

UNIVERSITY OF  
SASKATCHEWAN

# Saskatchewan Soil Information System (SKSIS)

## *The Launch!*

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# We are very grateful to our...

## COLLABORATORS

- Don Campbell
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- Jeff Schoenau
- Tim Nerbas
- Henry de Gooijer
- Darwin Anderson
- Brian McConkey
- Les Henry

## FUNDERS



Government  
— of —  
Saskatchewan

Growing Forward 2 

A federal-provincial-territorial initiative



**SaskCanola**  
Saskatchewan Canola Development Commission

SASKATCHEWAN  
**pulse**  
Growers



# What is SKSIS?

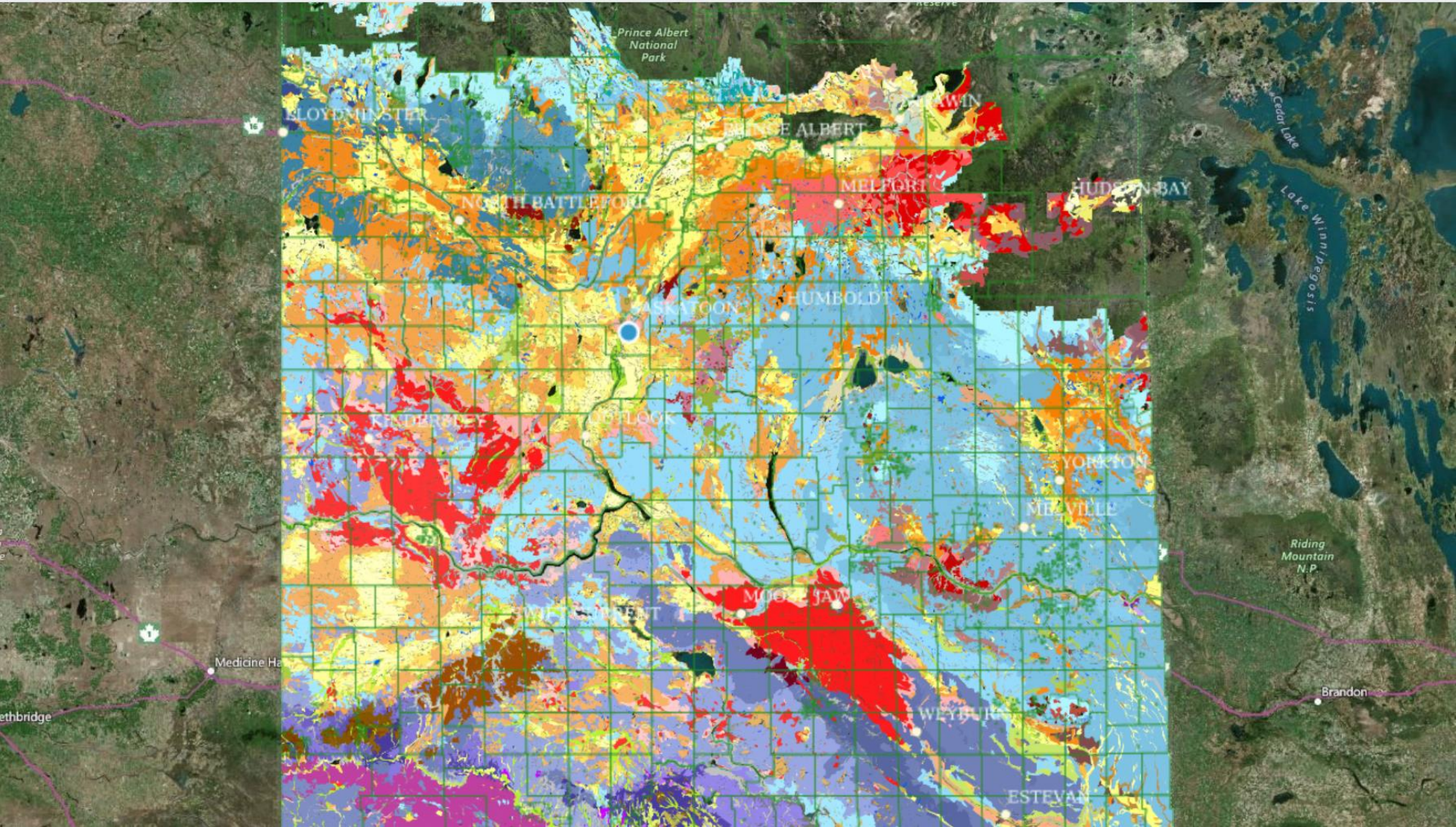
- Saskatchewan Soil Information System (SKSIS): exciting initiative underway since Jan. 2016
  - *Storing*: Repository for survey and other data
  - *Accessing*: Platforms (desktop and mobile)
  - *Refining*: Digital soil mapping (DSM)
  - *Sharing*: User-uploaded soil data (crowdsourcing)
- Welcome to... *SKSIS: the launch!*

**[sksis.usask.ca](http://sksis.usask.ca)**





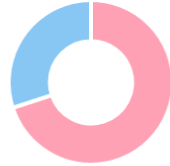
# Storing and Accessing





Map Polygon **Component**

 BRADWELL O.DBC  
 BRADWELL E.DBC



**Soil name:** BRADWELL O.DBC

**% of polygon:** 70

**Classification:** Orthic Dark Brown  
Chernozem CH

**Parent material:** Fluviolacustrine

**Soil name:** BRADWELL E.DBC

**% of polygon:** 30

**Classification:** Eluviated Dark Brown  
Chernozem CH

**Parent material:** Fluviolacustrine

Provide Feedback

**Area:** 467 ha

Provide Feedback

# Accessing

VL-FL

Br3:VL-FL  
22

OUTLOOK

*Pro tip:* Just because you can click on a point, doesn't mean you will find that exact soil at that exact point!

3:VL-FL

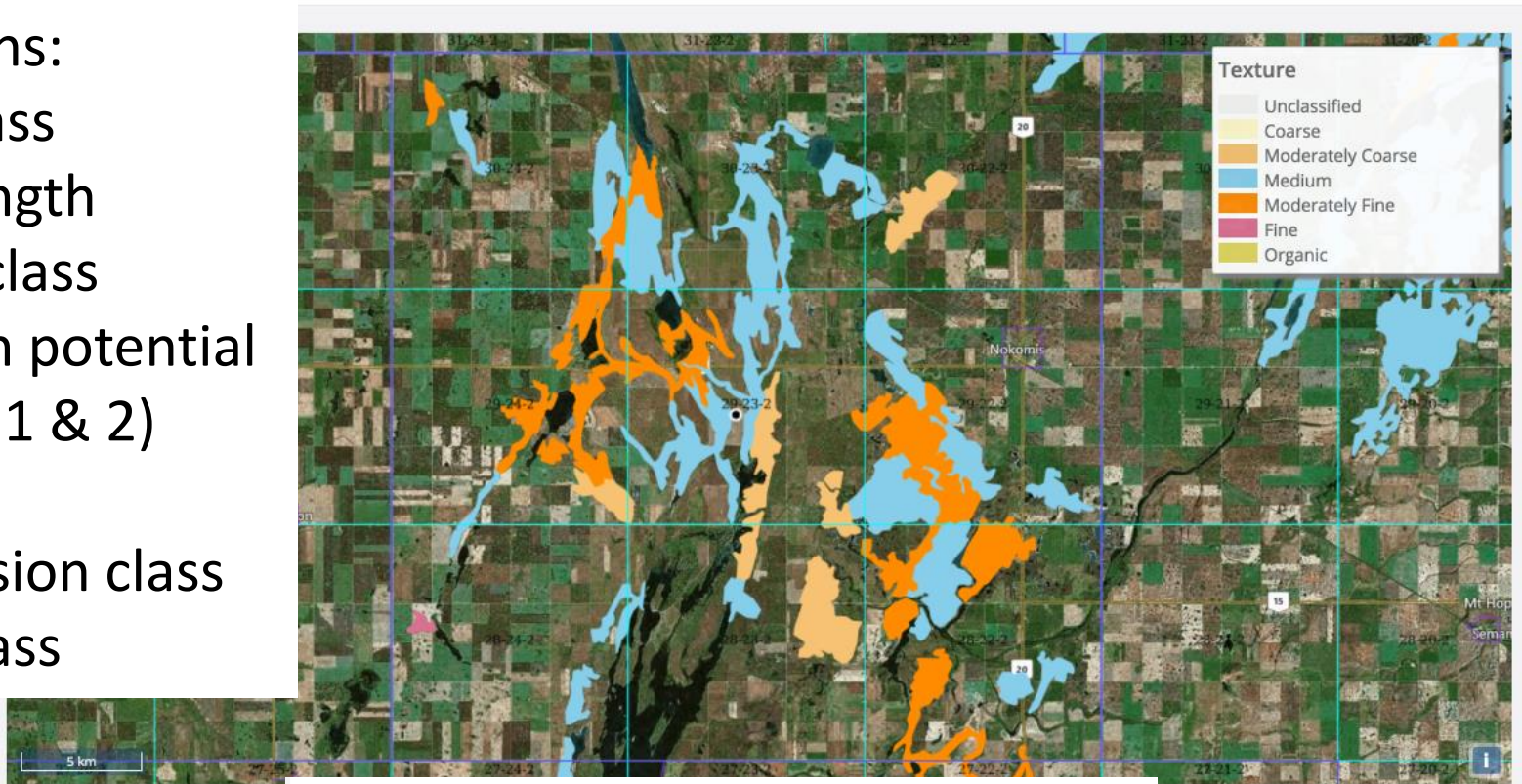
VL-FL

Aq1:FL-LS

# Access: Theme and query maps

## Filter options:

- Slope class
- Slope length
- Salinity class
- Irrigation potential
- Texture (1 & 2)
- pH
- Past erosion class
- Stone class



Tools

Theme:

Texture

## Filter polygons where:

Salinity Class

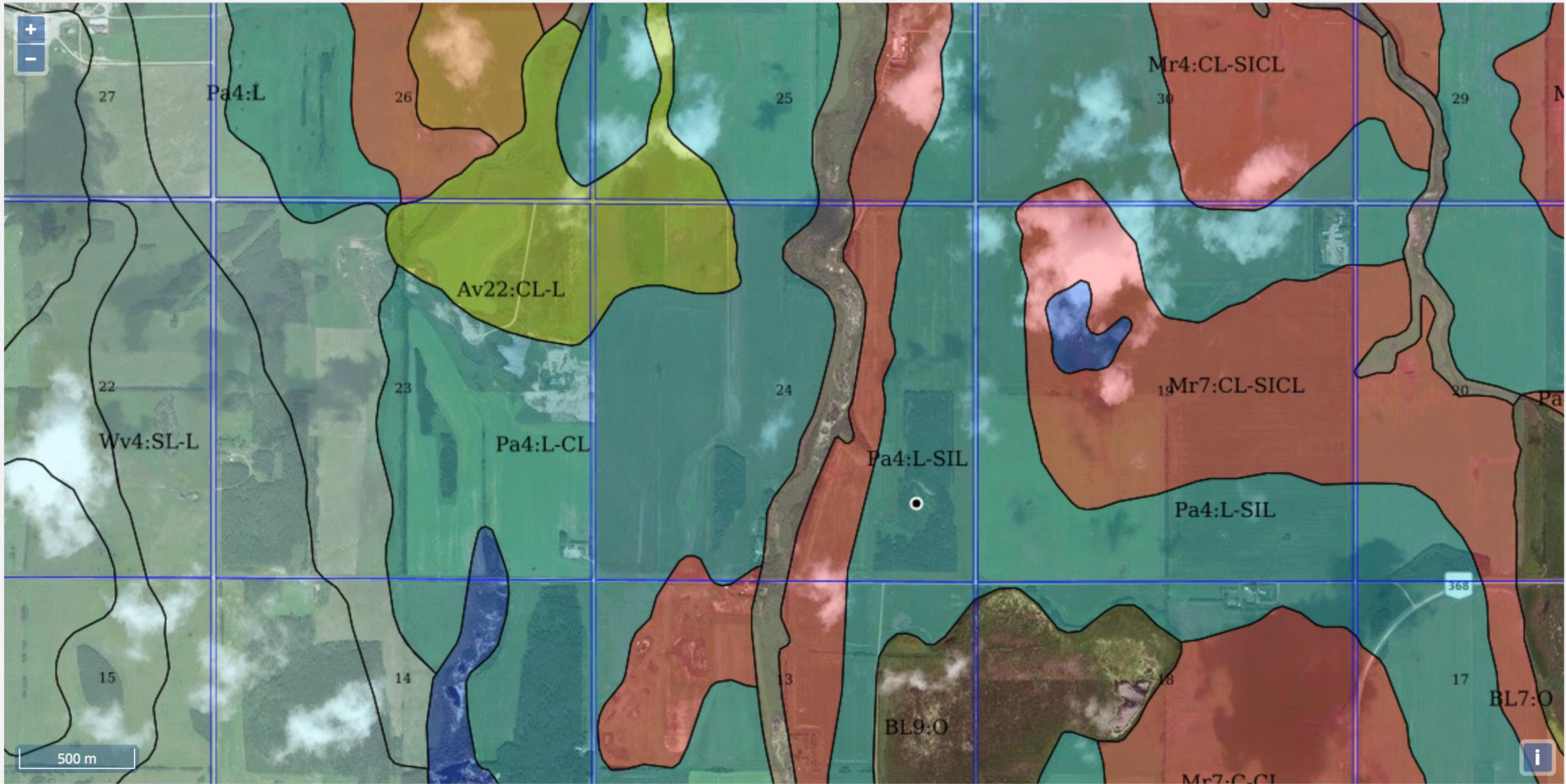
is

Severe (>16 mS/cm)

Component



# Access: Query by location



# Access: Query by datatype

## Tools

### Theme:

Soil Zone

### Basemap:

Default

### Toggle polygons

OFF

### Toggle treaty layer

OFF

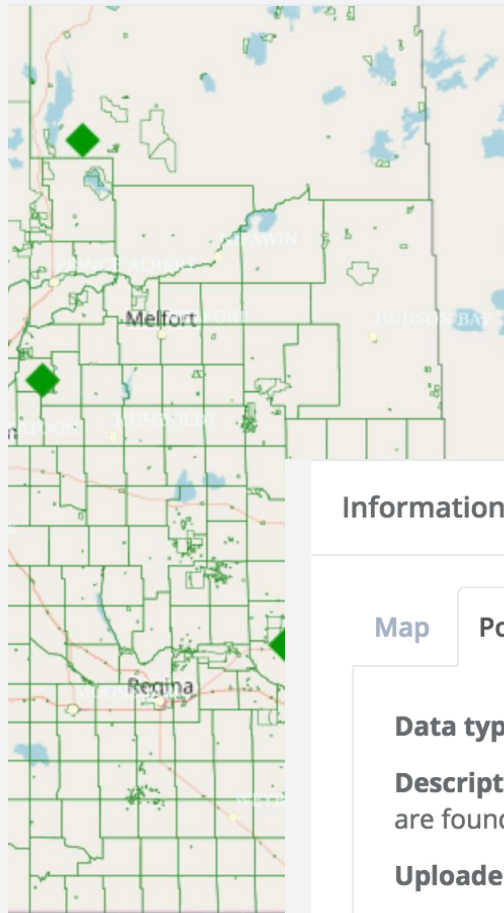
### Adjust polygon transparency



### Point Datatypes:

- Photos
- Soil Pits
- Publications
- Observations

Digital Soil Mapped Site



*Pro tip:* It's easier to see the points if you toggle off the polygons and go to the default basemap

## Information

Map

Point

Component

**Data type:** observation

**Description:** The only Podzols in the province are found here.

**Uploader:** kent.walters@usask.ca

**Date uploaded:** 2016-07-22Z



# Next steps: SKSIS-2

- Keep tweaking SKSIS-1 via user feedback
- Digital soil mapping (next steps):
  - Develop intermediate-scale SK soil map derived from 50-m shuttle radar (SRTM) DEM
  - Develop semi-automated protocol for fine-scale maps from drone-derived DEM and producer data
- Application Program Interface (API) to make it easier for other applications to work with SKSIS and facilitate data upload/download



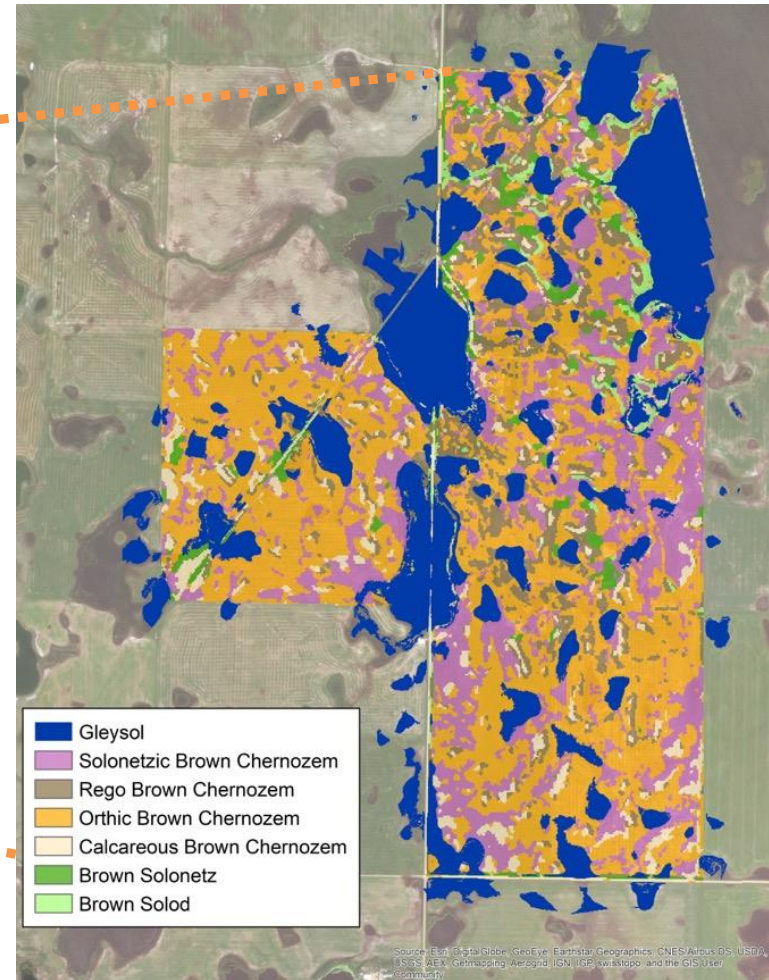
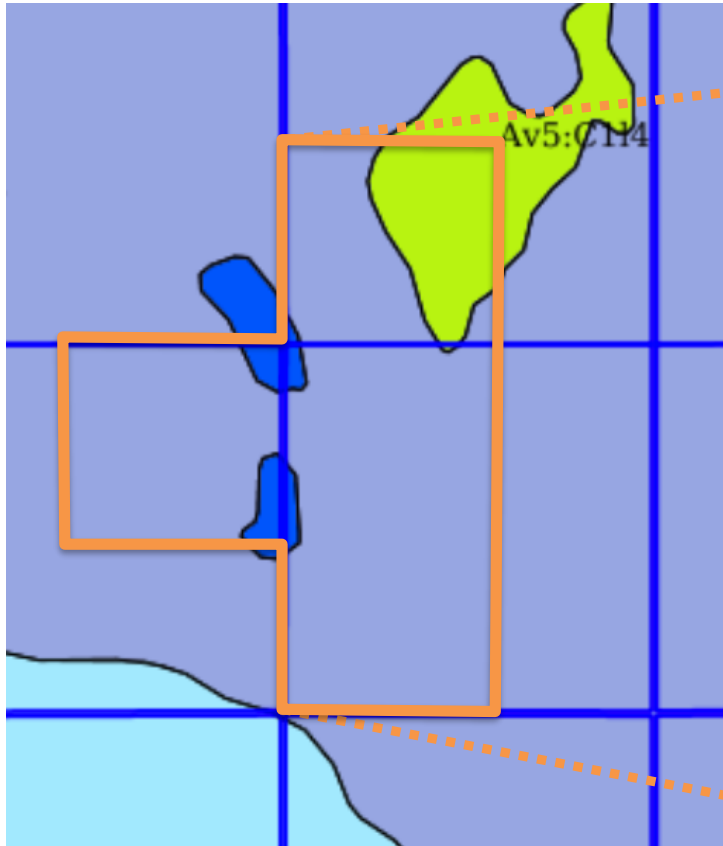
# Refining: Refine maps via DSM

- To get data from current 1:100,000 (too coarse for many applications) to  $\leq 1:10,000$ , we can use digital soil mapping (DSM) methods
- DSM allows us to:
  - Refine soil type and property maps
  - Better predict landscape-scale variability for management planning and predictive modeling
  - Less labour-intensive than complete re-survey



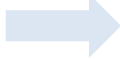


# DSM outputs: test site from SKSIS-1



*See poster by Kiss et al. for details*





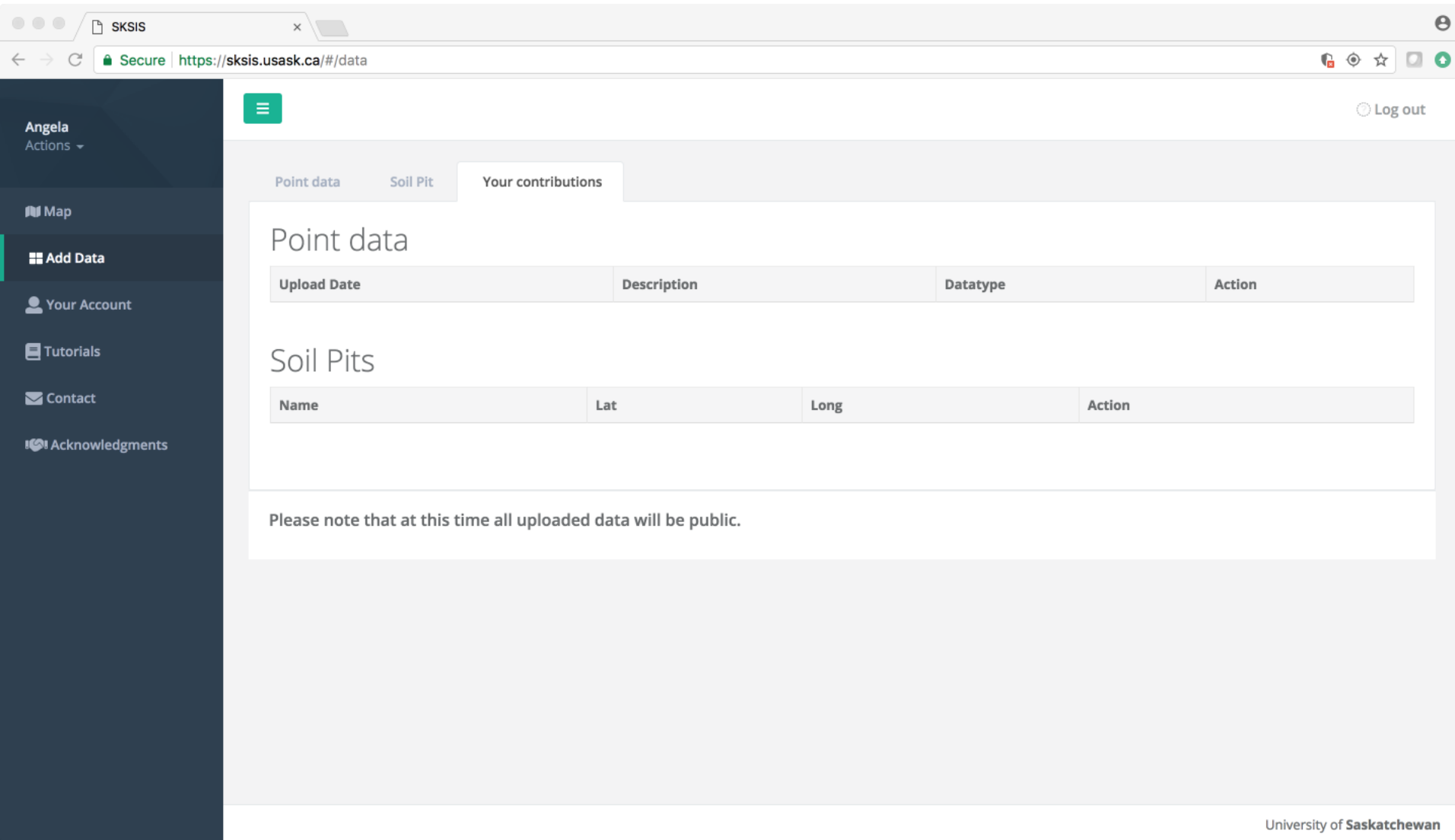
# Great, so what's DSM good for?

- Yield maps can tell you where your yields are higher/lower than average – but not *why*
- Using yield data together with soil survey data can take precision management decisions beyond variable rate fertilizer prescriptions
  - Are there other limiting factors in the soil that might be driving the variability?
  - Refined data will help visualize within-field soil variability: overlay with yield to look for patterns





# Sharing: desktop and mobile



The screenshot shows a web browser window with the URL <https://sksis.usask.ca/#/data>. The page features a dark sidebar on the left with navigation options: Angela (Actions), Map, Add Data, Your Account, Tutorials, Contact, and Acknowledgments. The main content area has three tabs: Point data, Soil Pit, and Your contributions. The 'Point data' tab is active, displaying a table with columns: Upload Date, Description, Datatype, and Action. Below this, the 'Soil Pits' tab is also visible, showing a table with columns: Name, Lat, Long, and Action. A note at the bottom of the main content area states: "Please note that at this time all uploaded data will be public." A "Log out" link is located in the top right corner of the application area.

Angela  
Actions ▾

Map

Add Data

Your Account

Tutorials

Contact

Acknowledgments

Point data   Soil Pit   Your contributions

## Point data

Upload Date	Description	Datatype	Action
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## Soil Pits

Name	Lat	Long	Action
------	-----	------	--------

Please note that at this time all uploaded data will be public.

Log out

# Challenges to effective sharing

- Privacy
- Competition

From Rossiter et al. (Geoderma, 2015):

- Developing protocols for data upload and sharing
- Quality control and data evaluation
- Integrating data of variable types, irregular spatial distribution – and variable quality
- Quantifying uncertainty



# SKSIS – the dream...

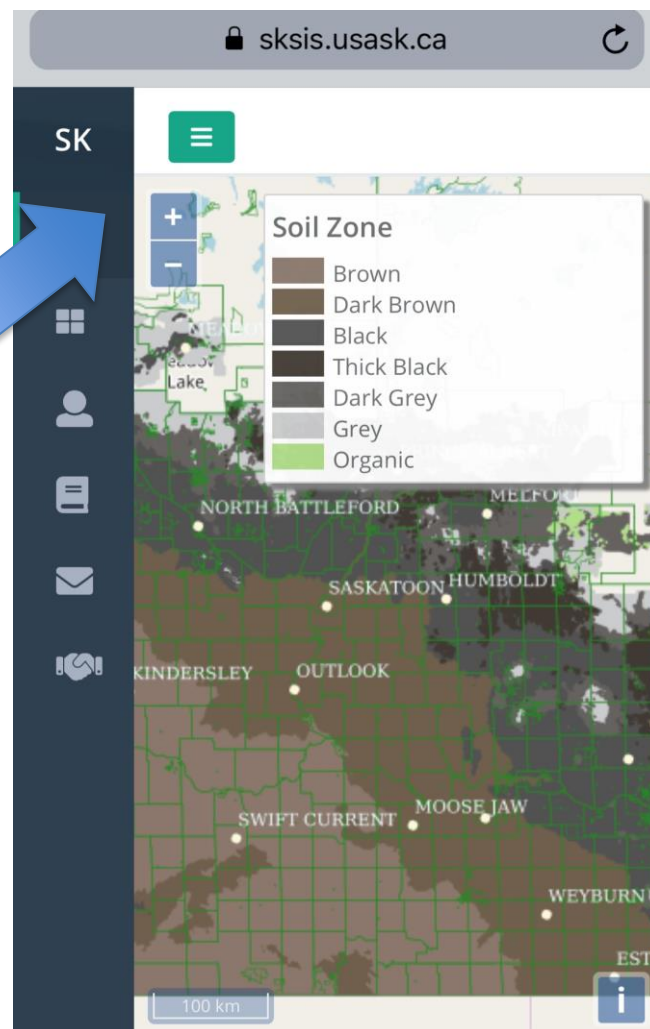


Soil information for all! A co-op for soil fans!

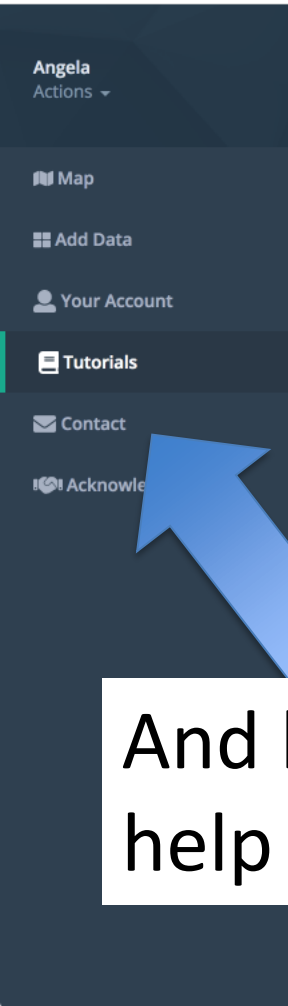


# What are you waiting for?

- Go to **sksis.usask.ca**
  - On your phone, tablet, laptop or at one of the demo stations
- *Pro tip:* to scroll on your mobile device, you may find it easier to have the left-hand menu showing
  - The Tool, Query, and Information boxes are below the map



# See Tutorial



- Angela  
Actions ▾
- Map
- Add Data
- Your Account
- Tutorials**
- Contact
- Acknowledge

Guides

**Quickstart Guide**

Map guide

**Toolbox**

**Basemap**

The basemap dropdown allows the selection of the

Four basemap options are available. They are the D

**Default**

The Default basemap contains political boundaries

**Satellite**

The Satellite basemap is a pure satellite layer with r

**Hybrid**

The Hybrid basemap contains political features like

on-satellite imagery layer v

umber of soil polygons.

anges the styling of the soi

ap unit, agricu

Both the soil polygons and the c

polygons can allow inspection of the soi

**Point Datatypes**

And help us help you!

## Information

Map Polygon Component

**Polygon ID:** SKDSSROC1135

**Surface Expression:** UNDULATING (u)

**Slope Description:** VERY GENTLE SLOPES 0.5 - 2% (CLASS 2)

**Stoniness:** Nonstony

**Polygon Label:** Br3:VL-FL2u4-3

Mainly Bradwell Orthic Dark Brown soils, with Bradwell Eluviated Dark Brown soils on lower slopes.

**Surface Texture:** Very fine loam

**Ag Capability:** 3(10)M

Soils in this class have moderately severe limitations that restrict the range of crops or require special conservation practices.

**Salinity Class:** 0

Salinity affect on productivity: None

**pH Class:** B1

40% 6.1-6.7, 40% 6.8-7.5, 20% 5.5-6.0



**Area:** 467 ha

Provide Feedback

# elp

Log out

polygons, particularly when a query

slider. Adjusting the opacity of the



# Some things to try at [sksis.usask.ca](https://sksis.usask.ca)

- On your own device or at a demo station:
  - In the **Tool box**, change your theme from Soil Zones to Map Units
  - Change your basemap from Default to Hybrid
  - Adjust polygon transparency to see beneath...
  - Use **Query box** to a) filter by your favorite soil properties, or b) explore your home section
  - To see the info about a given map unit, just click on it and check out the **Information box**

*For more about SKSIS design, see Bentham et al. poster*