Concentrations of *E. coli* and phosphorus are both important indicators of water quality and ecosystem health of streams and rivers. Coliforms can indicate the presence of potentially harmful bacteria, viruses and protozoans, while *E. coli* is an indicator of fecal contamination. Phosphorus can be harmful in excess as well due to its contribution to eutrophication. Phosphorus is a common element found in fertilizers, organic waste, and manure.

Streams running through agricultural land have been linked to increased levels in bacteria, phosphorus, and other contaminants due to runoff from fertilizers and cattle access to streams (Vidon et al., 2008).

**Hypotheses**
- Increase in analytes across a land-use gradient
- Agricultural streams will generally have a higher load of phosphorus and *E. coli* than urban or forested streams

**Materials and Methods**

Water samples were collected from 42 stream sites throughout the Champlain basin in 2008 and 2009. These samples were analyzed in the Streams lab at the University of Vermont for total phosphorus, total suspended solutes, and total coliforms (including *E. coli*). Analyses were done according to EPA guidelines. An Analysis of Variance (ANOVA) test was done comparing log transformed *E. coli*, total coliforms, and phosphorus for the streams in different land use types. Post hoc comparisons were made to detect differences between land use type (forested, urban, agricultural). Differences in means were also compared for 2008 and 2009 for each parameter. Statistical programs SPSS and JMP were used for data analysis.

**Introduction**

We compared the effect of land use on levels of *E. coli*, total coliforms, and phosphorus in streams characterized as forested, urban, and agricultural in the Lake Champlain basin.

**Objective**

**Results**

We compared the effect of land use on levels of *E. coli*, total coliforms, and phosphorus in streams characterized as forested, urban, and agricultural in the Lake Champlain basin.

**Discussion**

- *E. coli* and total coliform were significantly different across different stream types in 2009, particularly between urban and forested streams for *E. coli* and agricultural and forested streams for total coliform. This suggests heavier loading in agricultural and urban areas compared to forested areas.
- The lack of significance in the data sets would indicate land usage has little effect on phosphorus and a minimal effect on *E. coli* in streams. However, these results would most likely differ if more samples continue to be collected in subsequent years.
- Lack of substantial variation between stream types may be due to interannual weather conditions, especially if samples were not taken during storms which may flush pools of nutrients into stream water and would be an important hydrologic event to measure.

**Future Work**

- Stream sites should continue to be monitored and sampled to assess trends over time
- Increase the number of urban and agriculture sites being monitored to contribute equal sample sizes in each category.

**References**


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