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Rural Municipality of Dufferin

Information Bulletin 97-20

Soils and Terrain

An introduction
to the land resource

Land Resource Unit
Brandon Research Centre

Canada

Rural Municipality of Dufferin

Information Bulletin 97-20

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Originally Printed November, 1997
Revised June, 1999

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 databases and illustrate several typical derived and interpretive map products for agricultural land use planning applications. The bulletins will also be available in diskette format for each rural municipality.

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

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CITATION

Land Resource Unit, 1999. Soils and Terrain. An Introduction to the Land Resource. Rural Municipality of Dufferin. Information Bulletin 97-20 (Revised), Brandon Research Centre, Research Branch, Agriculture and Agri-Food Canada.

ACKNOWLEDGEMENTS

This project was financially supported in part by the Canada-Manitoba Agreement on Agricultural Sustainability, Prairie Farm Rehabilitation Administration (PFRA), and Agriculture and Agri-Food Canada.

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

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

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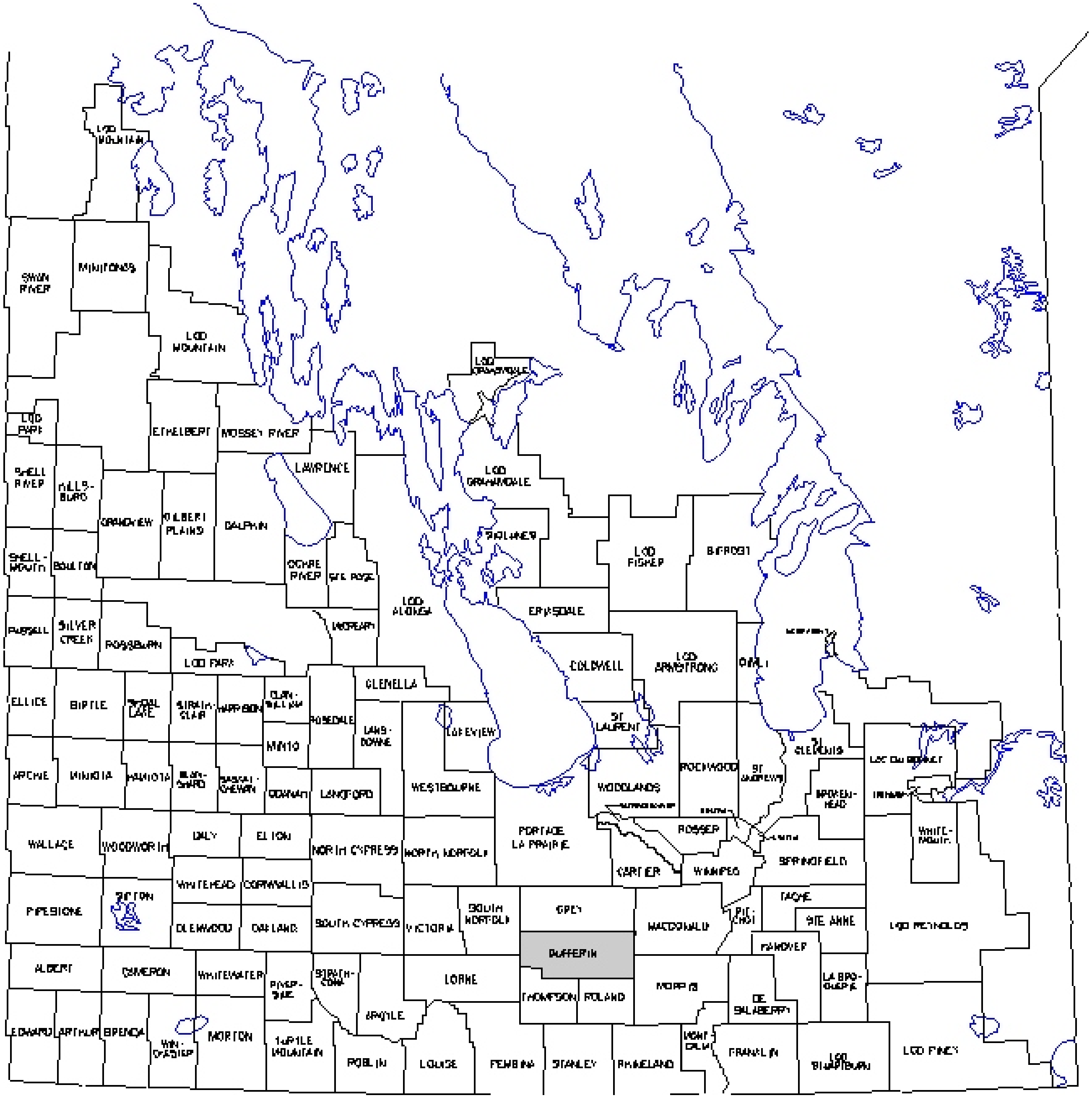


Figure 1. Rural municipalities of southern Manitoba.

INTRODUCTION

The location of the Rural Municipality of Dufferin is shown in Figure 1. A brief overview of the database information assembled, and general environmental conditions for the municipality are presented. A set of maps derived from the data for typical agricultural land use and planning applications are also included.

The soil map and database were compiled and registered using the computerized Geographic Information System (PAMAP GIS) facilities of the Manitoba Land Resource Unit. These databases were used in GIS to create the generalized, derived and interpretive maps and statistics contained in this report. The final maps were compiled and printed using Coreldraw.

This bulletin is available in printed or digital format. The digital bulletin is a Windows based executable file which offers additional display options, including the capability to print any portion of the bulletin.

LAND RESOURCE DATA

The soil and terrain information presented in this bulletin was compiled 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 analysed in two distinct layers as shown in Figure 2.

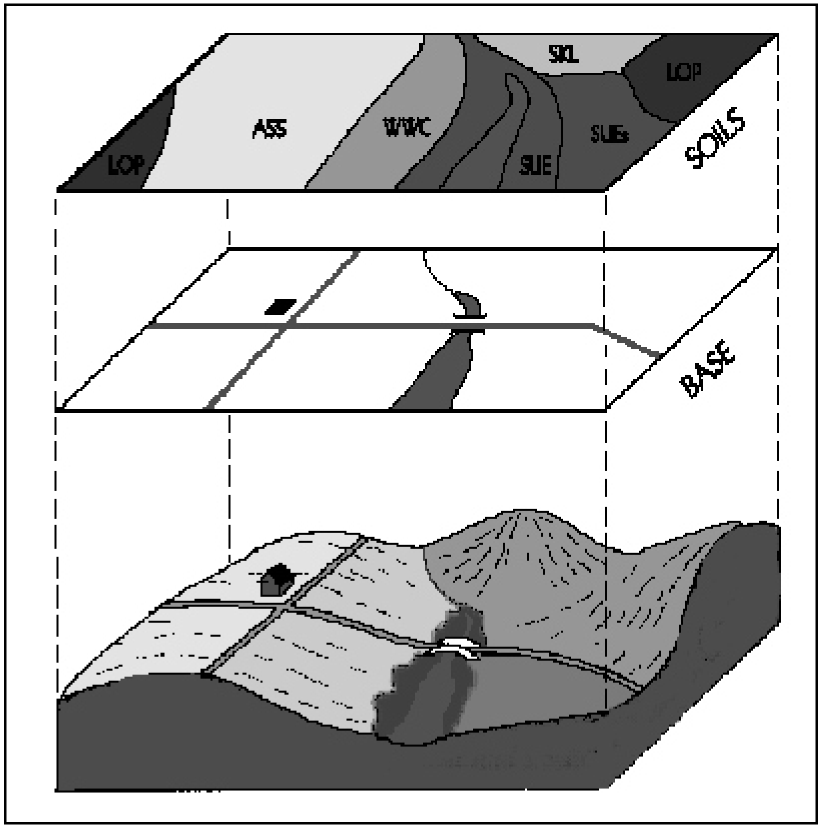


Figure 2. Soil and Base Map data.

Base Layer

Digital base map information includes the municipality and township boundaries, along with major streams, roads and highways. Major rivers and lakes from the base layer were also used as common boundaries for the soil map layer. Water bodies larger than 25 ha in size were digitized as separate polygons.

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. Modern soil series that best represent the soil association were 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. Slope length classes were also added, based on photo-interpretation.

LAND RESOURCE OVERVIEW

The Rural Municipality (RM) of Dufferin covers 9.5 Townships (approximately 87 000 ha) in south-central Manitoba. The town of Carman is the largest population centre. Land use within the rural municipality is predominantly agriculture.

Soils in the municipality have been mapped (1:20 000 scale) previously and published in report D60, Soils of the Rural Municipalities of Grey, Dufferin, Roland, Thompson, and part of Stanley (Michalyna et al, 1988).

Based on climatic data from Graysville (Environment Canada, 1993), mean annual temperature is 2.7˚C; mean annual precipitation is 538.7 mm; average frost-free period is 116 days (Environment Canada, 1982) and growing degree days above 5˚C are 1647. The calculated seasonal moisture deficit between May to September period is 250 to 300 mm; effective growing degree days (EGDD) above 5˚C accumulated from May to September are 1500 to 1600. This parameter provides an indication of heat energy available for crop growth (Agronomic Interpretations Working Group, 1992).

The RM of Dufferin can be split into three physiographic regions; Lower Assiniboine Delta, Red River Valley, and Pembina Escarpment (Canada-Manitoba Soil Survey, 1980). The Lower Assinboine Delta and Red River Valley describe most of the RM, with a small area in the north west corner of Township 6 Range 7 being part of the Pembina Escarpment. The Lower Assiniboine Delta covers the western half of the RM. It is characterized by level to gently undulating lacustrine sands overlying fine textured materials at depths up to 4 m. Soils in this area are dominantly imperfectly drained Almassippi, Willowcrest, and St. Claude (Black Chernozems) with inclusions of poorly drained Lelant (Rego Humic Gleysols). Areas of wind modified lacustrine sands are also common within this area and are represented by well drained Skelding (Orthic Regosol) and imperfectly drained Long Plain (Gleyed Regosol). Areas of coarse loamy textured soils seperate the Lower Assiniboine Delta from the finer textured soils of the Red River Valley. Soils in this area are commonly mapped as the imperfectly drained Reinland series (Gleyed Rego Black) and Kronstal series (Gleyed Black). Poorly drained areas are commonly mapped as Osterwick series (Rego Humic Gleysol). Most soils within the Lower Assiniboine Delta are affected by high water tables.

Capability for dryland agricultural is class 3 and 4 for the imperfectly drained sites and class 5 or 6 in the poorly drained locales. Reinland and Kronstal series are rated class 2 for agricultural capability due to their low water holding capacity. The Lower Assiniboine Delta is generally suitable for irrigation, however, the high water tables and rapid permeability results in a high potential for leaching and adverse environmental impact from irrigation. Theses soils are also very susceptible to wind erosion and proper management of crop residues is needed. As result of increased slope gradients and lower fertility levels, the Skelding and Long Plain series are less suitable for dryland agriculture (class 4 to class 6). These soils are generally not suited for irrigation because of their water holding capacity.

The Eastern Portion of the RM of Dufferin is within the Red River Valley physiographic subsection (Canada-Manitoba Soil Survey, 1980). The Red River Valley is a level to very gently sloping, lacustrine plain characterized by nearly level fluvial lacustrine loams and lacustrine clays. Low relief and medium to fine textured deposits at or near the surface have resulted in imperfect drainage over much of this area. The soils in this area can be desribed by two general groupings based upon surface texture. Areas where the dominant surface texture is clayey are represented by the imperfectly drained Red River, Scanterbury, and Myrtle series (Black Chernozems). Poorly drained sites have been mapped as Osborne series (Rego Humic Gleysol). Soils developed on a thin medium to moderately fine sediment layer overlying fine textured lacustrine sediments are commonly mapped as the imperfectly drained Graysville and Rignold series and the moderately well drained Denham series (Black Chernozems). Alluvial deposits within the immediate vacinity of the Boyne river are commonly mapped as the imperfectly drained Gervais and Fortier series (Gleyed Cumulic Regosols), the well drained La Salle series

(Cumulic Regosol) and the poorly drained Willowbend series (Rego Humic Gleysol).
The finer textured soils in this area have been rated as class 2 and 3 for agricultural capability and fair for irrigation suitability. Excess moisture and the occurence of salinity are generally the main limitations. Soils with a coarser surface texture have slightly improved drainage and are generally rated class 1 and 2 for agricultural capability and good for irrigation suitability.

The south western corner of the RM is characterized by the Pembina Escarpment. This region seperates a bedrock-controlled, hummocky morainic landscape (Pembina Hills) from the Lower Assiniboine Delta and the Red River Valley. Surface deposits consist dominantly of a variable thickness of loamy to fine loamy, slightly stony glacial till over shale bedrock with some coarse textured glacial fluvial deposits. Coarse textured glacial fluvial deposits are overlain by loamy lacustrine deposits in localized areas. Dark Gray Chernozems and Luvisols dominate on the well drained, moderately permeable soils developed in till. In the upland areas runoff is rapid and the water table is usually well below the rooting depth. These areas are commonly mapped as Dezwood (Orthic Dark Gray), Oakley (Orthic Dark Gray), and Pembina (Dark Gray Luvisol) series. The imperfectly drained Ullrich soils (Gleyed Black) are common on gentle slopes where the till is overlain by shallow lacustrine deposits. Coarse textured glacial fluvial deposits in this area are mapped as the rapidly drained Leary series (Orthic Dark Gray). Areas of gently sloping loam or coarse loamy sediments over coarse textured glacial fluvial deposits occur within the Pembina Escarpment. The well drained Vandal series (Orthic Dark Gray) and Trinton series (Orthic Dark Gray Luvisol) are the dominant soils mapped in these areas. Several streams dissect the Pembina Escarpment. Due to their erosional origins these channels are undifferentiated and classified as Eroded Slope Complex. Steeply sloping uplands are mostly wooded, although some areas have been cleared for grazing. Gently sloping uplands are mostly deforested and cultivated for cereal crop production.

Capability for dryland agriculture is class 2 or 3 for gently sloping soils developed on glacial till. The main linitation in these areas is topography. These soils are rated fair to poor for irrigation due to both landscape and soil factors. Soils developed on coarse textured materials have an agriculture capability class of 5 while soils with a loamy overlay on the coarse materials are rated as class 3. The main limitaion is low moisture holding capacity for soils with a coarse surface or subsurface texture. Suitability for irrigation is good for the Vandal and Trinton series while the Leary is rated poor due to its poor water holding capacity.

Land use in the RM of Dufferin is primarily agricultural with small areas of woodland, pasture, urban development and recreation. Annual crops occupy about 76.0% of the land in the RM. The remaining areas are in forest (6.9%), grassland (9.3%) and forage production (2.2%) most of which are used for livestock production. The remainder (5.6%) is being utilized for various non-agricultural applications.

Fine and moderately fine textured soils within the RM of Dufferin require the maintenance of adequate surface drainage, soil structure and tilth. Clayey soils of the Red River Valley have slow to very slow permeability, high shrink-swell properties and are very plastic. They are subject to surface ponding and slow runoff unless adequate drainage is provided. The sandy, moderately coarse or loamy textured soils of the Lower Assiniboine Delta and Red River Valley require careful management to reduce the risk of wind erosion. These soils have moderate to moderately rapid permeability, seasonal high water table or a saturation zone above the clay subsoil particularly in spring or following heavy rains.

DERIVED AND INTERPRETIVE MAPS

A large variety of computer derived and interpretive maps can be generated from the digital soil and landscape databases. 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 drainage, soil salinity, or slope class).

Interpretive maps portray more complex land evaluations based on a combination of soil and landscape information. Interpretations are based on soil and landscape conditions in each polygon. Interpretative maps typically show land capabilities, suitabilities, or risks related to sustainability.

Several examples of derived and interpretive maps are included in this information bulletin:

Derived Maps
Slope Classes
Surface Texture
Drainage
Salinity
Management Consideration

Interpretative Maps
Agricultural Capabilities
Irrigation Suitability
Potential Environmental Impact
Water Erosion Risk
Land Use.

The maps have all been reduced in size and generalized (simplified) in order to portray conditions for an entire rural municipality on one page. These generalized maps provide a useful overview of conditions within a municipality, but are not intended to apply to site specific land parcels. On-site evaluations are recommended for localized site specific land use suitability requirements.

Digital databases derived from recent detailed soil inventories contain additional detailed information about significant inclusions of differing soil and slope conditions in each map polygon. This information can be portrayed at larger map scale than shown in this bulletin.

Information concerning particular interpretive maps, and the primary soil and terrain map data, can be obtained by contacting the Manitoba Soil Resource Section of Manitoba Agriculture, the local PFRA office, or the Manitoba Land Resource Unit.

Slope Map.

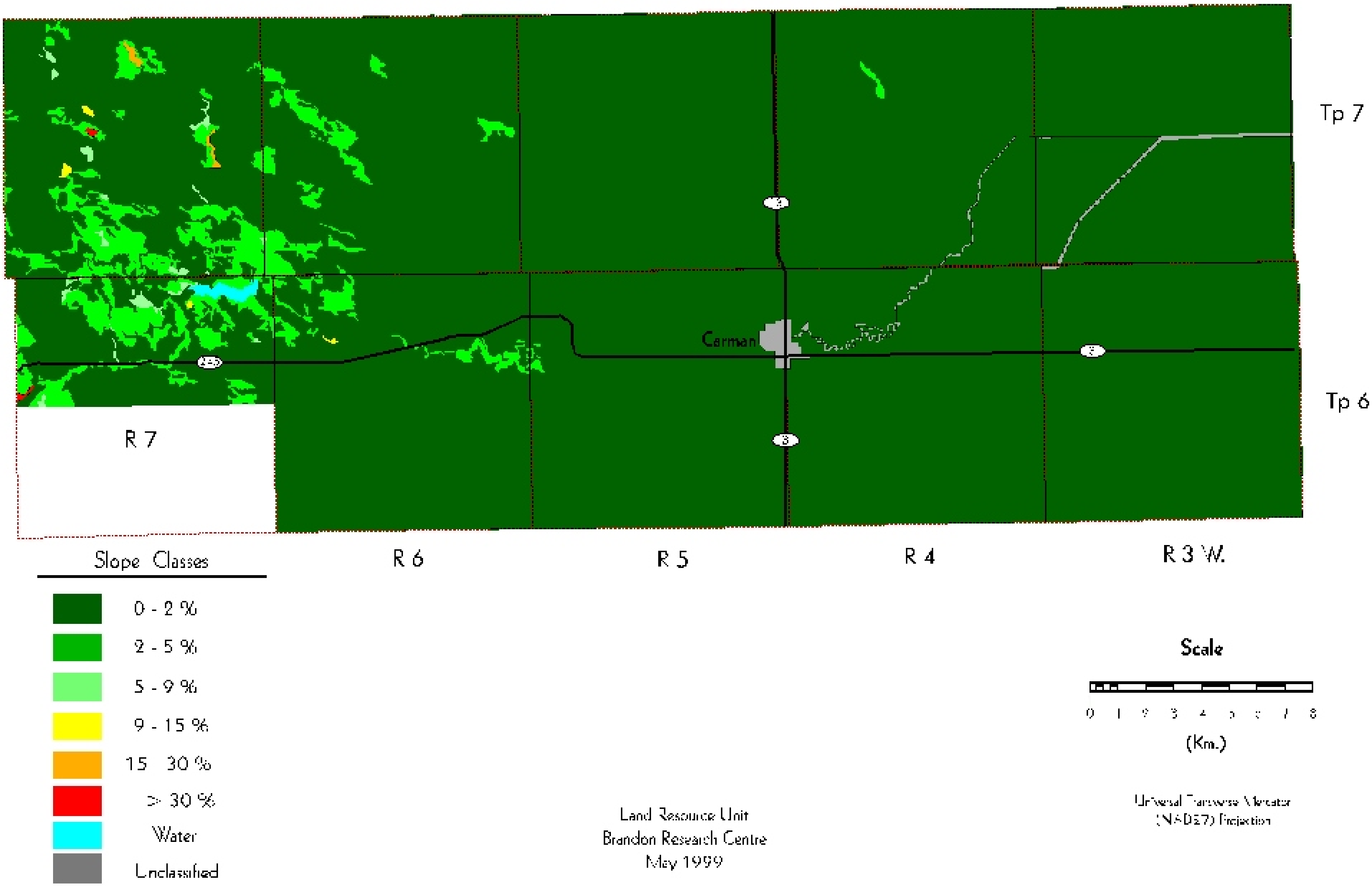
Slope describes the steepness of the landscape surface. The slope classes shown on this map are derived from the digital soil layer database. Specific colours are used to indicate the dominant slope class for each soil polygon in the RM. Additional slope classes may occur in each polygon area, but cannot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

Table 1. Slope Classes[1]

Slope Class	Area (ha)	Percent of RM
0 - 2 %	87361	94.6
2 - 5 %	4155	4.5
5 - 9 %	229	0.2
9 - 15 %	42	0.0
15 - 30 %	51	0.1
> 30 %	23	0.0
Unclassified	394	0.4
Water	120	0.1
Total	92375	100.0

[1] 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.

Slope Map


Tp 7
Tp 6
Carman
R 7
R 6
R 5
R 4
R 3 W.
Slope Classes
0 - 2 %
2 - 5 %
5 - 9 %
9 - 15 %
15 30 %
> 30 %
Water
Unclassified
Scale
(Km.)
Land Resource Unit
Brandon Research Centre
May 1999

Surface Texture Map.

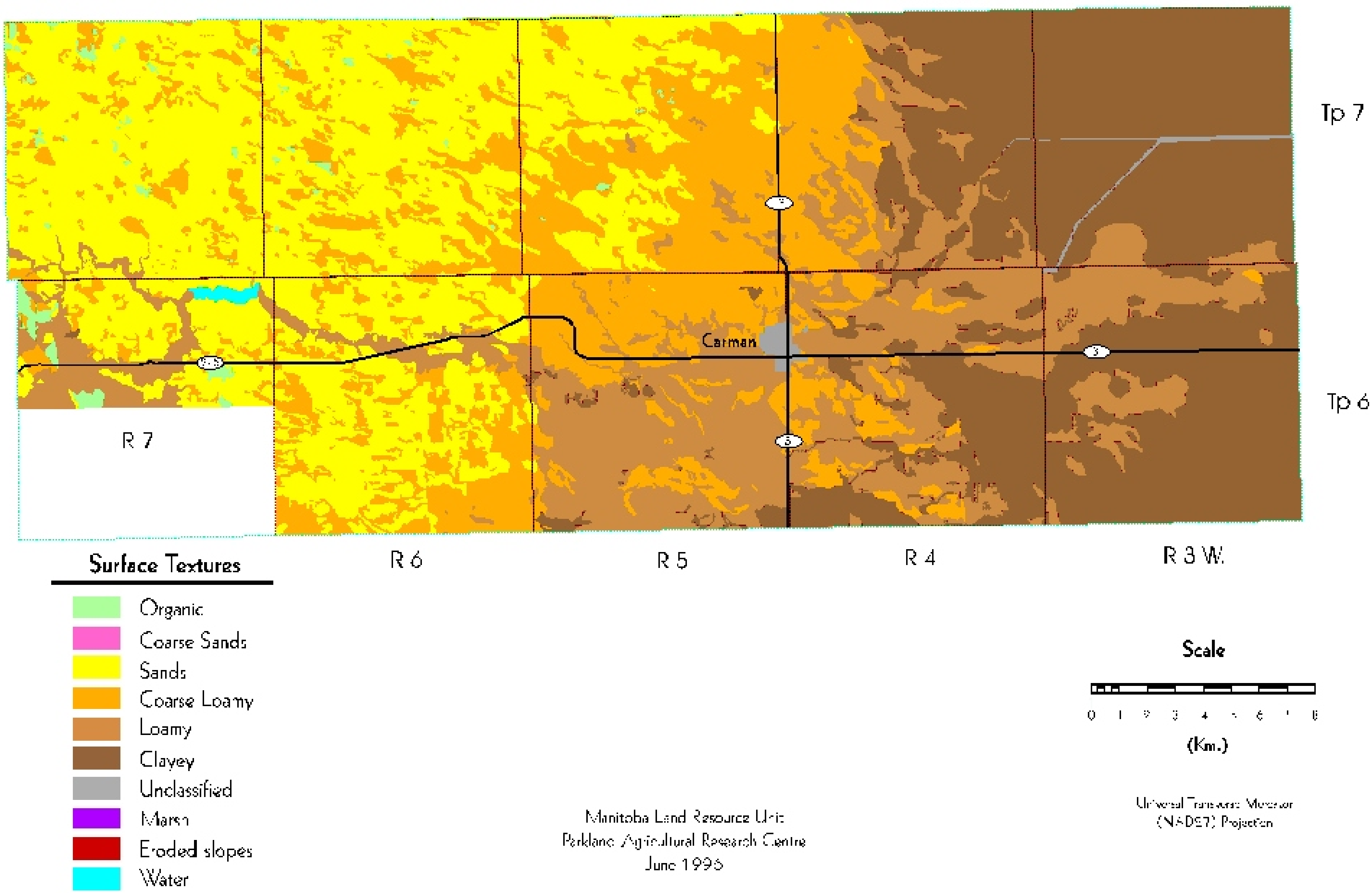
The soil textural class for the upper most soil horizon of the dominant soil series within a soil polygon was utilized for classification. Texture may vary from that shown with soil depth and location within the polygon.

Table 2. Surface Texture[1]

Surface Texture	Area (ha)	Percent of RM
Organics	566	0.6
Coarse Sands	0	0.0
Sands	27612	29.9
Coarse Loamy	20975	22.7
Loamy	17722	19.2
Clayey	24985	27.0
Eroded Slopes	0	0.0
Marsh	0	0.0
Unclassified	394	0.4
Water	120	0.1
Total	92375	100.0

[1] Based on the **dominant** soil series for each soil polygon.

Surface Texture Map



Soil Drainage Map.

Drainage is described on the basis of actual moisture content in excess of field capacity, and the length of the saturation period within the plant root zone. Six drainage classes plus four land classes are shown on this map.

Very Poor - Water is removed from the soil so slowly that the water table remains at or on the soil surface for the greater part of the time the soil is not frozen. Excess water is present in the soil throughout most of the year.

Poor - Water is removed so slowly in relation to supply that the soil remains wet for a large part of the time the soil is not frozen. Excess water is available within the soil for a large part of the time.

Imperfect - Water is removed from the soil sufficiently slowly in relation to supply to keep the soil wet for a significant part of the growing season. Excess water moves slowly down the profile if precipitation is the major source.

Moderately Well - Water is removed from the soil somewhat slowly in relation to supply. Excess water is removed somewhat slowly due to low perviousness, shallow water table, lack of hydaulic gradient, or some combination of these.

Well - Water is removed from the soil readily but not rapidly. Excess water flows downward readily into underlying materials or laterally as subsurface flow.

Rapid - Water is removed from the soil rapidly in relation to supply. Excess water flows downward if underlying material is pervious. Subsurface flow may occur on steep slopes during heavy rainfall.

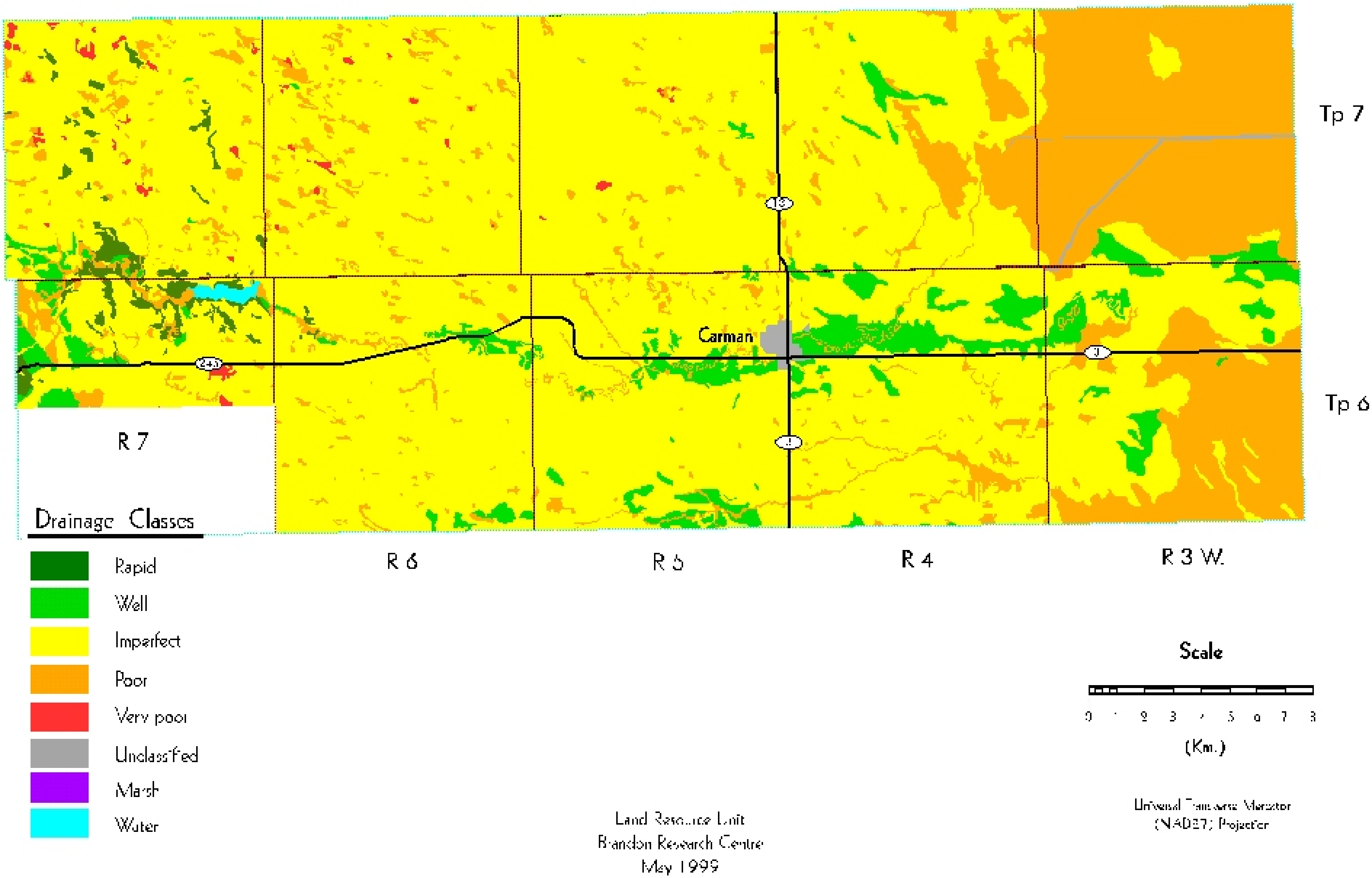
Drainage classification is based on the dominant soil series within each individual soil polygon.

Table 3. Drainage Classes[1]

Drainage Class	Area (ha)	Percent of RM
Very Poor	331	0.4
Poor	18446	20.0
Imperfect	67633	73.2
Well	4477	4.8
Rapid	973	1.1
Marsh	0	0.0
Unclassified	394	0.4
Water	120	0.1
Total	92375	100.0

[1] Area has been assigned to the dominant drainage class for each soil polygon. Salinity may be present in localized areas too small to present at this generalized scale.

Soil Drainage Map



Soil Salinity Map.

A saline soil contains soluble salts in such quantities that they interfere with the growth of most crops. Soil salinity is determined by the electrical conductivity of the saturation extract in decisiemens per metre (dS/m). Approximate limits of salinity classes are:

non-saline	< 4 dS/m
slightly saline	4 to 8 dS/m
moderately saline	8 to 16 dS/m
strongly saline	> 16 dS/m.

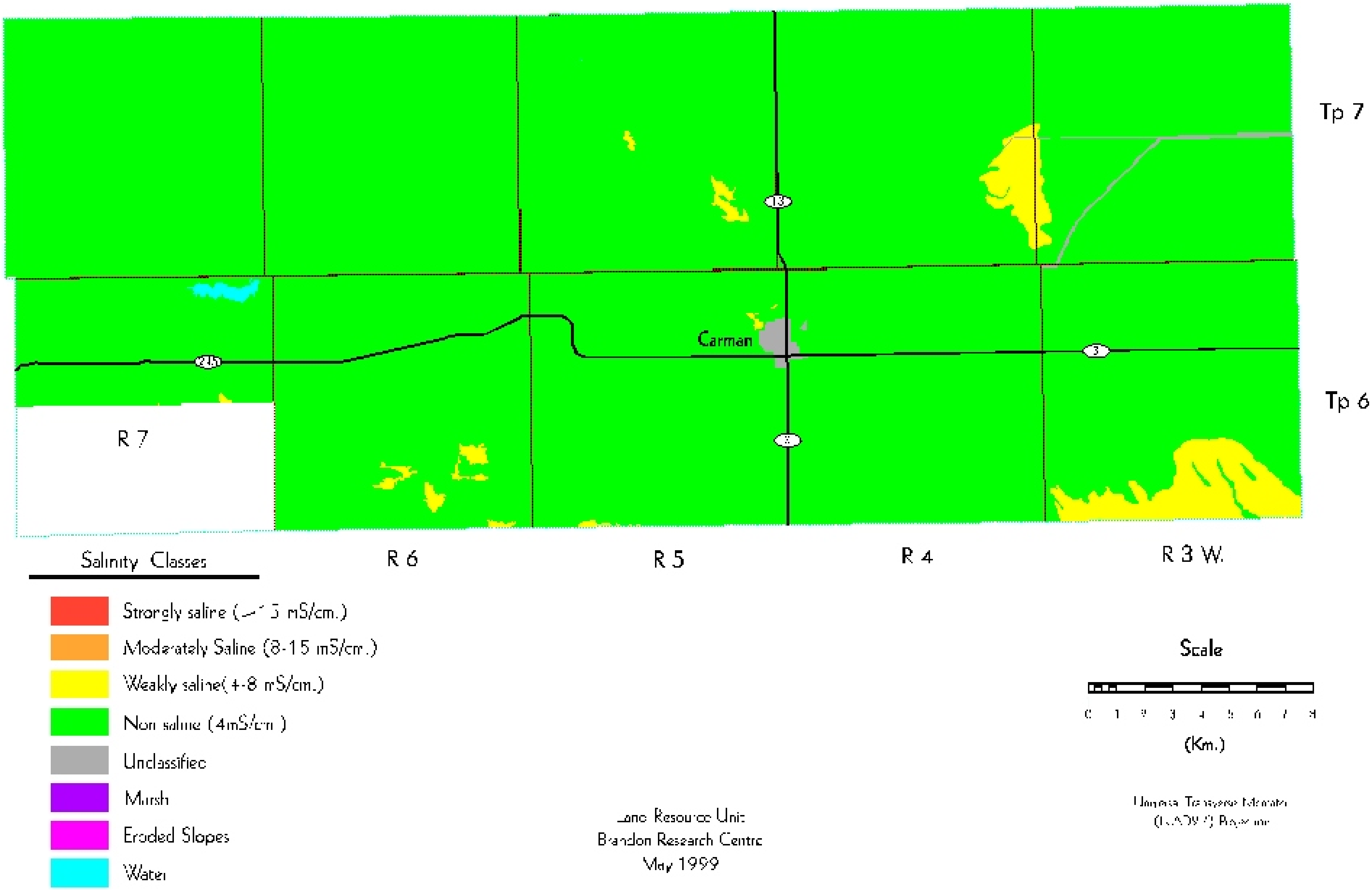
The salinity classification of each individual soil polygon was determined by the most severe salinity classification present within that polygon.

Table 4. Salinity Classes[1]

Salinity Class	Area (ha)	Percent of RM
Non Saline	89197	96.6
Weakly Saline	2664	2.9
Moderately Saline	0	0.0
Strongly Saline	0	0.0
Eroded Slopes	0	0.0
Marsh	0	0.0
Unclassified	394	0.4
Water	120	0.1
Total	92375	100.0

[1] Area has been assigned to the most severe salinity class for each soil polygon.

Soil Salinity Map



Management Considerations Map.

Management consideration maps are provided to focus on awareness of land resource characteristics important to land use. This map does not presume a specific land use. Rather it portrays the most common and wide spread attributes that apply to most soil landscapes in the province.

These maps **highlight attributes** of soil-landscapes that the land manager must consider for any intended land use.

- **Topography**
- **Wetness**
- **Coarse texture**
- **Medium texture**
- **Fine texture**
- **Organic**
- **Bedrock**

F = Fine texture - soil landscapes that have **fine textured soils (clays and silty clays)**, and thus low infiltration and internal permeability, require special considerations to mitigate surface ponding (water logging), runoff, trafficability. Timing and type of tillage practices used may be restricted.

C = Coarse texture - soil landscapes that have **coarse to very coarse textured soils (loamy sands, sands and gravels)**, and hence a high permeability throughout the profile, require special management practices related to application of agricultural chemicals, animal wastes, and municipal effluent to protect and sustain the long term quality of the soil and water resources. The risk of soil erosion can be minimized through the use of shelterbelts and maintenance of crop residues.

M = Medium texture - soil landscapes that have medium to moderately fine texture **(loams to clay loams)**, and hence have good water and nutrient retention properties, require good management and cropping practices to minimize leaching and the risk of erosion.

T = Topography - soil landscapes with **slopes greater than 5 %** are steep enough to require special management practices to minimize the risk of erosion.

W = Wetness - soil landscapes that have **poorly drained soils and/or >50 % wetlands** (due to seasonal and annual flooding, surface ponding, permanent water bodies (sloughs), and/or high water tables), require special management practices to mitigate adverse impact on water quality, protect subsurface aquifers, and sustain crop production during periods of high risk of water logging.

O = Organic - soil landscapes that have organic soils, require special management considerations of drainage, tillage, and cropping to sustain productivity and minimize subsidence and erosion.

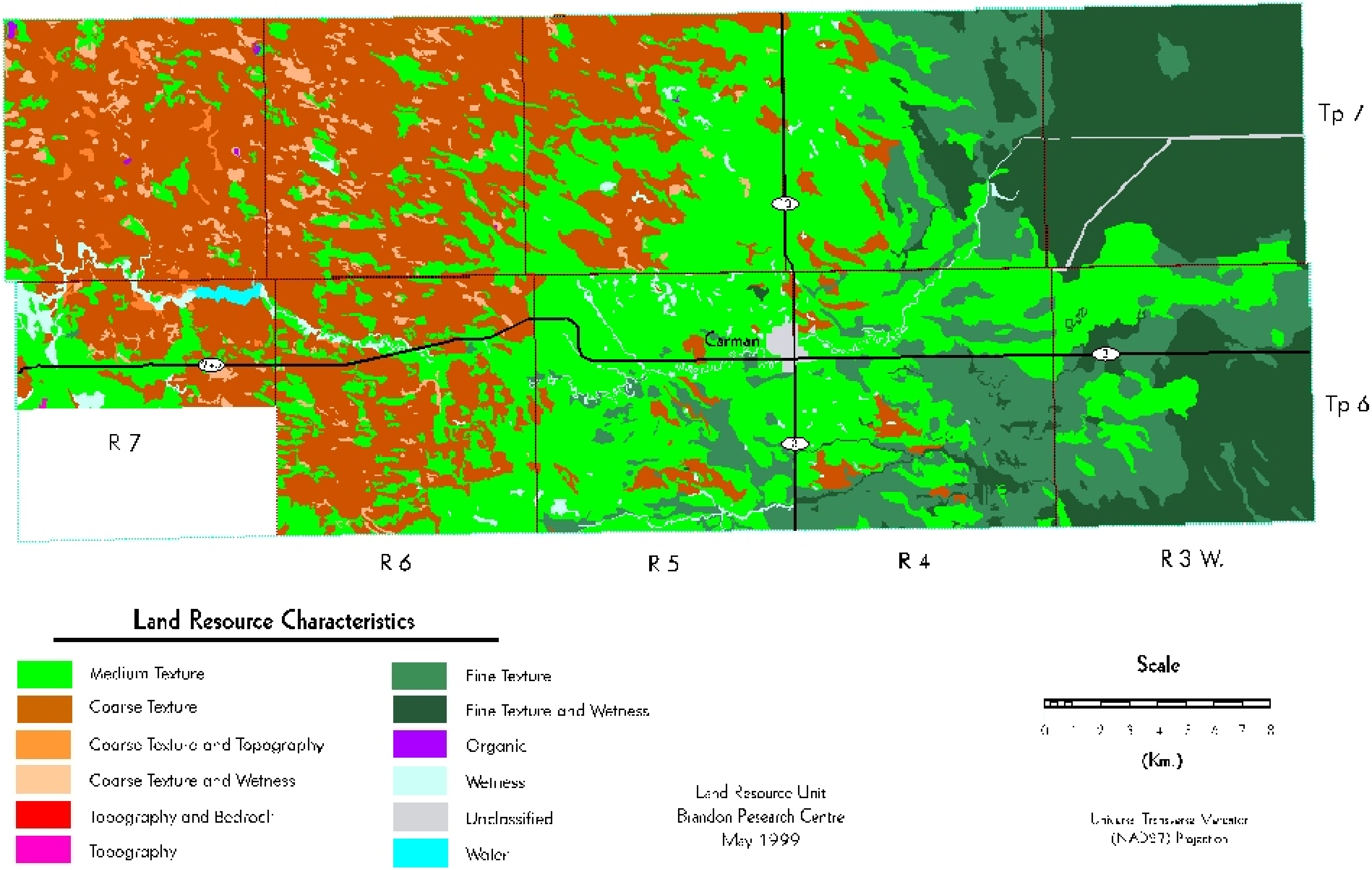
R = Bedrock - soil landscapes that have shallow depth to bedrock (< 50 cm) and/or exposed bedrock which may prevent the use of some or all tillage practices as well as the range of potential crop. They require special cropping and management practices to sustain agricultural production.

Table 5. Management Considerations[1]

Land Resource Characteristics	Area (ha)	Percent of RM
Fine Texture	11608	12.6
Fine Texture and Wetness	15121	16.4
Fine Texture and Topography	0	0.0
Medium Texture	32291	35.0
Coarse Texture	28979	31.4
Coarse Texture and Wetness	2030	2.2
Coarse Texture and Topography	322	0.3
Topography	11	0.0
Topography and Bedrock	12	0.0
Bedrock	0	0.0
Wetness	1452	1.6
Organic	35	0.0
Marsh	0	0.0
Unclassified	394	0.4
Water	120	0.1
Total	92375	100.0

[1] Based on **dominant** soil series for each soil polygon.

Management Considerations 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, class 4 land is marginal for sustained cultivation, class 5 land is capable of perennial forages and improvement is feasible, class 6 land is capable of producing native forages and pasture but improvement is not feasible, and class 7 land is considered unsuitable for dryland agriculture. Subclass modifers include structure and/or permeability (D), erosion (E), inundation (I), moisture limitation (M), salinity (N), stoniness (P), consolidated bedrock (R), topography (T), excess water (W) and cumulative minor adverse characteristics (X).

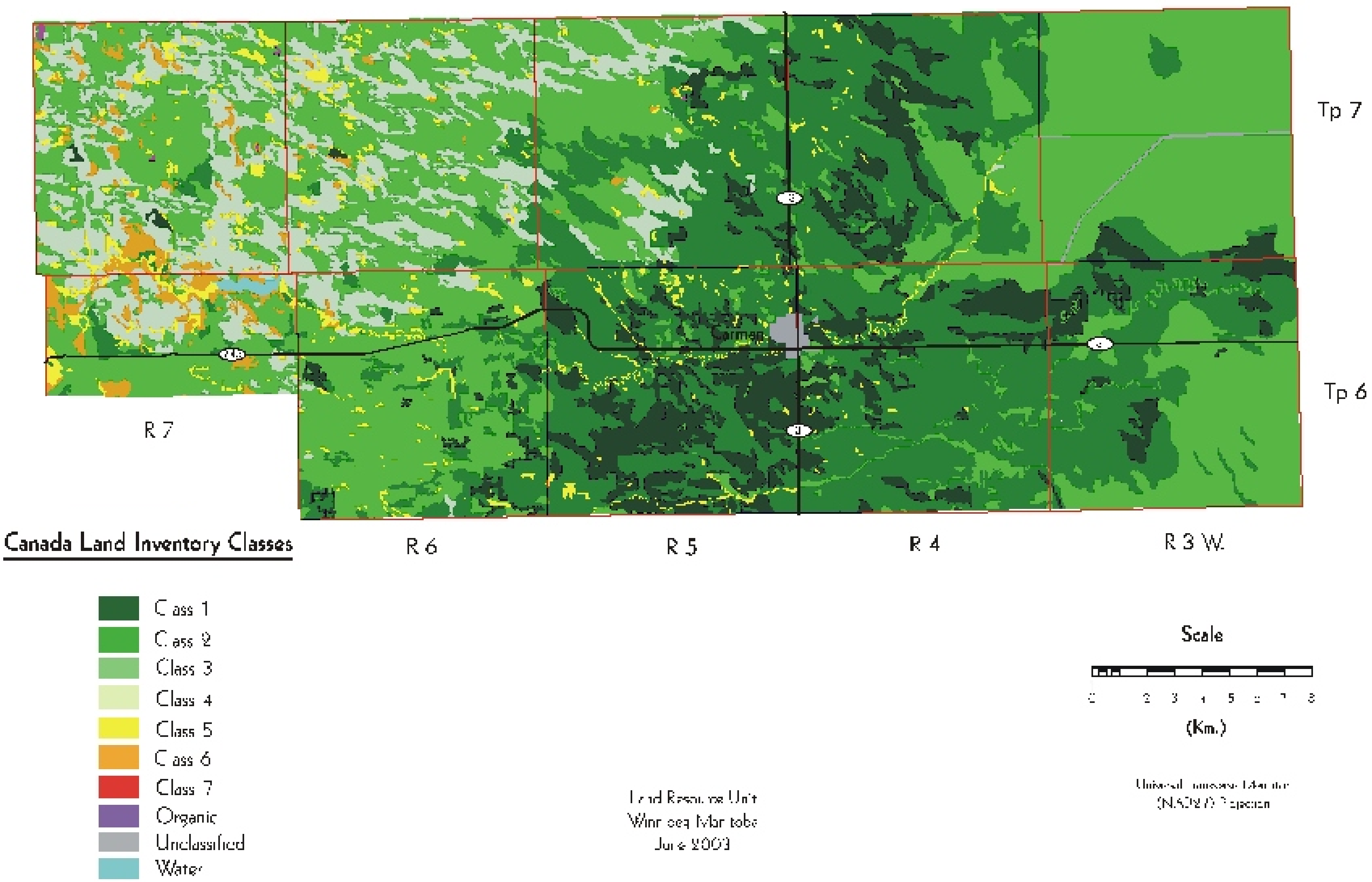
This generalized interpretive map is based on the dominant soil series and phases for each soil polygon. The CLI subclass limitations cannot be portrayed at this generalized map scale.

Table 6. Agricultural Capability[1]

Class Subclass	Area (ha)	Percent of RM
1	**8835**	**9.6**
2	**29350**	**31.8**
2DW	84	0.1
2I	757	0.8
2M	12487	13.5
2MT	51	0.1
2TI	41	0.0
2TW	12	0.0
2W	15918	17.2
3	**39565**	**42.8**
3I	2531	2.7
3M	17636	19.1
3ME	95	0.1
3N	197	0.2
3NW	1413	1.5
3TE	11	0.0
3W	17681	19.1
4	**10093**	**10.9**
4IW	10	0
4M	9358	10.1
4ME	204	0.2
4MT	8	0.0
4W	514	0.6
5	**2517**	**2.7**
5M	82	0.1
5W	1714	1.9
5WI	721	0.8
6	**1441**	**1.6**
6M	891	1.0
6MT	11	0.0
6TE	12	0.0
6W	307	0.3
6WI	220	0.2
Unclassified	**394**	**0.4**
Water	**120**	**0.1**
Organic	**35**	**0.0**
Total	**92349**	**100.0**

[1] Based on **dominant** soil, slope gradient, and slope length of each soil polygon.

Agriculture Capability Map



Irrigation Suitability Map.

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 factors are described by subclass symbols at detailed map scales. The irrigation rating system does not consider water availability, method of application, water quality, or economics of irrigated land use.

Irrigation suitability is a four class rating system. Areas with no or slight soil and/or landscape limitations are rated **Excellent** to **Good** and can be considered irrigable. Areas with moderate soil and/or landscape limitations are rated as **Fair** and considered marginal for irrigation providing adequate management exists so that the soil and adjacent areas are not adversely affected by water application. Soil and landscape areas rated as **Poor** have severe limitations for irrigation.

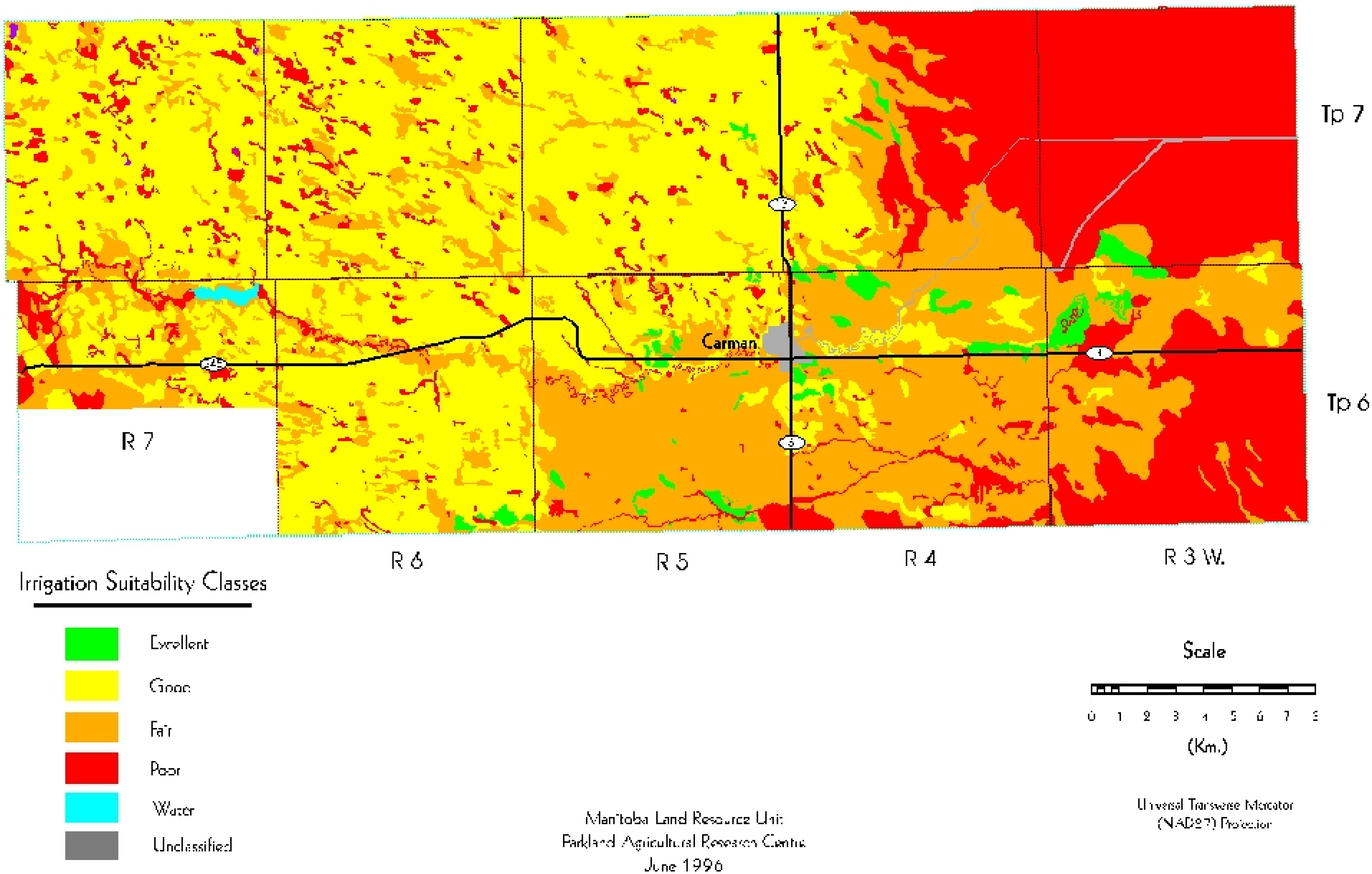
This generalized interpretive map is based on the dominant soil series for each soil polygon, in combination with the dominant slope class. The nature of the subclass limitations and the classification of subdominant components is not shown at this generalized map scale.

Table 7. Irrigation Suitability[1]

Class	Area (ha)	Percent of RM
Excellent	1368	1.5
Good	40974	44.4
Fair	26291	28.5
Poor	23193	25.1
Organic	35	0.0
Unclassified	394	0.4
Water	120	0.1
Total	92375	100.0

[1] Based on **dominant** soil, slope gradient, and slope length of each soil polygon.

Irrigation Suitability Map



Potential Environmental Impact Under Irrigation Map.

A major concern for land under irrigated crop production is the possibility that surface and/or ground water 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. Several factors are specifically considered: soil texture, hydraulic conductivity, salinity, geological uniformity, depth to water table and topography. The risk of altering surface and subsurface soil drainage regimes, soil salinity, potential for runoff, erosion and 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.

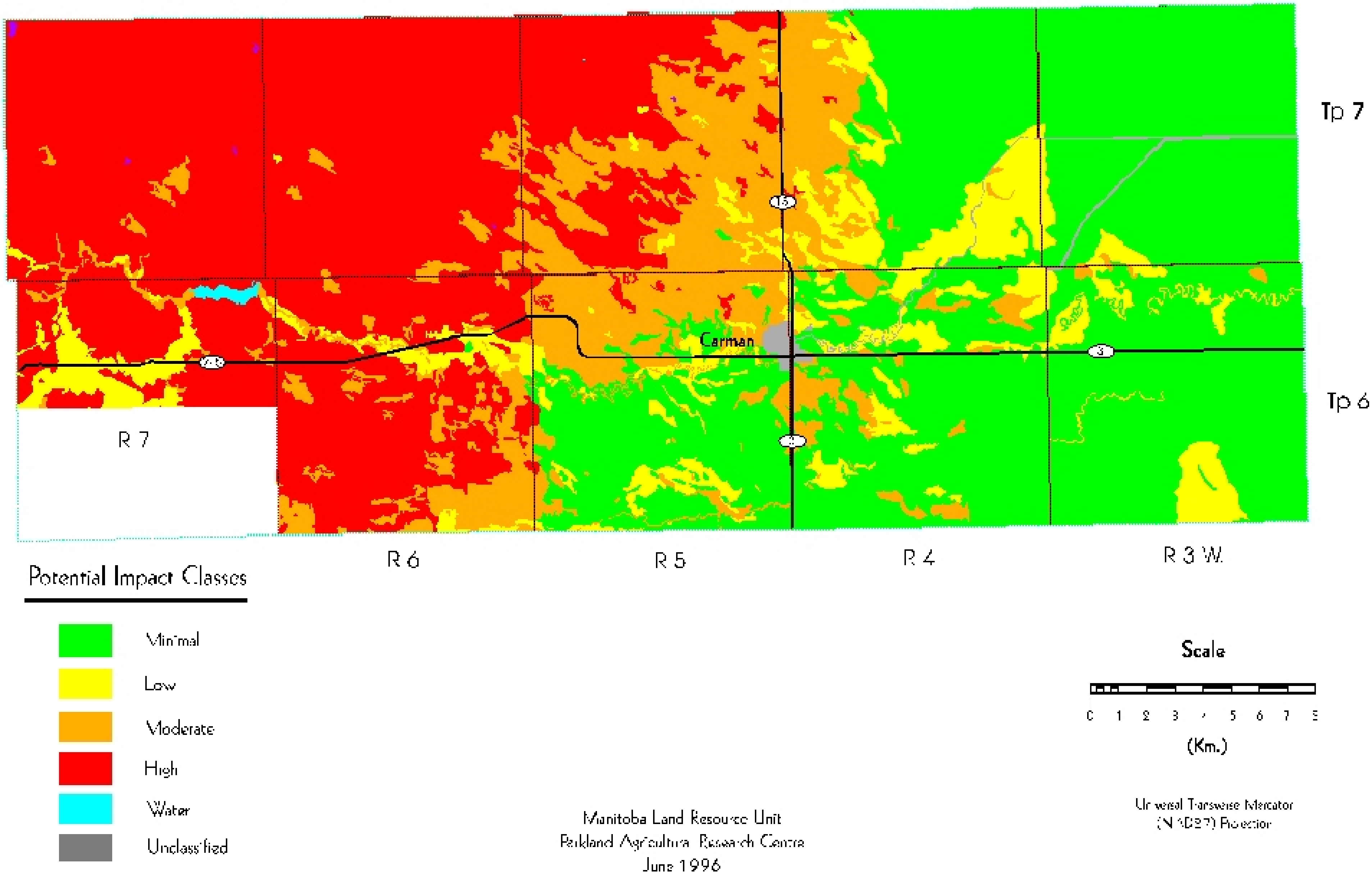
This generalized interpretive map is based on the dominant soil series and slope class for each soil polygon. The nature of the subclass limitations, and the classification of subdominant components is not shown at this generalized map scale.

Table 8. Potential Environmental Impact Under Irrigation[1]

Class	Area (ha)	Percent of RM
Minimal	**34969**	**37.9**
Low	**8283**	**9.0**
Moderate	**14641**	**15.8**
High	**33933**	**36.7**
Organic	**35**	**0.0**
Unclassified	**394**	**0.4**
Water	**120**	**0.1**
Total	**92375**	**100.0**

[1] Based on **dominant** soil, slope gradient, and slope length of each soil polygon.

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.

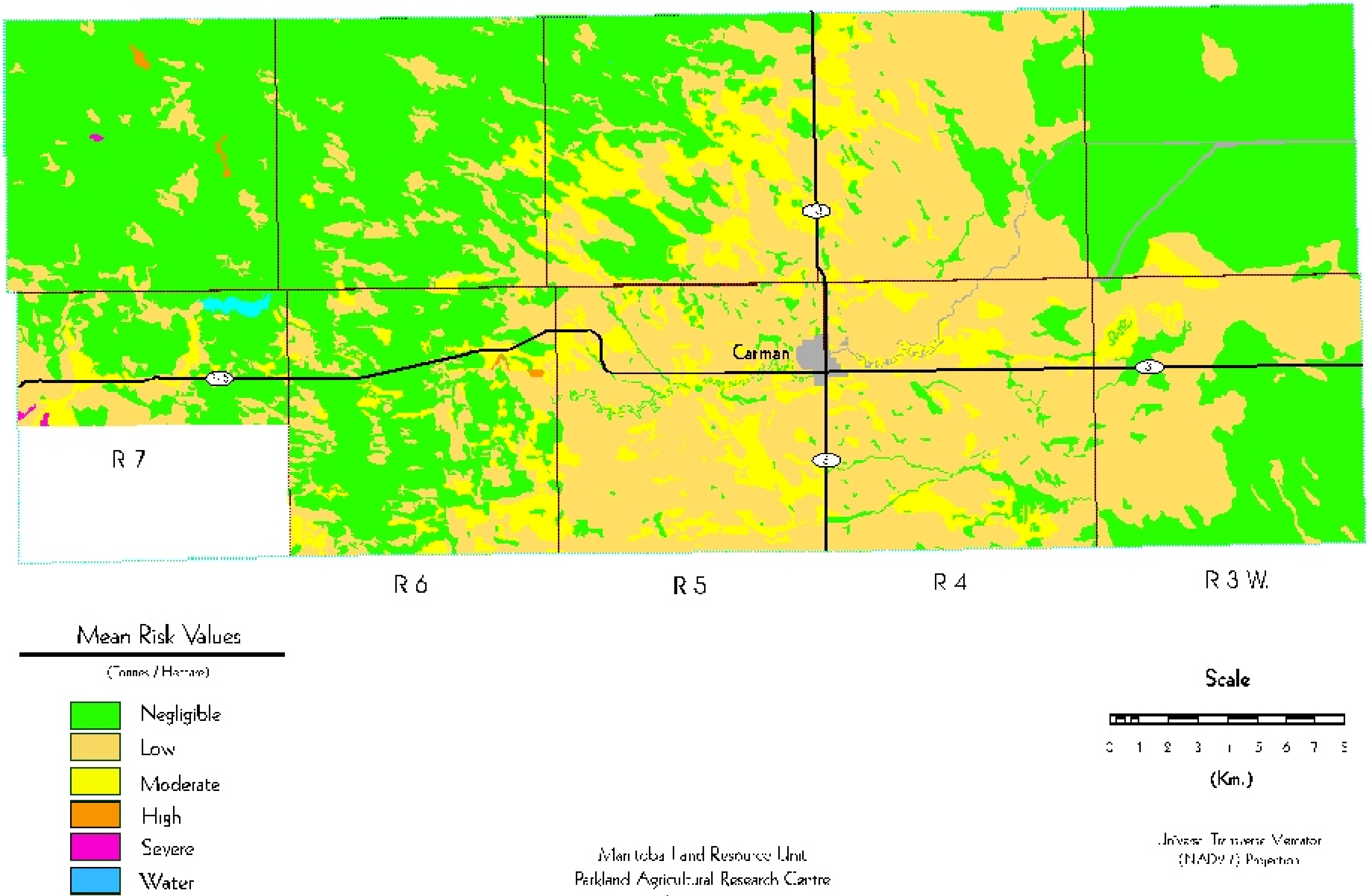
Cropping and residue management practices will significantly reduce this risk depending on crop rotation program, soil type, and landscape features.

Table 9. Water Erosion Risk[1]

Class	Area (ha)	Percent of RM
Negligible	**46316**	**50.1**
Low	**36341**	**39.3**
Moderate	**9093**	**9.8**
High	**76**	**0.1**
Severe	**34**	**0.0**
Unclassified	**394**	**0.4**
Water	**120**	**0.1**
Total	**92375**	**100.0**

[1] Based on **dominant** soil, slope gradient, and slope length of each soil polygon.

Water Erosion Risk Map



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:

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.

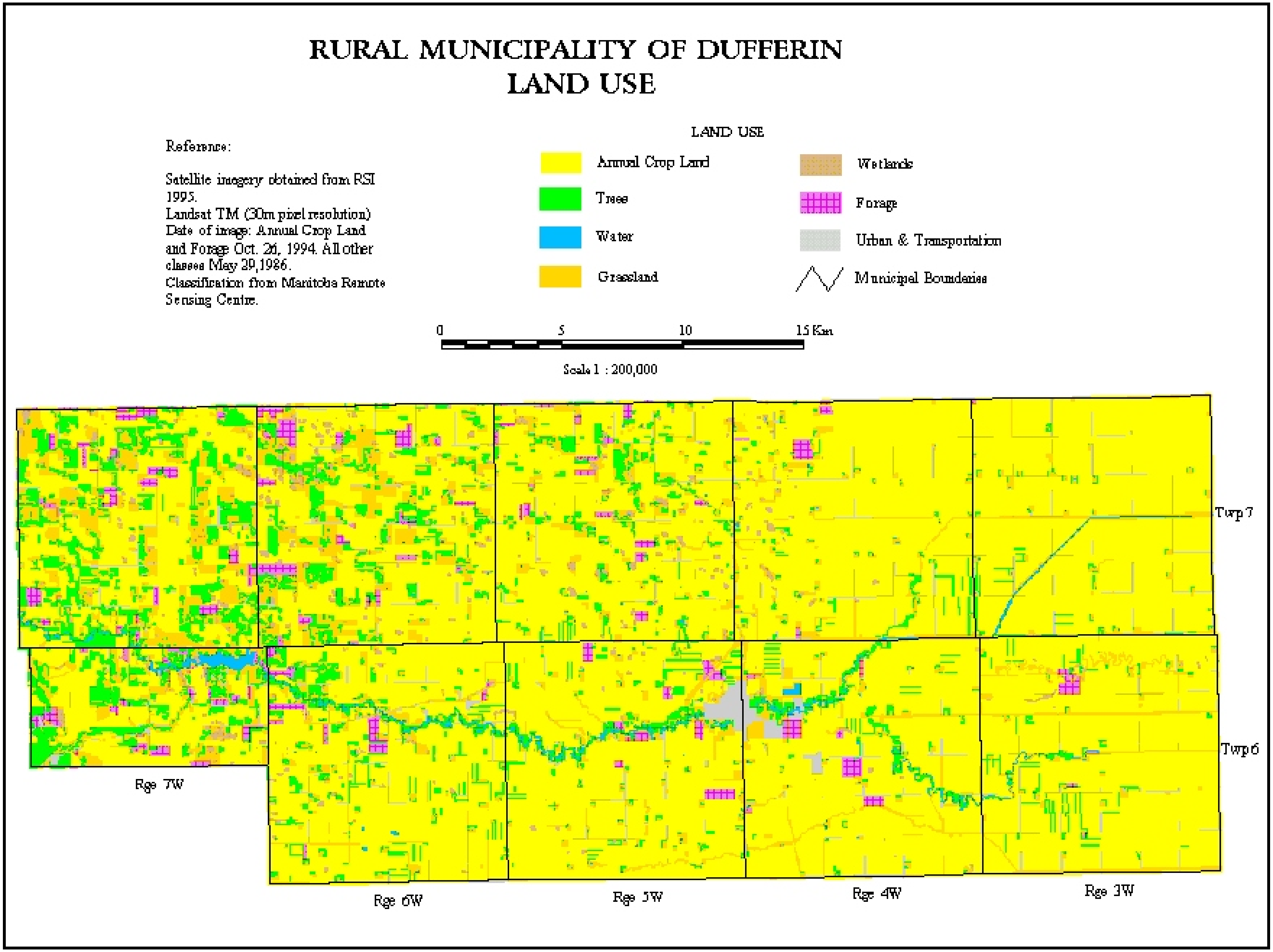
Water - open water - lakes, rivers streams, ponds, and lagoons.

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

Table 10. Land Use[1]

Class	Area (ha)	Percent of RM
Annual Crop Land	70657	76.0
Forage	2010	2.2
Grasslands	8676	9.3
Trees	6460	6.9
Wetlands	668	0.7
Water	491	0.5
Urban and Transportation	4054	4.4
Total	93016	100.0

[1] Land use information (1995) and map supplied by PrairieFarm Rehabilitation Administration. Areas may vary from previous maps due to differences in analytical procedures.


RURAL MUNICIPALITY OF DUFFERIN
LAND USE
Reference:
Satellite imagery obtained from RSI 1995.
Landsat TM (30m pixel resolution)
Date of image: Annual Crop Land and Forage Oct. 26, 1994. All other classes May 29,1986.
Classification from Manitoba Remote Sensing Centre.
LAND USE
Annual Crop Land
Trees
Water
Grassland
Wetlands
Forage
Urban & Transportation
Municipal Boundaries
0
5
10
15 Km
Scale 1 : 200,000
Twp 7
Twp 6
Rge 7W
Rge 6W
Rge 5W
Rge 4W
Rge 3W

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