Lake Oscawana Management Advisory Commission
Town of Putnam Valley, NY
October 29, 2022

Lake Oscawana 2022 Conditions Update

Northeast Aquatic Research, LLC

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Certified Lake Manager (NALMS)

Revisiting the Goals for Lake Oscawana…

Manage/Prevent Invasive Species & Nuisance	Manage nutrients to prevent HABs (cyanobacteria)	Balance between recreation & ecology

Bad water quality & AIS affects: recreation, human health, local economy, property values, & changes the ecosystem

Lake Science (Limnology) advises Lake Management

Oscawana Lake 2019-2022 Surveys: Invasive Eurasian watermilfoil

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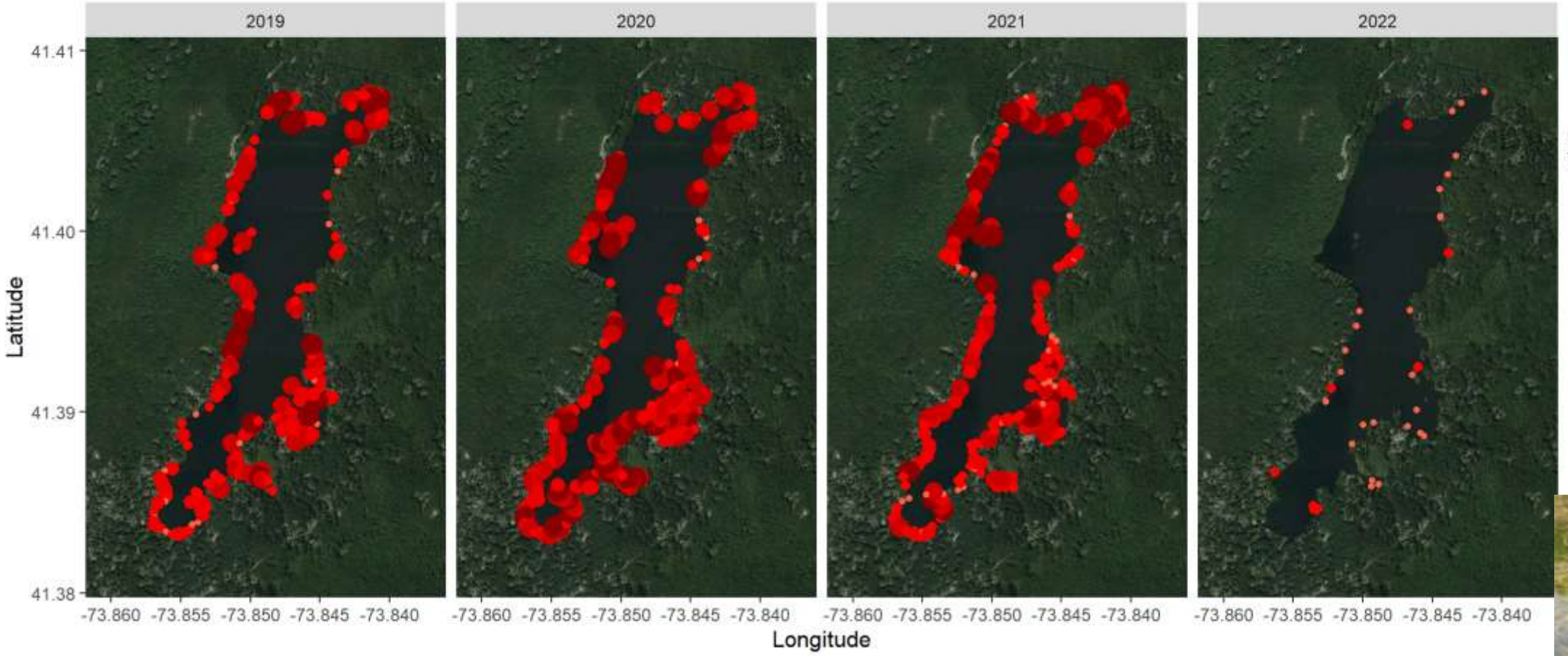

Species Density

- Very Sparse
- Sparse
- Medium
- Dense
- Very Dense

Oscawana Lake 2019-2022: Largeleaf Pondweed

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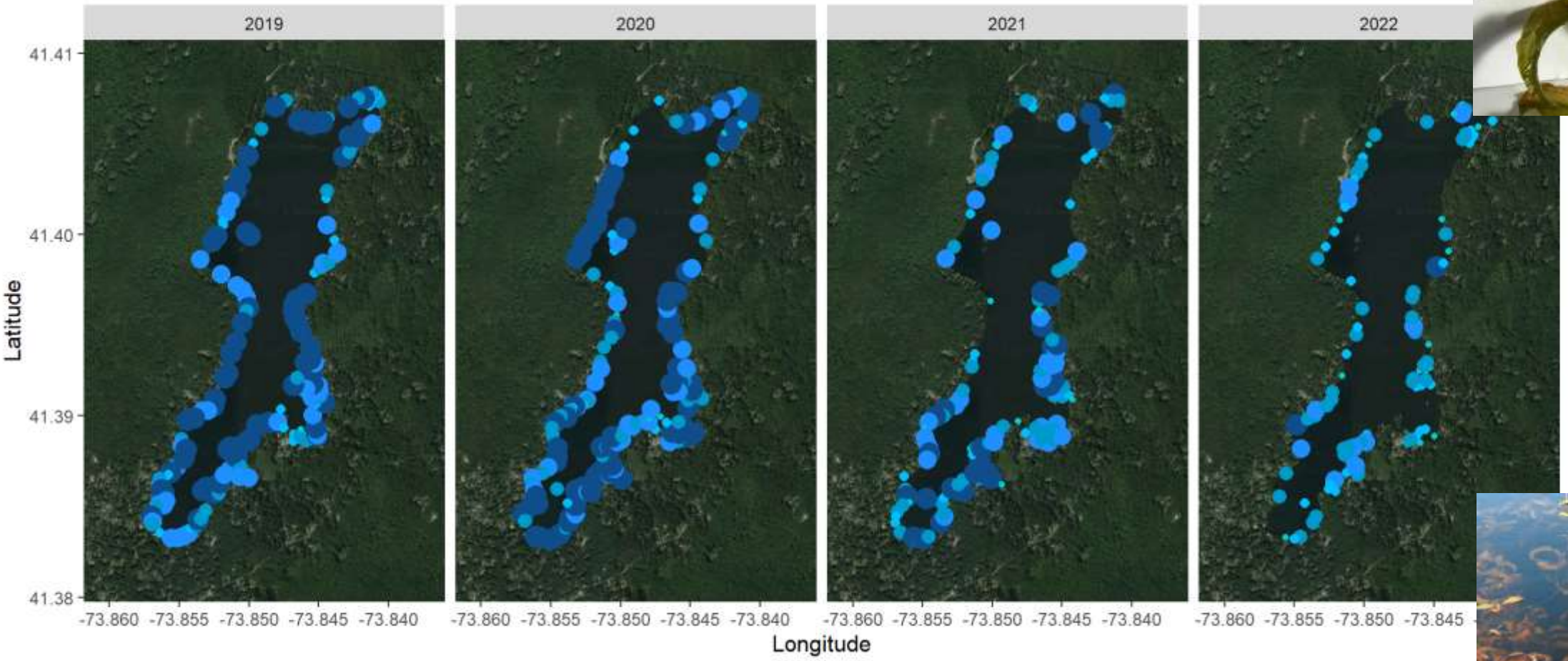
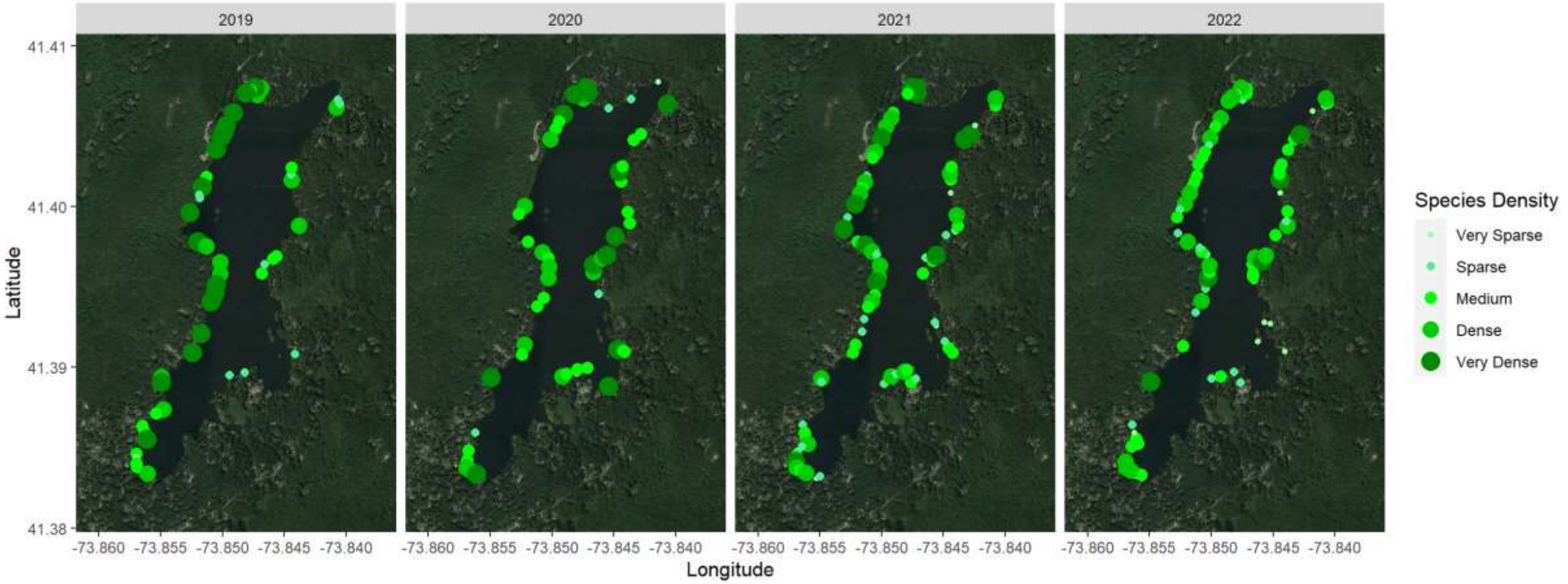


Oscawana Lake 2019-2022: Tapegrass (Vallisneria americana)

Northeast Aquatic Research, LLC



Wildwood Cove 2021 (left) &
Photo by Don Cameron (right)

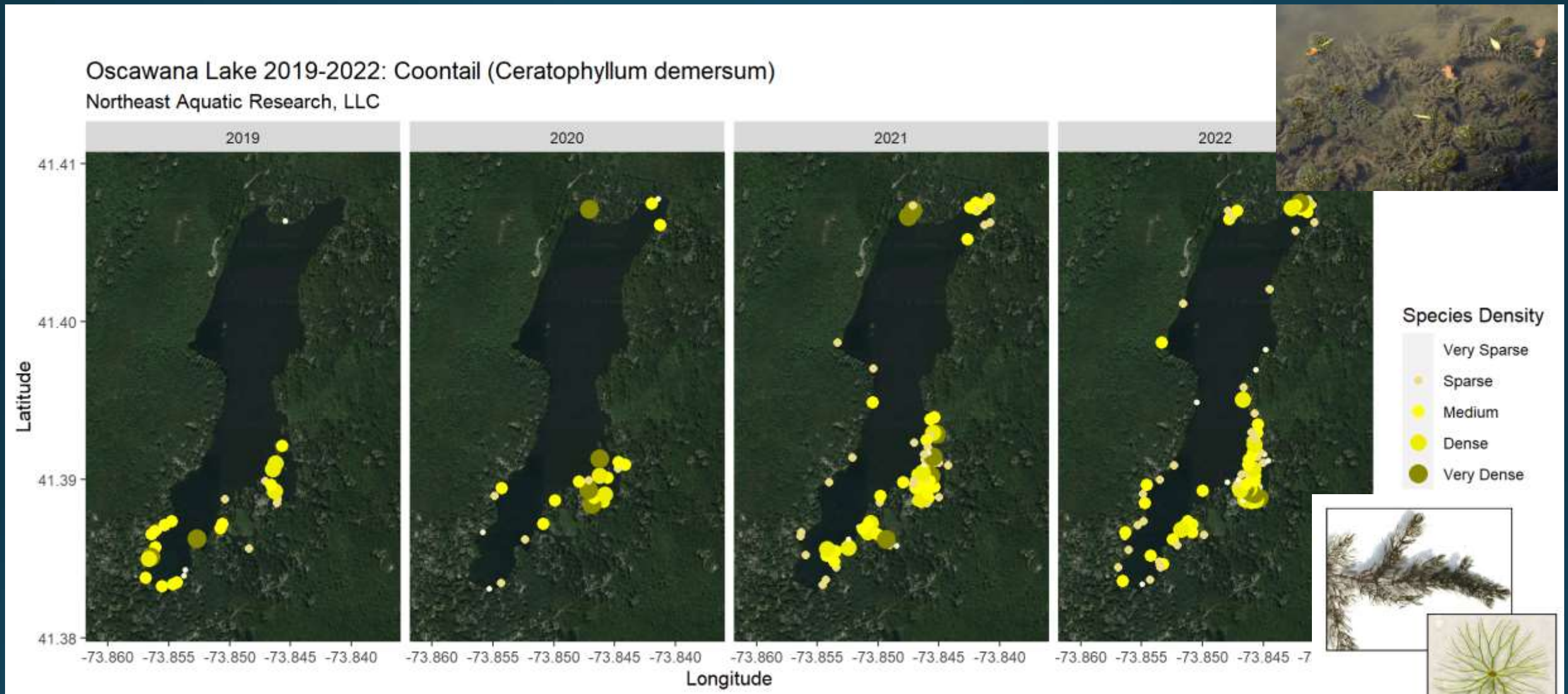
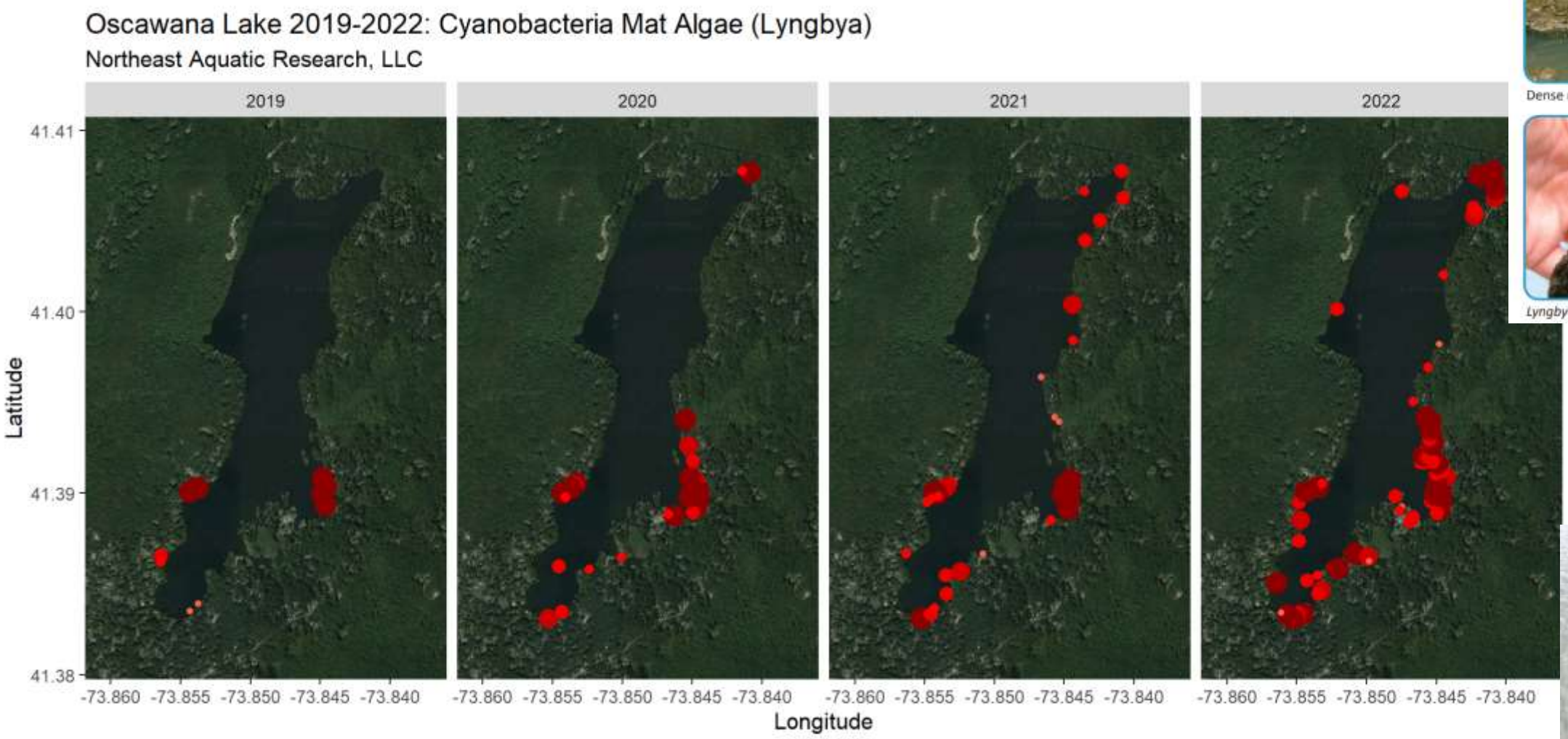


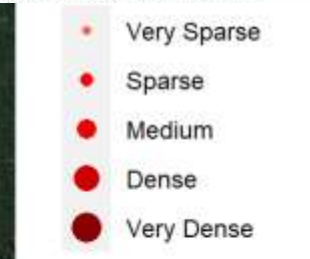
Photo credits CT Ag Station

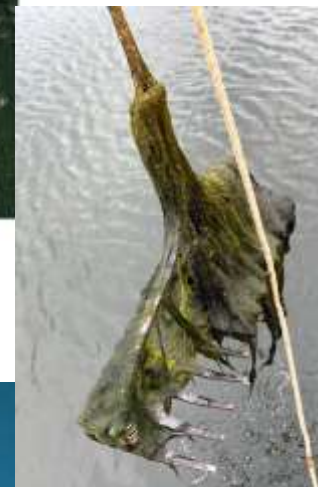
- Benthic/floating cyanobacteria mats and filamentous green algae will be a constant problem in Wildwood Cove unless septic systems are upgraded; may be an increasing problem with lower plant density




Dense mats of *Lyngbya wollei*


Lyngbya wollei has thick filaments.





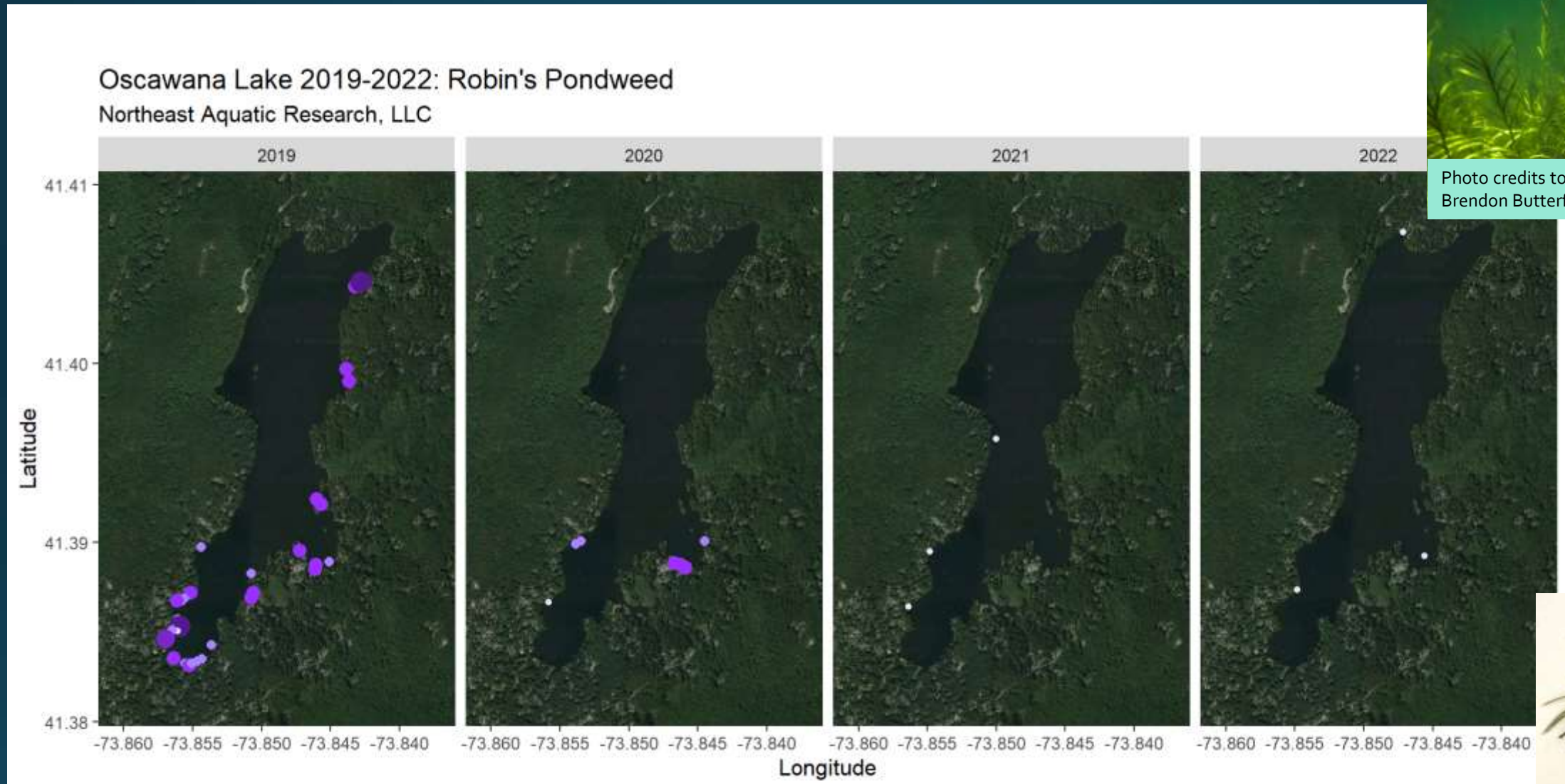
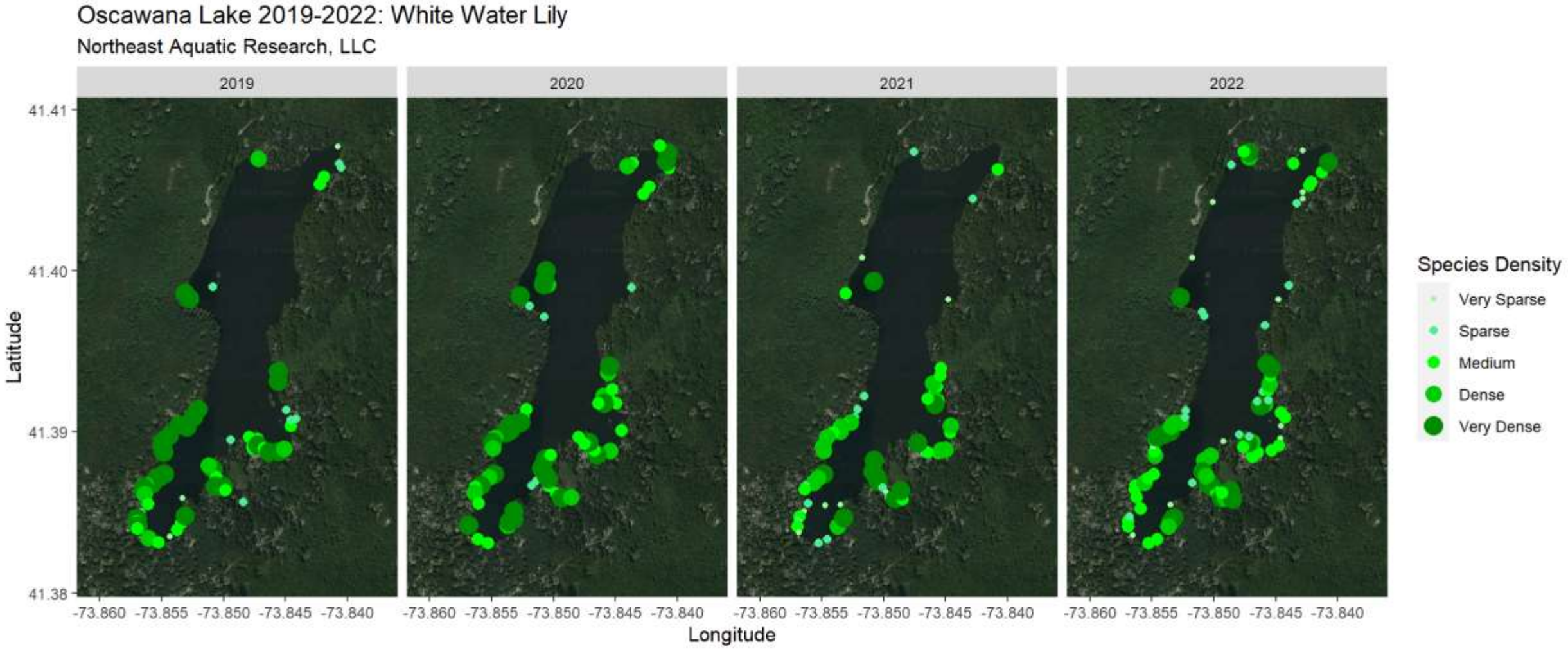


Photo credits to Brendon Butterfield


Oscawana Lake 2019-2022: White Water Lily
Northeast Aquatic Research, LLC
2019
2020
2021
2022
41.41
41.40
41.39
41.38
Latitude
-73.860 -73.855 -73.850 -73.845 -73.840
Longitude
Species Density
Very Sparse
Sparse
Medium
Dense
Very Dense

The direction the Lake Oscawana plant management program will take is uncertain at this time. Time will tell, data will guide.

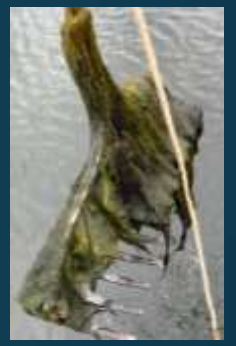
- Additional Grass carp (453) stocked in 2021 had a profound impact on Eurasian Water milfoil (EWM) and certain other native species as of 2022.
- The increasing abundance of Cyanobacteria mats is worrisome and needs to be monitored closely.
- Reduced need for mechanical harvesting.
- Presumably, the existing carp in the lake will continue to eat more plants as they grow larger over the next six+ years, and overall EWM abundance is likely to remain low for years.
- If the level of EWM present continues to be low in future years, it is unlikely that the Town will need to resort to aquatic herbicides.
- Uncertain what the 2023-2025 plant surveys will show, but the goal is to maintain native species in moderate levels throughout the lake (difficult balance to achieve).
- If needed, swim areas can still be maintained by combination of benthic barriers, hand fragment removals, and mechanical harvesting – but the harvester tracker device is a must to see where the and how much the harvester is working.

We advise waiting to see if Grass carp start to target native Tapegrass or other native species, now that milfoil is dramatically reduced. Ideally, harvester operations hours will be reduced in 2023.

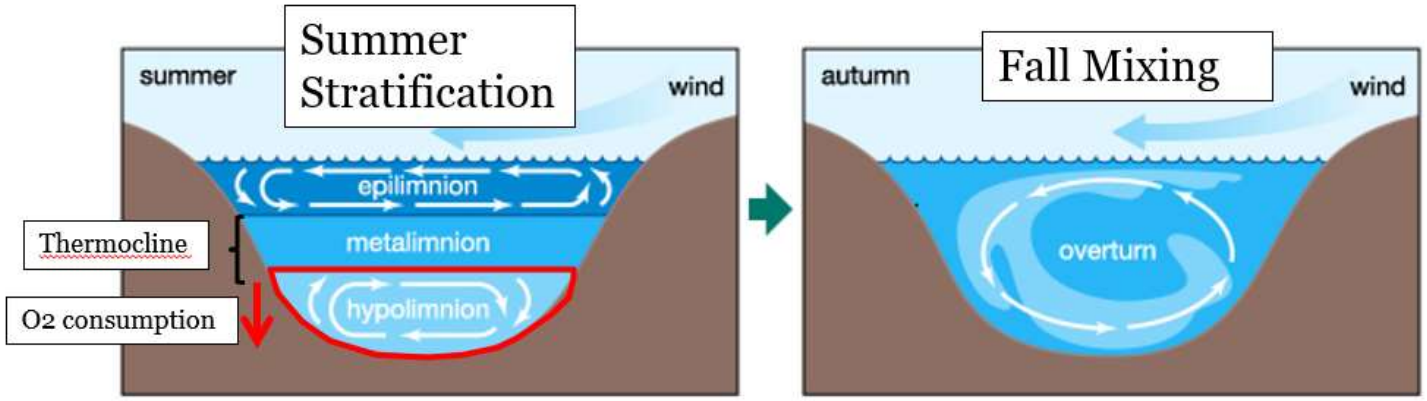
Oscawana Lake Watershed / Sub-basins & Watershed Property Parcels Data

External vs. Internal Nutrients "Loading"

Phosphorus + Nitrogen = Algae & Plants

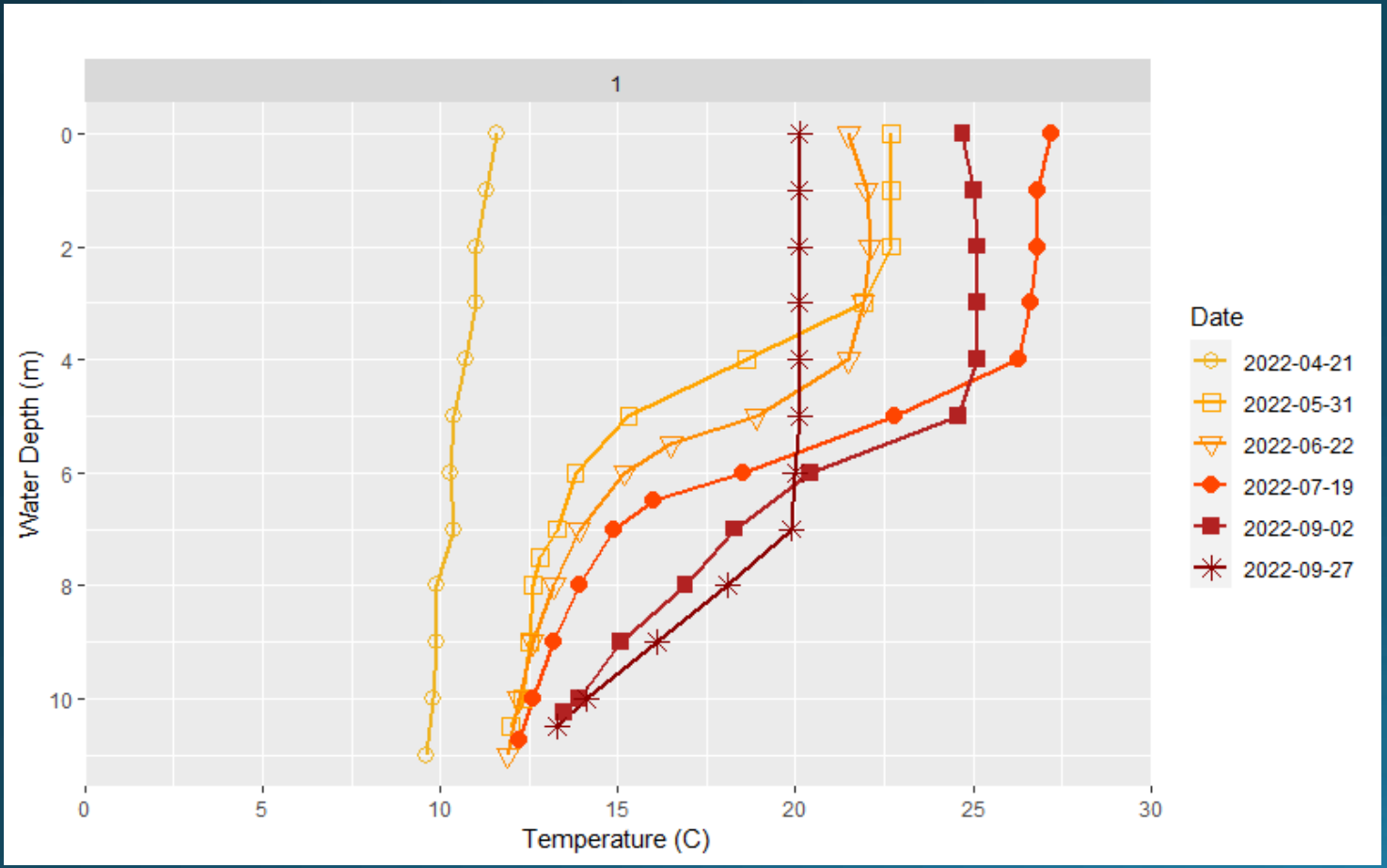


- Nutrient "Load" = quantity and form of nitrogen and phosphorus that comes from a specific source
- External load = watershed origins (watershed management ongoing)
- Internal load = lake sediment origins, recycled annually within the lake water and lake sediments, primarily during summer



Temperature Data

Normal display of temperature profile data; typical figure from annual reports

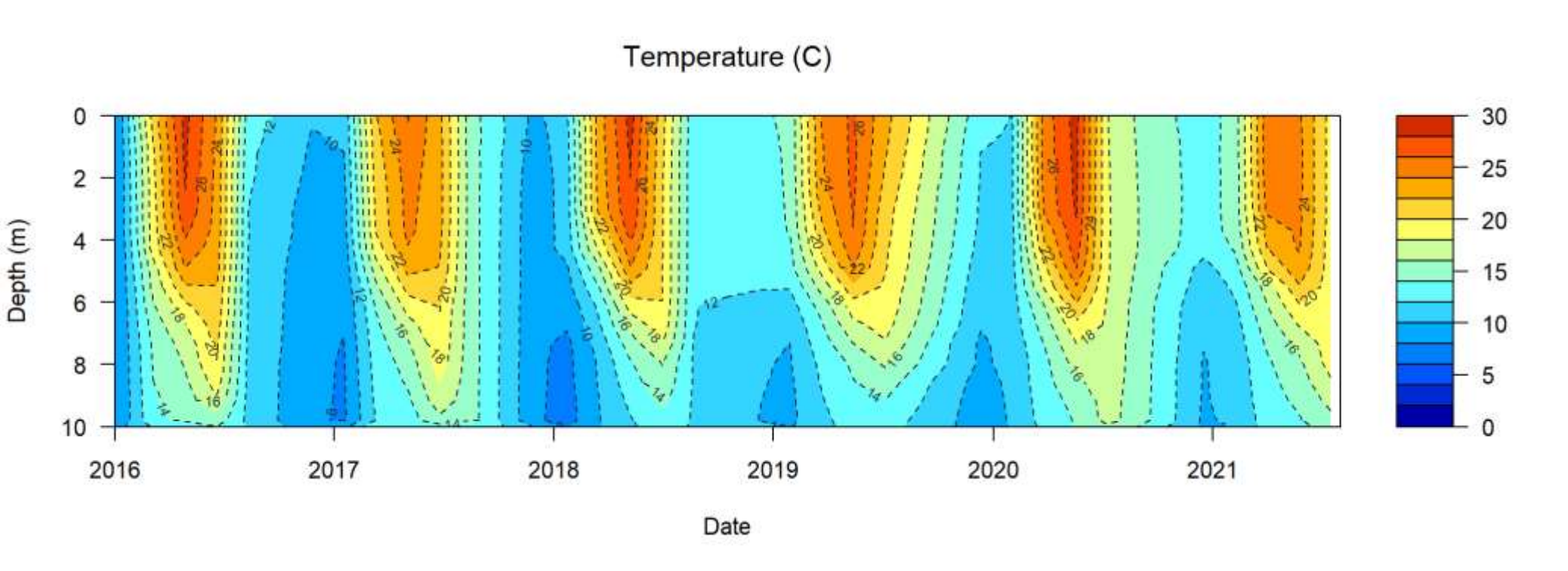


- Thermocline development begins as early as May
- Summer stratification increases in strength throughout summer, continues to isolate bottom waters
- Resultant decrease in dissolved oxygen below 6-meters (~19.5ft) happens every year
- That oxygen loss is normal for Oscawana and not an immediate management concern.

Isopleth Temperature Data

A new figure shown in 2021 report that you can expect to see again…

Isopleth figures are interpolations (models) of change in temperature between monitoring dates.



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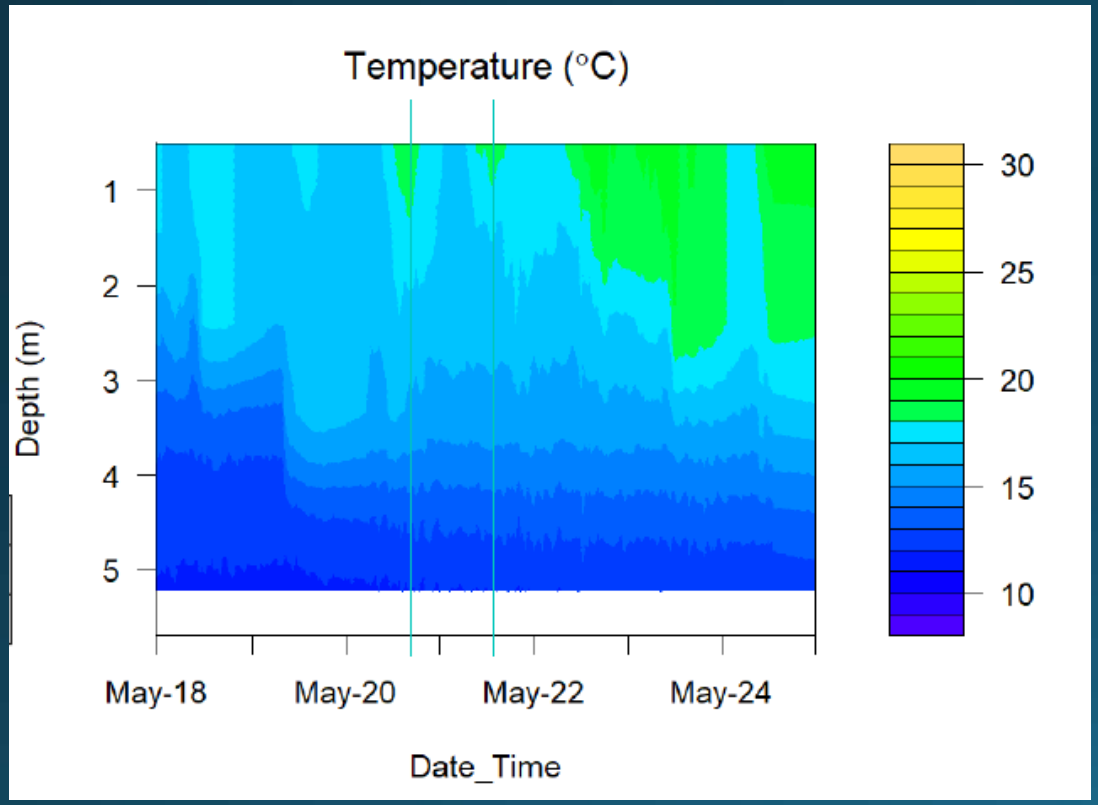


Above: An example of high resolution temperature isopleth from May at another lake

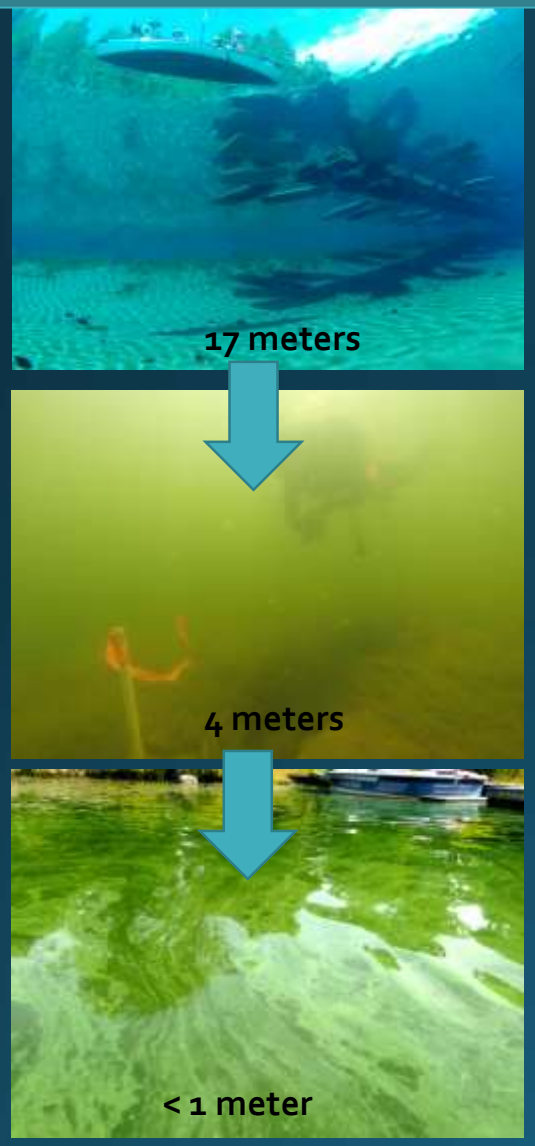
Why is high resolution temperature data important? How would it benefit the Oscawana monitoring program?

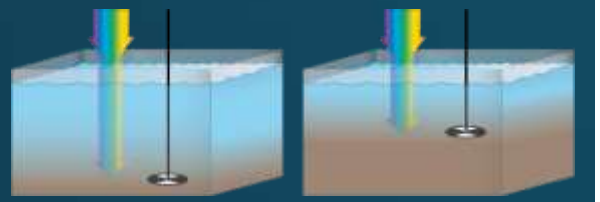
It can tell us A LOT more about:

- Lake mixing events from wind and storms
- Nutrient mobility from bottom to surface (stability of the thermocline daily)
- Demonstrate impacts of heat waves and potentially provide data that explains any surface cyanobacteria accumulations or blooms that may form
- Better understand the seasonal timing of anoxia (when the thermocline starts and ends each season)
- If left over the winter, can provide valuable ice-conditions data that relates to subsequent year's water quality

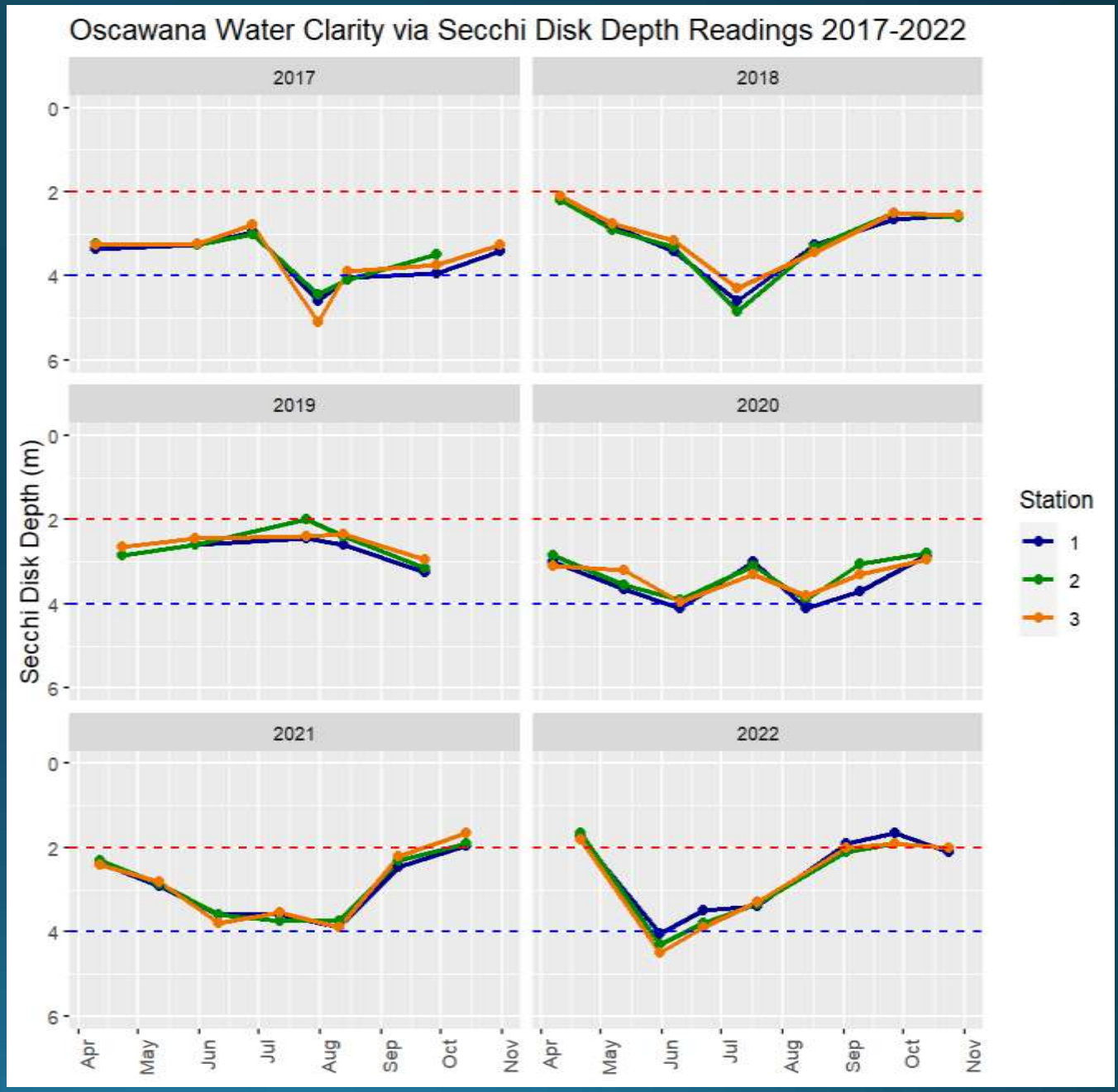
Water Clarity

Secchi Disk Transparency





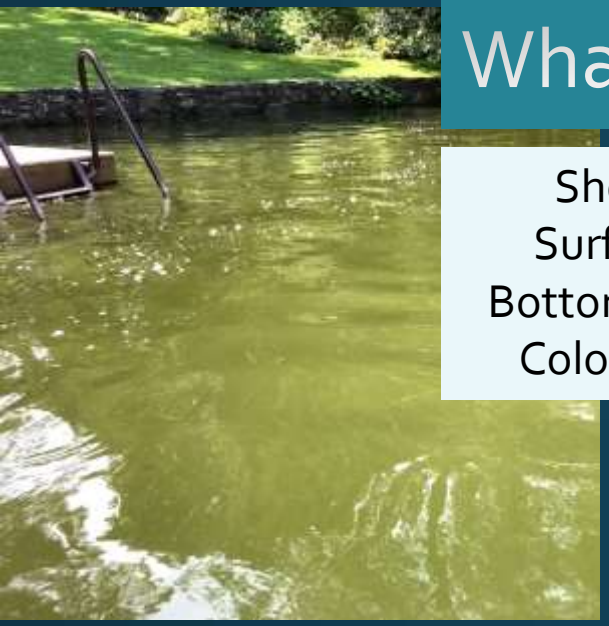
- 2022 clarity was excellent in late May through early July
- Steadily declined through August to end of September
- Slight CyanoHAB blooms noted in late summer to fall, may persist through Oct.



What kind of CyanoHAB bloom is it?

Shot-lived vs. sustained
Surface vs. whole-column
Bottom-origin? Middle-origin?
Colony sizes large or small?

Not all blooms are the same! (photos NOT from Oscawana)



Typical Scum Formation

- Bloom formation depends on:
  - Weather (temperature, light, wind)
  - Availability of nutrients (primarily nitrogen and phosphorus)
  - Climate (CO_2)
  - Gas vesicles & cell turgor pressure with storage of carbohydrates allows the cells to move up and down in water column on calm days
  - The buoyancy of cells is related to how actively they are photosynthesizing – how much carbohydrate storage vs. use & cell internal pressure that can collapse gas vesicles
  - Sometimes they get stuck on surface …. Causes scums
  - Larger-celled & colonies get stuck on surface more easily than smaller celled types of cyanobacteria

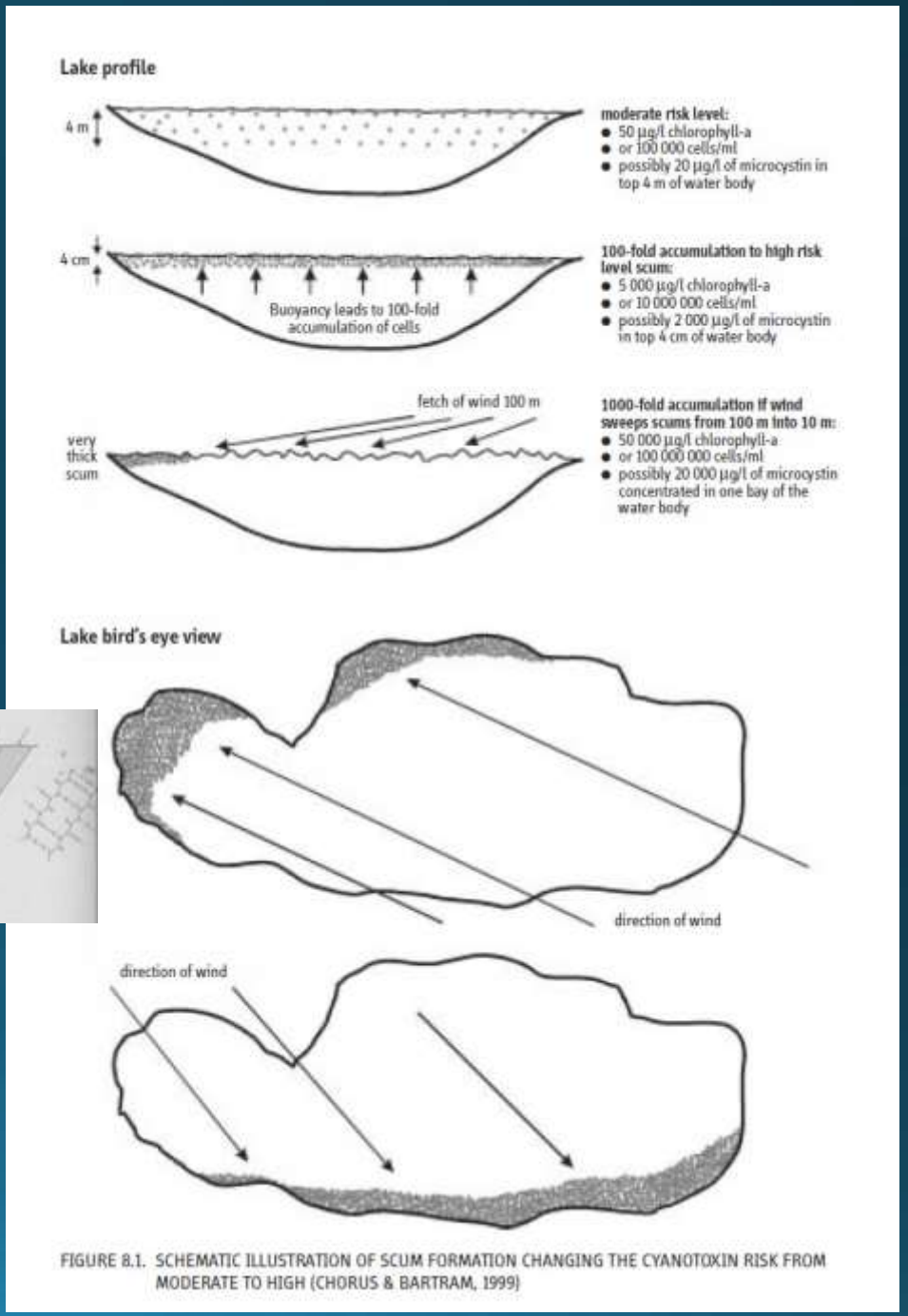


FIGURE 8.1. SCHEMATIC ILLUSTRATION OF SCUM FORMATION CHANGING THE CYANOTOXIN RISK FROM MODERATE TO HIGH (CHORUS & BARTRAM, 1999)

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NOT OSCAWANA!

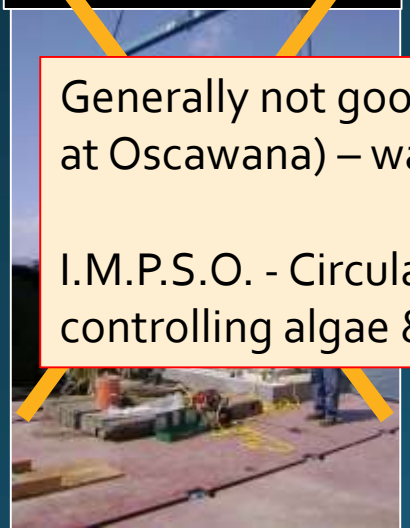
Oscawana Lake & Watershed Management Plan

1. Water Quality Analysis & Management Recommendations 2020 – still applies in 2022

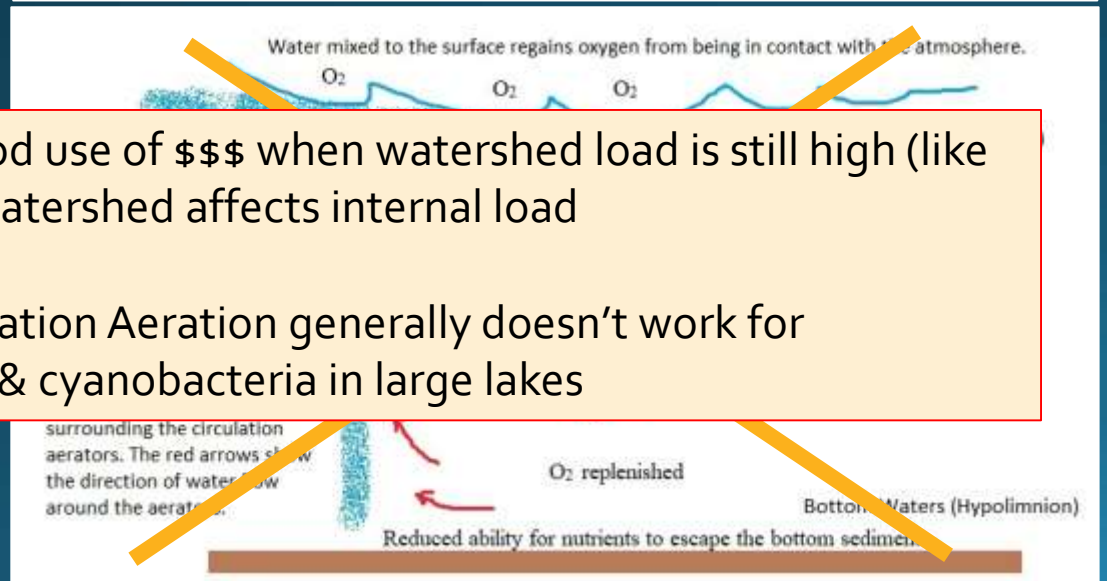
- Watershed greater importance vs. internal nutrient inputs compared to 2010 estimate (New loading model estimates)
- Very limited internal load control mechanisms

NYDEC has not allowed widespread use in NY lakes – permit framework weak, **not appropriate now,** could be in the future, but costly. Best used is cyanobacteria becomes more problematic.

Oxygenation/ Layer Aeration



Circulation/Destratification Aeration



Generally not good use of $$$ when watershed load is still high (like at Oscawana) – watershed affects internal load

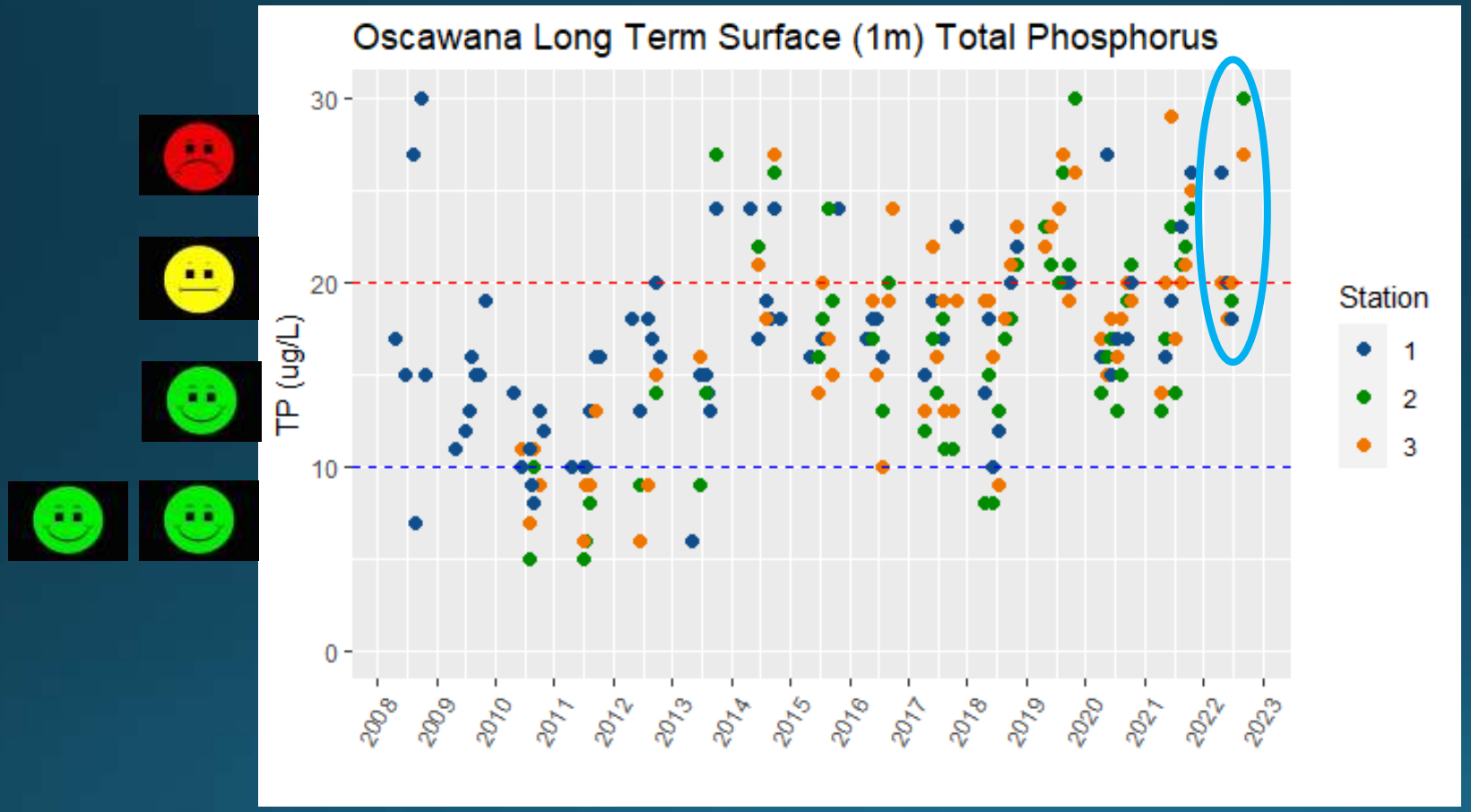
I.M.P.S.O. - Circulation Aeration generally doesn't work for controlling algae & cyanobacteria in large lakes

Nutrient-stripping/binding treatments

- Phoslock = Lanthanum-modified bentonite clay
- Aluminum sulfate + water → aluminum hydroxide (binds phosphate) + H+ ions

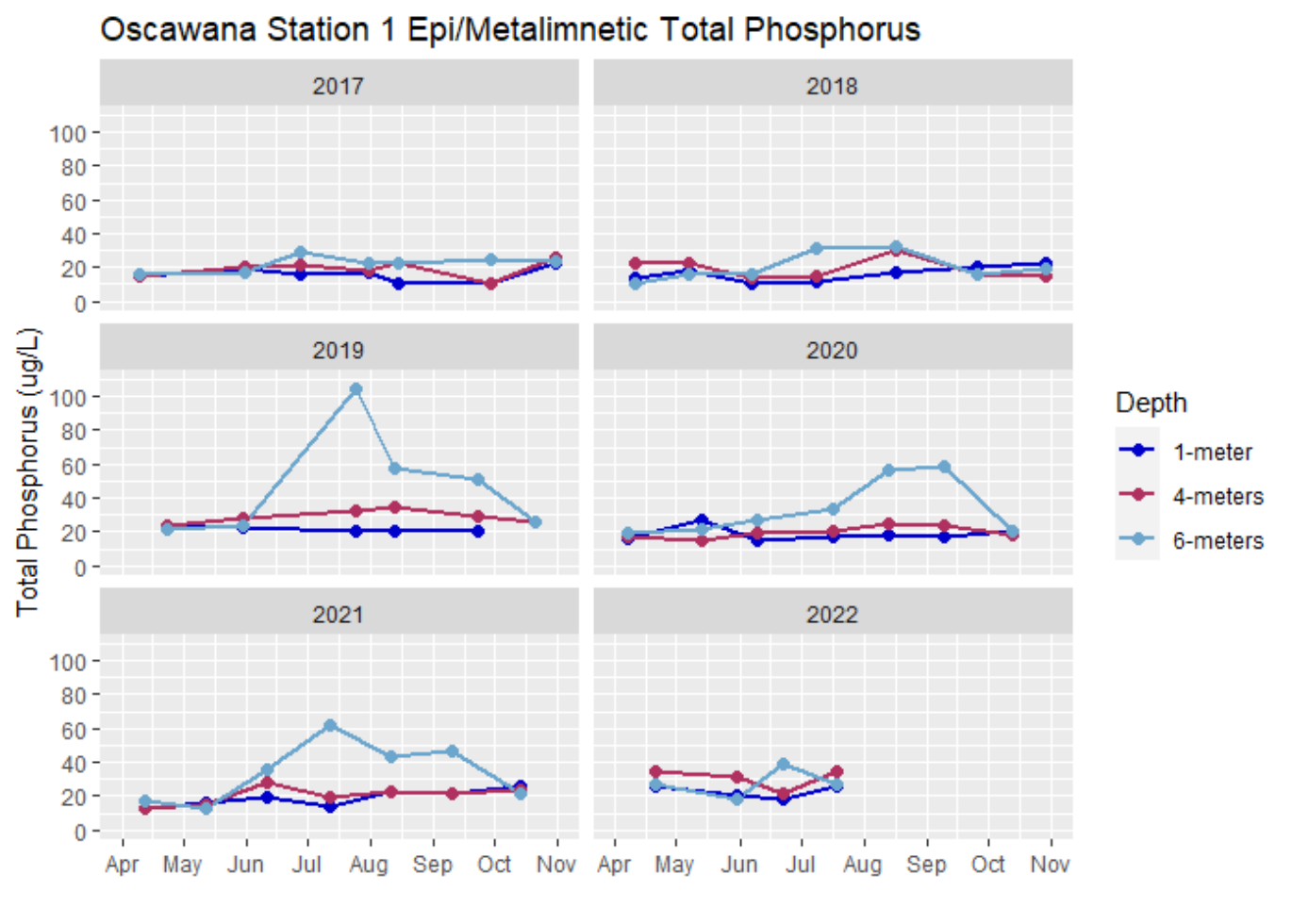
Photo demonstrates flocculation and water clarity process
(http://www.devrkenterprises.com/coagulant-chemicals.htm)

Nutrients (Phosphorus)



Total Phosphorus Nutrient Data

Station 1 – Epilimnion and Metalimnion

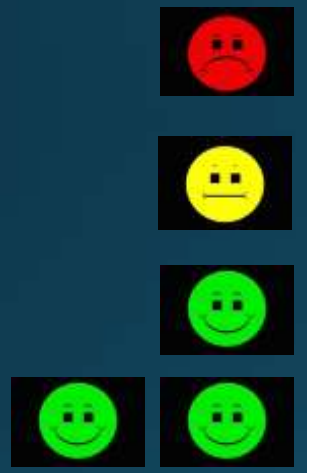


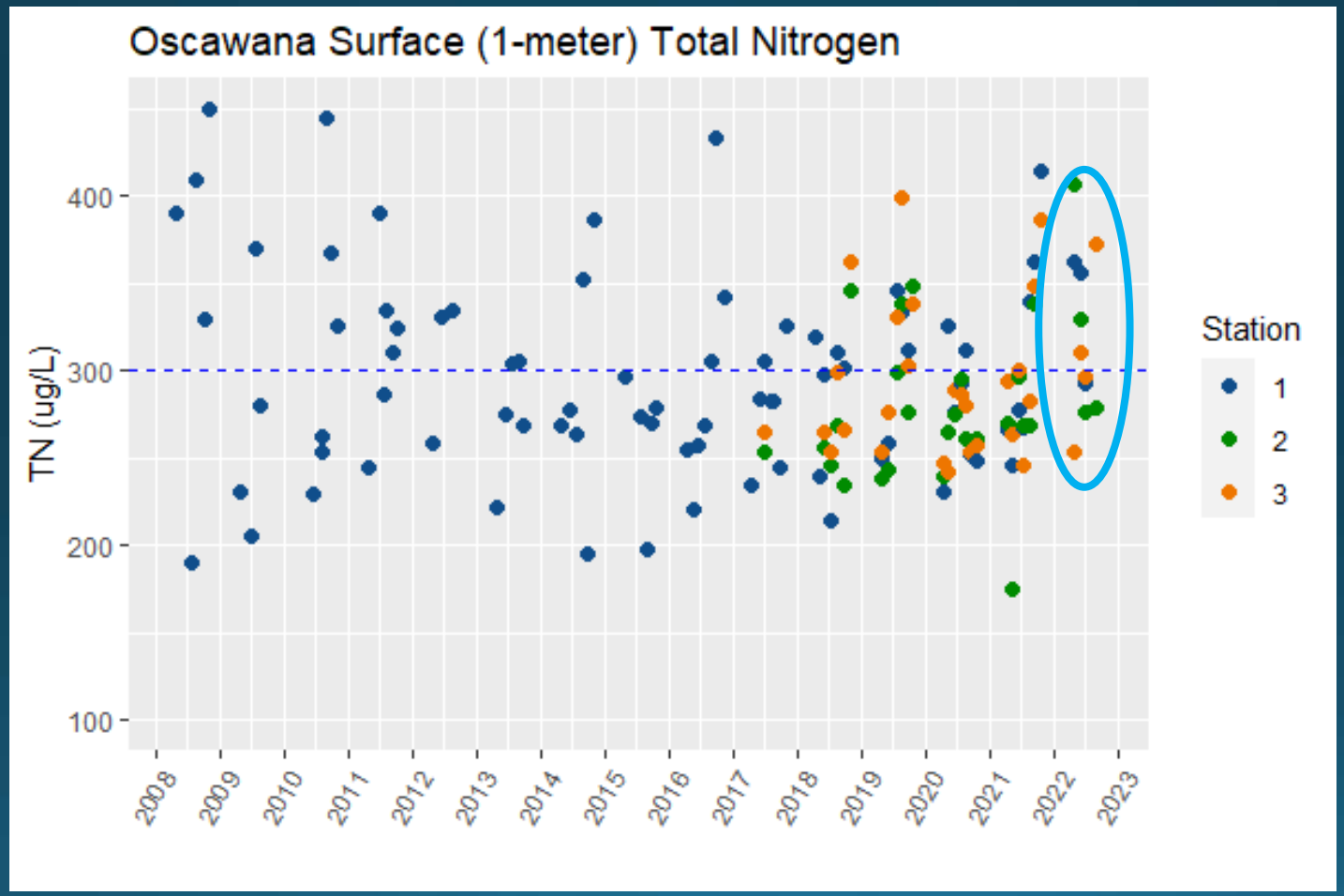
Station 1 - Hypolimnion

- Bottom nutrient concentrations dramatically higher due to internal nutrient releases (typically above 400 µg/L)
- Not all bottom nutrients make it to surface waters – thermocline stops that migration due to density differences btw cold and warm water
- Not all 2022 lab data released yet, will be in 2022 report

Surface Total Phosphorus goal to be below 25 µg/L for entire season.

Nutrients (Nitrogen)

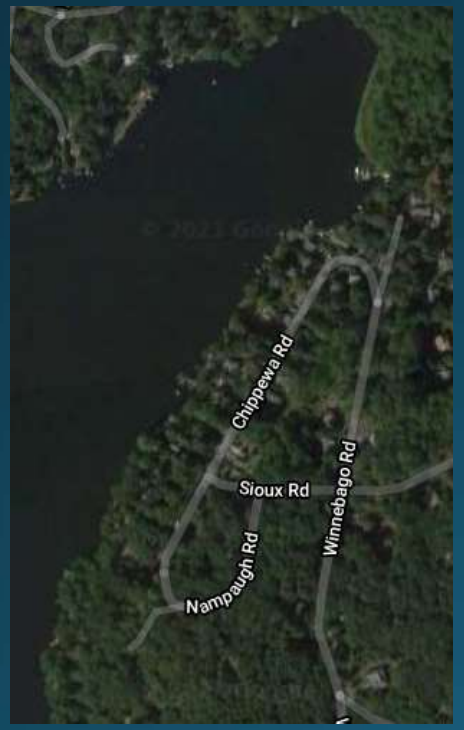




2. Watershed Management Plan

Parts of Plan in Action!

- Continue to review Highway Dept records for catch basins cleaning and improvements to stormwater and roads management each year
- LOMAC continues to use some funding to purchase catch basin filters for Chippewa & Winnebago Rds. (installed and maintained by Highway Dept)
- Continue to follow-up with Town septic pump-out enforcement, pump-out regulation now expanded to entire watershed!
- Investigated for nutrient "Hot Spots" 2021-2022
  - **Putnam County Dept. of Health currently following up with potential failed septics that were ID'ed during Oscawana watershed monitoring**



Ask the Putnam County Health Dept or your local Representatives about the septic system replacement reimbursement program to see if you qualify for up to $10,000 reimbursement! Funding period ended, but it is likely to be funded again if there is a strong community need.

Thank you!

Questions?

Review: Oscawana Fisheries Survey and Status

- 2019: Fisheries survey of entire lake
- Largemouth bass population in good shape
  - Abundant, diverse length classes and solid relative weight
- Prey fish abundant (bluegill, pumpkinseed, golden shiner)
- Not many Walleye
- Alewife still abundant
- Stocking walleye to control alewife has not be successful at improving water clarity.
  - Zooplankton are still small
  - Water clarity has not improved

We believe that walleye stocking is not a viable tool for improving water clarity at this moment.