

The Value of Wetlands in the Oxoboxo Brook

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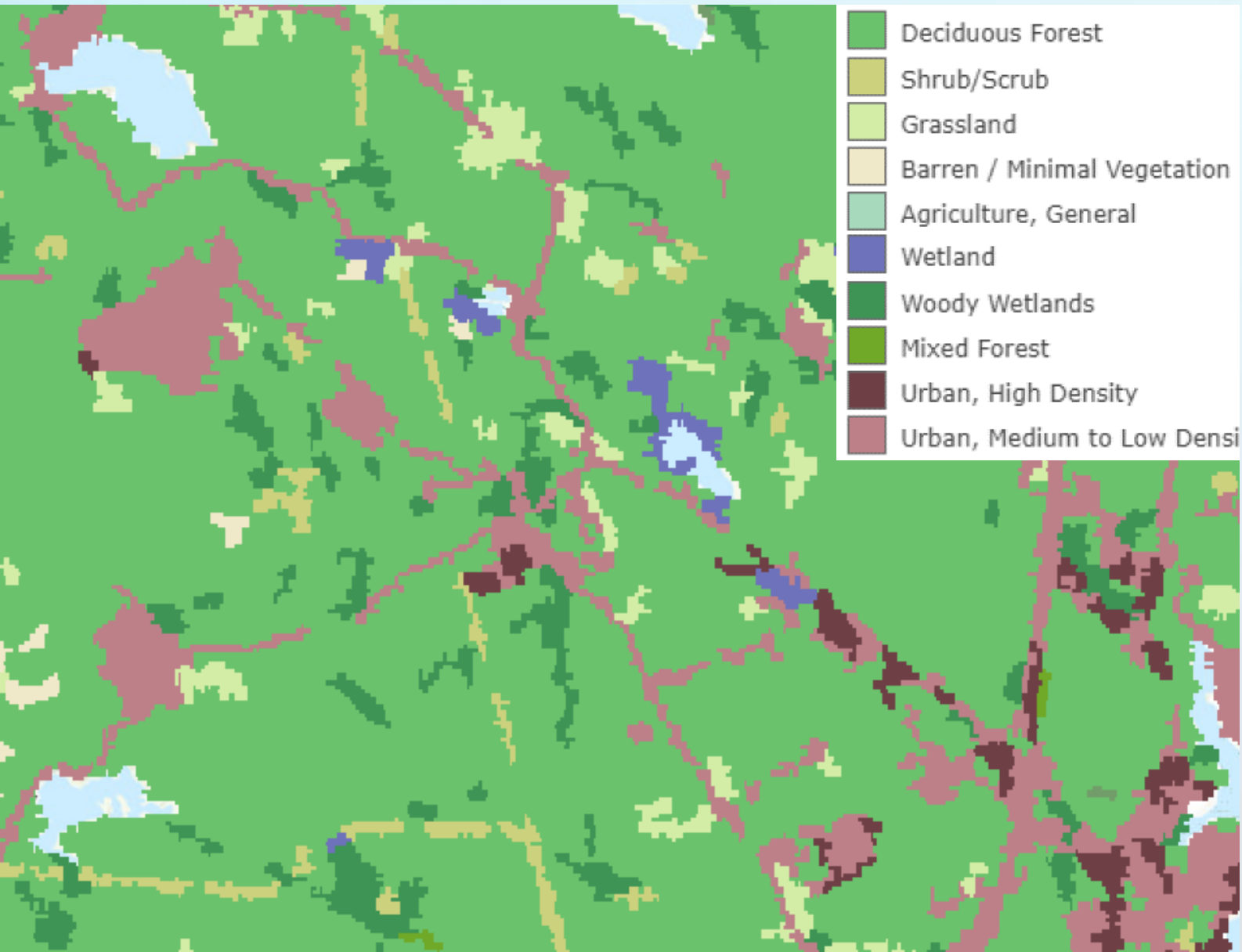
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Ledyard High School and Eastern Connecticut Conservation District

INTRODUCTION

- Wetlands are swamps, bogs, and marshes that naturally filter toxins from water.
- The Oxoboxo Brook in Montville, CT hosts a range of land cover, including both urban and wetland land types(see Fig. 1).
- Are the wetlands in the Oxoboxo Brook filtering the pollution caused by urbanization?

And, if so...



(Fig. 1) The land use coverage from Oxoboxo Lake to Goirs Pond, the entire length of the Oxoboxo Brook.

- Are the wetlands in the Oxoboxo sufficient in size to mitigate the effect of urban growth in Montville?

ACKNOWLEDGEMENTS

A BIG thank you to Judy Rondeau, my community partner, for helping me gather tools and data and process the data into results and conclusions, and to Abby for helping me out at every step of the way.

REFERENCES

Beaudoin, Therese M. 2018. MassDEP, Watershed Protection Program. *Water Quality Screening Chart. SMART Program*. Email to Judy Rondeau. Eastern Connecticut Conservation District. Natural Resource Specialist. January 24, 2018. Worcester, MA.

The Last Green Valley. 2008. *Water Data Analysis Information. Volunteer Water Quality Monitoring Program*. Putnam, CT.

METHODS

Knowing What to Look For

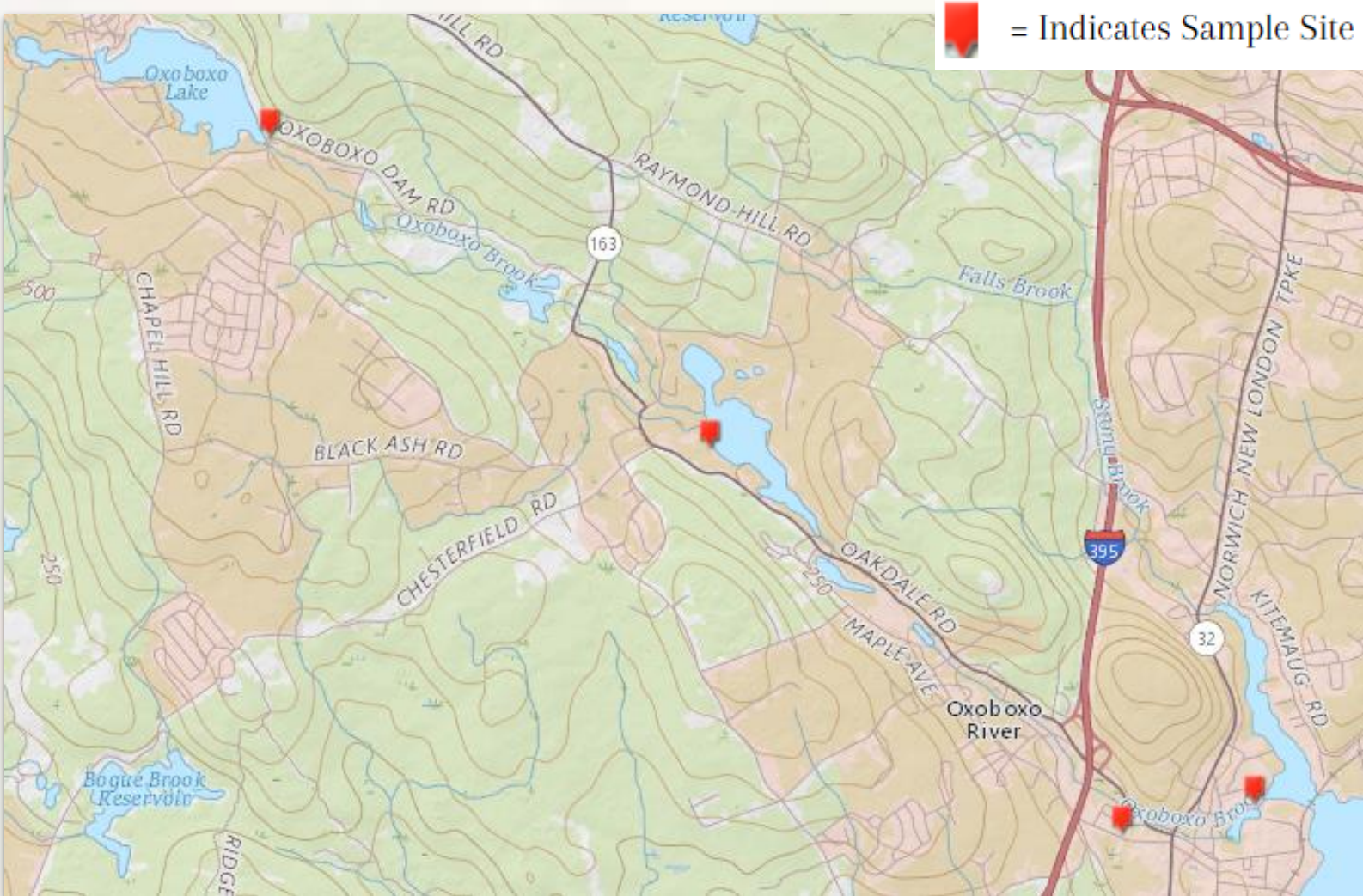
- Judy from the Eastern Connecticut Conservation District (ECCD) helped me learn what the indicators of water quality are.
 - Dissolved Oxygen (DO)
 - Temperature
 - pH
 - Specific Conductivity (SC)

Water Quality Indicators

- DO: measure of oxygen available to aquatic life in the water.
 - Temperature and DO have an inverse relationship.
 - Low temperature = high DO.
- pH: Different aquatic species prefer different pH levels, but 7 is neutral and generally ideal.
- SC: measure of how the water conducts electricity. This is a good indicator of some forms of pollution, such as road salts.

Choosing Sample Sites

- I used ArcGIS to determine land use coverage across the Brook. From that, 5 sample sites were selected(see Fig. 2)
- The 5 sample sites had varying ecosystems. Site requirements included:
 - Representing both urban and wetland areas
 - Show the development of water quality along the Brook
 - Ability to compare the beginning to the end result



(Fig. 2) This map shows the sites where I chose to test the Brook.

Testing in the Field

- Testing took place on Jan 4, 2018, after a snowfall (see Fig. 3.) This meant road salts were in use and the effects of urbanization would be most evident.
- Using a YSI meter loaned by the Niantic River Watershed Committee to test the water, 4 sites were tested.
- Only 4 of 5 sites were accessible at the time of the test due to snow.

Determining Land Use Coverage

- I used the map in Fig. 1 to estimate the percent wetland and urban land cover of each site.
- These factors were compared to the water quality at each site, then graphed on Figure 4.



Fig. 3. Field testing water quality of the Oxoboxo Brook in January 2018

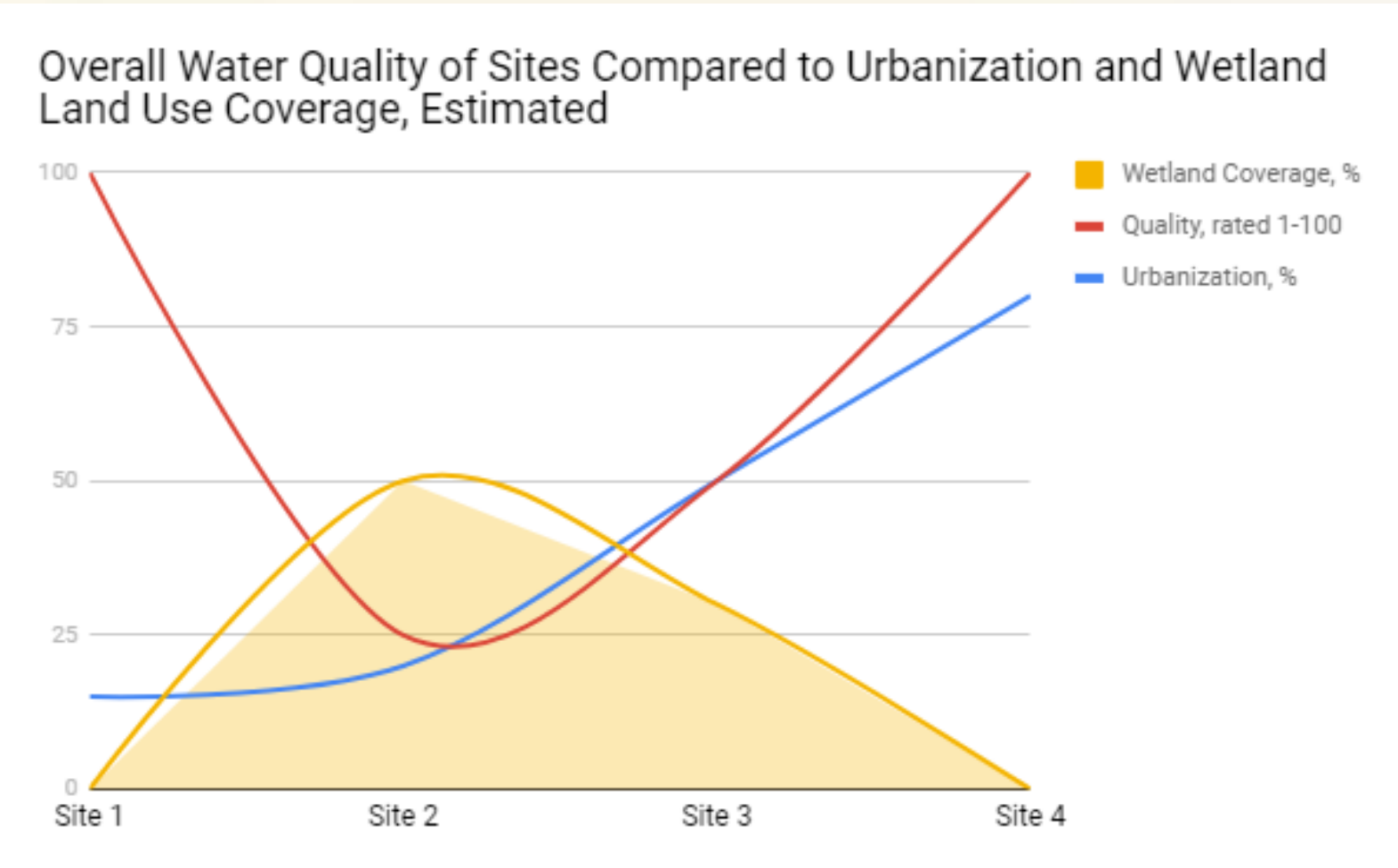
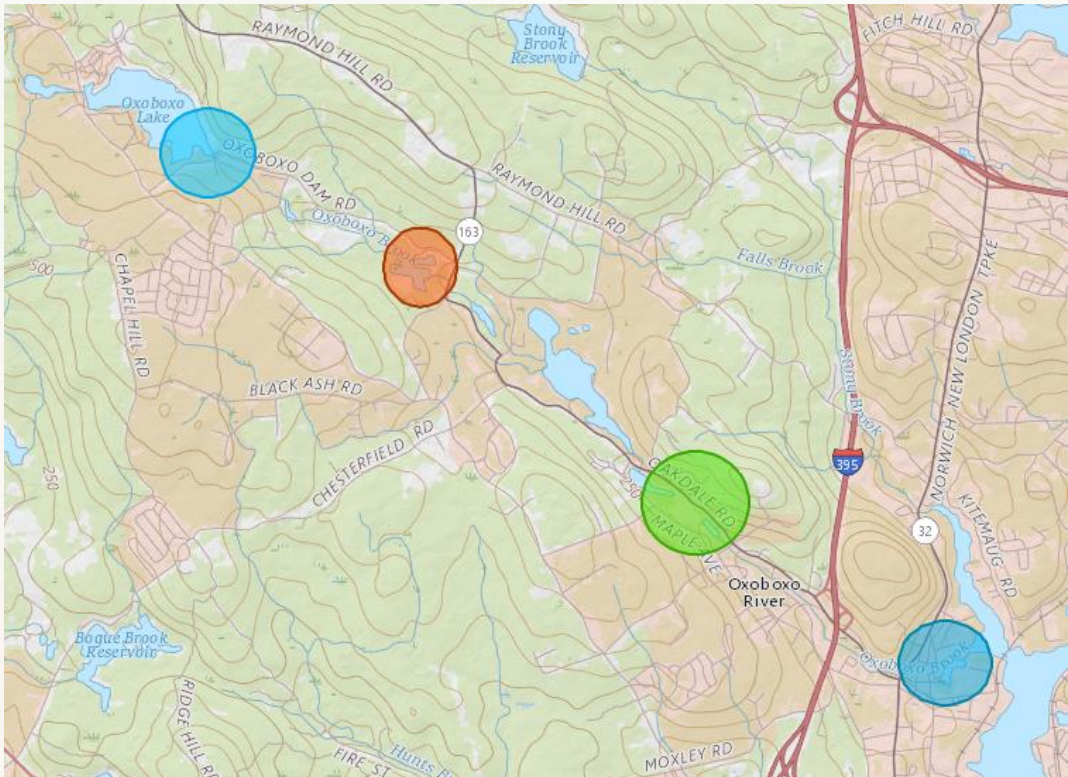
RESULTS

- The Brook begins and ends with a high water quality
- Overall, the Brook has a good water quality (see Table 1)

Site	DO (mg/L)	pH	Temp. (°C)	Conductivity (µS/cm)	Grade
1: Oxoboxo Lake	13.7	7.13	1.7	73.6	Excellent
2: Wheeler Pond	1.6	6.43	5.7	126.8	Fair
3: Redmill Pond	8.0	6.56	1.2	231.1	Good
4: Goirs Pond	12.7	7.39	0.5	118.8	Excellent

(Table 1) This table displays the data collected from the test and the ‘grade’ of the overall water quality at each site. Red=poor, Orange=fair, Green=good, and Blue=excellent.

While Site 2 had a poorer quality than the rest, the test site was not indicative of the entirety of Wheeler Pond. Therefore, the impact of the wetland on the improvement of the water quality is difficult to determine.



(Fig. 4) This chart represents the quality of the Brook at each site when compared to the land use coverage at the sites (left). The map shows the overall water quality at each site (above).

CONCLUSIONS

This study proved somewhat inconclusive due to the time of testing, as sites were blocked by ice and snow, preventing accurate results. However, due to the increase of water quality from Good to Excellent in the Brook’s last stretch, wetlands are likely contributing to filtering the growing development and urbanization of the downriver Uncasville area. The Red Mill Pond wetland may be a contributing factor in mitigating the pollution caused by urbanization, and that wetlands are overall positive for the ecosystems of the Brook.

In the future, further studies that test the quality of the Oxoboxo Brook yearlong would reveal more about the nature of the Brook and its various ecosystems. I recommend that local watershed organizations determine the brook’s macroinvertebrate population and that of other aquatic life to determine the biodiversity of the Oxoboxo Brook.