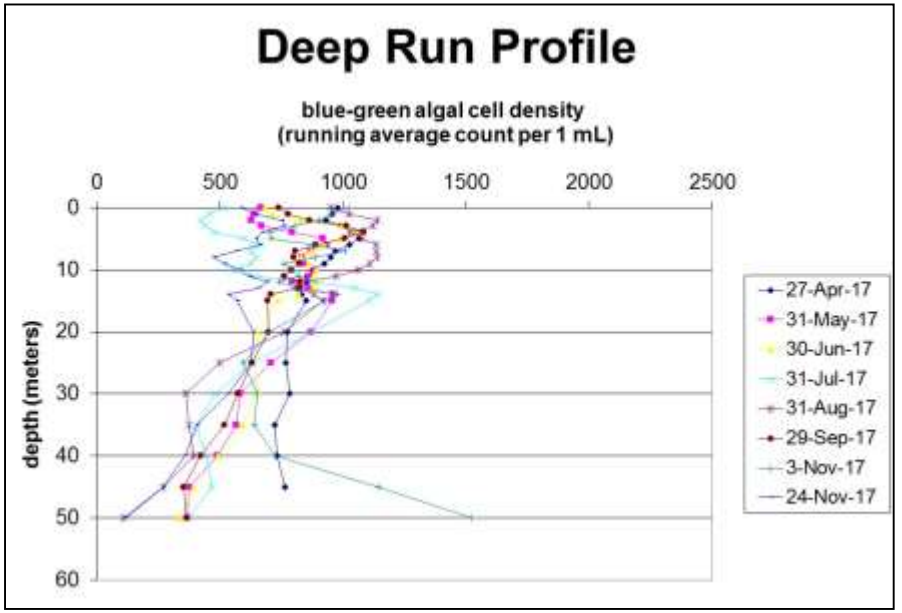
Long-term Mean Annual Algal Abundance (1996-2017)



Blue-green Algal Distribution

WHO lists low probability of health effects <20,000 cells/mL
(or 10 µg/L chlorophyll *a*, or 10 µg/L microcystin-LR)



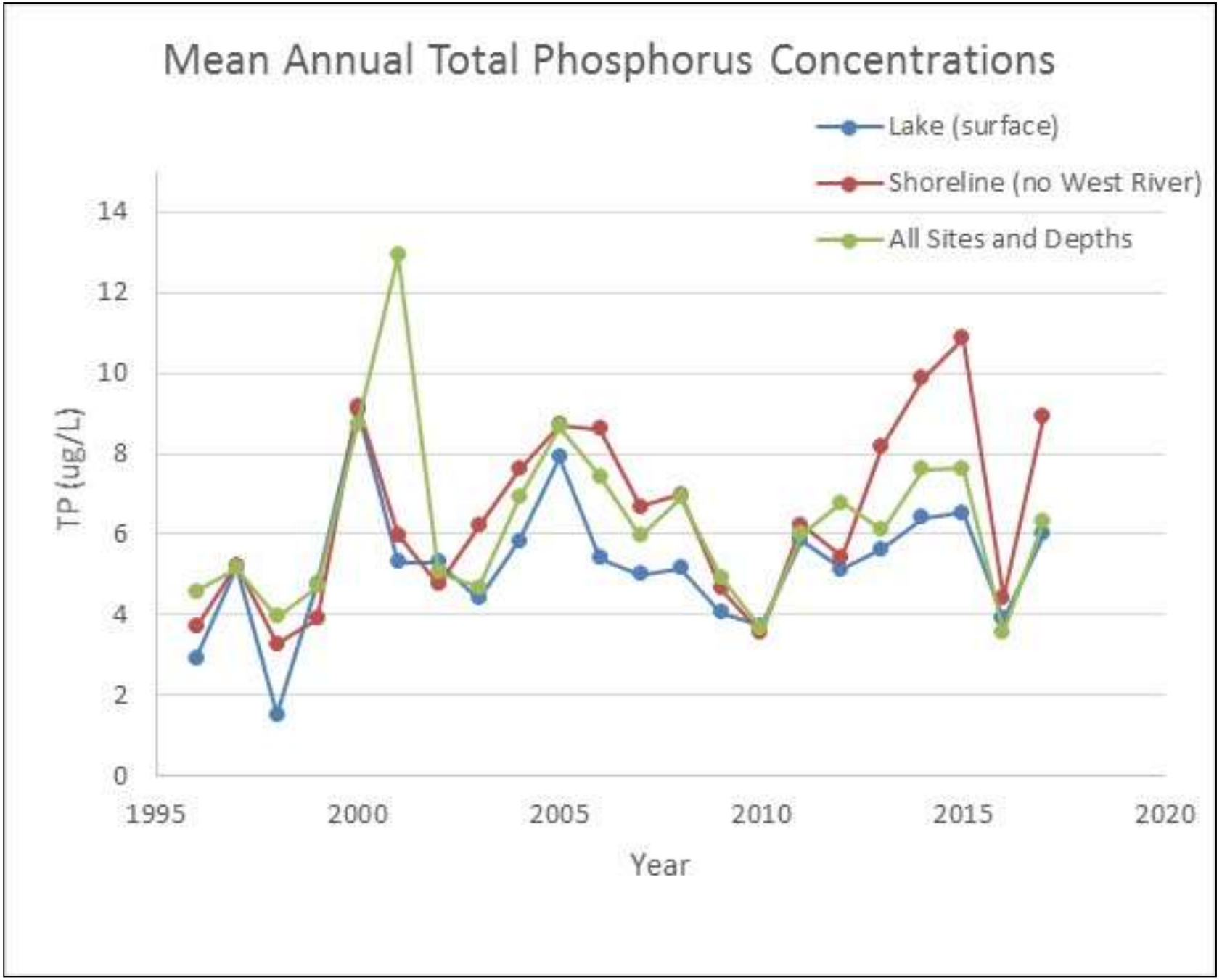


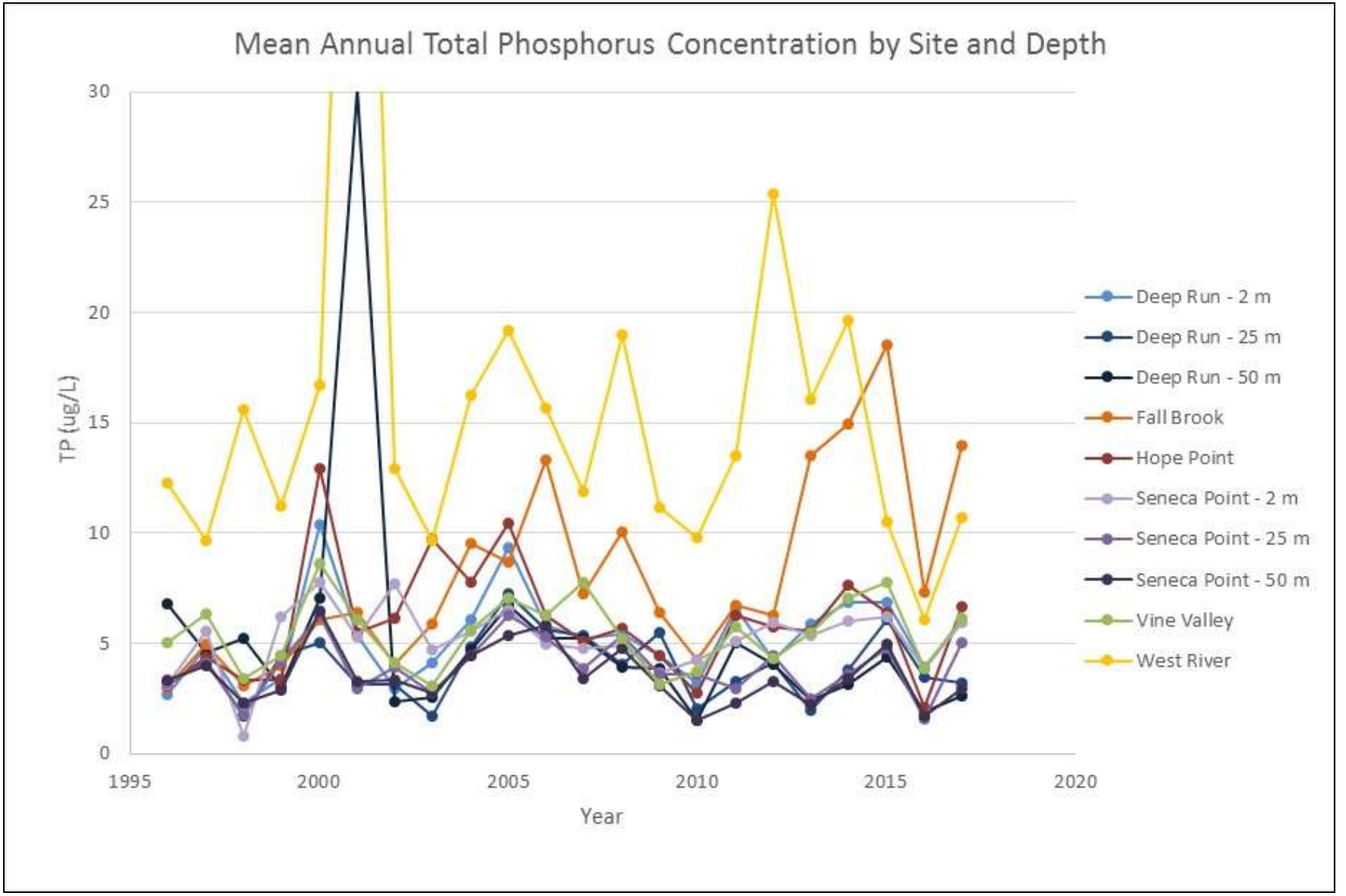
modifying factors: time of day (diurnal behavior)
zooplankton herbivory
surface weather conditions
shoreline sites may be significantly higher

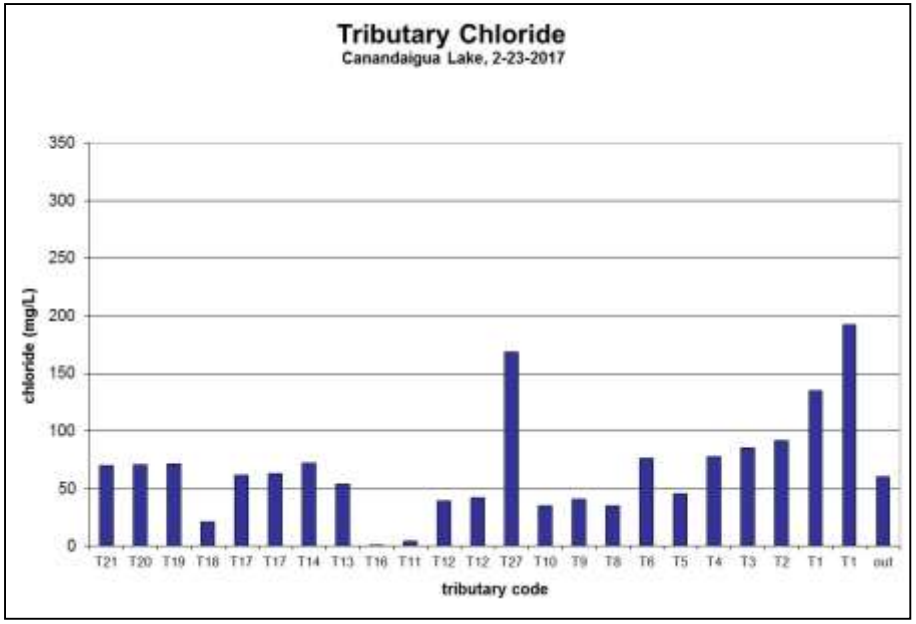
What affects algal abundance?

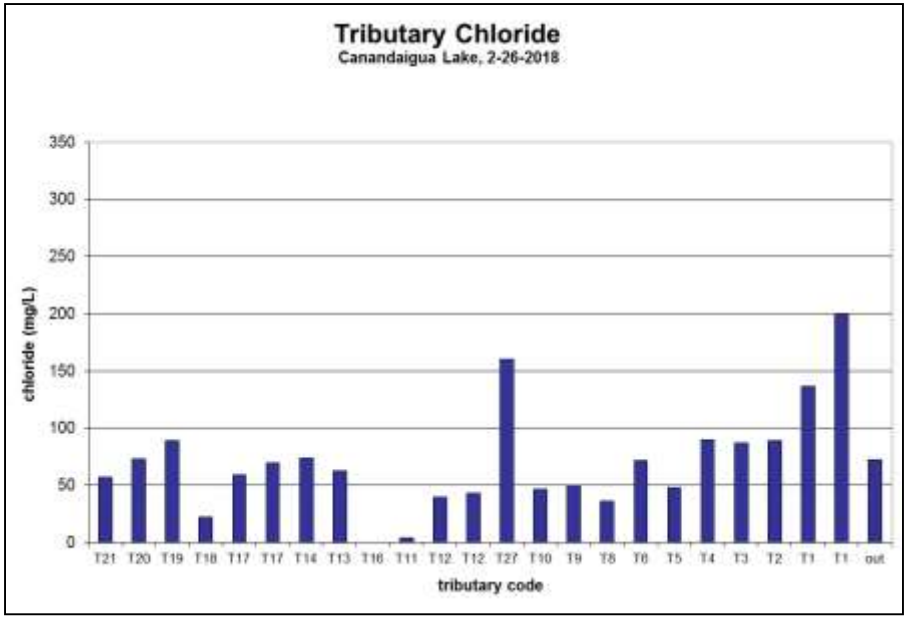
Nutrients – managing nutrients is complicated! We continue to monitor external loading of phosphorus and nitrogen, and total concentrations in the lake.

- Some sources of nutrients are “easily” managed
  - Effective watershed regulations may reduce external loading
- Other sources of nutrients “require higher levels of resource commitment and restoration/enhancement activities”
  - Intense storm events produce locally high nutrient runoff, leading to sub-watershed storm water management projects
- We are beginning to understand how biologically bound phosphorus affects the concentrations detected in the lake
  - Changing role of invasive quagga and zebra mussels living in the benthic zone of the lake


Mean Annual Total Phosphorus Concentrations
Lake (surface)
Shoreline (no West River)
All Sites and Depths
TP (ug/L)
0
2
4
6
8
10
12
14
1995
2000
2005
2010
2015
2020
Year

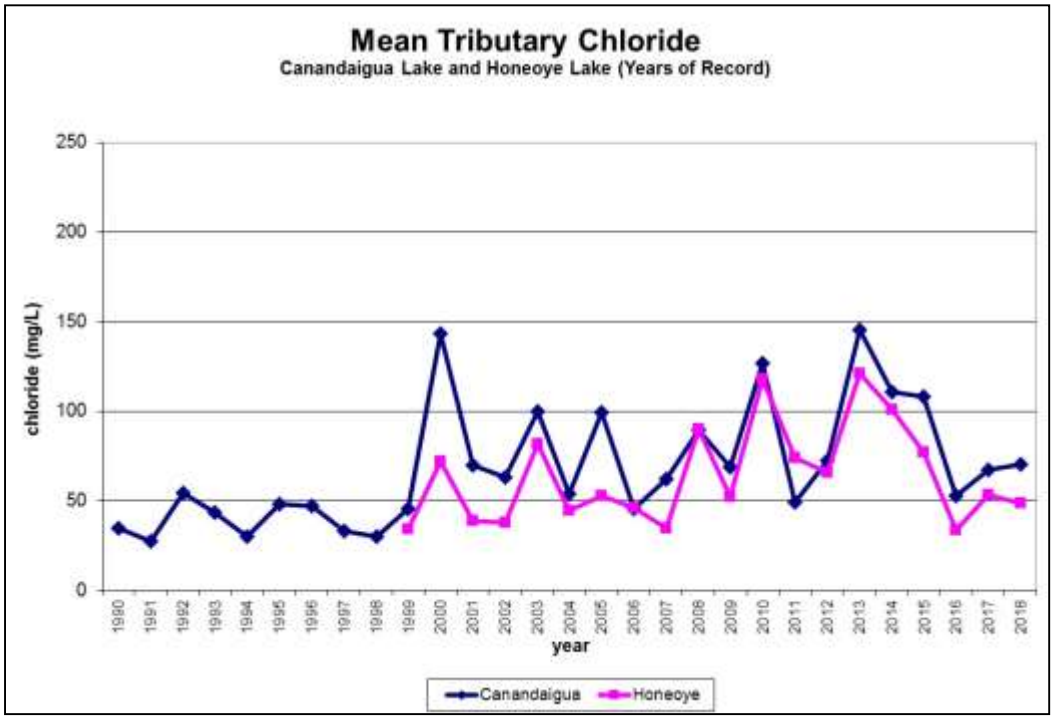

Mean Annual Total Phosphorus Concentration by Site and Depth
TP (ug/L)
30
25
20
15
10
5
0
1995
2000
2005
2010
2015
2020
Year
Deep Run - 2 m
Deep Run - 25 m
Deep Run - 50 m
Fall Brook
Hope Point
Seneca Point - 2 m
Seneca Point - 25 m
Seneca Point - 50 m
Vine Valley
West River





stream patterns reflect road mileage in sub-watershed

annual patterns reflect winter severity




Thank You!