

Lake Oscawana Management Advisory Commission  
Town of Putnam Valley, NY  
November 4, 2021

# Lake Oscawana 2021 Update

Northeast Aquatic Research, LLC

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**Hillary Kenyon Garovoy, M.S.**  
Limnologist/Soil Scientist  
Certified Lake Manager (NALMS)

**Alejandro Reyes, M.S.**  
Aquatic Ecologist  
Certified Lake Manager (NALMS)



# Overview

- Define key terms, goals, & monitoring parameters
- Explain why focus on watershed first vs. internal load controls
- Brief 2021 water quality update
- Review Lake Management Plan & what's happened since it was published
  - 1. Water quality, 2. Watershed, **3. Aquatic plants**

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## Overarching Goals for Lake Oscawana

Manage/Prevent Invasive Species & Nuisance

Manage nutrients to prevent HABs (cyanobacteria)

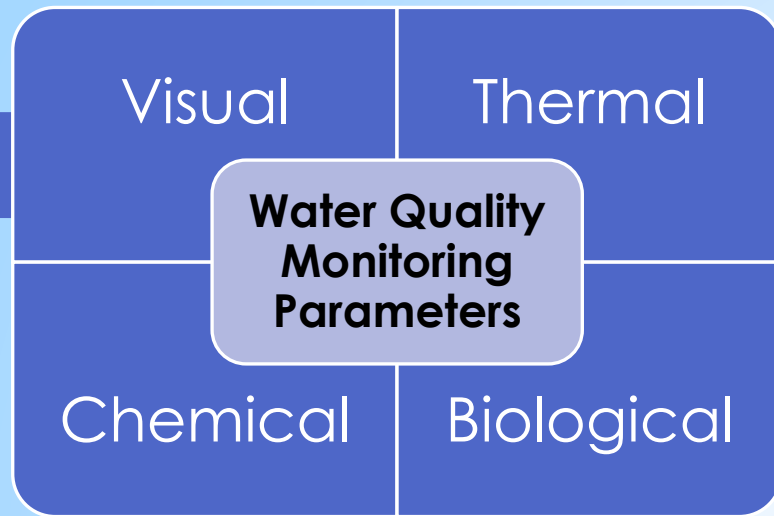
Balance between recreation & ecology



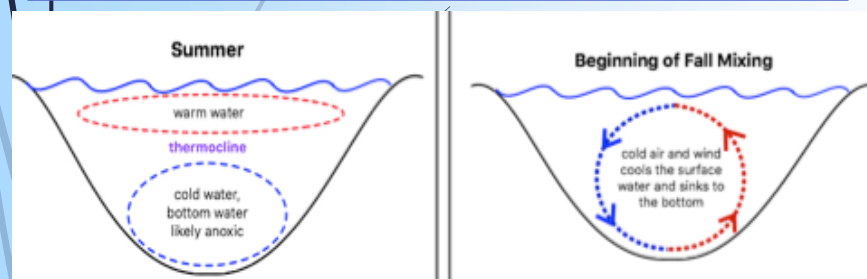
**Bad water quality & AIS affects: recreation, human health, local economy, property values, & changes the ecosystem**

Lake Science (Limnology) advises Lake Management



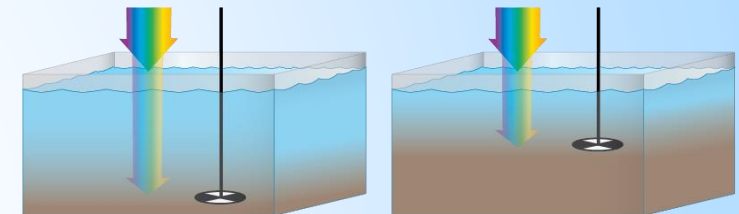


### Temperature Profiles / Stratification



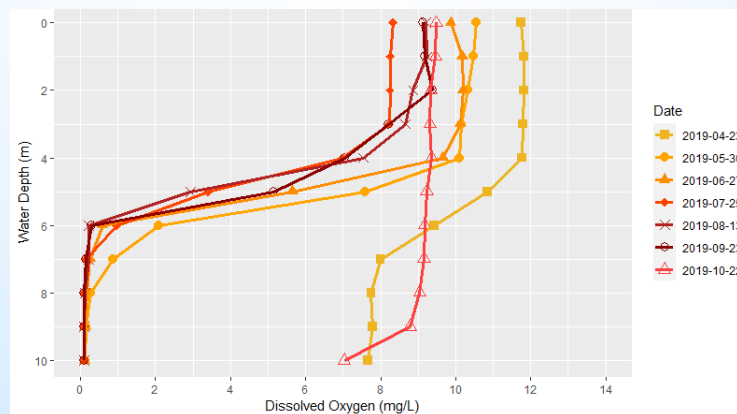
### Biological Parameters

- Aquatic Plants** – diversity, abundance
- Phytoplankton** – algae & cyanobacteria
- Zooplankton**
- Fisheries**
- Bacteria** – Coliform at beaches & inlets



### Chemical: What compounds are in the water? What forms? How much?

#### Dissolved Oxygen

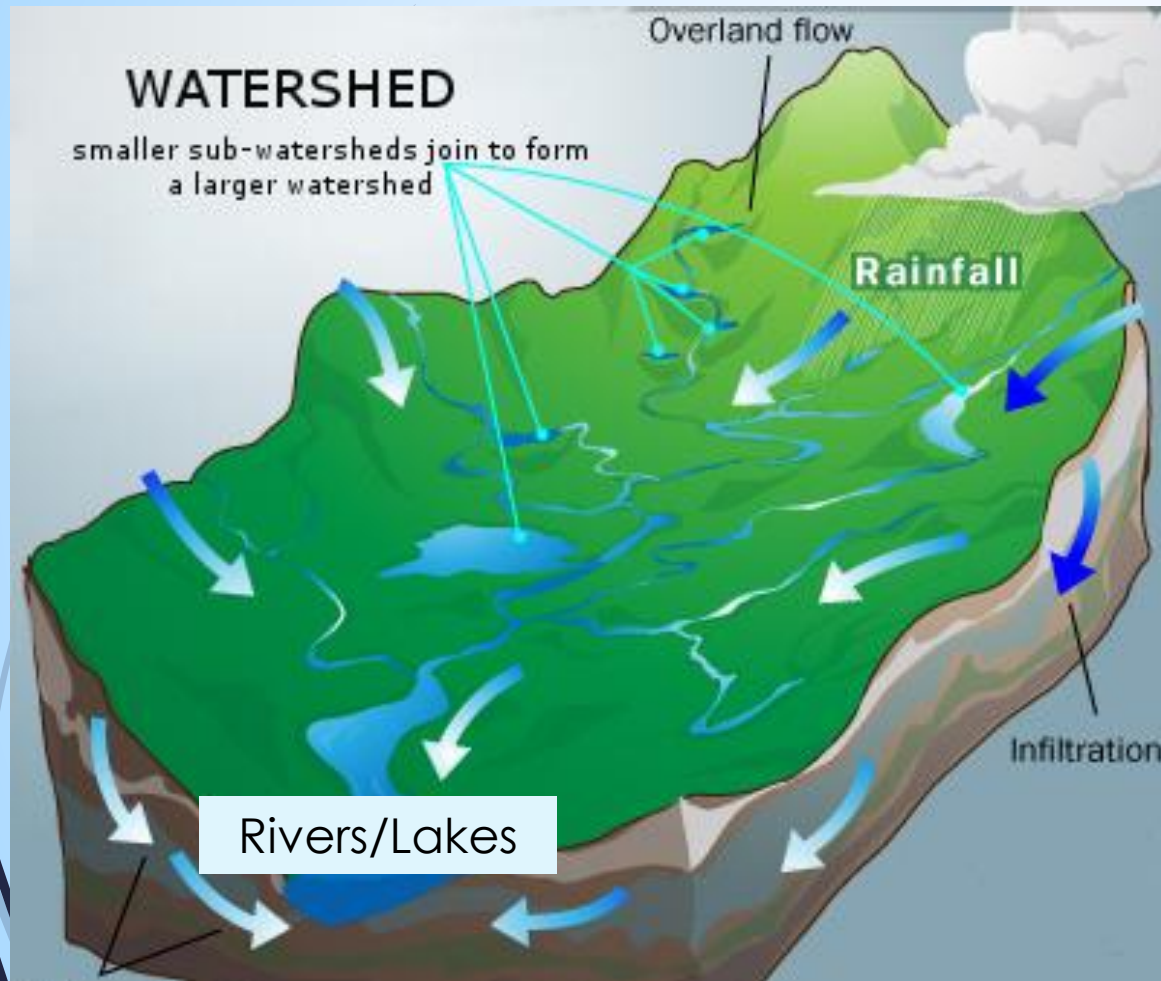


#### Nutrients – Nitrogen & *Phosphorus*



Nutrients should be relatively **low** (to ensure good clarity & prevent algae blooms)

## External vs. Internal “Loading”



Phosphorus + Nitrogen = Algae & Plants



- Nutrient “Load” = quantity and form of nitrogen and phosphorus that comes from a specific source
- External load = watershed origins
- Internal load = lake sediment origins, recycled within the lake water and lake sediments annually



## Oscawana Watershed SubBasins

Including linear feet of roadways (red lines) and mapping of direct-drainage area (shaded in blue) catch basins (blue points).

### Legend

- Feature 1
- Feature 2

- ▶ Anything that happens within these outlined yellow areas will impact Lake Oscawana
- ▶ Water flows downhill to the lakes
- ▶ Light blue shaded area = "direct drainage"
- ▶ Red lines show the roads
- ▶ Blue dots show stormwater catch basins/storm grates

# External vs. Internal “Loading”

- Internal load = recycled within the lake and lake sediments annually

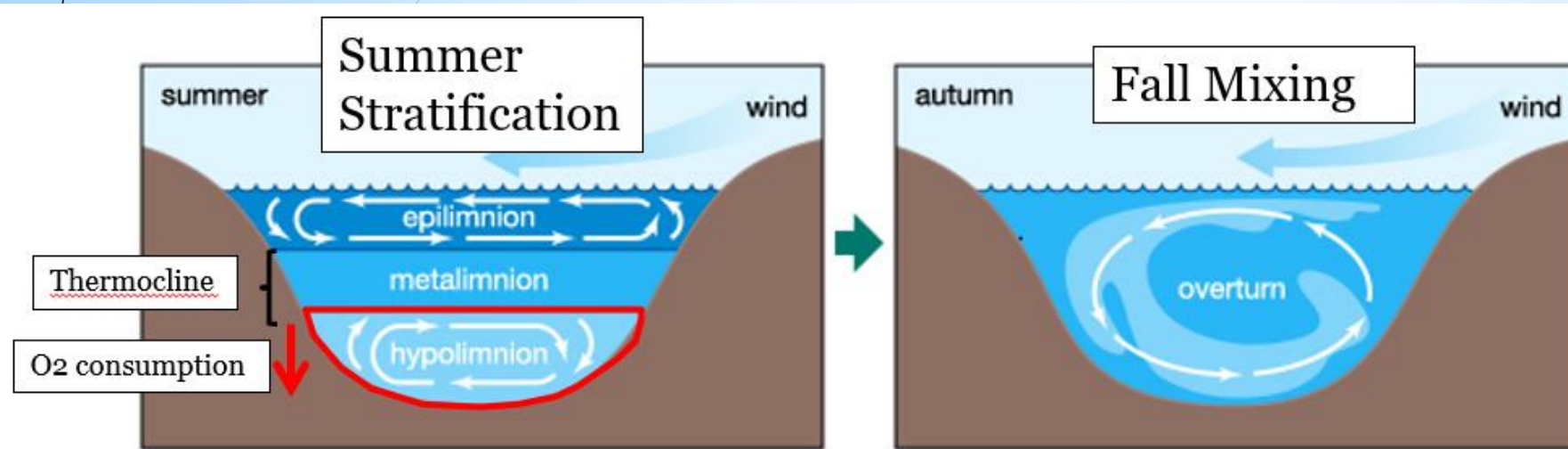
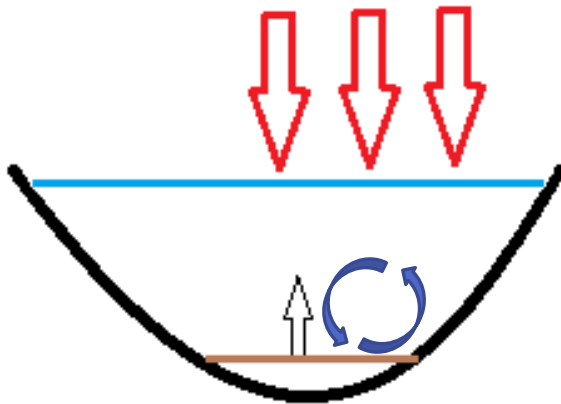
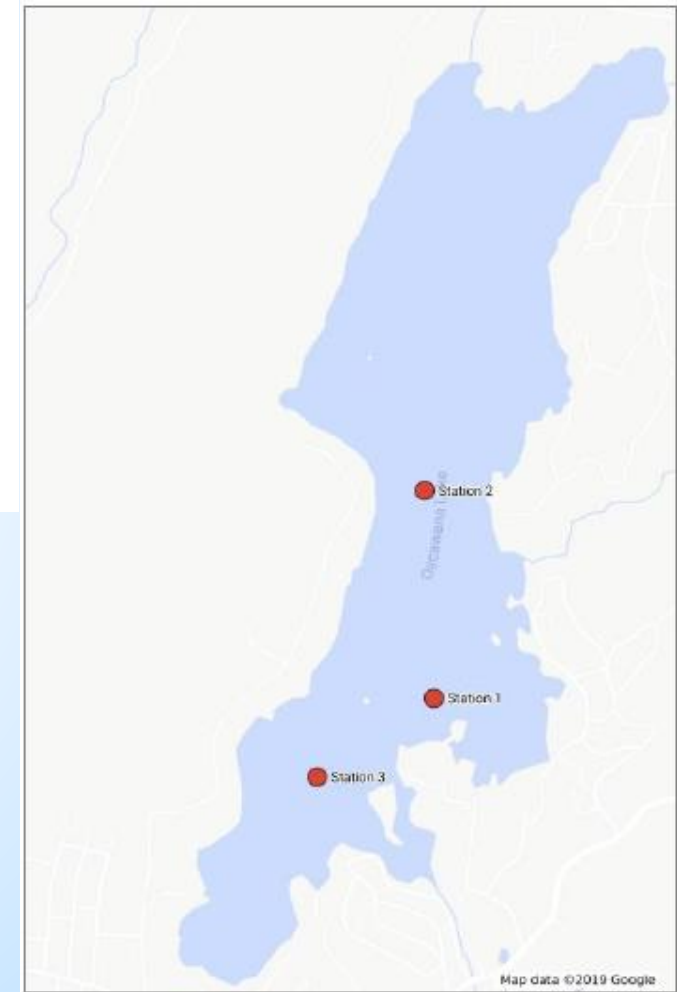


Image from Encyclopedia Britannica

More Nutrients in from Watershed



Accumulation of bottom muck, loss of oxygen, internal loading of nutrients begins at bottom





# Oscawana Lake & Watershed Management Plan 2020

Parts of Plan  
in Action!

## 1. Water Quality Analysis & Management Recommendations

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

### Oxygenation/ Layer 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

### Circulation/Destratification Aeration

Water mixed to the surface regains oxygen from being in contact with the atmosphere.



surrounding the circulation aerators. The red arrows show the direction of water flow around the aerators.

O<sub>2</sub> replenished

Bottom Waters (Hypolimnion)

Reduced ability for nutrients to escape the bottom sediment

### Nutrient-stripping/binding treatments

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

NYDEC has not allowed widespread use in NY lakes – permit framework weak

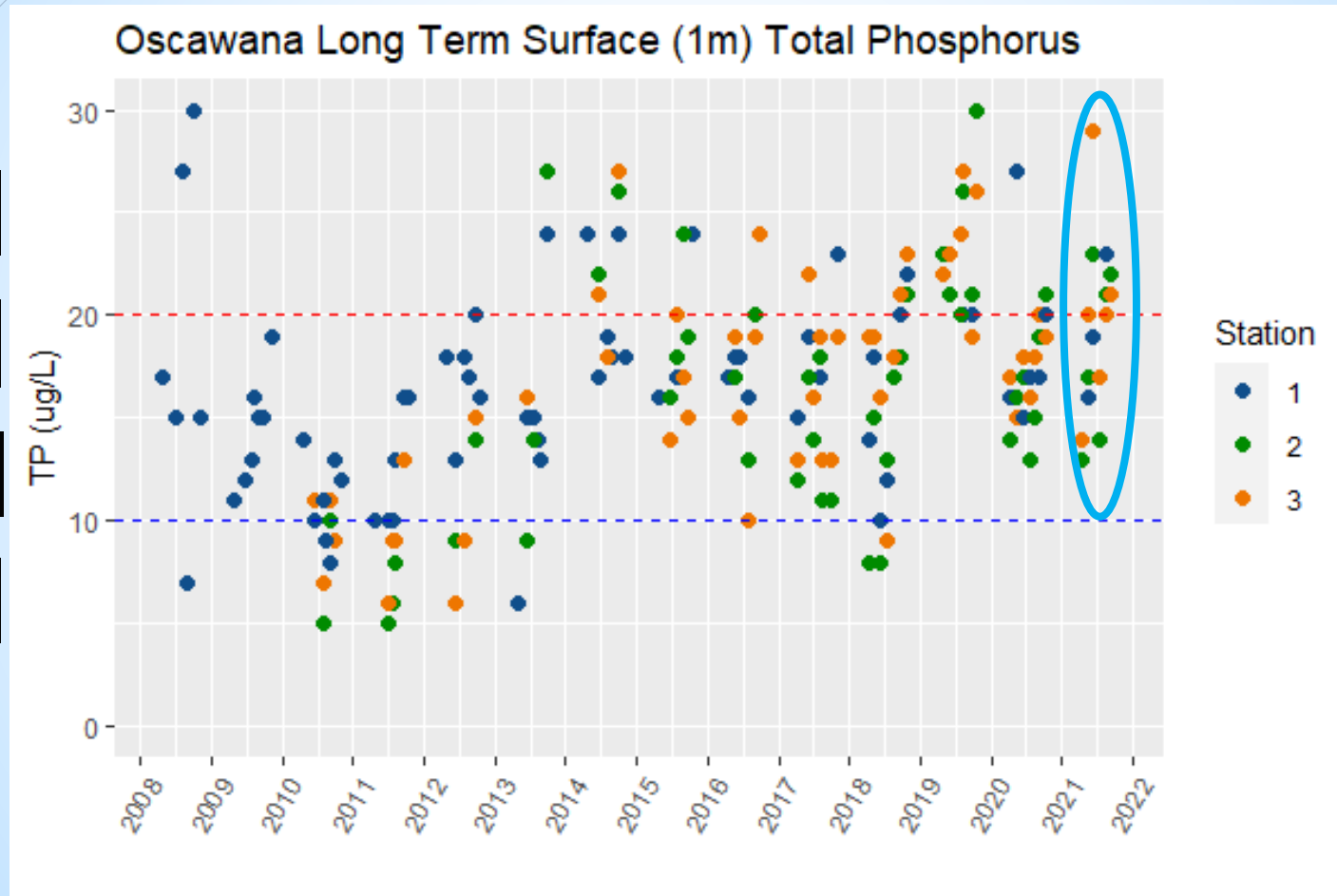
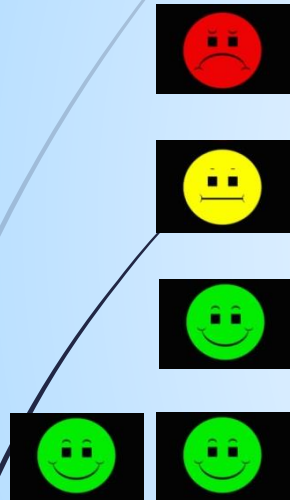


Photo demonstrates flocculation and water clarity process (<http://www.devrkenterprises.com/coagulant-chemicals.htm>)





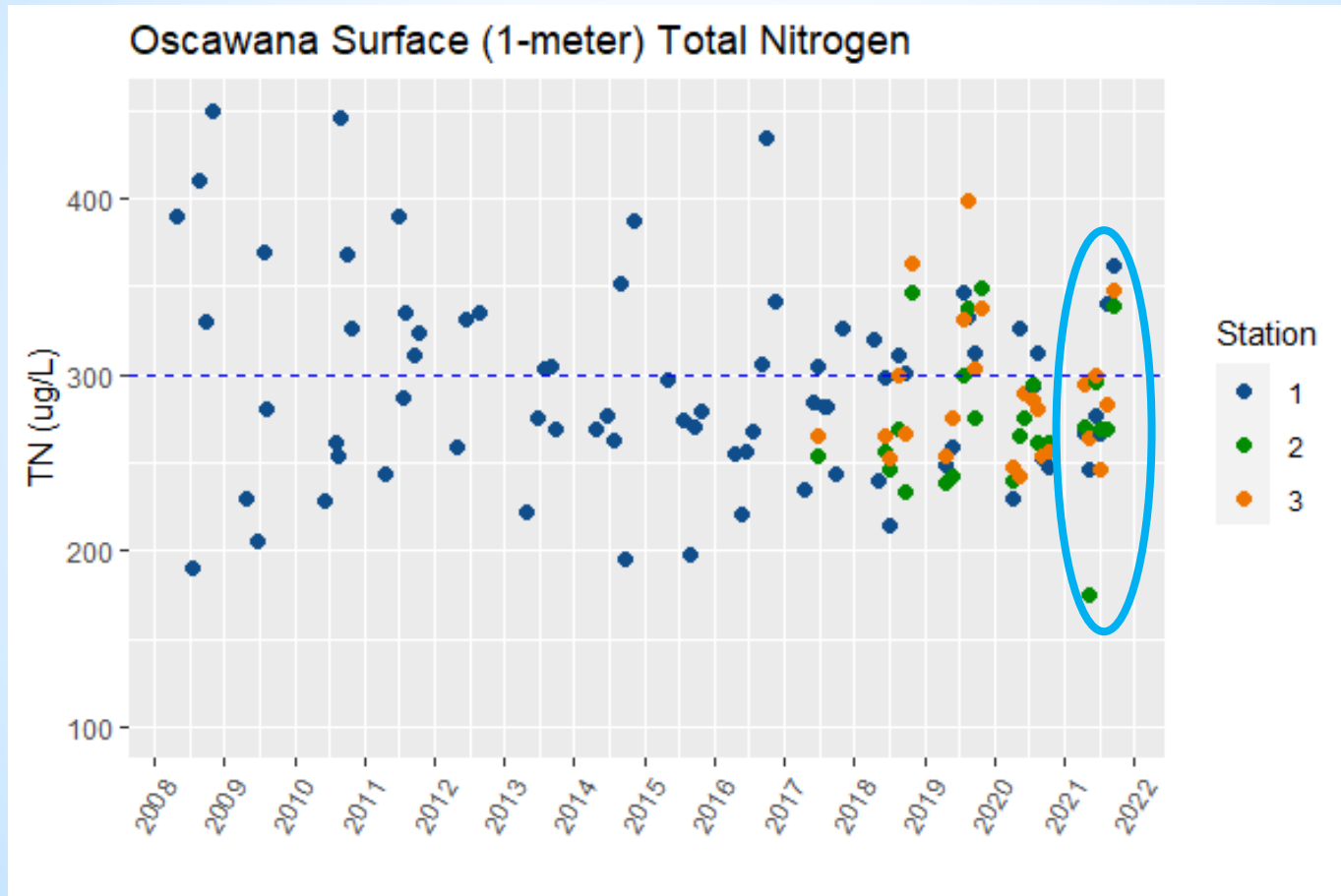
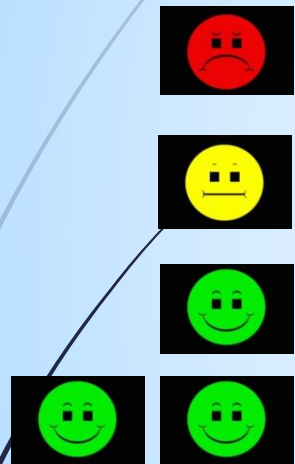
# Data: Nutrients (Phosphorus)



- Autumn bottom P was highest on record – previously high values not seen since 2013
- Lake-wide P mass not yet analyzed for 2021 - but preliminarily internal load was significantly higher than in recent years



# Data: Nutrients (Nitrogen)

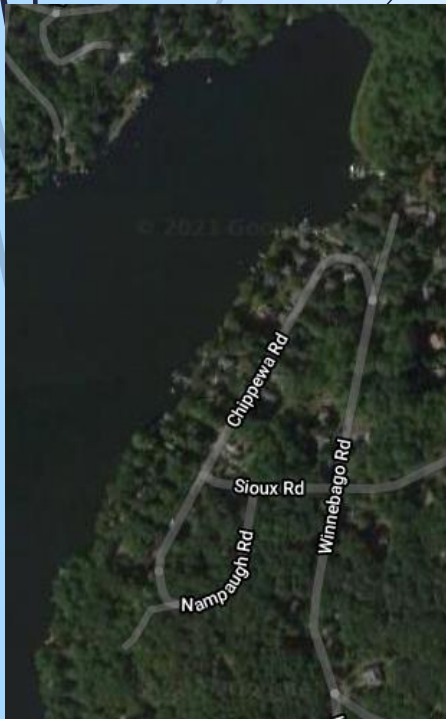


Autumn bottom N also very high

Parts of Plan  
in Action!

## 2. Watershed Management Plan

- Continue to review Town Highway Dept records for catch basins cleaning and improvements to stormwater and roads management each year
- LOMAC purchased and Highway Dept installing 45 catch basin filters for Chippewa & Winnebago Rds.
- Goal to replace every two years, need to be cleaned (ideal is 2x annually)
- Continue to follow-up with Town septic pump-out enforcement – NEAR aid in tracking pump-outs
- Investigated for nutrient “Hot Spots”
  - Met with Putnam County Dept. of Health in May 2021 – showed problematic areas
  - New 2021 watershed monitoring stations indicate that groundwater pollution from septic systems is a consistent problem for lake health in select areas



Ask the Putnam County Health Dept about the septic system replacement reimbursement program to see if you qualify for up to \$10,000 reimbursement!



### 3. Aquatic Plant Management Plan

Parts of Plan  
in Action!

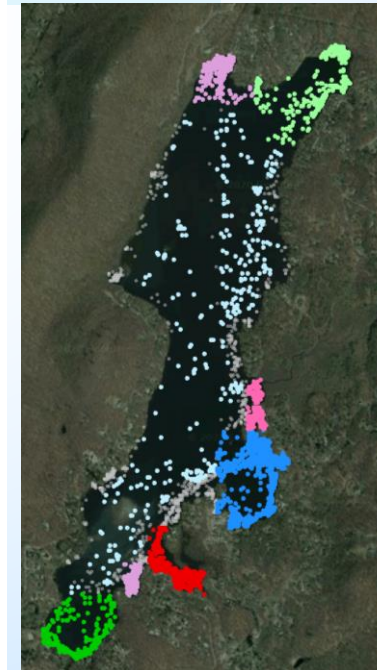
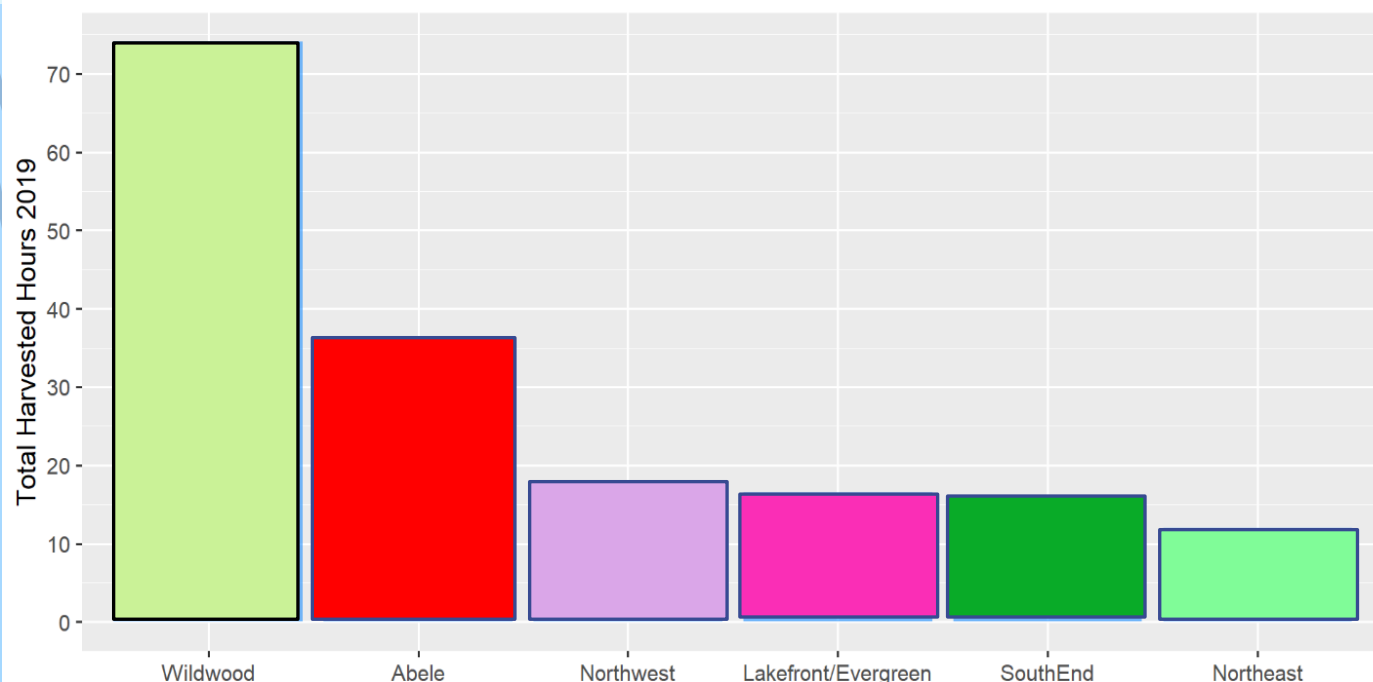
- Evaluate mechanical harvesting as plant management technique at Oscawana (success vs. setbacks)
- Proposed alternative plant management control methods – **integrated approach** – don't use just one technique
- LOMAC will inform residents & initial community dialogue for future decisions
  - Disclaimer: 2020 lack of harvester was not part of the plan... purchase and use of new 2021 mechanical harvester needed for this season, but integrated approach planned for future

### 3. Aquatic Plant Management Plan

#### Alternative Plant Control Methods Exist

- ▶ Pros and cons of mechanical harvesting as a primary plant control method detailed in LMP
- ▶ Mechanical harvester tracker data reviewed in 2020 Monitoring Report – presented last year for first time
- ▶ Inefficiency & potential for ecological harm greater than other techniques (particularly if alternatives used in moderation)

#### Mechanical Harvesting Limitations



New/larger harvester purchased and running starting in 2021

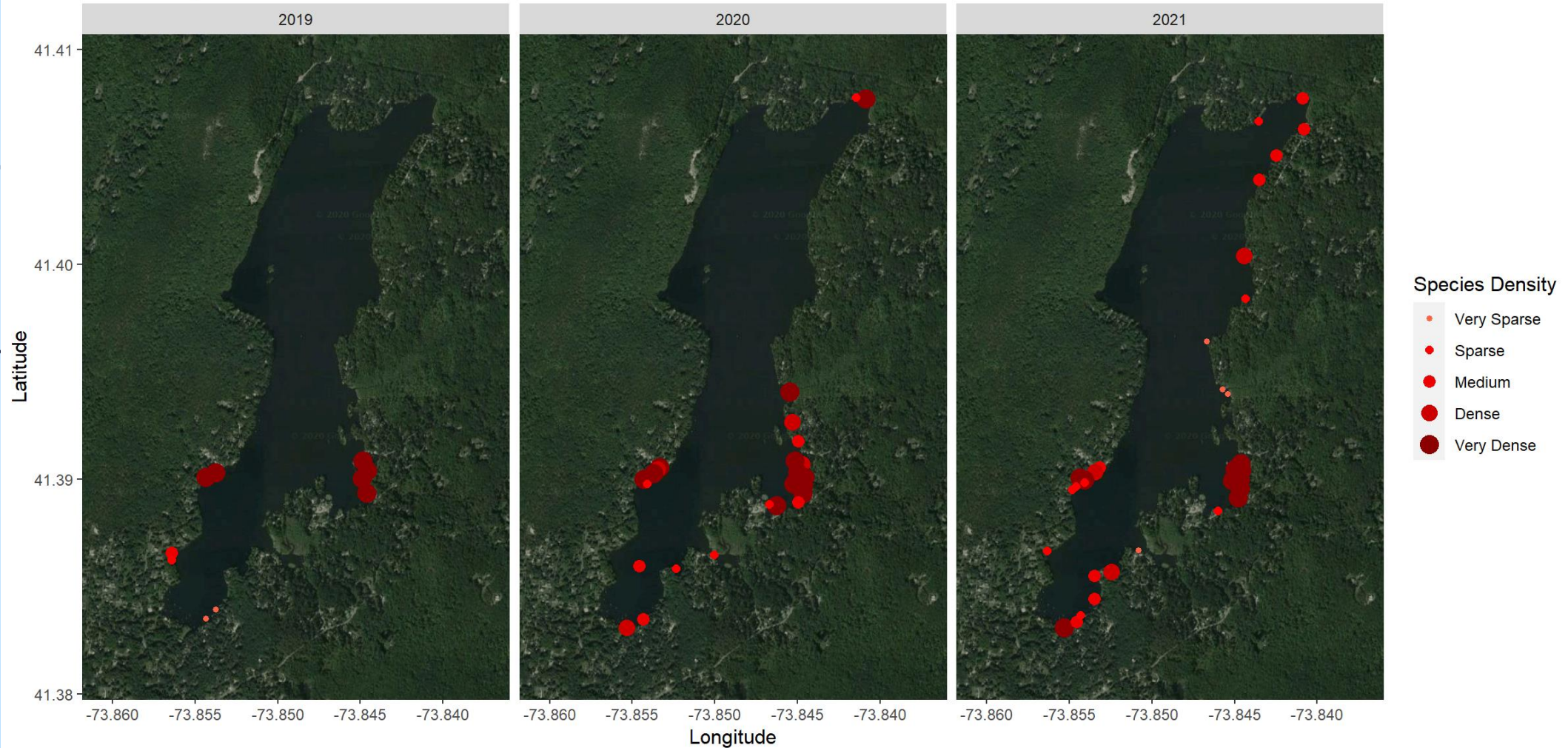


► Benthic/floating cyanobacteria mats and filamentous green algae will be a constant problem in Wildwood Cove unless septic systems are upgraded

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### Oscawana Lake July 2019, 2020, & 2021 Surveys: Cyanobacteria Mat Algae (Lyngbya)

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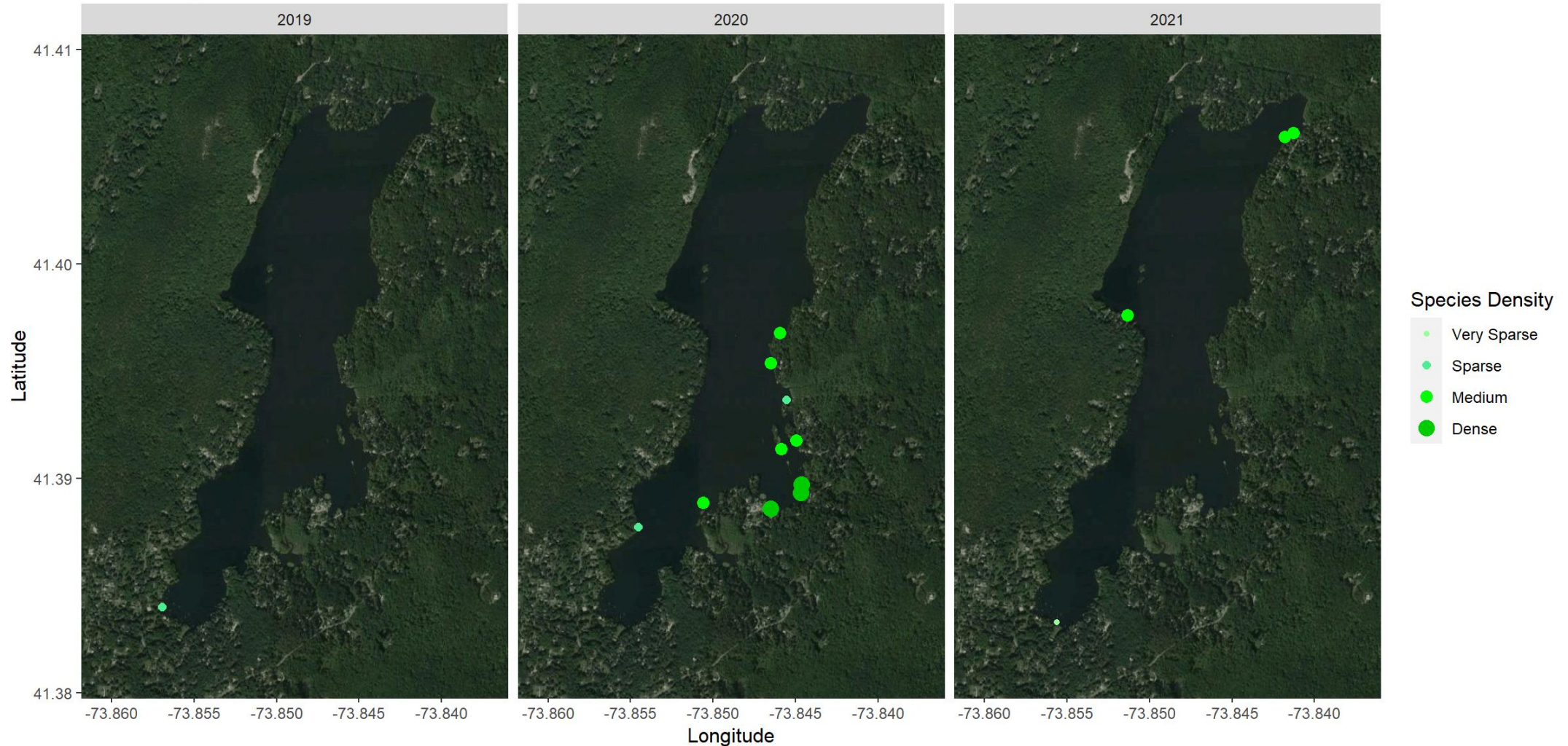




► Benthic/floating cyanobacteria mats and filamentous green algae will be a constant problem in Wildwood Cove unless septic systems are upgraded

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Oscawana Lake July 2019, 2020, & 2021 Surveys: Filamentous Green Algae  
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# Floating & submersed filamentous green algae & cyanobacteria

► How to tell the difference?

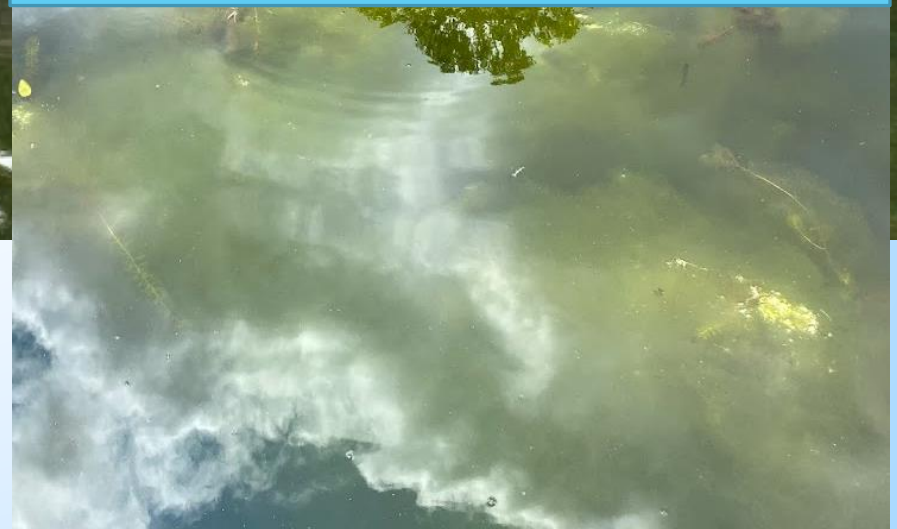


► Floating mats of cyanobacteria will make you itchy & potentially have harmful toxins in them

► Found growing together in 2021 in Wildwood Cove



► Filamentous green algae doesn't have toxins, but still unsightly





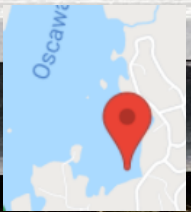
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## Floating & submersed filamentous algae & cyanobacteria

► How to tell the difference?

- Growing together in Wildwood Cove in photo below
- Multiple types of filamentous green algae – some slimy, some more coarse textured

Blackish/blue filamentous “algae” is usually cyanobacteria





# Alternatives to Mechanical Harvesting – Grass Carp

(certain areas require different techniques)

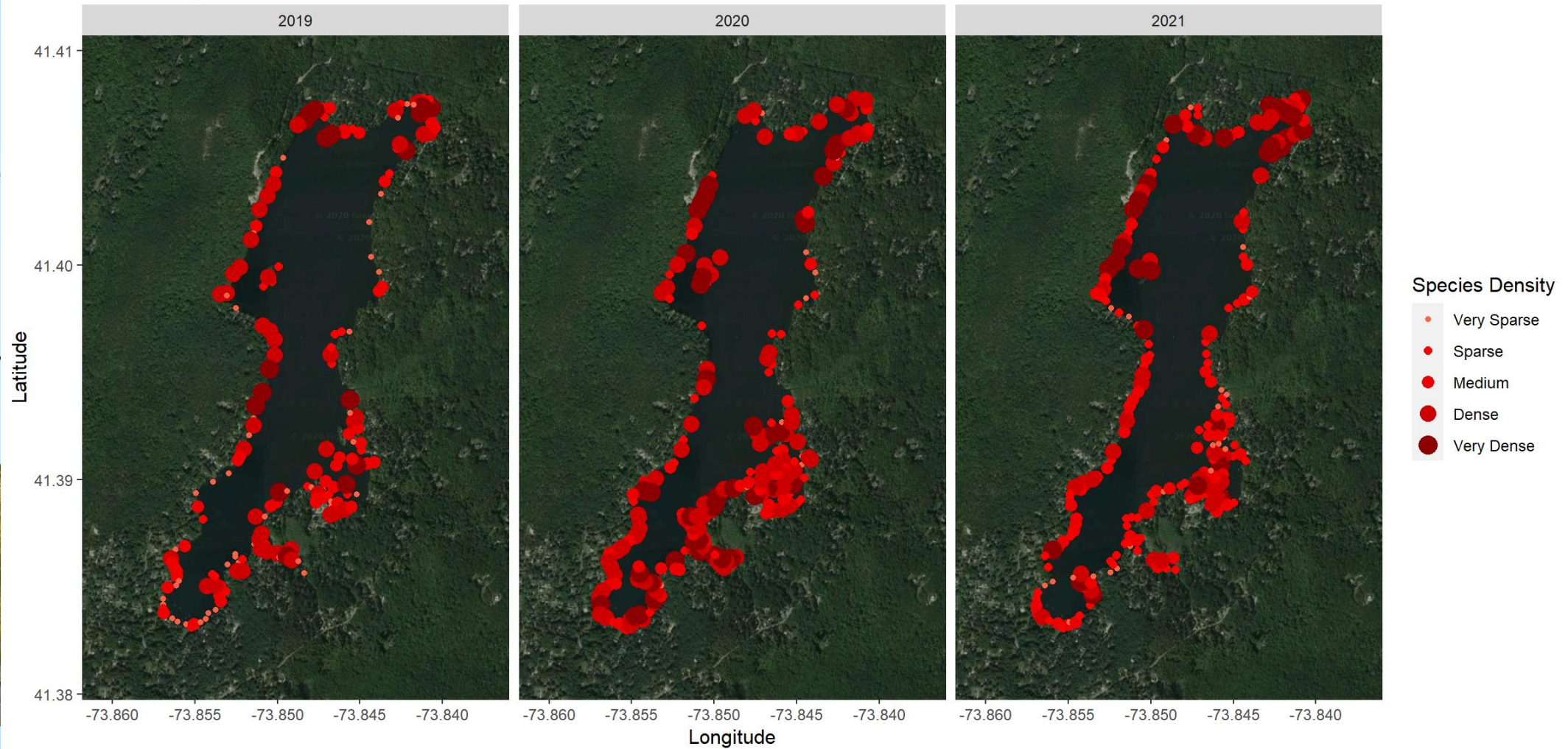
- ▶ Review alternatives from Lake Management Plan:
  - ▶ **Grass carp** – will not eat the filamentous algae or cyanobacteria mats
  - ▶ **Native plants still prevalent in Oscawana** – some maps on next slides
  - ▶ **NYDEC fisheries granted Oscawana a permit to stock an additional 453 grass carp in 2021**
  - ▶ Re-stocking rate was determined based on the assumed growth and mortality of original carp stocked in 2016 – brought lake back up to 9.2 fish per vegetated acre
  - ▶ Must not overstock – will negatively impact water quality & lake ecology
  - ▶ Need targeted plant management approaches in certain areas!

**Combinations.... Cheaper & potentially better control**





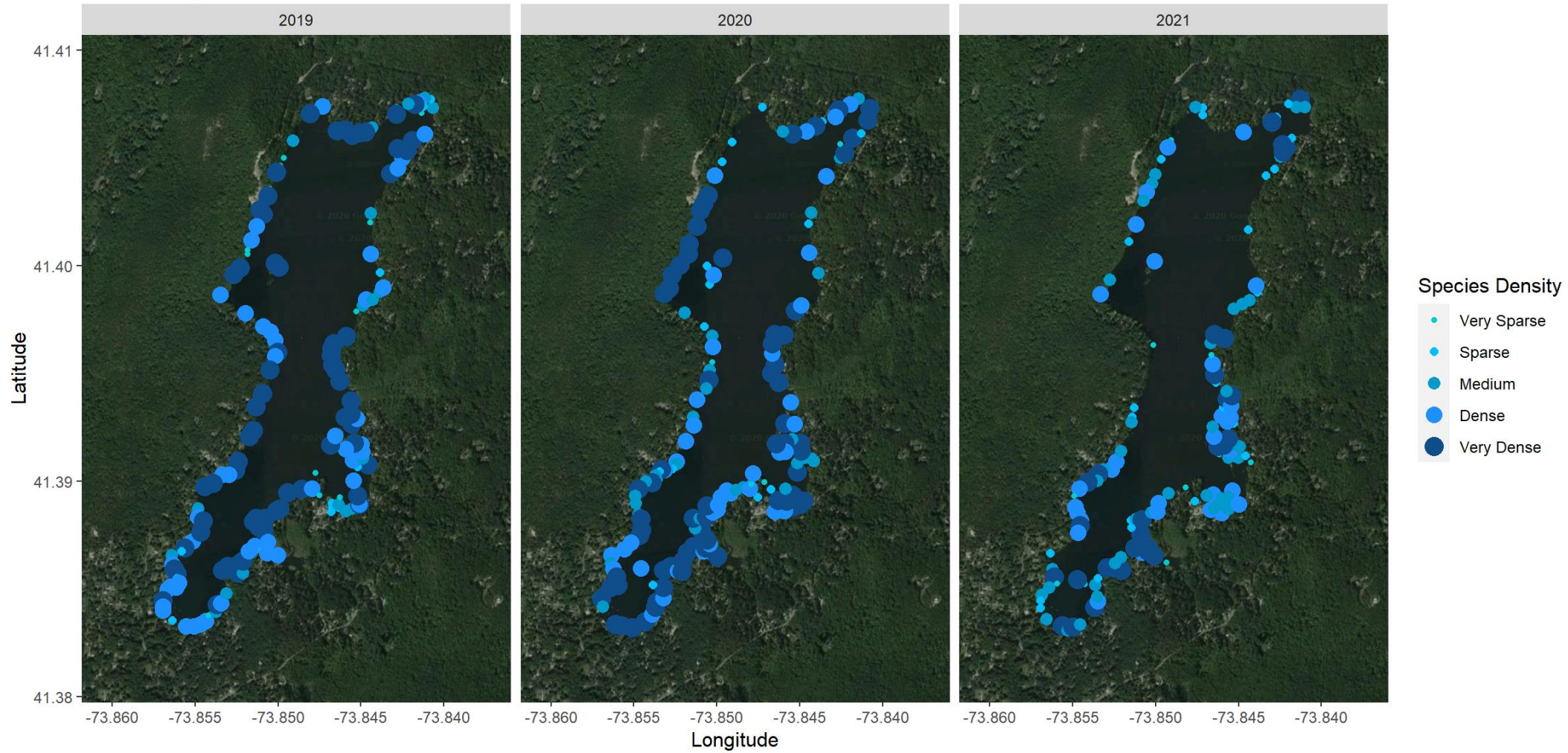
Oscawana Lake July 2019, 2020, & 2021 Surveys: Invasive Eurasian watermilfoil  
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Oscawana Lake July 2019, 2020, & 2021 Surveys: Largeleaf Pondweed  
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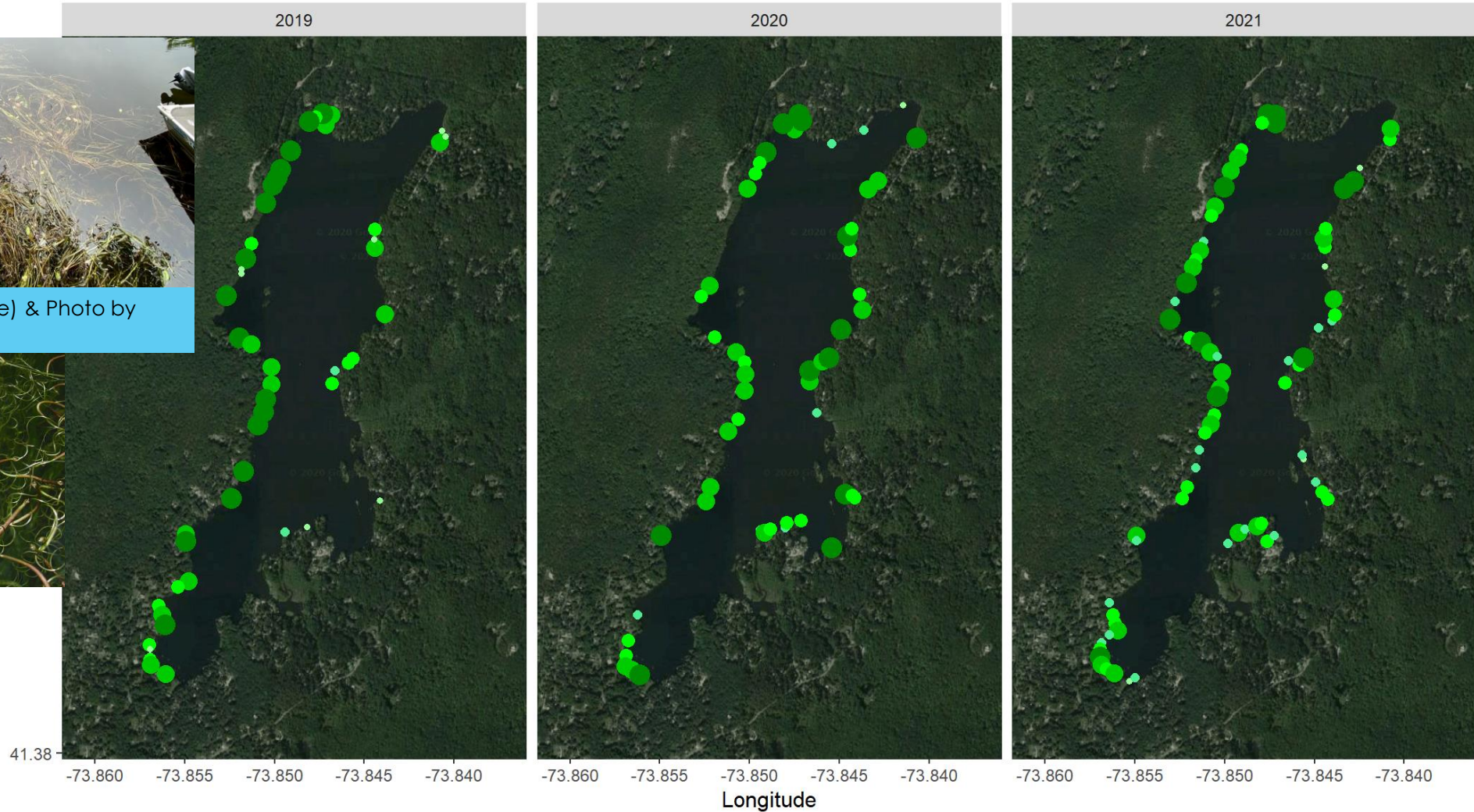


Oscawana Lake July 2019, 2020, & 2021 Surveys: Tapegrass (*Vallisneria americana*)

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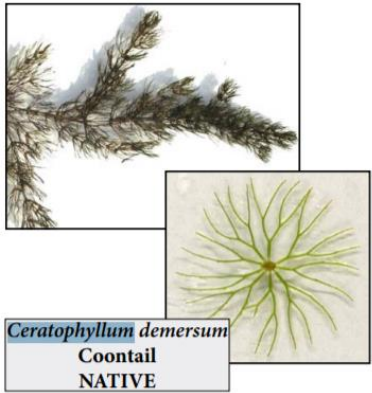


Wildwood Cove (above) & Photo by  
Don Cameron (below)



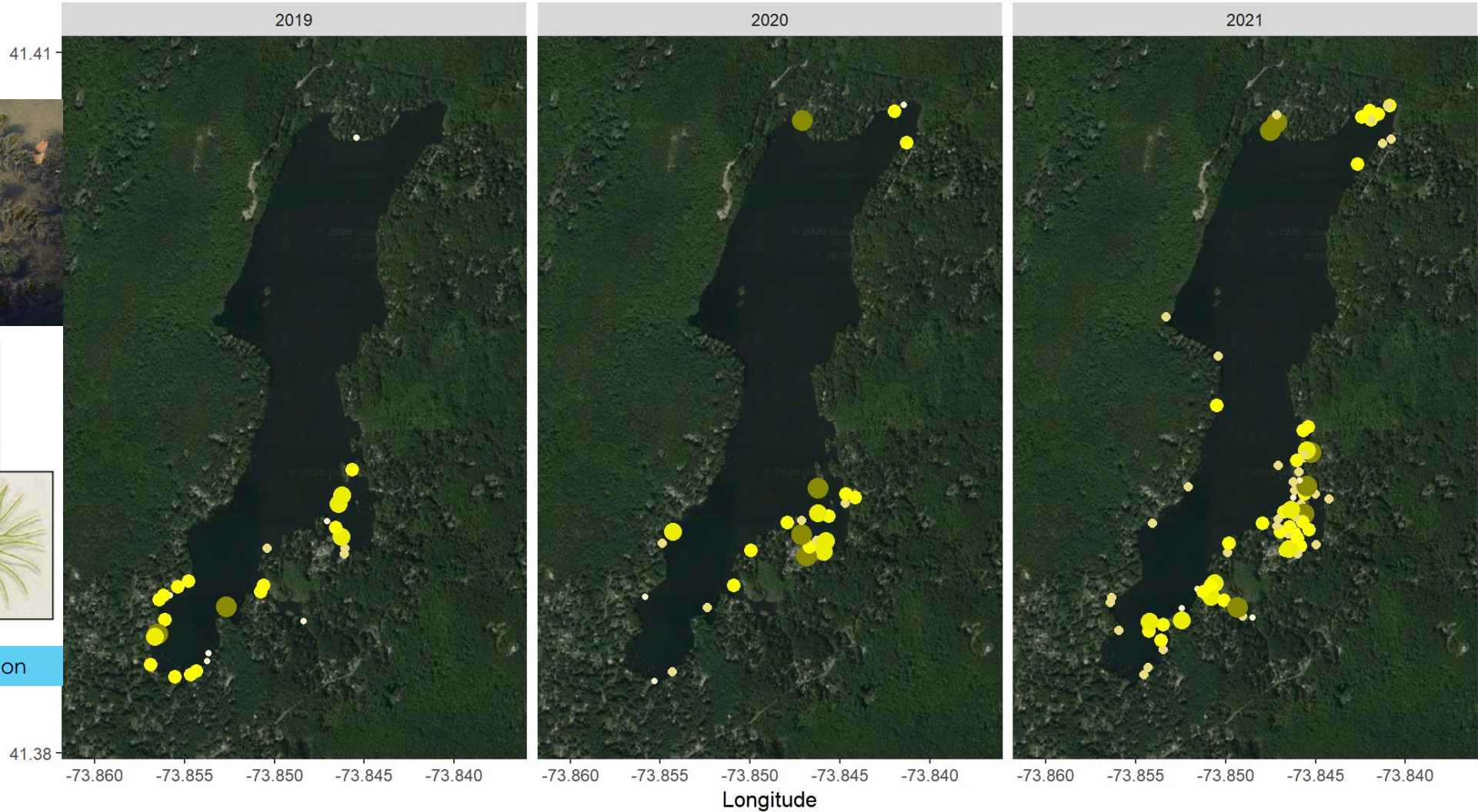


Oscawana Lake July 2019, 2020, & 2021 Surveys: Coontail (*Ceratophyllum demersum*)  
Northeast Aquatic Research, LLC



*Ceratophyllum demersum*  
Coontail  
NATIVE

Photo credits CT Ag Station





Oscawana Lake July 2019, 2020, & 2021 Surveys: Robin's Pondweed  
Northeast Aquatic Research, LLC

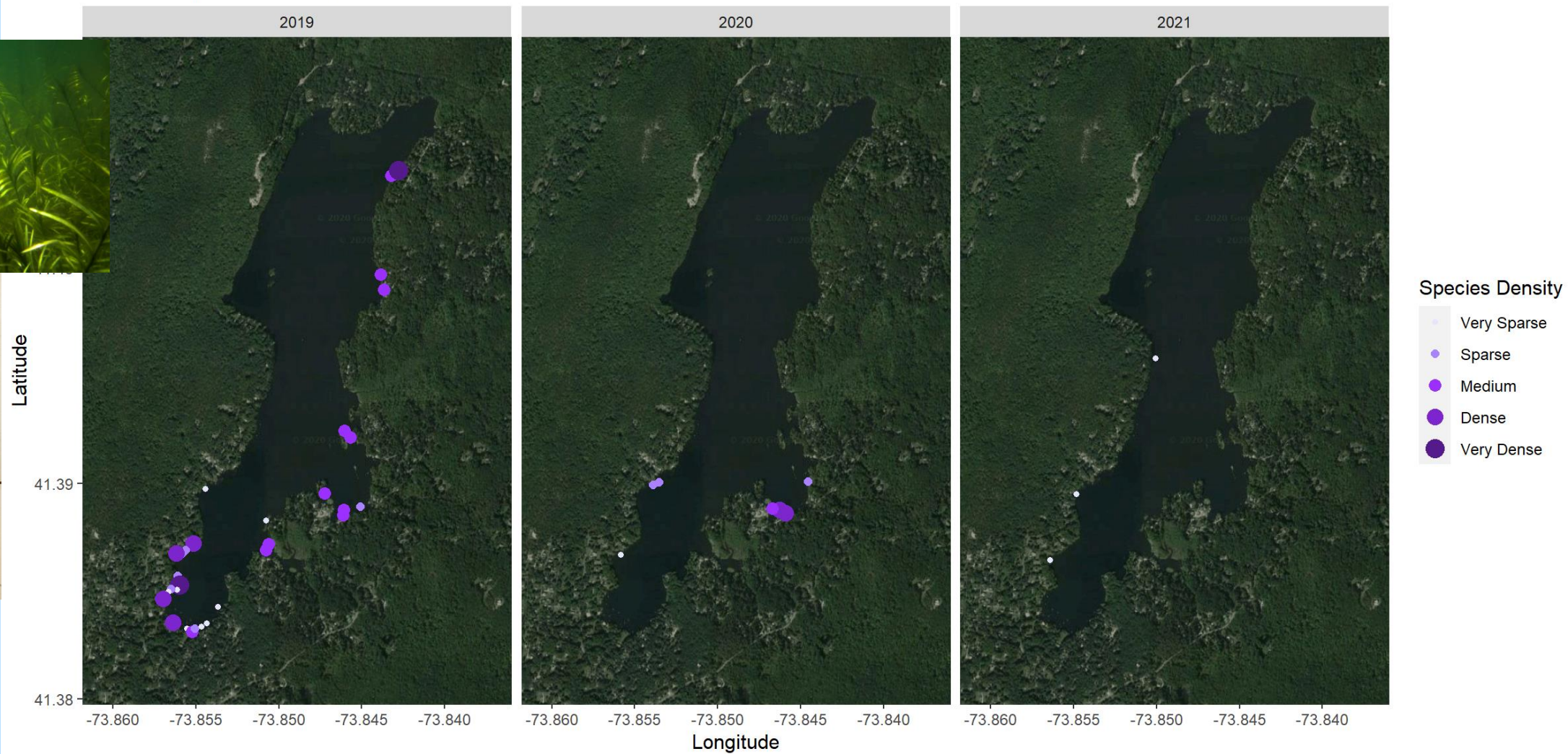


Photo credits to  
Brendon Butterfield





# Alternatives – for Beaches/dock areas/swim areas

(In addition to Grass carp - certain areas require different techniques)

- **Benthic barriers** – DEC permit; will be able to manage shallow, difficult to access areas
  - Appropriate for beaches or private dock areas, small areas
  - Must be taken out for winter & cleaned annually
  - May actually kill the plants & prevent from regrowing in swim areas
- **Diver hand harvesting or suction harvesting** – DEC permits; to manage swim areas that are heavily sloped and other difficult to access areas where harvester cannot get to easily
  - Some residents say they already take it upon themselves to hand-remove milfoil and other plants in their swim areas a couple times per season, but large-scale projects by a diving contractor require a permit





## Alternatives – for whole coves with dense Milfoil

- ▶ **Aquatic herbicides** (spoke about this last year, but LOMAC needs to make sure that community supports selective use)
  - ▶ Plan to start with test case to prove efficacy in recreationally important areas with dense plant growth
  - ▶ **EPA & NY registered herbicides are the most well-studied and successful forms of plant control.** More science behind herbicides than any other method.
  - ▶ Recommend: **SONAR** or **ProcellaCor** for Milfoil control
    - ▶ both highly effective at targeting Eurasian milfoil
    - ▶ Less impact to native pondweeds when treated with low dose
    - ▶ ~3 years of control in one treatment
    - ▶ No sediment disturbance
    - ▶ Will not harm anything that isn't a plant
    - ▶ Reminder: NEAR does NOT sell treatments – that would be a conflict of interest – we would help you hire the right **licensed applicator**
- ▶ Meantime, mechanical harvesting will continue operation at non-treated areas



Image 2: Potential Locations for Test Herbicide Treatments

# SONAR aquatic herbicide information:

- ▶ Active ingredient: Fluridone
  - ▶ Widely used across the US, for over 30 years; no adverse health impacts to animals or humans
  - ▶ Approved for use in drinking water reservoirs
  - ▶ Mode of Action:
    - ▶ Inhibits formation of carotenoids in plants, leading to the rapid degradation of chlorophyll by sunlight, which stops the plant from being able to produce carbohydrates
  - ▶ Highly effective on Eurasian watermilfoil
    - ▶ Effective on pondweeds at higher doses
- Typical concentrations used 4-10 ppb
  - Fluridone does require long contact times, ~45-90 days, so multiple treatments are needed in one season
  - Multiple year control (personal experience)
    - Tyler lake, CT
    - South Spectacle lake, CT
    - Copake Lake, NY



# ProcellaCOR aquatic herbicide information:

- ▶ Active ingredient: Florpyrauxifen-benzyl
- ▶ Originally for weeds in rice fields
- ▶ Mode of action: Auxin mimic
  - ▶ Plant hormones that artificially and rapidly heighten plant activity, resulting in abnormal growth leading to cell and plant tissue death.
- ▶ Highly effective on Eurasian watermilfoil – without harming other plants
  - ▶ Requires less herbicide than SONAR, only 3.oz to 12 oz per acre depending on water depth.
- Short exposure requirements
  - 6 hours or less
  - Better for lakes with high outflow rates
- Successful control
  - Lake Meahagh, NY
  - Pond 3, NY
  - Paugus Bay, Lake Winnepesaukee, NH
    - 1.5 to 2 miles upstream of a drinking water source





# 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 been 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.

# LOMAC needs to hear your perspective on proposed changes to plant management!

- We need to hear public input about proceeding with applying for a NYDEC aquatic herbicide treatment permit for potential use in Abele and possibly Wildwood Coves in 2022 – LOMAC has to get quotes from licensed applicator companies – permit process starts in January 2022
- Town of Putnam Valley also plans to move forward with more proposed watershed management projects have been proposed for specific areas on public and private properties. Some easements may be required. See LMP.
- Please continue to have your septic system pumped and inspected! Take advantage of the reimbursement program from County Health Dept for updating qualified septic systems in Oscawana watershed
- Look to the LOMAC newsletters for tips and helpful way to reduce your own impact on the lake (#1 don't use fertilizers, #2 stop erosion on your property, #3 embrace natural landscapes for a healthier lake)

<http://www.putnamvalley.com/lomac>



Thank you!

Questions?