

Soil Survey of the
Big Head Indian Reserve No. 124

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Location

The Big Head Indian Reserve, located about 8 miles northeast of the town of Pierceland, includes an area of approximately 11,500 acres. (All or portions of Sections 31 to 34 in Township 62, Range 24, Sections 27 and 34 to 36 in Township 62, Range 25, Sections 4 to 9, 14, 15, 17, 18, 20 to 22 and 29 in Township 63, Range 24 and Sections 1, 2 and 12 in Township 63, Range 25, all west of the 3rd Principal Meridian).

MAP LEGEND

The series of symbols which appear within each area, separated on the map by a soil boundary, are interpreted by means of the map legend.

There may be some terms in the legend which are unfamiliar to the reader. The booklet, "A Guide to Understanding Saskatchewan Soils"¹, will familiarize the reader with the terms used. To properly interpret the legend it is essential that the above-mentioned booklet be used as a reference.

Soils

Dominantly Dark Gray Chernozemic Soils

- Glenbush - Dominant Dark Gray Chernozemic soils developed on coarse to moderately coarse textured glacio-fluvial deposits.
- Gb1 - Dominant* Orthic Dark Gray.
- Horsehead - Dominant Dark Gray Chernozemic soils developed on medium to moderately fine textured, slightly calcareous glacial till.
- Ho2 - Dominant combination of Orthic and Eluviated Dark Gray.

* Series which are Dominant occupy over 40% of the Map Unit.

- Makwa - Dominant Dark Gray Chernozemic soils with minor amounts of Black Chernozemic soils developed on medium to moderately fine textured, highly resorted glacial till which in some places is associated with glacial lake deposits.
- Ma2 - Dominant combination of Orthic and Eluviated Dark Gray and Orthic and Eluviated Black.
- Ma3 - Dominant combination of Orthic and Eluviated Dark Gray and Orthic and Eluviated Black with a significant* occurrence of undifferentiated Gleysolic soils.

Dominantly Podzolic Soils

- Bodmin - Dominant Podzolic soils developed on coarse to moderately coarse textured glacio-fluvial deposits.
- Bd1 - Dominant Dark Gray Wooded.
- Sylvania - Dominant Podzolic soils developed on coarse to medium textured sandy glacio-fluvial and glacio-lacustrine deposits.
- Syl - Dominant Orthic Gray Wooded.
- Loon River - Dominant Podzolic soils developed on medium to moderately fine textured, slightly calcareous glacial till.
- Ln4 - Dominant combination of Dark Gray Wooded and Orthic Gray Wooded.

*Series which are Significant occupy over 15% of the Map Unit but less than 40%.

Miscellaneous Soils

- Pine Sand - A group of Regosolic soils developed on coarse glacio-fluvial and fluvial-lacustrine sands, some of which have been reworked by wind.
- PS1 - A combination of Orthic Regosol and Arenic Podzo Regosol.
- Alluvium - A group of soils developed on variable textured alluvial deposits.
- Av5 - Dominant combination of Orthic and Rego Humic Gleysols.
- Av6 - Dominant saline and/or carbonated Rego Humic Gleysols.
- Runway - Rw - A mapping complex of soils developed on variable deposits of glacial meltwater channels.

Textural Groupings and Classes

Textural Group	Textural Class
Coarse textured	Sands (s), loamy sands (ls)
Moderately coarse textured	Sandy loam (sl), fine sandy loam (fl)
Medium textured	Very fine sandy loam (vl), loam (l), silt loam (sil)
Moderately fine textured	Sandy clay loam (scl), clay loam (cl), silty clay loam (sicl)
Fine textured	Sandy clay (sc), clay (c), silty clay (sic), heavy clay (hc)

Gravelly (g) modifications of the above textures are recorded where present.

Landforms

Name	Symbol	Description
<u>Glacial Till Landforms</u>		
Moraine	Ma	Gently rolling moraine with a knob and kettle pattern having no external drainage.
Ground Moraine	Ga	Roughly undulating ground moraine with a knob and kettle pattern having no external drainage.
<u>Glacio-Fluvial Landforms</u>		
Outwash Plain	Fa	Gently rolling, kettled or pitted outwash plain without external drainage.
	Fd	Roughly undulating outwash plain with external drainage or glacial drainage channels.
<u>Glacio-Alluvial Landforms</u>		
Glacial Lake Delta and Post Glacial Alluvium Deposits	A	Depressional to nearly level alluvial plain having no external drainage.
	Ad	Moderately sloping alluvial plain with external drainage.

Topography

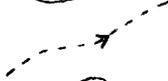
Description	Symbol	Percentage Slope
Depressional to nearly level	1	0-0.5%
Gently sloping or roughly undulating	3	2-5%*
Moderately sloping or gently rolling	4	5-9%

* A 5% slope means a rise or fall of 5 feet for every 100 feet of horizontal distance.

Other Map Symbols



Slough or depression area which is periodically flooded.



Drainage way indicating direction of flow.



Soil boundary.



Township corner.

Tp

Township.

Rg

Range.



Not suitable for grain production.

SOIL CAPABILITY FOR AGRICULTURE

Class	Soil Capability for Agriculture
1	No significant limitations.
2	Moderate limitations.
3	Moderately severe limitations.
4	Severe limitations.
5	Serious limitations - not suitable for annual crops but suitable for improved pasture.
6	Very serious limitations - suited only for permanent pasture.

Kind of Limitations

Climatic limitations - expressed on the basis of adverse subregional climate where there are no other limitations except climate.

Cs - heat deficiency expressed in terms of length of growing season and frost-free period.

Soil limitations - are caused by unfavorable inherent soil characteristics.

m - insufficient soil moisture holding capacity.

d - poor structure and/or permeability.

s - unfavorable soil characteristics. This subclass is used in a collective sense in place of subclasses m, d, f (low soil fertility) and n (excessive soil salinity) where more than two of them are present or where two of these limitations are present in addition to some other limitation.

Landscape limitations

t - unfavorable topography.

w - excess water - applies to soils where excess water, apart from that brought about by inundation, is a limitation in their use for agriculture.

e - erosion damage.

Guiding Criteria for Capability Classes in Saskatchewan

Class	Degree of Limitations	Range of Adaptability	Productivity*	Other Characteristics
1	No significant limitations.	Wide range of field crops.	Moderately high to high, 20-25 bu/acre (30.0 to 35.0 bu/acre)**	Deep, well drained, good water holding capacity. Natural high fertility.
2	Moderate limitations due to climate, soil or landscape.	Fairly wide range of field crops.	Moderately high to high, 15.5-20 bu/acre (24.0 to 30.0 bu/acre)**	Good water holding capacity. Natural high fertility or highly responsive to fertilizer.
3	Moderately severe limitations due to climate, soil or landscape.	Moderate range of field crops.	Medium to moderately high, 11.0-15.5 bu/acre (19-24 bu/acre)**	Limitations adversely affect the timing and ease of tillage, planting, harvesting, and application of conservation practices.
4	Severe limitations due to climate, soil or landscape.	Narrow range of field crops.	Low to medium 9.0-11.0 bu/acre (13-15 bu/acre)**	The high incidence of low yields or disastrous failures suggests that some of these soils be removed from continued cultivation.
5	Serious soil or landscape limitations make them unsuitable for the production of annual crops.	Suited for the production of adapted grasses and legumes.		Soils within this class are responsive to improvement practices through the use of farm machinery. Improvement of 25% of an area can double the carrying capacity.
6	Very serious soil or landscape limitations restrict their use to native grazing.	Suited only to native pasture.		Soils in this class are not responsive to improvement practice.
7	Prevent agricultural use.	Unsuited for agricultural use.		Bodies of water, townsites, parks, airports, railroads.

* Estimated productivity of arable Classes 1-4 is expressed in terms of long-time (1932-1961) average wheat yields in bu/acre.

** Estimated potential productivity.

THE SOILS OF THE BIG HEAD INDIAN RESERVE NO. 124

Interpretation of the Soil Symbol Sequence

The sequence of the soil symbols given for each area separated on the map is always arranged in the following order: Soil Association and Map Unit: Texture:Landform:Percentage Slope. An illustration of this is the symbol sequence Ln4:1:Ga3 which occurs in Section 4, Township 63, Range 24.

The letters Ln represent the abbreviation for the Loon River Association described in the legend as "Dominant Podzolic soils developed on medium to moderately fine textured, slightly calcareous glacial till". Medium to moderately fine textural groups are dominantly loam and clay loam textural classes. The number 4 indicates a Map Unit of the Loon River Association, namely Ln4, which is described as "A dominant combination of Dark Gray Wooded and Orthic Gray Wooded". The letter 1 represents the specific textural class of the surface soil, namely loam. The letters Ga described under the heading "Landforms" signify a "Roughly undulating ground moraine with a knob and kettle pattern having no external drainage". The topography in the area is indicated by the symbol 3, defined in the legend as slopes ranging from 2-5%.

It will be noted that the soil symbol sequence in certain areas contains two or more Associations and their Map Units, as in Section 27, Township 62, Range 25, where the symbols Syl:1s-Bdl:1s represent both the Sylvania (Sy) and Bodmin (Bd) Associations and their Map Units. Where two or more Associations and their Map Units occur in the one sequence, the first mentioned Association is dominant. The reason that some areas are indicated as a complex, such as the one above, is that at the present scale of mapping and the expected land use it was not considered practical to separate these soils.

Interpretation of Soil Capability² Symbol Sequence

Each area separated on the map (by a soil boundary) contains not only the soil symbol sequence already described but also a capability sequence. In the area containing the symbols Ln4:1:Ga3 the symbols 3_d^{10} occur and are interpreted as follows. The lower number is the capability class (i.e. 3). The small letter indicates the "limitation" or adverse climate, soil or landscape features which relegate the soil area to its particular capability class. The upper number indicates the percentage of the soil area designated to a specific capability class. By referring to the heading in the legend designated as "Soil Capability for Agriculture" it can be seen that 3_d^{10} describes an area of 100% Class 3 soil which has moderately severe limitations due to undesirable structure and/or permeability (d). It can, therefore, be concluded that subject to the limitations described, this area of roughly undulating Loon River loam is suitable for the production of annual crops.

EVALUATION OF THE AGRICULTURAL POTENTIAL OF THE BIG HEAD INDIAN RESERVE

An evaluation of the agricultural potential may be made of any portion of the map area by interpreting the map symbols by means of the legend.

Soil areas of the Makwa (Ma) Association make up approximately 4,400 acres which is about one-third of the map area. Makwa soils constitute the best potential areas for annual crop production in the Reserve. The capability edit for the Makwa areas ($2_{Cs}^8 5_w^2$) indicates that 80% of these areas are Class 2 soils and 20% are Class 5 soils. The only significant landscape limitation to crop production in the Makwa areas is the approximately 20% of the area occupied by Gleysolic soils (sloughs). As well, the major climatic limitation (Cs) due to a short frost-free period, is superimposed on the entire map area. Crops with a short growing season should be selected wherever possible. **Rapeseed**

and coarse grains will undoubtedly have a better chance of reaching maturity without frost damage than will wheat.

The areas of Loon River (Ln) and Horsehead (Ho) soils would be considerably less productive than the Makwa soils. The Loon River soils especially are subject to surface crusting and baking which results in poor seedling emergence in spring. The capability subclass symbol d refers to this crusting and baking property of Loon River soils which is partly due to the platy nature of the surface soil. As well, Loon River soils are low in organic matter and low in native fertility. Any attempt at sustained annual crop production on Loon River soils must be accompanied by heavy investment in fertilizer nitrogen and phosphorus. Adequate inputs of nitrogen are particularly required for stubble seeded crops on Loon River soils. A soil test is an excellent way to determine the exact nutrient requirements of a particular field.

Due to the heavy investment in nitrogen required for annual crop production on Loon River soils it is advisable to include a legume in a rotation to help build up the organic matter and nitrogen status of these soils.

The shaded areas of the map area are not suited to annual crop production. The Pine Sand (PS) and Alluvium (Av) areas are suited only to permanent native pasture. In the Bodmin (Bd) and Sylvania (Sy) areas some pasture improvement might be possible. However, this should be attempted only on a small trial basis, and if successful the area of improvement could be expanded.

Acknowledgments

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References

1. A Guide to Understanding Saskatchewan Soils. H.C. Moss. 1965. Saskatchewan Institute of Pedology Publication M1. Extension Publication 175. Distributed by Extension Division, University of Saskatchewan, Saskatoon.
2. A Guide to Soil Capability and Land Inventory Maps in Saskatchewan. Saskatchewan Institute of Pedology Publication M8. Department of Soil Science, University of Saskatchewan, Saskatoon. 1968.

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