

2018 Manitoba Soil Science Society Summer Tour

Thursday, August 16, 2018

**Interlake Soils:
What's Shaking Between the Lakes!**



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Thanks from the MSSS Executive for attending this year’s tour.

The 2018 MSSS Executive are, Laryssa Stevenson, Kevin Baron, Timi Ojo, John Heard, Christine Rawluk, Alison Nelson and Chamara Weeraskara.

Many thanks to Ingrid Kristjanson, Britany Knockaert, Darren Bond, Curtis Cavers and Michelle Erb, for their assistance with planning the tour – we couldn’t have done it without you!

2018 Tour Guides – Kevin Baron and John Heard

Thanks to our prize sponsors.

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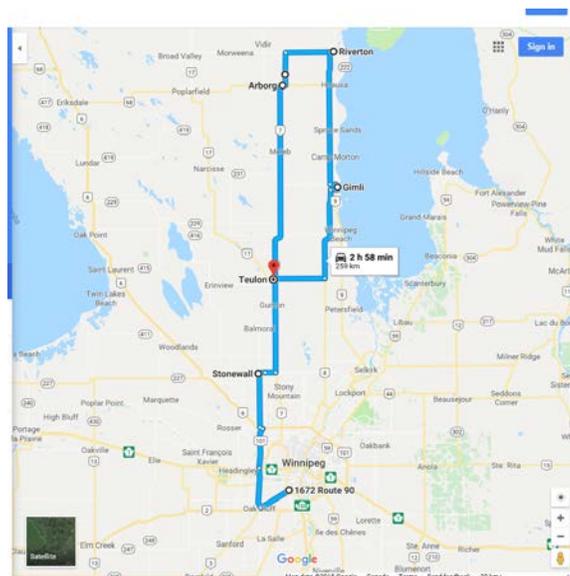
Fertilizer Canada and 4R Nutrient Stewardship

MB Pulse and Soybean Growers

MB Wheat and Barley Growers Association

Agenda

Time	Place	Purpose	Presenters
7:30 am	Winnipeg	Pick up riders at Sobey's Parking Lot at Kenaston & McGillivray	
8:30	Stonewall	Pick up riders at Tim Horton's	
	Stonewall	– Stonewall limestone quarry, Lafarge	?
10:30	Arborg – PESAI	<ul style="list-style-type: none"> – (Prairies East Sustainable Agriculture Initiative) – Fyala Soil – Tile drainage suitability – BASIC excess water initiative 	Michelle and Curtis Mitch Timmerman Eric Fridfinnson
12:00	lunch	Heritage Village	
1:00	Riverton	<ul style="list-style-type: none"> – Shallow peat soil – Farm management of peat soils 	Michelle and Curtis Eric Fridfinnson
2:30-3:30	Riverton to Gimli	<ul style="list-style-type: none"> – Drive by erosion control mat manufacturer – Forage seed production Landuse – recreation vs agriculture	Kevin Gulay on bus Michelle on bus
3:30	Teulon	Lakeland soil Farm management of Lakeland soils IDC risk and management	Michelle and Curtis Eric Fridfinnson President Laryssa Stevenson
4:30		Depart for Winnipeg	
5:30		Arrive at Winnipeg	



Activity #1. During the field trip meet a new friend to find out the following:

Position	Name	Expertise or Interest
Farmer		
Grad student		
Extension specialist		
Researcher		
Industry agronomist		
Conservation agency spec.		

References (useful to complete booklet assignments)

- 1) AgriMaps: <https://agrimaps.gov.mb.ca/agrimaps/>
- 2) Soil Report 12 – Detailed Reconnaissance Soil Survey of Fisher and Teulon
<http://sis.agr.gc.ca/cansis/publications/surveys/mb/mb12/index.html>
- 3) Soil Report D23 Soils of the Matlock – Gimli – Riverton Area:
<http://sis.agr.gc.ca/cansis/publications/surveys/mb/mbd23/index.html>
- 4) SDSU Drainage calculator: <http://www.igrowdrainage.org/#/calculators/drain-spacing>

Climate of the Interlake area (vs Winnipeg and Brandon)

	Interlake (Arborg)	Winnipeg RRV	Brandon
Ecodistrict	LBs1	Gt1	Gt2
Annual precipitation	20" (499 mm)	21" (521 mm)	19" (474 mm)
Growing season rainfall (May – Sept)	13.2" (329 mm)	14" (349 mm)	13" (323 mm)
Average annual temperature	1.6 °C	3.0 °C	2.2 °C
GDD (base 5C) cereals, canola (May – Sept)	1493	1686	1524
Average last spring frost	May 27	May 23	May 17
Average first fall frost	Sept 14	Sept 22	Sept 14
Frost free days	109	121	119

So compared to Winnipeg, the Interlake is _____ and _____.

So compared to Brandon, the Interlake is _____ and _____.

Stop 1: Stonewall Limestone quarry

Stonewall Soil (STW/xx3x)

The Stonewall series consists of moderately _____ to well drained Orthic Dark Grey Chernozem soils developed on less than one meter (50-100 cm) of extremely _____, loamy till over _____ bedrock. These soils have a similar solum to the Sandridge and Aneda series but differ in the depth to bedrock. The _____ is irregular, gently sloping, runoff is _____, permeability is moderate in the loamy till and variable in the fractured, permeable limestone _____. The native vegetation consist of _____ aspen, bur oak, hazel, forbs and native grasses.

The soil is characterized by a thin, moderately _____ leaf mat; a thin (4-8cm) dark gray friable A horizon, and a thin (12-20 cm) granular, _____ B horizon. The solum is normally less than 25 cm thick. The physical characteristics of the solum and parent material are similar to the Aneda series.

Fill above description with following terms

bedrock	brown	moderate
limestone	well	trembling
calcareous	topography	decomposed

Use AgriMaps on your smartphone to determine ag capabilities

<https://agrimaps.gov.mb.ca/agrimaps/>

	Ratings	Meaning
Ag Capability (dryland)	4R	

The Stonewall Quarry:

Our host is Lafarge Canada Inc. – guide Steve Van Wallegem

The end of this workbook includes an explanation of aggregate mined here, the 6 quarries and reclamation requirements.

Notes:

Mining process:

Which is the valued rock:

Limestone reserves:

Reclamation requirements:

Limestone facts:

- These marine deposits here some 450 Million years old

Stop 2: Fyala soil – Arborg PESAI

Fyala series (FYL)

The Fyala series consists of poorly drained peaty Rego Humic Gleysol soils developed on weakly to moderately calcareous _____ clay deposits. Surface texture of cultivated soils is clay, but usually contains a high percentage of peaty material that has been _____ with the mineral material. Fyala series are clay textured throughout the profile. Internal drainage in these soils is _____ by fine texture and a _____ water table. The soils are stone free.

The Fyala soils have a surface layer of _____, medium acid to neutral peat and _____ that is 0-15 cm thick, underlain by a thin, very dark gray Ah horizon high in organic matter and neutral to mildly _____ in reaction. The Ah horizon is from 5-15 cm thick but frequently _____ into the Ckg horizon to depths of 20 to 30 cm. The Ckg horizon is grayish brown to olive gray, contains numerous, large _____ of lime carbonate and is iron stained.

Fill above description with following terms

concretions	tongues	incorporated
fibrous	lacustrine	muck
high	impeded	alkaline

Similar soils:

Use AgriMaps on your smartphone to determine ag capabilities

<https://agrimaps.gov.mb.ca/agrimaps/>

	Ratings	Meaning
Ag Capability (dryland)		
Irrigation Suitability		

What is the depth to the water table _____

How much available water does this soil hold for canola? _____

How far should tile drains be spaced for these soils? _____

Sketch and colour the Fyala soil profile (markers/crayons are available for your sketch.)

Sketch	Horizon	Depth	Colour	Texture	Notes

Sketch the landscape of the Fyala soil.



Tile Drainage

Check the tile drainage pros and cons for these sites:

	PRO	CON
Rooting		
Trafficability		
Nitrogen loss		
Phosphorus loss		
Controlled drainage		
Salinity management		
Sodicity management		
Cost		
Other?		

Farmers usually first wish to know the cost and that is dependent on the spacing of the tiles, which is dependent upon water permeability of the soil.

Typical lateral spacings in various soils for pipe drains buried approximately 4 ft are:

Soil	Permeability	Lateral spacing (M)	Lateral spacing (ft)
Clay and clay loam	Very slow	9-20	30-70
Silt and silty	Slow to moderately slow	18-30	60-100
Sandy loam	Moderate to rapid	30-90	100-300

ASABE Standard *Design of Subsurface Drains in Humid Areas*

Exercise: For the 3 soils toured today, estimate the tile spacing using this SDSU calculator <http://www.igrowdrainage.org/#/calculators/drain-spacing> and the following assumptions.

- A) Drainage coefficient = the amount of water removed in 24 hours. Minnesota suggestions are 3/8" to 1/2" for field crops and 1/2" to 3/4" for truck crops (vegetables). In some MB RMs it is limited to 1/4".
- B) Tile diameter = 4 inches
- C) Tile depth = 4 ft
- D) Depth to restrictive layer = _____
- E) Minimum water table depth = 1 ft
- F) Hydraulic conductivity = _____ in/hour. Select values from soil test reports – or Mitch Timmerman’s demonstration.

Insert your calculated tile spacings in feet below. Compare to what the farmer at each site suggests is affordable. Is this similar to the typical spacing suggested above?

	Fyala	Shallow Peat	Lakeland
Field crops	-		
Vegetable crops		-	-

Stop 3: Shallow peat soils

Manitoba has some 1.8 M acres of peat soils that are [potentially arable, with some 300,000 acres presently farmed (1988). Despite their agricultural potential there are several challenges which limit production.

Farmer – Eric Fridfinnson

Management differences on peat vs mineral soils

	Peat	Mineral
Suitable crops		
Frost		
Tillage management		
Erosion		
Weed control – herbicide selection		
Drainage		
Nutrients Nitrogen Potassium Copper Manganese		
Other		
Value (\$/ac)		

Other notes:

Stop 3: Shallow Peat soils

Shallow Peat - Drained Phase

Areas of shallow peat soils in which the drainage has been improved through the installation of _____ are mapped as Shallow Peat Drained Phase. These are soils with 12 to 36 inches of peat over undifferentiated mineral material. The organic layer is mainly _____ peat that is neutral to alkaline in reaction and may be _____ due to the presence of limestone charged ground water. These soils occur in scattered locations within the _____ River Lowland. The mineral material underlying the peat is mostly clay that has been strongly gleyed and is strongly _____ with iron. There is little or no soil _____ development in the clay.

Fill above description with following terms

horizon	calcareous	mottled
fen	ditches	Icelandic

Soil suitability

	Ratings	Meaning
Ag Capability (dryland)		
Irrigation Suitability		

What is the depth to the water table _____

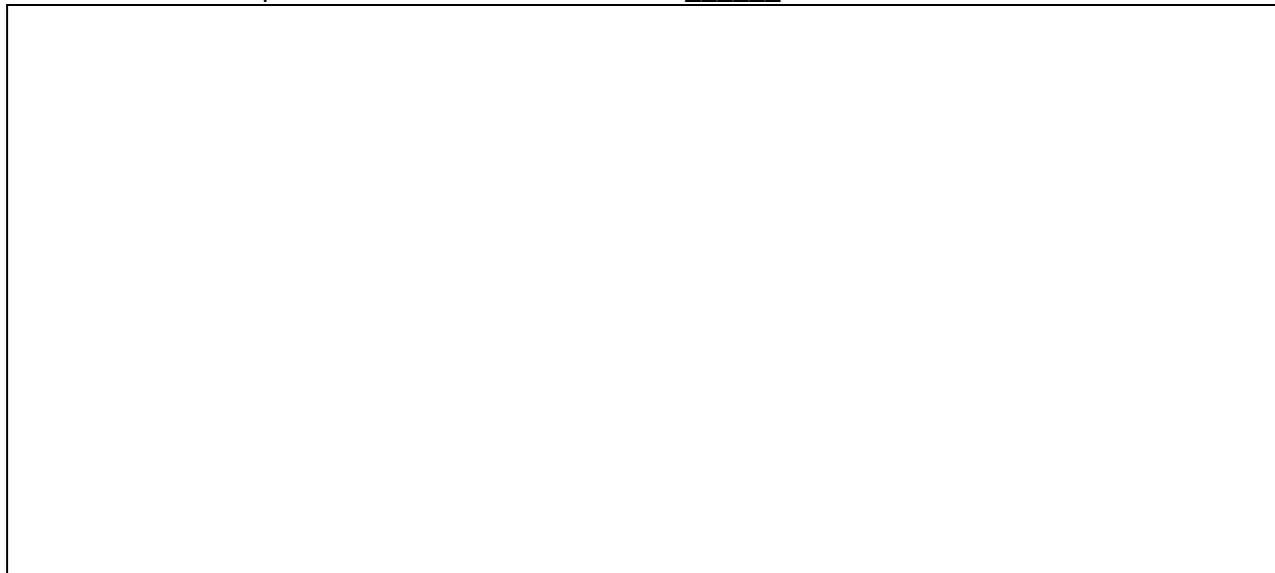
How much available water does this soil hold for canola? _____

How far should tile drains be spaced for these soils? _____

Sketch and colour the Shallow Peat profile

Sketch	Horizon	Depth	Colour	Texture	Notes

Sketch the landscape of the Shallow Peat soil series _____



Riverton - Gimli

Local Riverton industry ECBVerdyol, manufactures erosion control blankets from straw. These are widely exported for controlling soil erosion at road and construction sites.

Forage seed production – agronomist/grower Kevin Gulay

We will be driving past several leaf cutter bee shelters in fields between Riverton and Gimli.

	Forage seed
Forage seed typically grown	
Challenges to production	
Advantages of the Interlake area	

Stop 4: Lakeland soil - Teulon

Farmer – Darren Bond

	Lakeland soils
Typical rotations. Crop yields	
Typical tillage operations	
Water management	
Crop residues management	
Fertilization practices	
Land values	

Laryssa Stevenson (MSSS President) Agronomist – MB Pulse and Soybeans Growers

	Lakeland soils
IDC potential in area	
Soil properties	
Soil testing	
Variety selection	
Drainage	
Iron fertilization	

Stop 4: Lakeland Soil Series ()

The Lakeland soil series consists of imperfectly drained Gleyed Rego Black carbonated soils developed on moderately to extremely _____, dominantly fine loamy sediments. Surface textures range from loam to clay loam and occasionally _____ clay. The topography is very _____ sloping; runoff is slow; and permeability is moderate to moderately _____. The native vegetation consists of meadow grasses with clumps of _____. In some areas there is an upflow of groundwater containing _____ salts. Where the salt content in the rooting zone is sufficient to affect crop growth, the Lakeland slightly saline phase is mapped. Lakeland soils like most soils developed on extremely calcareous parent material have _____ soil profiles. The thin 15 to 25 cm very dark gray Ah horizon is granular, and usually moderately to strongly calcareous. This horizon is usually separated from the pale _____, extremely calcareous Ckgi horizon by a thin (15-20 cm) transitional, AC or Cca layer that is usually very strongly calcareous.

Lakeland, slightly saline phase consists of soils with similar profile characteristics as the Lakeland series except they have an appreciable quantity of soluble salts within the rooting zone of plants in sufficient quantity to affect crop growth. The salts are dominantly _____ sulfate and gypsum. These soils were formerly mapped as the Emerson (silty clay loam) Association.

Fill above description with following terms

silty	magnesium	gently
willow	calcareous	yellow,
shallow	soluble	slow.

Lakeland Soil suitability – determine from AgriMaps.

	Ratings	Meaning
Ag Capability (dryland)		
Irrigation Suitability		

What is the depth to the water table _____

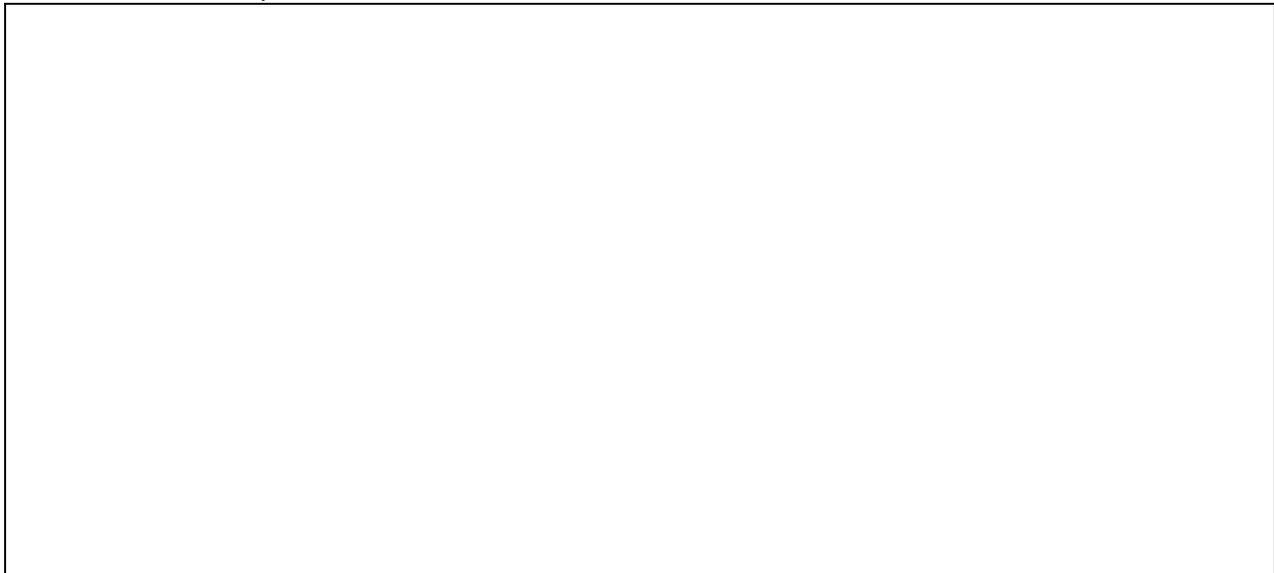
How much available water does this soil hold _____?

How far should tile drains be spaced for these soils? _____

Sketch and colour the Lakeland profile

Sketch	Horizon	Depth	Colour	Texture	Notes

Sketch the landscape of the Lakeland soil.



En route Agriculture and Soil Resource Scavenger Hunt

Our route passes many of the services and resources provided to Manitoba agricultural producers. Complete this scavenger hunt for a prize! Mark locations on the route map at front of tour guide.

Ag Services and Misc.	Name	Location
3 different grain elevators	1	
	2	
	3	
3 crop input service centres	4	
	5	
	6	
3 farm machinery dealers	7	
	8	
	9	
2 grain processing facilities	10	
	11	
Fertilizer storage	12	
2 Field Research centres	13	
	14	
Vegetable processing plant	15	
Irrigation pivot displayed	16	
Manure storage or application	17	
Poultry barn	18	
Swine barn	19	
Beef feedlot	20	
Pasturing (rotational grazing?)	21	
Distilleries, breweries	22	
Wildlife protection agency	23	
Crop on-farm-tests	24	

Soil and Land uses	Name	Location
Wet lands	A	
Derelict car storage	B	
Sanitary landfill site	C	
Constructed water storage for irrigation	D	
Land for sale	E	
New subdivisions	F	
Parks	G	
Pipeline stations	H	
Sand/gravel pits/piles	I	
Dog spas	J	
Summer fallow	K	
Ditch drainage	M	
Tile drainage	N	
Shelterbelt	O	
Stubble burning	P	
Newly cleared land	Q	
Wind erosion	R	
Water erosion	S	
Salinity	T	
Salinity management	U	
Weather station	V	
Straw removal	W	
Post harvest tillage	X	
Wildlife habitat	Y	
Fruit crop production	Z	
Sod farms		

Trivia

Where is Manitoba's largest moose?	
Who/what is the Riverton Rifle?	
What does Komarno mean?	
Which research soil scientist lives on Lakeland/Balmoral soils near Gunton?	
Which of our bus riders was raised in a house at the Arborg Heritage museum?	
What's your suggested BEST LAND USE for the Inwood soils?	
Where was the Allis Chalmers WD 45 tractor?	

Summer Tour Evaluation

Note: If this is returned with your name and contact information, you will be entered to win a prize.

Please rate the stops according to your level of satisfaction:

(Not so great) ___1 ___2 ___3 ___4 ___5 (fabulous and informative)

STOP 1: Limestone quarry

(Not so great) ___1 ___2 ___3 ___4 ___5 (fabulous and informative)

Comments _____

STOP 2: Fyala soil at PESAI

(Not so great) ___1 ___2 ___3 ___4 ___5 (fabulous and informative)

Comments _____

STOP 3: Peat soils near Riverton

(Not so great) ___1 ___2 ___3 ___4 ___5 (fabulous and informative)

Comments _____

STOP 4: Lakeland soil near Teulon

(Not so great) ___1 ___2 ___3 ___4 ___5 (fabulous and informative)

Comments _____

Workbook ,Exercises and Prizes:

(Needs improvement) ___1 ___2 ___3 ___4 ___5 (informative)

Comments _____

Bus and driver:

___1 ___2 ___3 ___4 ___5 (fabulous)

Comments _____

Bus program:

(Needs improvement) ___1 ___2 ___3 ___4 ___5 (informative)

Comments _____

Length of tour:

(Not so great) ___1 ___2 ___3 ___4 ___5 (perfect)

Comments _____

Food:

___1 ___2 ___3 ___4 ___5

Comments (be specific please)

Suggest a Theme and/or location for next year's summer tour:

Additional Comments:

Contact Information for prize:

Name (please print) _____

Email _____

Phone number _____

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A small illustration of a purple forage plant with several small flowers and green leaves is positioned to the right of the text.

MAN  FLAX