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Evaluating the Soil Landscapes of Canada Coverage Using Google Earth – 2012 Update

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North East Regional Cooperative Soil Survey Conference

Orono Maine USA, June, 2012

Canada

Evaluating the SLC Coverage Using Google Earth

Recent changes in the Canadian Soil Survey program

- The national soil survey program is historically part of the Research Branch of Agriculture and Agri-Food Canada (AAFC).
- In the 1980s, this was known as the Canadian Land Resource Research Centre (LRRC). Headquarters was at the Central Experimental Farm in Ottawa, with regional soil resource units in each Canadian province.
- In 1995 reorganization, Canadian Soil Information System (CanSIS) staff remained in Ottawa, and regional soil resource units were reassigned to Research Stations in each province.

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Recent changes in the Canadian Soil Survey program

- In 1999, the British Columbia, Alberta, Saskatchewan and Manitoba units were recombined into the Western Land Resource Unit.
- Eastern Canadian units and the Ottawa CanSIS unit remained separate, but collaborated on national projects.
- Collaboration increased in the 2000s, to update the soils information needed for many national level projects.

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Recent changes in the Canadian Soil Survey program

- The **Agri-Environment Services Branch (AESB)** was created in 2009. AESB incorporated the former Prairie Farm Rehabilitation Administration (PFRA), AAFC Policy Branch, Ag Geomatics, as well as soil survey and extension staff.

- Research Branch pedologists were transferred to AESB in 2010.
  - 5 assigned to the AESB regional Soil Resources Unit.
  - 4 assigned to the AESB national Earth Observation Service (EOS).

- The Earth Observation Service (EOS) includes a Remote Sensing Unit, a Digital Soil Mapping and Interpretations Unit, and the Canadian Soil Information Service (CanSIS) Unit.

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Recent changes in the Canadian Soil Survey program

- On July 1, 2012, the AAFC **Research Branch** and the **Agri-Environment Services Branch** will be recombined into a new **Science and Technology Branch**.

- The **Science and Technology Branch** will have 5 directorates. One will be cross sectoral, and 4 will be regional and devoted to specific ecosystems:

- 1. Mountain /Pacific /North
- 2. Prairie /Boreal Plain
- 3. Mixedwood Plain
- 4. Atlantic and Coastal.

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Recent changes in the Canadian Soil Survey program

- Research and Development Directors within the four regional directorates will be responsible for a broader portfolio of research activities that will include hypothesis-driven research as well as adaptive and applied research to cover the entire innovation continuum.

- The fifth directorate will be cross-sectoral and will guide and support the development of a national strategic direction for research, development and transfer activities that is adapted regionally and transferred according to local circumstances and needs.

- Through the ecosystem-based regional directorates we will have R&D Centres and local outreach and collaboration capacity available in each province.

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Recent changes in the Canadian Soil Survey program

- AAFC pedologists will be reassigned within the new Science and Technology Branch as follows:

- 1. Mountain/Pacific/North — EOS, 10 soils staff (incl. 4 pedologists)
- 2. Prairie / Boreal Plain — BC(1), AB(1), and SK(1) pedologists
- 3. Mixedwood Plain — ON(2) and PQ* pedologists
- 4. Atlantic and Coastal — NB*, NS*, PEI* and NL* pedologists

* currently vacant positions, due to recent retirements.

- AAFC Research Station staff, including soil research scientists and technicians, will also be reassigned within the new S&T Branch structure.

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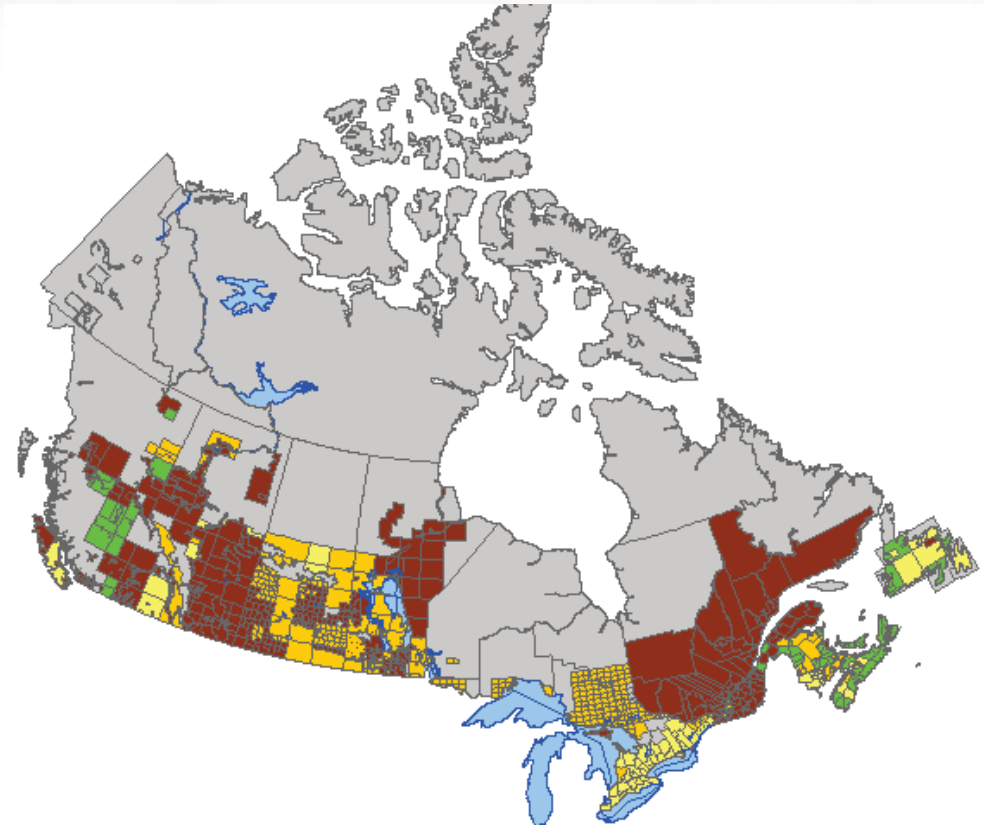
Recent changes in the Canadian Soil Survey program

- New reporting relationships still being established.
- AAFC pedologists will continue to participate in ongoing multi year collaborative projects, including the 4 year Soil Database Upgrade project, the Watershed Evaluation of Beneficial Management practices project (WEBS), and international projects such as Global Soil Map.
- Use of new Geospatial tools will hopefully compensate for manpower limitations.

Evaluating the SLC Coverage Using Google Earth

Detailed Canadian Soil Maps



Approximately 25% of Canada (mainly in agricultural areas).

- over 3,000 separate maps at scales from 1:20,000 to 1:250,000, in different historical formats.
- new resurvey work is limited.
- long term plan to compile these as provincial GIS soil coverages within the National Soil Data Base.
- Soil Landscapes of Canada (SLC) coverage at 1:1 million scale is the best available in remaining areas.

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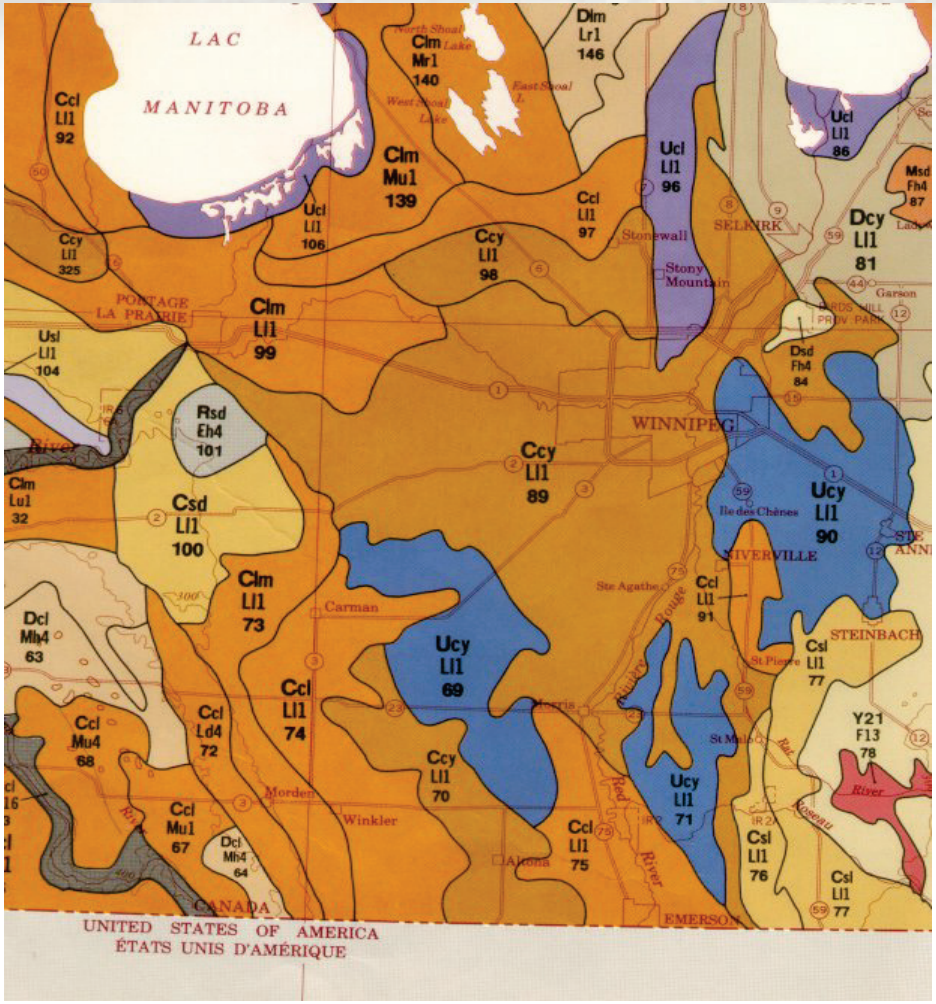
The Soil Landscapes of Canada (SLC)



- The Generalized Soil Map coverage for Canada.
- Originally released as a set of 1:1 million scale printed maps.
- Digitized in the 1990s, with updated GIS releases to support many national and regional level modelling applications.
- Still the main soil map coverage for most of the non agricultural areas of Canada.

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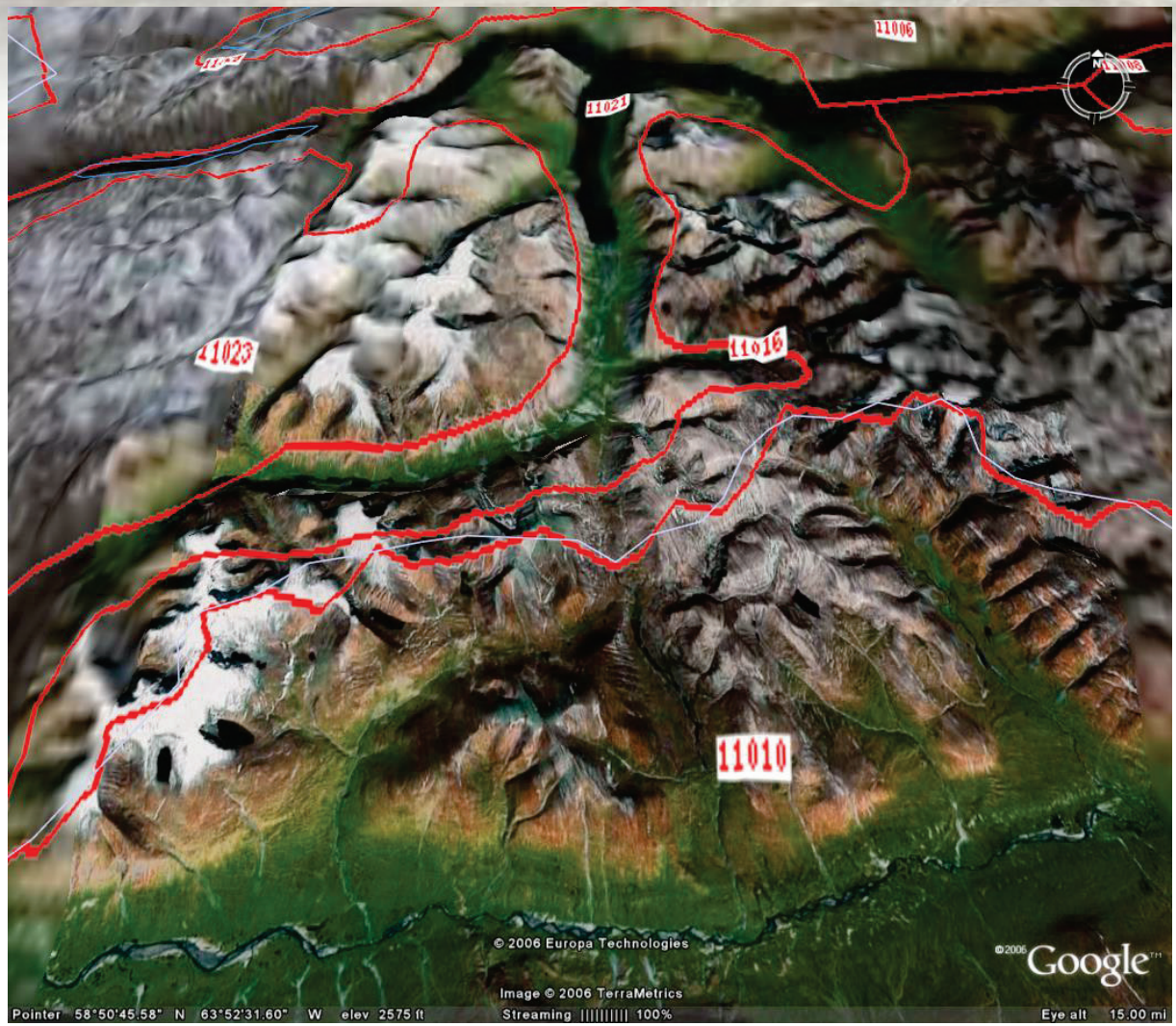
SLC Upgrade ("SLC Version 4")

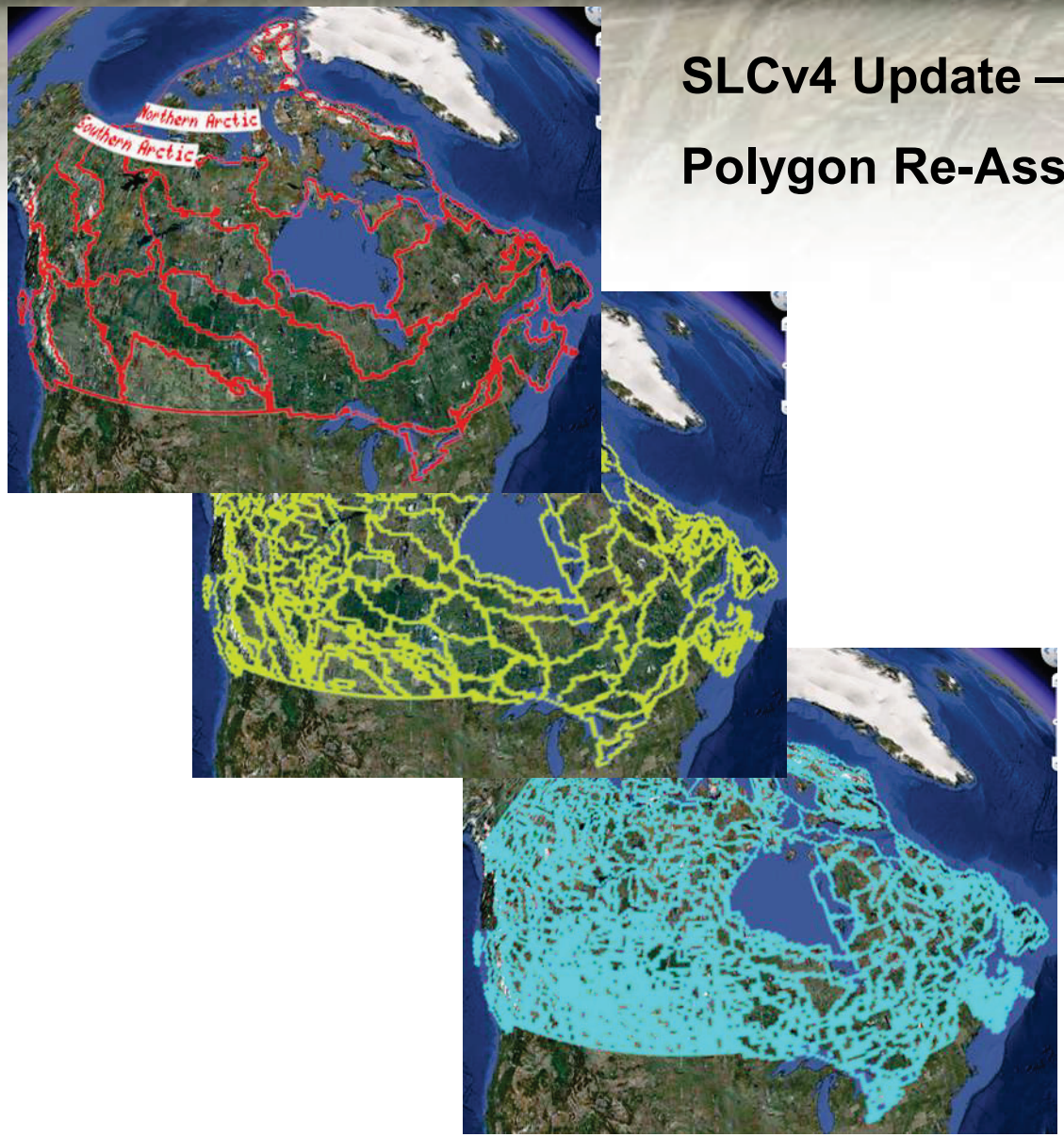
- The current SLC "Version 3" polygon coverage has soil components linked to an extensive set of soil and landscape attributes.
- SLCv3 soils data limited to the main ag areas.
- A complete, national coverage ("SLCv4") with upgraded polygon lines and soils information is needed to support many future applications, such as climate change, greenhouse gas emissions and Global Soil Map (GSM).
- **Completing this upgrade by 2014, with limited in house expertise, is a challenge. New tools are needed!**

Evaluating the SLC Coverage Using Google Earth



- In 2006, our AAFC unit initiated use of our SLCv3 coverage with Google Earth.
- GE is a useful tool to show soil landscape relationships.
- It also revealed many areas where the currently polygon registration was inaccurate.

Evaluating the SLC Coverage Using Google Earth

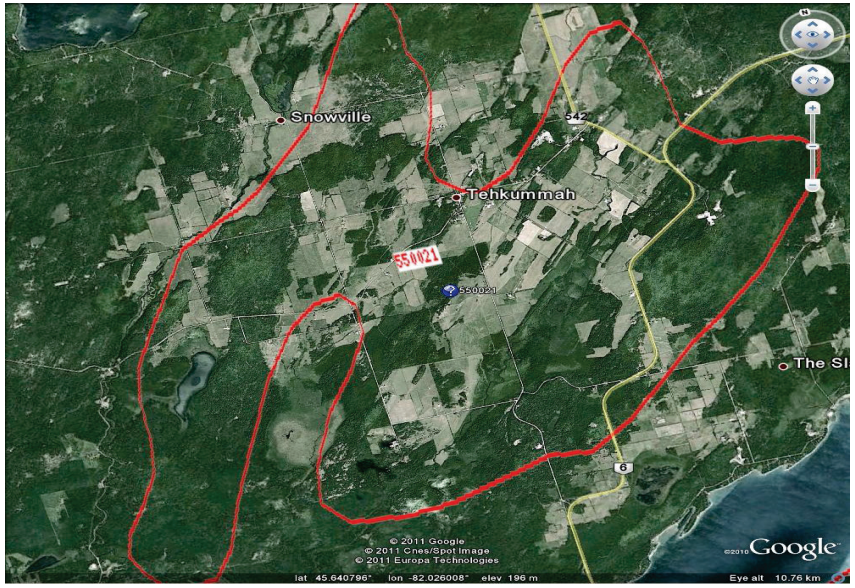


SLCv4 Update – Phase 1

Polygon Re-Assessment Using Google Earth

- The SLC coverage is “nested” to the Canadian Ecological framework.
- Ecozone, Ecoregion and Ecodistrict map layers were added to the CanSIS web map server.

Evaluating the SLC Coverage Using Google Earth



National Topographic System (NTS) 1:250,000 and 1:50,000 contour maps were also added to the CanSIS web map server.

- NTS contour map transparency is adjustable in GE to show background imagery and SLC boundaries (in red).

Evaluating the SLC Coverage Using Google Earth

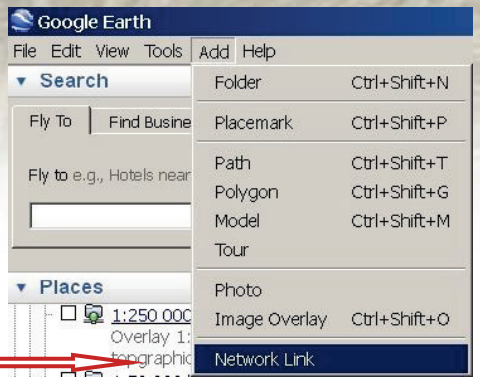
How to load this layer within Google Earth:

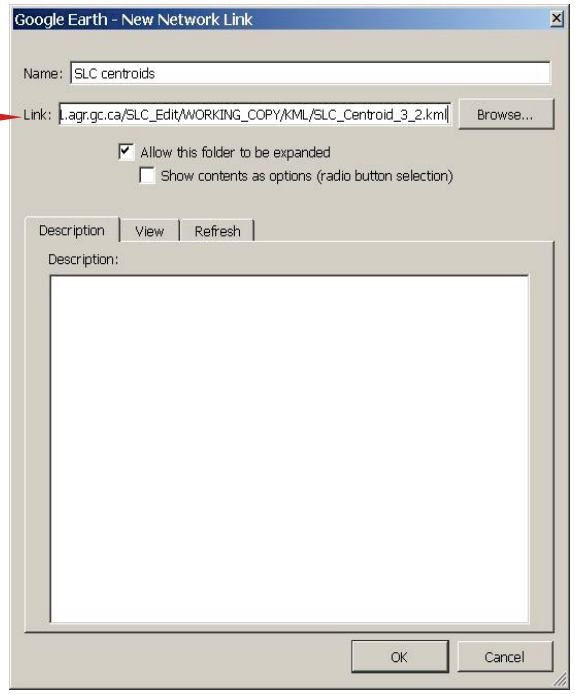
If closed, launch Google Earth

- ☐ **Select Add from the top menu bar (Fig. 1A), then select Network Link**
- ☐ **Copy the following URL:**

http://wms1.agr.gc.ca/SLC_Edit/WORKING_COPY/KML/SLC_Centroid_3_2.kml

- ☐ **Paste the copied URL into the Link field**
- ☐ **Give the link a name within the Google Earth – New Network Link window (e.g. "SLC centroids")**
- ☐ **Click OK**
- ☐ **The layer with the specified name should now appear in the Places menu (Fig. 1B) and the centroids (Fig. 1H) should appear in the main map window within Google Earth (Fig. 1C)**

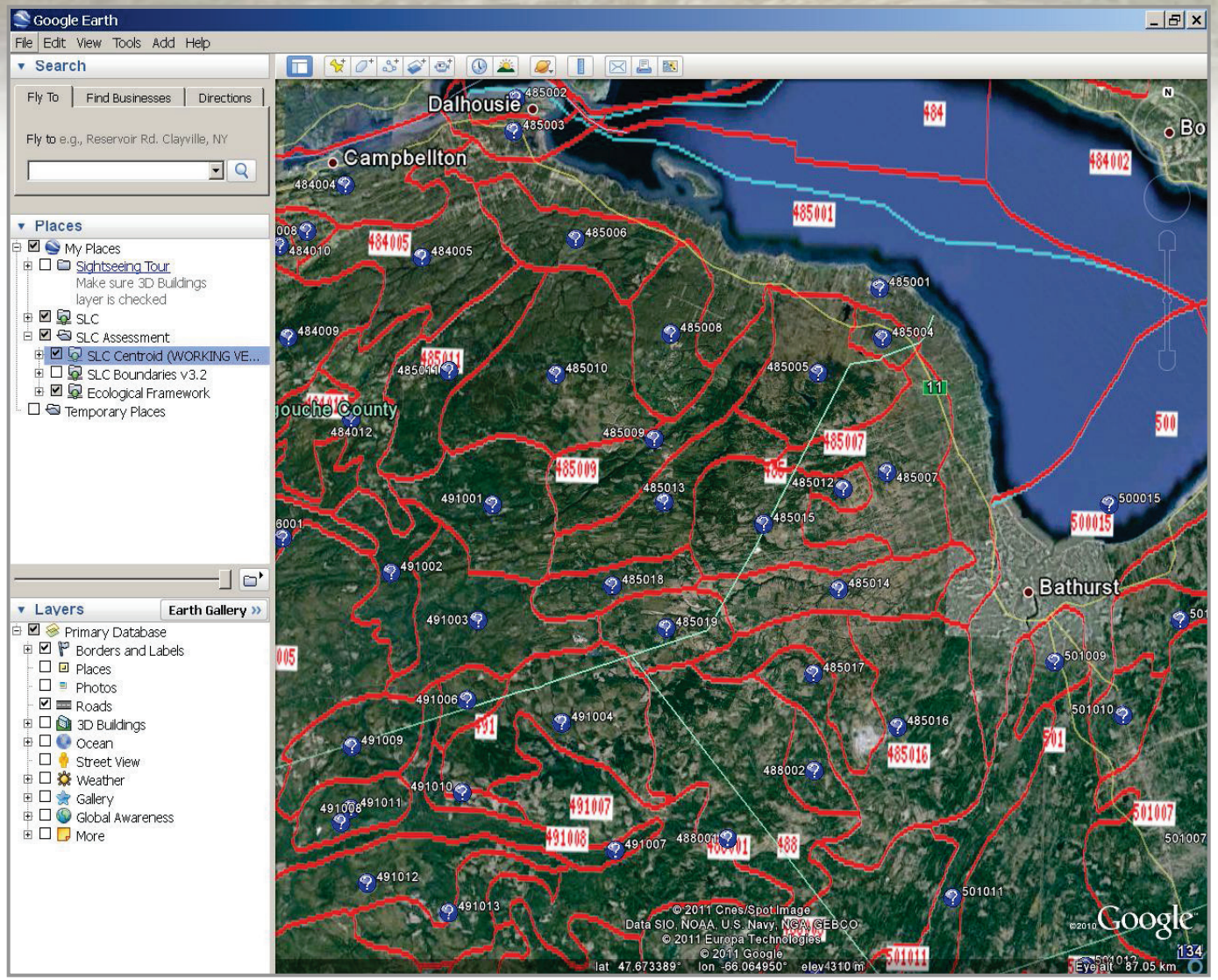




SLC Polygon Assessment Form ("PAF") Users Manual

- Developed for regional soil specialists.
- Explains how to load the SLC layers and use the Polygon Assessment Form within Google Earth.

Evaluating the SLC Coverage Using Google Earth

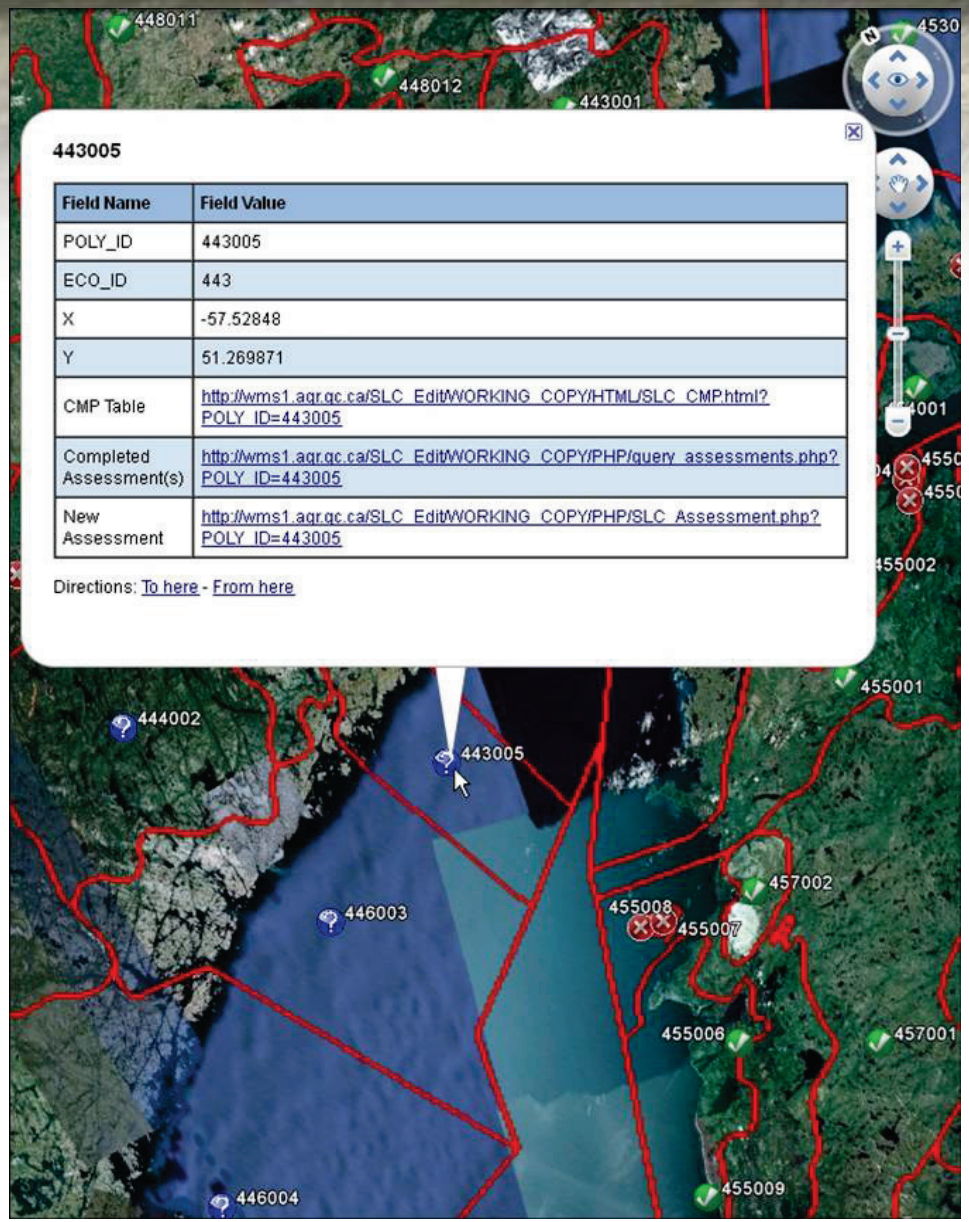


- SLC lines and centroids are options in the **Places** menu.
- When selected, (checked), the SLC lines and centroids appear on the GE map.

Evaluating the SLC Coverage Using Google Earth

- SLC polygon centroids are a separate GIS point coverage.
- The centroids link to the soil component data and Polygon Assessment Forms (“PAFs”).
- The centroid pin colour shows the status of the SLC polygon assessment:
- Blue - not assessed yet.
- Green - polygon OK.
- Red - edits needed.

Evaluating the SLC Coverage Using Google Earth



- Left click on any SLC polygon centroid to view an attribute table with web links to:
- CMP Soil Component Table.
- Completed Assessments (Polygon Assessment Table).
- A new blank SLC Polygon Assessment Form (“PAF”).

Evaluating the SLC Coverage Using Google Earth

SLC Component Table Web Page

- Lists all the soils in the polygon and their areal extent.
- Link to the Soil Names Table defining each Canadian soil code.
- Link back to the Polygon Assessment Form ("PAF").

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Soil Landscape Component Table (CMP)

SLC Polygon Assessment Form (PAF)

Component Table (CMP) - ped_ca_slc_v3r2_cmp

Selection Method

Show selected records | Show all records

SL	CMP	PROVINCE	SOIL_CODE	MODIFIER	LU	PERCENT	SLOPE	STONE	LOCSF	KIND	DRAINAGE	OR
536005	1	PE	ARY	D	A	60	B	N	U	M	W	
536005	2	PE	CTW	D	A	20	B	N	U	M	W	
536005	3	PE	CLO	C	A	20	B	N	U	M	R	

Evaluating the SLC Coverage Using Google Earth

Web link to the CanSIS Soil Names Table.

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Soil Landscape Soil Name Table (SNT)

Soil Name Table (SNT) - ped_ca_soil_v2r000_snt

Selection Method

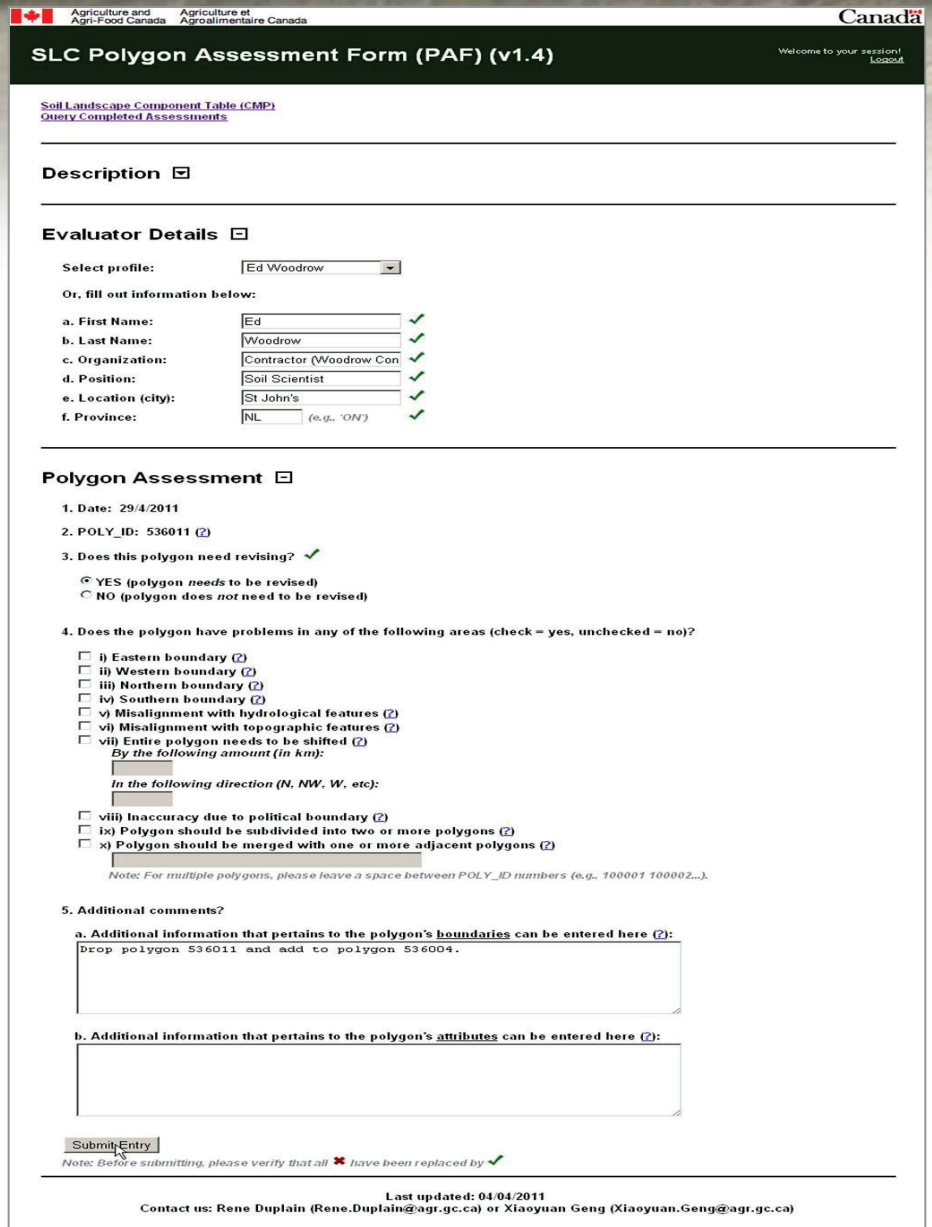
○ Show selected records ◉ Show all records

SOIL_ID	PROVINCE	SOIL_CODE	MODIFIER	PROFILE	SOILNAME	KIND	WATERTBL	ROOTRESTRI	RESTR_TYPE	DRA
ABABCgl~~~N	AB	ABC	gl~~~	N	ATHABASCA	M	YU	0	-	
ABABCst~~~A	AB	ABC	st~~~	A	ATHABASCA	M	NO	0	-	
ABABCst~~~N	AB	ABC	st~~~	N	ATHABASCA	M	NO	0	-	
ABABC~~~~~A	AB	ABC	~~~~~	A	ATHABASCA	M	NO	0	-	
ABABC~~~~~N	AB	ABC	~~~~~	N	ATHABASCA	M	NO	0	-	
ABACE~~~~~A	AB	ACE	~~~~~	A	ALLIANCE	M	NO	0	-	
ABACV~~~~~A	AB	ACV	~~~~~	A	ACADIA VALLEY	M	NO	0	-	
ABACV~~~~~N	AB	ACV	~~~~~	N	ACADIA VALLEY	M	NO	0	-	
ABADMgl~~~N	AB	ADM	gl~~~	N	ARDMORE	M	YU	0	-	
ABADMxt~~~N	AB	ADM	xt~~~	N	ARDMORE	M	NO	0	-	
ABADM~~~~~N	AB	ADM	~~~~~	N	ARDMORE	M	NO	0	-	
ABADYgl~~~N	AB	ADY	gl~~~	N	ACADEMY	M	YU	0	-	
ABADYsa~~~N	AB	ADY	sa~~~	N	ACADEMY	M	YU	4	SA	1
ABADYxp~~~N	AB	ADY	xp~~~	N	ACADEMY	M	NO	5	LI	

For a detailed description of all the fields in the SNT table, see:
http://sis.agr.gc.ca/pls/meta/web_dataset?uri=http://sis.agr.gc.ca/cansis/nsdb/slc/v3.2/cmp&lang=en

Last updated: 25/02/2011
Questions? Contact: Rene.Duplain@agr.gc.ca

Evaluating the SLC Coverage Using Google Earth



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SLC Polygon Assessment Form (PAF) (v1.4)

Welcome to your session! Logout

Soil Landscape Component Table (CMP)
Query Completed Assessments

Description

Evaluator Details

Select profile: Ed Woodrow

Or, fill out information below:

a. First Name: Ed
b. Last Name: Woodrow
c. Organization: Contractor (Woodrow Con
d. Position: Soil Scientist
e. Location (city): St John's
f. Province: NL (e.g., 'ON')

Polygon Assessment

1. Date: 29/4/2011
2. POLY_ID: 536011 (?)
3. Does this polygon need revising?
   - YES (polygon *needs* to be revised)
   - NO (polygon does *not* need to be revised)
4. Does the polygon have problems in any of the following areas (check = yes, unchecked = no)?
   - i) Eastern boundary (?)
   - ii) Western boundary (?)
   - iii) Northern boundary (?)
   - iv) Southern boundary (?)
   - v) Misalignment with hydrological features (?)
   - vi) Misalignment with topographic features (?)
   - vii) Entire polygon needs to be shifted (?)
     - *By the following amount (in km):*
     - *In the following direction (N, NW, W, etc):*
   - viii) Inaccuracy due to political boundary (?)
   - ix) Polygon should be subdivided into two or more polygons (?)
   - x) Polygon should be merged with one or more adjacent polygons (?)

   Note: For multiple polygons, please leave a space between POLY_ID numbers (e.g., 100001 100002...).
5. Additional comments?

   a. Additional information that pertains to the polygon's boundaries can be entered here (?):
   Drop polygon 536011 and add to polygon 536004.

   b. Additional information that pertains to the polygon's attributes can be entered here (?):

Submit Entry

Note: Before submitting, please verify that all ✖ have been replaced by ✓

Last updated: 04/04/2011
Contact us: Rene Duplain (Rene.Duplain@agr.gc.ca) or Xiaoyuan Geng (Xiaoyuan.Geng@agr.gc.ca)

The SLC Polygon Assessment Form (PAF) opens as a separate web page.

- Separate sections identify the evaluator, whether the polygon needs revision (YES or NO), and the specific type of revision (polygon boundary or soil data).
- Completed assessments are uploaded to the central web server.
- All assessments can be viewed in GE, and additional assessments can be added for any SLC polygon.

Evaluating the SLC Coverage Using Google Earth

Web link to the SLC Completed Polygon Assessments Table

Back to previous page

Query Results for POLY_ID = ALL
(As of 07/03/2011)

EVAL_DATE	EVAL_FNAME	EVAL_LNAME	EVAL_ORG	EVAL_POS	EVAL_CITY	EVAL_PROV	POLY_ID	REVISE	BOUND_E	BOUND_W	BOUND_N	BOU
2011/01/31	Wally	Fraser	AAFC	Data Manager	Winnipeg	MB	849009	N	0	0	0	(
2011/01/31	Wally	Fraser	AAFC	Data Manager	Winnipeg	MB	670001	Y	0	0	0	(
2011/02/01	Wally	Fraser	AAFC	Data Manager	Winnipeg	MB	840003	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	471016	Y	0	0	0	(
2011/02/01	Xiaoyuan	Geng	AAFC	Data Steward	Ottawa	ON	471017	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	471008	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	475002	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	538001	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	536015	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	536012	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	475001	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	475002	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	475005	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	475014	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	475018	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	475009	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	475011	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	475016	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	477001	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	477002	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	475020	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	475017	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	475015	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	475012	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	475023	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	476001	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	471019	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	475010	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	475007	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	475004	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	475006	N	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	474002	Y	1	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	474005	Y	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	474004	Y	1	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	474001	Y	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	474001	Y	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	472012	Y	0	0	0	(
2011/02/01	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	472006	N	0	0	0	(
2011/02/02	Ed	Woodrow	Contractor (Woodrow Consulting LTD.)	Soil Scientist	St John's	NL	471013	N	0	0	0	(

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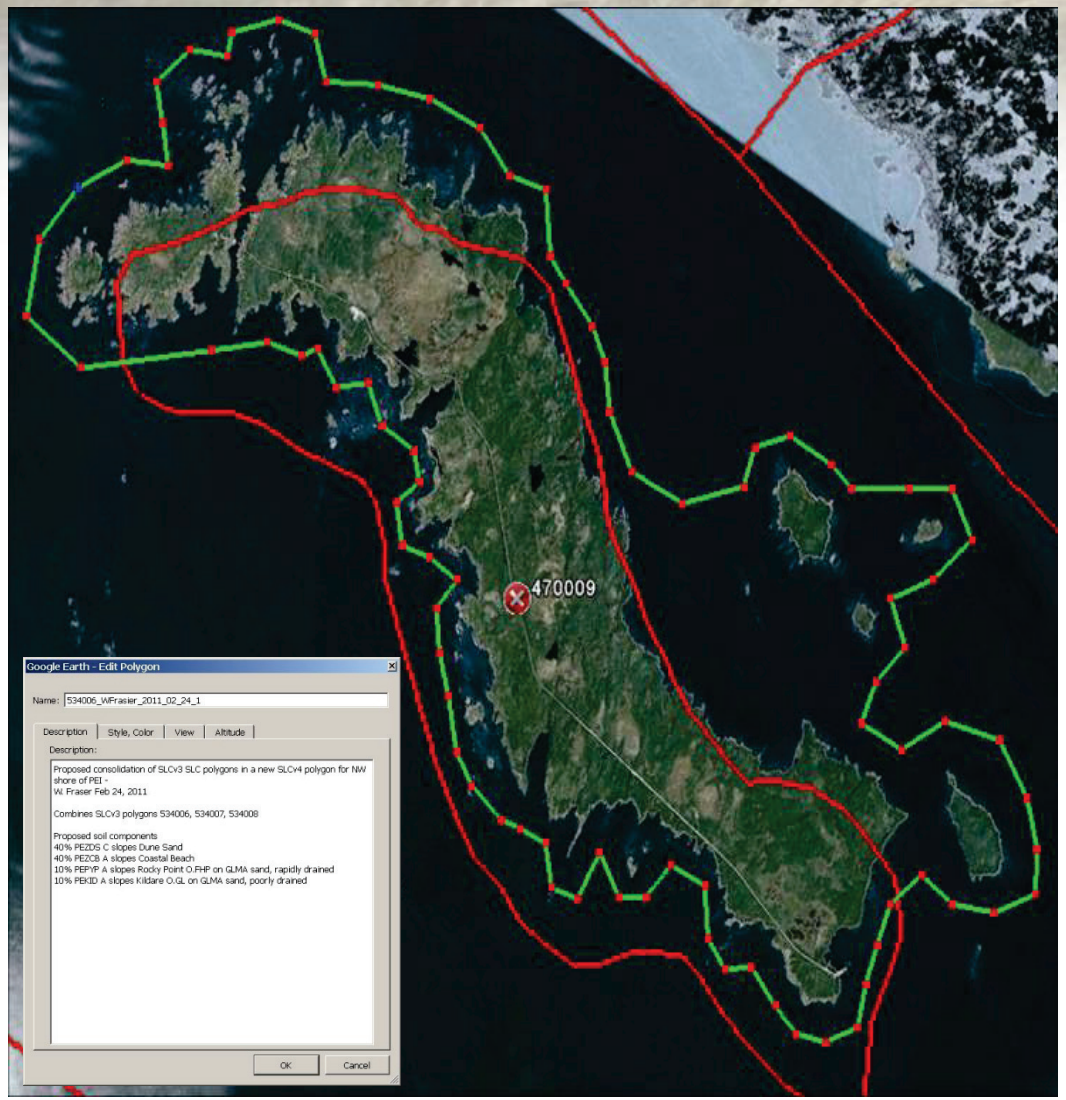
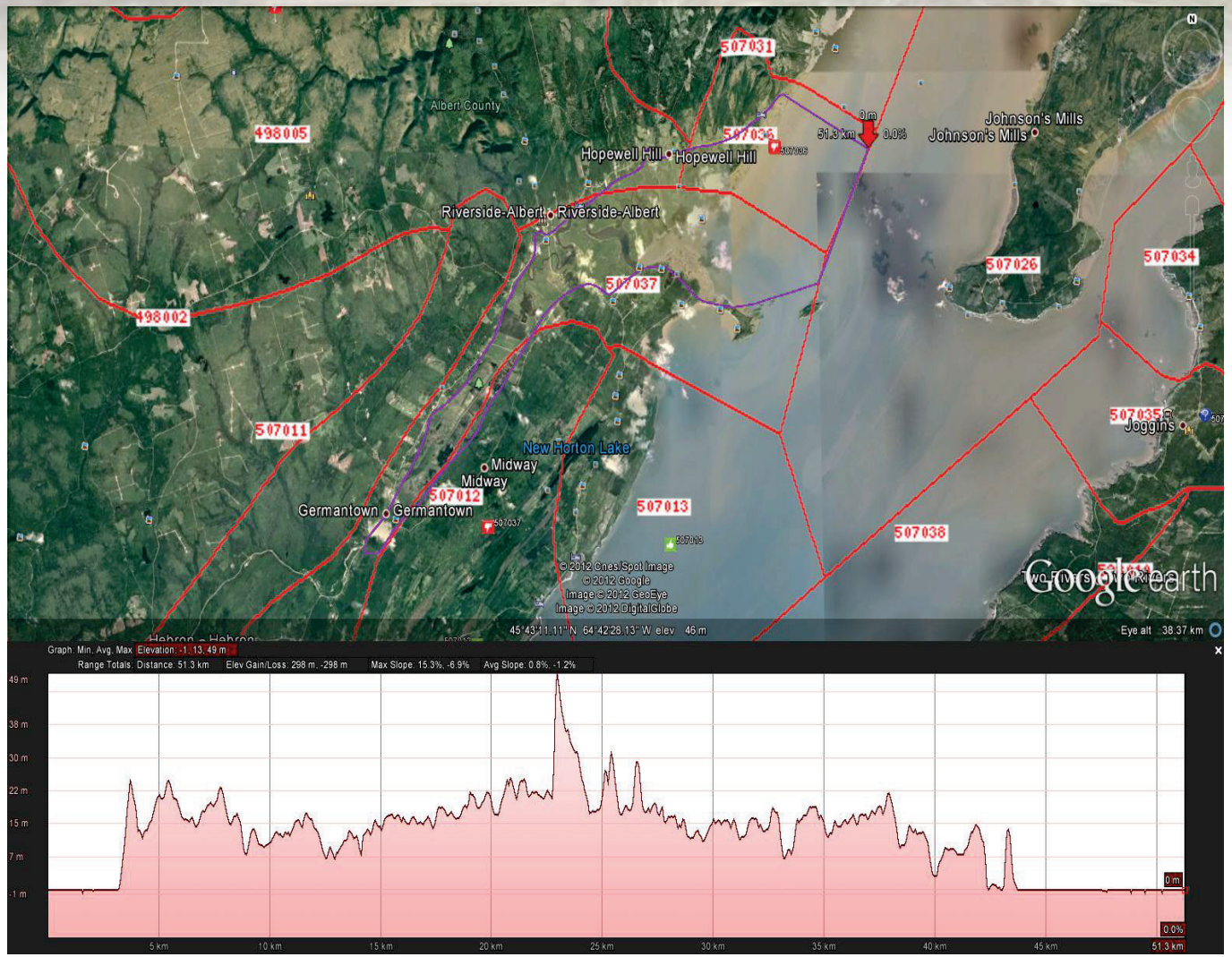


- The **Add Polygon** tool in Google Earth can be used to redraw any SLC polygon.
- New polygons (kml files) appear as additional items in the GE Places menu, and can be re-labelled and re-edited.
- The kml polygon files can be sent as email attachments to other pedologists, or uploaded to an online server directory.
- Kml files can also be imported into ArcGIS.

Evaluating the SLC Coverage Using Google Earth

- The revised boundary for SLC 507037, an area of tidal mud flats, is in purple.
- The line can be further revised, using different GE 3D views, photos, and Streetview.
- The revised kml line is uploaded to the Ottawa server with the PAF assessment.

Evaluating the SLC Coverage Using Google Earth

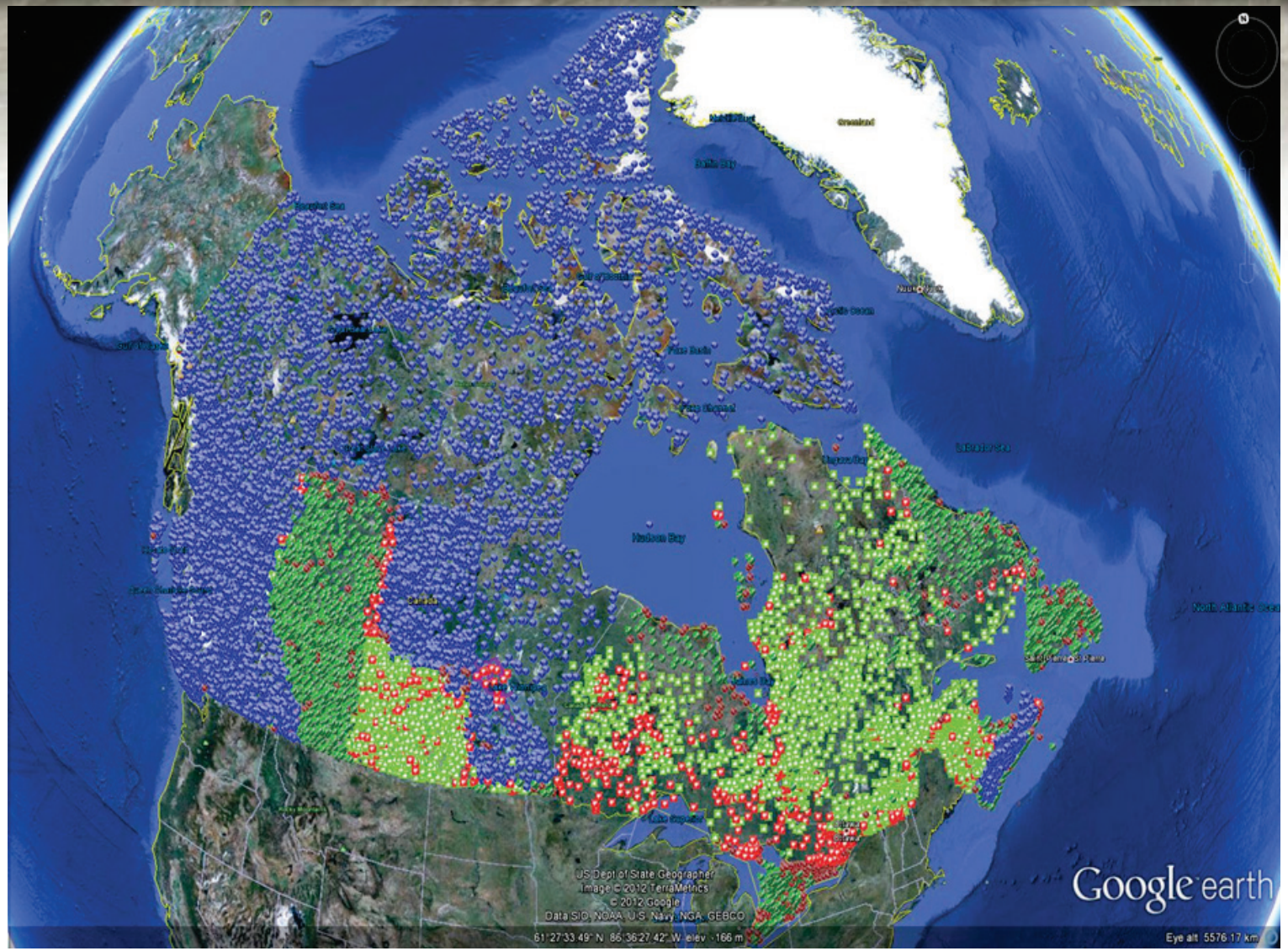


- The new GE path (kml file) for SLC 507037, an area of tidal mud flats, is in purple.
- The slope and elevation at any point along the proposed new path (poly boundary) can be viewed during editing.

Evaluating the SLC Coverage Using Google Earth

- The new GE path (kml file) for SLC 507037, an area of tidal mud flats, is in purple.
- GE Street View is also used as an assessment tool to confirm polygon landforms and boundaries .

Evaluating the SLC Coverage Using Google Earth



- SLC Assessments June 2012.

Questions??