

Project Squeaky Clean: Mirror Lake Water Quality

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Project Motivation & Goals

Healthy lakes and rivers are essential for both people and wildlife, but many in the U.S. are threatened by pollution from runoff, waste, and human activity. According to the U.S. Environmental Protection Agency, nearly half of the assessed lakes and reservoirs are considered impaired, often due to nutrient buildup, harmful algae, and low oxygen levels (EPA, 2023).

Mirror Lake in Meriden, Connecticut, is showing some of these warning signs. I noticed green water, trash in and around the lake, and large amounts of geese feces. During warmer months, the lake sometimes has dead fish and visible algae blooms. As someone who visits this popular public space often, I became **concerned about the health of the lake** and the safety of the people who use it for walking, fishing, and other activities.

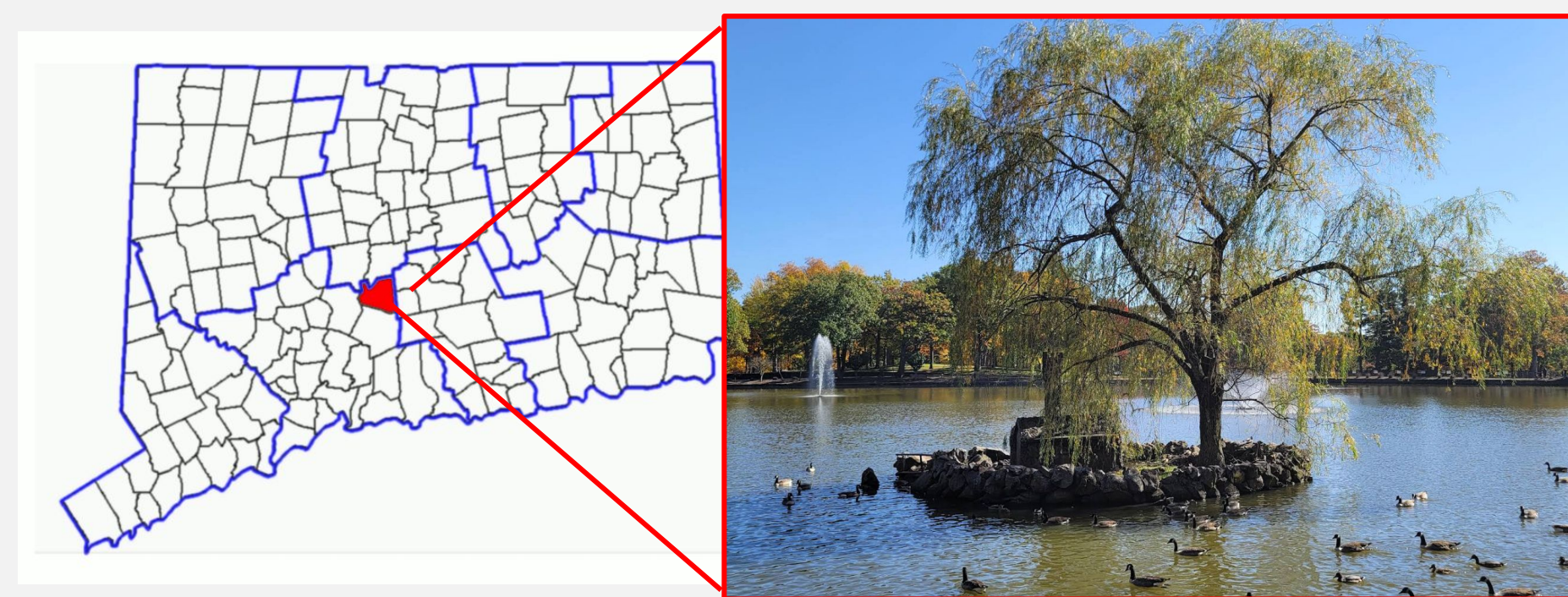


Figure 1. Photo of Mirror Lake by Google user A. B. M Hasan Talukder (left) and map of Connecticut showing the town of Meriden, where the project took place (right)

To address these concerns, I set **three goals for my project**:

1. Organize a community cleanup of the lake and its surroundings
2. Test and evaluate the water quality of Mirror Lake
3. Raise awareness about how our actions can cause water pollution

Water Quality Research

Water Testing

- Preliminary water testing occurred on 10/30/24 (Fig. 7) and water samples were collected 3/10/25 (Fig. 4) at the north (inlet), northeast (shoreline), and south (outlet) areas of the lake.
- Parameters measured in the field: Phosphate, pH, Conductivity, Nitrate, and Total Dissolved Solids (TDS)
- Water samples were also collected on 3/10/25 and submitted to the UConn Center for Environmental Science and Engineering (CESE) for more detailed laboratory analysis.

Test Results & Interpretation

- High levels of Phosphorus at the Outlet (see Table 1)
- Slightly elevated NOx and pH at the Outlet
- The Outlet of Mirror Lake was determined to be eutrophic to hypereutrophic, meaning the water is cloudy with nuisance algal blooms, and likely not able to support healthy aquatic wildlife.



Figure 4. Testing water in the lake (left); **Figure 5.** Water testing at the CESE laboratory (center and right)

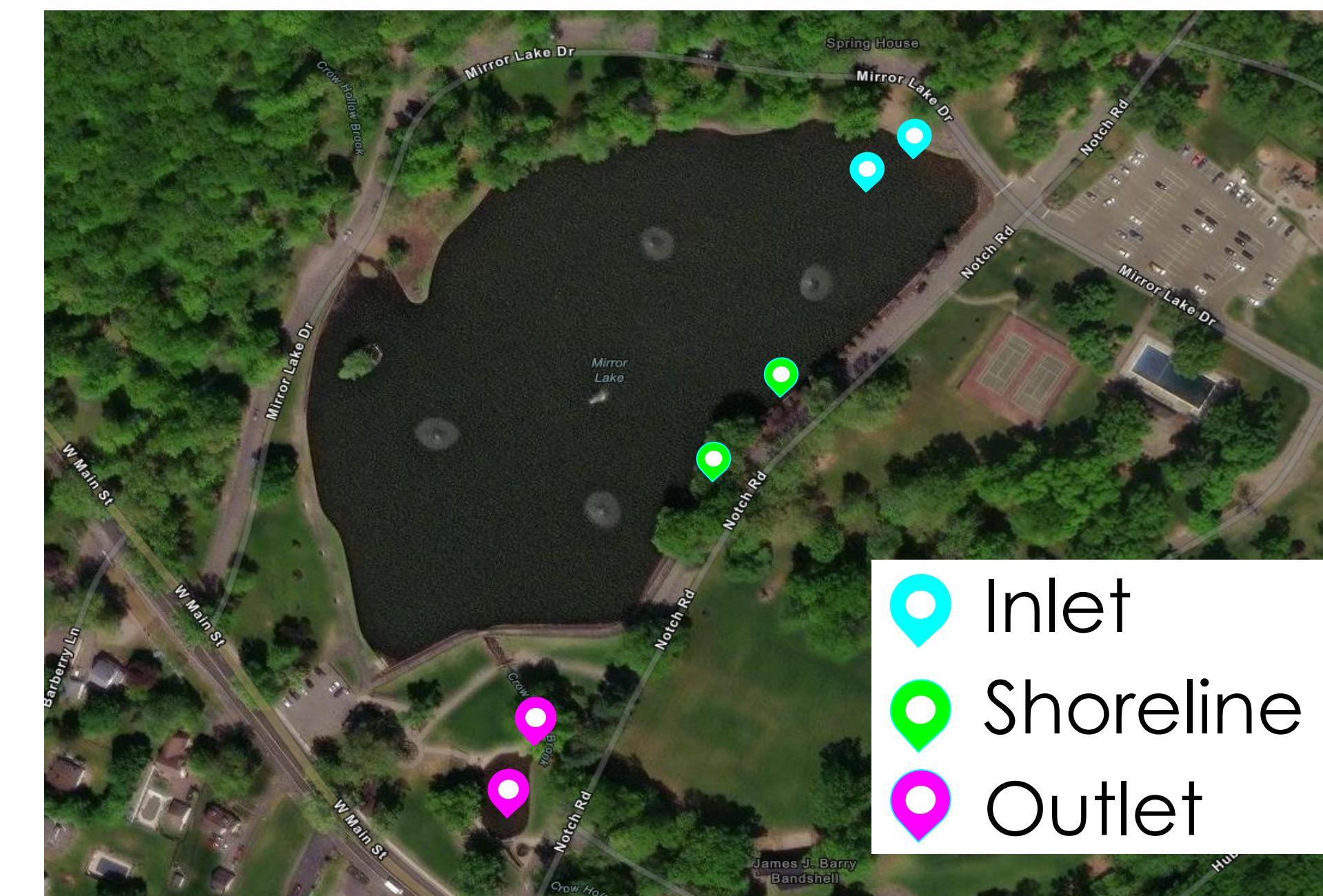


Figure 6. Water sample locations (above); **Figure 7.** Tamara Parks and Ryan Perusier testing water quality (top right); **Figure 8.** Algae bloom at Mirror Lake, taken by Ryan Perusier (bottom right)



| Sample Location | Ammonia mg/L | Nitrogen Oxide mg/L | Total Phosphorus mg/L | pH unitless | Chloride mg/L | Conductivity µS/cm |
|-----------------|----------------|---------------------|-----------------------|------------------|----------------|--------------------|
| Inlet | 0.0065 Okay | 0.141 Okay | 0.049 Elevated | 7.45 Okay | 131.85 Okay | 574 Okay |
| Shoreline | 0.006 Okay | 0.143 Okay | 0.043 Elevated | 7.7 Okay | 129.85 Okay | 541.5 Okay |
| Outlet | 0.0105 Okay | 0.198 Elevated | 0.112 High | 7.85 Elevated | 130.25 Okay | 561.5 Okay |

Table 1. Results from the CESE Lab testing the collected water samples.

Community Cleanup Event

Project Planning

- Chris Bourdan, the Meriden Parks & Recs Director, helped me recruit a volunteer youth group, Ball Headz, for a cleanup event
- Contacted Ball Headz, a community youth group to engage in a service project
- Received approval to conduct cleanup at Mirror Lake
- Planned and advertised the event



Cleaning Up Mirror Lake

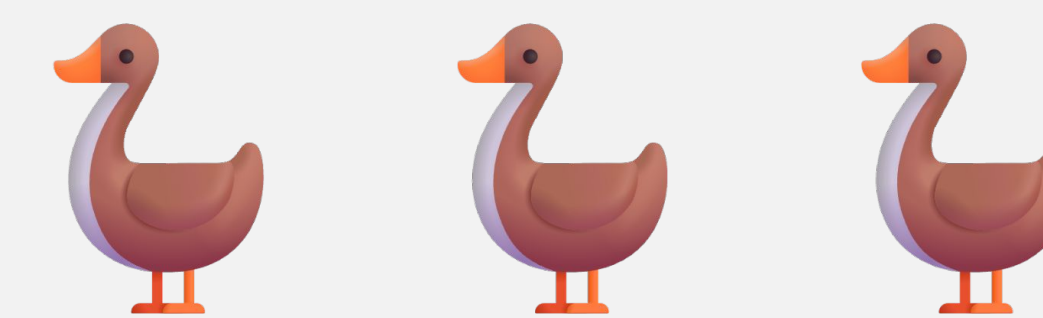
- The cleanup took place on October 14, 2024
- There were a total of eleven volunteers, including me
- We used trash bags, trash pickers, and gloves to gather physical trash along the shore perimeter and in the water, where I had the unexpected experience of falling in the lake
- Afterwards, Chris Bourdan was so nice as to buy the group lunch



Figure 2. The Ball Headz youth group cleaning the area around the lake (left); **Figure 3.** Ball Headz logo (right)

Increasing Awareness & Building Connections

- During the cleanup event I had the opportunity to inform the youth participants about different contributing factors of water pollution, including:
 - animal waste
 - garbage/litter
 - agricultural and urban runoff
- After I met some of the Ball Headz group, I realized that it wasn't the first time I had met them, I had seen them in other clean ups, events, and other community involved activities. I believe our partnership could be lasting, throughout other experiences as well.



Conclusion and Next Steps

- While the main part of the lake is relatively healthy, it likely experiences **excessive algae growth**, especially near the outlet, which can lead to: low dissolved oxygen levels, potentially harmful algal toxins, blockage of sunlight for plants, and degraded habitat conditions for benthic macroinvertebrates and other aquatic life.
- Pet waste and goose droppings can raise phosphorus levels in the lake, which encourages harmful algal growth. Surprisingly, four adult geese can contribute as much phosphorus as a single septic system.
- Next steps include providing solutions to safely lowering the phosphorus levels through substances such as aluminum salts, lanthanum-modified bentonite clay, and algaecides.

Acknowledgements and References

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References:

1. U.S. Environmental Protection Agency (2023). National water quality inventory: Report to Congress
2. Clean Water Fact Sheet, produced by NEMO and Connecticut Sea Grant
3. New Hampshire Department of Environmental Services