

INTRODUCTION

Storm water runoff in aquatic ecosystems is a pertinent environmental issue in urban communities. Without adequate storm water management practices, pollutants from everyday human, industrial, and agricultural activities can threaten wildlife that reside in aquatic habitats, and alter ecosystems. Bodies of water, especially, lakes, ponds, and streams/rivers, are vulnerable to runoff from agricultural products and salt contamination after storm events⁴.

The purpose of this project was to understand the water quality of Gorham's Pond in Darien, CT, a coastal town off of Interstate 95. No previous data has been collected on Gorham's Pond before this study, so the project goals include to:

- (1) obtain baseline data on the water quality of the pond
- (2) identify to what degree water quality is impacted after storm events

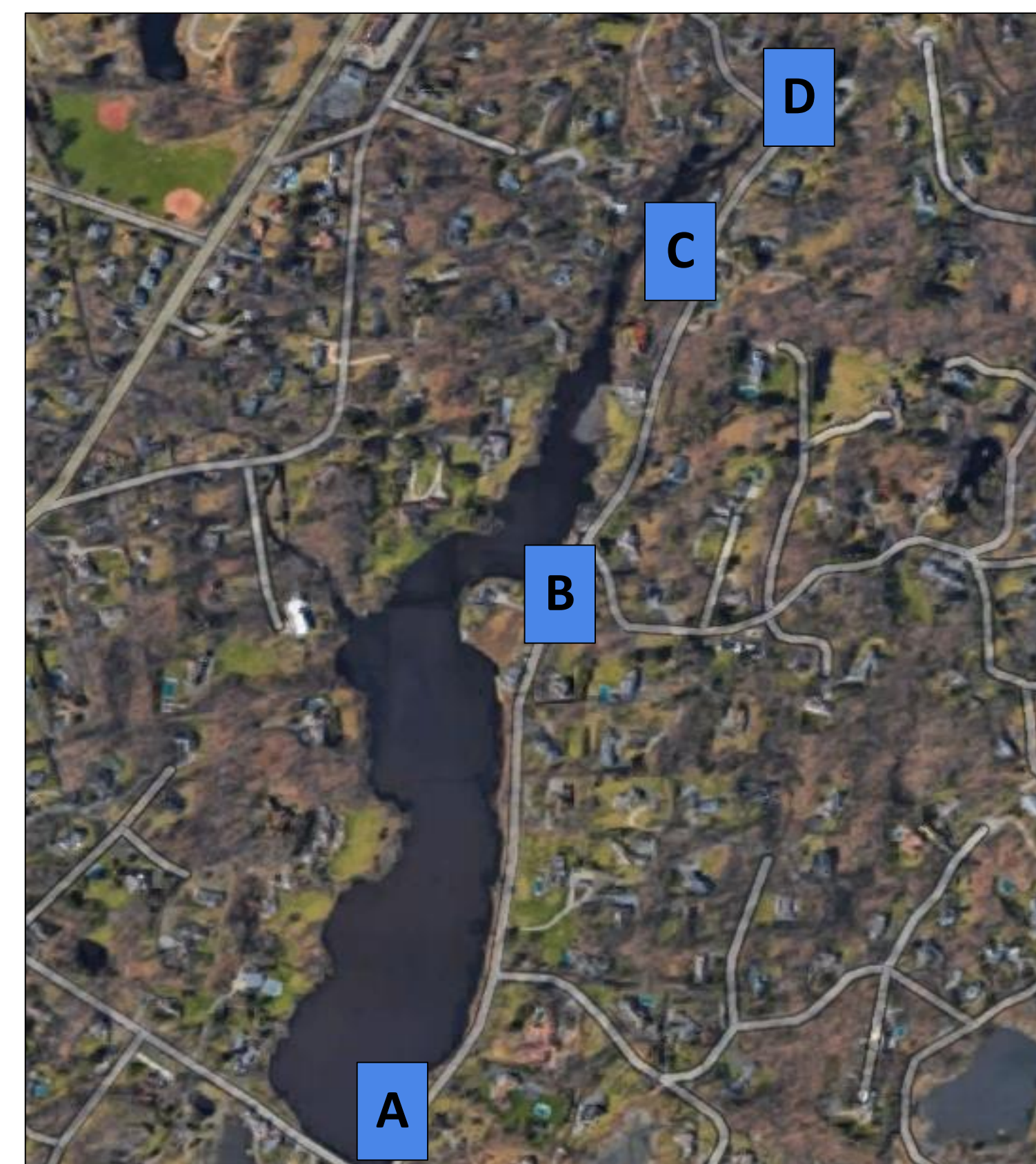


Figure 1: Aerial satellite map of Gorham's Pond in Darien, CT showing locations of sites A, B, C, D.

MATERIALS AND METHODS

- Between September 2018-January 2019, water quality testing at 4 sites (A,B,C,D; see fig. 1) took place at Gorham's Pond in Darien, CT
- Water quality parameters tested included: salinity, nitrates, nitrites, pH, phosphates, dissolved oxygen, total dissolved solids, and temperature
- Equipment utilized for testing included: thermometer, hydrometer, nitrate/nitrite testing strips, pH testing strips, phosphate testing kit, TDS meter, and DO automatic probe
- Periodic testing after significant rainfall events occurred (Rainfall events, below).



Figure 2. Collecting water samples in early September at Site D.

- Algae, aquatic plants, small fish, and other organisms were frequently observed throughout Gorham's Pond

WATER QUALITY STANDARDS^{1,2,3,4}

pH	6.5-8.5
Temperature	1-3 °C of preferred temperature by organism
Phosphates	0.0-0.1 mg/L
Nitrates	0-10 mg/L
Nitrites	0.0-0.01 mg/L (4)
Salinity	0-1,000 mg/L
Dissolved Oxygen	4-5 ppm minimum to support marine life
Total Dissolved Solids	0-500 ppm

CONCLUSIONS

Dissolved oxygen, temperature, and pH decreased gradually from September-January at all sites. Nitrates were relatively low, with the exception of some high levels at sites A and B, likely as the result of isolated runoff incidents following rain events on 10/2/18, 12/15/18, and 1/5/19. Nitrites were also relatively low, and salinity fluctuated but remained generally low. Total dissolved solids remained relatively constant with the exception of extremely high levels at site A. These levels are most likely the result of storm water runoff from the nearby bridge road crossing that runs over site A. In addition, phosphates gradually increased at all sites, showing an increased impact from stormwater runoff on the pond.

Special attention should be paid to further investigate the water quality of Gorham's Pond. Our hope is for environmental organizations and community members to become aware of pollutants in local streams. This data can be used to help gather funds to clean up the pond and protect the aquatic wildlife.

ACKNOWLEDGEMENTS & REFERENCES

Thank you to Abby Beissinger and the NRCA staff for their help in developing my project idea, providing me with resources, carrying out my testing, and helping me create this poster. Thank you to Christina Genz, Jess Castoro and SoundWaters for providing me with testing resources and being a helping hand along the way! Thank you to Elissa Johnson for encouraging me to apply for NRCA. Thank you to my friends and family for encouraging me along the way and helping on testing days! Finally, thank you to Friends of Gorham's Pond and Carol Smith, Beth and Bart Bergman, and Lucia and Matt Zachowski for generously providing testing sites!

- Fondriest Environmental "Dissolved Oxygen." Fondriest Environmental Learning Center, <https://goo.gl/sZfwkB>
- EPA South Australia. "Salinity." <https://goo.gl/r9yCHx>.
- EPA United States "Secondary Drinking Water Standards: Guidance for Nuisance Chemicals." <https://goo.gl/Rgpm2v>
- "Water Quality Parameters." Cornell University, <https://goo.gl/AhQFSv>.

RESULTS



Figure 3: Results of water quality testing of: A. Total Dissolved Solids; B. Dissolved Oxygen, C. pH, D. Temperature, E. Phosphates, F. Nitrates, G. Nitrites, H. Salinity.

Rainfall Events:

Sept: 9/10, 9/25, 9/28
 Oct: 10/2, 10/11, 10/12, 10/16, 10/27, 10/28, 10/29
 Nov: 11/2, 11/3, 11/5, 11/6, 11/9, 11/13, 11/15, 11/16, 11/24, 11/25, 11/26
 Dec: 12/2, 12/15, 12/16, 12/20, 12/21, 12/24, 12/28, 12/31
 Jan: 1/1, 1/5, 1/9, 1/19, 1/20, 1/24, 1/29