WATER REUSE RESEARCH DEMONSTRATION PROJECT

National Nutrient Reuse and Recovery Forum

March 8, 2018

Theresa MacIntyre-Morris – York Region

Ann Huber – Soil Resource Group

York Region

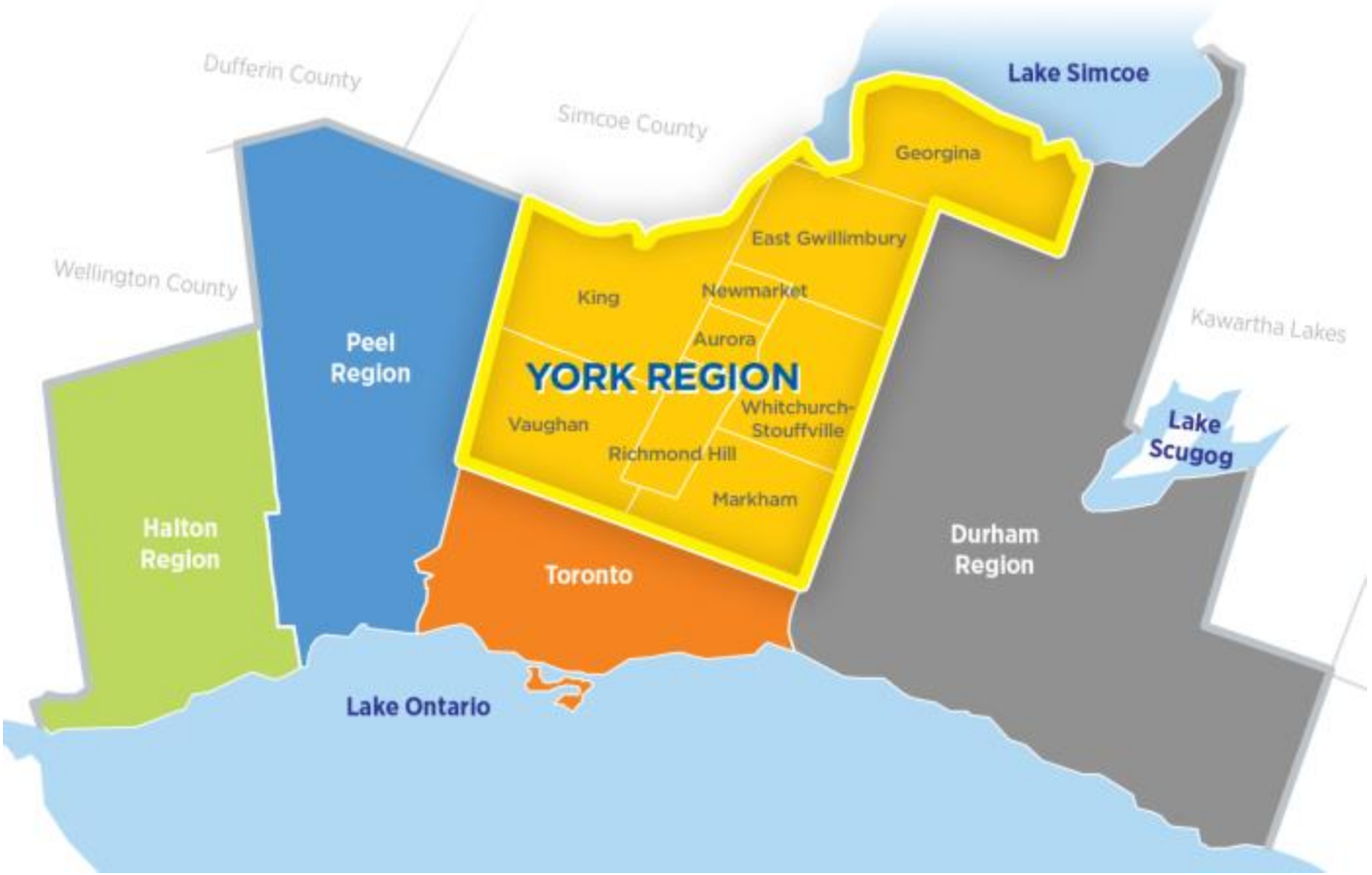
Water Reuse Research Demonstration Project

- To start laying the groundwork for future water reuse opportunities
- To help better understand the technical, regulatory and environmental implications of water reuse

Research Project Scope

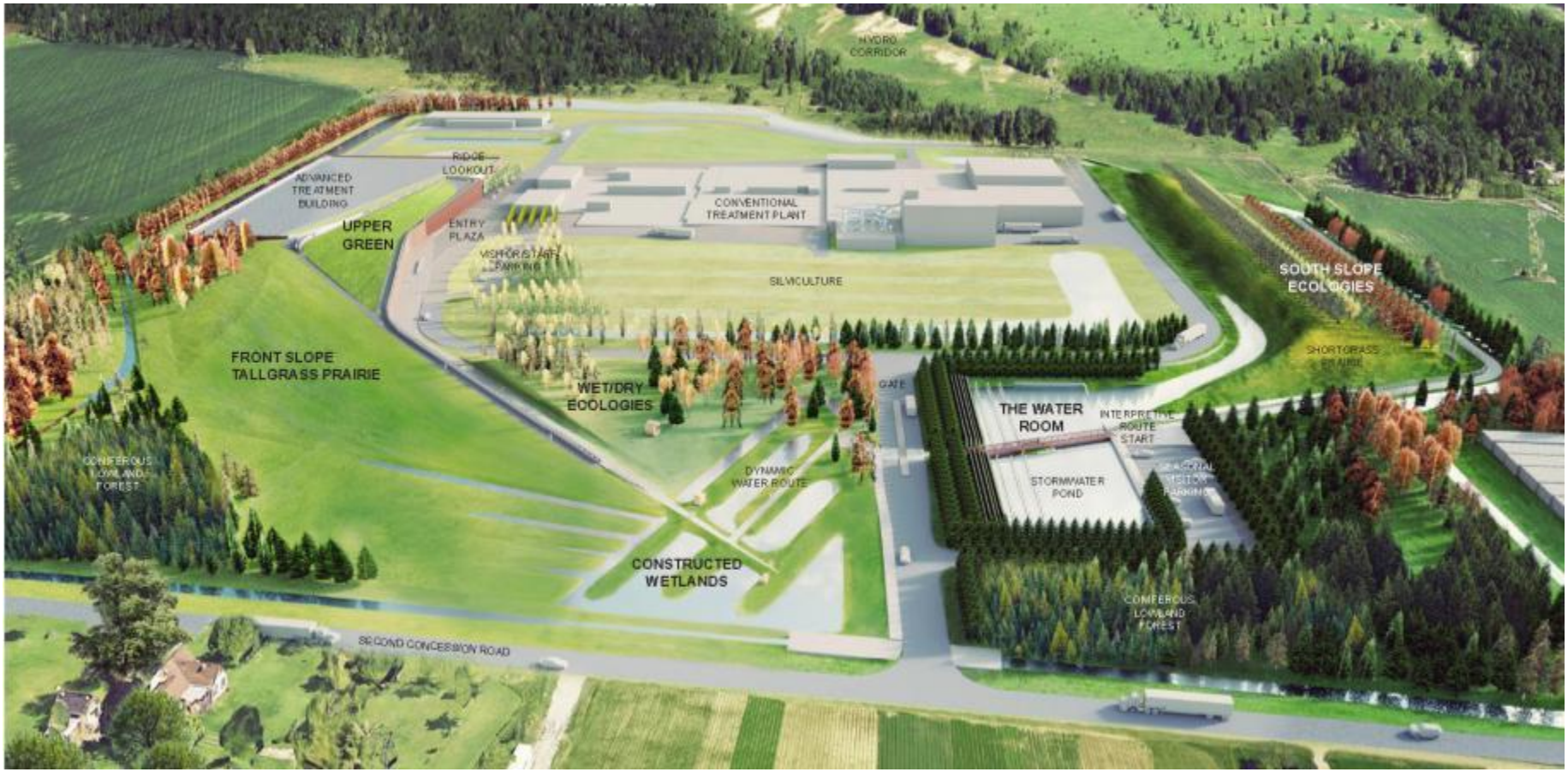
- The project will focus on the use of reclaimed water for non-food agricultural irrigation
- Evaluate the effects of reclaimed water on:
  - Plant health
  - Soil properties
  - Water quality and quantity
- Track impact on energy and greenhouse gas emissions

Why consider water reuse in Ontario and York Region?



York Region

Proposed Water Reclamation Centre

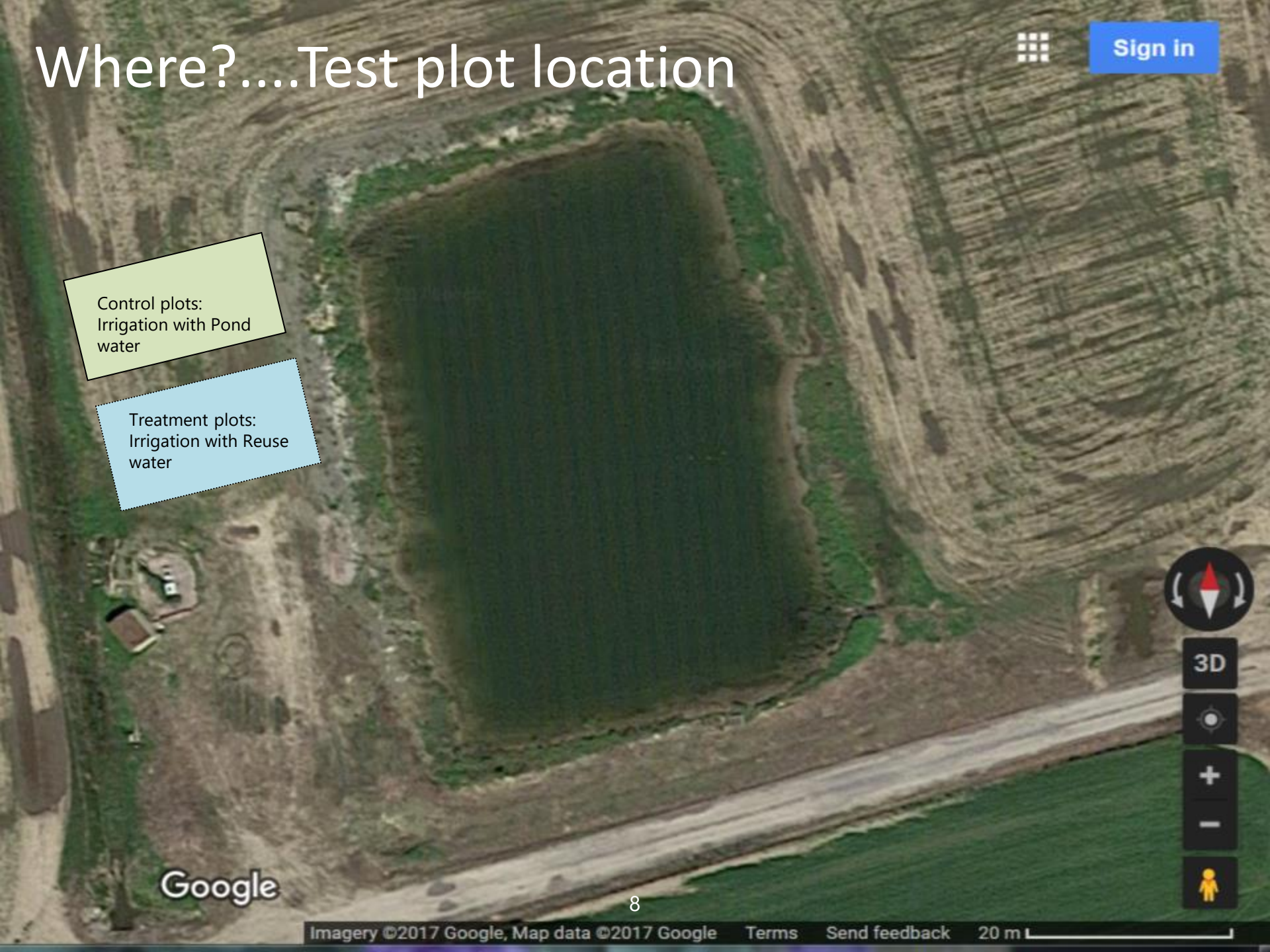


York Region

Who?.... Academic Team Members

- Soil Resource Group
  - Dr Ann Huber
  - Margaret Ribey
  - Don King
- University of Waterloo
  - Dr David Rudolph
  - Dr Will Robertson
  - Student
- Agriculture & Agri-Food Canada
  - Patrick Handyside
  - Sonja Fransen

Where?....Test plot location



How?..... Irrigation method

- Storage tank
  - 3500 US gal (13m^3)
- Irrigation method:
  - Oscillating sprinkler
  - Pumps/hoses
  - Flow meters
- Irrigation scheduling
  - Water Budget method (OMAFRA pub 845)

What?..... Monitoring program

- Water:
  - Groundwater – nested wells
  - Tile flow as events occur - autosamplers
  - Soil water – lysimeters
- Soil chemistry – nutrients and 'limiters' (Na, Cl, metals)
- Soil health: organic matter, Solvita, water holding capacity & compaction
- Plant health (disease and insect pressure; tissue analysis)

- Germination trial (Aug 2018 – June 2019)
- Alternate crop trial (Aug – Oct 2018; Apr – June 2019)

What?.... Reuse Water Quality

Table 6-2. Average Monthly Effluent Parameter Values for York Region Water Resource Recovery Facilities 2013-2014

PLANT	CBOD (MG/L)	TP (MG-P/L)	TKN (MG-N/L)	SOLIDS (MG/L)	E COLI (GMD)
Schomberg	0.71	0.04	0.79	2.80	1.00
Mt Albert	0.93	0.06	0.85	3.28	1.00
Nobleton	0.83	0.03	0.60	2.61	1.00
Sutton	0.90	0.08	0.89	2.13	1.32
Keswick	0.82	0.03	0.88	1.52	1.00
Kleinburg	0.94	0.05	0.82	4.44	1.00

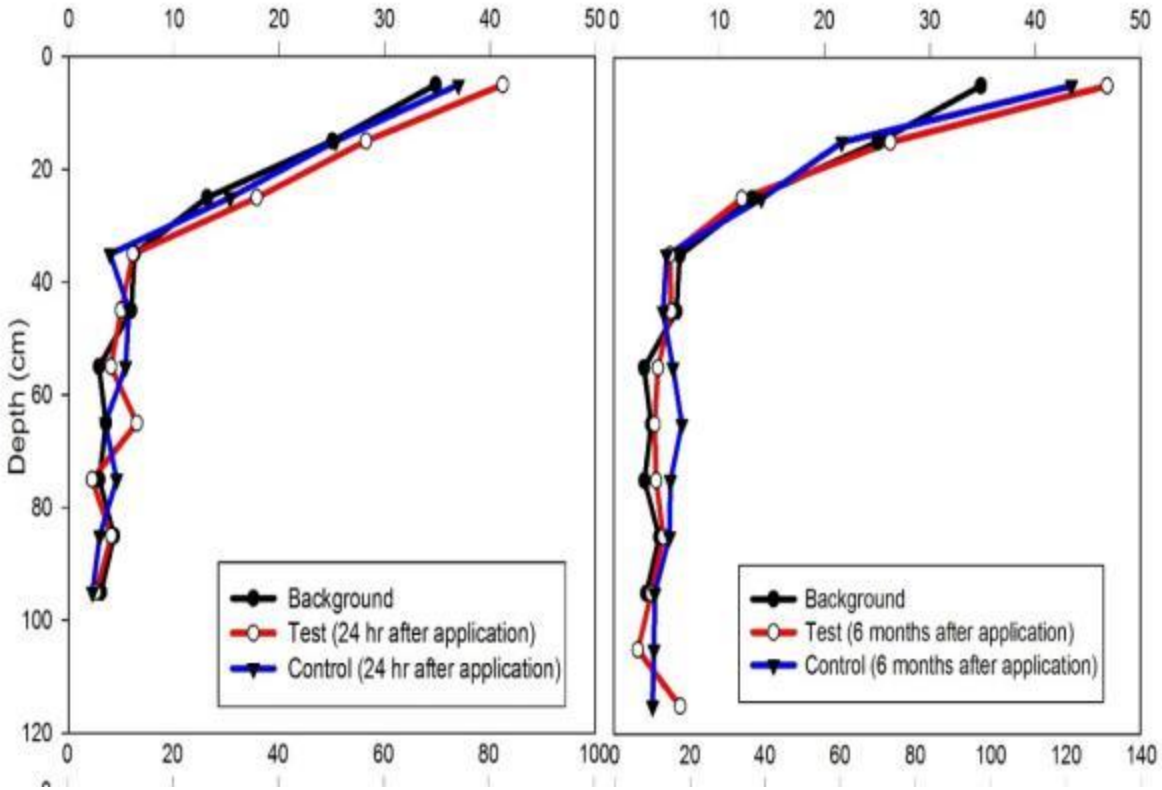
Mount Albert WRRF Secondary Effluent Quality (2012-2013)

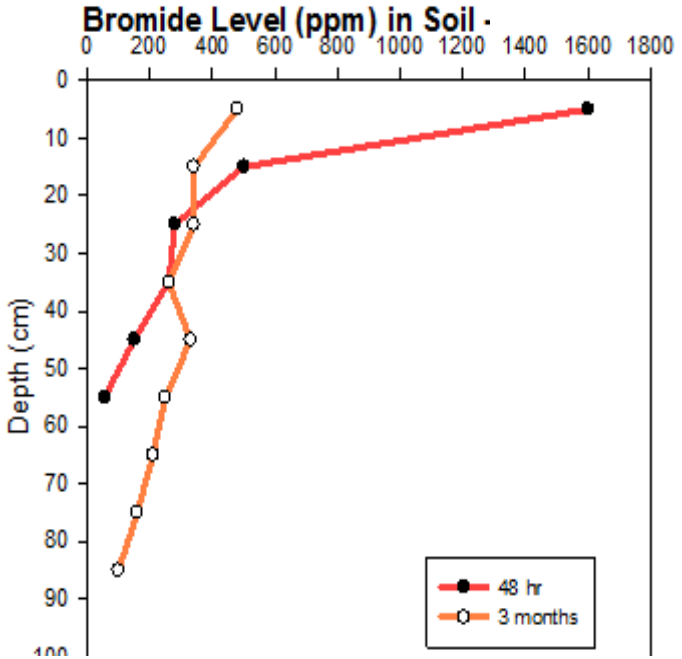
Study Phase (3 months)	Average Chloride (mg/L)	Average Sodium (mg/L)	Count
Phase I	298	221	8
Phase II	304	219	11
Phase III	270	210	21
Phase IV	310	240	25

How?..... Detailed soil profile monitoring: Soil P, NO_3-N and Na or Cl

For example:

Soil P 24 hr and 6 months after GNF application





SRG Soil Resource Group

Questions

Theresa MacIntyre-Morris
theresa.macintyre-morris@york.ca
1-877-464-9675 ext 75117

Ann Huber
ahuber@srgresearch.ca
(519) 341-2176