Agriculture and Agri-Food Canada
Agriculture et Agroalimentaire Canada

**Rural Municipality of Edward**

**Information Bulletin 97-1**

# Soils and Terrain

## An introduction to the land resource

Land Resource Unit
Brandon Research Centre

Canada

# Rural Municipality of Edward

# Information Bulletin 97-1

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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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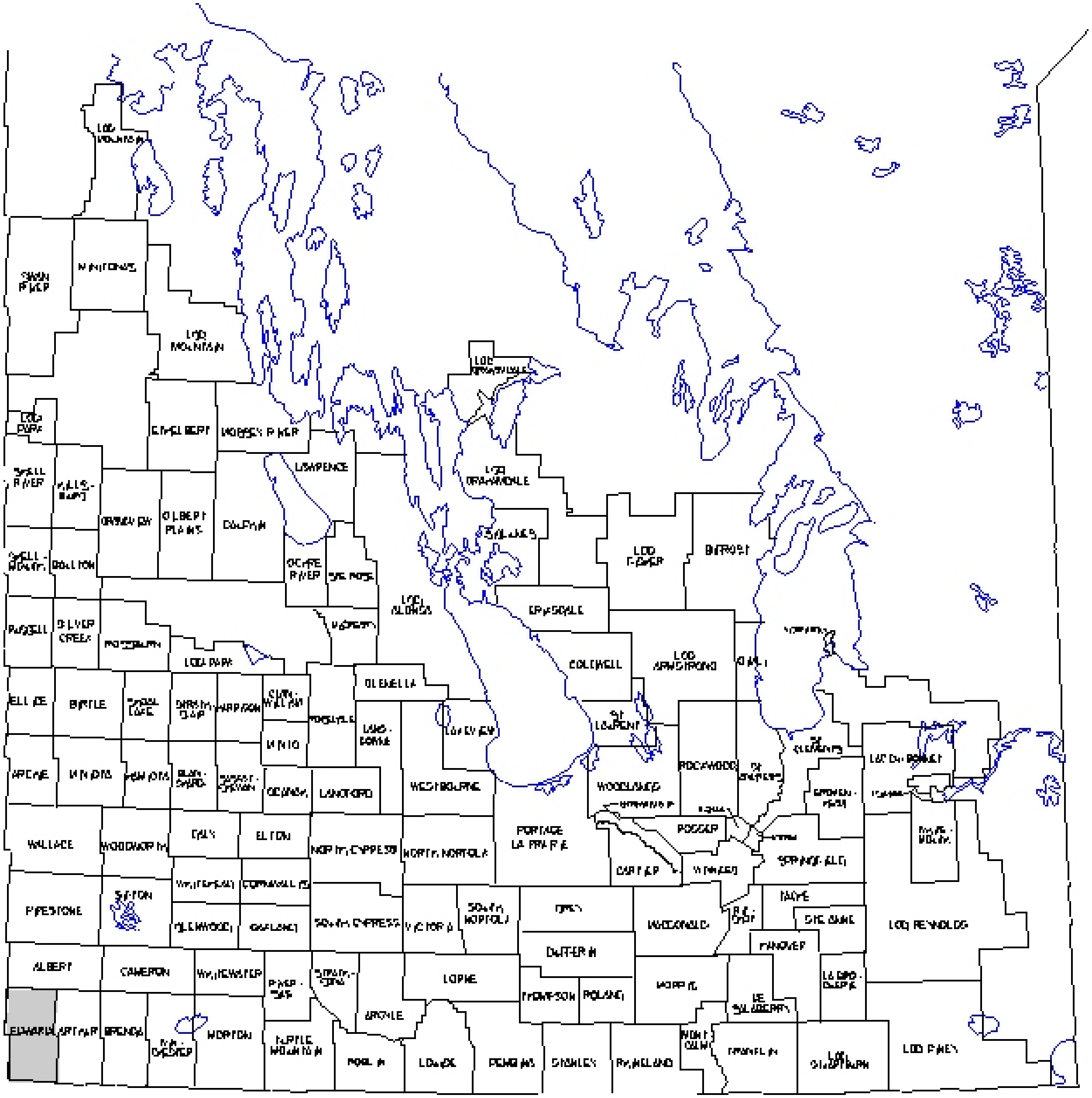


**Figure 1.** Rural municipalities of southern Manitoba.

## INTRODUCTION

The location of the Rural Municipality of Edward is shown in Figure 1. A brief overview of the database information, 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 Geographic Information System (PAMAP GIS) facilities of the Manitoba Land Resource Unit. These databases were used in the GIS to create the generalized, derived and interpretive maps and statistics 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.

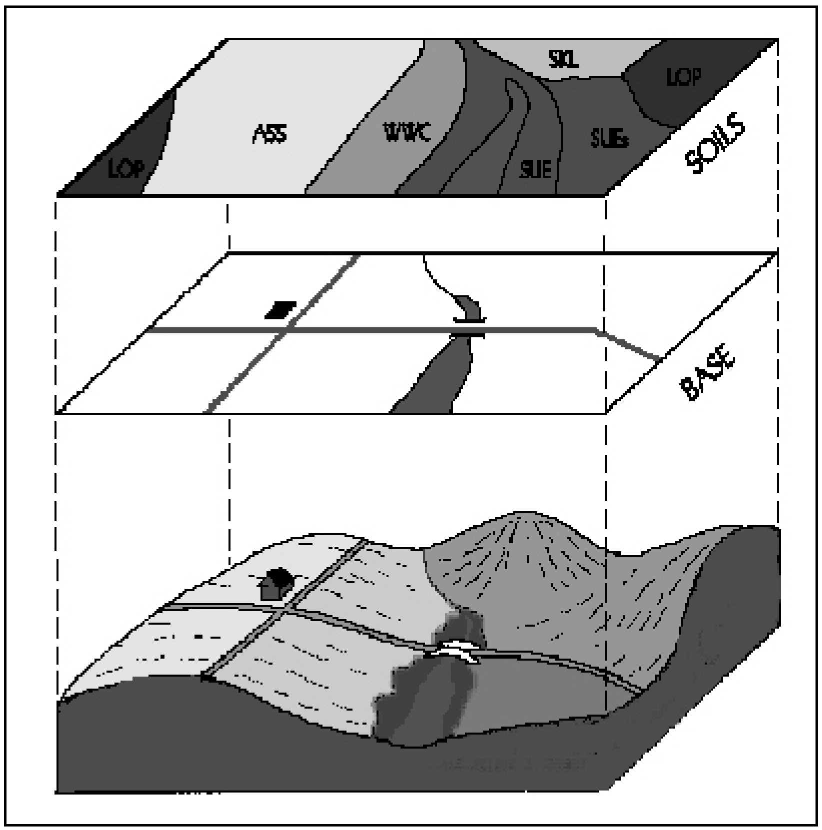



**Figure 2.** Soil and Base Map data.

### 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 was also added, based on air 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 gradient and length classes were also added, based on air photo-interpretation.

## LAND RESOURCE OVERVIEW

The Rural Municipality (RM) of Edward covers an area of 8 townships (77 688 hectares) of land in south-western Manitoba immediately north of the Canada-United States boundary and adjacent to the Manitoba-Saskatchewan boundary (page 3). The main population centres are the villages of Elva, Lyleton and Pierson as most of the population is rural farm-based. Most agricultural services are generally provided from larger centres outside the municipality.

The climate in the municipality can be described by weather data from Pierson. The mean annual temperature is 3.1˚C and the mean annual precipitation is 449 mm (Environment Canada, 1993). The average degree-days above 5˚C is 1656, and the average frost-free period is 110 days (Ash, 1991). The calculated seasonal moisture deficit for the period between May and September for the area ranges from 300 to approximately 317 mm. The estimated effective growing degree days (EGDD) above 5˚C, accumulated from date of seeding to date of the first fall frost, is approximately 1500 (Agronomic Interpretations Working Group, 1995). These parameters provide an indication of moisture and heat energy available for crop growth. These conditions are generally suitable for the production of a wide range of cereal and oil-seed crops adapted to western Canada.

The RM of Edward is located in the Saskatchewan Plain. The majority of the area occurs in the Antler River-Lake Souris Plain while the northwest portion of the municipality is in the Souris Plain (Canada-Manitoba Soil Survey, 1980). The Antler River-Lake Souris Plain ranges in elevation from 442 to about 465 metres asl (m asl) and is characterized by a generally level land surface with low relief (less than 3 m) and slopes usually less than 2 percent (page 9). The Souris Plain occurs at elevations of 472 to about 498 m asl and is characterized by undulating topography with slopes of 2 to 5 percent. Slightly greater local relief occurs along the valleys containing the Antler River and Gainsborough Creek.

The soil materials in this municipality are primarily loam textured, comprised dominantly of lacustrine sediments, loamy glacial till and thin loamy sediments underlain by till (page 11). Sandy glacio-lacustrine sediments cover nearly one-third of the municipality, and occur mainly in the eastern half and southern part of the municipality. Local areas of stratified sand and gravel glaciofluvial material occur mainly in the northern part of the RM.

Soils in the municipality have been mapped at a detailed 1:20 000 scale and a semi-detailed 1:40 000 scale and published in the report, Soils of the Boissevain-Melita Area, Soil Report No. 20, (Eilers et al., 1978). According to the Canadian System of Soil Classification (Expert Committee on Soil Survey, 1987), the soils are dominantly Black Chernozems with minor occurrences of Humic Gleysols. Regosolic soils occur in areas affected by severe wind erosion. A more detailed and complete description of the type, distribution and textural variability of soils in the municipality is provided in the published soil report.

Surface drainage of the RM is facilitated mainly by the Antler River, Gainsborough Creek and Graham Creek and their tributary creeks and channels. Well drained soils cover about 47 percent of the area, mainly in the western half of the municipality. Imperfectly drained soils affected by seasonally high water tables occupy about 37 percent of the land area, mainly in the eastern half. Deep, coarse sand and gravel soils are commonly rapidly drained. Minor areas of poor drainage are scattered throughout the RM (page 13).

A few minor areas of weak soil salinity (page 15) occur in the municipality, usually in association with imperfectly drained soils. In addition to salinity, other management considerations are primarily related to coarse texture and wetness (page 17). Slightly to moderately stony soil conditions are associated with the till soils in the western portion of the RM.

The majority of the soils in the RM (71%) are rated in **Class 2** and **3** for agriculture capability (page 19). About seventy-three percent of the soils are classified as **Good** to **Fair** for irrigation suitability (page 21). Low water holding capacity (droughtiness), topography and wetness are the main limitations for agriculture. Well and imperfectly drained soils in gently sloping landscapes are generally rated **Class 2** for agriculture and **Good** or **Excellent** for irrigation. Rapidly drained sandy soils, coarse sand and gravel soils and very poorly drained soils are rated in **Class 5 and 6** for agriculture and **Poor** for irrigation.

A major issue 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 has been included in this bulletin (page 23). As shown, approximatelt two thirds of the land area of the RM is at **Low** to **Moderate** risk. Areas of sandy and gravelly soils have an increased risk for deep leaching of potential contaminants on the soil surface and are rated as having a **High** potential or risk for environmental impact under irrigation. This EI map is intended to be used in association with the irrigation suitability map.

Another issue of concern to producers and soil conservation and land use specialists is soil erosion caused by agricultural cropping and tillage practices. To highlight areas with potential for water erosion, a risk map has been included to show where special practices should be adopted to mitigate this risk (page 25). The risk of water erosion is **Negligible** for the majority of the soils in the RM although about one-third of the area is at a **Low** to **Moderate** risk. Areas of gently undulating loamy soils are at **High** risk of water erosion and low knolls in these areas are also susceptible to erosion by wind. Management practices focus primarily on maintaining adequate crop residues to provide sufficient surface cover during the early spring period. Sandy soils require careful management to keep soil erosion to a minimum; these practices include shelter belts, minimum tillage and suitable crop rotations. To provide adequate protection for the land most at risk to water erosion and the coarser textured soils most at risk from wind erosion, a shift in land use away from annual cultivation to production of perennial forages and pasture may be required.

Land use in the RM of Edward is primarily agriculture. An assessment of the status of land use in 1993 was obtained through an analysis of satellite imagery (page 27). It showed that annual crops occupied about 61% of the land in the RM, while the remaining areas were in grassland (29.1%), forage production (2.7%) and tree cover (3.1%). Treed areas occur primarily around poorly drained depressions in till landscapes and as shelter belts on level lacustrine soils. Wetlands cover 1.4 percent of the area and surface water exists primarily as intermittent water bodies during wet seasons. The grassland areas provide native and improved pasture and forage for livestock. Various non-agricultural uses such as recreation and infrastructure for urban areas and transportation occupy about 2.6 percent of the RM.

While most of the soils in the RM of Edward have moderate to moderately severe limitations for arable agriculture, management of lands with severe to very severe limitations requires careful choice of crops and maintenance of adequate surface cover to reduce the risk of degradation and maintain productivity. Implementation of conservation practices on all soils on a site-by-site basis will help to insure that agriculture land use is sustainable over the long term.

**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.

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.**

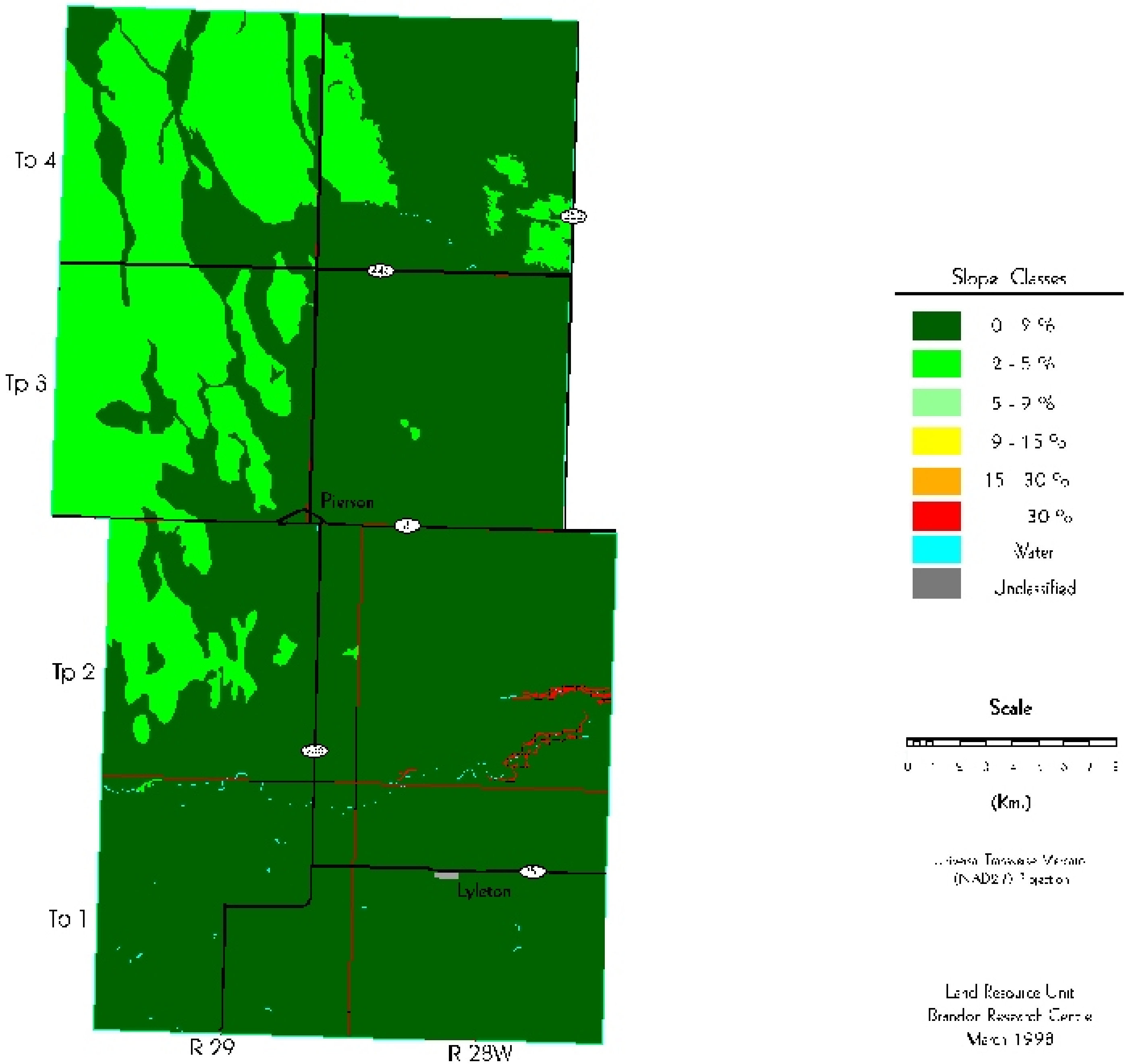
Slope describes the steepness of the landscape surface. The slope classes shown on this map are derived from the digital soil layer database. Specific colours are used to indicate the dominant slope class for each soil polygon in the RM. Additional slope classes may occur in each polygon area, but cannot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

**Table 1. Slope Classes**[1]

| Slope Class | Area (ha) | Percent of RM |
|---|---|---|
| 0 - 2 % | 59966 | 77.2 |
| 2 - 5 % | 17483 | 22.5 |
| 5 - 9 % | 0 | 0.0 |
| 9 - 15 % | 0 | 0.0 |
| 15 - 30 % | 0 | 0.0 |
| > 30 % | 143 | 0.2 |
| Unclassified | 23 | 0.0 |
| Water | 73 | 0.1 |
| Total | 77688 | 100.0 |

[1] Area has been assigned to the dominant slope class in each soil polygon.

# Slope Map


Tp 4
Tp 3
Tp 2
Tp 1
Pierson
Lyleton
R 29
R 28W
Slope Classes
2 - 5 %
9 - 15 %
30 %
Water
Unclassified
Scale
(Km.)
Land Resource Unit

**Surface Texture Map.**

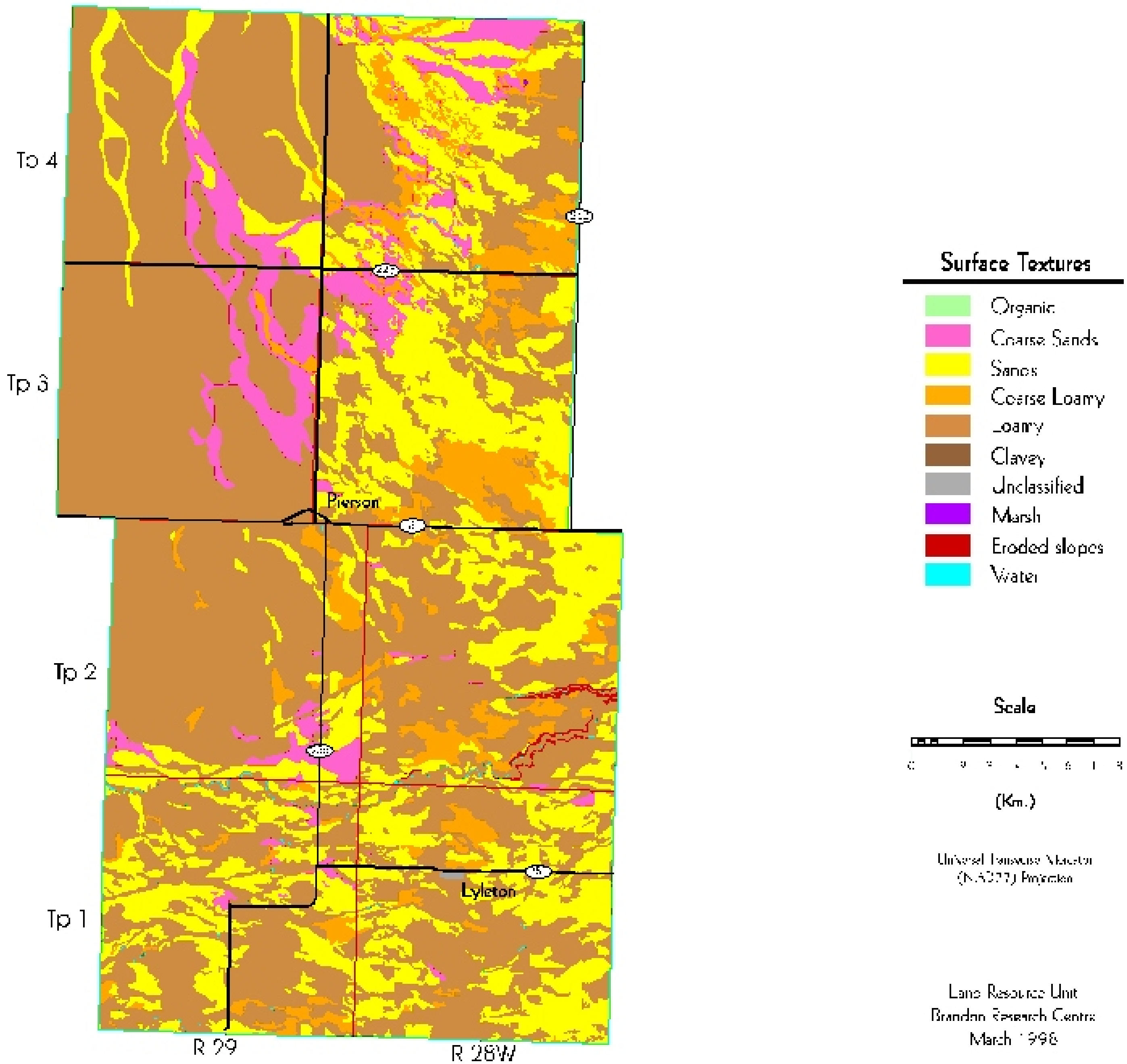
The soil textural class for the upper most soil horizon of the dominant soil series within a soil polygon was utilized for classification. Texture may vary from that shown with soil depth and location within the polygon.

**Table 2. Surface Texture**[1]

| Surface Texture | Area (ha) | Percent of RM |
|---|---|---|
| **Organics** | **0** | **0.0** |
| **Coarse Sands** | **4898** | **6.3** |
| **Sands** | **21042** | **27.1** |
| **Coarse Loamy** | **5827** | **7.5** |
| **Loamy** | **45679** | **58.8** |
| **Clayey** | **0** | **0.0** |
| **Eroded Slopes** | **143** | **0.2** |
| **Marsh** | **3** | **0.0** |
| **Unclassified** | **23** | **0.0** |
| **Water** | **73** | **0.1** |
| **Total** | **77688** | **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.

**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.

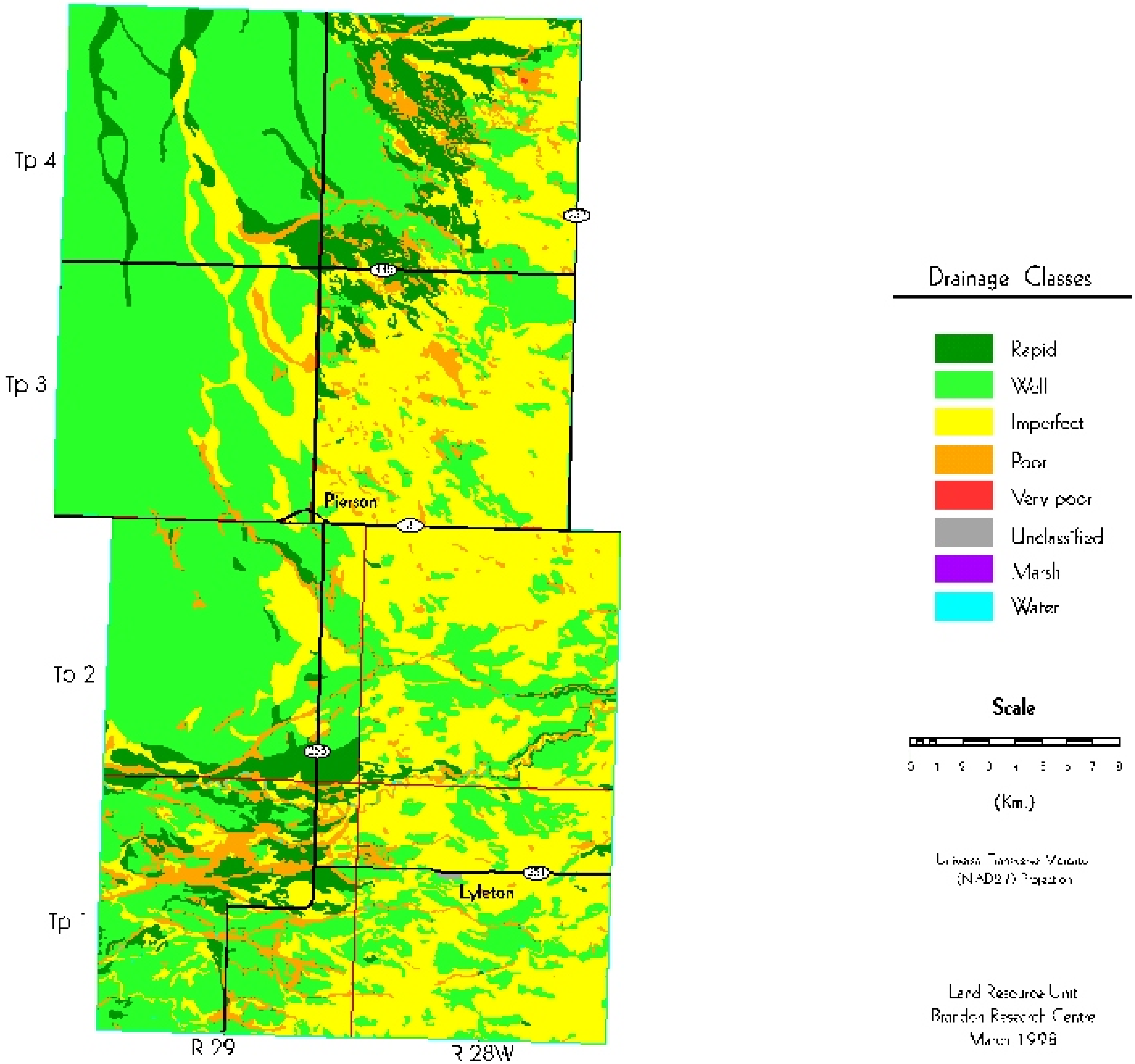
Drainage classification is based on the dominant soil series within each individual soil polygon.

**Table 3. Drainage Classes[1]**

| Drainage Class | Area (ha) | Percent of RM |
|---|---|---|
| Very Poor | 3 | 0.0 |
| Poor | 5223 | 6.7 |
| Imperfect | 28343 | 36.5 |
| Well | 36521 | 47.0 |
| Rapid | 7502 | 9.7 |
| Marsh | 0 | 0.0 |
| Unclassified | 23 | 0.0 |
| Water | 73 | 0.1 |
| Total | 77688 | 100.0 |

[1] 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:

| | |
|---|---|
| **non-saline** | < 4 dS/m |
| **weakly saline** | 4 to 8 dS/m |
| **moderately saline** | 8 to 15 dS/m |
| **strongly saline** | > 15 dS/m. |

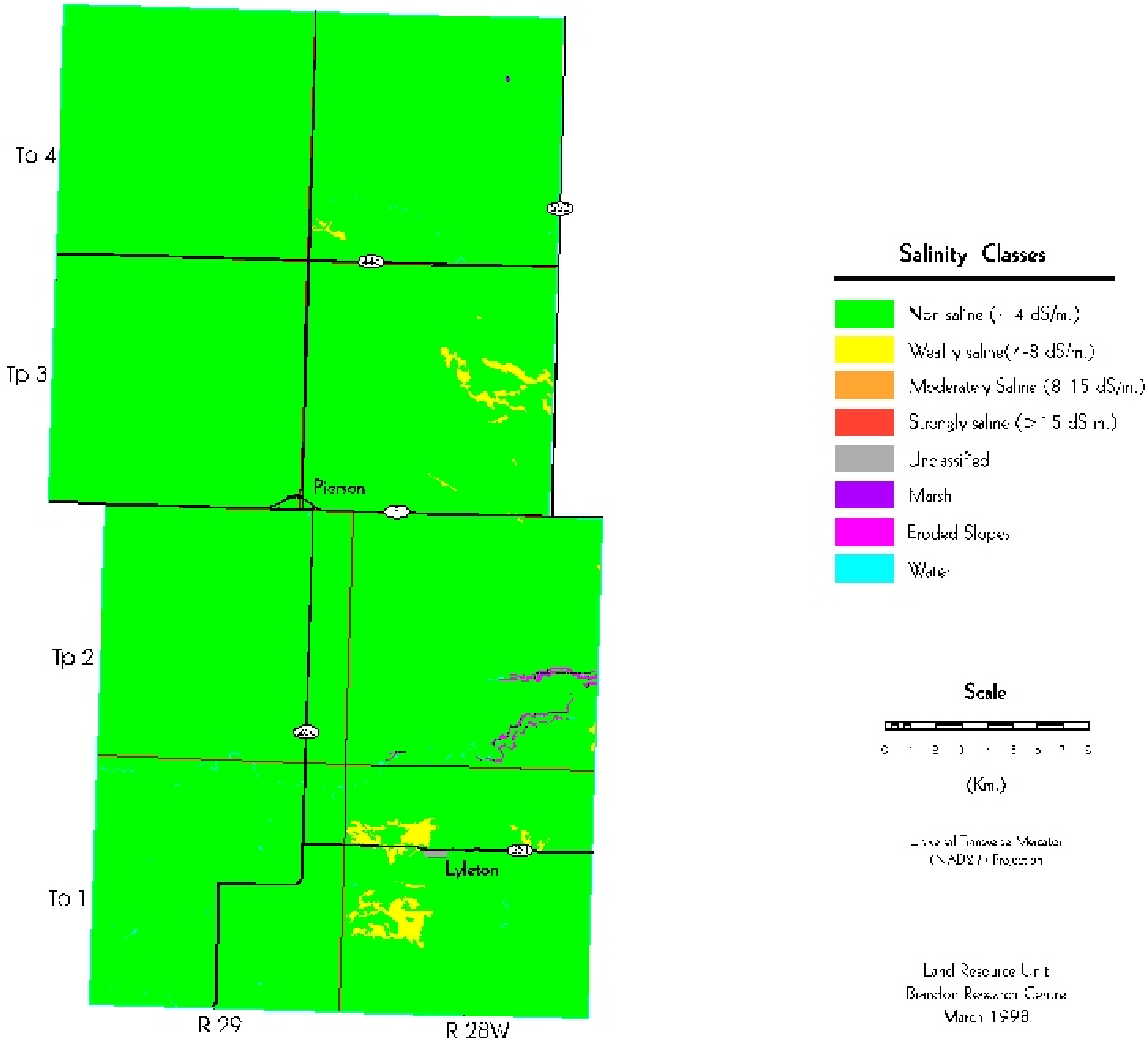
The salinity classification of each individual soil polygon was determined by the most severe salinity classification present within that polygon.

**Table 4. Salinity Classes[1]**

| Salinity Class | Area (ha) | Percent of RM |
|---|---|---|
| **Non Saline** | **76564** | **98.6** |
| **Weakly Saline** | **882** | **1.1** |
| **Moderately Saline** | **0** | **0.0** |
| **Strongly Saline** | **0** | **0.0** |
| **Eroded Slopes** | **143** | **0.2** |
| **Marsh** | **3** | **0.0** |
| **Unclassified** | **23** | **0.0** |
| **Water** | **73** | **0.1** |
| **Total** | **77688** | **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.

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

**F = Fine texture** - soil landscapes with **fine textured soils (clays and silty clays)**, have 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.

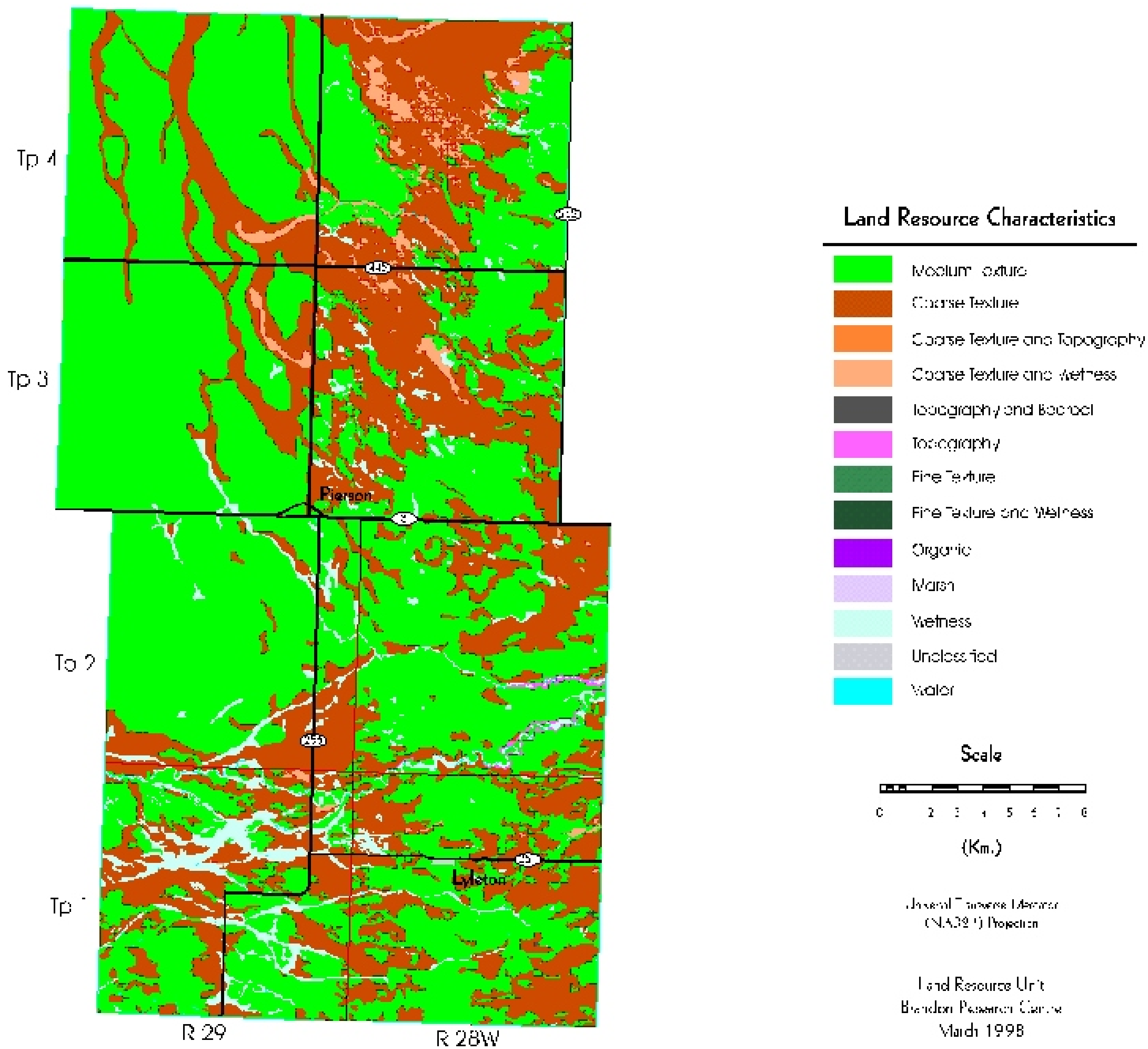
**R = Bedrock** - soil landscapes that have shallow depth to bedrock (< 50 cm) and/or exposed bedrock which may prevent the use of some or all tillage practices as well as the range of potential crops. They require special cropping and management practices to sustain agricultural production.

**Table 5. Management Considerations**[1]

| Land Resource Characteristics | Area (ha) | Percent of RM |
|---|---|---|
| Fine Texture | 0 | 0.0 |
| Fine Texture and Wetness | 0 | 0.0 |
| Fine Texture and Topography | 0 | 0.0 |
| Medium Texture | 46714 | 60.1 |
| Coarse Texture | 25507 | 32.8 |
| Coarse Texture and Wetness | 1510 | 1.9 |
| Coarse Texture and Topography | 0 | 0.0 |
| Topography | 143 | 0.2 |
| Topography and Bedrock | 0 | 0.0 |
| Wetness | 3707 | 4.8 |
| Wetness and Topography | 0 | 0.0 |
| Bedrock | 0 | 0.0 |
| Organic | 0 | 0.0 |
| Marsh | 3 | 0.0 |
| Unclassified | 23 | 0.0 |
| Water | 73 | 0.1 |
| Total | 77688 | 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]**

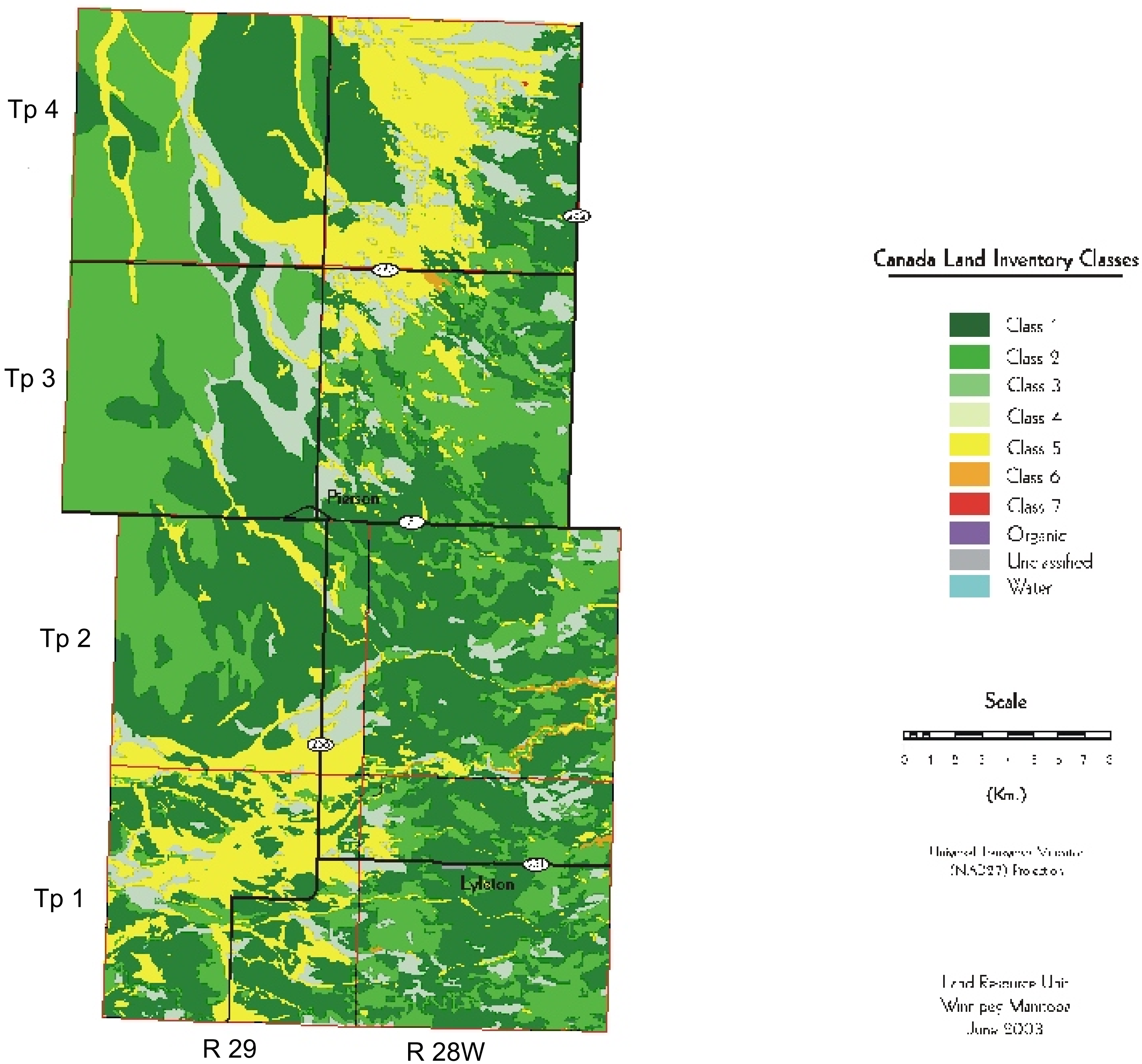
| Class / Subclass | Area (ha) | Percent of RM |
|---|---|---|
| **1** | **4** | **0.0** |
| **2** | **32344** | **41.5** |
| 2E | 71 | 0.1 |
| 2I | 186 | 0.2 |
| 2IW | 205 | 0.3 |
| 2M | 3454 | 4.4 |
| 2MT | 384 | 0.5 |
| 2P | 1073 | 1.4 |
| 2T | 1771 | 2.3 |
| 2TP | 3771 | 4.8 |
| 2TW | 167 | 0.2 |
| 2W | 10064 | 12.9 |
| 2WE | 347 | 0.4 |
| 2X | 10851 | 13.9 |

**Table 6. Agricultural Capability[1](cont)**

| Class / Subclass | Area (ha) | Percent of RM |
|---|---|---|
| 3 | 23339 | 30.0 |
| 3EM | 65 | 0.1 |
| 3EW | 15 | 0.0 |
| 3I | 679 | 0.9 |
| 3M | 10586 | 13.6 |
| 3MN | 32 | 0.0 |
| 3N | 587 | 0.8 |
| 3P | 11375 | 14.6 |
| **4** | **8542** | **11.0** |
| 4EM | 45 | 0.1 |
| 4M | 8379 | 10.8 |
| 4ME | 116 | 0.1 |
| 4R | 2 | 0.0 |
| **5** | **13317** | **17.1** |
| 5M | 8078 | 10.4 |
| 5W | 4834 | 6.2 |
| 5WI | 405 | 0.5 |
| **6** | **228** | **0.3** |
| 6M | 85 | 0.1 |
| 6T | 144 | 0.2 |
| **7** | **3** | **0.0** |
| 7W | 3 | 0.0 |
| **Unclassified** | **24** | **0.0** |
| **Water** | **73** | **0.1** |
| **Organic** | **0** | **0.0** |
| **Total** | **77873** | **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.

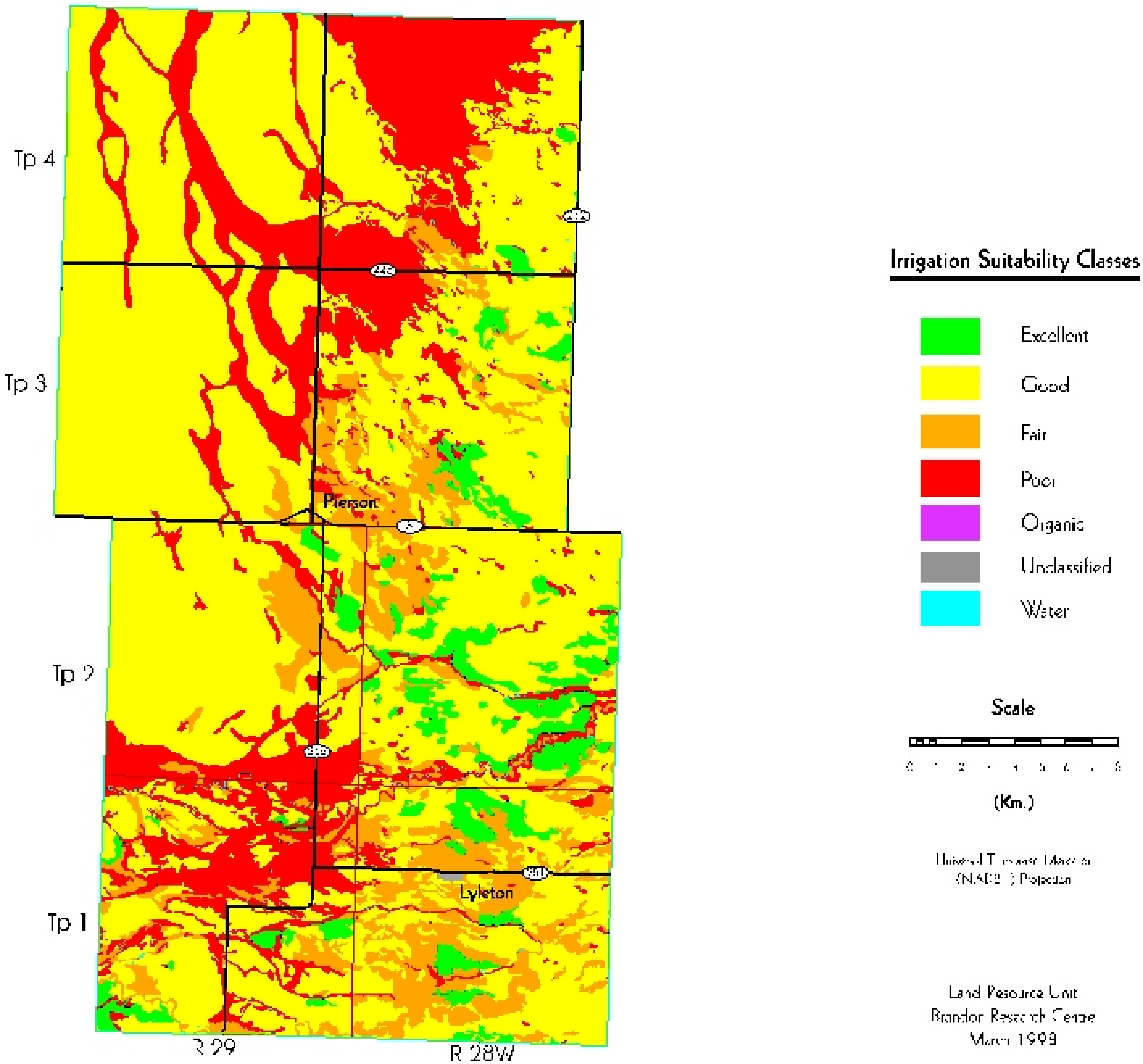
This generalized interpretive map is based on the dominant soil series for each soil polygon, in combination with the dominant slope class. The nature of the subclass limitations and the classification of subdominant components is not shown at this generalized map scale.

**Table 7. Irrigation Suitability[1]**

| Class | Area (ha) | Percent of RM |
|---|---|---|
| Excellent | 3991 | 5.1 |
| Good | 48122 | 61.9 |
| Fair | 8995 | 11.6 |
| Poor | 16484 | 21.2 |
| Organic | 0 | 0.0 |
| Unclassified | 23 | 0.0 |
| Water | 73 | 0.1 |
| Total | 77688 | 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 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.

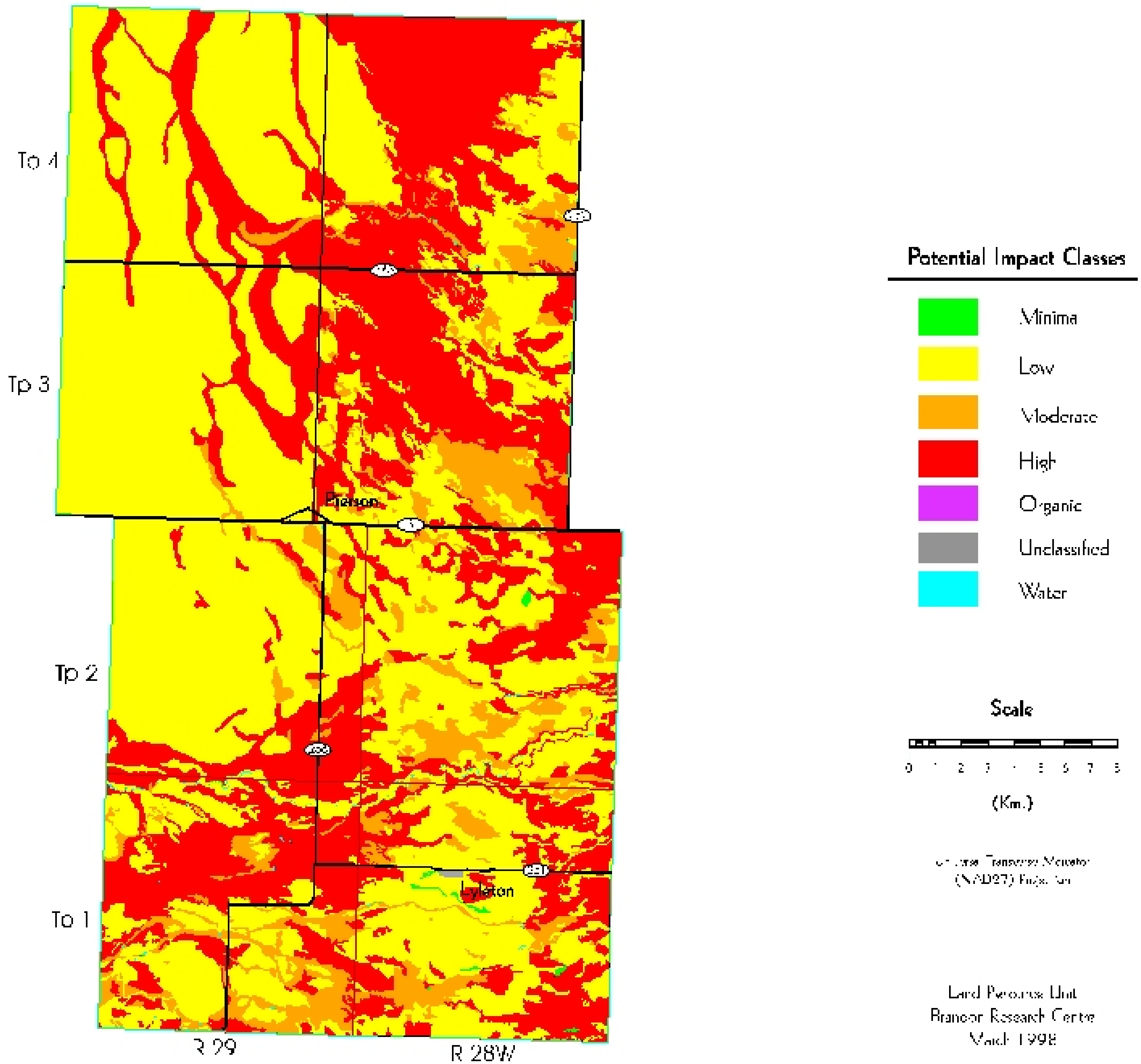
This generalized interpretive map is based on the dominant soil series and slope class for each soil polygon. The nature of the subclass limitations, and the classification of subdominant components is not shown at this generalized map scale.

**Table 8. Potential Environmental Impact Under Irrigation[1]**

| Class | Area (ha) | Percent of RM |
|---|---|---|
| **Minimal** | **73** | **0.1** |
| **Low** | **43767** | **56.3** |
| **Moderate** | **6854** | **8.8** |
| **High** | **26899** | **34.6** |
| **Organic** | **0** | **0.0** |
| **Unclassified** | **23** | **0.0** |
| **Water** | **73** | **0.1** |
| **Total** | **77688** | **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 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. The map shows 5 classes of soil erosion risk based on bare unprotected soil:

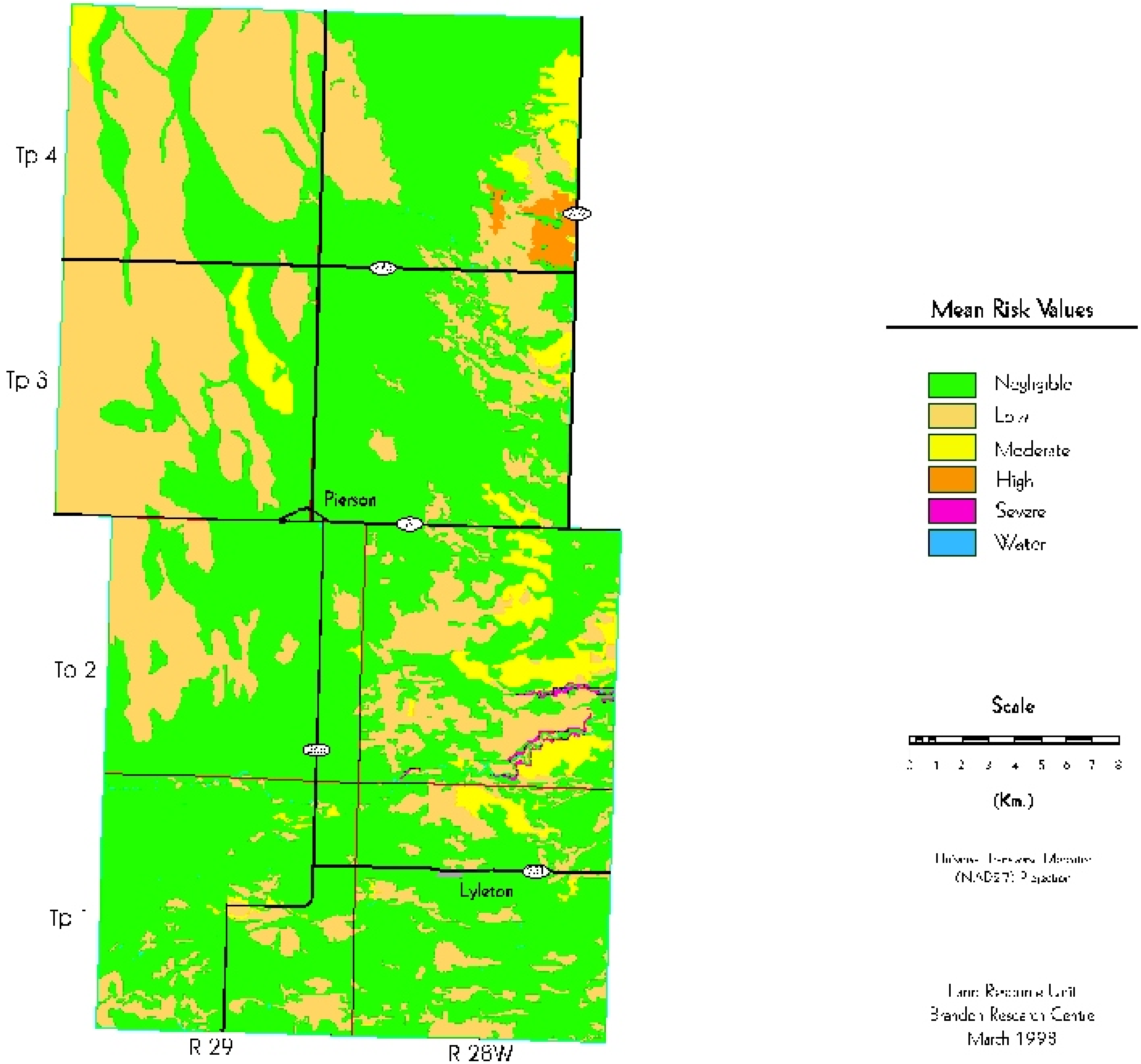
**negligible**
**low**
**moderate**
**high**
**severe.**

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 | 48292 | 62.2 |
| Low | 25096 | 32.3 |
| Moderate | 3604 | 4.6 |
| High | 456 | 0.6 |
| Severe | 143 | 0.2 |
| Unclassified | 23 | 0.0 |
| Water | 73 | 0.1 |
| Total | 77688 | 100.0 |

# 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.

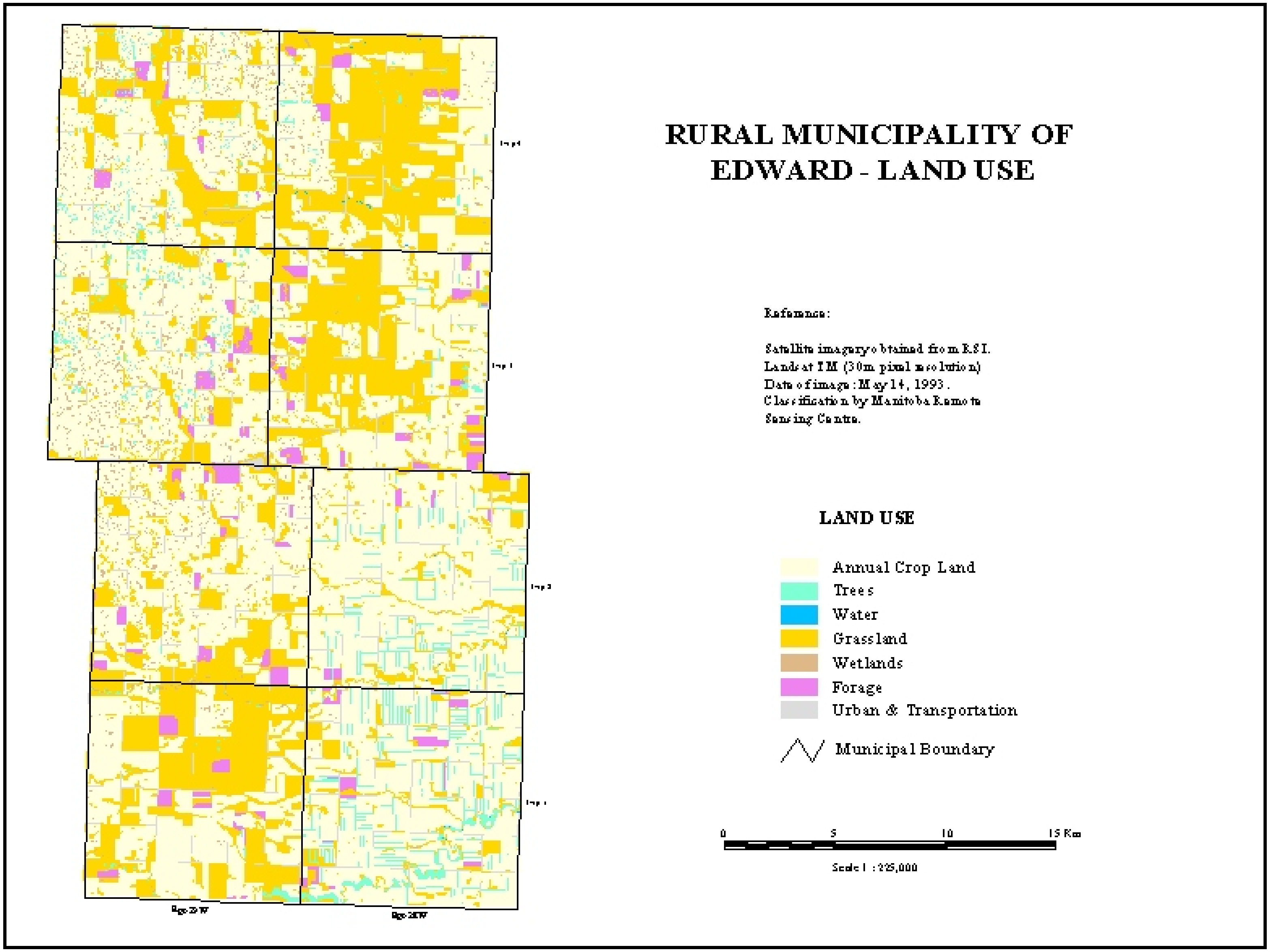
**Water** - open water - lakes, rivers streams, ponds, and lagoons.

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

**Table 10. Land Use[1]**

| Class | Area (ha) | Percent of RM |
|---|---|---|
| Annual Crop Land | 47784 | 61.1 |
| Forage | 2123 | 2.7 |
| Grasslands | 22734 | 29.1 |
| Trees | 2422 | 3.1 |
| Wetlands | 1074 | 1.4 |
| Water | 24 | 0.0 |
| Urban and Transportation | 2062 | 2.6 |
| Total | 78223 | 100.0 |

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


RURAL MUNICIPALITY OF
EDWARD - LAND USE
Reference:
Satellite imagery obtained from RSI.
Landsat TM (30m pixel resolution)
Date of image: May 14, 1993.
Classification by Manitoba Remote
Sensing Centre.
LAND USE
Annual Crop Land
Trees
Water
Grassland
Wetlands
Forage
Urban & Transportation
Municipal Boundary
0
5
10
15 Km

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