

An Analysis of the Water Quality in Brown's Run Reservoir in Greene County, PA

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Abstract

The objective of The Harry Enstrom Chapter of the Izzak Walton League of America is to gather data regarding the current surface-water quality at defined locations in watersheds throughout Greene County. In this study, Brown's Run Reservoir, located in Mather, PA, was tested for pH, temperature, electrical conductivity, and total dissolved solids over a period of 7 months on a weekly basis, according to EPA protocols. Citizen Watershed Monitoring kits and certification were both provided by the Izzak Walton League. The purpose of this investigation was to determine if there was a dramatic change in water chemistry over the months, and to determine if the water quality was in alignment with EPA standards. The hypothesis was that the water quality would be below EPA standards. An additional macroinvertebrate study was also performed in a stream that runs into Brown's Run Reservoir, also located in Mather, PA, in order to provide further information regarding the water quality of the reservoir. The results showed that pH, temperature, electrical conductivity, and total dissolved solids varied between months, but remained within acceptable limits for all parameters. The macroinvertebrate study indicated that the stream running into Brown's Run Reservoir was in the range of fair quality, suggesting that there may be low levels of stream contamination from anthropogenic sources. The data collected from the reservoir did not exceed EPA standards, therefore, the water quality was found to be acceptable.



Figure 1: Brown's Run Reservoir located in Mather, PA in Greene County, PA. Site where water testing occurred.

Introduction

- Water quality has become an important issue in the area of Greene County.
- pH is the measurement of how acid or basic a substance is. The pH scale ranges from 0 to 14.
- Electrical conductivity measures the amount of dissolved ions in the water.
- Total dissolved solids is a measurement of all the inorganic and organic substances, such as minerals, salts, or metals dissolved within a given volume of water.
- According to EPA standards, acceptable water quality for streams and inland freshwater have a pH reading between 6 and 9, electrical conductivity reading between 150 and 500 μS , and total dissolved solids reading under 500 ppm.*

Objectives

- To gather baseline data for Brown's Run Reservoir.
- To determine whether or not a change in the parameters occurred over the 7 month period.
- To investigate any possible factors that may influence the water quality of Brown's Run Reservoir.
- To determine whether or not the water quality of Brown's Run reservoir is in alignment with EPA standards.

Methods

- Water samples were collected once a week at Brown's Run Reservoir from June 2011 through December 2011
- Samples were taken at three different stations around the reservoir: Station A, Station B, and Station C
- Water samples were washed and collected according to EPA standards
- Samples were tested for pH, temperature, electrical conductivity (EC), and total dissolved solids (TDS). Three measurement for each parameter were taken at each station
- Macroinvertebrate study was performed in the stream five times. Kick nets were used for collection, and kicking lasted for three minutes.
- Macroinvertebrate species were counted and recorded, then returned back to the stream



Figure 2: Water quality testing meters and quality testing technique. Citizen Watershed Monitoring kit provided by Izzak Walton League of America



Figure 3: Stream that runs into Brown's Run Reservoir. Site of macroinvertebrate sampling

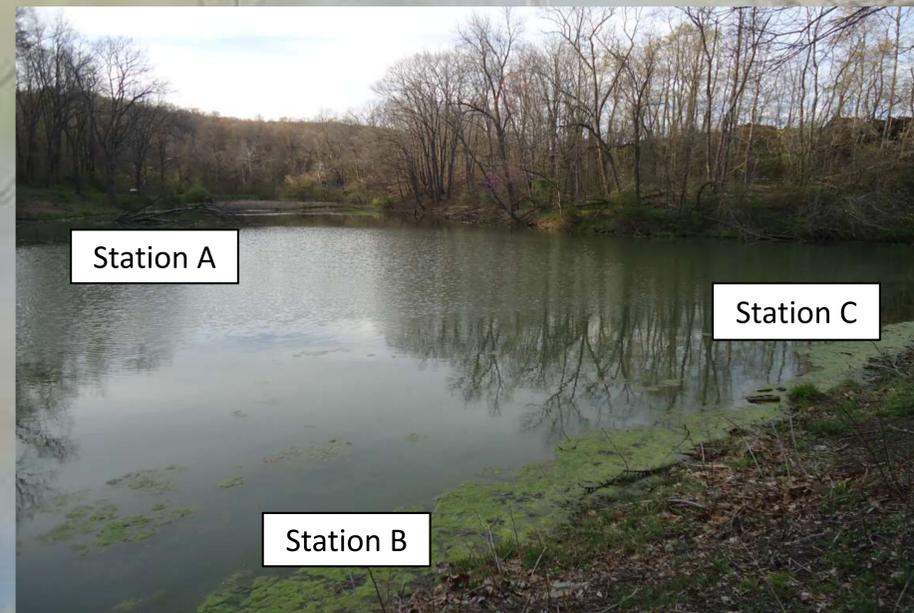
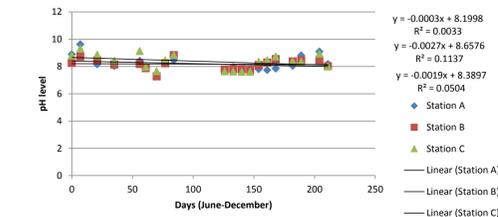


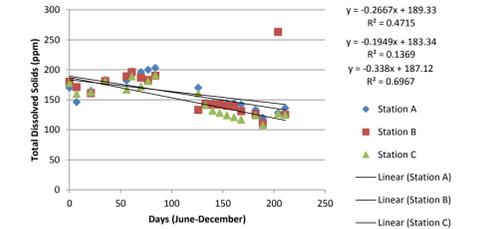
Figure 4: Brown's Run Reservoir with Stations A, B, and C marked. pH, temperature, electrical conductivity, and total dissolved solids were recorded for each station.

Results

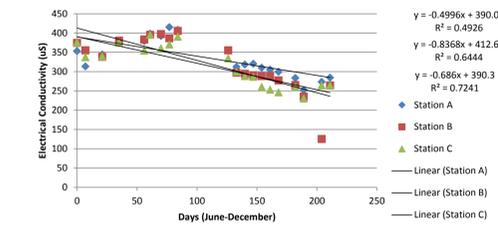
Average pH level for Stations A B C



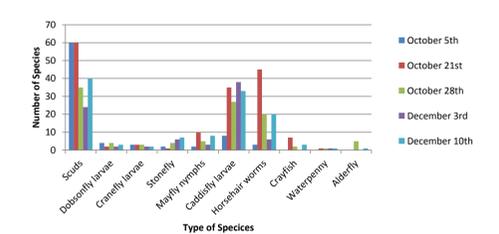
Average TDS for Stations A B C



Average EC for Stations A B C



Macroinvertebrate sampling for Brown's Run Stream



Discussion

- All parameters (pH, EC, TDS) stayed within EPA standards over the testing period, indicating that the water quality was within acceptable EPA limits during this time.
- For pH, there was no significant change over the 7 month period. There was a change in electrical conductivity and total dissolved solids; however, it was not found to be significant.
- A relationship existed between electrical conductivity and total dissolved solids. As EC increases, TDS increases and visa versa.
- The results from the macroinvertebrate study indicated that the water quality was of "Fair" condition according to EPA criteria, and low levels of contamination existed during this time.
- This study provides valuable baseline water quality data which can be used for comparison in future water quality studies in Greene County

Acknowledgments

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