

# Innovative nitrogen management strategies to reduce groundwater impacts in drinking water source protection areas

Jacqueline Brook <sup>1</sup>, Donald King <sup>2</sup>, David Rudolph <sup>1</sup>

<sup>1</sup> Department of Earth and Environmental Science, University of Waterloo  
<sup>2</sup> Soil Resource Group, Guelph, Ontario

## Outline

- Project Goals
- Introduction to the study site
- Overview of the study design
- Preliminary Results
- Conclusions

## Objective

Investigate the benefits of different combined nitrogen management and cropping practices in reducing the leaching potential of nitrogen under corn within a source water protection area.

## Practices under investigation

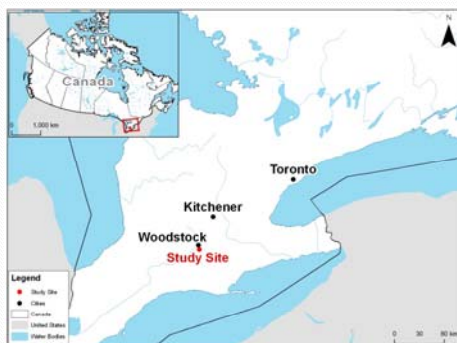
### *Nutrient treatment*

- Polymer coated urea (slow release fertilizer)
- Side dress application of fertilizers

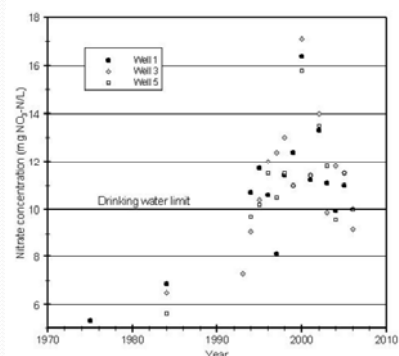
### *Cropping practice*

- Legume cover crop (red clover) with reduced nutrient application

## Study Site



## Well Concentration



## Study Site



● Municipal supply well

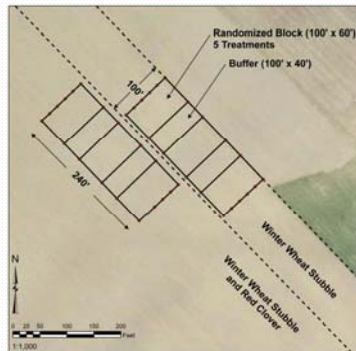
- Owned by Oxford County, as a part of a preemptive mitigation strategy.
- The University of Waterloo has been conducting experiments at the site since 1998
  - Performance of best management practices monitored at the site since 2004

## Study Site

- Gently sloping topography
- Surficial soils consists of a glacially derived silt to silt-sand till
- Agricultural activity in the area is dominated by livestock, corn and soybean

## Study Design

- 2 year study
- Random block design
- Treatments repeated on both red clover cover crop and no clover cover crop
- Treatments have 3 replicates



## Rates of nitrogen fertilizer application (lbN/ac)

Treatment	Winter wheat stubble	Red Clover stubble
Control	5	5
Spring application of polymer coated urea	138	76
Spring application of urea	138	76
Side dress application of UAN 28%	125	69

## Calculating rates of nitrogen fertilizer

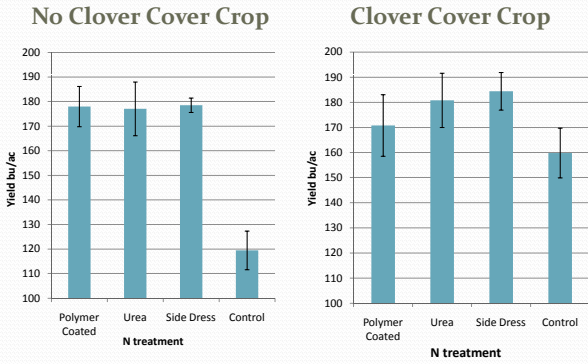


## Monitoring

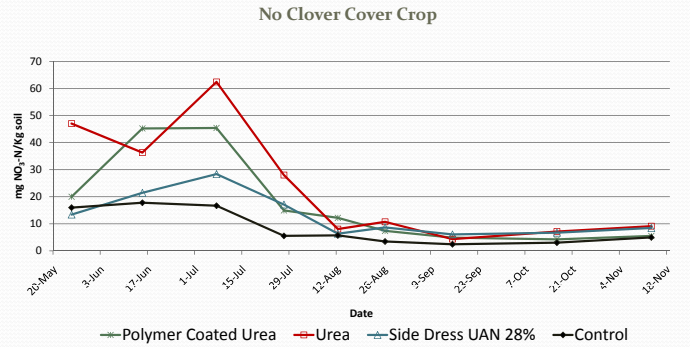
- Measure grain yield
- Biweekly shallow soil samples of 30cm (12inches)
- Deep soil cores after planting and after harvest; 4.5m (15ft)



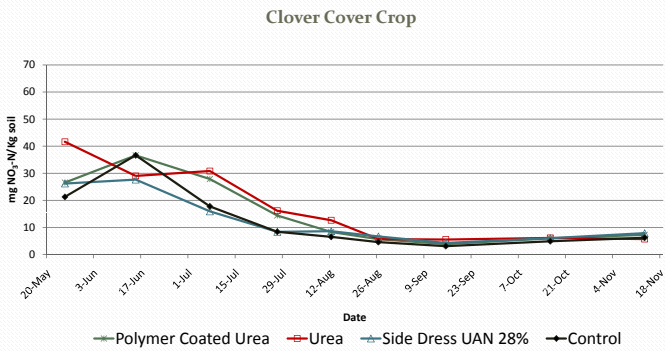
## Corn Yields



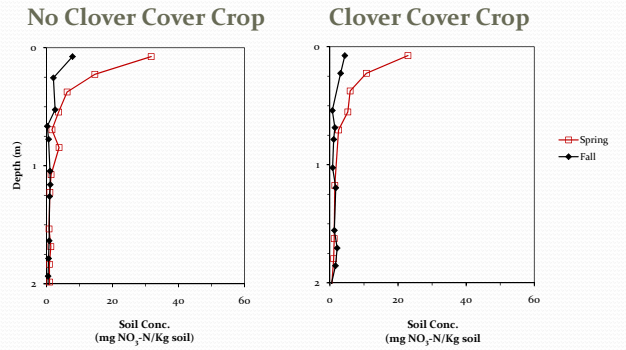
## Shallow Soil Cores



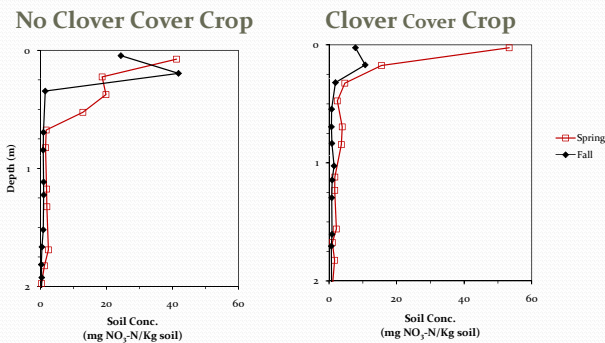
## Shallow Soil Cores



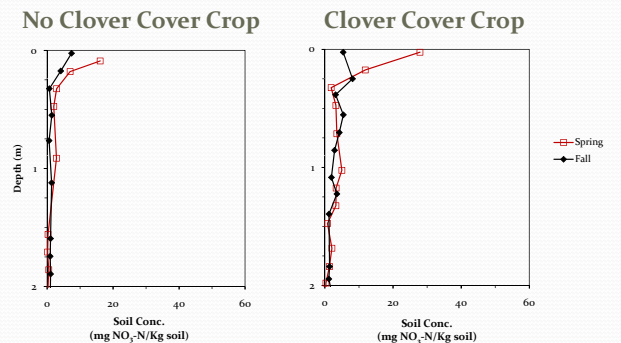
## Control



## Urea

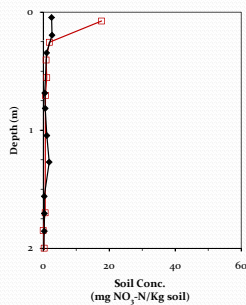


## Polymer Coated Urea

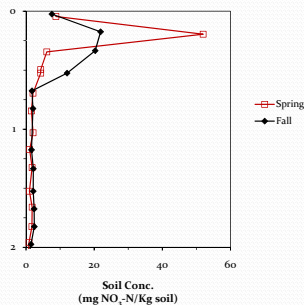


## Side Dress Urea 28% UAN

### No Clover Cover Crop



### Clover Cover Crop



## Conclusions

- Polymer coated urea may reduce leaching without affecting corn yields.
- Clover cover crop with reduced fertilizer inputs had similar yields as treatments without clover, and did not increase leaching loss during the growing season.
- The side dress application without clover acted similarly to the polymer coated urea.

## On going work

- 2010 spring cores at the site are being processed
- The same block treatments are being replicated at a different location.

## Consequence

Better recommendations to farmers for nitrogen management practices that protect water sources while maintaining good crop yields.

## Technical Help

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