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**Rural Municipality of La Broquerie**


**Information Bulletin 98-24**

## **Soils and Terrain**

An introduction  
to the land resource

Land Resource Unit  
Brandon Research Centre



Canada 

## **Rural Municipality of La Broquerie**

### **Information Bulletin 98-24**

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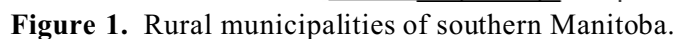
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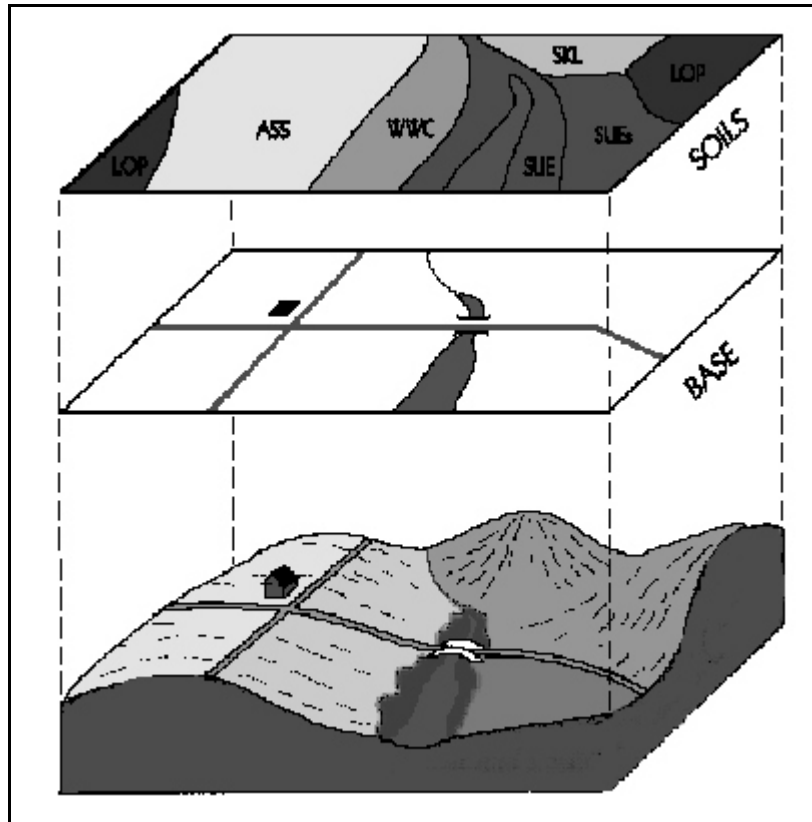
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This bulletin is available in printed or digital format. The digital bulletin is a Windows based executable file which offers additional display options, including the capability to print any portion of the bulletin.

## 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.

## SOIL AND TERRAIN OVERVIEW

The Rural Municipality (RM) of La Broquerie covers an area of 6 townships (approximately 58 000 ha) located 45 km southeast of Winnipeg in southeastern Manitoba (page 3). The village of La Broquerie is the largest population and service centre as the population in the municipality is mainly rural farm-based. Most agricultural and other services are provided from larger centres in the surrounding region.

The climate in the area can be related to weather data from Steinbach located about 2 km west of the municipality. The mean annual temperature is 2.4°C and the mean annual precipitation is 510 mm (Environment Canada, 1993). The average frost-free period is 115 days and degree-days above 5°C accumulated from May to September average 1644 (Ash, 1991). An evaluation of growing conditions in this region of Manitoba can be related to seasonal moisture deficit and effective growing degree-days (EGDD) above 5°C. The seasonal moisture deficit calculated between May and September is slightly less than 250 mm and the estimated effective growing degree-days accumulated from May to September average just less than 1500 (Agronomic Interpretations Working Group, 1995). These parameters provide an indication of moisture and heat energy available for crop growth and are generally adequate to support a wide range of crops adapted to western Canada.

Physiographically, the RM of La Broquerie occurs almost entirely in the Southeastern Plain Section of the Manitoba Plain (Canada-Manitoba Soil Survey, 1980). A small portion of the Red River Valley touches the northwest corner of the municipality. The Southeastern Plain is level to gently sloping and broken in places by low ridges. In contrast, the Red River Valley is dominantly level and flat-lying. Elevation of the land surface varies from about 315 metres above sea level (m asl) in the southeast, decreasing gradually to 262 m asl in the northwest. Local relief is generally under 3 metres and slopes are less than 2 percent except for a few sand and

gravel beach ridges on which the slope approaches 5 percent (page 9). The low surface gradient of 1.6 metres per kilometre or 8.3 feet per mile results in poorly developed surface drainage throughout the municipality. Extensive areas of very poorly drained organic terrain to the east of the municipality release water to the drainage system throughout the year and high groundwater levels also contribute to poor drainage in the region. The Seine River drains the northern portion of the municipality while Joubert Creek provides external drainage in the south. Surface drainage for agricultural purposes has been improved in parts of the area by a network of man-made drains.

Soil materials in the Southeastern Plain consist primarily of thin, sandy to coarse-loamy lacustrine veneers overlying stony, loam textured glacial till. These surface deposits are underlain by bedrock at depths of 30 to 80 metres. Areas of waterworked, extremely calcareous, stony, loam till and local areas of gravelly sand outwash and beach deposits are also common (page 11). The flat topography results in the majority of soils being classified as imperfectly to poorly drained (page 13).

Soils in the municipality have been mapped at a semi-detailed 1:50 000 scale, described in detail, and published in the report *Soils of the Rural Municipalities of Ste. Anne and La Broquerie and part of the Local Government District of Stuartburn* (Hopkins, 1985). According to the Canadian System of Soil Classification (Soil Classification Working Group, 1998), poorly drained Humic Gleysol soils with thin peaty surface layers are dominant. Dark Gray Chernozemic soils occupy well to imperfectly drained sites and weakly developed Brunisolic soils are common on rapidly to imperfectly drained sandy materials. Gray Luvisols and Organic soils occur mainly in the eastern part of the municipality.

Soils throughout the municipality are non-saline (page 15). Major management considerations relate to coarse texture and wetness (page 17). Seasonal high water tables (at 1 to 2 metres) and saturated soils are also common. Surface water ponds in poorly

drained depressional areas and organic terrain throughout the area. Well drained sandy soils are subject to potential wind erosion and droughtiness. Moderately to excessively stony conditions are associated with the till soils and beach deposits throughout the area.

Six percent of the soils are rated in **Class 2** for agricultural capability and 12 percent in **Class 3**. Nearly 37 percent of the soils are placed in **Class 4** and 29 percent rated in **Class 5** due to droughtiness and excess wetness. **Class 6** soils affected by excessive wetness occupy 11 percent of the area (page 19). Organic soils cover 6 percent of the area and have very limited capability for agriculture in their native undrained state. About 32 percent of the soils are rated as **Good** and 20 percent are rated **Fair** for irrigation suitability whereas the remainder are rated as **Poor** (42 percent), primarily due to poor drainage (page 21).

One of the issues currently receiving considerable attention is the sustainability of agricultural practices and their potential impact on the soil and groundwater environment. To assist in highlighting this concern to land planners and agricultural producers, an assessment of potential environmental impact (EI) under irrigation (page 23) shows that the majority of the RM is at **High** potential risk of leaching due to the high permeability of the sandy soils and their typically high watertables. In contrast, the risk for leaching is **Low** on loamy textured till soils. This EI map is intended to be used in association with the irrigation suitability map.

Another issue of concern to producers, soil conservationists and land use specialists is soil erosion caused by agricultural cropping and tillage practices. Areas with potential for water erosion are shown on page 25. About 94 percent of the land in the municipality is at a **Negligible** risk of degradation due to water erosion. However, the extensive areas of sandy soils in the municipality are at a greater risk of erosion by wind. Current management practices focus on maintaining adequate crop residues to provide sufficient surface cover to adequately protect the soils from both wind and water erosion.

The dominant land use in the RM of La Broquerie is agriculture. An assessment of the status of land use in 1994, obtained through an analysis of satellite imagery, showed that annual crops occupy 22 percent and forage crops utilize 8 percent of the land in the municipality. Grassland areas at 35 percent and tree cover at 32 percent of the land area provide forage and grazing capacity as well as wildlife habitat. Wetlands occupying about 1 percent of the area and the organic soils also provide wildlife habitat. Various non-agricultural uses such as infrastructure for urban areas, transportation and recreation occupy nearly 2 percent of the municipality (page 27).

The majority of soils in the RM of La Broquerie have severe to very severe limitations for arable agriculture. Sandy and loamy textured soils require careful management to protect against the risk of wind erosion. This includes leaving adequate crop residues on the surface to provide sufficient trash cover during the early spring period. The provision of shelter belts, minimum tillage practices, and crop rotations including forages will help to reduce the risk of soil degradation and maintain productivity.

A major portion of the municipality has low relief and a dominance of imperfectly to very poorly drained soils. The sandy soils are permeable near the surface but because of a loamy till subsoil, they typically have seasonal high water tables and may experience occasional surface ponding in spring or following heavy rains. Consequently, improvement and maintenance of water management infrastructure is required on a watershed or regional basis to reduce surface ponding while maintaining adequate soil moisture for crop growth.

## 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

Surface Texture

Drainage

Salinity

Management Considerations

### Interpretative Maps

Agricultural Capability

Irrigation Suitability

Potential Environmental Impact

Water Erosion Risk

Land Use

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.

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.



**Slope Map.**

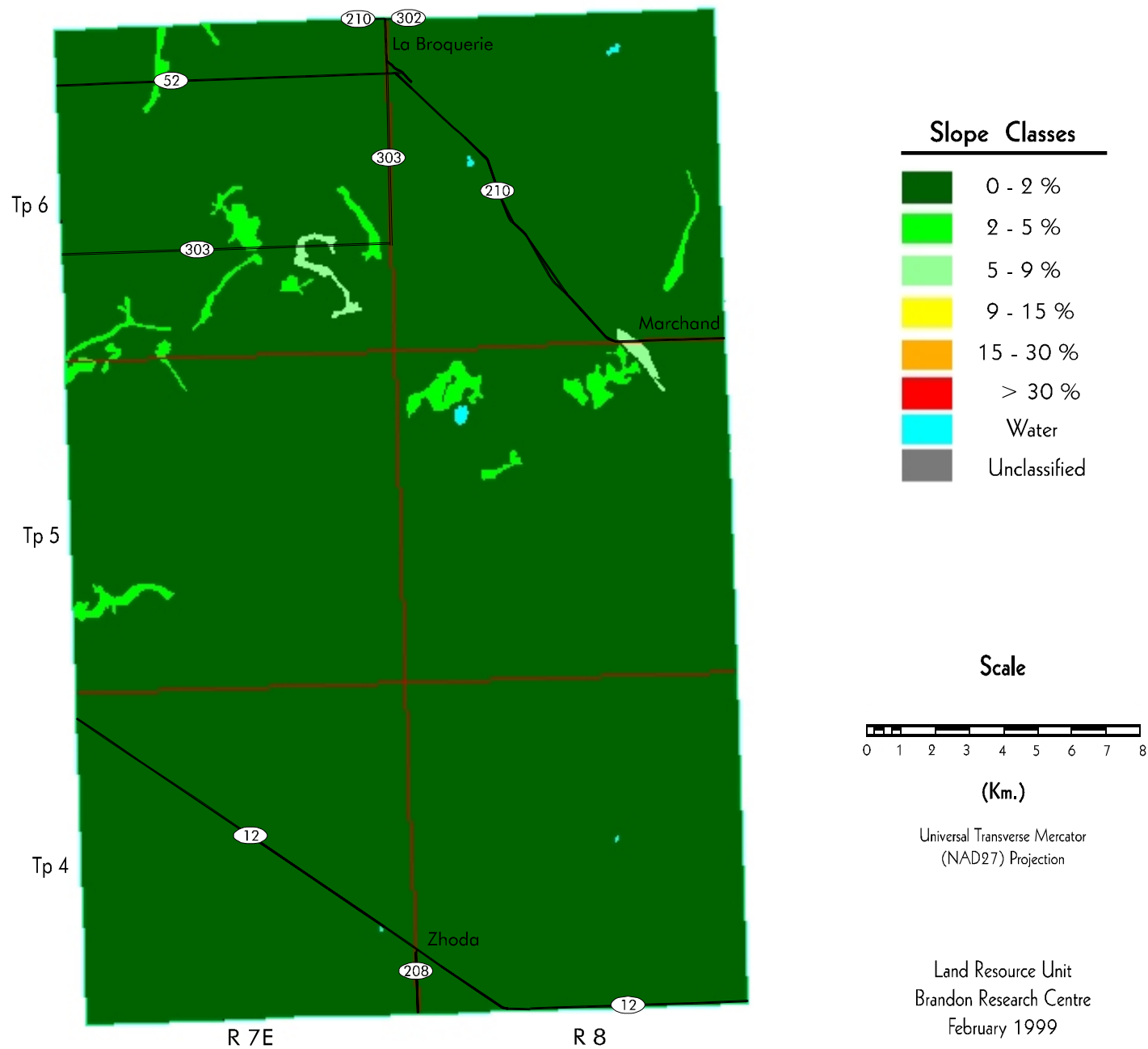
Slope describes the steepness of the landscape surface. The slope classes shown on this map are derived from the digital soil and terrain layer database. Specific colours are used to indicate the dominant slope class for each polygon in the RM. Additional slope classes may occur in each polygon area,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

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

<b>Slope Class</b>	<b>Area (ha)</b>	<b>Percent of RM</b>
<b>0 - 2 %</b>	<b>57006</b>	<b>98.1</b>
<b>2 - 5 %</b>	<b>936</b>	<b>1.6</b>
<b>5 - 9 %</b>	<b>156</b>	<b>0.3</b>
<b>9 - 15 %</b>	<b>0</b>	<b>0.0</b>
<b>15 - 30 %</b>	<b>0</b>	<b>0.0</b>
<b>&gt; 30 %</b>	<b>0</b>	<b>0.0</b>
<b>Unclassified</b>	<b>0</b>	<b>0.0</b>
<b>Water</b>	<b>20</b>	<b>0.0</b>
<b>Total</b>	<b>58119</b>	<b>100.0</b>

<sup>1</sup> Area has been assigned to the dominant slope in each soil polygon.

## Slope Map



**Surface Texture Map.**

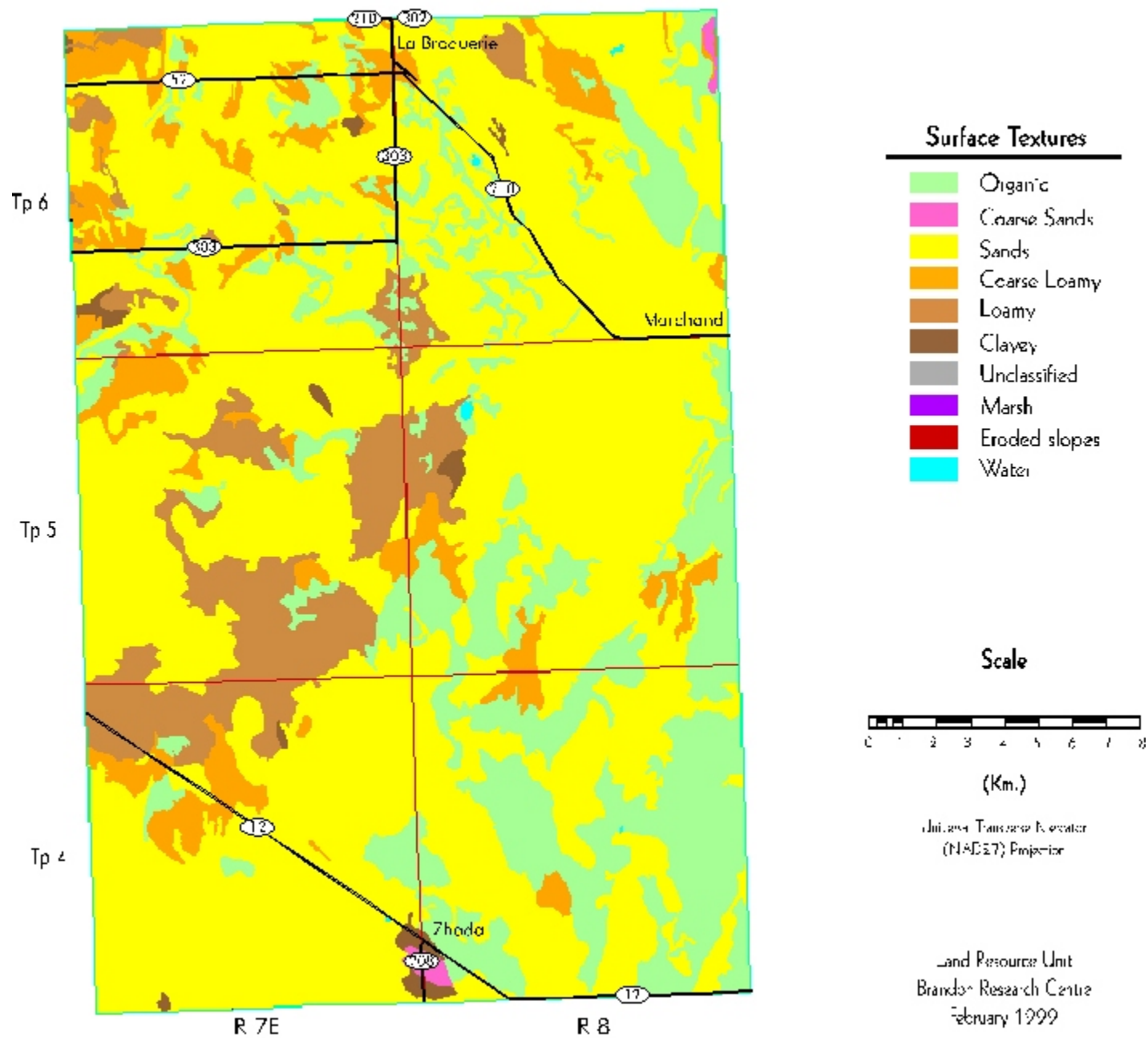
The soil textural class for the upper most soil horizon of the dominant soil series within a soil polygon was utilized for classification. Texture may vary from that shown with soil depth and location within the polygon.

**Table 2. Surface Texture<sup>1</sup>**

<b>Surface Texture</b>	<b>Area (ha)</b>	<b>Percent of RM</b>
<b>Organics</b>	<b>10916</b>	<b>18.8</b>
<b>Coarse Sands</b>	<b>157</b>	<b>0.3</b>
<b>Sands</b>	<b>37369</b>	<b>64.3</b>
<b>Coarse Loamy</b>	<b>4297</b>	<b>7.4</b>
<b>Loamy</b>	<b>4946</b>	<b>8.5</b>
<b>Clayey</b>	<b>413</b>	<b>0.7</b>
<b>Eroded Slopes</b>	<b>0</b>	<b>0.0</b>
<b>Marsh</b>	<b>0</b>	<b>0.0</b>
<b>Unclassified</b>	<b>0</b>	<b>0.0</b>
<b>Water</b>	<b>20</b>	<b>0.0</b>
<b>Total</b>	<b>58119</b>	<b>100.0</b>

<sup>1</sup> 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. Five drainage classes plus three 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.

**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.

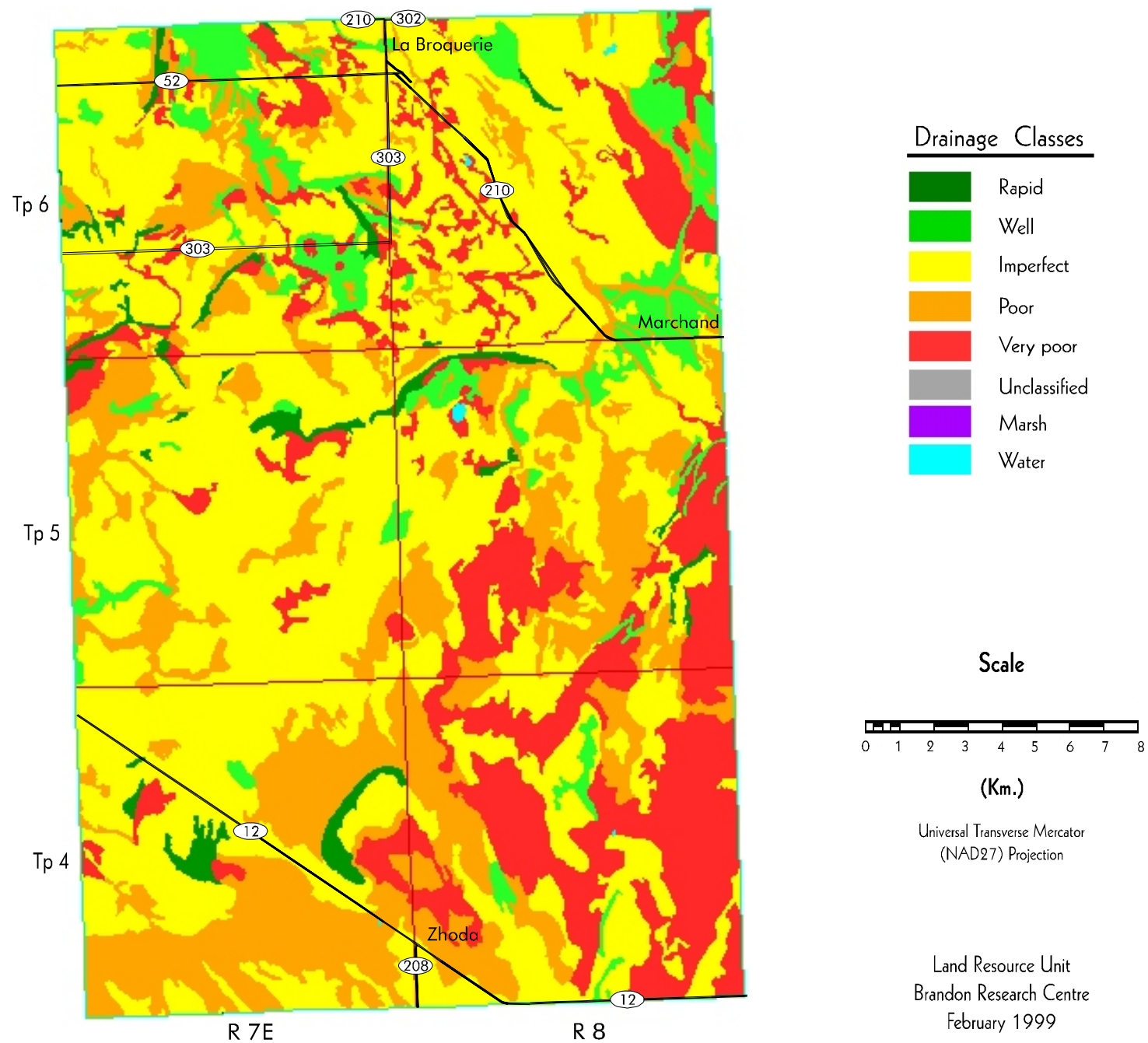
Drainage classification is based on the dominant soil series within each individual soil polygon.

**Table 3. Drainage Classes<sup>1</sup>**

<b>Drainage Class</b>	<b>Area (ha)</b>	<b>Percent of RM</b>
<b>Very Poor</b>	<b>10404</b>	<b>17.9</b>
<b>Poor</b>	<b>12957</b>	<b>22.3</b>
<b>Imperfect</b>	<b>29949</b>	<b>51.5</b>
<b>Well</b>	<b>3604</b>	<b>6.2</b>
<b>Rapid</b>	<b>1184</b>	<b>2.0</b>
<b>Marsh</b>	<b>0</b>	<b>0.0</b>
<b>Unclassified</b>	<b>0</b>	<b>0.0</b>
<b>Water</b>	<b>20</b>	<b>0.0</b>
<b>Total</b>	<b>58119</b>	<b>100.0</b>

<sup>1</sup> Area has been assigned to the dominant drainage class for each soil polygon.

## 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:

<b>non-saline</b>	< 4 dS/m
<b>weakly saline</b>	4 to 8 dS/m
<b>moderately saline</b>	8 to 15 dS/m
<b>strongly saline</b>	> 15 dS/m

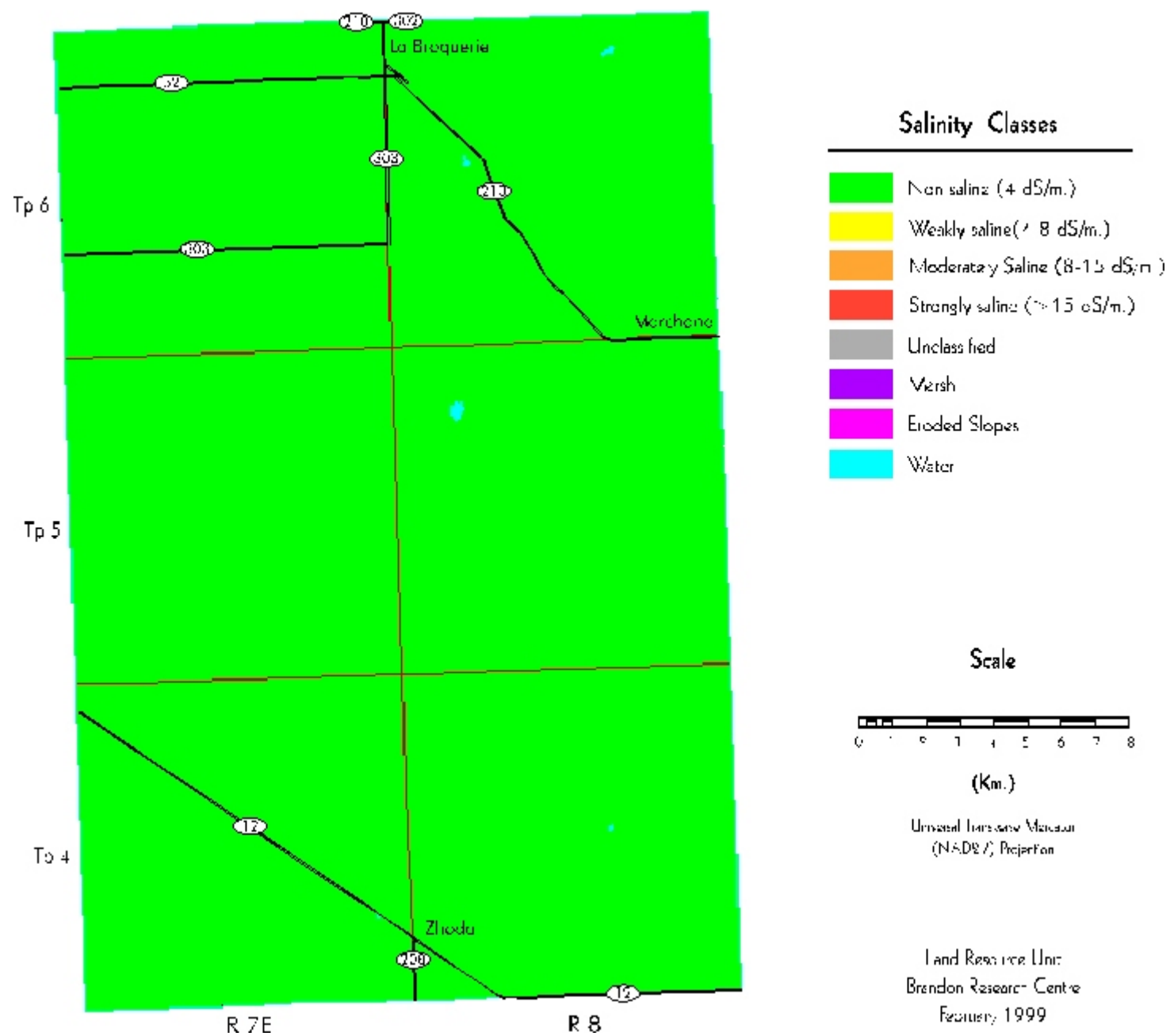
The salinity classification of each individual soil polygon was determined by the most severe salinity classification present within that polygon.

**Table 4. Salinity Classes<sup>1</sup>**

<b>Salinity Class</b>	<b>Area (ha)</b>	<b>Percent of RM</b>
<b>Non Saline</b>	<b>58098</b>	<b>100.0</b>
<b>Weakly Saline</b>	<b>0</b>	<b>0.0</b>
<b>Moderately Saline</b>	<b>0</b>	<b>0.0</b>
<b>Strongly Saline</b>	<b>0</b>	<b>0.0</b>
<b>Eroded Slopes</b>	<b>0</b>	<b>0.0</b>
<b>Marsh</b>	<b>0</b>	<b>0.0</b>
<b>Unclassified</b>	<b>0</b>	<b>0.0</b>
<b>Water</b>	<b>20</b>	<b>0.0</b>
<b>Total</b>	<b>58119</b>	<b>100.0</b>

<sup>1</sup> 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.

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

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

**M = Medium texture** - soil landscapes with medium to moderately fine textures (**loams to clay loams**), and good water and nutrient retention properties. Good management and cropping practices are required to minimize leaching and the risk of erosion.

**C = Coarse texture** - soil landscapes with **coarse to very coarse textured soils (loamy sands, sands and gravels)**, have a high permeability throughout the profile, and 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.

**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 with organic soils, requiring special management considerations of drainage, tillage, and cropping to sustain productivity and minimize subsidence and erosion.

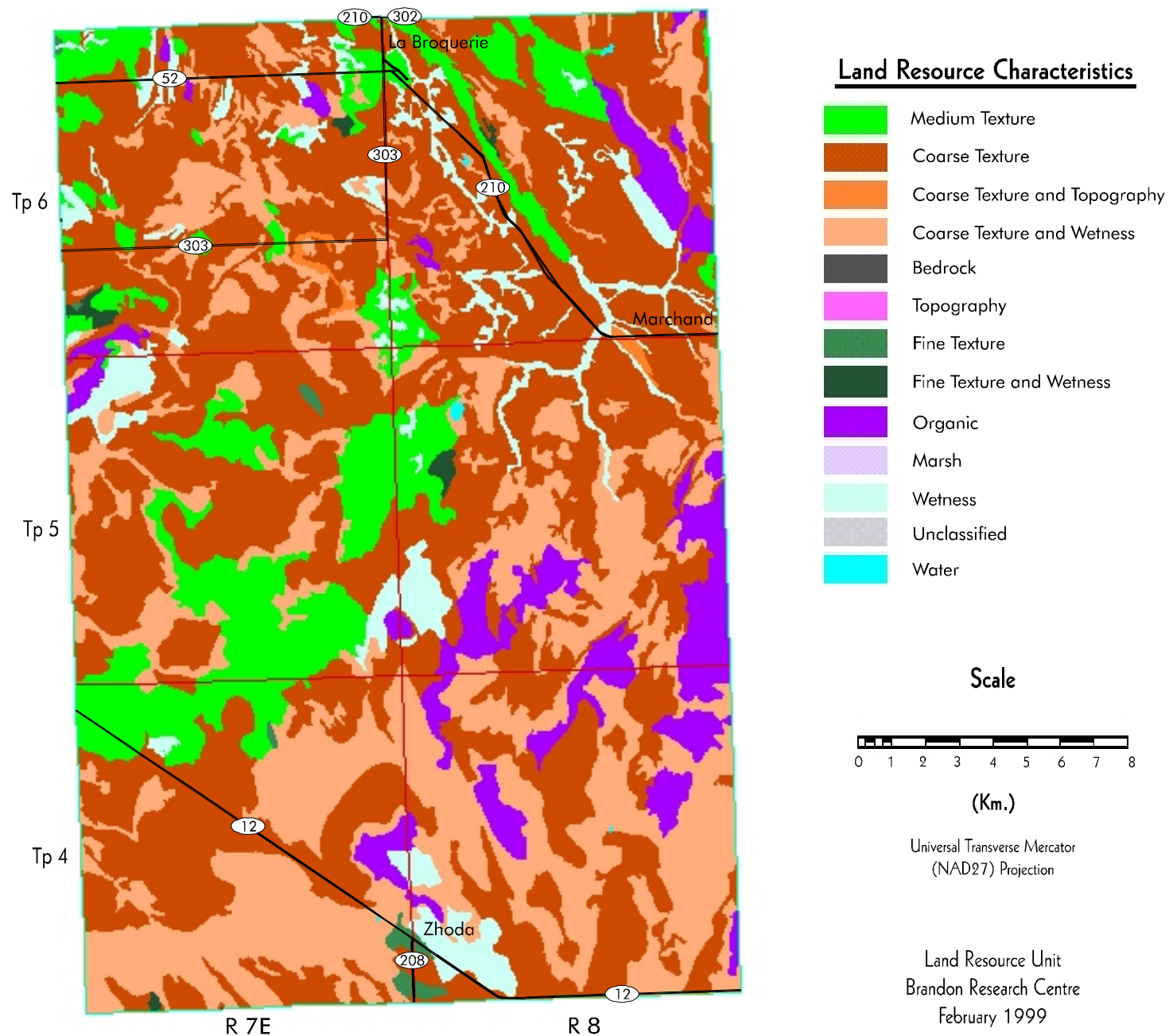
**R = Bedrock** - soil landscapes that have shallow depth to bedrock (< 50 cm) and/or exposed bedrock which may prevent the use of some or all tillage practices as well as the range of potential crops. They require special cropping and management practices to sustain agricultural production.

**Table 4. Management Considerations<sup>1</sup>**

Land Resource Characteristics	Area (ha)	Percent of RM
<b>Fine Texture</b>	<b>212</b>	<b>0.4</b>
<b>Fine Texture and Wetness</b>	<b>201</b>	<b>0.3</b>
<b>Fine Texture and Topography</b>	<b>0</b>	<b>0.0</b>
<b>Medium Texture</b>	<b>6437</b>	<b>11.1</b>
<b>Coarse Texture</b>	<b>27932</b>	<b>48.1</b>
<b>Coarse Texture and Wetness</b>	<b>16291</b>	<b>28.0</b>
<b>Coarse Texture and Topography</b>	<b>156</b>	<b>0.3</b>
<b>Topography</b>	<b>0</b>	<b>0.0</b>
<b>Bedrock</b>	<b>0</b>	<b>0.0</b>
<b>Wetness</b>	<b>3206</b>	<b>5.5</b>
<b>Organic</b>	<b>3663</b>	<b>6.3</b>
<b>Marsh</b>	<b>0</b>	<b>0.0</b>
<b>Unclassified</b>	<b>0</b>	<b>0.0</b>
<b>Water</b>	<b>20</b>	<b>0.0</b>
<b>Total</b>	<b>58119</b>	<b>100.0</b>

<sup>1</sup> Based on the **dominant** soil series and slope gradient within each 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 modifiers 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 5. Agricultural Capability<sup>1</sup>**

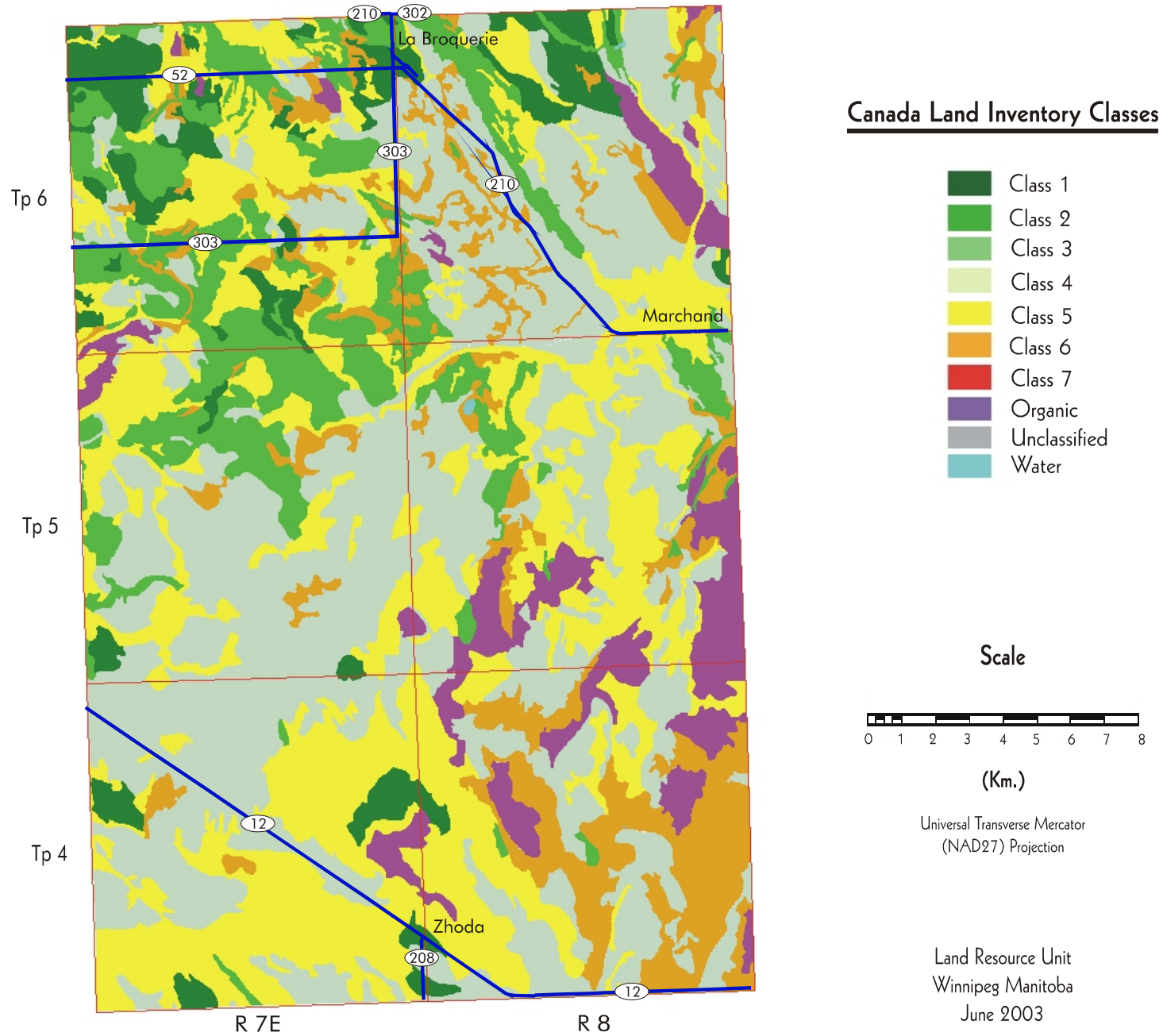
<b>Class Subclass</b>	<b>Area (ha)</b>	<b>Percent of RM</b>
<b>2</b>	<b>3292</b>	<b>5.7</b>
2M	2252	3.9
2MP	582	1.0
2W	407	0.7
2WP	50	0.1
<b>3</b>	<b>6824</b>	<b>11.8</b>
3D	867	1.5
3M	4156	7.2
3MI	408	0.7
3MP	402	0.7
3P	991	1.7

**Table 5. Agricultural Capability<sup>1</sup>(cont)**

<b>Class Subclass</b>	<b>Area (ha)</b>	<b>Percent of RM</b>
<b>4</b>	<b>21292</b>	<b>36.7</b>
4DP	3888	6.7
4M	16400	28.2
4MP	288	0.5
4P	603	1.0
4W	113	0.2
<b>5</b>	<b>16793</b>	<b>28.9</b>
5M	2909	5.0
5MP	215	0.4
5P	224	0.4
5W	12955	22.3
5WI	473	0.8
5WP	17	0.0
<b>6</b>	<b>6185</b>	<b>10.7</b>
6P	67	0.1
6W	6118	10.5
<b>Water</b>	<b>21</b>	<b>0.0</b>
<b>Organic</b>	<b>3659</b>	<b>6.3</b>
<b>Total</b>	<b>58064</b>	<b>100.0</b>

<sup>1</sup> Based on the **dominant** soil series and slope gradient within each 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.

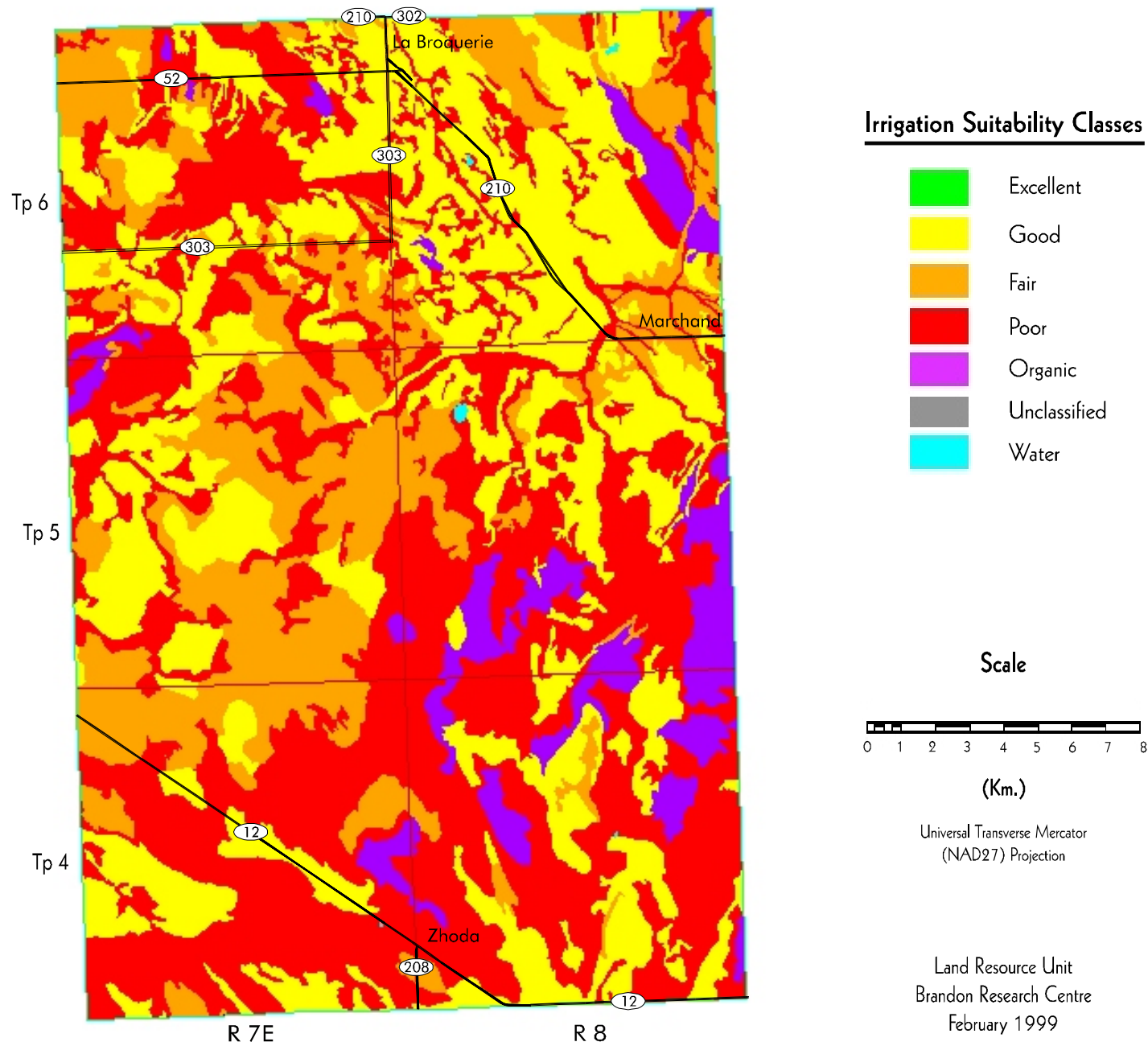
This generalized interpretive map is based on the dominant soil series for each soil polygon, in combination with the dominant slope class. The nature of the subclass limitations and the classification of subdominant components is not shown at this generalized map scale.

**Table 6. 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>18509</b>	<b>31.8</b>
<b>Fair</b>	<b>11340</b>	<b>19.5</b>
<b>Poor</b>	<b>24586</b>	<b>42.3</b>
<b>Organic</b>	<b>3663</b>	<b>6.3</b>
<b>Unclassified</b>	<b>0</b>	<b>0.0</b>
<b>Water</b>	<b>20</b>	<b>0.0</b>
<b>Total</b>	<b>58119</b>	<b>100.0</b>

<sup>1</sup> Based on the **dominant** soil series and slope gradient within each polygon.

## Irrigation Suitability Map





**Potential Environmental Impact Under Irrigation Map.**

A major environmental 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.

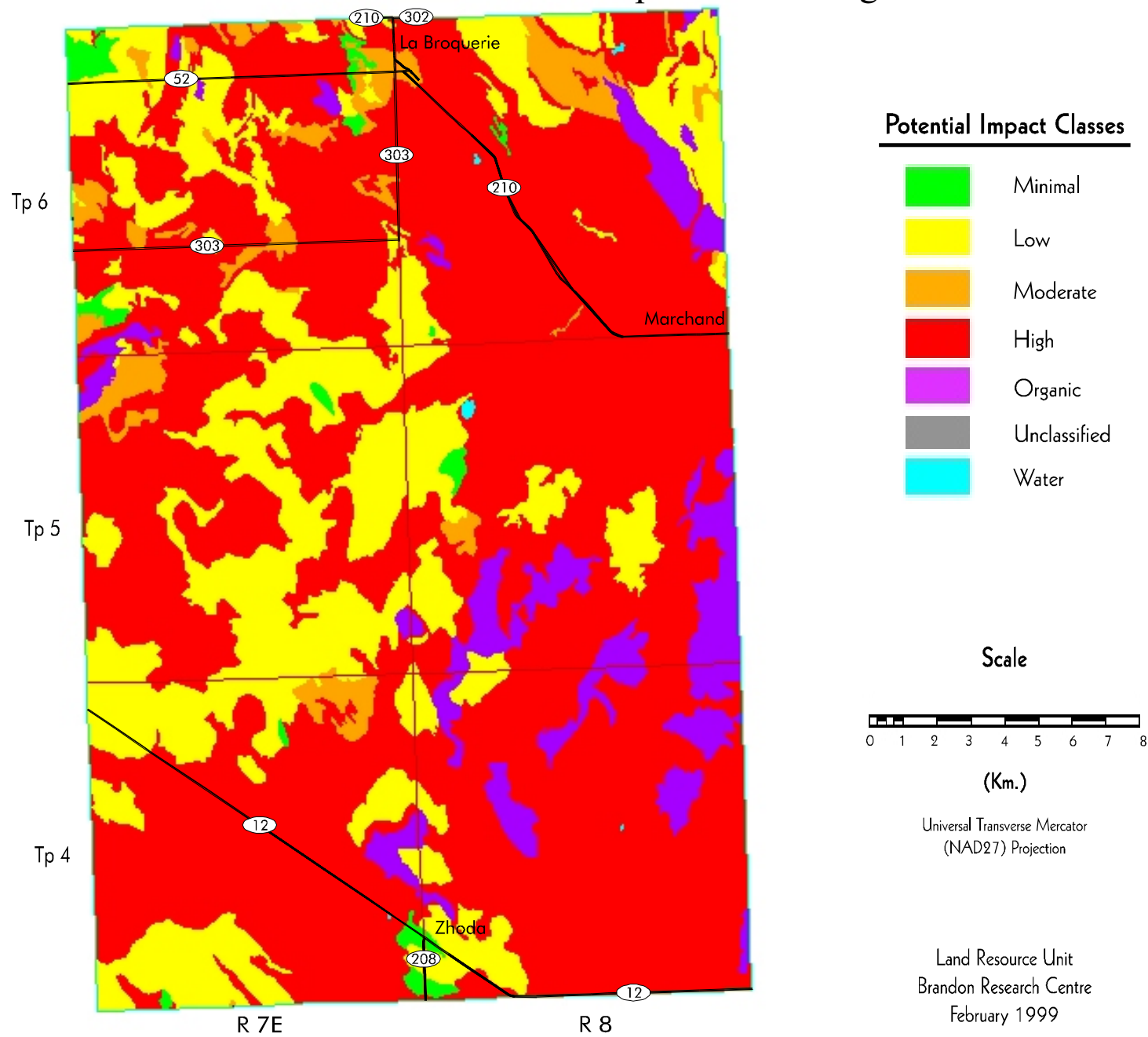
This generalized interpretive map is based on the dominant soil series and slope class for each soil polygon. The nature of the subclass limitations, and the classification of subdominant components is not shown at this generalized map scale.

**Table 7. Potential Environmental Impact Under Irrigation<sup>1</sup>**

<b>Class</b>	<b>Area (ha)</b>	<b>Percent of RM</b>
<b>Minimal</b>	<b>633</b>	<b>1.1</b>
<b>Low</b>	<b>13588</b>	<b>23.4</b>
<b>Moderate</b>	<b>2154</b>	<b>3.7</b>
<b>High</b>	<b>38059</b>	<b>65.5</b>
<b>Organic</b>	<b>3663</b>	<b>6.3</b>
<b>Unclassified</b>	<b>0</b>	<b>0.0</b>
<b>Water</b>	<b>20</b>	<b>0.0</b>
<b>Total</b>	<b>58119</b>	<b>100.0</b>

<sup>1</sup> Based on the **dominant** soil series and slope gradient within each 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 USLE predicted soil loss (tons/hectare/year) is calculated for each soil component in each soil map polygon. Erosion risk classes are assigned based on the weighted average soil loss for each map polygon. Water erosion risk factors include mean annual rainfall, slope length, slope gradient, vegetation cover, management practices, and soil erodibility. The map shows 5 classes of soil erosion risk based on bare unprotected soil:

**negligible**  
**low**  
**moderate**  
**high**  
**severe**

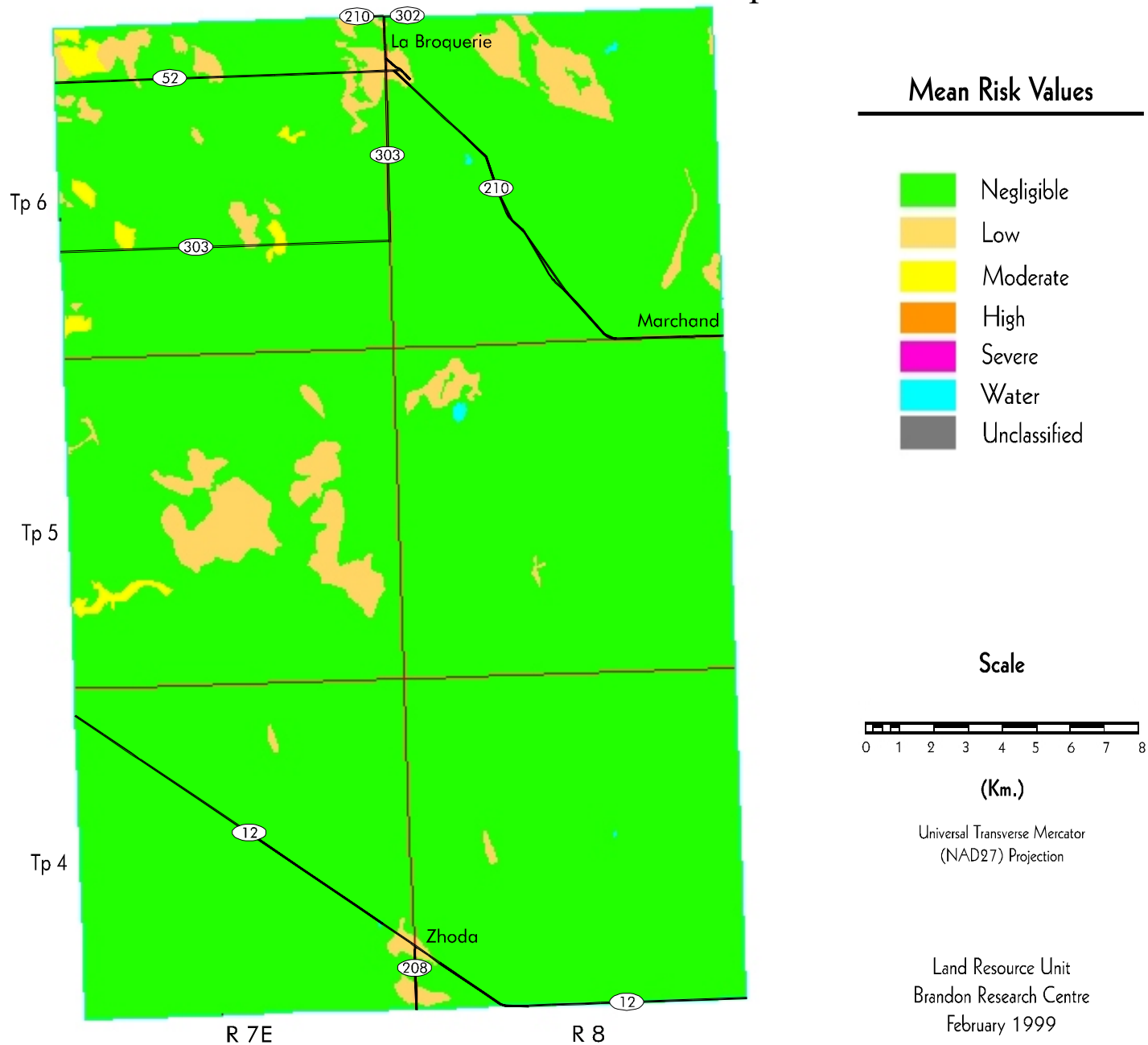
Cropping and residue management practices will significantly reduce this risk depending on crop rotation program, soil type, and landscape features.

**Table 8. Water Erosion Risk<sup>1</sup>**

<b>Class</b>	<b>Area (ha)</b>	<b>Percent of RM</b>
<b>Negligible</b>	<b>54771</b>	<b>94.2</b>
<b>Low</b>	<b>2923</b>	<b>5.0</b>
<b>Moderate</b>	<b>404</b>	<b>0.7</b>
<b>High</b>	<b>0</b>	<b>0.0</b>
<b>Severe</b>	<b>0</b>	<b>0.0</b>
<b>Unclassified</b>	<b>0</b>	<b>0.0</b>
<b>Water</b>	<b>20</b>	<b>0.0</b>
<b>Total</b>	<b>58119</b>	<b>100.0</b>

<sup>1</sup> Based on the **weighted average** USLE predicted soil loss within each polygon, assuming a bare unprotected soil.

## 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.

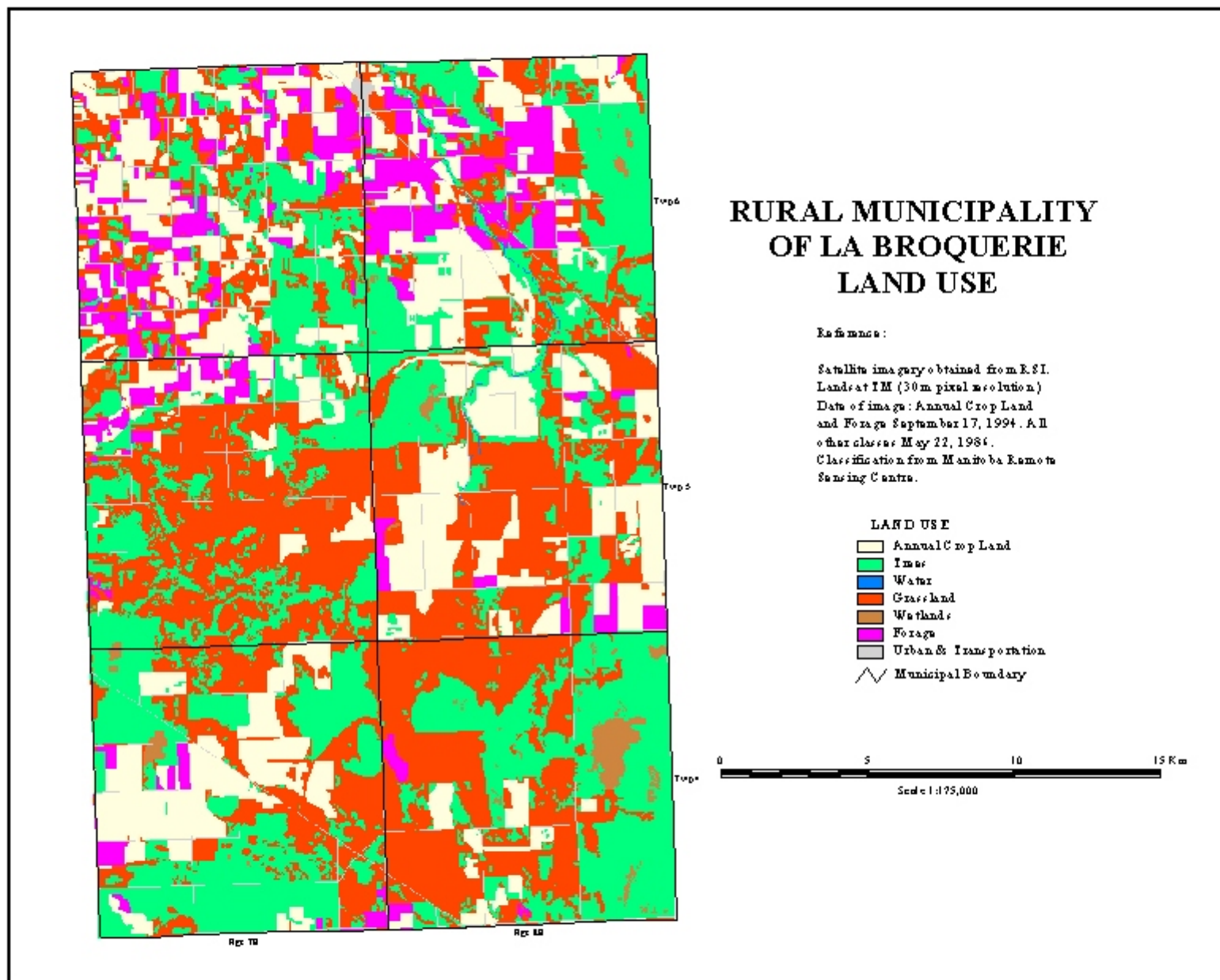
**Water** - open water - lakes, rivers streams, ponds, and lagoons.

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

**Table 9. Land Use<sup>1</sup>**

<b>Class</b>	<b>Area (ha)</b>	<b>Percent of RM</b>
<b>Annual Crop Land</b>	<b>12490</b>	<b>21.4</b>
<b>Forage</b>	<b>4473</b>	<b>7.7</b>
<b>Grasslands</b>	<b>20632</b>	<b>35.4</b>
<b>Trees</b>	<b>18476</b>	<b>31.7</b>
<b>Wetlands</b>	<b>643</b>	<b>1.1</b>
<b>Water</b>	<b>62</b>	<b>0.1</b>
<b>Urban and transportation</b>	<b>1478</b>	<b>2.5</b>
<b>Total</b>	<b>58254</b>	<b>100.0</b>

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



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