

# Palmer Lake

## Aquatic Vegetation and Water Quality Study

# Aquatic Ecosystem Consulting

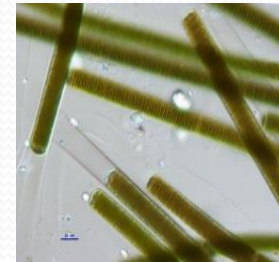
- About us
  - Environmental consulting firm located in Putnam County, NY
  - Providing water quality testing for
    - private homeowners
    - lake associations
    - local governments
  - Over 30 years of combined experience
  - Experts in evaluating the ecological health of lakes

# Aquatic Ecosystem Consulting

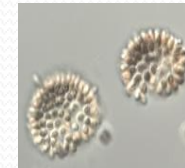
- Who are we?
  - Ms. Alissa Perrone (co-founder)
    - Master's in Biology/Aquatic Ecology
    - Over 15 years of experience
      - researcher and consultant in the Aquatic Sciences
  - Mr. Steve Di Lonardo (co-founder)
    - Master's in Biology/Aquatic Ecology
    - Over 15 years of experience
      - Environmental consulting, drinking water research, public health

# Aquatic Ecosystem Consulting

- What do we do?
  - **Lake Ecosystem Assessments**
    - Algal bloom and monitoring/testing
      - *Algae ID (community composition)*
      - *Toxicity (identify toxic algal species)*
    - Water quality testing
      - *Nutrients (N,P)*
      - *Physical (clarity, temperature, oxygen)*
      - *Chemical (pH, conductivity, alkalinity)*
    - Aquatic plant surveys
      - *Identify plant species*
      - *Measure plant biomass/percent cover*
  - **Lake Ecosystem Management**
    - Develop and oversee a management strategy to meet the stakeholder's objectives.
    - “Maintenance Control” not “Crisis Management”



*Lyngbya*  
(*Limnoraphis*) sp. A



*Gomphosphaeria*  
*aponica*



*Microcystis*  
*aeruginosa*



# Aquatic Ecosystem Consulting

- Why were we hired?
  - Over 80% of Palmer Lake is covered with aquatic plants
  - Difficult to boat and swim
  - Present management technique is not effective for whole lake
  - Looking for a more proactive approach to management



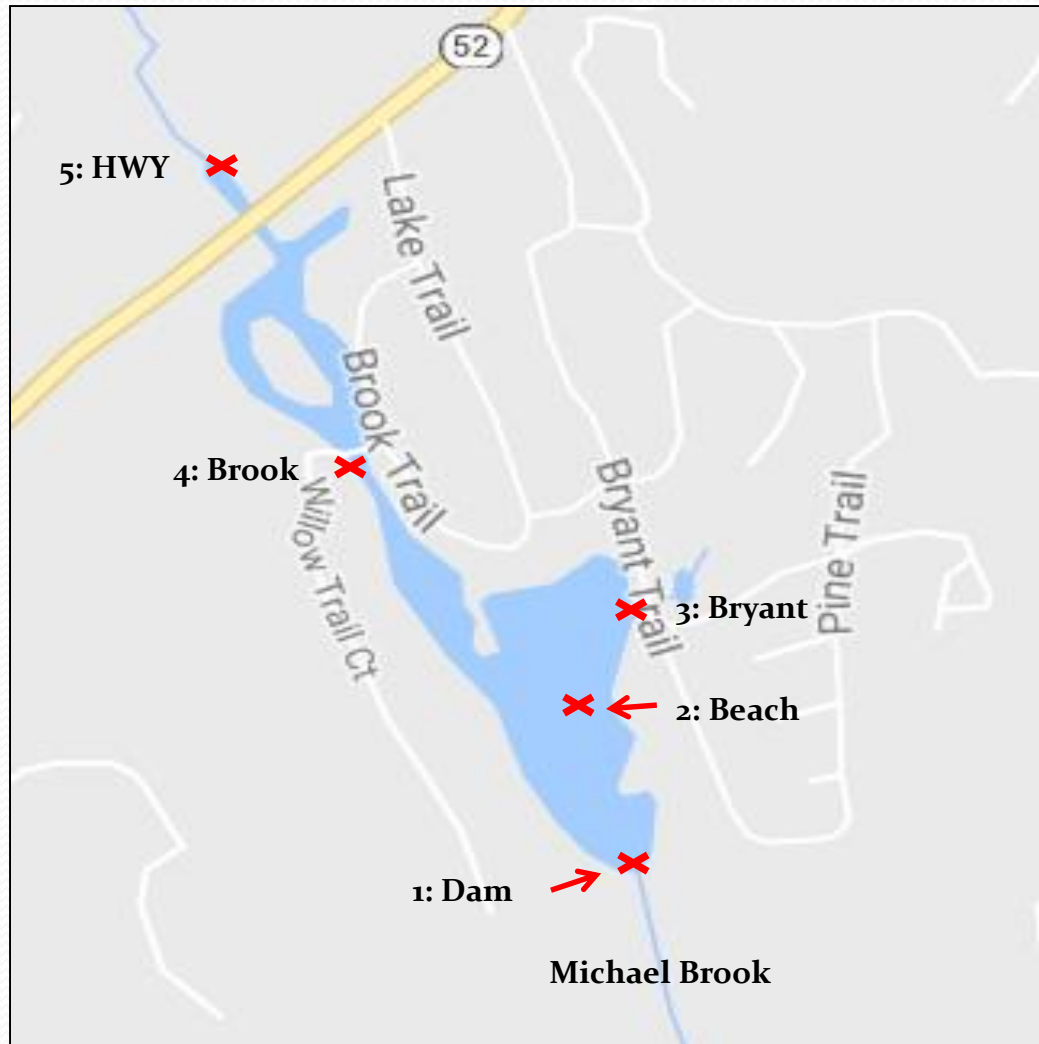
# Sampling Protocol

- Scope of Work
  - Collection, identification and mapping of aquatic plants
  - Measurement, collection and analysis of water quality variables
  - Collection and identification of algae
  - Data analysis, report preparation and management recommendations

# Sampling Protocol (cont.)

- How often and where we will sample?
  - **Water Quality**
    - Seasonal sampling (summer 2016, fall 2016, and spring 2017)
      - better picture of the lake's ecological health throughout the year.
    - Five sites
      - Provides us with a proper representation of the lake's water quality
      - Aids us in monitoring possible water quality issues stemming from the tributaries that are entering the lake.

# Water Quality Sampling

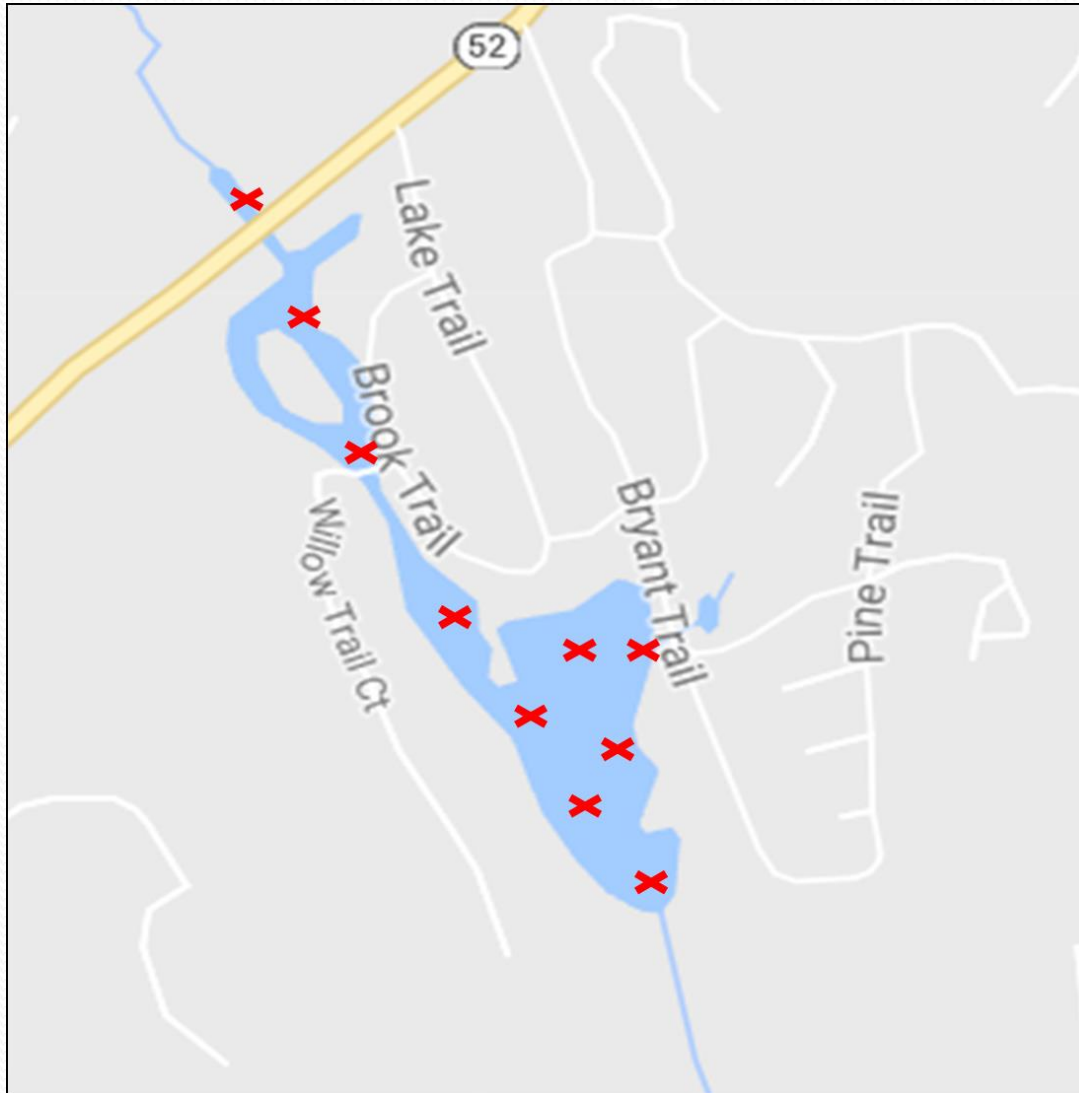




# Sampling Protocol (cont.)

- How often and where we will sample?
  - **Vegetation Study**
    - Annually (summer)
    - Ten sites – plant identification and biomass
      - Best representation of plants species in the entire lake (invasives present?)
    - Whole lake – percent cover
      - More accurate percent coverage analysis (required by DEC for carp permit)
  - Furthermore, sampling multiple sites at different times of the year will provide us with a larger dataset by which to guide our management recommendations

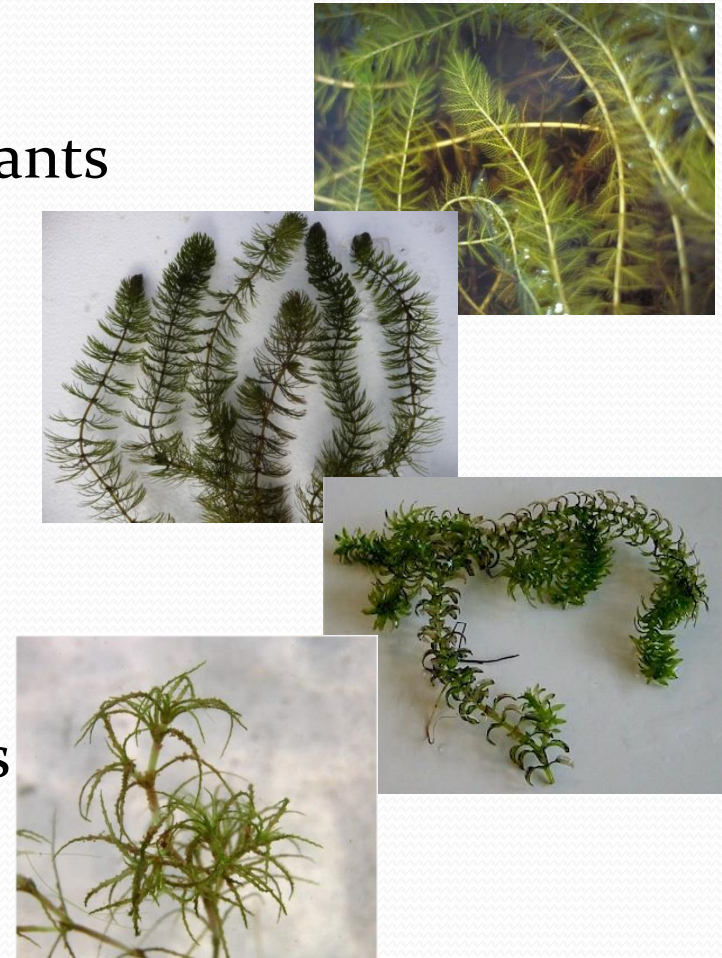
# Vegetation Study



# August 2016 Observations

- **Aquatic Vegetation**

- 88% of lake covered in aquatic plants
- Four species of plants found
  - Eurasian Milfoil (*Myriophyllum*)\*
  - Coontail (*Ceratophyllum*)
  - Waterweed (*Elodea*)
  - Brittle Waterlily (*Najas*)\*
- 40% Eurasian Milfoil
- Duckweed present at 70% of sites



# August 2016 Observations (con't)

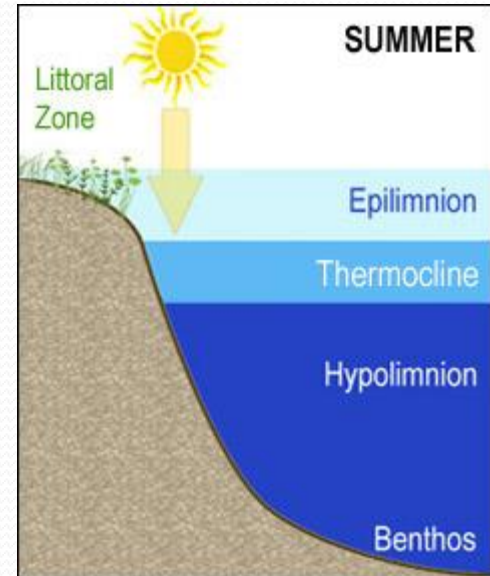
- **Water Quality**

- Low levels of oxygen; 4 of 5 sites
  - Dense plant canopy leads to low oxygen
  - Effects game fish populations
- Water clarity is fair
  - Secchi depth – 7 feet
- Lake exhibits stratification
  - Higher O<sub>2</sub> vs other sites; fewer plants
- Conductivity and alkalinity within normal range



# Management Issues

- **Excessive aquatic vegetation**
  - Shallow profile throughout most of the lake; light abundant
  - internal and external nutrient loading
- **Nuisance waterfowl**
  - Canada geese



# Proposed Solutions

- Phase I: In-lake; Integrated Plan
  - **Aquatic vegetation**
    - Lake drawdown - late fall 2016
      - Exposure to freezing kills seeds and root systems
      - **Not the only answer**
      - Can promote other species (i.e. cattails, phragmites)
    - Stocking sterile triploid carp
      - Carp will eat vegetation (body weight each day)
      - Last about 8 – 12 years
      - Can cause algae blooms if carp overgraze
      - May lead to required algaecide treatment



# Proposed Solutions (cont.)

- **Nuisance waterfowl deterrent**
  - “Away with geese” lights
    - Only effective ~10m radius (need 8-10 lights around beach)
  - Goose barrier around dock
    - Sticks at each corner with rope attached
    - Prevents geese from roosting/defecating on dock/beach area



Reducing geese will result in less exceedances in fecal coliform counts; fewer interruptions in swimming



# Next Steps

- Drawdown
  - Last week of October/first week November
- Carp Stocking
  - Repair fish barrier to min. 1.5-inch fence hole
  - Complete and submit permit application
    - Short form – last permit was issued in 2004
  - Meet with DEC; inspection of fish barrier
  - Carp stocking Spring 2017





Questions?