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Rural Municipality of Portage La Prairie

Information Bulletin 97-22

Soils and Terrain

An introduction to the land resource

Land Resource Unit
Brandon Research Centre

Canada

Rural Municipality of Portage La Prairie

Information Bulletin 97-22

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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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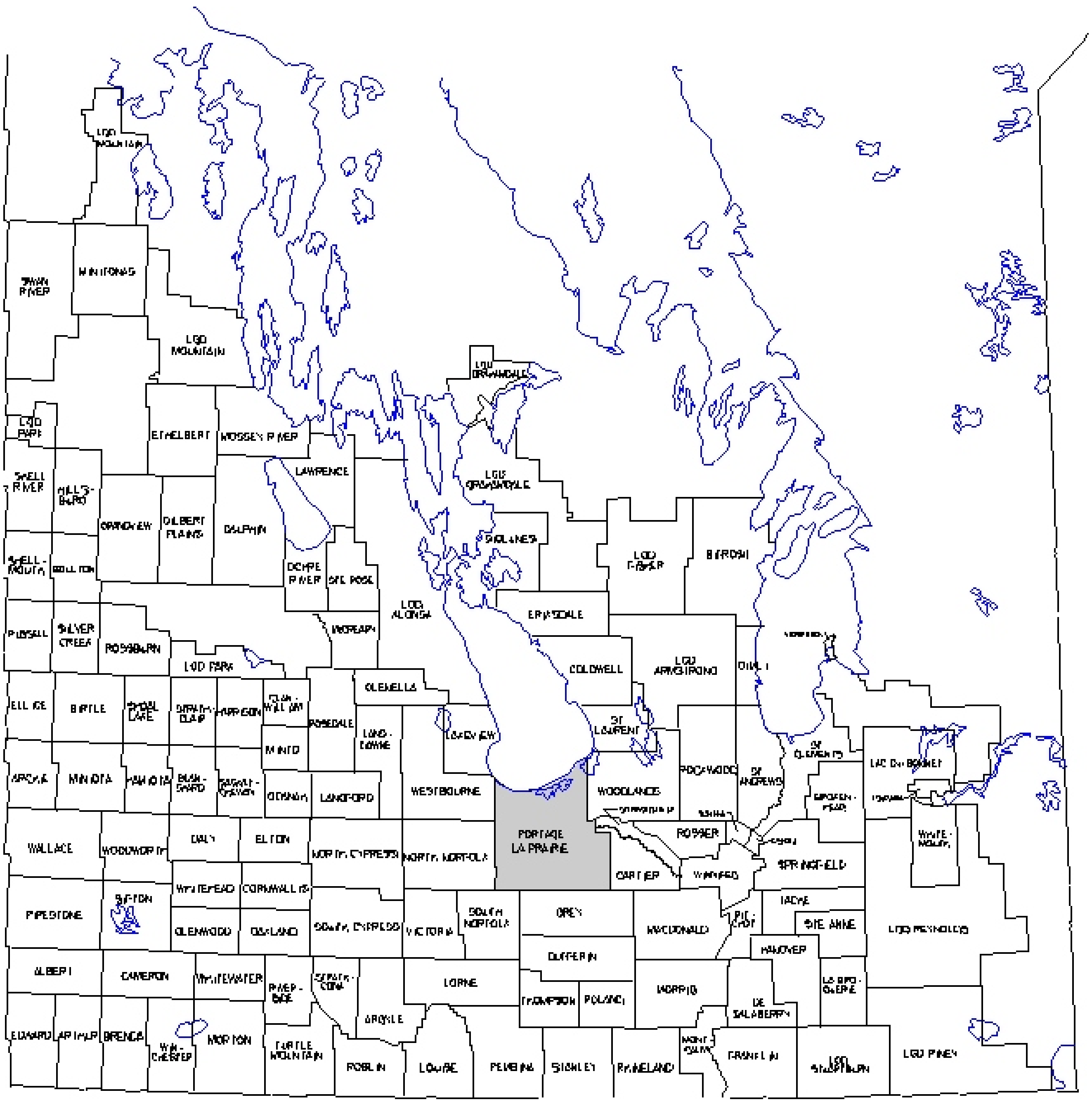


Figure 1. Rural municipalities of southern Manitoba.

INTRODUCTION

The location of the Rural Municipality of Portage La Prairie 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.

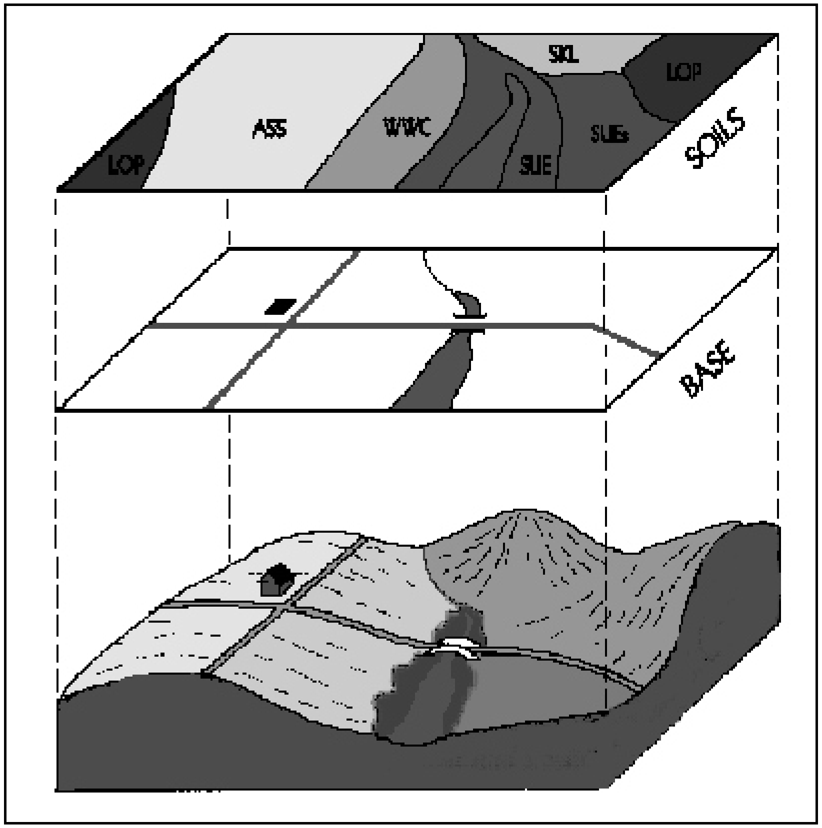


Figure 2. Soil and Base Map data.

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 Portage La Prairie covers 21.5 Townships (approximately 211 000 ha) in south-central Manitoba. The town of Portage La Prairie is the largest population centre. Land use within the rural municipality is predominantly agriculture.

Soils in the municipality have been mapped (1:20 000 and 1:126 720 scale) previously and published in Soils of the West Portage and Macgregor Map Areas Report No. D20 and D44 (Michalyna et al, 1982),Soils of the Portage La Prairie Area Report No.17 (Michalyna and Smith, 1972),Reconnaissance Soil Survey of Carberry Map Sheet Area Report No.7 (Ehrlich et al, 1957) and Detailed-Reconnaissance Soil Survey Of the Fisher and Teulon Map Sheet Areas Report No. 12 (Pratt et al, 1961).

Based on climatic data from Portage La Prairie, mean annual temperature is 2.7˚C; mean annual precipitation is 538.7 mm (Environment Canada, 1993); average frost-free period of 126 days and growing degree days above 5˚C is 1692 (Ash, 1991). The calculated seasonal moisture deficit between May to September period is 250 mm; effective growing degree days (EGDD) above 5˚C accumulated from May to September is 1400 near Lake Manitoba to 1600 in the south east corner of the RM. This parameter provides an indication of heat energy available for crop growth (Agronomic Interpretations Working Group, 1992).

The RM of Portage La Prairie can be divided into four physiographic regions; Lower Assiniboine Delta, Red River Valley, Interlake Plain and Woodlands Plain (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 east corner of the RM being comprised of the Interlake Plain and the Woodlands Plain. The Lower Assiniboine Delta covers the south western corner 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 series (Gleyed Black Chernozems) with inclusions of poorly drained Lelant series (Rego Humic Gleysols). Areas of wind modified lacustrine sands are also common within this area and are represented by well drained Skelding series (Orthic Regosol) and imperfectly drained Long Plain series (Gleyed Regosol). An area 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. These 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 low water holding capacity.

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 soil drainage. The soils in this area can be desribed by two general groupings based on surface texture. Areas where the dominant surface texture is clayey are represented by the imperfectly drained Red River, Scanterbury, Plum Coulee, and Deadhorse series (Gleyed Black and Gleyed Rego Black). The Morris soil series (Gleyed Solonetzic Black) is commonly found associated with these clayey soils. It differs through a poorly structured B horizon high in magnesium and sodium. Poorly drained sites have been mapped as Osborne series (Rego Humic Gleysol). Loamy textured soils developed on recent alluvium found near stream channels are commonly mapped as the well drained La Salle and Elm River series (Cumulic Regosols), imperfectly drained Gervais and Popolar Point series (Gleyed Cumulic Regosols). The poorly drained series associated with these soils is Willowbend series (Rego Humic Gleysol). Fortier series (Gleyed Cumulic Regosol) is commonly mapped on alluvium with clayey textures. The imperfectly drained Gnadenthal and Neuhorst series (Gleyed Carbonated Rego Black) are commonly mapped north of the Assinniboine River on coarse loamy alluvium and deltaic deposits found adjacent to steam channels.

The finer textured soils in this area have been rated as class 2 and 3 for agricultural capability and poor to 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 fair to good for irrigation suitability.

The northern edge of the RM borders on Lake Manitoba. This area is characterized by poorly drained soils, marshes and open water. This area is rated class 7 for agricultural capability and rated poor for irrigation suitability. Primary land use in this area is native grassland or wetlands utilized by wildlife with some forage production.

The Interlake Plain can be found in the north east corner of the RM. Soils in this area are developed on gently undulating, extremely calcareous, loamy glacial and water-worked stoney till. They may also contain a thin overlay of lacustrine sediments. Soils in this area are dominantly well drained loamy textured Isafold series (Rego Black). A significant portion of the area is mapped as the imperfectly drained Lundar series (Gleyed Rego Black)and the poorly drained Clarkleigh series (Rego Humic Gleysol). All three soils can commonly be found in complex soil unit in which Lundar and Clarkleigh represent major inclusions. Localized areas of coarse textured sand and gravel deposits are mapped as Agassiz series (Orthic Black).

Agricultural capability of soils in this region is class 3 for the well drained Isafold and class 4 for the imperfectly drained Lundar. The major limitation being stones on theses soils. The poorly drained Clarkleigh is rated class five for agricultural capability due mostly to excess water. The Agassiz series is rated class 5 due to its low water holding capacity. Soils classified as Isafold are rated Fair for Irrigation suitability. All other soils are rated Poor for irrigation suitability.

The southern edge of the Interlake Plain is separated from the Red River Valley by the Woodlands Plain. The Woodlands Plain is comprised of strongly calcareous loamy to clayey lacustrine sediments underlain by extremely calcareous loamy till within 1 to 2 m. Imperfectly drained locations are commonly mapped as Marquette series (Gleyed Rego Black) or Kline series (Rego Humic Gleysol) in the poorly drained areas. These soils are often found in combination with the clayey soils of the Red River Valley or the Loamy textured soils of the Interlake Plain.

Soils of the woodland plain have an agricultural suitability of class 2 or 3. Suitability for irrigation is considered poor due to their imperfect to poor drainage. These soils have similar characteristics as the clayey textured soils of the Red River Valley.

Land use in the RM of Portage la Prairie is primarily agricultural with small areas of woodland, pasture, urban development and recreation. Annual crops occupy about 60.6% of the land in the RM. The remaining areas are in forest (9.0%), grassland (16.2%) and forage production (2.7%) most of which are used for livestock production. The remainder (11.6%) is being utilized for various non-agricultural applications.

Fine and moderately fine textured soils within the RM of Portage La Prairie 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 surface drainage is provided. The sandy, moderately coarse and loamy textured soils of the Lower Assiniboine Delta, Interlake Plain and Red River Valley require careful management to reduce the risk of wind and water erosion. Soils of the Lower Assinniboine Delta 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:

<u>Derived Maps</u>
Slope Classes
Surface Texture
Drainage
Salinity
Management Consideration

<u>Interpretative Maps</u>
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.

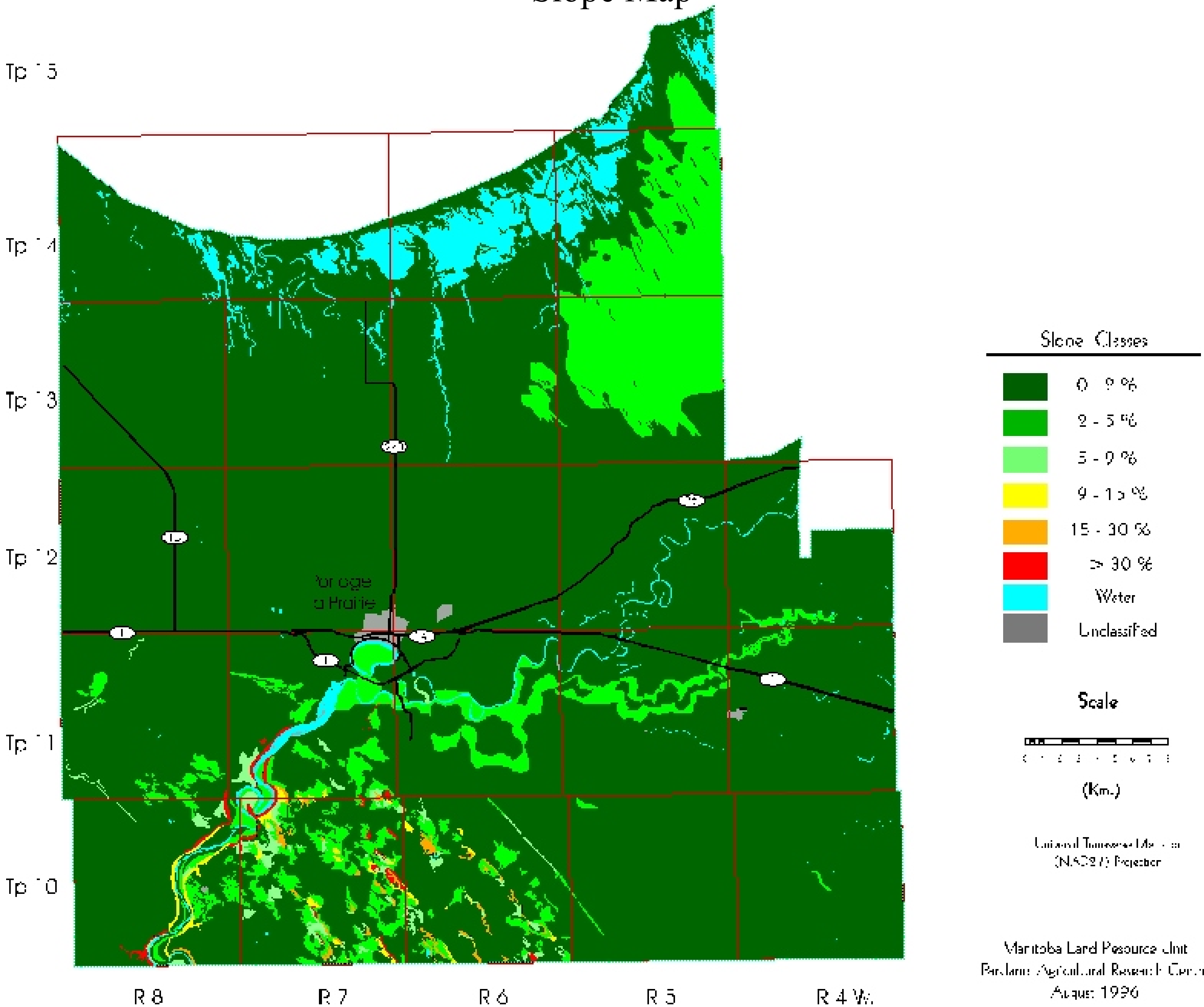
Slope describes the steepness of the landscape surface. The slope classes shown on this map are derived from the digital soil layer database. Specific colours are used to indicate the dominant slope class for each soil polygon in the RM. Additional slope classes may occur in each polygon area, but cannot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

Table 1. Slope Classes[1]

Slope Class	Area (ha)	Percent of RM
0 - 2 %	177136	83.8
2 - 5 %	21874	10.3
5 - 9 %	1510	0.7
9 - 15 %	683	0.3
15 - 30 %	566	0.3
> 30 %	587	0.3
Unclassified	635	0.3
Water	8461	4.0
Total	211453	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 15
Tp 14
Tp 13
Tp 12
Tp 11
Tp 10
R 8
R 7
R 6
R 5
R 4 W.
Slope Classes
15 - 30 %
> 30 %
Water
Unclassified
Scale
(Km.)
Manitoba Land Resource Unit
August 1996

Surface Texture Map.

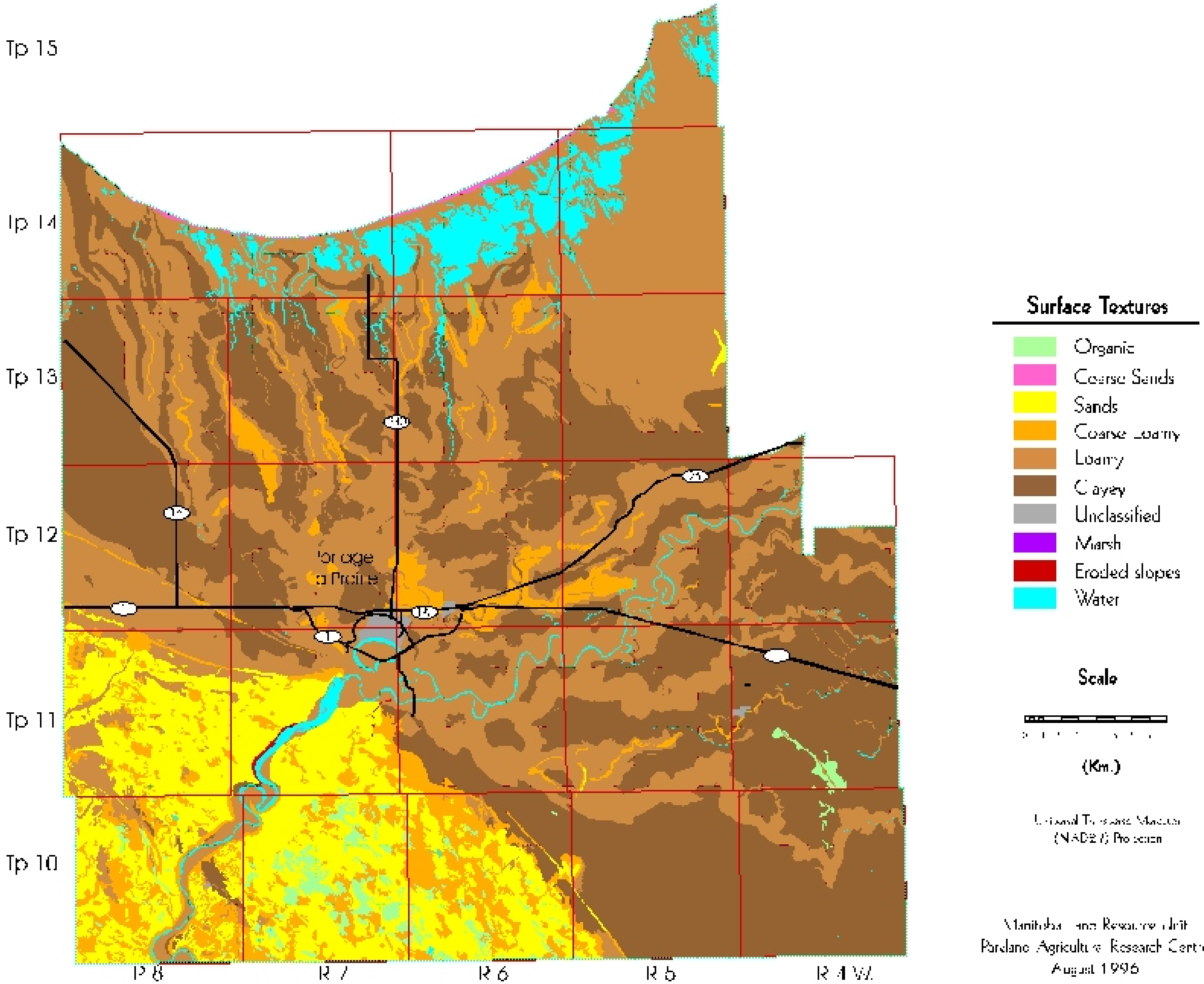
The soil textural class for the upper most soil horizon of the dominant soil series within a soil polygon was utilized for classification. Texture may vary from that shown with soil depth and location within the polygon.

Table 2. Surface Texture[1]

Surface Texture	Area (ha)	Percent of RM
Organics	2582	1.2
Coarse Sands	549	0.3
Sands	24716	11.7
Coarse Loamy	17162	8.1
Loamy	80630	38.1
Clayey	76622	36.2
Eroded Slopes	96	0.0
Marsh	0	0.0
Unclassified	635	0.3
Water	8461	4.0
Total	211453	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.

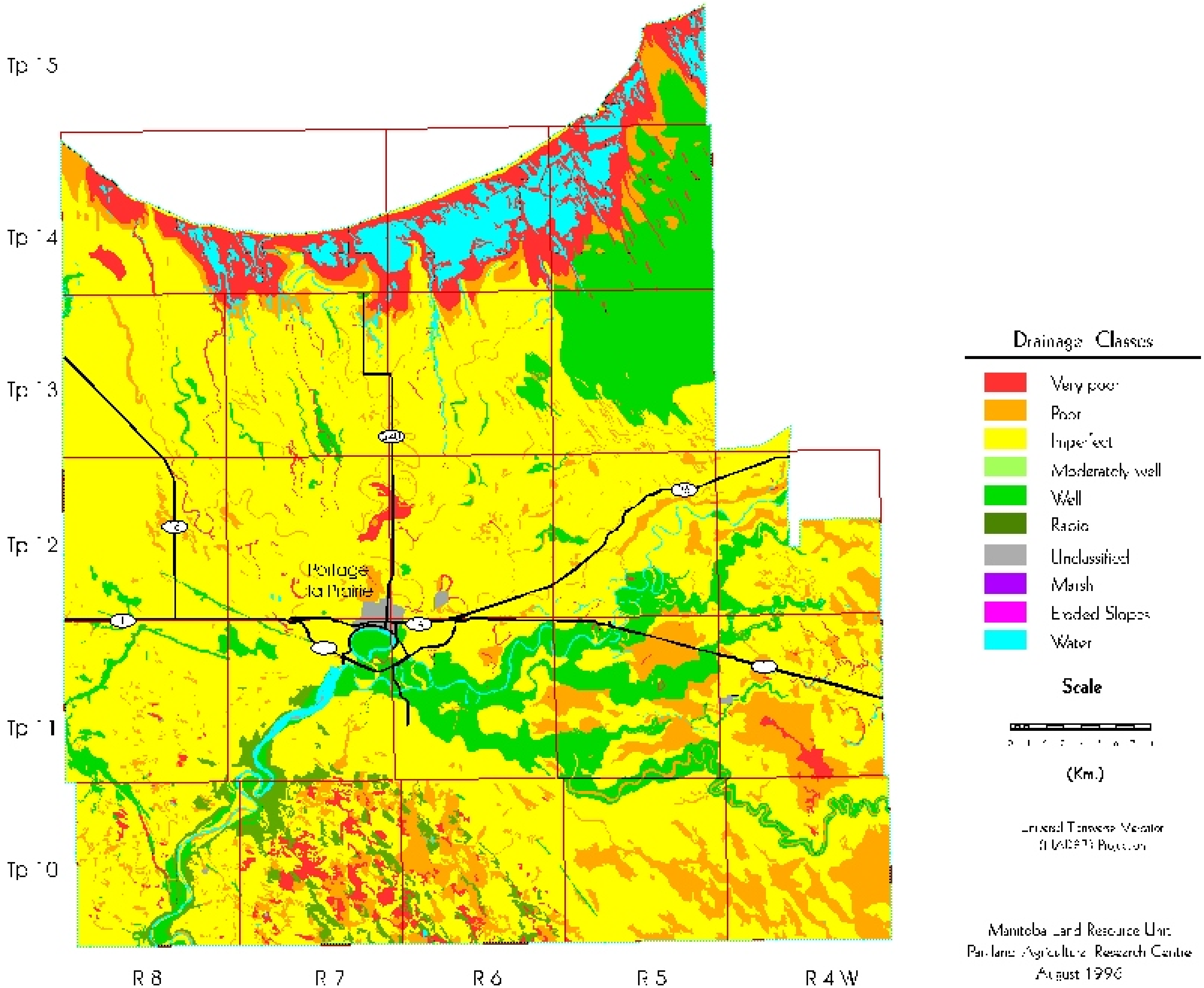
Drainage classification is based on the dominant soil series within each individual soil polygon.

Table 3. Drainage Classes[1]

Drainage Class	Area (ha)	Percent of RM
Very Poor	13546	6.4
Poor	25220	11.9
Imperfect	131499	62.2
Moderately Well	0	0.0
Well	28173	13.3
Rapid	3918	1.9
Marsh	0	0.0
Unclassified	635	0.3
Water	8461	4.0
Total	211453	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.

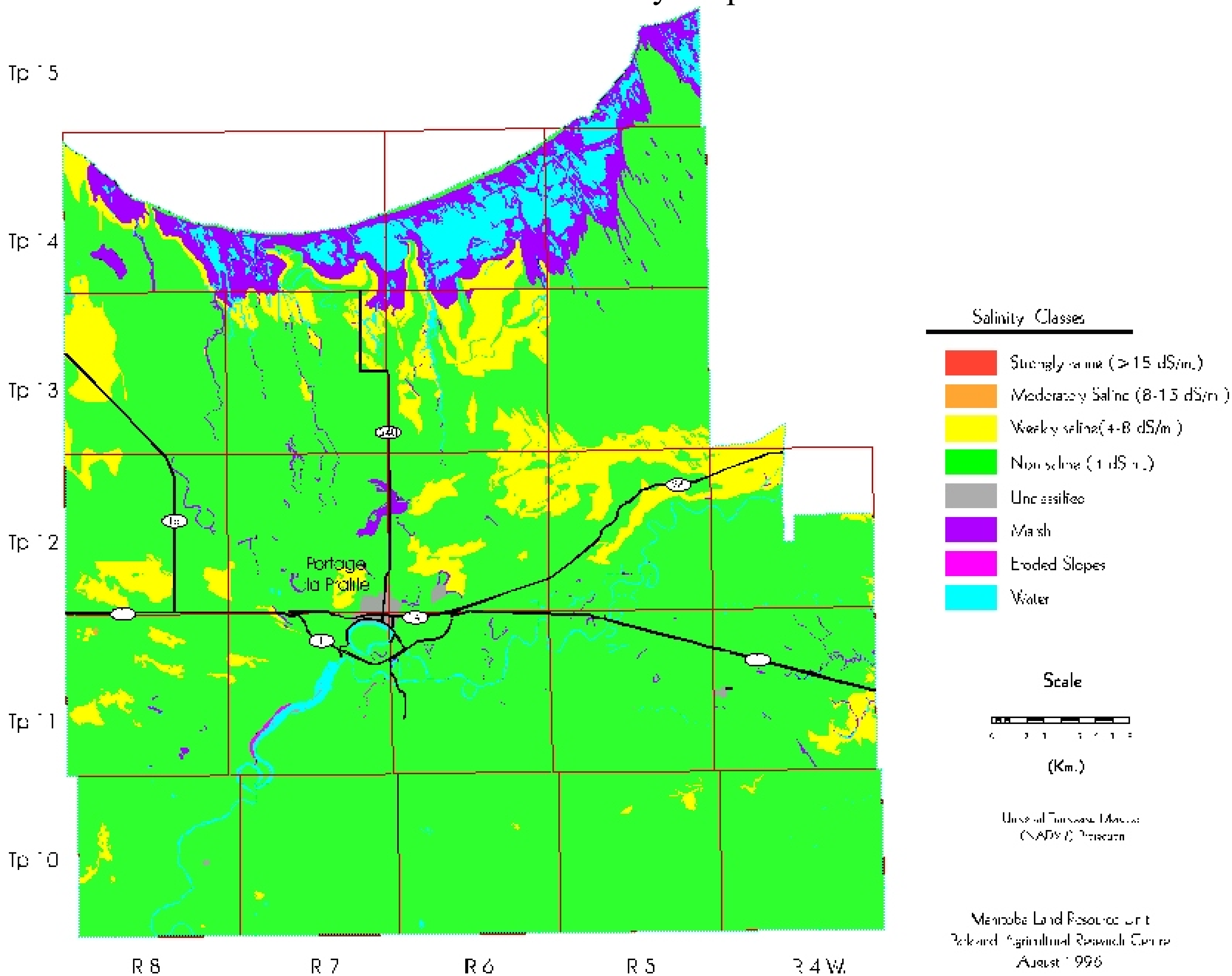
The salinity classification of each individual soil polygon was determined by the most severe salinity classification present within that polygon.

Table 4. Salinity Classes[1]

Salinity Class	Area (ha)	Percent of RM
Non Saline	168548	79.7
Weakly Saline	22739	10.8
Moderately Saline	11	0.0
Strongly Saline	0	0.0
Eroded Slopes	96	0.0
Marsh	10964	5.2
Unclassified	635	0.3
Water	8461	4.0
Total	211453	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.

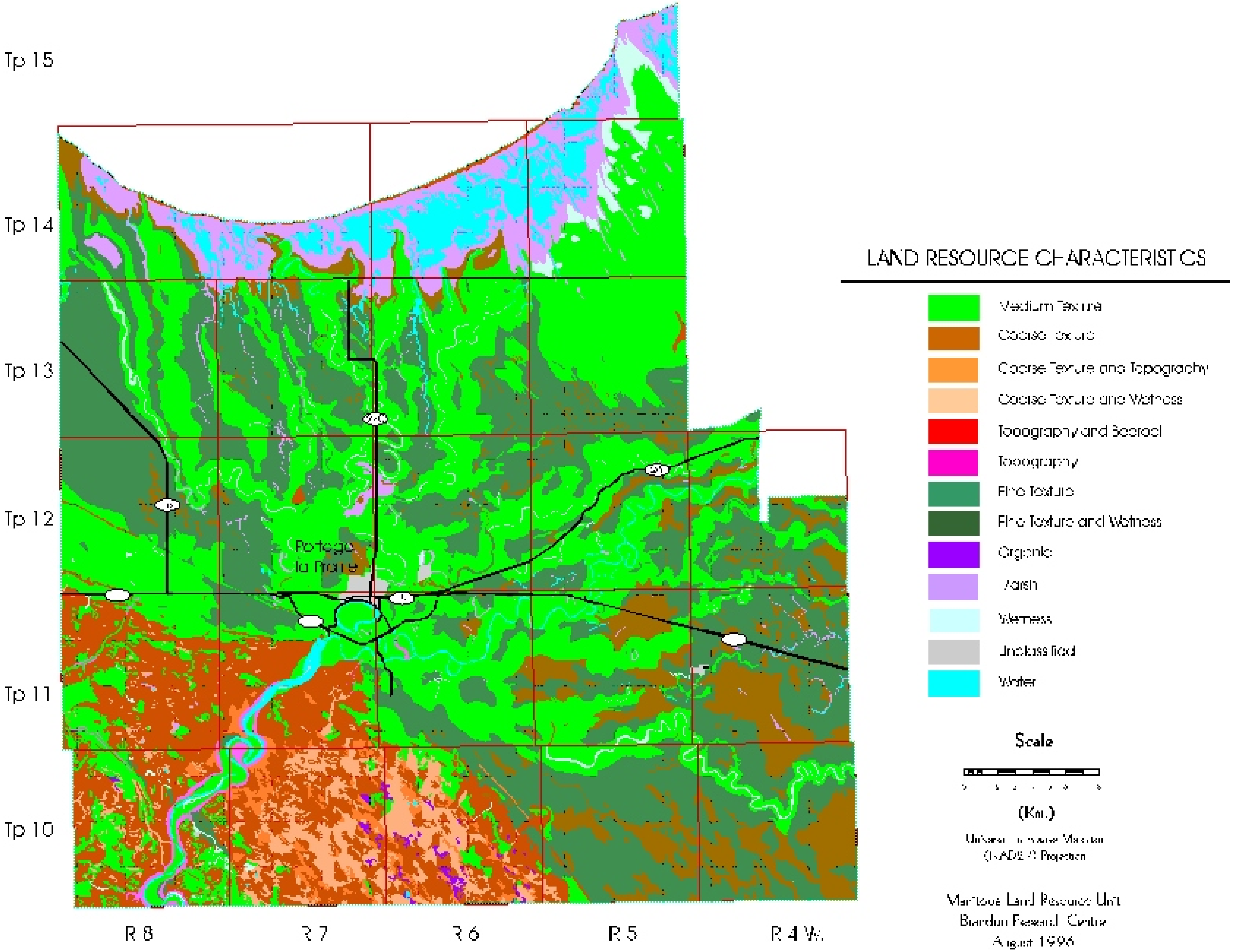
R = Bedrock - soil landscapes that have shallow depth to bedrock (< 50 cm) and/or exposed bedrock which may prevent the use of some or all tillage practices as well as the range of potential crop. They require special cropping and management practices to sustain agricultural production.

Table 5. Management Considerations[1]

Land Resource Characteristics	Area (ha)	Percent of RM
Fine Texture	60663	28.7
Fine Texture and Wetness	17525	8.3
Fine Texture and Topography	0	0.0
Fine Texture, Wetness and Topography	0	0.0
Medium Texture	75553	35.7
Coarse Texture	24027	11.4
Coarse Texture and Wetness	6484	3.1
Coarse Texture and Topography	2386	1.1
Coarse Texture, Wetness and Topography	0	0.0
Topography	960	0.5
Topography and Bedrock	0	0.0
Wetness	3343	1.6
Wetness and Topography	0	0.0
Bedrock	0	0.0
Organic	451	0.2
Marsh	10964	5.2
Unclassified	635	0.3
Water	8461	4.0
Total	211453	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).

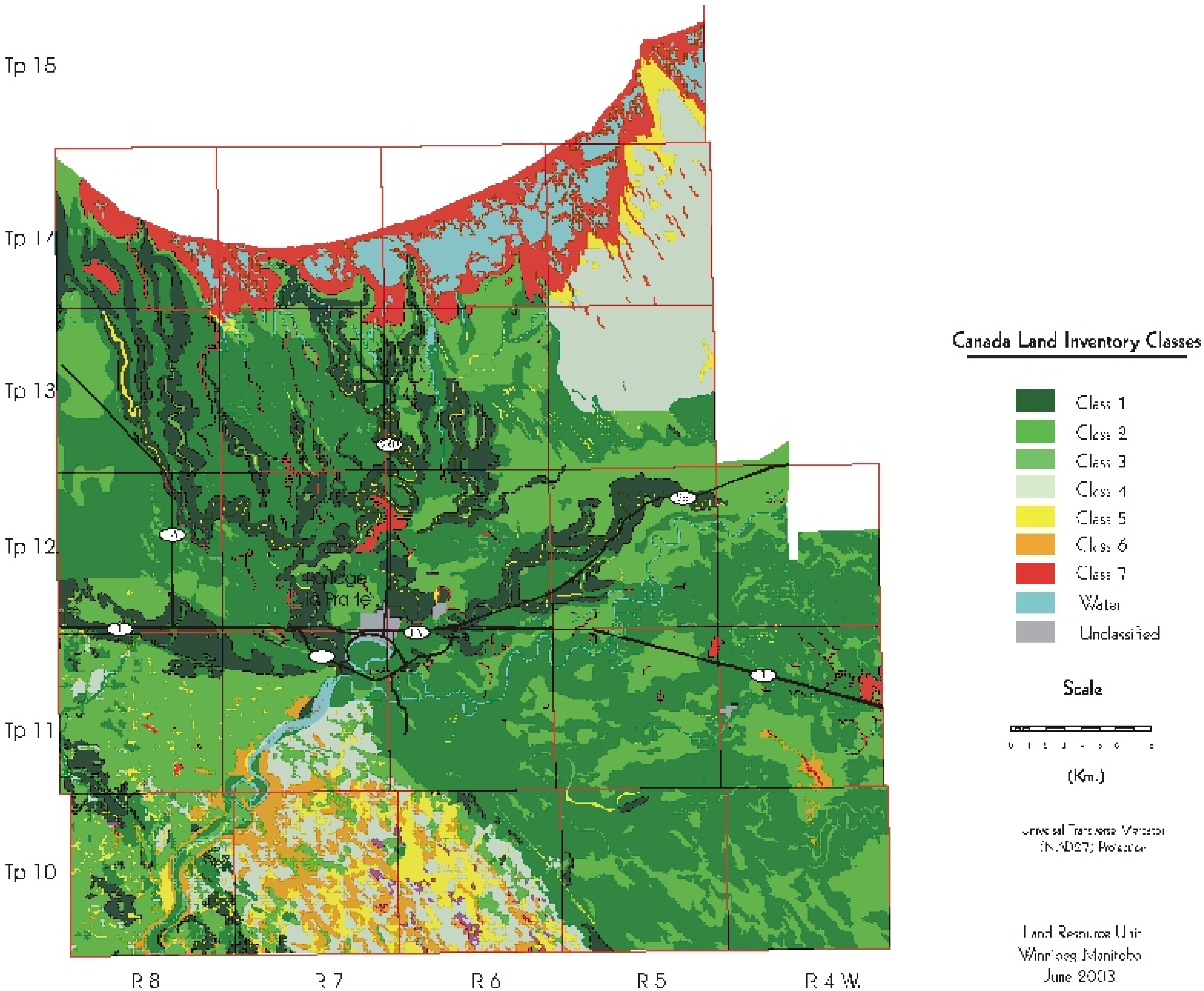
This generalized interpretive map is based on the dominant soil series and phases for each soil polygon. The CLI subclass limitations cannot be portrayed at this generalized map scale.

Table 6. Agricultural Capability[1]

Class Subclass	Area (ha)	Percent of RM
1	**21246**	**10.1**
2	**77489**	**36.7**
2DW	9421	4.5
2I	8623	4.1
2M	3968	1.9
2MT	10	0.0
2P	7	0.0
2T	67	0.0
2TD	15	0.0
2TI	3687	1.7
2W	51690	24.5
3	**55974**	**26.5**
3D	877	0.4
3I	5799	2.7
3M	12822	6.1
3ME	29	0.0
3MT	5	0.0
3N	16316	7.7
3NW	3370	1.6
3T	97	0.0
3TE	36	0.0
3TI	152	0.1
3W	16473	7.8
4	**20774**	**9.8**
4	42	0.0
4DP	11486	5.4
4M	8821	4.2
4ME	414	0.2
4N	11	0.0
5	**8626**	**4.1**
5	38	0.0
5M	288	0.1
5W	6754	3.2
5WI	1545	0.7
6	**6024**	**2.9**
6M	3043	1.4
6MT	190	0.1
6T	657	0.3
6W	2134	1.0
7	**11596**	**5.5**
7M	579	0.3
7W	11017	5.2
Unclassified	**633**	**0.3**
Water	**8495**	**4.0**
Organic	**450**	**0.2**
Total	**211308**	**100.0**

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

Agricultural 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.

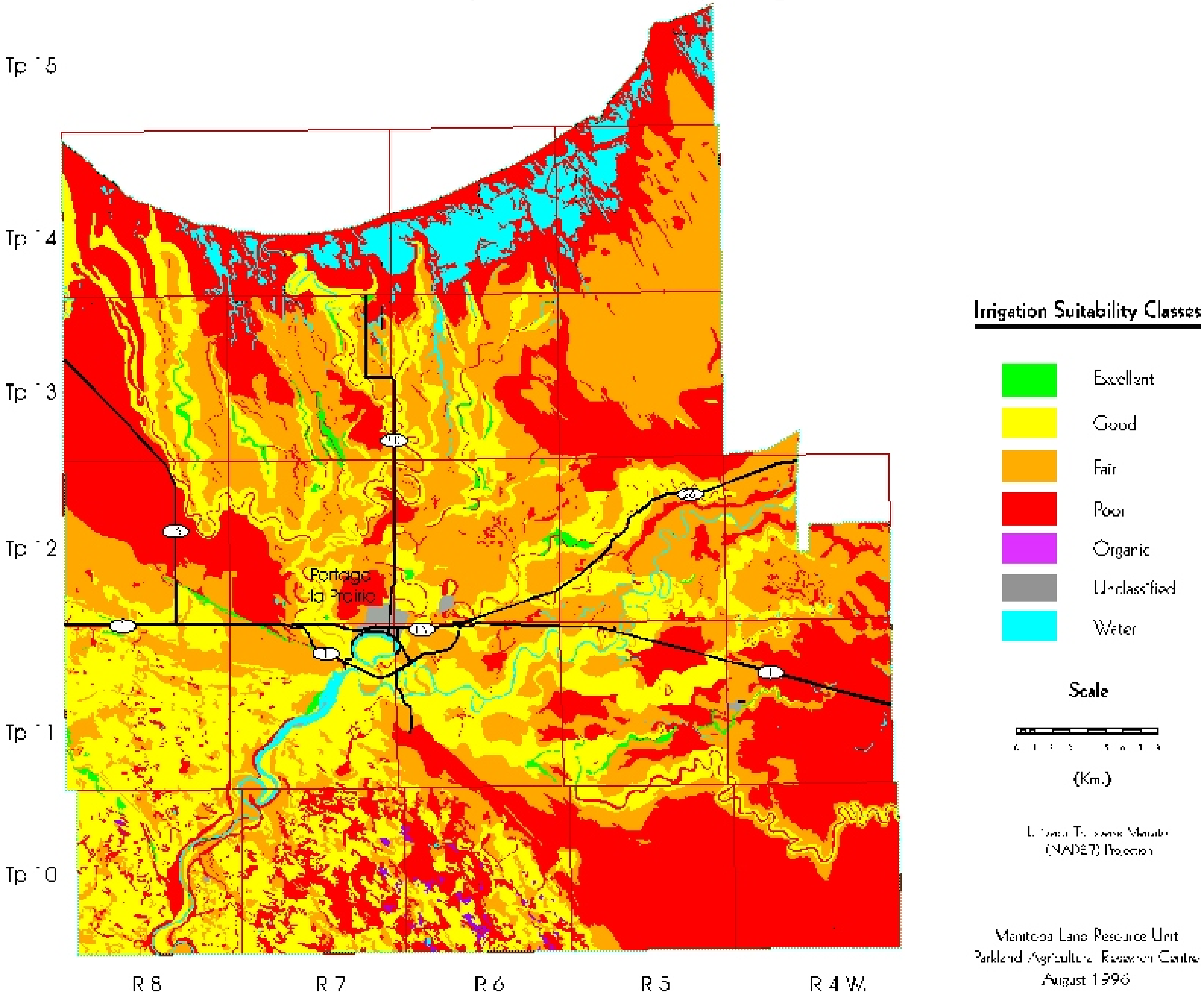
This generalized interpretive map is based on the dominant soil series for each soil polygon, in combination with the dominant slope class. The nature of the subclass limitations and the classification of subdominant components is not shown at this generalized map scale.

Table 7. Irrigation Suitability[1]

Class	Area (ha)	Percent of RM
Excellent	**1494**	**0.7**
Good	**55511**	**26.3**
Fair	**69665**	**32.9**
Poor	**75237**	**35.6**
Organic	**451**	**0.2**
Unclassified	**635**	**0.3**
Water	**8461**	**4.0**
Total	**211453**	**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.

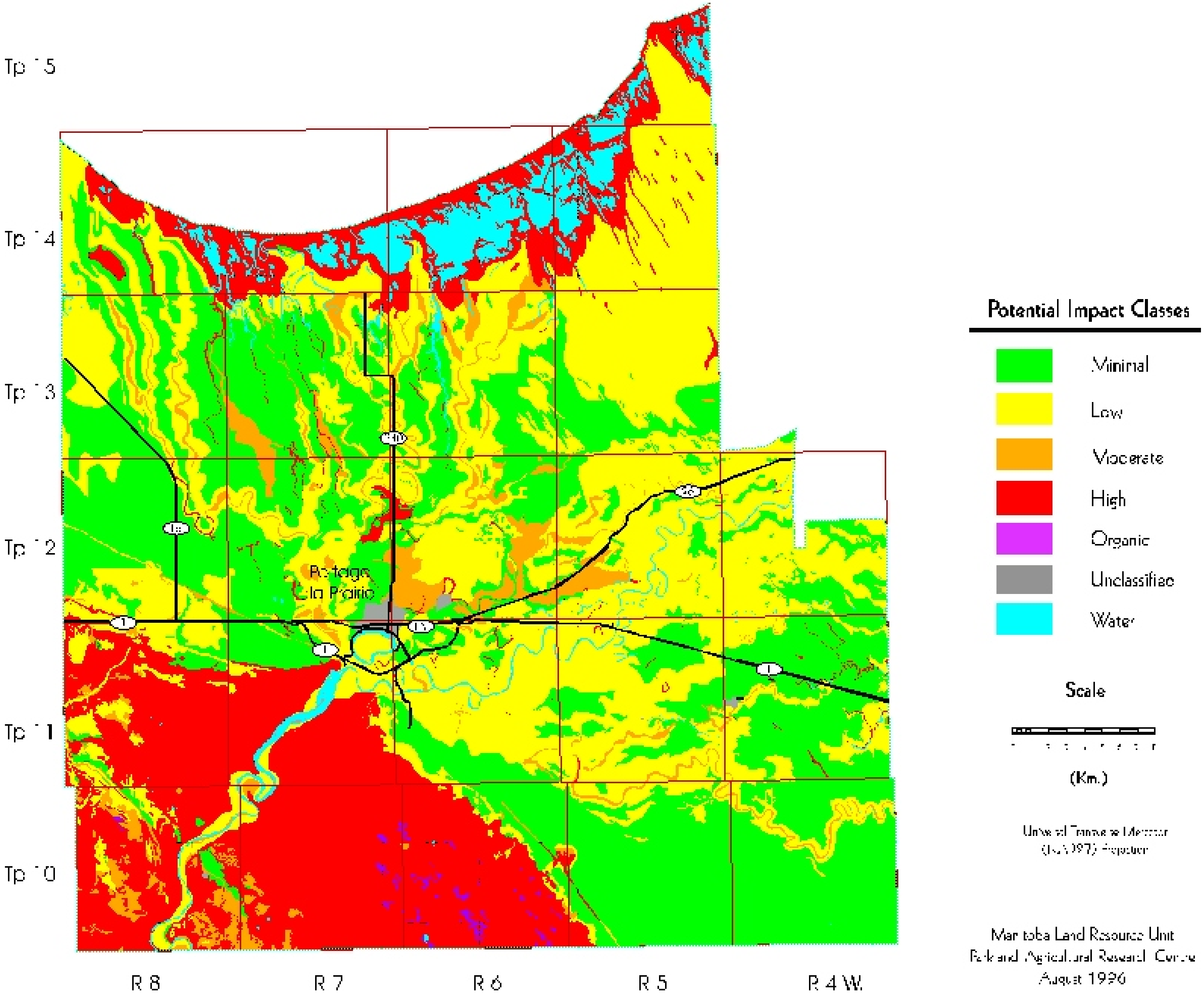
This generalized interpretive map is based on the dominant soil series and slope class for each soil polygon. The nature of the subclass limitations, and the classification of subdominant components is not shown at this generalized map scale.

Table 8. Potential Environmental Impact Under Irrigation[1]

Class	Area (ha)	Percent of RM
Minimal	69380	32.8
Low	76505	36.2
Moderate	9962	4.7
High	46058	21.8
Organic	451	0.2
Unclassified	635	0.3
Water	8461	4.0
Total	211453	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.

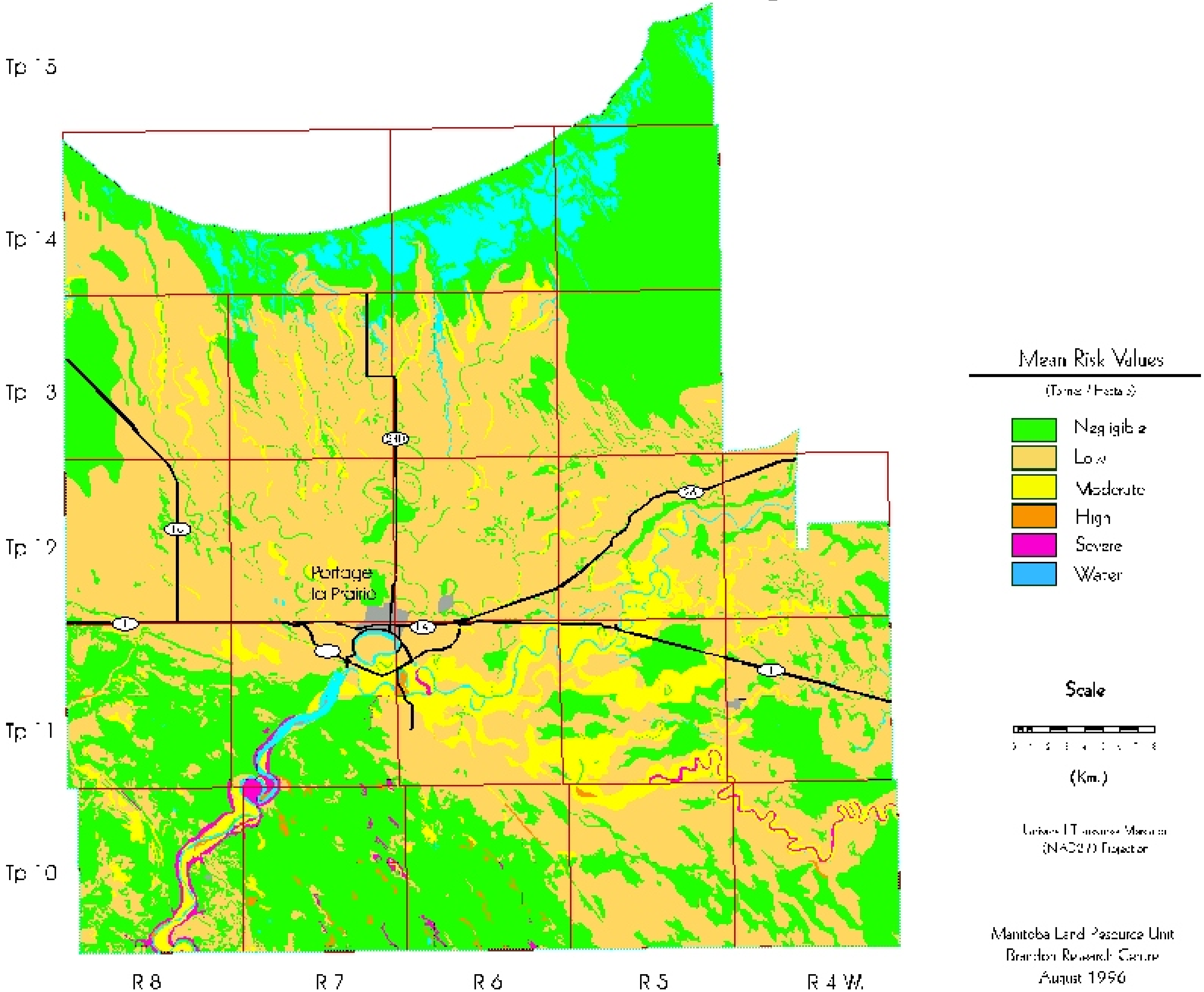
Cropping and residue management practices will significantly reduce this risk depending on crop rotation program, soil type, and landscape features.

Table 9. Water Erosion Risk[1]

Class	Area (ha)	Percent of RM
Negligible	**80532**	**38.1**
Low	**103196**	**48.8**
Moderate	**16425**	**7.8**
High	**668**	**0.3**
Severe	**1536**	**0.7**
Unclassified	**635**	**0.3**
Water	**8461**	**4.0**
Total	**211453**	**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.

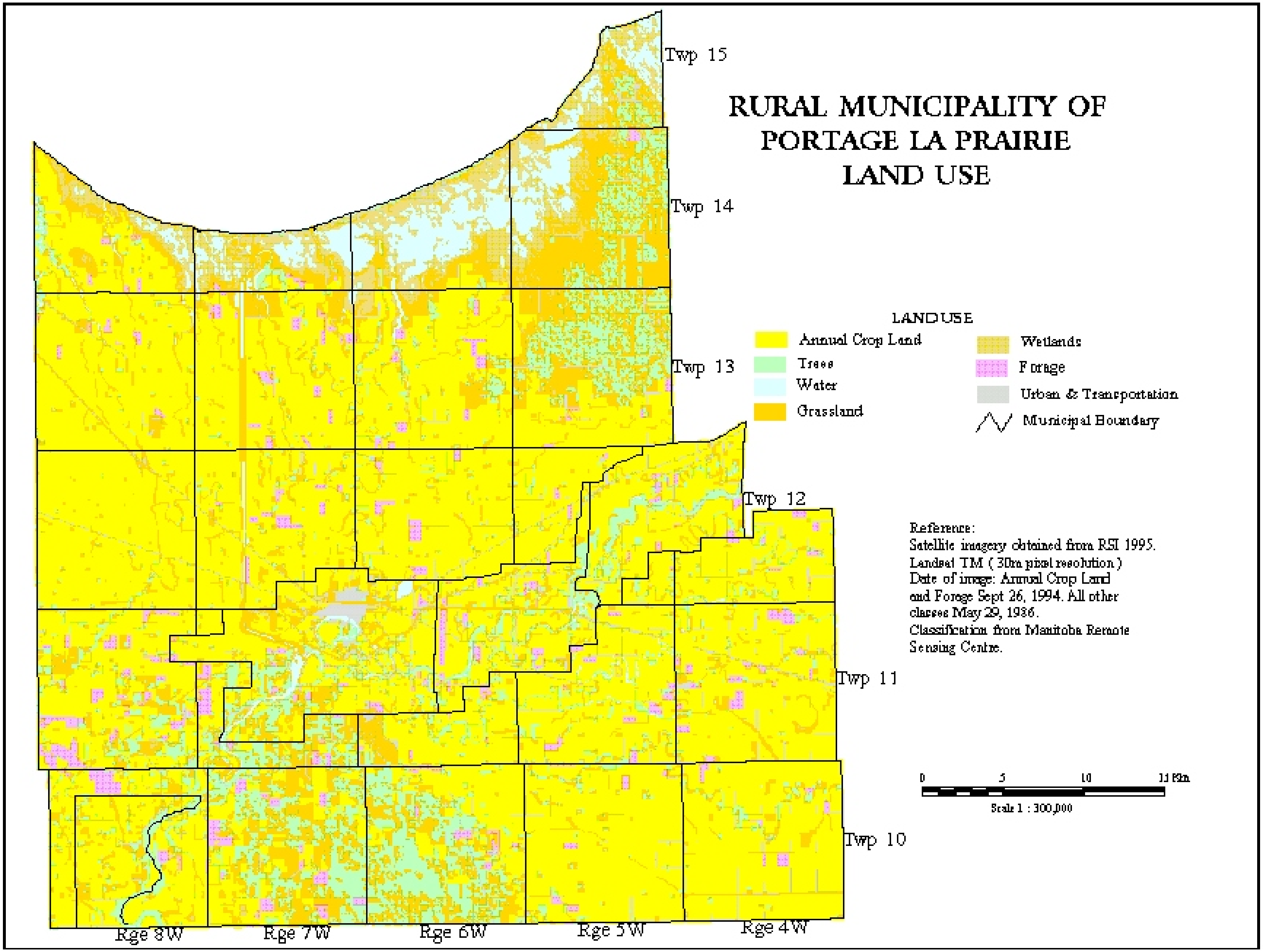
Water - open water - lakes, rivers streams, ponds, and lagoons.

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

Table 10. Land Use[1]

Class	Area (ha)	Percent of RM
Annual Crop Land	128669	60.6
Forage	5840	2.7
Grasslands	34372	16.2
Trees	19014	9.0
Wetlands	8465	4.0
Water	7758	3.7
Urban and Transportation	8308	3.9
Total	212426	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
PORTAGE LA PRAIRIE
LAND USE
LANDUSE
Annual Crop Land
Trees
Water
Grassland
Wetlands
Forage
Urban & Transportation
Municipal Boundary
Reference:
Satellite imagery obtained from RSI 1995.
Landsat TM (30m pixel resolution)
Date of image: Annual Crop Land
and Forage Sept 26, 1994. All other
classes May 29, 1986.
Classification from Manitoba Remote
Sensing Centre.
Scale 1 : 300,000
Twp 15
Twp 14
Twp 13
Twp 12
Twp 11
Twp 10
Rge 8W
Rge 7W
Rge 6W
Rge 5W
Rge 4W

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