

# Identifying & Managing Field Scale Soil Variability

**MUSKOKA FARMS MATTER**

**January 30, 2016**

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# AgMaps

Geographic  
Information Portal



Free  
Tool  
#1

## Introducing the New and Improved Agricultural Information Atlas

Create maps, find data and generate records with larger map views, faster responses, updated air photos and new user-friendly tools for simple and easy navigation.

### The Agricultural Information Atlas

Land owners, land use planners, agricultural consultants and engineers, municipal government and academics can go to the [Agricultural Information Atlas website](#) to get agricultural information and create maps.

- [Agricultural Information Atlas Help](#)
- [Tutorial Series: Agricultural Information Atlas Help](#)
- [Create maps for Tile Drainage Records](#)
- [Create maps for Nutrient Management Strategies and Non-Agricultural Source Material Plans](#)
- [Create maps using the GLASI template](#)

### The Canada Land Inventory (CLI)

The [Canada Land Inventory \(CLI\)](#) provides a land use index for agriculture, forestry and recreation uses. Prefabricated CLI maps in PDF format can be downloaded.

## OMAFRA Program Data Set Descriptions

### Drainage Mapping

- [Constructed Drains](#)
- [Drain Connections](#)
- [Tile Drainage Project](#)

# Train Yourself by Watching Another do it....

## **AgMaps Geographic Information Portal - Tutorials**

We have developed a series of tutorials to help you use the Agricultural Information Atlas (AIA). The tutorials are straight-forward and provide easy to understand information on the functions of the AIA, as well as give basic instructions on how to use the application. Click on the titles below to start watching!

*Please note the tutorials are currently only compatible on the following browsers: Internet Explorer 9 or later, Safari 5.1 or later and Google Chrome 17 or later.*

- **Tutorial #1: Introduction to AgMaps and the AIA | Transcript**
- **Tutorial #2: Layout and Tabs | Transcript**
- **Tutorial #3: Navigation and Bookmarking | Transcript**
- **Tutorial #4: Tools | Transcript**
- **Tutorial #5: Layers, Transparency and Legend | Transcript**
- **Tutorial #6: Measuring and Identifying Features | Transcript**
- **Tutorial #7: Searching | Transcript**
- Watching our tutorials? Fill out our **online evaluation** and let us know what you think!
- **Tutorial #8: Labeling a Map and Using Markup Tools | Transcript**
- **Tutorial #9: Creating a General Use Map | Transcript**
- **Tutorial #10: Creating a Tile Drainage Record | Transcript**
- **Tutorial #11: Creating an AgErosion Watershed Map | Transcript**
- **Tutorial #12: Creating a Farmstead Sketch | Transcript**
- **Tutorial #13: Creating a Field Map | Transcript**

# Base Layers

The screenshot displays the Ontario Agricultural Information Atlas web application. The browser address bar shows the URL: [www.gisoeapp.lrc.gov.on.ca/AIA/Index.html?site=AIA&viewer=AIA&locale=en-US](http://www.gisoeapp.lrc.gov.on.ca/AIA/Index.html?site=AIA&viewer=AIA&locale=en-US). The page header includes the Ontario logo and the text "Ministry of Agriculture, Food and Rural Affairs Agricultural Information Atlas".

The navigation menu includes "About", "Navigation", "Map Information", and "Markup & Printing". Below this is a toolbar with "Bookmarks", "Zoom In", "Zoom Out", "Initial View", "Previous Extent", and "Next Extent".

The "Select Map Layers" panel on the left is expanded to show the "Operational Layers" section. The "Parcels" layer is currently selected and visible on the map. Other layers in this section include "Assessment Parcel", "Farm Tax Rated Parcels - Current Year", and "Farm Tax Rated Parcels - Previous Year". The "Administrative" and "Environment/Base Data" sections are also visible, with "Environment/Base Data" expanded to show "LIO Topographic" and "Ontario Imagery".

The main map area shows a topographic map of a region in Ontario, featuring several lakes (Silver Lake, Zandy Lake, Lake Muskoka, Leonard Lake) and roads. A search bar at the top of the map area contains the text "I want to...". A scale bar at the bottom of the map indicates 10km.

At the bottom of the page, there is a footer with the text: "Powered By Land Information Ontario | ACCESSIBILITY | PRIVACY | IMPORTANT NOTICES | © QUEEN'S PRINTER FOR ONTARIO, 2015 | IMAGERY COPYRIGHT NOTICE".

# Transparency

The screenshot displays the Agricultural Information Atlas web application. The browser address bar shows the URL: [www.gisoeapp.lrc.gov.on.ca/AIA/Index.html?site=AIA&viewer=AIA&locale=en-US](http://www.gisoeapp.lrc.gov.on.ca/AIA/Index.html?site=AIA&viewer=AIA&locale=en-US). The page header includes the Ontario logo and the text "Ministry of Agriculture, Food and Rural Affairs" and "Agricultural Information Atlas".

Navigation tabs include "About", "Navigation", "Map Information", and "Markup & Printing". Below these are icons for "Bookmarks", "Zoom In", "Zoom Out", "Initial View", "Previous Extent", and "Next Extent".

The "Select Map Layers" panel on the left lists the following layers:

- Operational Layers
  - Parcels
    - Assessment Parcel
    - Farm Tax Rated Parcels - Current Year
    - Farm Tax Rated Parcels - Previous Year
  - Administrative
  - Environment/Base Data
- Background Map and Imagery
  - LIO Topographic
  - Ontario Imagery

The main map area shows a rural landscape with a large blue water body on the right. A search bar at the top left of the map area contains the text "I want to...". A scale bar at the bottom indicates 100m. The footer text reads: "Powered By Land Information Ontario | ACCESSIBILITY | PRIVACY | IMPORTANT NOTICES | © QUEEN'S PRINTER FOR ONTARIO, 2015 | IMAGERY COPYRIGHT M".

Agricultural Information | Agricultural Information | www.gisoeapp.lrc.gov.on.ca/AIA/Index.html?site=AIA&viewer=AIA&locale=en-US

Apps | Homepage | Library | ISPA | International ... | Crop Portal | Google Maps | 2015 Projects - One... | Data Mapper | OMAFRA Field Crop... | Shorten - Bitly | Premier Crop Syst...

Ontario Ministry of Agriculture, Food and Rural Affairs  
Agricultural Information Atlas

About | Navigation | Map Information | Markup & Printing

Select Map Layers | Legend | Identify | Search By Location | Query | Measure Distance | Measure Area | Feet (ft) | Acres (ac) | Erase | Clear All | Add as Drawing

4453090008008000000 | I want to...

Details

Roll Number  
4453090008008000000

Click or tap a location on the map to learn what's there.

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# Imagery and Parcel (Roll #)

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The interface features a top navigation bar with tabs for "About", "Navigation", "Map Information", and "Markup & Printing". Below this is a toolbar with various map tools: "Select Map Layers", "Legend", "Identify", "Search By Location", "Query", "Measure Distance", "Measure Area", "Feet (ft)", "Acres (ac)", "Erase", "Clear All", and "Add as Drawing".

On the left side, there is a "Select Map Layers" panel with a search bar containing "I want to...". The layers are organized into several categories:

- Operational Layers** (indicated by a red box around the header):
  - Parcels
  - Assessment Parcel
  - Farm Tax Rated Parcels - Current Year
  - Farm Tax Rated Parcels - Previous Year
- Administrative** (indicated by a plus sign):
  - Environment/Base Data
- Background Map and Imagery** (indicated by a minus sign):
  - LIO Topographic
  - Ontario Imagery

The main map area shows an aerial satellite view of a rural landscape with a large parcel highlighted in yellow and outlined in red. A scale bar at the bottom indicates 200m. A tooltip at the bottom of the map reads: "Click or tap a location on the map to learn what's there."

At the bottom of the page, there is a footer with the text: "Powered By Land Information Ontario | ACCESSIBILITY | PRIVACY | IMPORTANT NOTICES | @ QUEEN'S PRINTER FOR ONTARIO, 2015 | IMAGERY COPYRIGHT NOT"

# Early Spring (nearly) Bare Ground Imagery

The screenshot displays the Ontario Agricultural Information Atlas web application. The browser address bar shows the URL: [www.gisoeapp.lrc.gov.on.ca/AIA/Index.html?site=AIA&viewer=AIA&locale=en-US](http://www.gisoeapp.lrc.gov.on.ca/AIA/Index.html?site=AIA&viewer=AIA&locale=en-US). The page header includes the Ontario logo and the text "Ministry of Agriculture, Food and Rural Affairs Agricultural Information Atlas".

The interface features a navigation menu with "About", "Navigation", "Map Information", and "Markup & Printing". Below this is a toolbar with various map tools: "Select Map Layers", "Legend", "Identify", "Search By Location", "Query", "Measure Distance", "Measure Area", "Erase", "Clear All", and "Add as Drawing". The "Measure Area" tool is currently active, showing units of "Metres (m)" and "Metre² (m²)".

On the left side, there is a "Select Map Layers" panel with the following categories and items:

- Operational Layers**
  - Parcels
  - Assessment Parcel
  - Farm Tax Rated Parcels - Current Year
  - Farm Tax Rated Parcels - Previous Year
- Administrative**
- Environment/Base Data**
- Background Map and Imagery**
  - LIO Topographic
  - Ontario Imagery

The main map area shows an aerial view of agricultural fields. A search bar at the top left of the map area contains the text "I want to...". A scale bar at the bottom left of the map area indicates a distance of 20m.

At the bottom of the page, there is a footer with the text: "Powered By Land Information Ontario | ACCESSIBILITY | PRIVACY | IMPORTANT NOTICES | © QUEEN'S PRINTER FOR ONTARIO, 2015 | IMAGERY COPYRIGHT NOTIC".

# Labelling the map with points or measuring area (acres)

The screenshot displays the Ontario Agricultural Information Atlas web application. The browser address bar shows the URL: [www.gisoeapp.lrc.gov.on.ca/AIA/index.html?site=AIA&viewer=AIA&locale=en-US](http://www.gisoeapp.lrc.gov.on.ca/AIA/index.html?site=AIA&viewer=AIA&locale=en-US). The page header includes the Ontario logo and the text "Ministry of Agriculture, Food and Rural Affairs" and "Agricultural Information Atlas".

The interface features a navigation menu with "About", "Navigation", "Map Information", and "Markup & Printing". Below this is a toolbar with icons for "Select Map Layers", "Legend", "Identify", "Search By Location", "Query", "Measure Distance", "Measure Area", "Feet (ft)", "Acres (ac)", "Erase", "Clear All", and "Add as Drawing".

The main map area shows an aerial view of agricultural fields. Several polygons are drawn on the map, each with a data label: "Area: 0.46 ac; Perimeter: 679.60 ft", "Area: 0.67 ac; Perimeter: 823.89 ft", "Area: 0.09 ac; Perimeter: 300.67 ft", and "Area: 0.06 ac; Perimeter: 241.55 ft". A red pushpin is placed on the map with a label "Sample #2" and coordinates "45° 5' 1.90" N, 79° 28' 7.10" W".

On the left side, there is a "Label Map" panel with instructions: "Choose the colour of pushpin that you would like to place at the location clicked. You may also add a short label to place on the map beside the marker." Below this are color selection icons, a "Label:" input field containing "Sample #2", a checkbox for "Label with map coordinates", and buttons for "Add", "Remove Previous", and "Clear All".

# Layout and Printing / Saving a Map

Markup & Printing

Create Map Label Map Markup Styles Edit Erase Clear All

Create a printable map

Select Layout  
General Map with Legend

Output Format  
Pdf

Resolution  
Standard

Map Scale  
Current Extent

Title  
My Farm near Milford Bay Ontario

Print

Markup & Printing

Create Map Label Map Markup Styles Edit Erase Clear All

Create a printable map

Your file is ready. To view the file, please click 'Open File'.

Open File



October 19 2005

Butter & Ego Rd

293 m

© 2016 Google  
Image © 2016 DigitalGlobe

45°05'23.93" N 79°28'21.14" W elev. 262 m

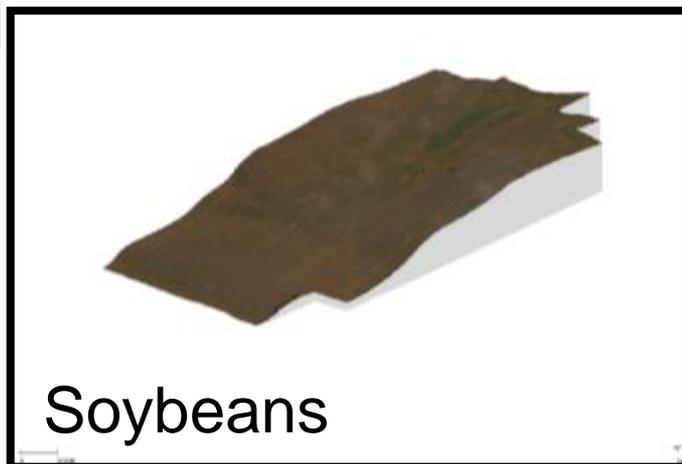
©2010 Google

Eye alt: 1.55 km

Imagery Date: 5/8/2004 2005



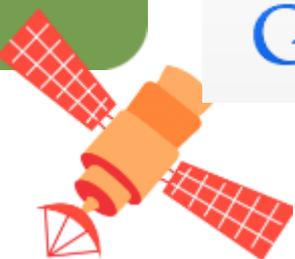
Sept 4, 2013



Sept 27, 2013.

Google Earth

April 23, 2014



# Near Bare Ground Analysis – Spring 2010



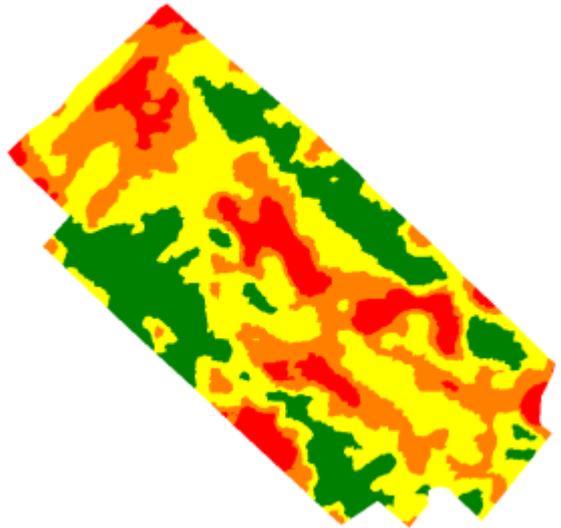
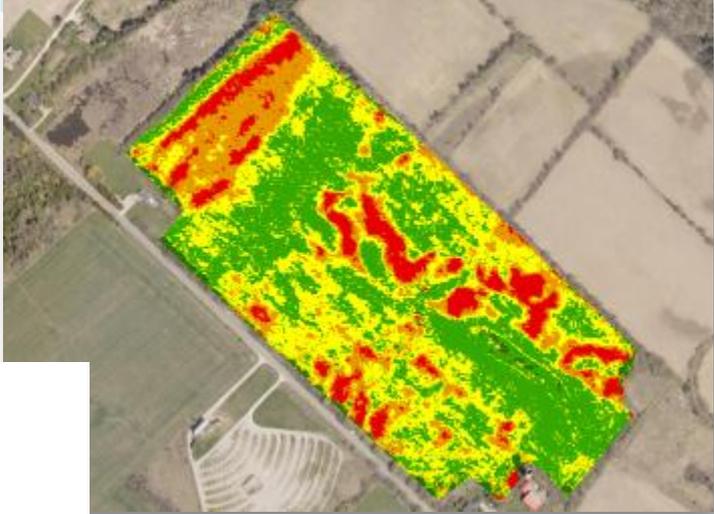
0 160ft

N ↑

# In-season analysis...



## 2014 Soybeans: Processed Image



Normalized Estimated Volume (Dry) ((1))		
Green	61.90 - 79.92	-- %
Yellow	52.71 - 61.90	-- %
Orange	43.66 - 52.71	-- %
Red	20.16 - 43.66	-- %



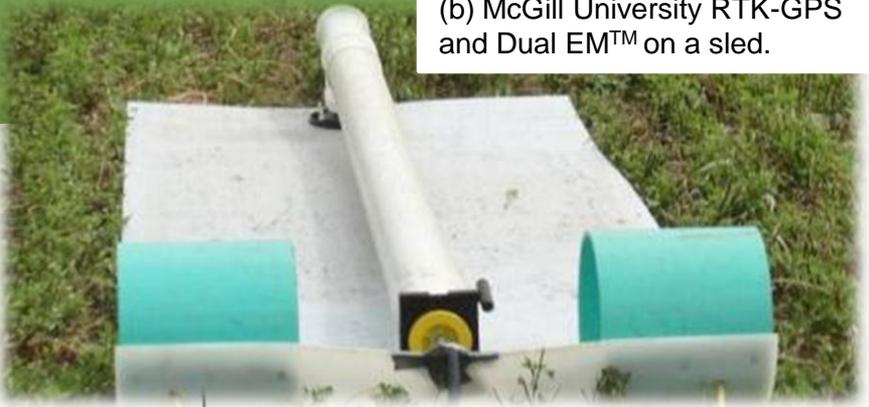
# **NEW SOIL MAPPING TECHNOLOGIES IN THE PROVINCE.....**

## **PROXIMAL SOIL SENSING**

Figure 1. (a) Soil Optix (Practical Precision)



(b) McGill University RTK-GPS and Dual EM™ on a sled.



(c) Soil Information System - Trimble (Premier Equipment)



(c) VERIS – MSP3 (Dupont Pioneer)



# Electrical Resistivity / Electromagnetic Induction Sensing

Soil EC measurements are correlated with soil properties that affect crop productivity, including soil texture, cation exchange capacity, drainage conditions, salinity and subsoil characteristics (Kitchen et al., 2003; Grisso et al., 2009)

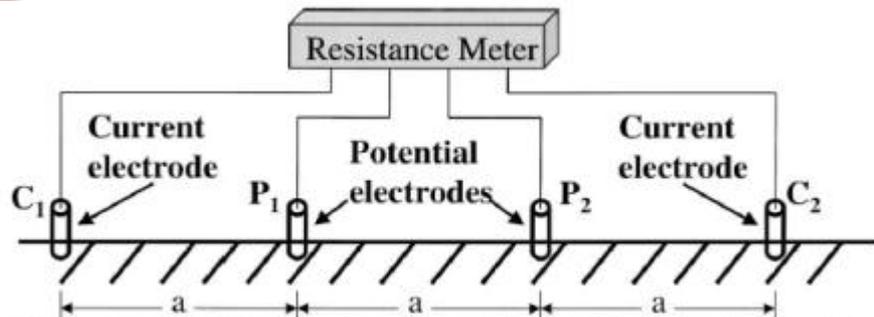
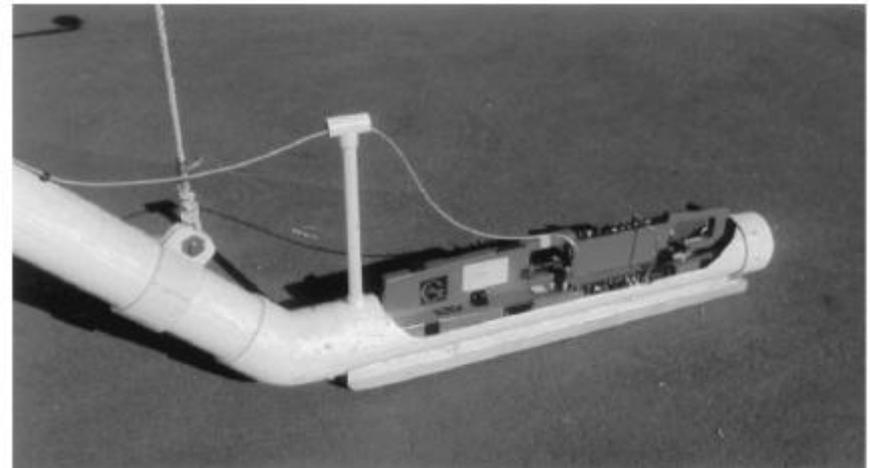
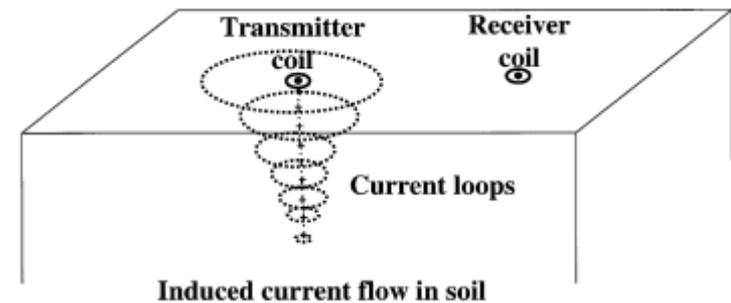
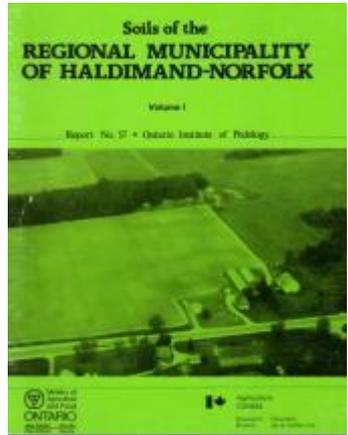
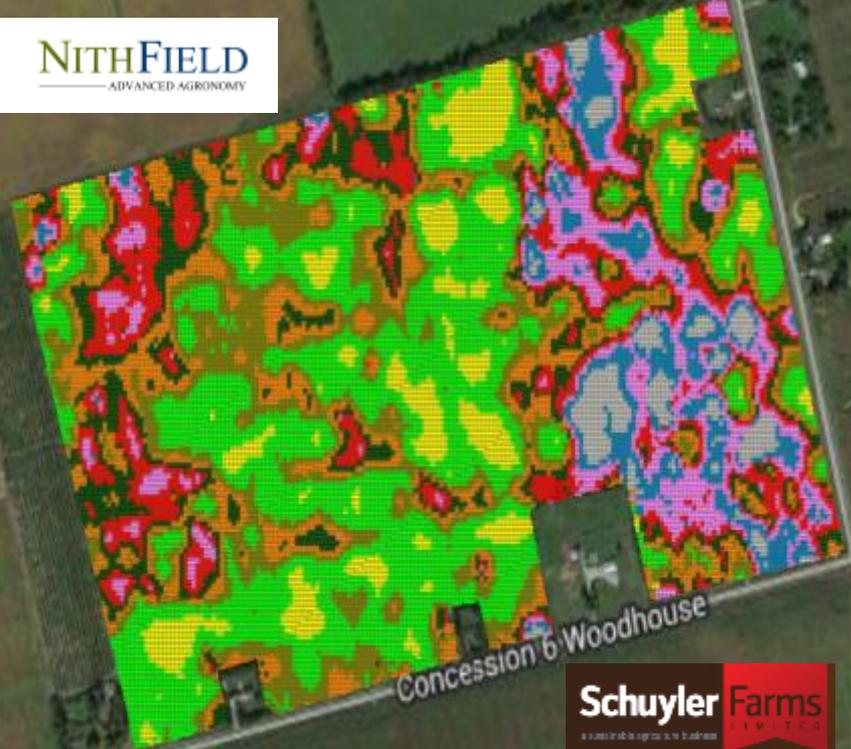


Fig. 4. Schematic of Wenner array electrodes. C<sub>1</sub> and C<sub>2</sub> represent the current electrodes, P<sub>1</sub> and P<sub>2</sub> represent the potential electrodes, and *a* represents the interelectrode spacing. Modified from Rhoades and Halvorson (1977).



EMI Mapping for short...

# Putting Legacy Soil Maps on the Landscape using:

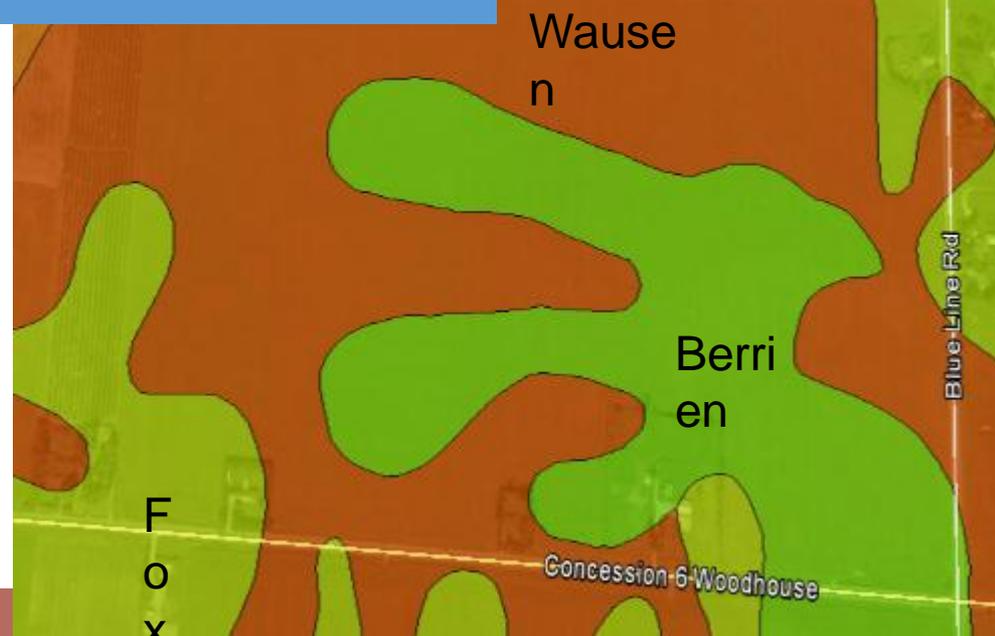


## Predictive Digital Soil Mapping (PDSM):

- Digital Elevation Model (DEM)
- EMI mapping
- soil coring & pedology expertise



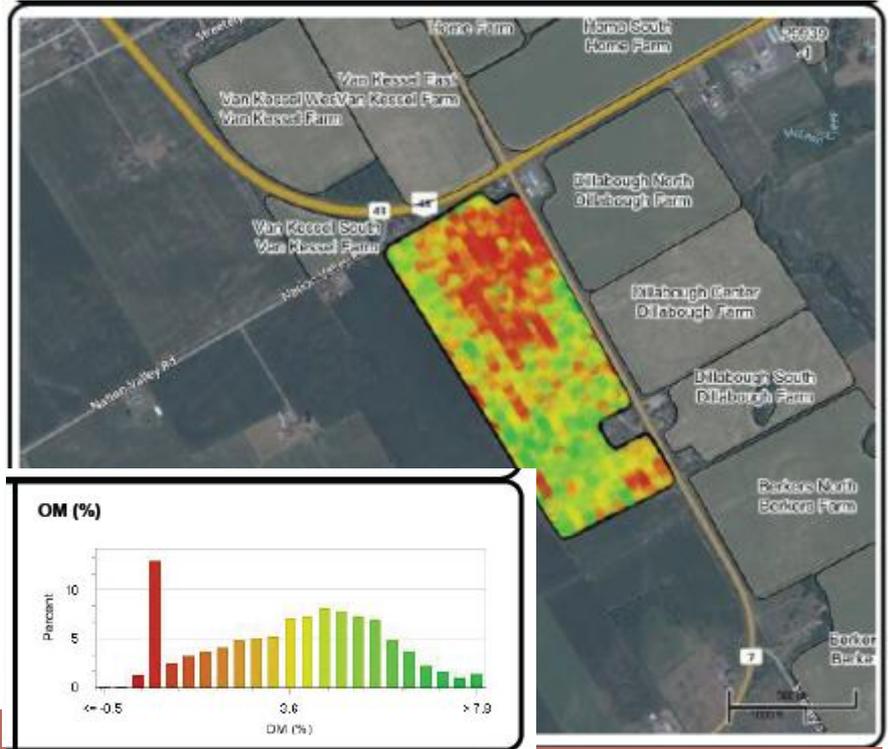
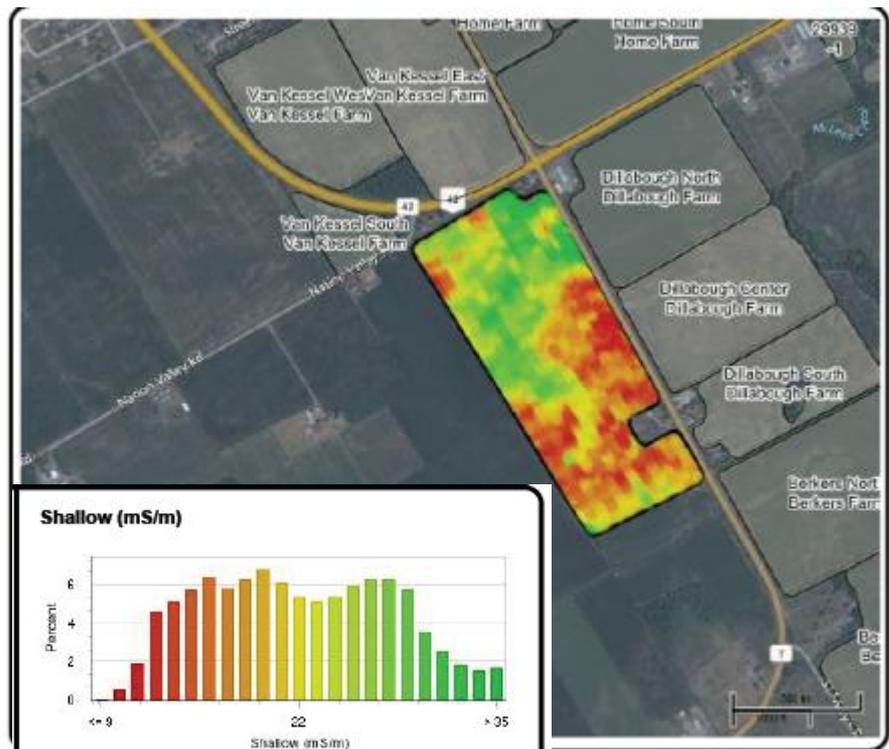
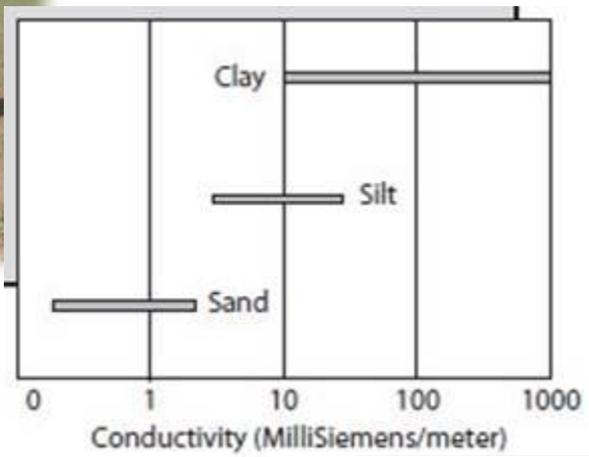
	<b>Fox</b>	Well Drained	
	<b>Brady</b>	Imperfectly Drained	SANDS/DEEP
	<b>Granby</b>	Poorly Drained	
	<b>Bookton</b>	Well Drained	
	<b>Berrien</b>	Imperfectly Drained	SANDS OVER CLAY
	<b>Wausen</b>	Poorly Drained	
	<b>Brantford</b>	Well Drained	
	<b>Beverly</b>	Imperfectly Drained	SILTY CLAY/CLAY
	<b>Toledo</b>	Poorly Drained	





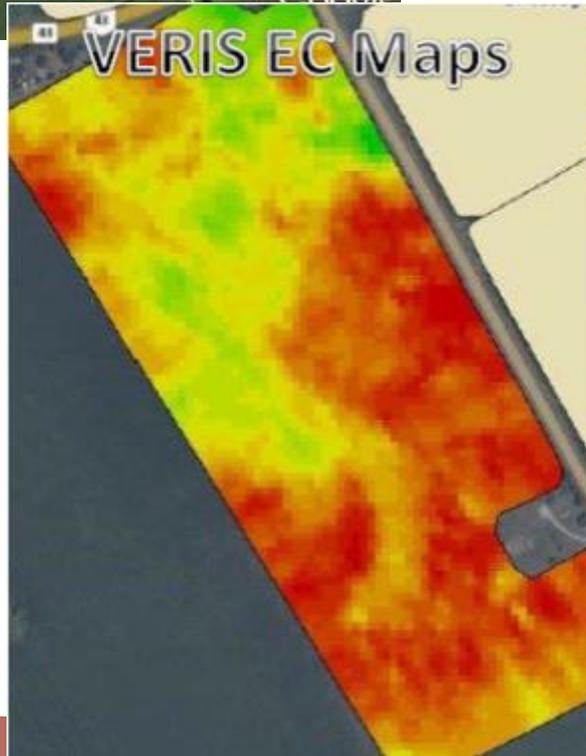
# VERIS MSP3:

- Electrical Resistivity
- RTK-GPS:
- DEM/Topography
- Organic Matter Camera
- pH sensor





- **Dark Green:** coarse texture, dark soil
- **Dark Blue:** Finer Texture, Dark Soil
- **Yellow:** Coarse Texture, lighter soil
- **Red:** Fine Texture, Lighter Soil
- **Grey:** Nominal



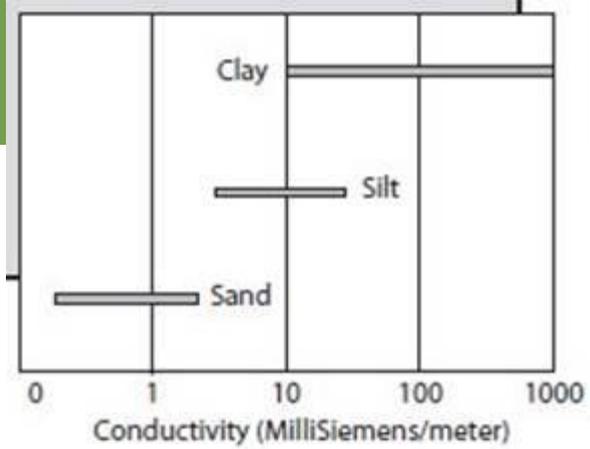
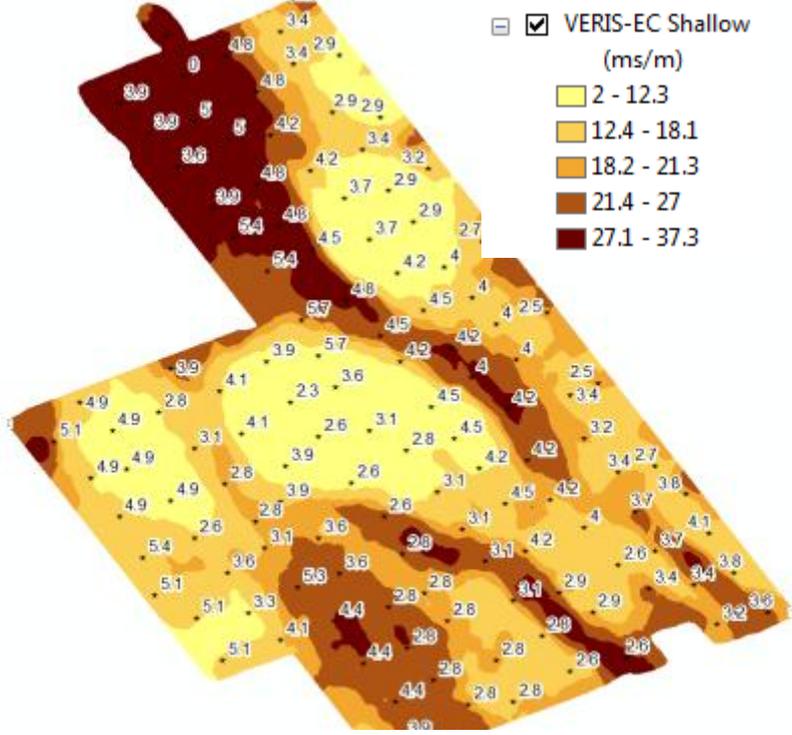
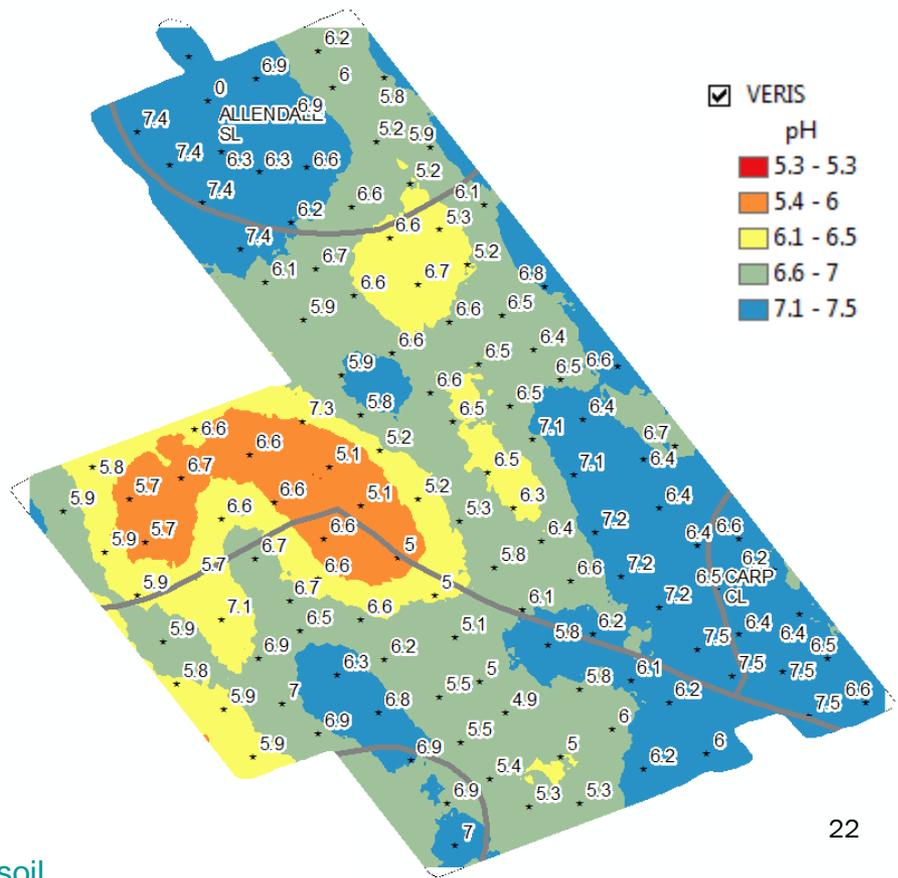


Table 9-2. Soil pH at Which Lime is Recommended for Ontario Crops

Crops	Soil pH Below Which Lime is Recommended	Target Soil pH <sup>1</sup>
Coarse and medium-textured mineral soils (sand, sandy loams, loams and silt loams)		
Perennial legumes, oat, barley, wheat, triticale, beans, peas, canola, flax, tomatoes, raspberries, strawberries, all other crops not listed below	6.1	6.5
Corn, soybeans, rye, grass, hay, pasture, tobacco	5.6	6.0
Potatoes	5.1	5.5
Fine-textured mineral soils (clays and clay loams)		
Alfalfa, cole crops, rutabagas	6.1	6.5
Other perennial legumes, oat, barley, wheat, triticale, soybeans, beans, peas, canola, flax, tomatoes, raspberries, all other crops not listed above or below	5.6	6.0
Corn, rye, grass hay, pasture	5.1	5.5
Organic soils (peats and mucks)		
All field and vegetable crops	5.1	5.5

<sup>1</sup> Where a crop is grown in rotation with other crops requiring a higher pH (for example, corn in





## Ontario Imagery Acquisition Projects

# 2013-2017

### Background

The Government of Ontario has a new imagery acquisition strategy to acquire and regularly update high-resolution imagery for Ontario. The strategy ensures there is long term, affordable approach to acquisition projects that will benefit public and private sector organizations.

A competitive contract was awarded to collect aerial imagery for the next five years across Ontario. The predefined acquisition areas range between 35,000 and 45,000 sq km.

Partnerships and a shared funding model are fundamental to the strategy.



A Map of the Five Year Acquisition Plan

**Report  
Bugs to....**

Email: [omafra.gis@ontario.ca](mailto:omafra.gis@ontario.ca)

**Thank-you!  
Questions?**

**[www.ontario.ca/agmaps](http://www.ontario.ca/agmaps)**

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