

Comparative Study of Water Chemistry in Reservoir Brook

NRCA Student: Christina Beaulieu, Mercy High School
Community Partners: Sandy Weiss and Jane Brawerman
Connecticut River Coastal Conservation District

INTRODUCTION

For this project, I wanted to personally learn more about what may or may not be contaminating the Reservoir Brook and how different factors in the environment could affect it. This location especially has special meaning to me since my family and I enjoy hiking around the Portland Reservoir and past the Reservoir Brook. I also wanted to compare this data over time to discover water quality trends over multiple years of data (i.e. 2012, 2014, and 2017). This study is important because it shows the effects of different characteristics that land quality has on water chemistry.

Water quality standards “describe the desired condition of a water body” for different water uses, such as swimming and fishing.¹ Nutrients from lawn fertilizers and other sources can run off into water bodies. Nitrogen and phosphorus are two types of nutrient pollution that cause algae to grow in the water and eutrophication which decreases the dissolved oxygen levels for fish and other organisms.²

Background Information: On June 15, 2012, Public Act 12-155, which was a bill put in place to focus on reducing phosphorus in state waters, was approved. The Public Act 12-155 was, “A state-wide response to address phosphorus nonpoint source pollution”, as stated in the official Bill No. 440.³ Connecticut DEEP (Department of Energy and Environmental Protection) worked with past standards created by the U.S. Environmental Protection Agency (EPA) to create these policies to help reduce the level of phosphorus in water and maintain this healthy levels.

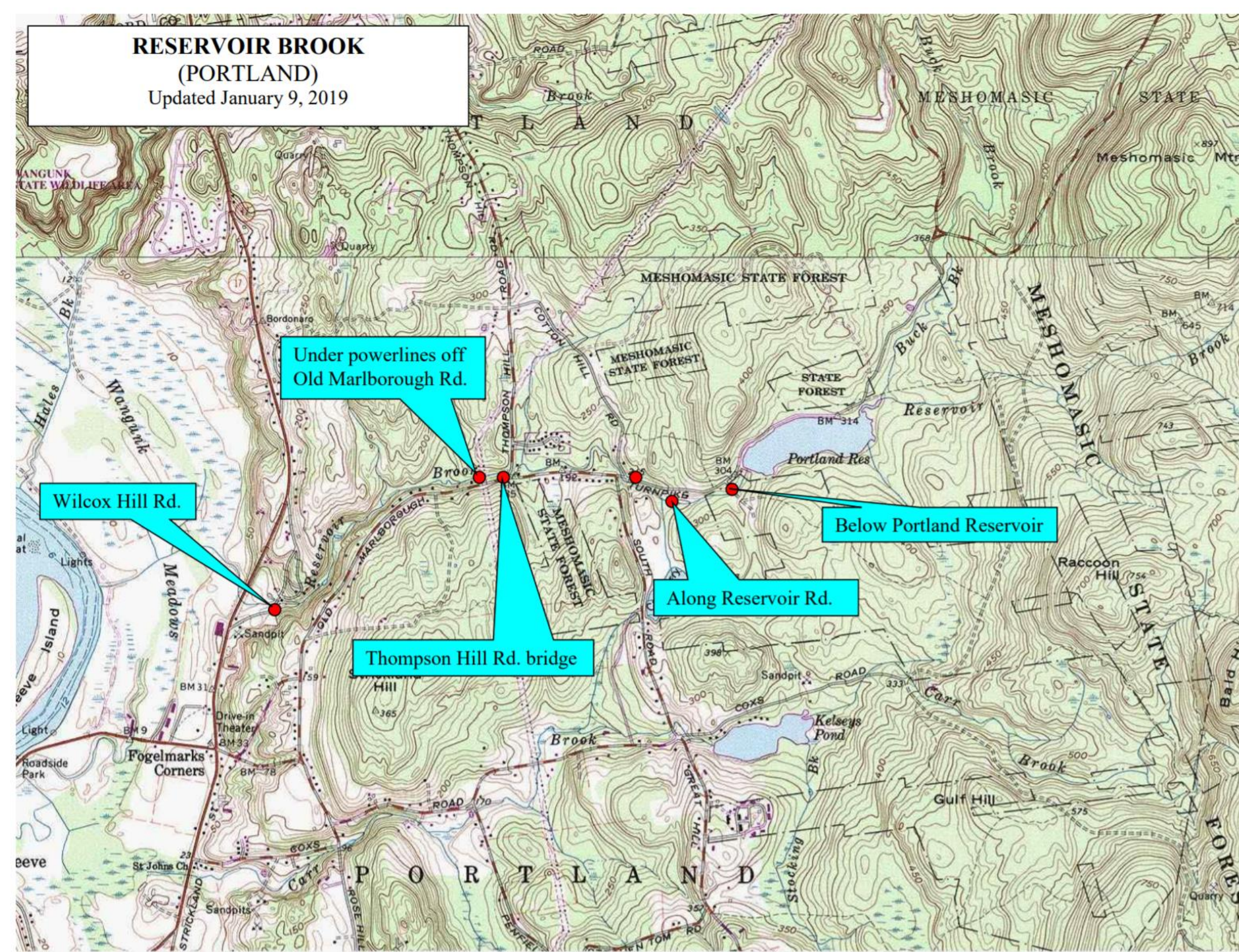


Figure 1: An updated map⁴ of the Reservoir Brook as of January 9, 2019. This map describes the different locations (red dots) along the brook that were tested for different characteristics of water chemistry by the CT DEEP.



Figure 2. At our favorite spot along the Portland Reservoir

METHODS

Project Component 1

My project was focused mainly on Reservoir Brook which runs out of the Portland Reservoir, both located in Portland, CT. This project was completed between July 2019 and March 2020.

To complete this project, I began by contacting my community partners, who provided ideas and direction. They helped in identifying existing data about the water quality of the brook with assistance from DEEP, the source of the data. The next step was to study and interpret the data and learn about the sample sites and what might be affecting the results.

The study was focused on two sites on Reservoir Brook where water samples were collected and tested by DEEP. They can be described as having rocky conditions, with most areas covered by trees. There are multiple residential and industrial areas along Reservoir Brook.

Project Component 2

The water chemistry data from CT DEEP included multiple indicators. I chose to focus on phosphorus and specifically, orthophosphate. I compiled the data from samples taken between June 12th, 2012 and August 4th, 2017 in a bar graph.

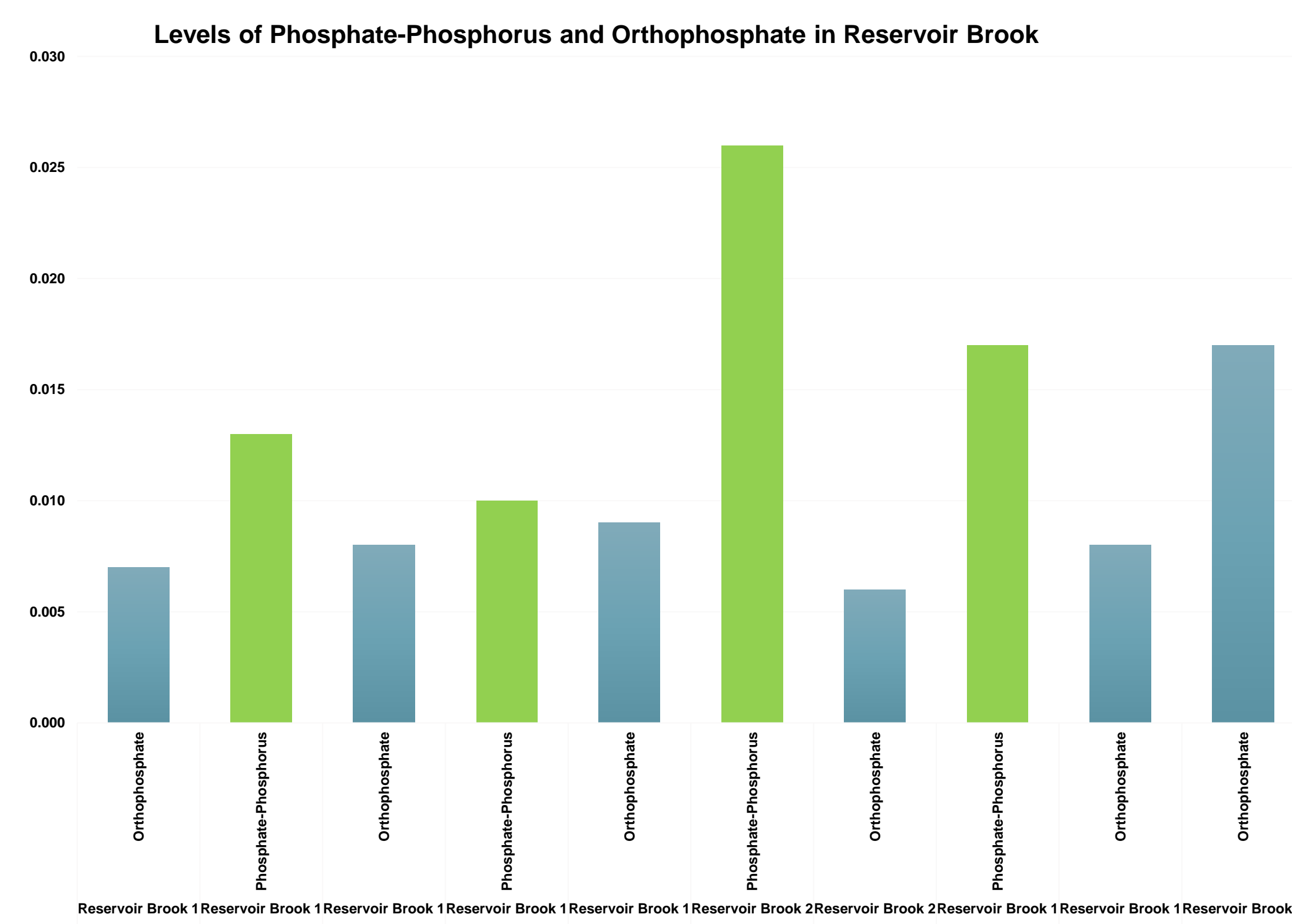


Figure 3: The graph shows the location, date and phosphate-phosphorus and orthophosphate levels in the water.

Bar Chart Key:
Reservoir 1 = Between Route 17 and Wilcox Hill Rd; Reservoir 2 = East of Portland Reservoir in state forest at Mulford Road; PPM = parts per million; equivalent to 1 milligram per liter of water (mg/L)

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RESULTS / DISCUSSION

Through the completion this project, I worked with my community partners to collect research, analyze data, and discover the reasons behind these issues. The result for my project was finding a trend in the data, which proved the levels of phosphorus in the water are consistent and normal levels.

Project Component 1

- Finding the location of the Reservoir Brook and points of sampling
- Choosing what components of the data to analyze
 - Decided to focus on the levels of phosphorus in the water and used background information of topic to understand data and explain trend

Project Component 2

- It was found that for the most part the data was consistent, except for a spike in the Phosphate-Phosphorus level in July of 2012
- This spike could be as a result of many reasons and is difficult for me to pinpoint the exact cause, however this level is still within the 'safe' levels of phosphate in water



Figure 5: This wall is what guides the water as it runs out of the reservoir when it overflows. The water runs down this white platform into the brook.

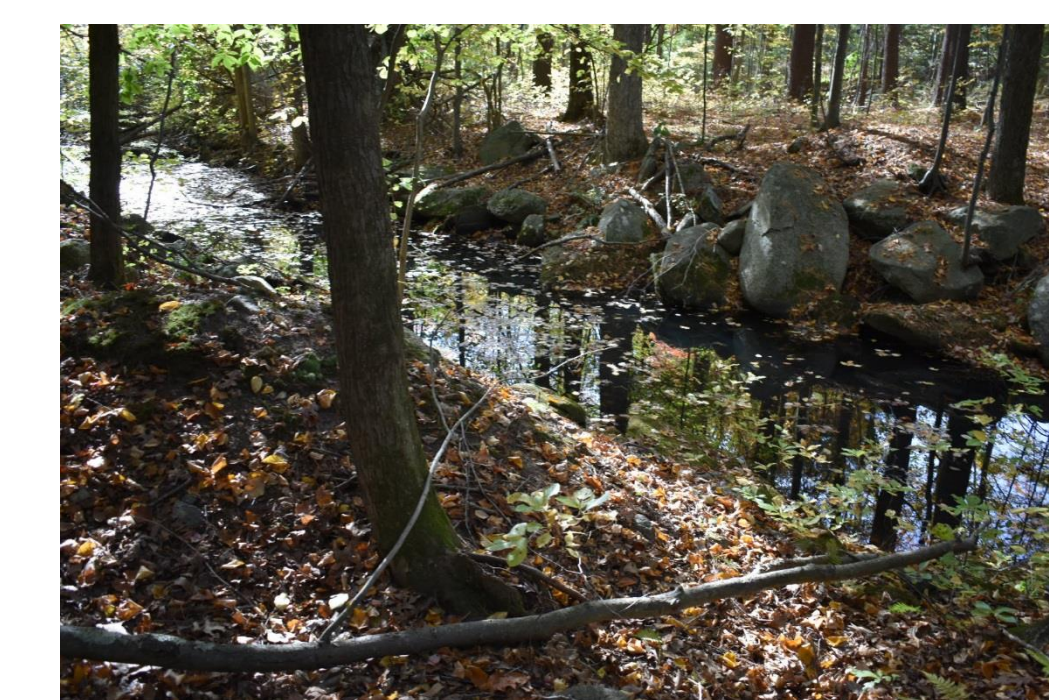


Figure 6: This area of the Reservoir Brook is almost at the point of where the water exits the reservoir (as shown in figure 5).



Figure 7: This is another image of a point along the Reservoir Brook, near the beginning of the brook.

CONCLUSION

The findings of this project determined how much the level of orthophosphate and phosphate-phosphorus in the water has changed over time, especially since the Public Act 12-155 was approved in June 2012. By comparing the data of 2012, 2014, and 2017, it was revealed that for the most part the data stayed consistent and the levels didn't change much. The one exception was a spike in July 2012. This can be a result of many factors, including the location of the samples, time of the year or any other uncontrolled conditions. The levels of phosphorus in the Reservoir Brook are within safe standards and have stayed consistent for multiple years. After much research, my conclusion on this project is that compared to other areas in Connecticut, the levels of phosphorus are relatively low and it therefore does not appear to be an issue of concern in this specific location.

REFERENCES

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