Provincial Soil Concept

Soil is one of our most valuable natural resources. To ensure that we do not take this resource for granted, soils need to be protected and managed in a sustainable manner. Designation and proclamation of a provincial soil is one way to increase public awareness and create a greater appreciation for soils.

The concept of provincial (state) soils is practiced to a limited extent in Canada and universally in the United States. As of 2000, every state in the United States (including the territories of Guam, Puerto Rico and the US Virgin Islands) has designated a state soil. Of these, 20 have received official proclamation by their state legislature (USDA-Natural Resources Conservation Service).

The 3rd session of the 39th Legislature Assembly of Manitoba (Nov. 2008 – present) is reading Bill 223 (THE COAT OF ARMS, EMBLEMS AND THE MANITOBA TARTAN AMENDMENT ACT (PROVINCIAL SOIL DESIGNATED)) proposed by Mr. Cliff Cullen (MLA Turtle Mountain), to designate Newdale soil as an Emblem of Manitoba (http://web2.gov.mb.ca/bills/39-3/b223e.php).

Current Status of Provincial Soils in Canada

Province/Territory	Provincial Soil	Classification
New Brunswick	**Holmesville proclaimed Feb. 1997**	**Orthic Humo-Ferric Podzol**
Prince Edward Island	**Charlottetown proclaimed Nov. 1998**	**Orthic Humo-Ferric Podzol**
Nova Scotia	**Queens proclaimed May 2008**	**Orthic Humo-Ferric Podzol**
British Columbia	TBA	Humo-Ferric Podzol
Alberta	Breton designated	Orthic Gray Luvisol
Manitoba	**Newdale designated and awaiting proclamation**	**Orthic Black Chernozem**
Quebec	Ste. Rosalie designated	Orthic Humic Gleysol

What is a Soil Series?

A soil series is an individual soil type, with a particular kind and arrangement of soil layers developed on a particular type of parent material and located in a particular soil zone. The properties of a particular soil series are determined by moisture influences

and landscape position. As a result, an individual soil series can usually be found in a specific part of a given field.

A soil series name is often derived from a town or landmark in or near the area where the series was first recognized (e.g. Newdale soil series named after the town of Newdale, MB).

The Newdale Soil Series

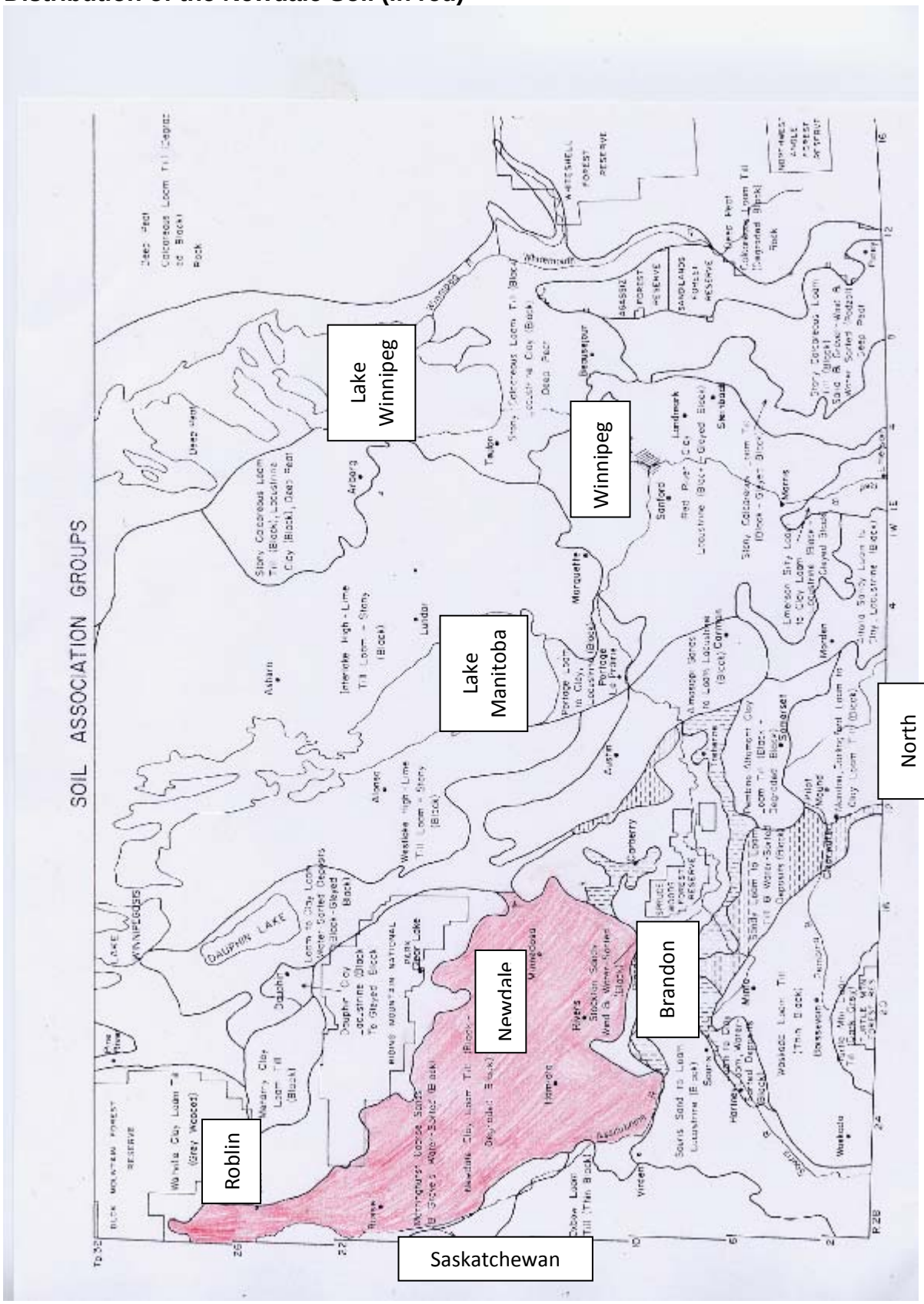
The Newdale series is characterized by an Orthic Black Chernozem (meaning Typical Dark Grassland Soil) profile on moderately to strongly calcareous, loamy glacial moraine till of limestone, granitic and shale origin. These soils are moderately well to well-drained and occur in mid to upper slope positions of undulating to hummocky landscapes. The soil has an extensive area occurring from north of Brandon, MB north-east to the Saskatchewan border. Surface runoff of water is moderate to moderately rapid; permeability of water into the soil is moderately slow. Most of these soils are presently cultivated; they have formed under intermixed aspen grove and grassland vegetation and many areas are characterized by a Prairie-pothole landscape.

The Newdale soil profile has a very dark gray surface layer because of the accumulation of organic matter (A horizons), commonly 25 centimetres thick. Under the surface layer is a dark brown maturing layer (Bm horizon) 10 to 30 centimetres thick. Below this is a lighter transitional layer (BC horizon) 3 to 15 centimetres thick. Below this is the original soil material (parent material, Ck horizon) relatively unchanged since being deposited after the glaciers retreated. It is a lime carbonate horizon

Properties of the Newdale Soil

Horizon	Depth cm	pH $CaCl_2$	Organic Carbon %	Organic Matter %	$CaCO_3$ %	Extracteable Cations meq./100gm					CEC meq./ 100gm	Very Fine Sand %	Total Sand %	Total Silt %	Total Clay %	Texture Class
						Ca	Mg	Na	K	H						
Ap	0 - 15	7.2	4.5	7.8	1	24	10	0.3	1.0	3	39	9	30	36	34	Clay loam
Ah	15 - 25	7.2	3.0	5.2	1	19	8	0.3	0.9	0	29	12	42	30	28	Clay loam
Bm	25 - 45	7.3	1.0	1.7	1	18	9	0.3	0.8	0	25	9	34	35	31	Clay loam
BC	45 - 55	7.6			15	18	9	0.1	0.5	0	21	10	35	34	31	Clay loam
Ck	55 - 100	7.9			20	12	16	0.7	0.7	0	20	10	36	36	26	Loam

Distribution of the Newdale Soil (in red)



Classification Criteria of Soils vs. Automobiles. Example Includes the proposed Official Soil of Manitoba, the Newdale Soil.

Classification Catergory	Soils	Automobiles
Order	Chernozemic	General Motors
Great Group	Black	Car
Subgroup	Orthic Black	Chevrolet
Association	Fine loamy, mixed, cool, subhumid	4-door Sedan
Series	Newdale	Impala
Phase	NDL/xcxs	loaded, good condition

Soil Orders in Canada- based on properties that reflect the effects of the dominant soil-forming processes. The Newdale soil is a Chernozemic soil.

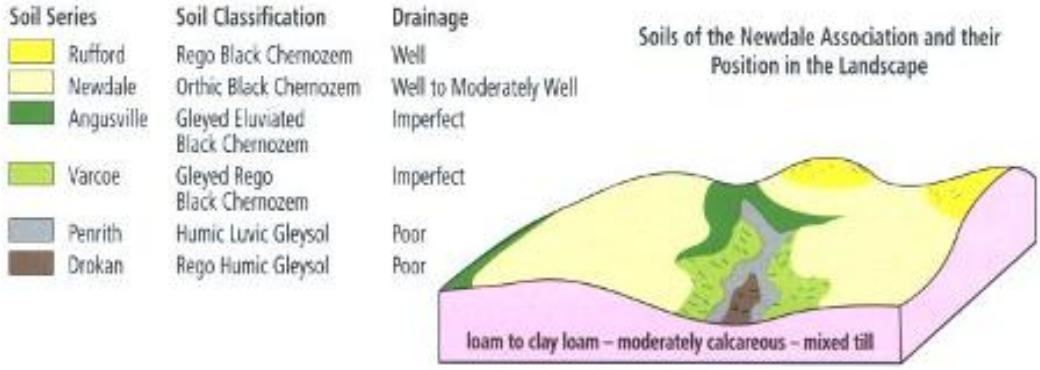
Chernozemic	most grassland, agricultural soils in Manitoba (high organic matter in A layer), Newdale is a member
Gleysolic	poorly drained soils (saturated, reduced, mottles)
Luvisolic	forest soils (Ae and Bt layers)
Regosolic	young soils along rivers, slopes, sand dune areas (weak layers development)
Solonetzic	sodium-affected soils (sodium in B layer)
Vertisolic	heavy clay soils with high shrink-swell potential (cracks and shear planes)
Brunisolic	catch-all category (weak B layer)
Cryosolic	frozen soils
Podzolic	B horizon with Fe, Al, organic matter, forest and young organic soils
Organic	more than 30% organic matter by weight

The Horizon Profile of a Newdale Soil

The soil layers of a Newdale soil is shown below. The deep black surface layer is referred to an Ah horizon. The A means this is the layer that roots and soil organisms mostly live in and the layer most changed over time. The black colour comes from the accumulation of organic matter over time. If the soil has had a history of ploughing, then the near surface layer will be a Ap horizon. The p meaning it is ploughed. Below the A horizon is the Bm horizon. Here the soil is being changed by root and soil organisms over time. The m is for maturing because this layer will likely become part of an increasing A horizon. The next layer is the C horizon. Shown are two layers. The Cca is a calcareous (limestone derived) and alkaline (high pH). Below this is the Ck horizon which is the unaltered material deposited by glaciers. It is important to note that the A and B horizons were at one time much like the Ck horizon. Time, climate and action of roots and organisms altered these to be what they are now.

The Newdale Soil is Also an Association of Soils

The Newdale Soil is also the dominant soil in a sequence or family of related soils located in the same climatic zone formed from similar parent material under different landscape positions resulting in different profile characteristics. Together, the soils are referred to as an Association. These soils are adjacent to one another from hilltop to depression. Variation in soil horizons from hilltop to depression is caused by the amount of water available at each point along the slope as a function of infiltration, runoff, run-on and proximity to the water table. Each soil type located along the slope is a soil series (e.g. The Newdale association includes six soil series: Newdale, Rufford, Varcoe, Angusville, Penrith and Drokan).



Soils of the Newdale Association

References

The information above has been extracted from the Soil Manitoba Guide 2008, Manitoba Agriculture, Food and Rural Initiatives. Below are links to chapters in the guide used here.

Understanding the Soil Landscapes of Manitoba
http://www.gov.mb.ca/agriculture/soilwater/soilmgmt/fsm01s01.html

Using Soil Survey Information
http://www.gov.mb.ca/agriculture/soilwater/soilmgmt/fsm01s02.html#provincial

In addition the following resources have been used;
Manitoba Soils and Their Management. Manitoba Department of Agriculture (out of print).

State Soils of the USA. http://soils.usda.gov/gallery/state_soils/#list