

# Relative importance of agricultural practice, landform features, storm events and season on water quality of first-order streams in the Beaver Valley watershed

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## Background



- >50% of biologically limiting nutrients enter watersheds through first order streams
- Season, land use, precipitation and landform features are potential drivers of first order stream water chemistry

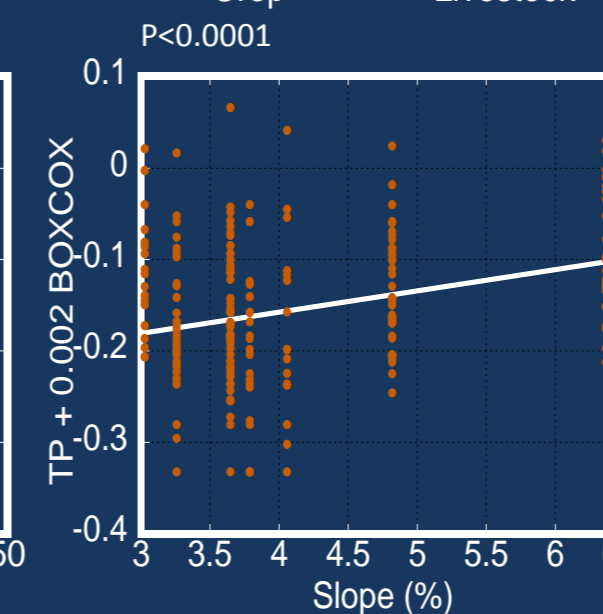
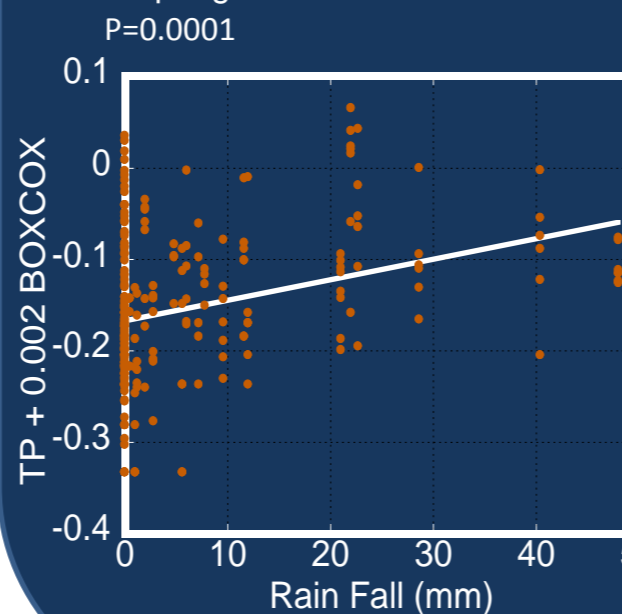
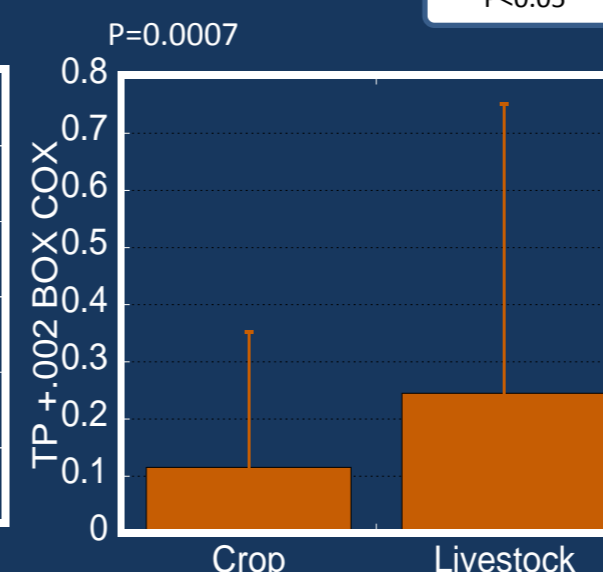
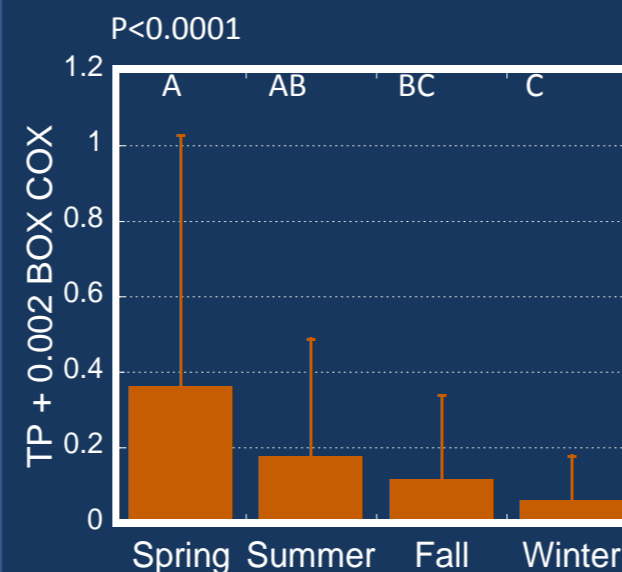
- Agricultural run off is a major pollutant which results in eutrophication and thus has been identified as a primary threat to drinking water and ecosystem health

## Results

Summary of the order parameters entered stepwise regression models  
a-  $r^2 > 0.2$ , b-  $r^2 > 0.1$ , c-  $r^2 > 0.05$ , d-  $r^2 < 0.05$

Parameters	Drivers							
	Agricultural Season	Calendar Season	Rain Fall	Snow Depth	Slope	Soil Class	Watershed Area	Land Use
TNN LOG	1a	3d	5	4d	2b			
TAN LOG	3d	4d	1b		2c			
TN LOG			2		1c	5d	3d	4d
TP + 0.002 BOX-COX	1a	4d	2b	5d			6d	3c
TSS LOG			2b	3d		1b	5d	4d
TURB BOX-COX	5d		1b	4d	3d	2c		
PH	3d	2b				4d	5d	1a

P<0.05



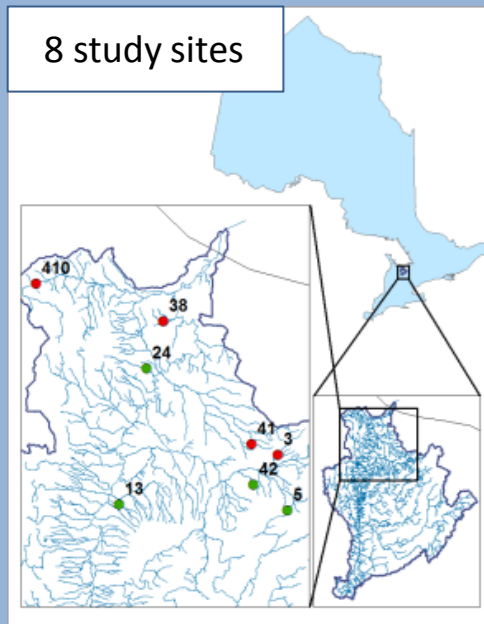
## Discussion



- Rain fall, agricultural season, practice type and slope explain the majority of the variance
- Increasing precipitation results in elevated nutrient and sediment levels
- Majority of water chemistry parameters reflect seasonal variance
- Agricultural season explains more variance than the conventional calendar season
- Livestock and crop based land uses are significantly different
- Ammonia, phosphorus, sediment and pH are intensified at livestock sites, while nitrate concentrations peak at crop sites
- Higher slope values correlate with raised phosphorus, ammonia, pH and sediment readings and decreased nitrate and TN values

**Objective:** Determine the main drivers of water chemistry in agriculturally influenced first order streams

## Methods



8 study sites

Sampled May 2010-July 2011  
Growth period- Biweekly  
Dormant Period- Monthly

Total Phosphorus  
Total Nitrogen  
Total Nitrate-Nitrogen  
Total Ammonia Nitrogen  
Suspended Solids  
pH  
Turbidity

Quantified potential water chemistry drivers

**GIS Data**  
Slope  
Soil Class  
Watershed Area  
**Monitoring**  
Rain Fall  
Snow Depth  
Agricultural Season  
Agricultural Practice

- Crop
- Livestock

**Conclusion:** Rainfall, season, land use and slope are the main drivers of head water chemistry in an agricultural environment

### Acknowledgements

All of the members of the Chow-Fraser lab, both past and current  
Dr. Stewart Sweeney  
Ontario Graduate Scholarship  
Georgian Bay Forever  
Sierra Club of Canada



### References

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