Storm Chasers: The Correlation Between Water Discharge, Suspended Solids and Nutrients During a Major Storm Event in the Winooski River, Essex Junction, VT.

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Introduction

- The Winooski River is Vermont's second longest river, approximately ninety miles long. It is used for many things, both recreational and agricultural. Water quality may be negatively affected as precipitation and storm water runoff increase.
- Storm water runoff contains solids from fertilizer, roads, eroded sediments, animal waste, sewage and other nutrient-rich minerals. These may become suspended in the Winooski River during storm events.
- It is important that we test for Total Suspended Solids (TSS) in the Winooski River because high concentrations decrease water quality.

Methods and Materials

- Using an automated sampler called an Isco, samples are collected at a site in Essex Junction. One Isco sample consists of two bottles. One bottle is filtered for TSS at Saint Michaels College using the method for the Examination of Water & Wastewater (APHA 2005) and Wetzel & Likens 2000, the other bottle is tested for nutrients at Johnson State College using standard EPA methods (NH_4) and 353.2 (NO_3).
- All of the measurements are then logged into a database and shared between schools.
- The data shown in this research study is the TSS data from Saint Michael's college and the nutrient data from Johnson State College collected in 2013. The graphs display the relationships between discharge and TSS along with other nutrients.
- The storm was chosen from 2013 to show a specific example.

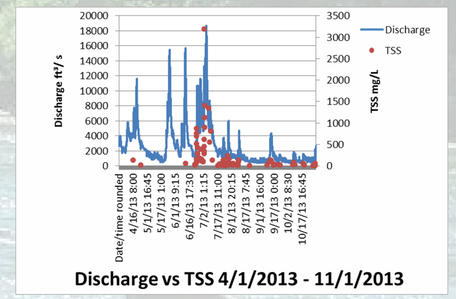

Figure 1

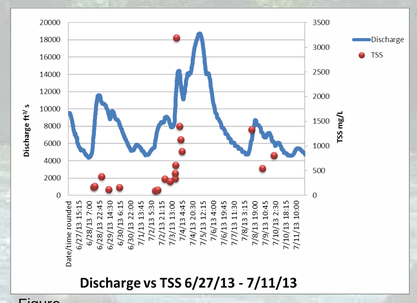

Figure 2

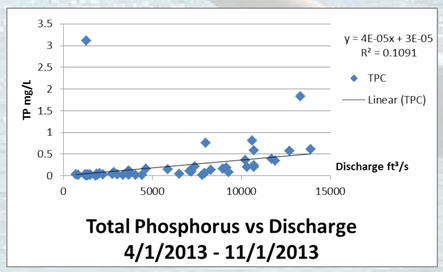

Figure 3

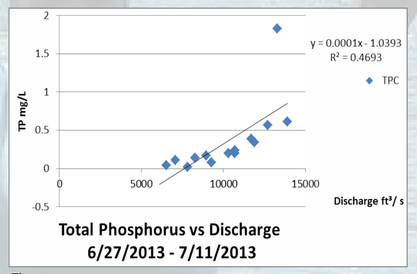

Figure 4

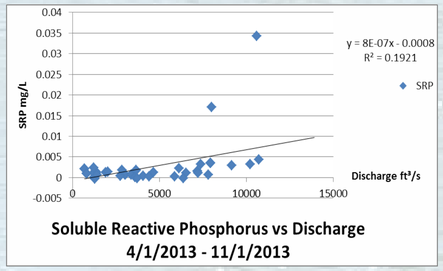

Figure 5

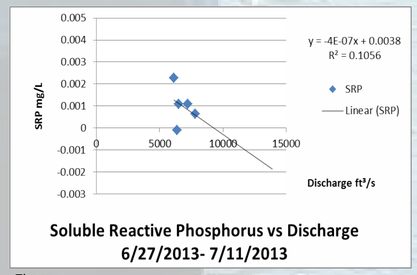

Figure 6

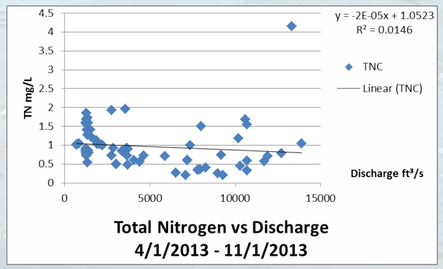

Figure 7

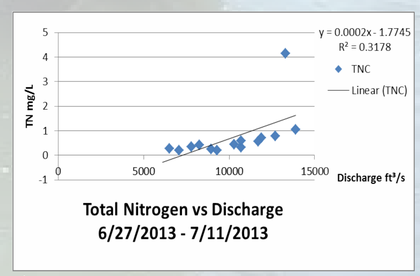

Figure 8

Discussion

- There is a slight relationship between discharge, TSS, and nutrients from April to November 2013 as shown in figures 1, 3, 5 and 7.
- Looking closely at a specific storm event displays a greater, yet still insignificant, relationship between discharge, TSS, and nutrients. Figures 2, 4, 6 and 8 show an increase in TSS, and nutrients while there is an increase in the discharge. There is an exceptionally good relationship increase for Total Phosphorus vs. Discharge (Figures 3 and 4)
- There is a slight relationship between discharge, TSS, and nutrients; therefore storm water does contribute to the amount of TSS, and nutrients in the Winooski River at Essex Junction, though it can not be considered a primary source.
- The amount of Soluble Reactive Phosphorus has shown a slight decrease as discharge increases.
- This location has shown a smaller relationship than other locations. This is most likely because this site is closest to the mouth of the Winooski watershed, and drains the entirety of the Winooski watershed, so there’s a lot upstream impacting it. Also the Isco is only a few feet away from a corn farm, and approximately one mile away from a dam.

Acknowledgments

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Literature cited

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