# Roaring Brook Lake Management Update

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## Talk Outline

- 2022 Water Quality Summary
- Aquatic Plant Survey Results
- Eutrosorb Trial – Preliminary Results
- 2023 Outlook

# 2022 Water Quality Summary

# Water Quality Summary

- New to 2022 Data – Three point scoring system For lake water quality
- Aimed to evaluate current lake status and account for past trends
- Each parameter gets a point depending on meeting a certain criteria

**One Point:** Seasonal Average at Or Better than Optimal Value

**One Point:** Seasonal Average Not Above Threshold Value

**One Point:** Long Term Trend is Not Increasing Over a 5-Year Period.

# Point System Description

**Table 1.** Parameters included in the optimal and threshold value matrix for evaluating lake status.

| Parameter | Optimal Value | Threshold Limit |
|---|---|---|
| **Water Clarity** | > 3 meters | < 2 meters |
| **Surface Total Phosphorus** | < 10 µg/l | > 20 µg/l |
| **Surface Total Nitrogen** | < 200 µg/l | > 600 µg/l |
| **Cyanobacteria Cell Counts** | < 2,000 cells/ml | > 20,000 cells/ml |

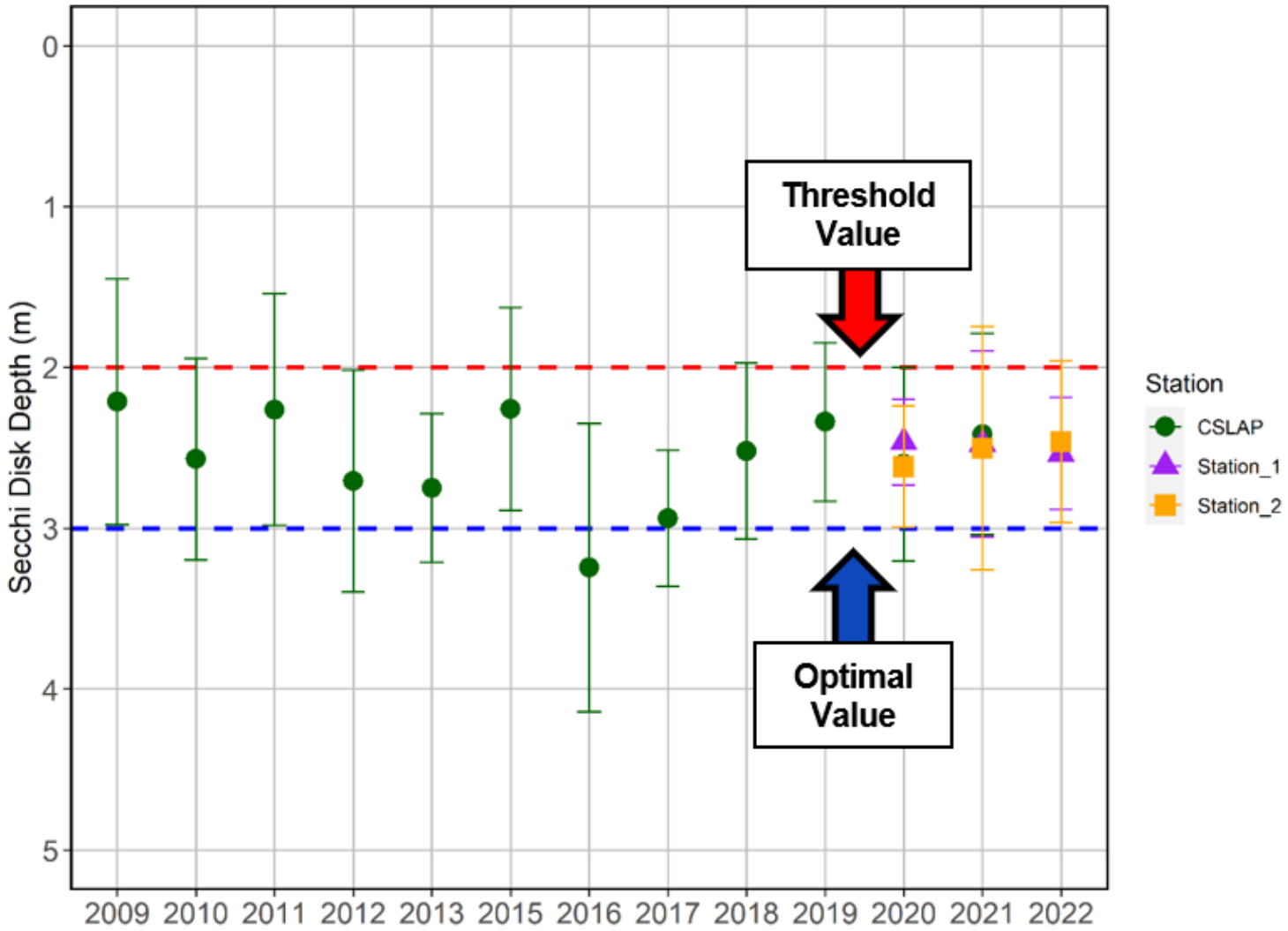
# Scorecard Table

**Table 2.** Data Scorecard for Roaring Brook Lake in 2022.

| Parameter | Seasonal Average at or Better than Optimal Value | Seasonal Average Not Above Threshold Value | Long Term Trend | 2022 Score |
|---|---|---|---|---|
| **Water Clarity (m)** | 0 | 1 | 1 | **2** |
| **Surface Total Phosphorus (µg/l)** | 0 | 1 | 1 | **2** |
| **Surface Total Nitrogen (µg/l)** | 0 | 1 | 1 | **2** |
| **Cyanobacteria Cell Counts (cells/ml)** | 1 | 1 | 1 | **3** |
| **Total** | **1/4** | **4/4** | **4/4** | **9/12** |

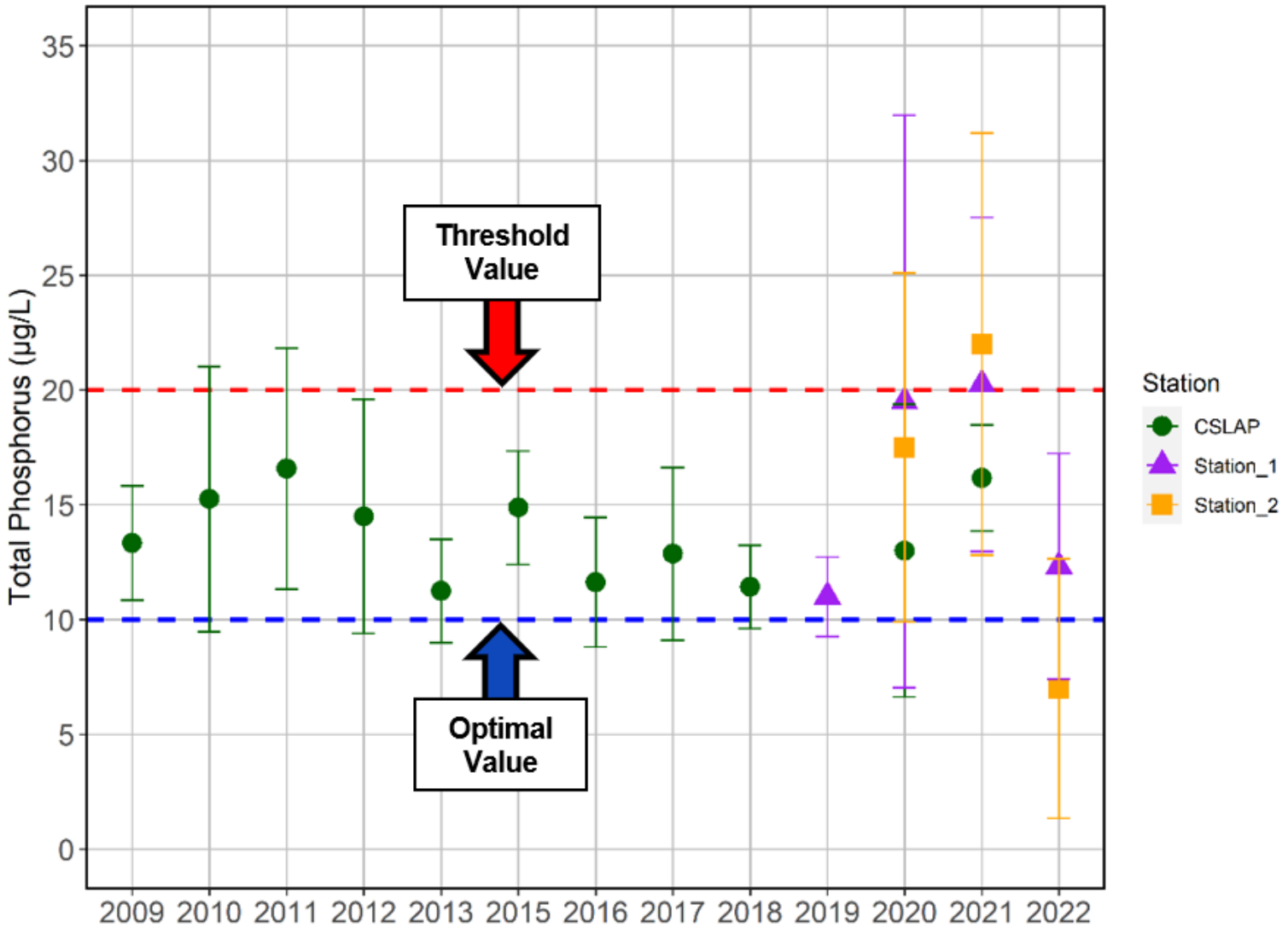
# Water Clarity (Score 2/3)

- **Water clarity was consistent with previous years, averaging 2.5 meters for the entire season.**
- **Greatest clarity reading documented in July (2.95 meters).**



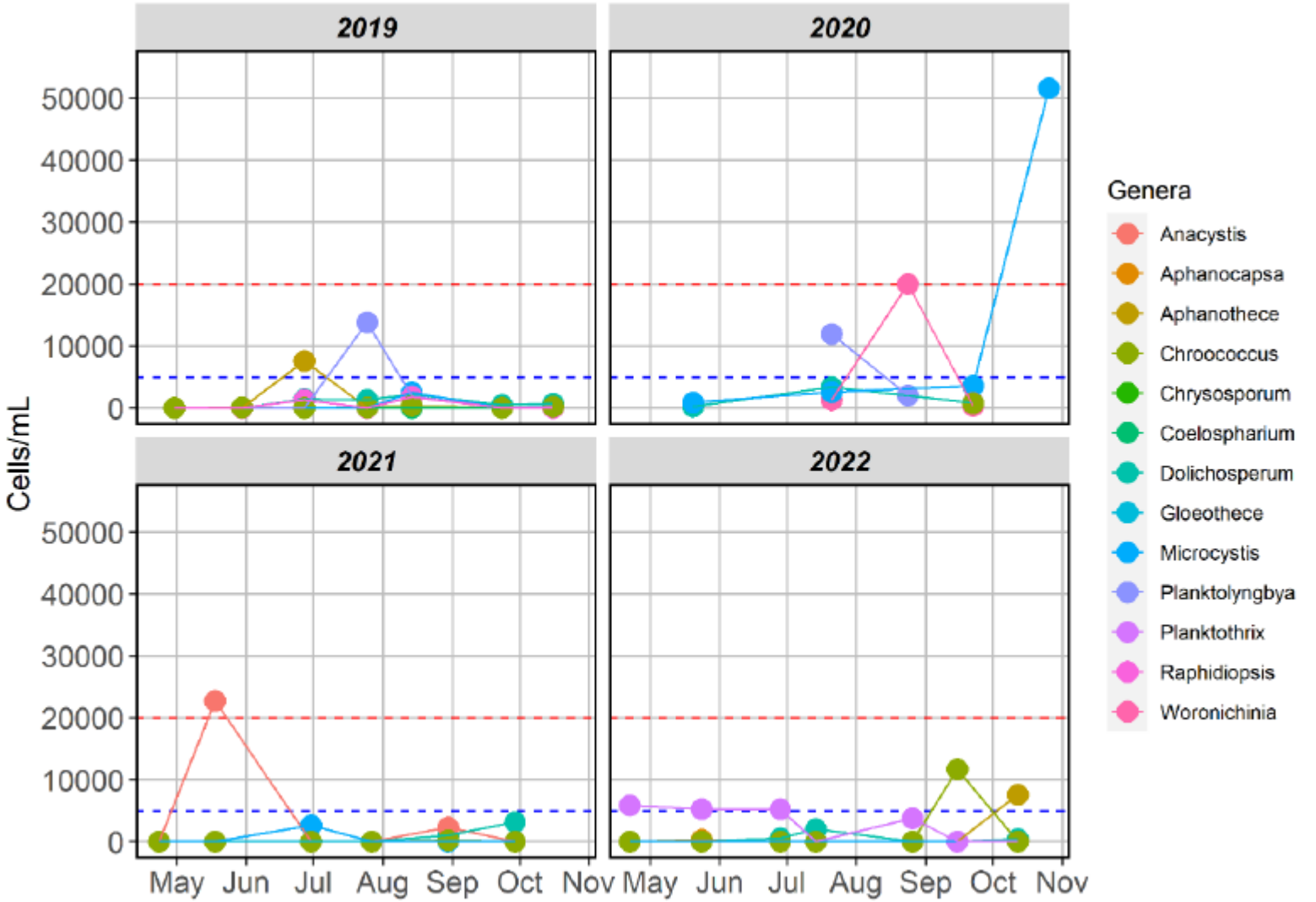
# Total Phosphorus (Score 2/3)

- **Total phosphorus concentrations were lower than 2020 and 2021 at both stations.**
- **No single phosphorus concentration exceeded the 20 µg/L state threshold.**



# Cyanobacteria Cell Counts (Score 3/3)

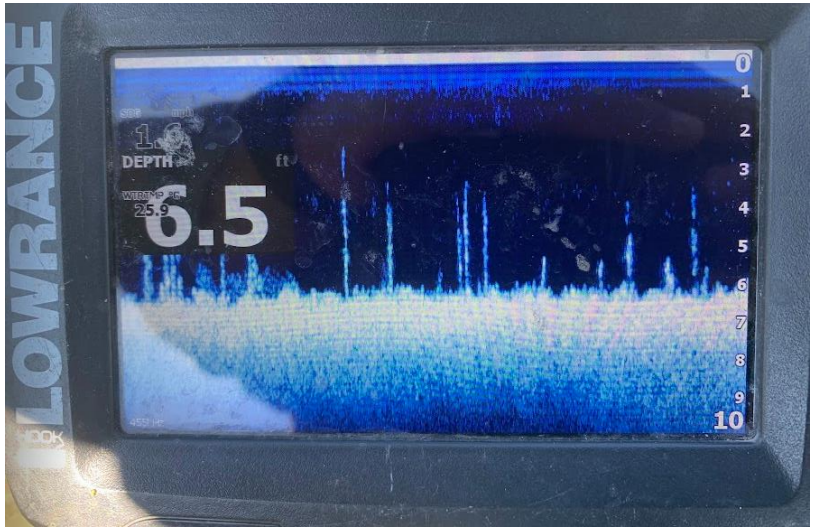
- **Cyanobacteria cell counts were low in 2022, with no single value exceeding 10,000 cells/ml.**
- **There were no single spikes in concentrations as seen in 2020 and 2021.**



# Aquatic Plant Survey

# Aquatic Plant Survey

- Last survey performed in 2019
- With decreasing grass carp numbers, aquatic plants were expected to increase lake wide.
- Survey performed in August of 2022.

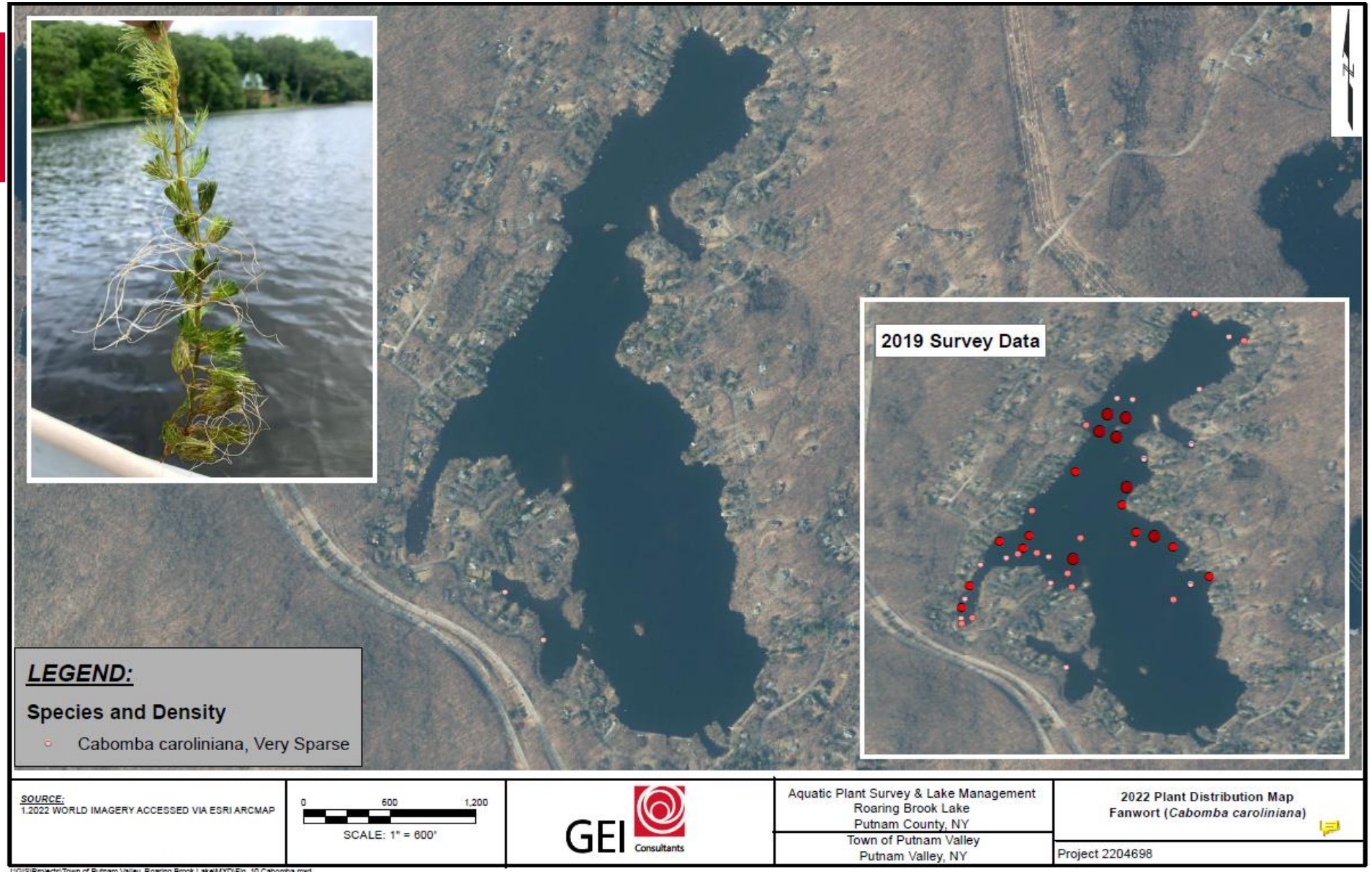



# Results

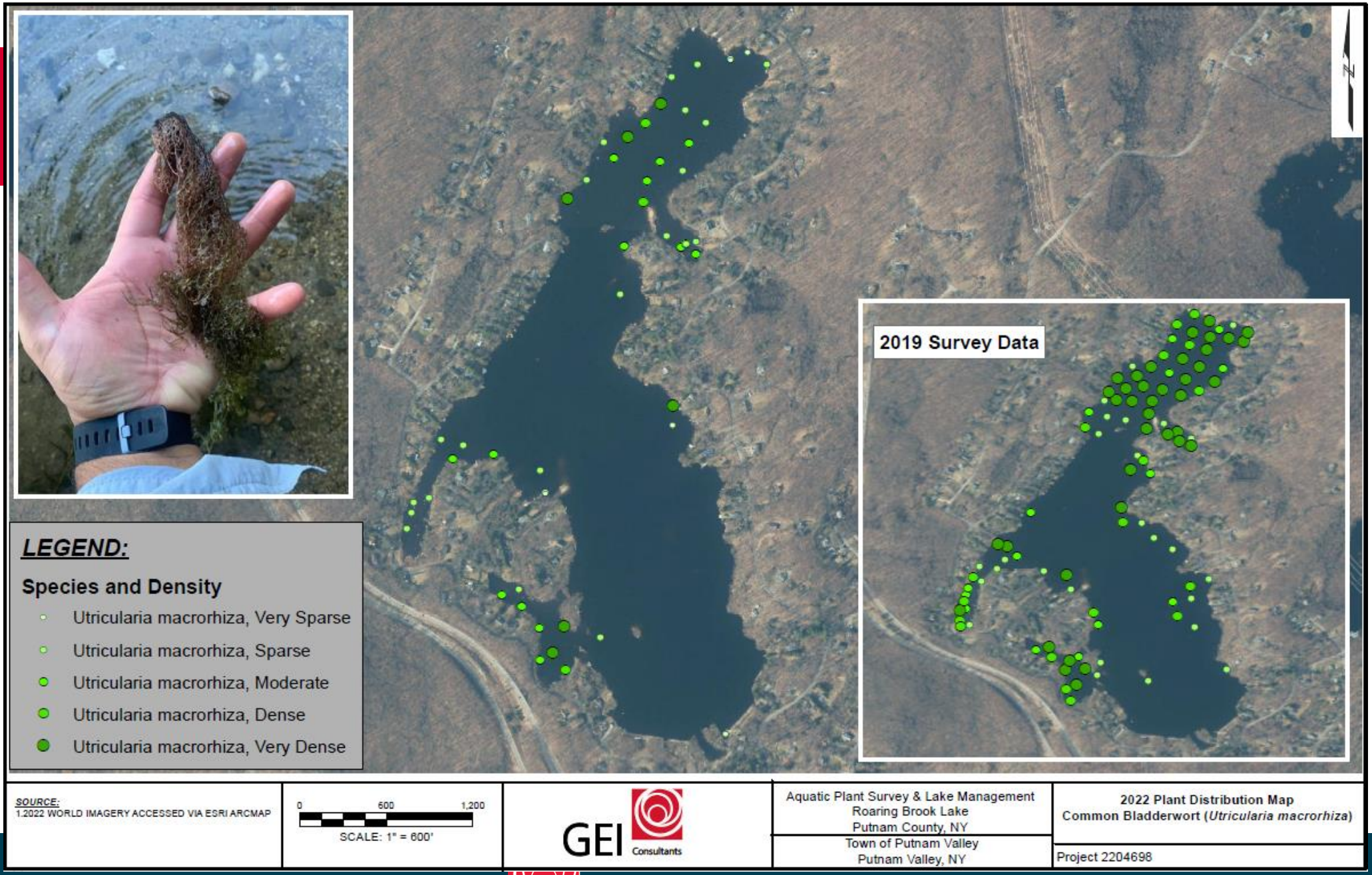
- A total of 19 species were documented on Roaring Brook Lake
- Notable Increases from 2019-2022: Lyngbya and Eurasian Watermilfoil
- Notable Decreases from 2019-2022: Fanwort and Common Bladderwort

| Scientific Name | Common Name | 2019 Points Found | Freq -- 2019 | 2022 Points Found | Freq -- 2022 | Change Btwn. Surveys |
|---|---|---|---|---|---|---|
| ***Brasenia schreberi*** | Watershield | 0 | 0% | 2 | 1% | 1% (+) |
| ***Cabomba caroliniana*** | Fanwort | 45 | 21% | 2 | 1% | -20% (-) |
| ***Callitriche spp.*** | Water Starwort | 44 | 21% | 26 | 12% | -9% (-) |
| ***Ceratophyllum demersum*** | Coontail | 12 | 6% | 2 | 1% | -5% (-) |
| ***Elatine minima*** | Small Waterwort | 0 | 0% | 9 | 4% | 4% (+) |
| ***Eleocharis aucicularis*** | Needle Spikerush | 0 | 0% | 1 | 1% | 1% (+) |
| ***Filamentous algae*** | Filamentous Algae | 10 | 5% | 3 | 1% | -3% (-) |
| ***Isoetes spp.*** | Quillwort | 0 | 0% | 1 | 1% | 1% (+) |
| ***Lyngbya wolleii*** | Lyngbya | 1 | 1% | 32 | 15% | 15% (+) |
| ***Myriophyllum spicatum*** | Eurasian Watermilfoil | 27 | 13% | 61 | 29% | 16% (+) |
| ***Najas flexilis*** | Slender Waternymph | 0 | 0% | 1 | 1% | 1% (+) |
| ***Najas minor*** | Brittle Naiad | 8 | 4% | 6 | 3% | -1% (-) |
| ***Najas spp.*** | Waternymph | 1 | 1% | 6 | 3% | 2% (+) |
| ***Nitella spp.*** | Stonewort | 62 | 29% | 52 | 24% | -5% (-) |
| ***Nothing Present*** | | 65 | 31% | 83 | 39% | 9% (+) |
| ***Phragmites australis*** | Common Reed | 1 | 1% | 3 | 1% | 1% (+) |
| ***Potamogeton amplifolius*** | Largeleaf Pondweed | 9 | 4% | 22 | 10% | 6% (+) |
| ***Potamogeton epihydrus*** | Ribbonleaf Pondweed | 1 | 1% | 0 | 0% | -1% (-) |
| ***Potamogeton pusillus*** | Small Pondweed | 1 | 1% | 0 | 0% | -1% (-) |
| ***Utricularia gibba*** | Humped Bladderwort | 4 | 2% | 0 | 0% | -2% (-) |
| ***Utricularia macrorhiza*** | Common Bladderwort | 98 | 46% | 49 | 23% | -23% (-) |
| ***Vallisneria americana*** | Eel grass | 0 | 0% | 12 | 6% | 6% (+) |

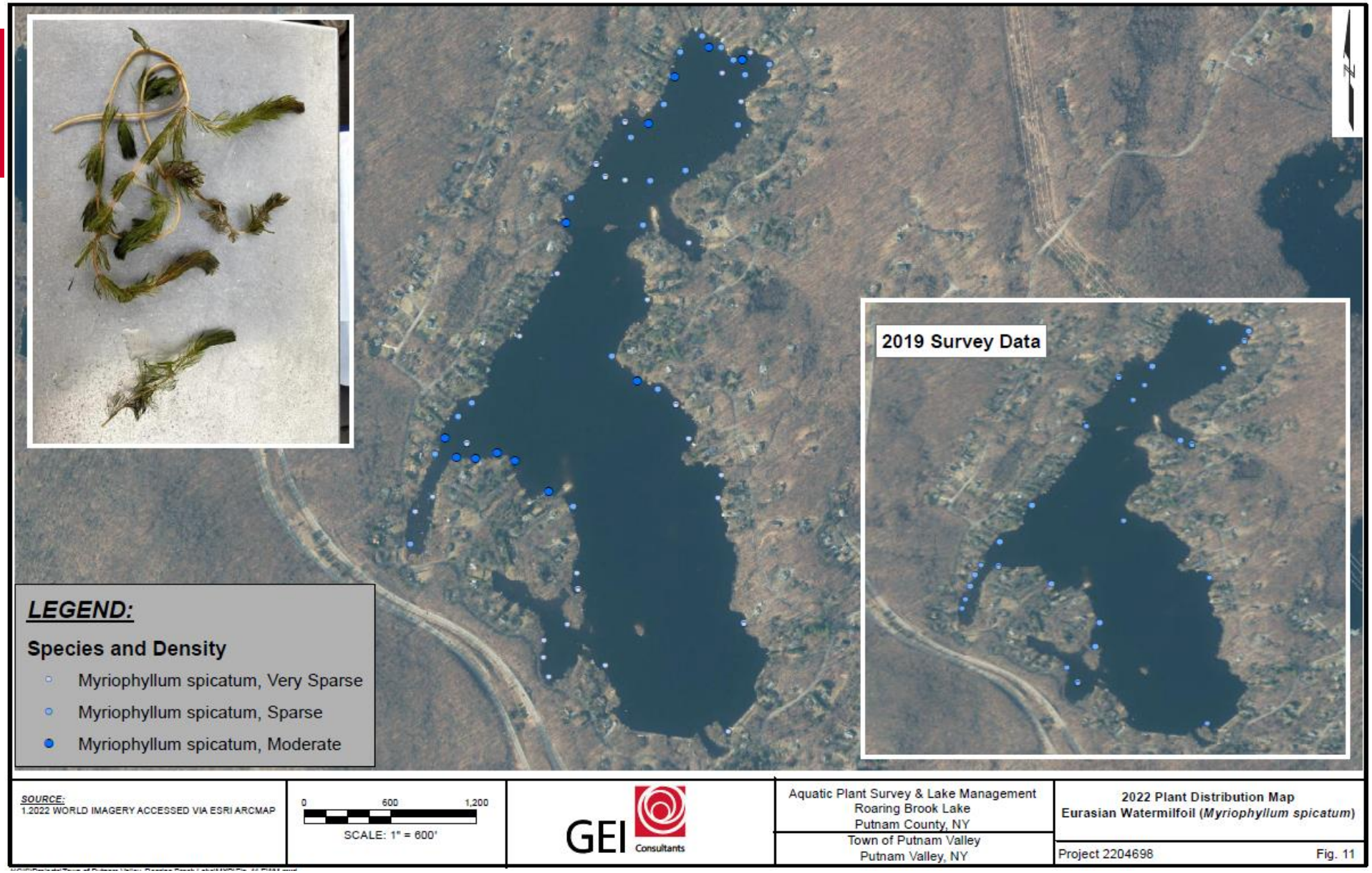
# Fanwort


2019 Survey Data
LEGEND:
Species and Density
Cabomba caroliniana, Very Sparse
SOURCE:
1.2022 WORLD IMAGERY ACCESSED VIA ESRI ARCMAP
0
600
1,200
SCALE: 1" = 600'
GEI Consultants
Aquatic Plant Survey & Lake Management
Roaring Brook Lake
Putnam County, NY
Town of Putnam Valley
Putnam Valley, NY
2022 Plant Distribution Map
Fanwort (Cabomba caroliniana)
Project 2204698

# Bladderwort



# Milfoil


2019 Survey Data
LEGEND:
Species and Density
Myriophyllum spicatum, Very Sparse
Myriophyllum spicatum, Sparse
Myriophyllum spicatum, Moderate
SOURCE:
1.2022 WORLD IMAGERY ACCESSED VIA ESRI ARCMAP
0
600
1,200
SCALE: 1" = 600'
GEI Consultants
Aquatic Plant Survey & Lake Management
Roaring Brook Lake
Putnam County, NY
Town of Putnam Valley
Putnam Valley, NY
2022 Plant Distribution Map
Eurasian Watermilfoil (Myriophyllum spicatum)
Project 2204698
Fig. 11

# Aquatic Plant Summary

- The aquatic plant community has shifted from 2019 to 2022.
- Most of the middle of the lake is devoid of plants, which was not the case in 2022
  - Indicated by bladderwort and fanwort absence.
- Some plants in the shallows are increasing, such as Eurasian watermilfoil and largeleaf pondweed.
- Much of the shore is still very rocky and sandy, especially where there is a significant slope.
- Aquatic plants are not increasing overall as thought previously.

# Additional Thoughts – Aquatic Plants

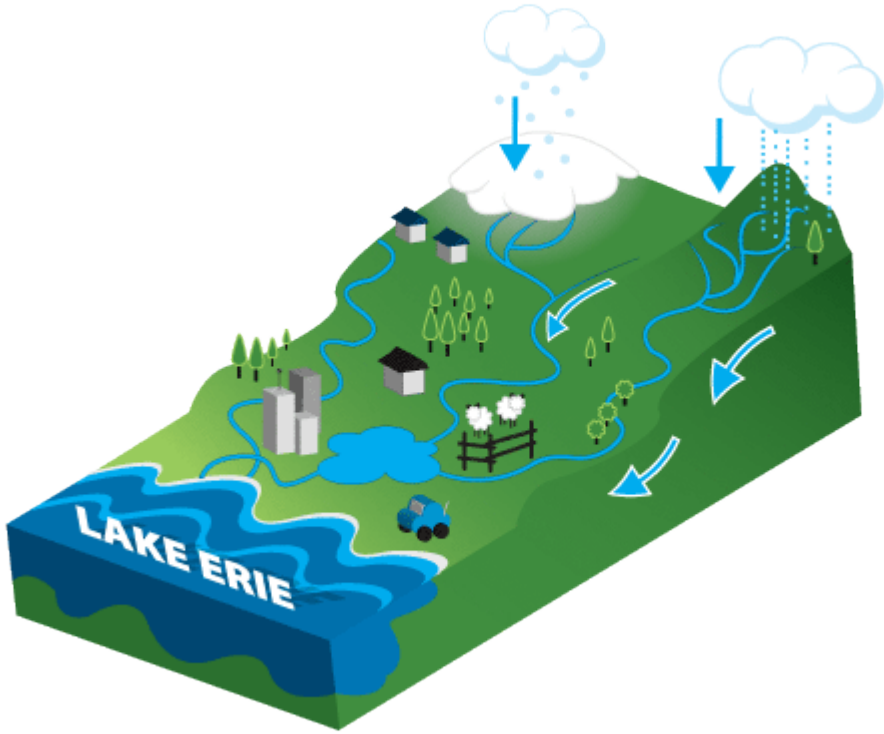
- Since carp numbers are still declining, Roaring Brook Lake will still have to consider aquatic plant management techniques in the near future.
- Eurasian watermilfoil will most likely be the next aggressive invader
  - Based on current distribution and depth profile

- Aquatic plant management techniques to consider:
  - Diver Assisted Suction Harvesting
  - Benthic Mats
  - Herbicide Application
  - Grass Carp

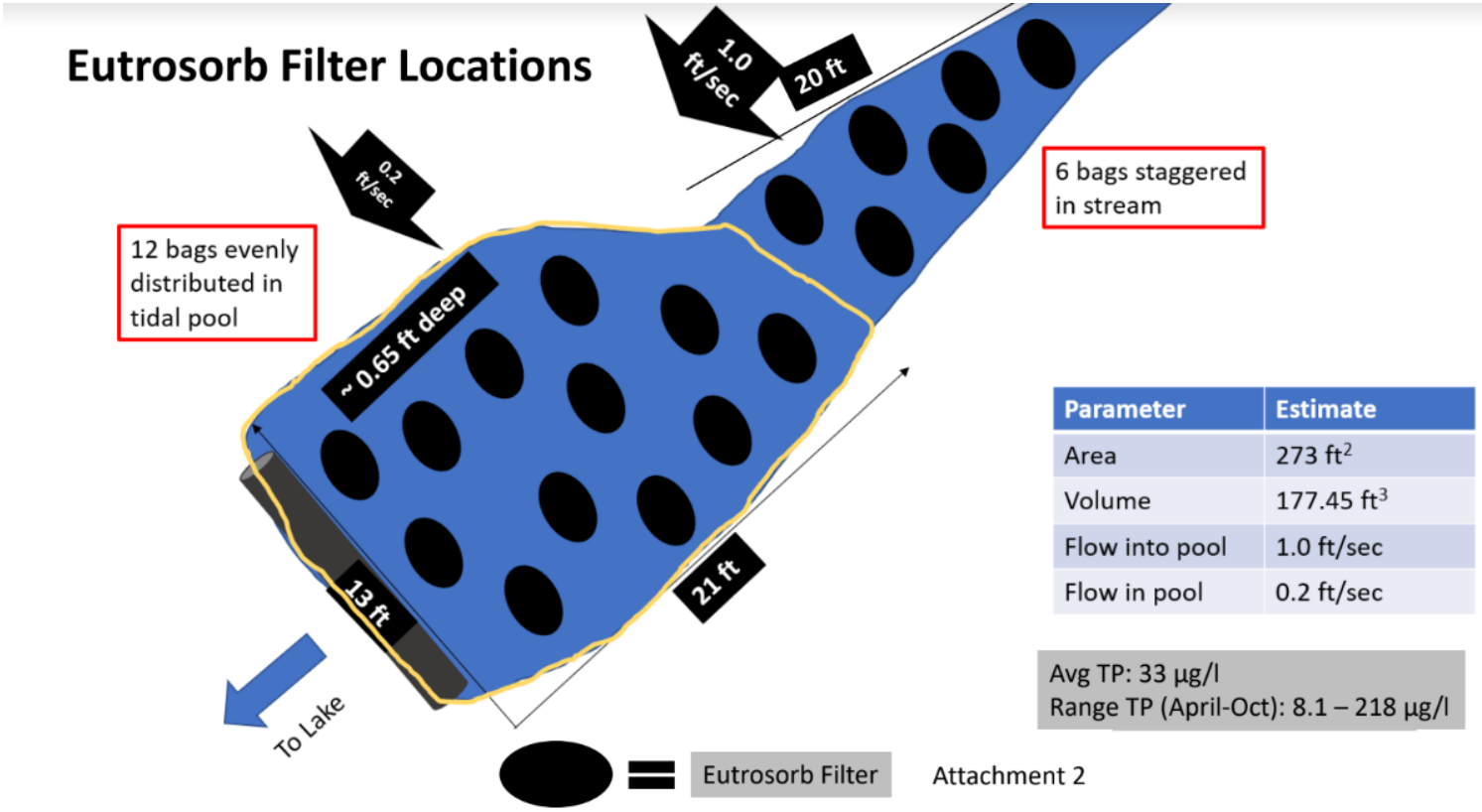
# Eutrosorb Trial

# Eutrosorb Trial

- The watershed is the ultimate source of nutrients entering Roaring Brook Lake.
- Nutrients can be managed in the watershed via managing stormwater and septic system inputs.
- To manage stormwater, either infiltration of water or additional treatment is required.
- Eutrosorb is a proprietary nutrient binding media, specifically formulated to bind soluble reactive phosphorus (SRP).




# Install Date: 4-28-23
# 1 Month Check: 5-23-23




| Parameter | Estimate |
|---|---|
| Area | 273 $ft^2$ |
| Volume | 177.45 $ft^3$ |
| Flow into pool | 1.0 ft/sec |
| Flow in pool | 0.2 ft/sec |

Avg TP: 33 µg/l
Range TP (April-Oct): 8.1 – 218 µg/l

# 1 Month Post

| Above and Below TP and SRP | | | |
|---|---|---|---|
| **Date** | **Sample** | **SRP (ug/L)** | **TP (ug/L)** |
| **4/28/2023** | Above Bags | 3.4 | 17.4 |
| **4/28/2023** | Below Bags | 3.5 | 17.8 |
| **5/23/2023** | Above Bags | 13.2 | 14.6 |
| **5/23/2023** | Below Bags | 14.7 | 9.3 |

| Sediment TP (ug/g) | | |
|---|---|---|
| **Sample ID** | **4/28/2023** | **5/23/2023** |
| **3** | 8.2 | 14.2 (+) |
| **6** | 5.1 | 6.8 (+) |
| **9** | 6.6 | 7.3 (+) |
| **14** | 9.4 | 9.1 (-) |
| **17** | 8.6 | 10.6 (+) |
| **18** | 15.6 | 9.7 (-) |

# Eutrosorb Trial (What Have We Learned)

- Eutrosorb is uptaking soluble reactive phosphorus from Roaring Brook
- April 28th to May 23rd had some rain (4.41 inches total)
- Difference in SRP and TP in brook between April and May.
- Periphyton growth may be an issue for binding sites.
- Future Samplings: July (3 MAT), October (6 MAT), January (9 MAT).