



Agriculture and  
Agri-Food Canada

Agriculture et  
Agroalimentaire Canada

## Rural Municipality of Sifton


### Information Bulletin 96-2

## Soils and Terrain

An introduction  
to the land resource

Land Resource Unit  
Brandon Research Centre



Canada 

## **Rural Municipality of Sifton**

### **Information Bulletin 96-2**

Prepared by:

Manitoba Land Resource Unit,  
Centre for Land and Biological Resources Research,  
Agriculture and Agri-Food Canada.

Department of Soil Science, University of Manitoba.

Manitoba Soil Resource Section,  
Soils and Crops Branch, Manitoba Agriculture.

## PREFACE

This is one of a new series of information bulletins for individual rural municipalities of Manitoba. They serve to introduce the newly developed digital soil and terrain databases, and illustrate several typical derived map products for agricultural land use planning applications. The bulletins will also be available in diskette format for selected rural municipalities.

Information contained in this bulletin may be quoted and utilized with appropriate reference to the originating agencies. The authors and originating agencies assume no responsibility for the misuse, alteration, re-packaging, or re-interpretation of the information.

This information bulletin serves as an introduction to the land resource information available for the municipality. More detailed information, including copies of the primary soil and terrain maps at larger scales, may be obtained by contacting:

Manitoba Land Resource Unit  
Room 360 Ellis Bldg, University of Manitoba,  
Winnipeg, Manitoba R3T 2N2  
Phone: 204-474-6118 FAX: 204-275-5817

## CITATION

Manitoba Land Resource Unit, 1995. Soils and Terrain. An introduction to the land resource. Rural Municipality of Sifton, Information Bulletin 96-2, Ellis Bldg, University of Manitoba, Winnipeg.

## ACKNOWLEDGEMENTS

This project was supported under the Canada-Manitoba Agreement of Agricultural Sustainability.

The following individuals and agencies contributed significantly to the compilation, interpretation, and derivation of the information contained in this report.

Managerial and administrative support was provided by:

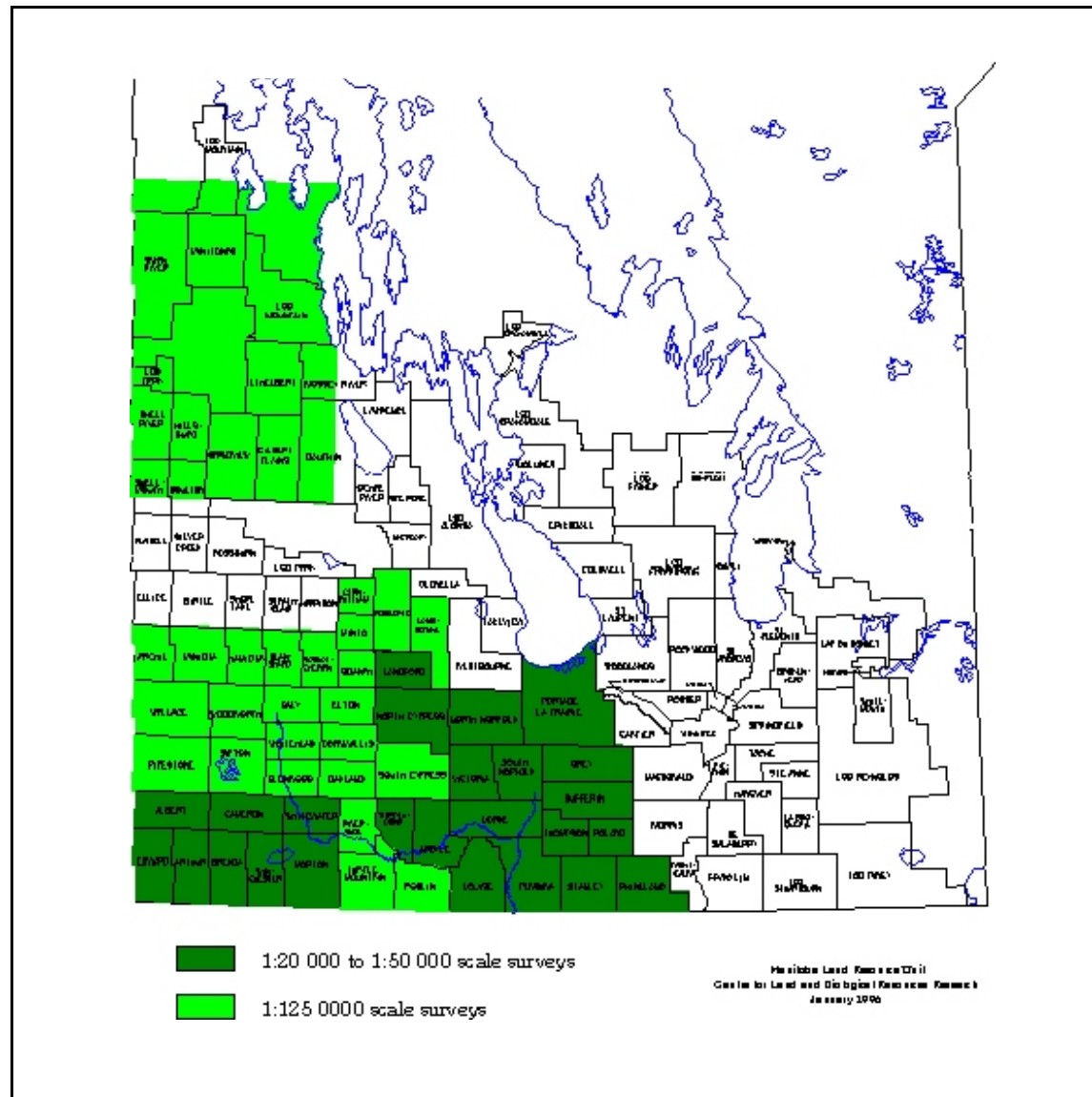
R.G. Eilers, Head, Manitoba Land Resource Unit, CLBRR, Agriculture and Agri-Food Canada.  
G.J. Racz, Head, Dept. of Soil Science, University of Manitoba.  
F. Wilson, Manager, Manitoba Land and Soil Programs, PFRA, Agriculture and Agri-Food Canada.  
G.F. Mills, Manitoba Soil Survey, Soils and Crops Branch, Manitoba Agriculture.  
K.S. McGill, Chief, Land Utilization and Soil Survey, Soils and Crops Branch, Manitoba Agriculture.

Technical support was provided by:

L. Fuller and G.W. Lelyk, Manitoba Land Resource Unit, CLBRR, Agriculture and Agri-Food Canada.  
J. Fitzmaurice, N. Lindberg, K. Gehman, A. Waddell, and M. Fitzgerald, Dept. of Soil Science, University of Manitoba.  
R. Lewis, PFRA, Agriculture and Agri-Food Canada.

Professional expertise for data conversion, correlation, and interpretation was provided by:

W.R. Fraser and W. Michalyna of the Manitoba Land Resource Unit, CLBRR, Agriculture and Agri-Food Canada.  
P. Haluschak and G. Podolsky, Manitoba Soil Survey Unit, Soils and Crops Branch, Manitoba Agriculture.



**Figure 3.** Rural municipalities in southern Manitoba with digital and terrain map information (1996).

## INTRODUCTION

This information bulletin is one of a new series prepared for selected rural municipalities in southern Manitoba (Figure 1). A brief overview of the soil and terrain database information assembled for each municipality is presented, as well as a set of maps derived from the data for typical agricultural land use and planning applications.

The soil and terrain maps and databases were compiled and registered using the computerized Geographic Information System (GIS) facilities of the Manitoba Land Resource Unit. These GIS databases were used to create the generalized interpretive maps and statistics contained in this report.

## LAND RESOURCE DATA

The soil and terrain (landscape) information were obtained as part of a larger project to provide a uniform level of land resource information for agricultural and regional planning purposes throughout Agro-Manitoba. This information was compiled and analyzed in digital form, using Geographic Information System (GIS) techniques. Three distinct layers of information were used, as shown in Figure 2.

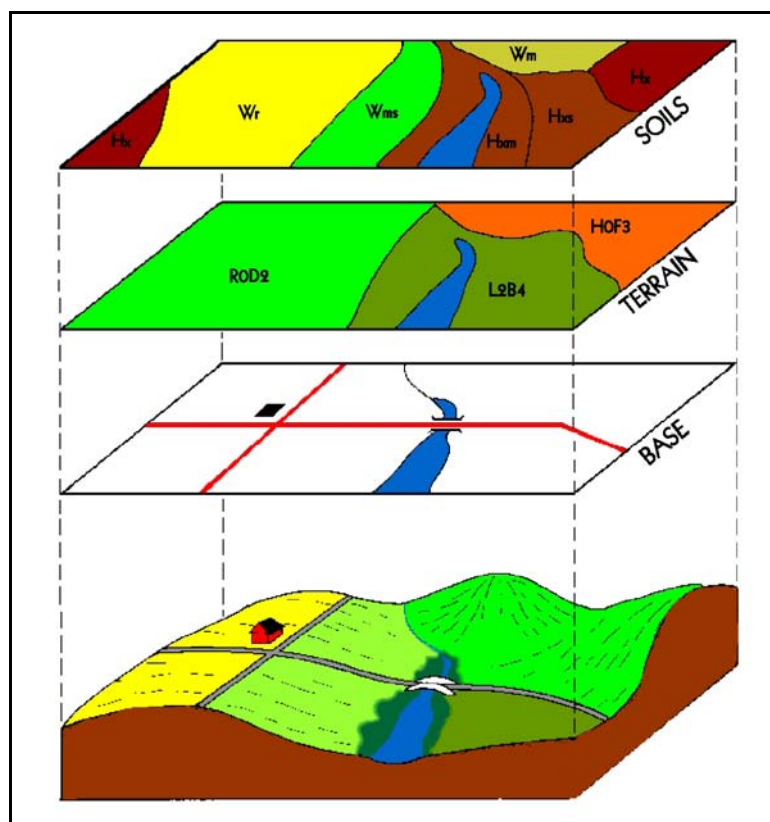


Figure 2. Soil, Terrain, and Base Map data.

## Base Layer

Digital base map information includes the municipality and Township boundaries, and major streams, roads and highways. The soil and terrain layers were added and aligned ("georeferenced") to the digital base map. Major rivers and lakes from the base layer were also used as common boundaries for the soil and terrain map layers. Water bodies larger than 25 ha in size were digitized as separate polygons.

## Terrain Layer

A separate terrain layer was produced for municipalities for which only reconnaissance scale soil map coverage was available. This was compiled by aerial photo-interpretation techniques, using recent 1:50 000 scale stereo air photo coverage. The terrain information was transferred from the photographs onto the standard RM base and digitized in the GIS. Where the soil and terrain boundaries coincided, such as along prominent escarpments and eroded stream channels, the new terrain line was used for both layers. The terrain line, delineated from modern airphoto interpretation, was considered more positionally accurate than the same boundary portrayed on the historical reconnaissance soil map. Each digital terrain polygon was assigned the following legend characteristics:

- Surface form
- Slope class
- Slope length class
- Percent wetlands
- Wetland size
- Erosional modifiers
- Extent of eroded knolls
- Polygon number

The first four legend fields are considered differentiating, that is, a change in any of these classes defines a new polygon.

## Soil Layer

The most detailed soil information currently available was selected as the data source for the digital soil layer for each rural municipality.

Comprehensive detailed soil maps (1:20 000 to 1:50 000 scale) have been published for many rural municipalities. Where they were available, the individual soil map sheets were digitized and compiled as a single georeferenced layer to match the digital RM base. Map polygons have one or more soil series components, as well as slope and stoniness classes. Soil database information was produced for each polygon, to meet national standards (MacDonald and Valentine, 1992). Slope length classes were also added, based on photo-interpretation.

Older, reconnaissance scale soil maps (1:126 720 scale) represented the only available soil data source for many rural municipalities. These maps were compiled on a **soil association** basis, in which soil landscape patterns were identified with unique surficial geological deposits and textures. Each soil association consists of a range of different soils ("associates") each of which occurs in a repetitive position in the landscape. Each polygon digitized from the reconnaissance soil map was assigned the following legend characteristics:

Map symbol and modifier (overprinted symbol)  
Soil Association or Complex name  
Soil series and modifier codes  
Polygon number

A modern soil series that best represents the soil association was identified for each soil polygon. The soil and modifier codes provide a link to additional databases of soil properties. In this way, both detailed and reconnaissance soil map polygons were related to soil drainage, surface texture, and other soil properties to produce various interpretive maps.

## SOIL AND TERRAIN OVERVIEW

The Rural Municipality (RM) of Sifton covers 9 Townships (approximately 87 000 ha) in south-western Manitoba. The town of Oak Lake is the largest population centre. Land use within this municipality is dominantly pasture and forage crops with local areas of cereal and oilseed production.

Soils in the municipality have been mapped in the Reconnaissance Soil Survey of South-Western Manitoba (Ellis and Shafer, 1940) and the Reconnaissance Soil Survey of the Rosburn and Virden Map Sheet Areas (Ehrlich et al., 1956). A portion of the municipality has been mapped at a more detailed scale (1:20 000) as reported in the Soils of the Plum Lakes Project (Michalyna and St.Jacques, 1989).

Based on climatic data from Virden (Environment Canada, 1982), mean annual temperature is 2.0°C and mean annual precipitation is 462 mm. Average frost-free period is 120 days and growing degree days above 5°C are 1702. The seasonal moisture deficit between May to September is 250 to 300 mm. Effective growing degree days (EGDD) above 5°C accumulated for the period from seeding to the first frost in the fall vary from 1400-1500. This parameter provides an indication of heat energy available for crop growth (Agronomic Interpretations Working Group, 1992).

The largest portion of the municipality occurs in the Antler River-Lake Souris Plain (referred to as the Lake Souris Basin in published soil reports). This area is characterized by level to undulating topography with local hummocky (duned) areas and several small water bodies (Oak Lake and the Plum Lakes). Relief in the municipality is generally subdued with slopes of less than 5 percent. Duned landscapes consist of natural areas of mixed grasses and tree species, dominantly aspen and bur oak. Native vegetation on level landscapes consists of upland grasses and shrubs grading to more water-tolerant grasses, sedges, reeds and cattails in proximity to low-lying areas affected by a high water table or flood-prone areas adjacent to the water bodies. The dominant soils in Sifton Municipality are Black Chernozems ranging in texture from from sands to loamy fine sands, (Souris Association in the central and

southern portions and Stockton Association to the north), to minor areas of loam and clay loam textures (Carroll Association) and clay textures (Pipestone Association). Regosolic soils are dominant on variable sandy loam to clay textures on alluvial lands (Assiniboine Association) and in areas of the Souris and Stockton Duned phase. Humic Gleysols occur in extensive areas throughout the RM affected by poor drainage and high water tables.

Imperfectly drained soils and minor areas of well drained soils of the Souris and Stockton Associations occupy approximately 40% of the RM. They have an agriculture capability of class 3 and good to fair suitability for irrigation. The potential environmental impact from irrigation is high. Land use is mainly for growing forage and pasture with some local production of cereals. These lands are susceptible to erosion by wind if surface cover is minimal. A considerable area of the Souris and Stockton soils is affected by high water tables and periods of excess moisture (32% of the RM). These poorly drained soils are wet for considerable portions of the year and are under native vegetation of sedge and grasses. Agriculture capability is 5 and 6W with land use limited mainly to production of native hay and grazing with some wildlife habitat. Suitability for irrigation is poor and the area has a high risk of adverse environmental impact if irrigated.

Local areas of the sandy soils have been influenced by aeolian deposition (7%) and have been mapped as the Souris and Stockton Duned phase. Undulating to hummocky topography is dominant with slopes up to 30%. These areas are stabilized under mixed grass and tree cover but are very susceptible to erosion by wind if cultivated or overgrazed. Agriculture capability is dominantly class 6 due to droughtiness and topography. They are rated poor for irrigation and have a high potential for environmental impact under irrigation.

The Pipestone soils occur in the south-western part of the RM. They are mainly imperfectly drained clayey soils affected by varying levels of salinity. Agriculture capability is class 2 to 3 depending on the degree of salinization. Suitability for irrigation is poor. Land use is mainly production of cereals and some forages. Local areas of poorly drained soils are usually saline and used for growing tame

forage or native hay.

The Carroll soils occur on imperfectly to moderately well drained loam to clay loam lacustrine deposits in the northeast part of the RM. Agriculture capability is class 1 and 2 and risk of erosion is low. Suitability for irrigation is good to fair; these soils have a potential for moderate environmental impact when irrigated. Land use is dominantly cereal production.

The Assiniboine River valley is a major topographic feature in the northeast part of the RM. It is 1.2 to 2.5 km in width and has a depth of approximately 90 m. The steeply sloping valley walls are mapped as the Eroded Slopes Complex; agriculture capability is class 7 and land use is mainly suited for native woodland and wildlife habitat. The level to gently undulating floodplain within the valley is subject to periodic inundation. These soils are mapped as the Assiniboine Complex developed on sandy loam to clay textured, stratified alluvial deposits. Agriculture capability varies from class 2 to 4 depending on the frequency of inundation. Suitability for irrigation ranges from good to poor.

Water levels in the area around Oak Lake and Plum Lakes vary with the seasonal rainfall. The natural surface drainage from much of the RM tends to collect around these water bodies. Oak Lake receives water from the Pipestone Creek and the Pipestone Creek Diversion. The lake levels are controlled to maintain use of the area for recreation, cottages, wildlife and waterfowl habitat as well as production of native hay and grazing.

## **DERIVED AND INTERPRETIVE MAPS**

A large variety of computer derived and interpretive maps can be generated, once the soil and terrain data are stored in digital format. These maps are based on selected combinations of database values and assumptions.

**Derived maps** show information that is given in one or more columns in the computer map legend (such as soil texture, drainage, stoniness, or slope class).

**Interpretive maps** portray a more complex evaluation of information presented in the legend combined in a unique way to arrive at an entirely new map.

Several examples of derived and interpretive maps are included in this information bulletin. The maps have all been reduced in size and generalized (simplified), in order to portray conditions for an entire rural municipality on one page. Only interpretations based on the dominant soil and terrain conditions in each polygon are shown at such reduced scales. These generalized maps provide a useful overview of conditions within a municipality, but are not intended to apply to site specific land parcels.

The digital databases may also contain more detailed information concerning significant inclusions of differing soil and slope conditions in each map polygon, particularly where they have been derived from modern detailed soil maps. This information can be portrayed at larger map scales.

Information concerning particular interpretative maps, and the primary soil and terrain map data, can be obtained by contacting the Manitoba Land Resource Unit.



**Slope Map.**

Slope describes the steepness of the landscape surface. The slope classes shown on this map are derived from the digital terrain layer database. Specific colours are used to indicate the most significant, limiting slope class for each terrain polygon in the RM. Additional slope classes can occur in each polygon area, but cannot be portrayed at this reduced map scale.

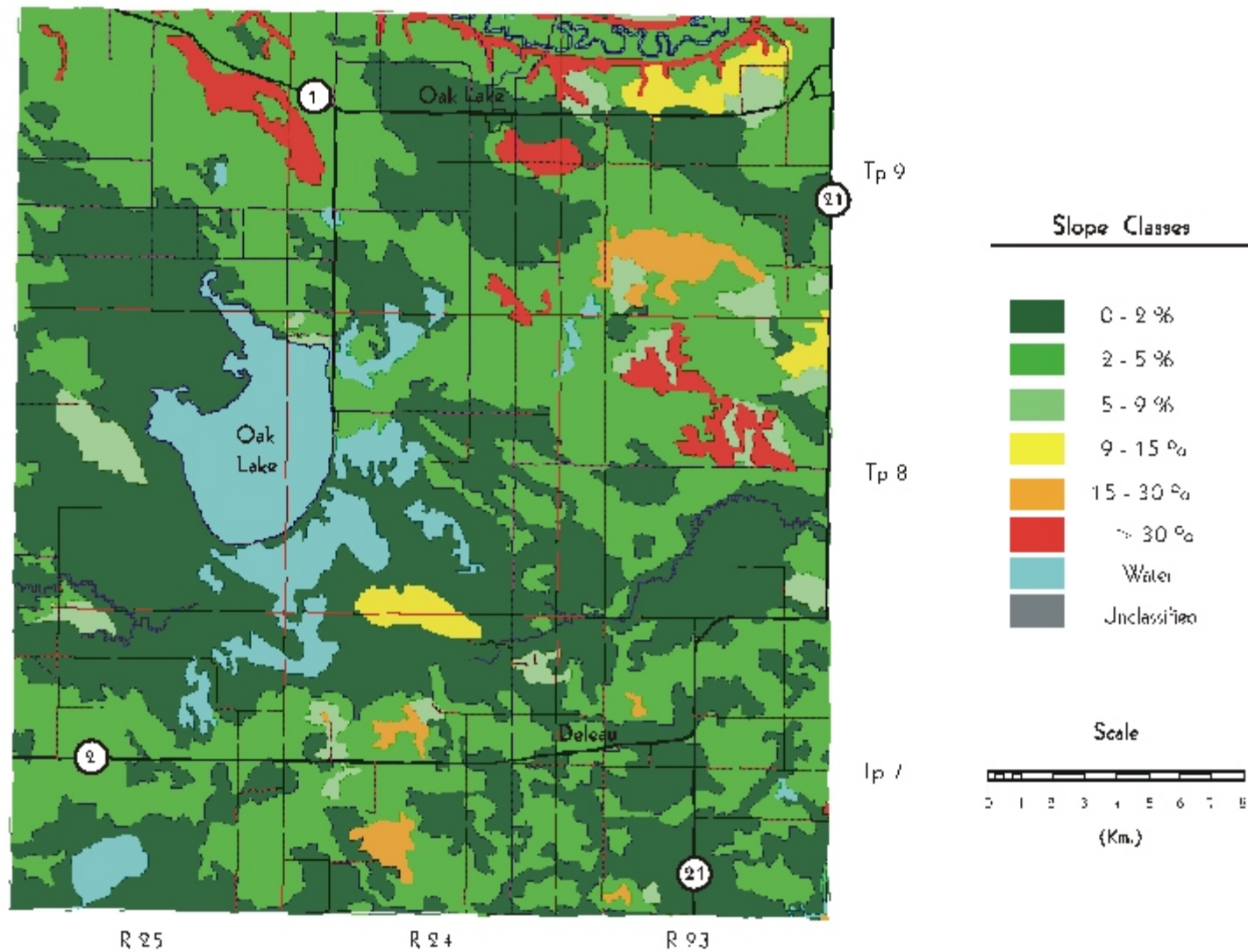
**Table 1. Slope Classes<sup>1</sup>**

<b>Slope Class</b>	<b>Area (ha)</b>	<b>Percent of RM</b>
<b>0 - 2 %</b>	<b>36225</b>	<b>41.6</b>
<b>2 - 5 %</b>	<b>36198</b>	<b>41.6</b>
<b>5 - 9 %</b>	<b>2734</b>	<b>3.1</b>
<b>9 - 15 %</b>	<b>1285</b>	<b>1.5</b>
<b>15 - 30 %</b>	<b>1259</b>	<b>1.4</b>
<b>&gt; 30 %</b>	<b>2815</b>	<b>3.2</b>
<b>Water</b>	<b>6593</b>	<b>7.6</b>
<b>Unclassified</b>	<b>4</b>	<b>0.0</b>
<b>Total</b>	<b>87113</b>	<b>100.0</b>

<sup>1</sup> Area has been assigned to the most significant limiting slope for each terrain polygon. Significant areas of lesser slope, and smaller areas of greater slope may occur in each terrain polygon.

## Rural Municipality of Sifton

## Slope Map



Manitoba Land Resource Unit,  
Centre for Land and Biological Resources Research  
December 1994

### Surface Form Map.

Surface forms describe the overall shape of the earth's surface. The various surface forms may exhibit a regular (or irregular) pattern of convexities and concavities, and are commonly associated with characteristic ranges of slope gradients and slope lengths. They may also imply particular modes of origin. For example, scrolled and terraced surface forms are created by river and stream deposits, while undulating and hummocky landforms are frequently associated with glacial moraines. A description of the various surface form classes are contained in a separate Soil and Terrain Classification System Manual (Manitoba Land Resource Unit, 1996).

Surface form and slope class are two key features of the digital terrain map layer. Both of these characteristics are important as controlling and influencing factors to consider for sustainable land use planning and management.

**Table 2. Surface Form and Slope Classes<sup>1</sup>**

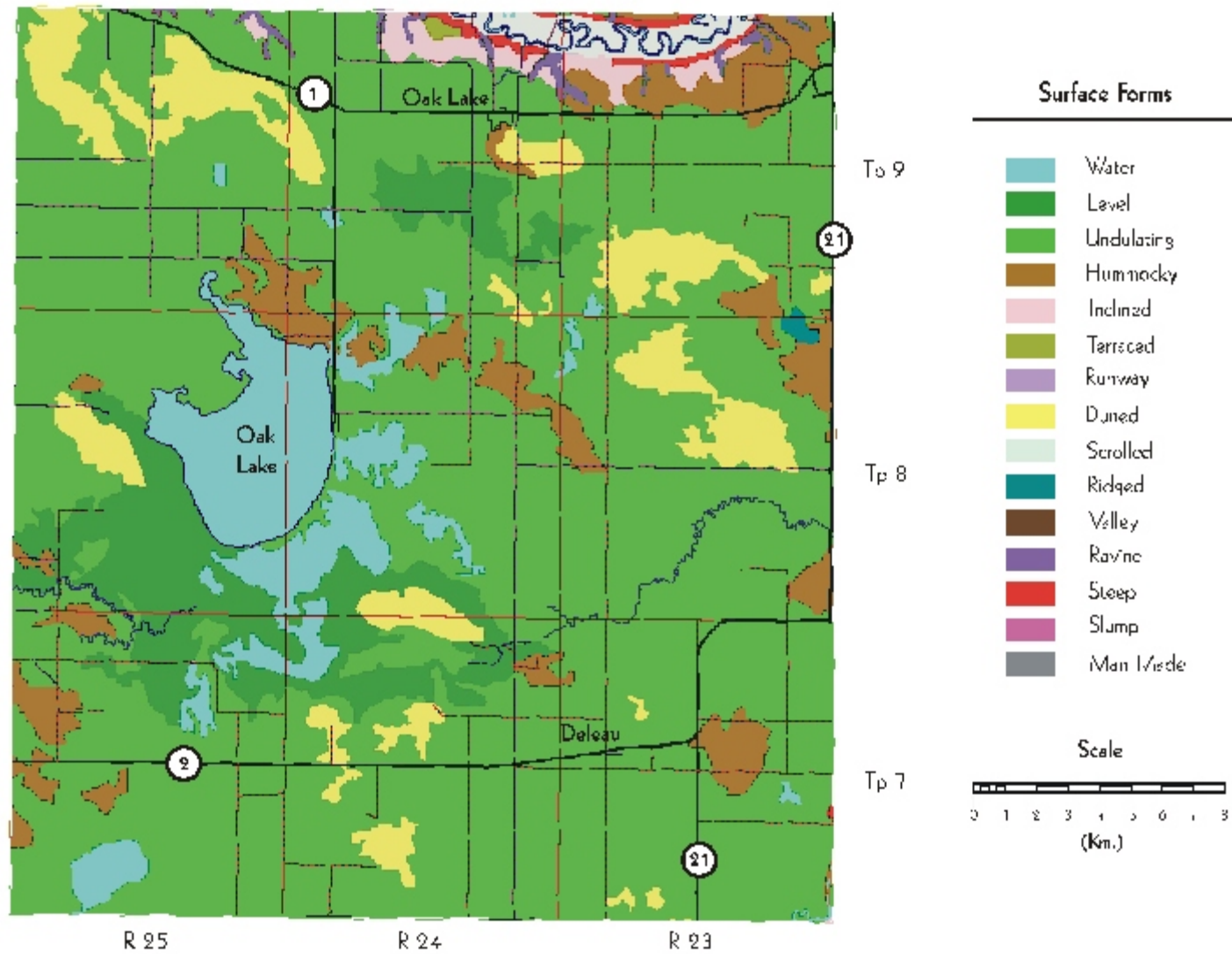
<b>Surface Form Slope Class</b>	<b>Area (ha)</b>	<b>Percent of RM</b>
<b>Scrolled</b>	<b>900</b>	<b>1.0</b>
C (2.0 to 5.0%)	900	1.0
<b>Duned</b>	<b>6332</b>	<b>7.3</b>
C (2.0 to 5.0%)	1307	1.5
D (6.0 to 9.0%)	1346	1.5
E (10.0 to 15.0%)	479	0.6
F (16.0 to 30.0%)	1253	1.4
H (31.0 to 70.0%)	1947	2.2
<b>Hummocky</b>	<b>5524</b>	<b>6.3</b>
C (2.0 to 5.0%)	3330	3.8
D (6.0 to 9.0%)	1388	1.6
E (10.0 to 15.0%)	806	0.9
<b>Inclined</b>	<b>910</b>	<b>1.0</b>
C (2.0 to 5.0%)	817	0.9
F (16.0 to 30.0%)	6	0.0
H (31.0 to 70.0%)	88	0.1

<b>Surface Form Slope Class</b>	<b>Area (ha)</b>	<b>Percent of RM</b>
<b>Level</b>	<b>6977</b>	<b>8.0</b>
A (0.0 to 0.5%)	5357	6.1
B (0.5 to 2.0%)	1620	1.9
<b>Ravine</b>	<b>434</b>	<b>0.5</b>
H (31.0 to 70.0%)	163	0.2
J (> 70.0%)	271	0.3
<b>Man Made</b>	<b>4</b>	<b>0.0</b>
<b>Ridged</b>	<b>94</b>	<b>0.1</b>
C (2.0 to 5.0%)	94	0.1
<b>Steep</b>	<b>347</b>	<b>0.4</b>
J (> 70.0%)	347	0.4
<b>Terraced</b>	<b>60</b>	<b>0.1</b>
C (2.0 to 5.0%)	60	0.1
<b>Undulating</b>	<b>58938</b>	<b>67.7</b>
B (0.5 to 2.0%)	29248	33.6
C (2.0 to 5.0%)	29690	34.1
<b>Water</b>	<b>6593</b>	<b>7.6</b>
<b>Total</b>	<b>87113</b>	<b>100.0</b>

<sup>1</sup> Area has been assigned to the most significant limiting slope for each terrain polygon. Significant areas of lesser slope, and smaller areas of greater slope may occur in each terrain polygon.

## Rural Municipality of Sifton

## Surface Form Map



Manitoba Land Resource Unit  
 Centre for Land and Biological Resources Research  
 December 1994

### Generalized Soil Map.

All soil polygons on the original published reconnaissance maps were digitized to create the soil layer. In some cases, areas of overprinted symbols on the original maps were delineated as additional new soil polygons.

This generalized soil map has been reduced in size and simplified by grouping the original soil association polygons. The groups have been colour themed according to similar modes of origin, texture, and soil drainage. Soils derived from glacial till deposits (typically loam to clay loam in texture) have been assigned blue and green colours. Soils developed from glacial lake deposits are coloured yellow (sandy), orange (loam), or brown (clay). Sand and gravel deposits are coloured in pink.

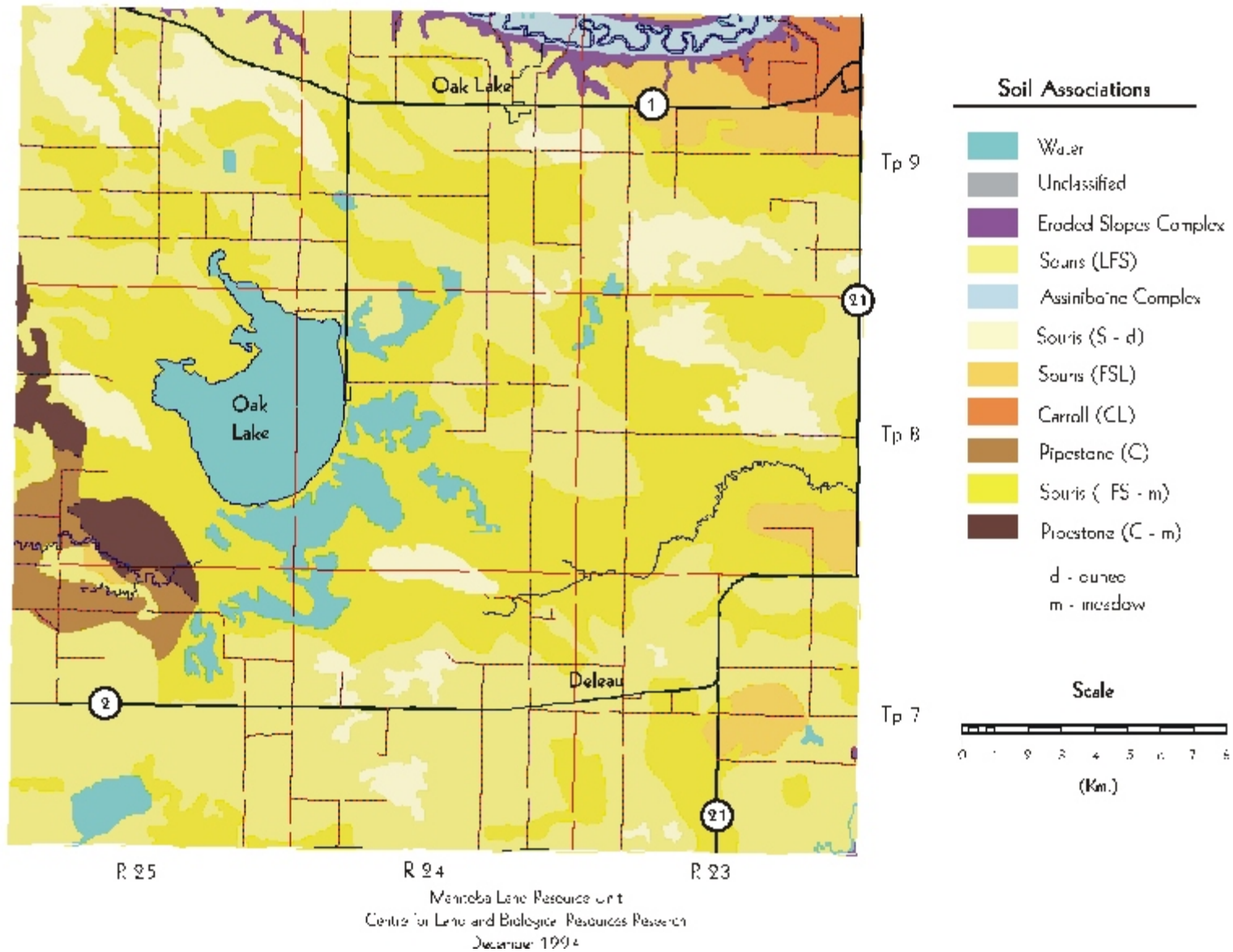
The groups have been named after the dominant soil association, and the statistics for each the groups have been summarized (in bold). The original reconnaissance map symbol types and their areal extent in the municipality are shown within each group.

**Table 3. Generalized Soil Association Groups**

<b>Association Group Associate</b>	<b>Area (ha)</b>	<b>Percent of RM</b>
<b>Eroded Slopes</b>	<b>874</b>	<b>1.0</b>
<b>Souris (LFS)</b>	<b>36936</b>	<b>42.4</b>
Slfs	18658	21.4
Sls	4332	5.0
Ss	13946	16.0
<b>Assiniboine Complex</b>	<b>905</b>	<b>1.0</b>
As	905	1.0
<b>Souris (S - d)</b>	<b>6332</b>	<b>7.3</b>
Slfs (duned)	5484	6.3
Ss (duned)	848	1.0
<b>Souris (FSL)</b>	<b>3113</b>	<b>3.6</b>
Cl	37	0.0
Sfsl	3076	3.5
<b>Carroll (CL)</b>	<b>1217</b>	<b>1.4</b>
Ccl	1217	1.4
<b>Pipestone (C)</b>	<b>1710</b>	<b>2.0</b>
Pc	1710	2.0
<b>Souris (LFS - m )</b>	<b>28047</b>	<b>32.2</b>
Slfs (meadow)	26088	29.9
Sls (meadow)	621	0.7
Ss (meadow)	1338	1.5
<b>Pipestone (C - m)</b>	<b>1384</b>	<b>1.6</b>
Pc (meadow)	1384	1.6
<b>Water</b>	<b>6593</b>	<b>7.6</b>
<b>Unclassified</b>	<b>4</b>	<b>0.0</b>
<b>Total</b>	<b>87113</b>	<b>100.0</b>

## Rural Municipality of Sifton

## Generalized Soil Map



### Agricultural Capability Map.

This evaluation utilizes the 7 class Canada Land Inventory system (CLI, 1965). Classes 1 to 3 represent the prime agricultural land, classes 4 and 5 represent marginal lands, and classes 6 and 7 are considered unsuitable for dryland agriculture.

This generalized interpretive map is based on the dominant modern soil type for the soil polygon, in combination with the dominant slope class identified from the terrain polygon layer. The nature of the CLI subclass limitations and the classification of subdominant components cannot be portrayed at this generalized map scale.

**Table 4. Agricultural Capability<sup>1</sup>**

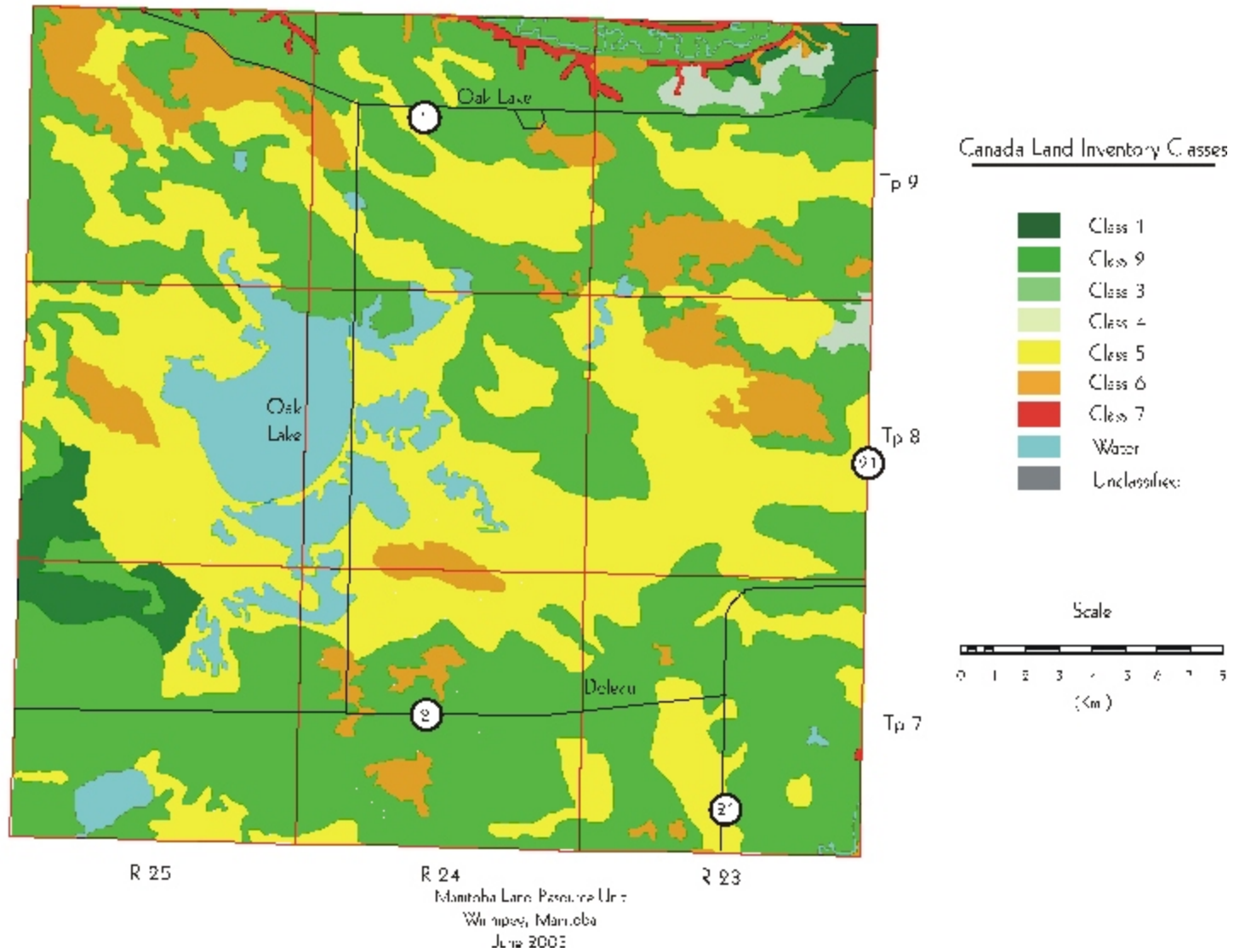
<b>Class Subclass</b>	<b>Area (ha)</b>	<b>Percent of RM</b>
<b>2</b>	<b>2449</b>	<b>2.8</b>
2T	750	0.9
2TW	108	0.1
2W	1587	1.8
2X	4	0.0
<b>3</b>	<b>40716</b>	<b>46.7</b>
3I	894	1.0
3M	38567	44.2
3MT	979	1.1
3T	275	0.3
<b>4</b>	<b>786</b>	<b>0.9</b>
4	212	0.2
4T	573	0.7
<b>5</b>	<b>29466</b>	<b>33.8</b>
5	138	0.2
5W	29328	33.6
<b>6</b>	<b>6586</b>	<b>7.6</b>
6M	4384	5.0
6MT	1948	2.2
6T	253	0.3
<b>7</b>	<b>607</b>	<b>0.7</b>
7T	607	0.7
<b>Water</b>	<b>6607</b>	<b>7.6</b>
<b>Total</b>	<b>87219</b>	<b>100.0</b>

<sup>1</sup> Based on **dominant** soil and slope of the respective soil and terrain maps.



## Rural Municipality of Sifton

## Agriculture Capability Map





### Irrigation Suitability Map.

Irrigation suitability is a four class rating system. Classes are **Excellent, Good, Fair, and Poor**. Irrigation ratings are based on an assessment of the most limiting combination of soil and landscape conditions. Soils in the same class have a similar relative suitability or degree of limitation for irrigation use, although the specific limiting factors may differ. These limiting The irrigation rating system does not consider water availability, method of application, water quality, or economics of irrigated land use.

This generalized interpretive map is based on the dominant soil series for each soil polygon, in combination with the dominant slope class from the terrain layer database. The nature of the subclass limitations, and the classification of subdominant components is not shown at this generalized map scale.

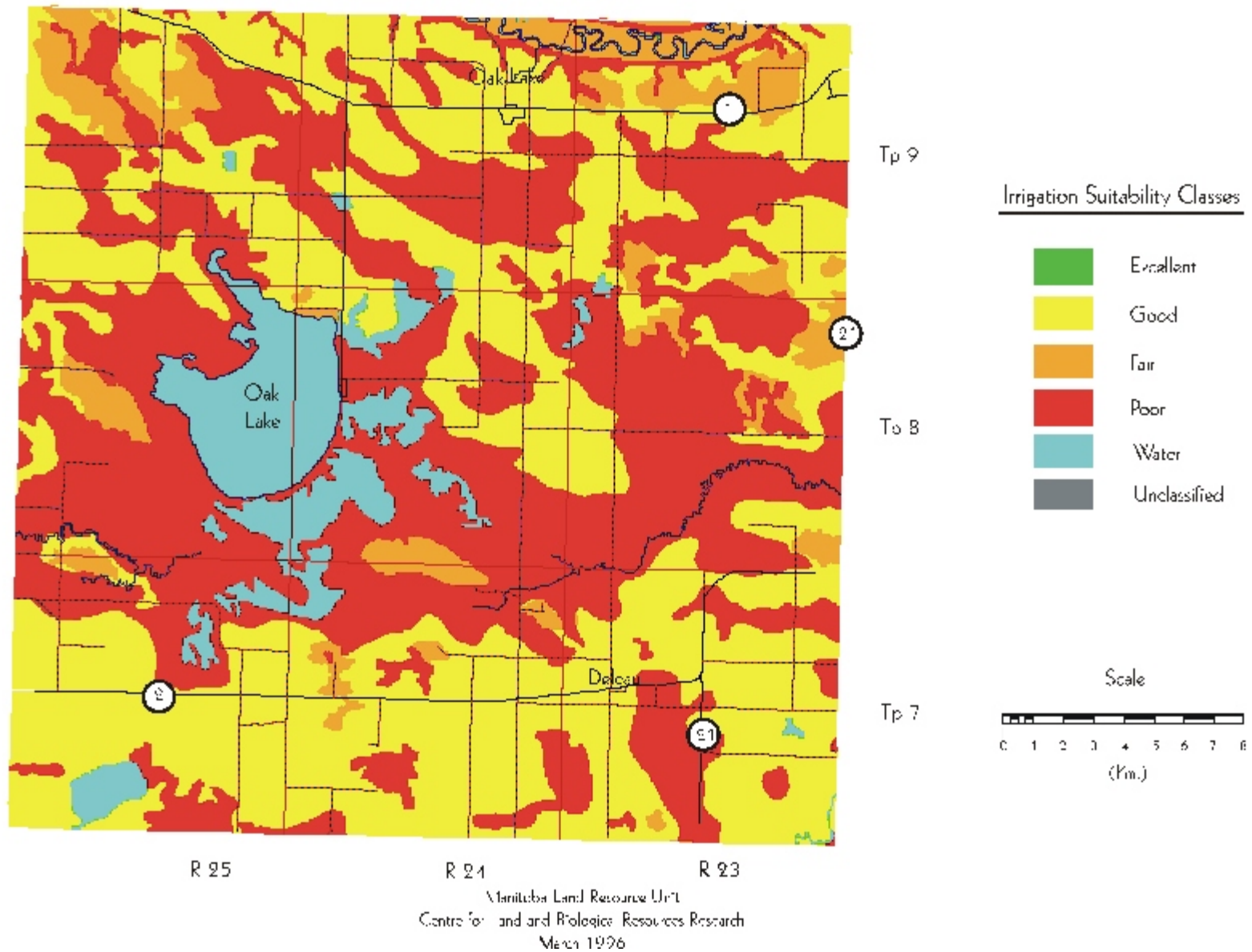
**Table 5. Irrigation Suitability<sup>1</sup>**

<b>Class</b>	<b>Area (ha)</b>	<b>Percent of RM</b>
<b>Excellent</b>	<b>0</b>	<b>0.0</b>
<b>Good</b>	<b>39227</b>	<b>45.0</b>
<b>Fair</b>	<b>6075</b>	<b>7.0</b>
<b>Poor</b>	<b>35214</b>	<b>40.4</b>
<b>Organic</b>	<b>0</b>	<b>0.0</b>
<b>Water</b>	<b>6593</b>	<b>7.6</b>
<b>Unclassified</b>	<b>4</b>	<b>0.0</b>
<b>Total</b>	<b>87113</b>	<b>100.0</b>

<sup>1</sup> Based on **dominant** soil and slope of the respective soil and terrain maps.

## Rural Municipality of Sifton

## Irrigation Suitability Map



### Potential Environmental Impact Under Irrigation.

A major concern for land under irrigated crop production is the possibility that surface and/or groundwater may be impacted. The potential environmental impact assessment provides a relative rating of land into 4 classes (minimal, low, moderate and high) based on an evaluation of specific soil factors and landscape conditions that determine the impact potential.

Soil factors considered are those properties that determine water retention and movement through the soil; topographic features are those that affect runoff and redistribution of moisture in the landscape. Specifically considered are: soil texture, hydraulic conductivity, salinity, geological uniformity, depth to watertable and topography. The risk of altering surface and subsurface soil drainage regimes, soil salinity or the potential for runoff, erosion or flooding is determined by specific criteria for each property.

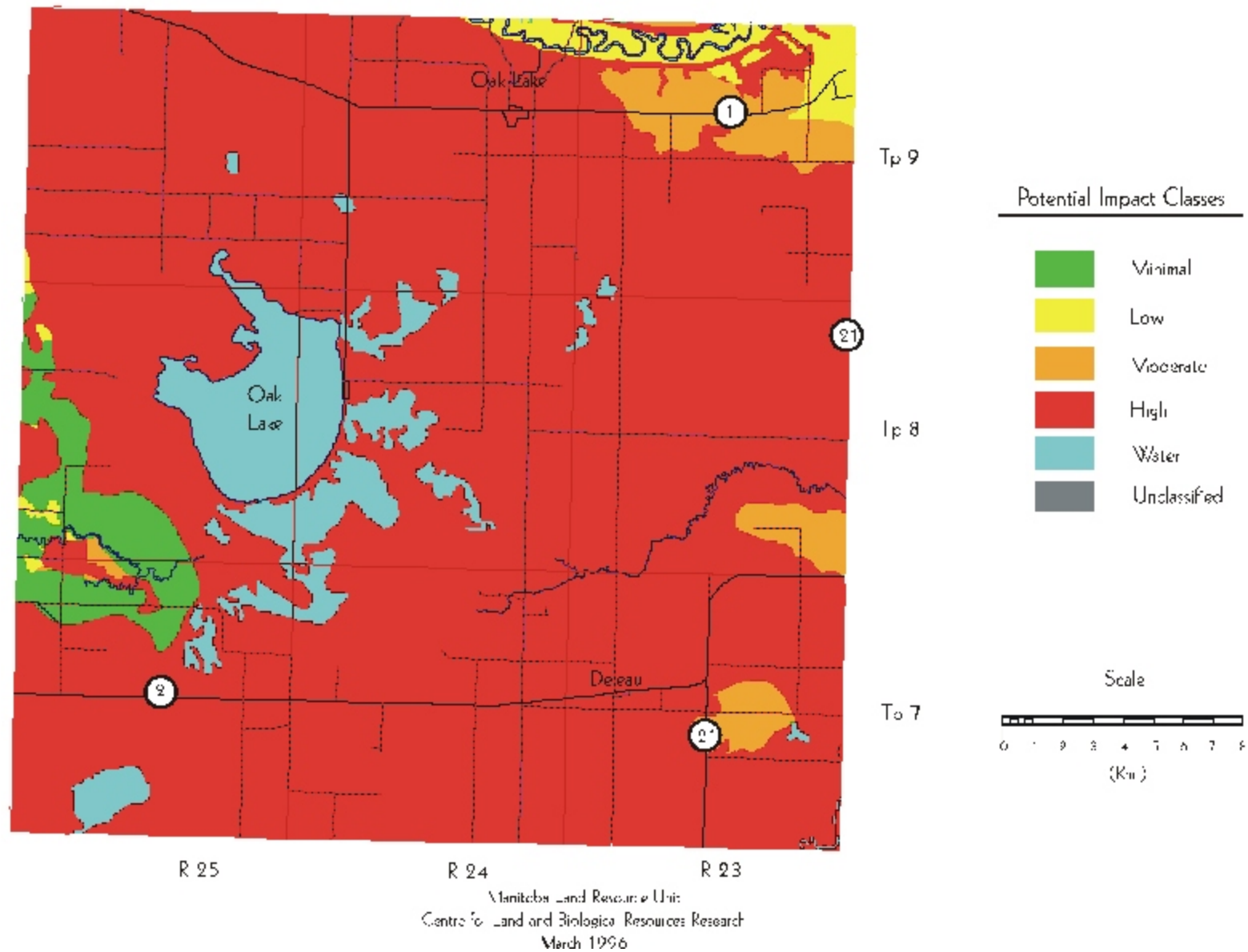
Use of this rating is intended to serve as a warning of potential environmental concern. It may be possible to design and/or give special consideration to soil-water-crop management practices that will mitigate any adverse impact.

This generalized interpretive map is based on the dominant soil series for each soil polygon, in combination with the dominant slope class from the terrain layer database. The nature of the subclass limitations, and the classification of subdominant components is not shown at this generalized map scale.

**Table 6. Potential Environmental Impact Under Irrigation<sup>1</sup>**

<b>Class</b>	<b>Area (ha)</b>	<b>Percent of RM</b>
<b>Minimal</b>	<b>2910</b>	<b>3.3</b>
<b>Low</b>	<b>1838</b>	<b>2.1</b>
<b>Moderate</b>	<b>3353</b>	<b>3.8</b>
<b>High</b>	<b>72415</b>	<b>83.1</b>
<b>Organic</b>	<b>0</b>	<b>0.0</b>
<b>Water</b>	<b>6593</b>	<b>7.6</b>
<b>Unclassified</b>	<b>4</b>	<b>0.0</b>
<b>Total</b>	<b>87113</b>	<b>100.0</b>

<sup>1</sup> Based on **dominant** soil, slope gradient, and slope length of the respective soil and terrain maps.

**Rural Municipality of Sifton****Potential Environmental Impact Under Irrigation**

**Water Erosion Risk Map.**

The risk of water erosion was estimated using the universal soil loss equation (USLE) developed by Wischmeier and Smith (1965). The map shows 5 classes of soil erosion risk based on bare unprotected soil:

negligible  
low  
moderate  
high  
severe

Cropping and management practices will significantly reduce this risk depending on crop rotation program, soil type, and landscape features.

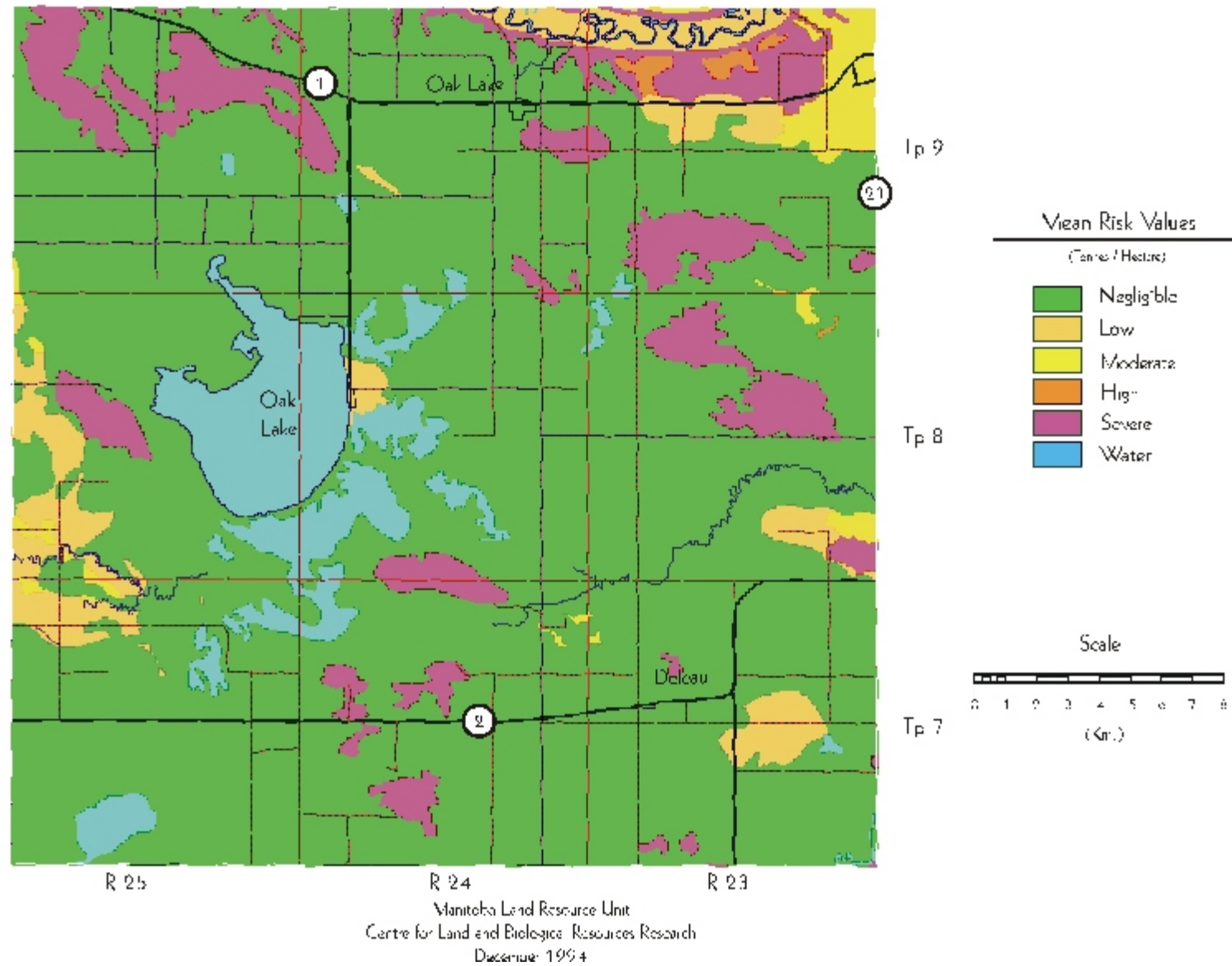
**Table 7. Water Erosion Risk<sup>1</sup>**

<b>Class</b>	<b>Area (ha)</b>	<b>Percent of RM</b>
<b>Negligible</b>	<b>65695</b>	<b>75.4</b>
<b>Low</b>	<b>4563</b>	<b>5.2</b>
<b>Moderate</b>	<b>1699</b>	<b>1.9</b>
<b>High</b>	<b>296</b>	<b>0.3</b>
<b>Severe</b>	<b>8268</b>	<b>9.5</b>
<b>Water</b>	<b>6593</b>	<b>7.6</b>
<b>Unclassified</b>	<b>0</b>	<b>0.0</b>
<b>Total</b>	<b>87113</b>	<b>100.0</b>

<sup>1</sup> Based on **dominant** soil, slope gradient, and slope length of the respective soil and terrain maps.

## Rural Municipality of Sifton

## Water Erosion Risk Map



**REFERENCES**

Agronomic Interpretations Working Group. 1995. Land Suitability Rating System for Agricultural Crops: Spring-seeded Small Grains. Edited by W.W. Pettapiece. Tech. Bull. 1995-6E. Centre for Land and Biological Resources Research, Agriculture and Agri-Food Canada, Ottawa. 90 pages, 2 maps.

Canada Land Inventory. 1965. Soil Capability Classification for Agriculture. Canada Land Inventory Report No. 2. ARDA, Dept. of Forestry, Canada, Ottawa.

Ellis, J.H., and Shafer, W.H. 1940. Reconnaissance Soil Survey of South-Western Manitoba. Soils Report No. 3. Manitoba Soil Survey. Published by Manitoba Dept. of Agriculture. 104pp and map.

Ehrlich, W.A., Pratt, L.E. and Poyser, E.A. 1956 Report of Reconnaissance Soil Survey of Rossburn and Virden Map Sheet Areas. Soils Report No. 6. Manitoba Soil Survey. Published by Manitoba Dept. of Agriculture. 121pp and 2 maps.

Environment Canada. 1982. Canadian Climatic Normals 1951-1980. 1- Temperatures, Vol. 2; 2- Precipitation, Vol. 3; 3- Frost, Vol. 6; 4- Degree Days, Vol. 4. Atmospheric Environment, Downsview, Ontario.

Expert Committee on Soil Survey. 1987. The Canadian System of Soil Classification. Second Edition. Publ. No. 1646. Research Branch, Agriculture Canada.

MacDonald, K.B., and Valentine, K.W.G. 1992. CanSIS Manual 1 CanSIS/NSDB: A General Description. Land Resource Division, Centre for Land and Biological Resources Research, Research Branch, Agriculture Canada, Ottawa.

Manitoba Land Resource Unit. 1996. Soil and Terrain Classification System Manual. In preparation. Ellis Bldg. University of Manitoba. Winnipeg.

Michalyna, W. and St.Jaques, E. 1989. Soils of the Plum Lakes Project. Soils Report D-81. Canada-Manitoba Soil Survey, University of Manitoba, Winnipeg

PFRA. 1964. Handbook for the Classification of Irrigated Land on the Prairie Provinces. PFRA, Regina, Saskatchewan.

Wishmeier, W.H. and Smith, D.D. 1965. Predicting Rainfall-erosion Loss from Cropland East of the Rocky Mountains. U.S. Department of Agriculture, Agriculture Handbook No. 282, U.S. Government Printing Office, Washington, D.C.

**ADDENDUM****Land Use Map.**

The land use classification of the RM has been interpreted from LANDSAT satellite imagery, using supervised computer classification techniques. Many individual spectral signatures were classified and grouped into the seven general land use classes shown here. Although land use changes over time, and some land use practices on individual parcels may occasionally result in similar spectral signatures, this map provides a general representation of the current land use in the RM.

The following is a brief description of the land use classes are:

**Annual Crop Land** - land that is normally cultivated on an annual basis.

**Forage** - perennial forages, generally alfalfa or clover with blends of tame grasses.

**Grasslands** - areas of native or tame grasses, may contain scattered stands of shrubs.

**Trees** - lands that are primarily in tree cover.

**Wetlands** - areas that are wet, often with sedges, cattails, and rushes.

**Water** - open water-lakes, rivers streams, ponds, and lagoons.

**Urban and Transportation** - towns, roads, railways, quarries.

**Table 10. Land Use<sup>1</sup>**

<b>Class</b>	<b>Area (ha)</b>	<b>Percent of RM</b>
<b>Annual Crop Land</b>	<b>15876</b>	<b>18.1</b>
<b>Forage</b>	<b>4360</b>	<b>5.0</b>
<b>Grasslands</b>	<b>45356</b>	<b>51.7</b>
<b>Trees</b>	<b>13109</b>	<b>14.9</b>
<b>Wetlands</b>	<b>3295</b>	<b>3.8</b>
<b>Water</b>	<b>3388</b>	<b>3.9</b>
<b>Urban and Transportation</b>	<b>2371</b>	<b>2.7</b>
<b>Total</b>	<b>87755</b>	<b>100.0</b>

<sup>1</sup> Land use information (1995) and map supplied by Prairie Farm Rehabilitation Administration. Total area may vary from previous maps due to differences in analytical procedures.



