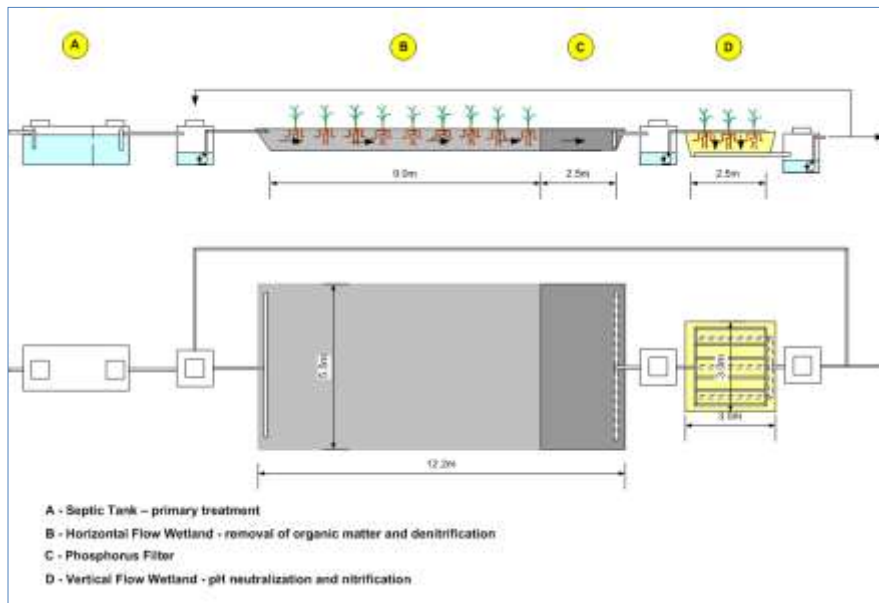


# Household Subsurface Flow Constructed Wetland

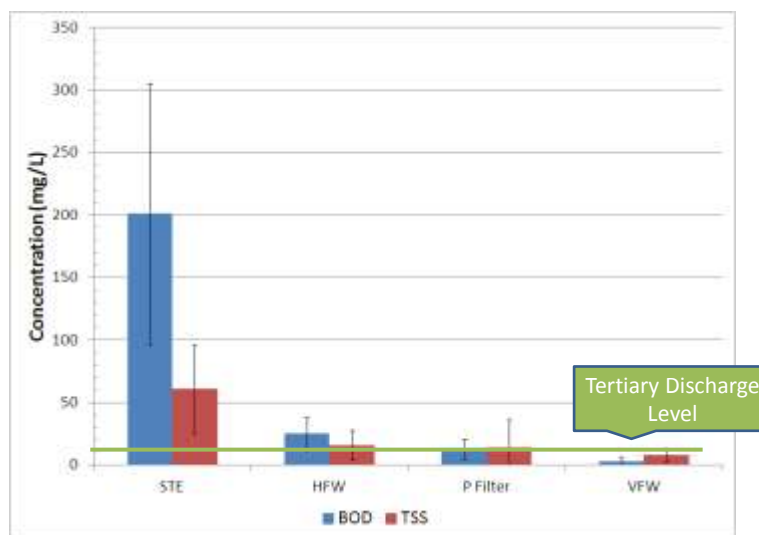
Campus d'Alfred Pilot Project



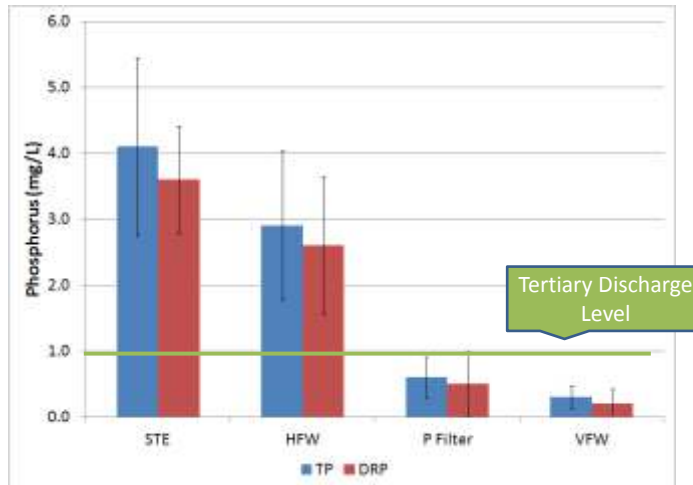




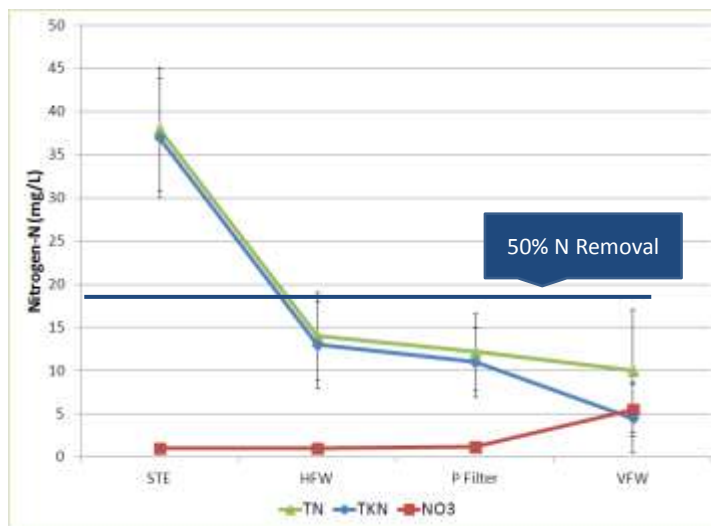
## Organic Matter and Solids



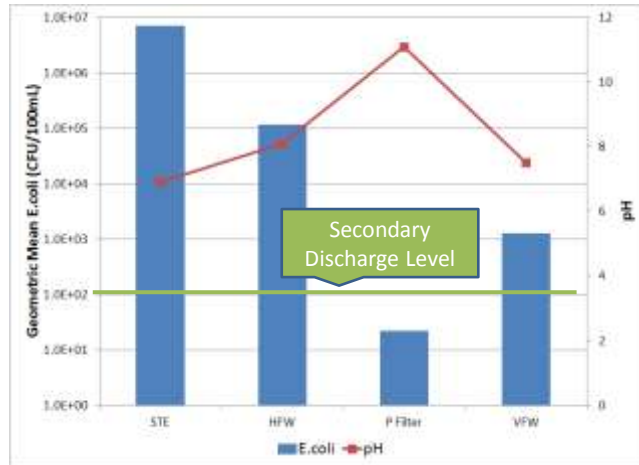
# Phosphorus



# Nitrogen



## E.coli



## Summary

The wetland system:

- ✓ Reduces organic matter and solids to below 10 mg/L
- ✓ Reduces TP to below 1.0 mg/L
- ✓ Removes 74% of total nitrogen
- ❖ Removes 3.8 log E.coli but does not meet discharge standard

## **Acknowledgements**

- Jed Rode, M.A.Sc. Student
- Canada Mortgage and Housing Corporation
- Canadian Water Network

**P&R Stream Sampling Project**

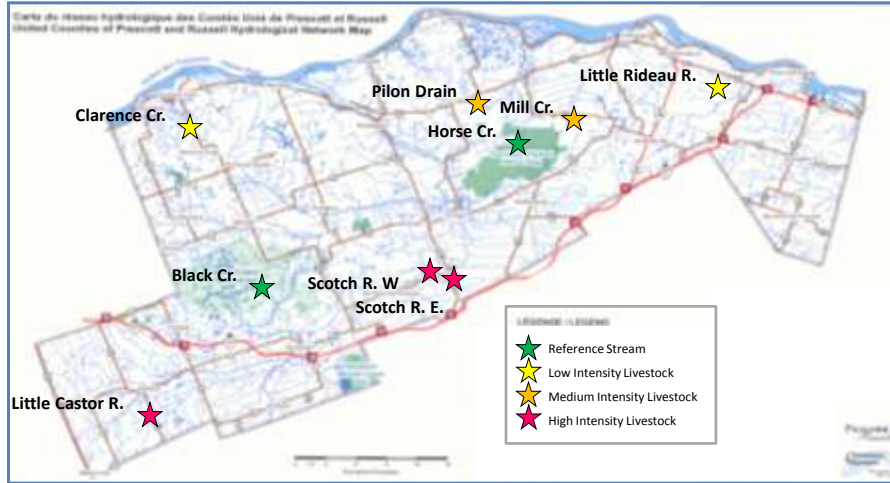
## Study Objectives

- Characterise the stream water quality health within Prescott-Russell
- Compare water quality with livestock intensity
- Study the seasonal variation in a suite of water quality indicators

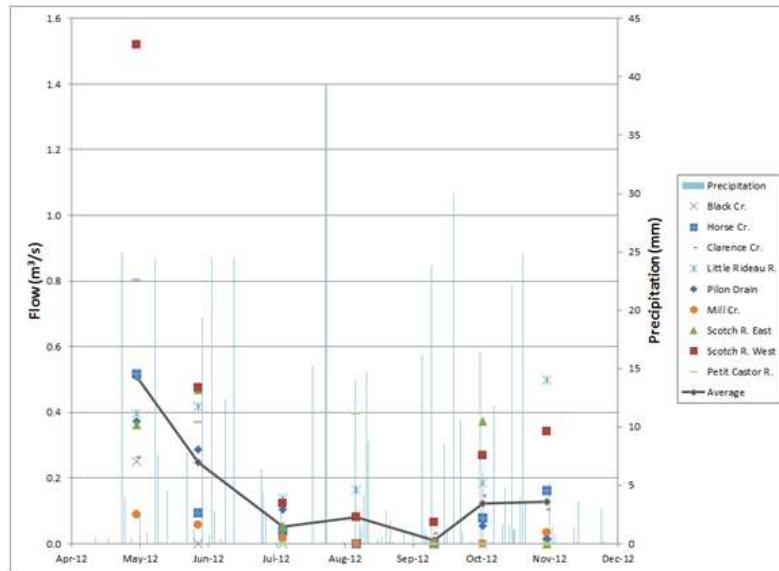
## Study Methodology

- Samples collected monthly from May - November from 9 stream locations
  - reference streams to high intensity livestock
- *In-situ* measurements: flow, pH, T and DO
- Lab analyses: NO<sub>3</sub>, NH<sub>3</sub>, O-PO<sub>4</sub>, turbidity, *E.coli*, *Salmonella*, *C. Perfringens* and Enterococci

# Sampling Locations

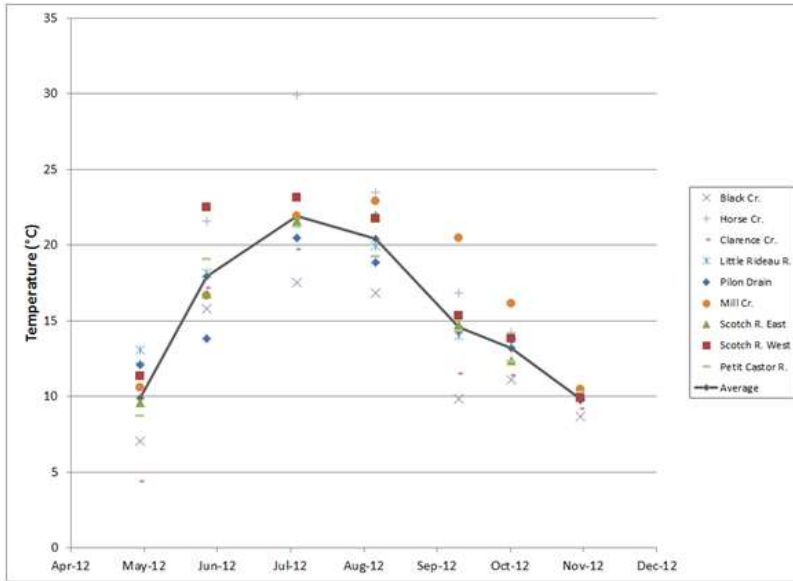


# Stream Flow

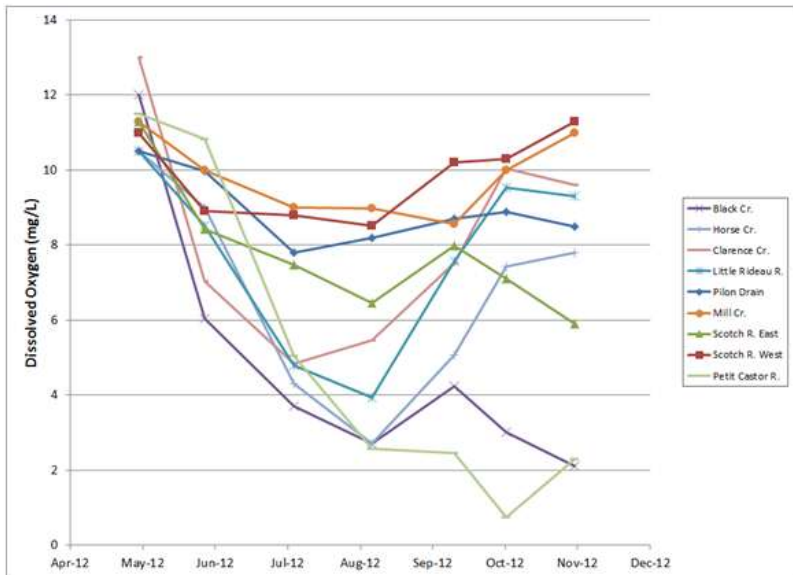




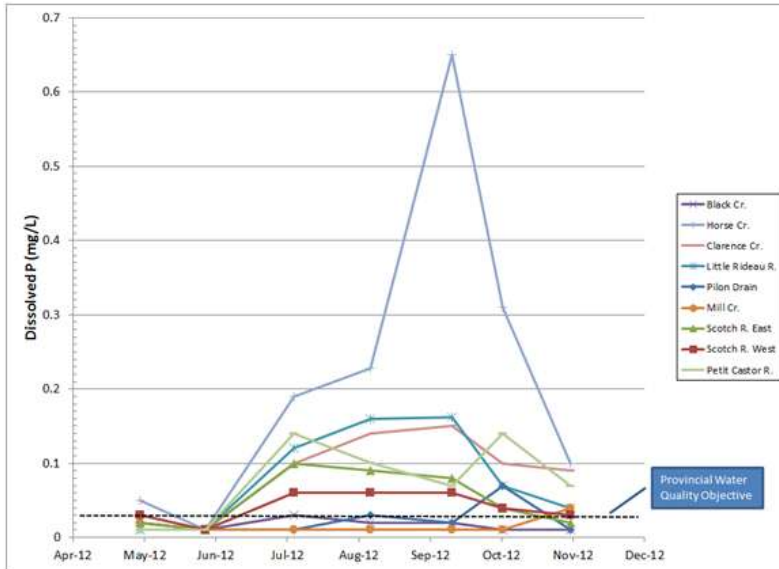
### Stream Temperature



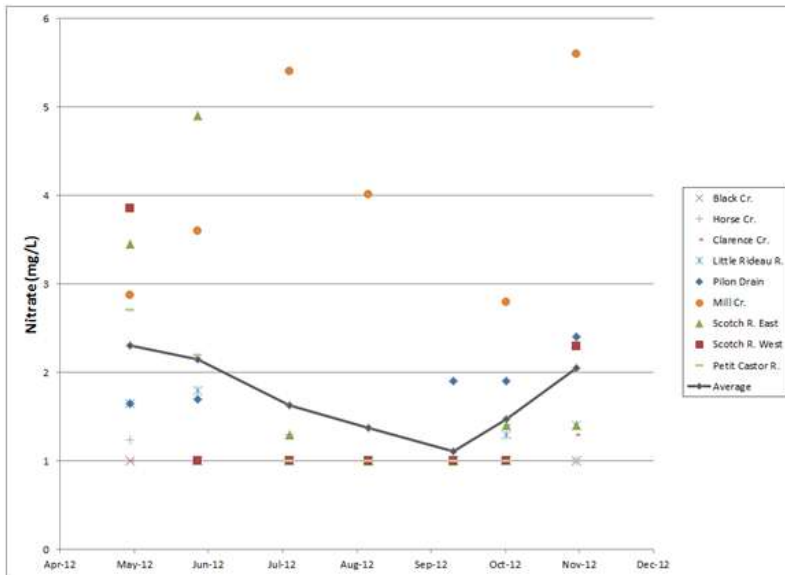
### Stream Dissolved Oxygen



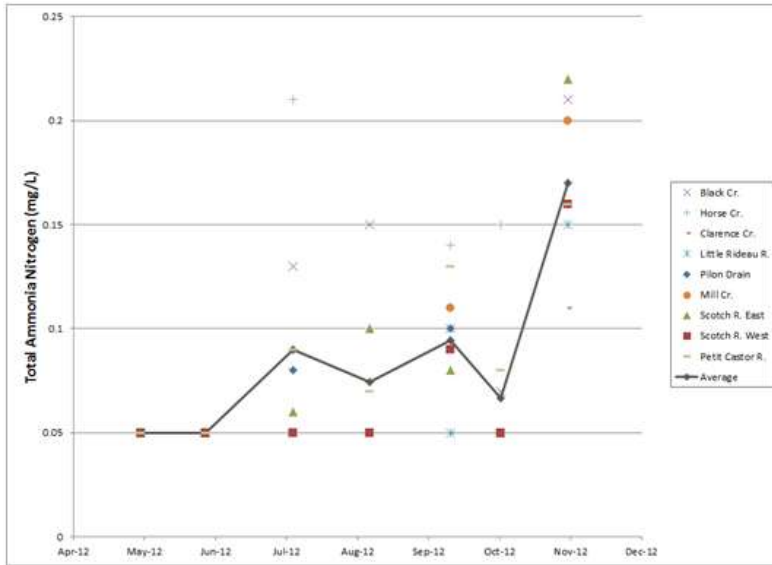
## Stream Dissolved Phosphorus



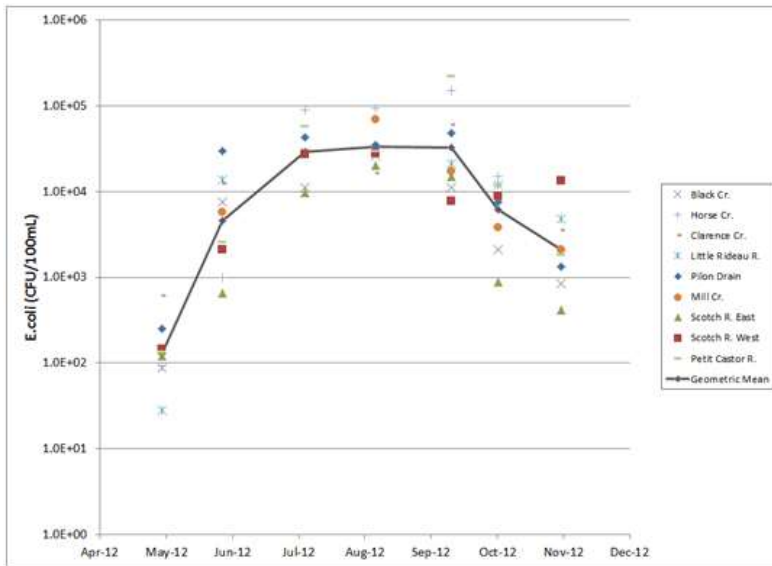
## Stream Nitrate



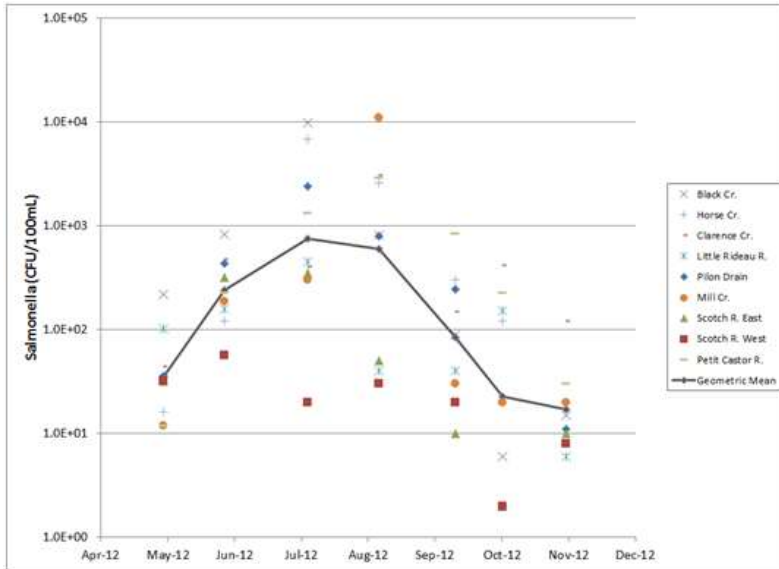
### Stream Ammonia



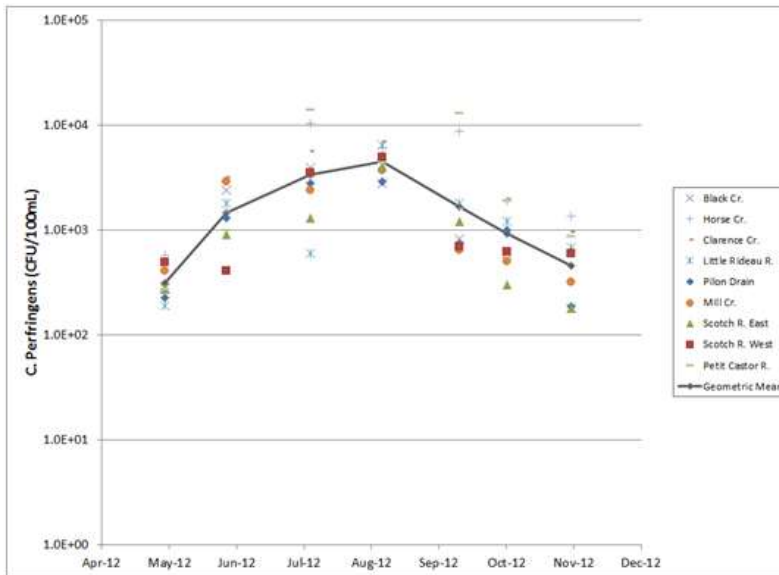
### Stream E.coli



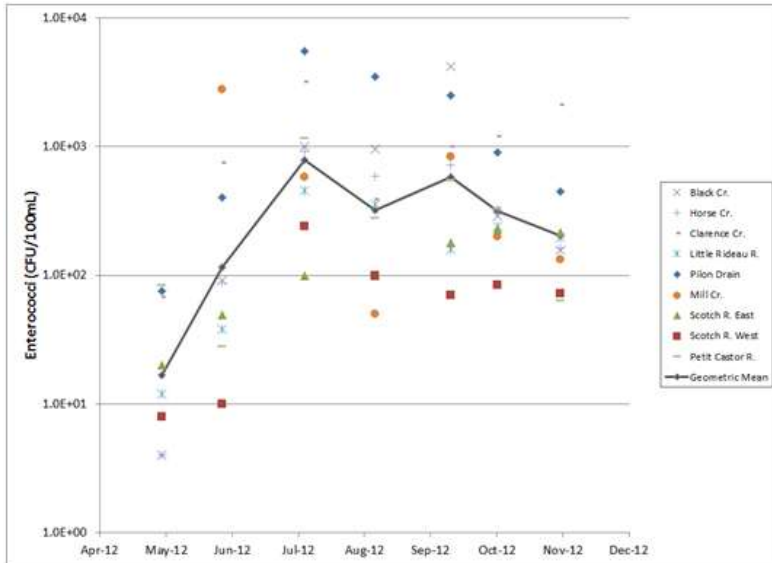
### Stream Salmonella



### Stream C. Perfringens



## Stream Enterococci



## Correlations

Bacterial Indicator	Correlation Coefficient (R <sup>2</sup> )	
	Stream Flow	Stream Temperature
<i>E.coli</i>	-0.47	0.49
<i>Salmonella</i>	-0.14	0.85
<i>C. perfringens</i>	-0.28	0.81
Enterococci	-0.59	0.36

## Summary

- Water quality was generally good with high DO, low nitrate and ammonia concentrations
- Phosphorus levels were high, with 6 of 9 streams above the PWQO limit
  - 6 of 8 streams had significantly higher P concentrations than the reference stream.
- No observed correlation between livestock intensity and water quality
- Bacteria numbers varied inversely with stream flow and varied strongly with temperature.
  - *E.coli* counts were consistently above the CWQG for recreational use.

## Acknowledgements

- Prescott-Russell Environmental Stewardship Council