



Comparison of Stream Water Characteristics within Agricultural and Forested Watersheds

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Introduction

Land-use within a watershed, and the effect on vegetation and soil properties, directly influences the chemical properties of stream water. The goal of this study was to analyze E. coli, total phosphorous, total suspended solids and discharge for ten different rivers in Vermont and New Hampshire, to determine how agricultural vs. forested watersheds affected stream water chemistry. Five streams were chosen, within primarily agricultural watersheds and five sites with forested watersheds. By comparing the water chemistry of these rivers, we were able to discover how they were affected by their surroundings. We suspected that we would find high levels of E. coli in agricultural regions, due to the fact that large populations of domesticated animals are located there. Within agricultural watersheds, large amounts of nutrients (phosphorus) and bacteria (E. coli) run off into the streams. High-levels of erosion within agricultural watersheds can contribute to high levels of TSS and phosphorus, as well.

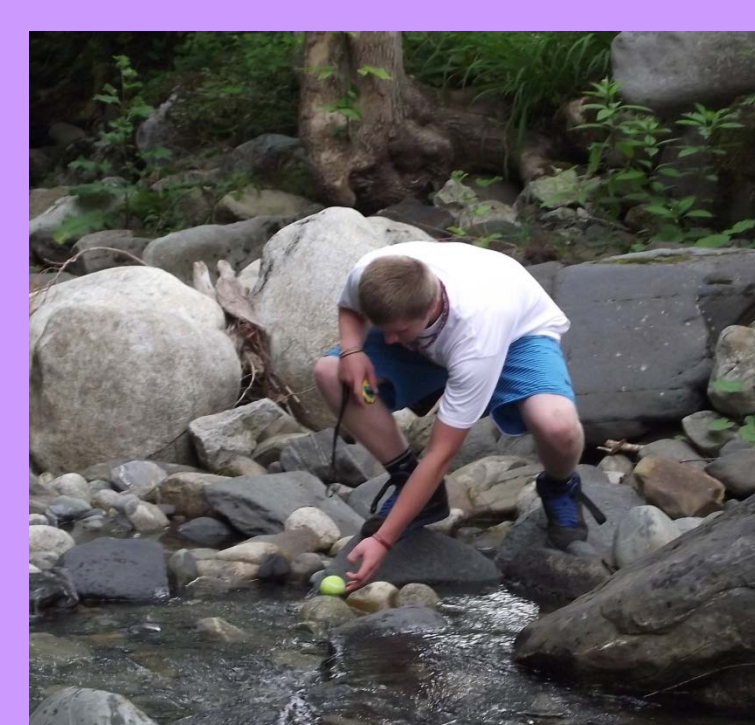
Stream water properties within watersheds depend largely on the topography, elevation, run-off and vegetation. It can be expected, within a forested watershed, that TSS and phosphorus levels would show marked increase during high-flow events, indicated by increased discharge. E. coli levels would be expected to be much lower within these streams.

Hypothesis

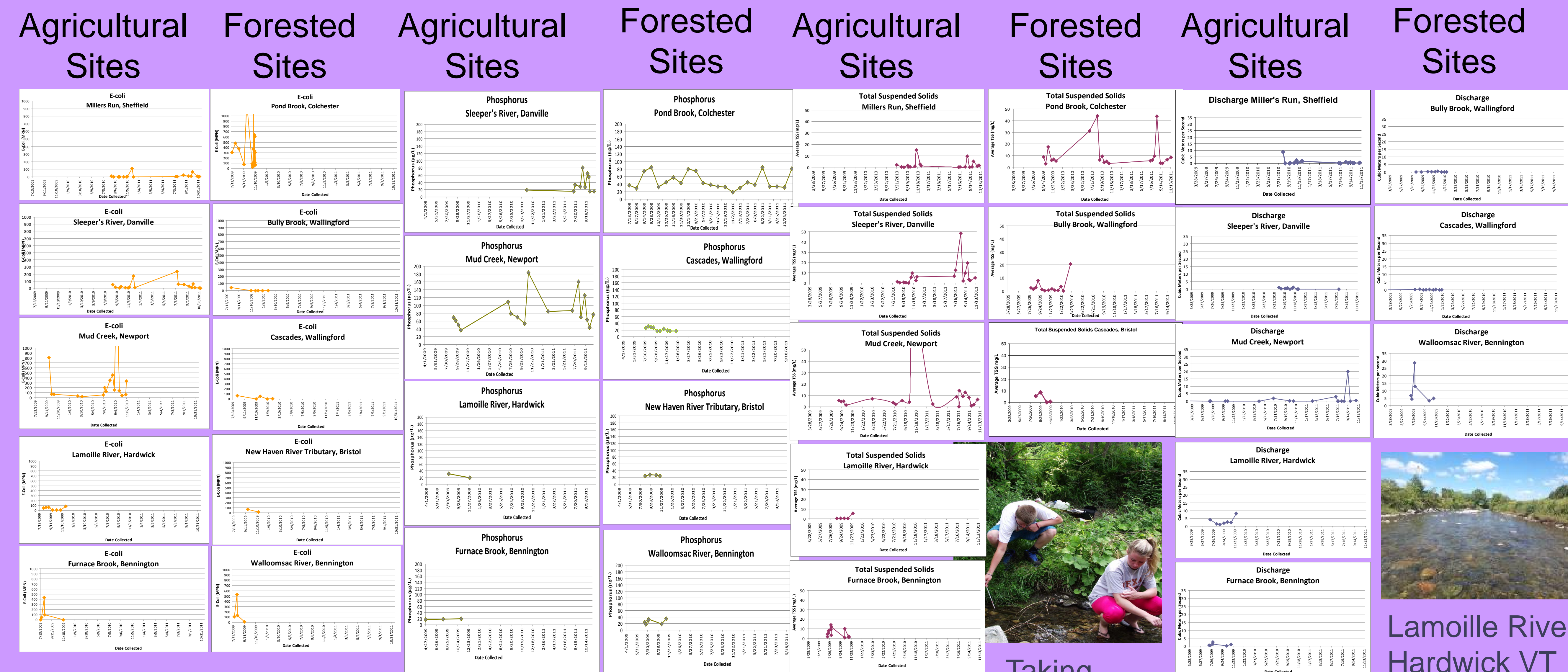
In this study, it is expected that higher levels of TSS, phosphorus and E. coli would be observed in streams located within agricultural watersheds, than streams within forested watersheds.



Measuring width of Stream



Collecting Discharge Data



Taking measurements in the field

Lamoille River, Hardwick VT

Methods

Site data, such as obvious pollution, the ph level, canopy cover, cloud cover, weather within the past 24 hours was recorded. Water samples were taken, in order to measure Total suspended solids (TSS), E-Coli, and Phosphorous. Included with water samples were appropriate "blanks" for quality assurance. Discharge was measured using standard procedures and calculating flow using: $Discharge (m^3/s) = \frac{A L C}{T}$

Conclusion

The studies of the ten agricultural and forested streams show that levels of phosphorus there are higher at agricultural sites compared to forested sites, with the exception of Pond Brook, located in Colchester, Vermont. Levels of E. coli tend to be higher in agricultural sites in comparison with forested locations, with the exception of Pond Brook. Also, the T.S.S. data shows that the levels are indeed higher in the agricultural regions than in the forested areas, and again with the exception of Pond Brook. The E. coli, phosphorus and T.S.S. levels in Pond Brook, Colchester are abnormally high and are shown by the data to be out of the ordinary. Since the location where the sampling took place is downstream from Middle Road and close to a farm, the high levels in the data may be related to run-off from these locations. Not all sites had all available geochemical data for analysis.

Works Cited

- Schlesinger, W. H., 1997, Biogeochemical Cycles: An analysis of Global Change.
- Vermont EPSCoR Streams Project, Reference Manual for Highschool Teams, 2011-2012.

