

Winter's Impact on NYC Drinking Water

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Abstract

The urbanization of our area is affecting our pond. This impacts both humans and wildlife. We question if our stream meets the requirements for the NYS DEC. By analyzing the past three years of data and taking new measurements, we can draw a conclusion about the quality of the stream in front of Mahopac High School. After using brine solution to treat icy roads, our normal trend of increasing conductivity began to decrease.

Background info

Our watercourse is a class C stream and feeds into both the Muscote trout stream and the New York City drinking water reservoirs. There is a detention pond with a storm drain pipe that flows into it. Past data has shown an increase in conductivity partially due to the accumulation of road salt during winter seasons.

Intro & Research Questions

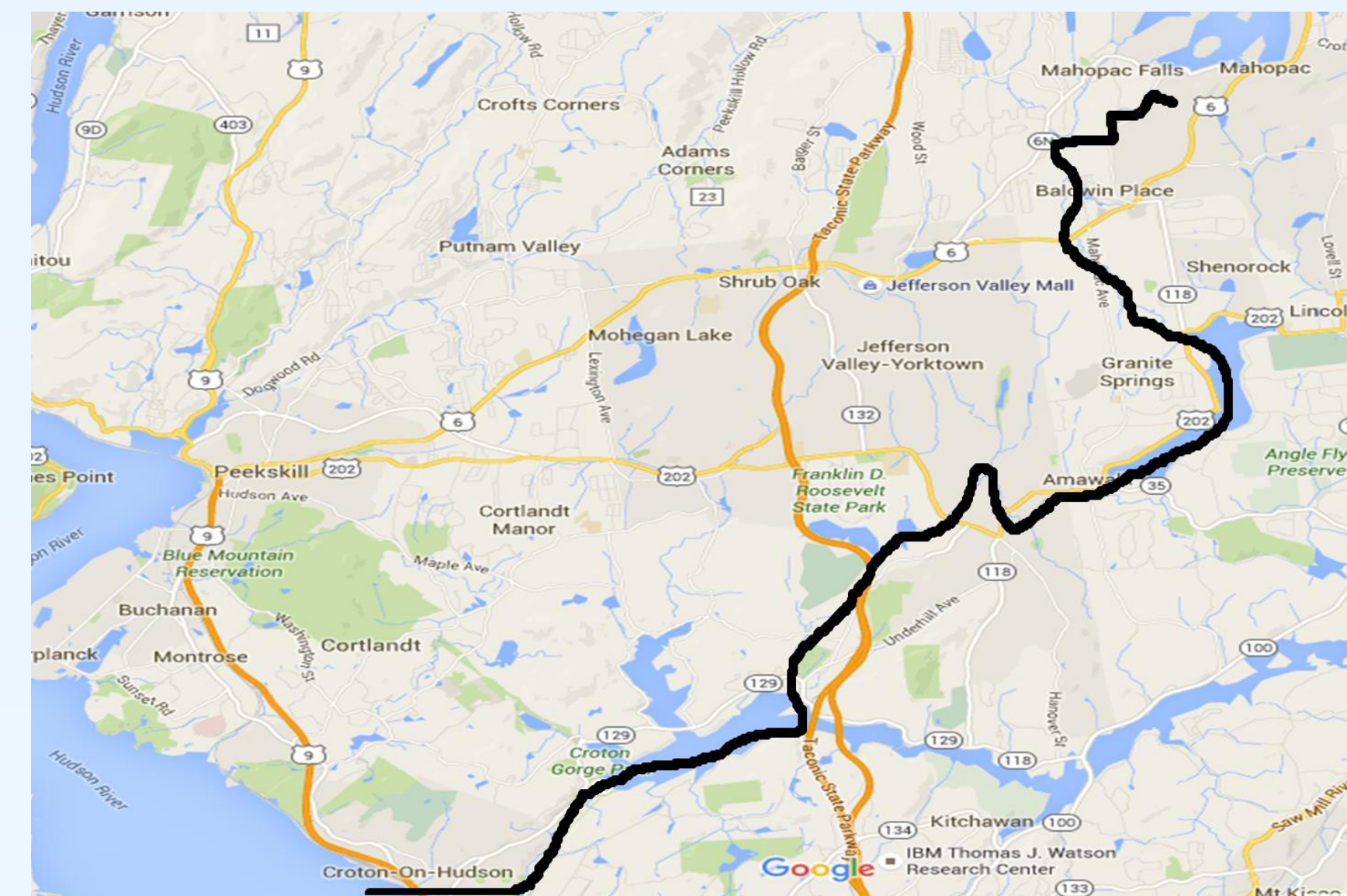
- Using water quality data, how has road salt affected our ecosystem?
- Are there alternatives to using salt on the roads in the winter?

Hypothesis

Using brine solution will show an improvement in our water quality by decreasing the conductivity compared to previous winters using road salt.

Research Methods

- Used YSI Pro30 Probe and Hach test kits in our pre-pond and post-pond to obtain conductivity, alkalinity, nitrate, and chloride readings over a period of 3 years
 - Inputted data into Globe visualization system
 - Analyzed trends and graphs



Conclusions

Overall there has been an improvement in our water quality regarding conductivity. Our data shows a decrease in this parameter since we began to use the brine. As shown on our graphs, the conductivity is rising at a slower rate once we took the 2015-16 winter into account. However, we can not fully conclude the water has become healthier holistically because of it. Other factors like bedrock erosion, and water softeners can impact conductivity. Also, since the brine is derived from oils, our data would not show an increase of decrease of water quality regarding this factor. In order to get a more accurate picture of the effects of brine on our stream, we would need to study the water for more winter seasons.

Acknowledgements

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Bibliography

Photos taken by Heather Gorodess & Gabe Burchett
Globe.gov
Map courtesy of Google.com/maps 3/4/16

Time (Years)	Pre-Pond ($\hat{1}/4S/cm$)	Post Pond ($\hat{1}/4S/cm$)	Average ($\hat{1}/4S/cm$)
2013-2014	678.43	816.86	747.64
2014-2015	713.33	727.11	720.22
2015-2016	594.50	627.17	610.83

Results

Percent Change before and after using brine solution in Post Pond Conductivity: 18.8%

Percent Change before and after using brine solution in Average Conductivity: 16.8%

Rate of Conductivity change ($\hat{1}/4S/cm$)/day

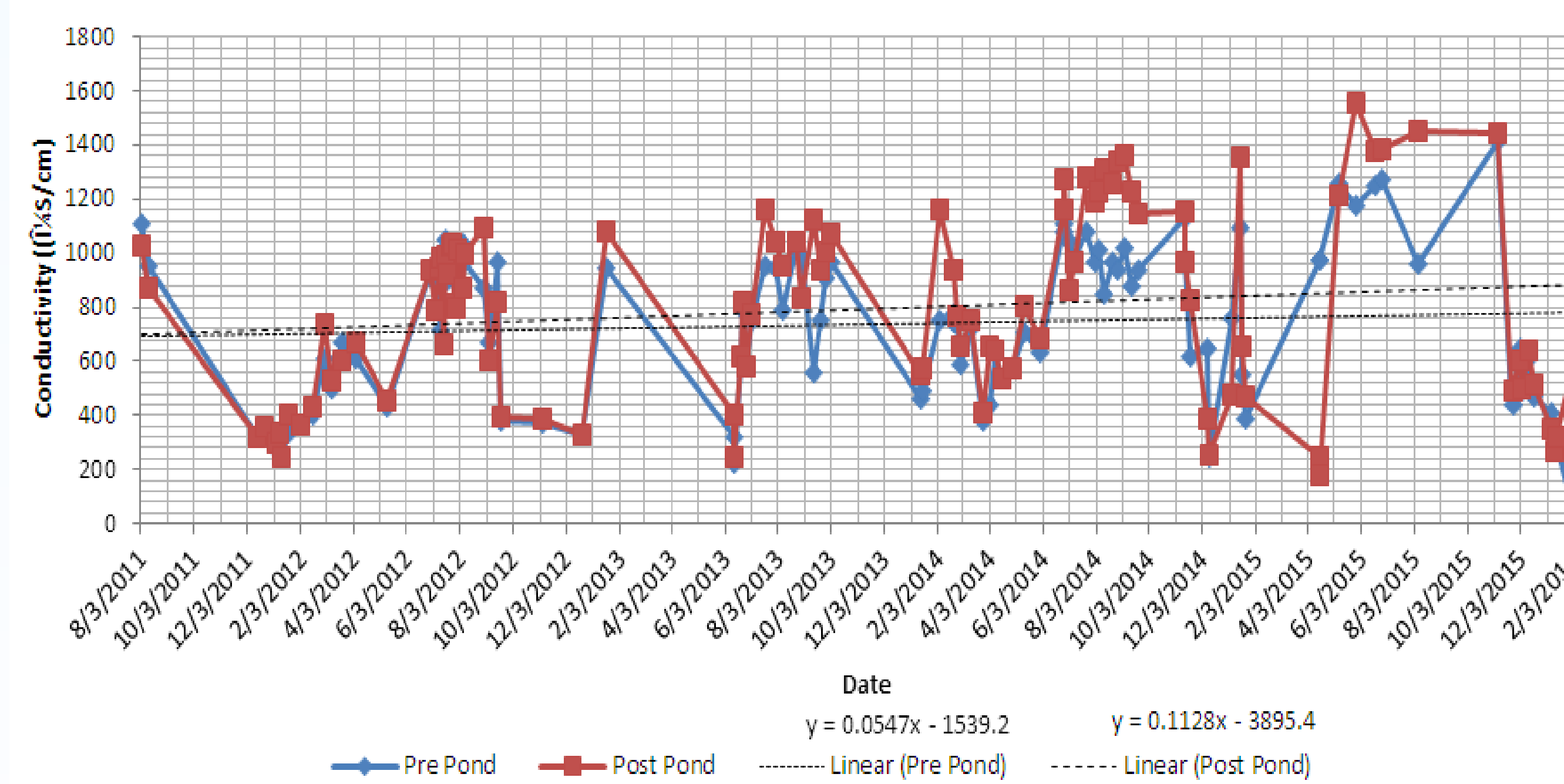
2011-2015

2011-2016

Pre Pond: 0.1538
Post Pond: 0.2098

Pre Pond: 0.0547
Post Pond: 0.1128

Pre and Post Conductivity for 2011-2016



While we had a general increase in conductivity the past few years, once the brine began the conductivity decreased.

