Agriculture and Agri-Food Canada
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Rural Municipality of Blanshard

Information Bulletin 98-15

Soils and Terrain

An introduction to the land resource

Land Resource Unit
Brandon Research Centre

Canada

Rural Municipality of Blanshard

Information Bulletin 98-15

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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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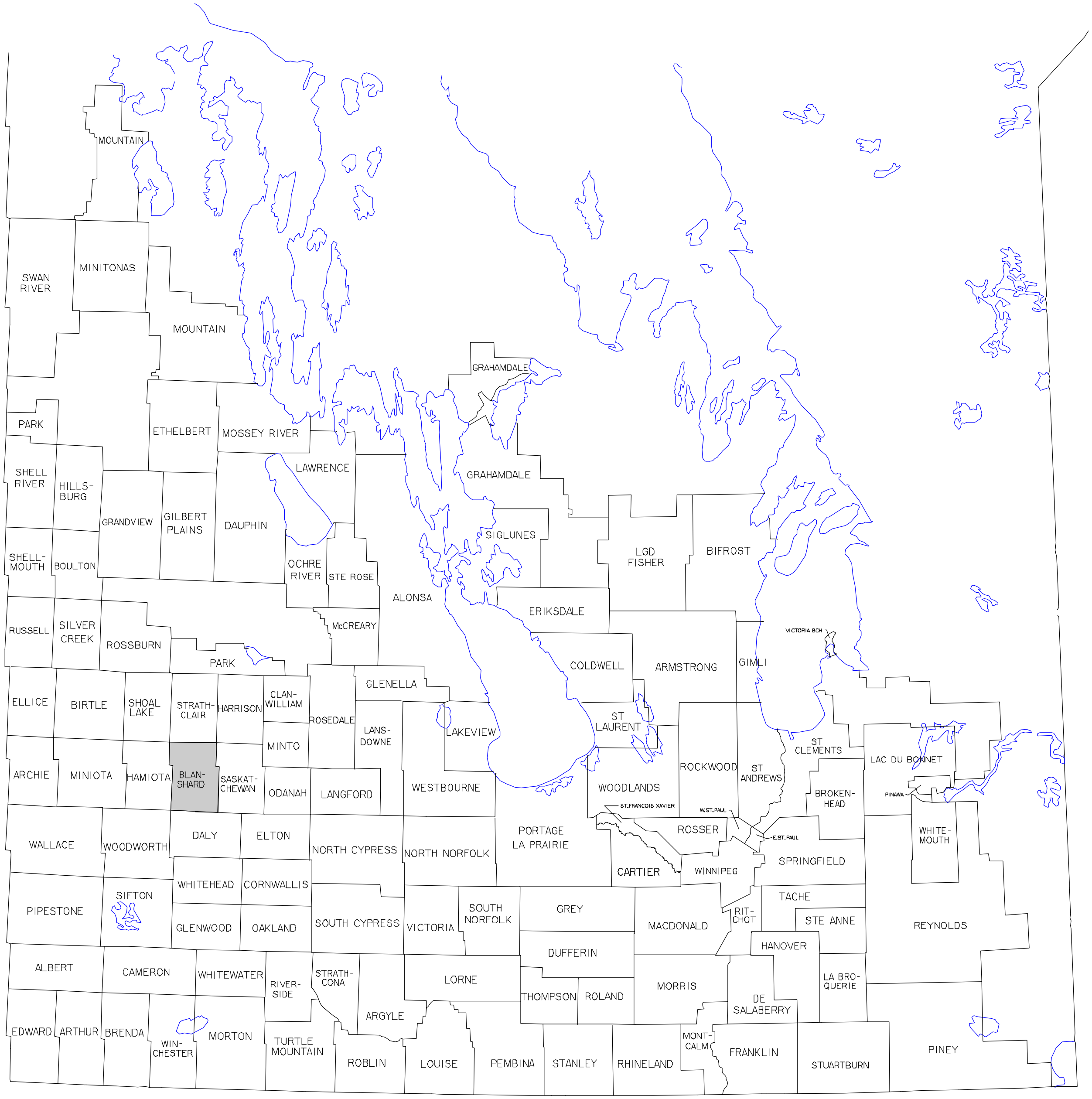


Figure 1. Rural municipalities of southern Manitoba.

INTRODUCTION

The location of the Rural Municipality of Blanshard 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 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.

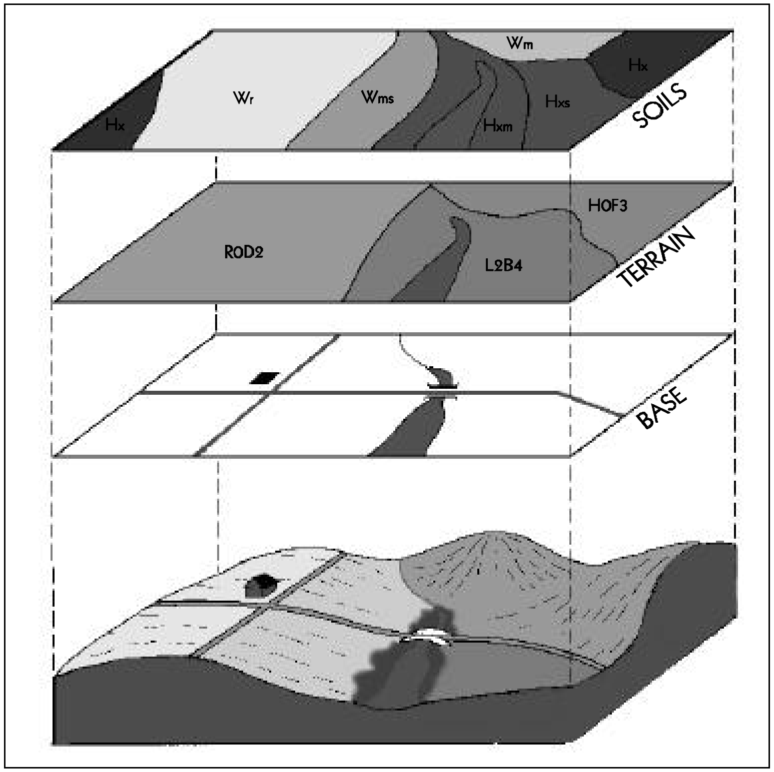


Figure 2. Soil, Terrain and Base Map data.

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.

Terrain Layer

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

Surface form	Wetland size
Slope	Erosional modifiers
Slope length	Extent of eroded knolls
Percent wetlands	

The four legend characteristics on the left are considered differentiating, that is, a change in any of these classes defines a new polygon.

Soil Layer

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, reconnaissance soil map polygons were related to soil drainage, surface texture, and other soil properties to produce various interpretive maps.

SOIL AND TERRAIN OVERVIEW

The Rural Municipality (RM) of Blanshard covers an area of 6 townships (approximately 58 038 hectares) of land in western Manitoba (page 3). The Town of Oak River is the main population centre in the municipality and aside from a small concentration of people in the village of Cardale, most of the population is rural farm-based.

The climate in the municipality can be related to the weather data from Hamiota located 8 km to the west. The mean annual temperature at Hamiota is 1.6°C and the mean annual precipitation is 426 mm (Environment Canada, 1982). The average frost-free period is 104 days and growing degree-days above 5°C average 1552 (Ash, 1991). The calculated seasonal moisture deficit for the period between May and September for the area ranges between 200 mm to the north and 250 mm in the southwest corner. The estimated effective growing degree days (EGDD) above 5°C accumulated from date of seeding to the date of the first fall frost range from 1300 in the northeast to 1400 in the southwest (Agronomic Interpretations Working Group, 1995).

Physiographically, the RM of Blanshard is located entirely in the Newdale Plain subsection of the Saskatchewan Plain (Canada-Manitoba Soil Survey, 1980). Elevations in the municipality gradually decrease from 692 metres above sea level (m asl) in the northeast to about 487 m asl in the southwest. Lowest elevations of 480 m asl occur where Oak River flows south from the municipality and Broughtons Creek flows from the southeast corner of the area. The land surface varies from near level and gently undulating to hummocky. About half of the municipality is characterized by irregular, gently undulating topography with average relief under 3 m and slopes ranging from 2 to 5 percent while the remainder consists of slightly rougher topography with higher local relief ranging from 3 to 8 metres and slopes from 5 to 9 percent. Extensive areas are characterized by numerous sloughs and intermittent water bodies in depressions (page 9).

The soil materials in this municipality consist mainly of loamy textured glacial till (morainal) deposits. Minor areas of gravel and sand deposits occur in and along the small channels containing Oak River and Broughtons Creek (page 11).

Soils in the municipality have been mapped at a reconnaissance map scale of 1:126 720 and published in the soil survey report for the Rossburn and Virden Map Sheet Areas (Ehrlich et al, 1956). According to the Canadian System of Soil Classification (Expert Committee on Soil Survey, 1987), the soils are classified as dominantly Black Chernozems of the Newdale Association. Local areas of poorly drained soils (Gleysols) are common in depressional areas of the landscape (page 11). A more detailed and complete description of the type, distribution and textural variability of soils in the municipality is provided in the published soil survey.

Surface drainage of the municipality is provided by a sparse network of creeks and intermittent streams tributary to Oak River which flows south to the Assiniboine River and Broughtons Creek flowing to the Little Saskatchewan River and subsequently to the Assiniboine River. The soils are dominantly well drained in undulating and hummocky topography with minor areas of imperfectly drained soil on lower slopes. Surface runoff collects in depressional areas throughout the landscape. These sites are characterized by poorly drained soils, and many of the depressions contain shallow intermittent ponds and small lakes during spring snowmelt and periods of high rainfall (page 13).

Management considerations are related primarily to topography and drainage (page 15). Salinity is a minor concern throughout most of the municipality, but the Newdale smooth phase in the southern part of the municipality is characterized by low relief and high watertables with upward groundwater pressure resulting in a higher proportion of saline soils. Saline soils commonly occur throughout poorly drained depressional areas and in lower slopes around the depressions. Crests and upper slopes of low knolls and ridges in this area are usually calcareous and may be weakly saline, particularly in the subsoil. The topographic pattern associated with undulating and hummocky terrain in the municipality is characterized by numerous undrained depressions varying in size from small potholes and sloughs to larger meadows and intermittent and shallow lakes. This variation in drainage and the associated distribution of salinity serves to break up the field pattern and limit agricultural use. Many of the poorly drained soils are non-arable because of inundation during the spring season and some soils are affected by excessive salinity. Variably stony soils occur throughout the municipality but do not constitute a serious problem to cultivation over most of the area.

Approximately 47 percent of the land in the RM is rated as **Class 2** for agriculture capability (page 17) and **Good** for irrigation suitability (page 19). An additional 44 percent is rated as **Class 3** for agriculture capability (page 17) and **Fair** for irrigation suitability (page 19). Topography, stoniness, wetness and salinity are the main limitations for agriculture capability. Poorly drained soils are rated in **Class 5** for agriculture capability and **Poor** for irrigation. Steeply sloping land is rated in **Class 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 21). As shown, half of the municipality is at a **Low** risk of degradation. An additional 47 percent of the land with greater local relief and slightly higher slopes is at a **Moderate** risk of degradation due to greater risk of runoff to streams and water bodies in the landscape. 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. 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 23). About 3 percent of the land in the RM is at **Severe** risk of degradation and an additional 32 percent of the area has a **High** risk. One-half of the land in the RM is considered to have a **Moderate** risk of water erosion. Just over 9 percent of the area is at **Low** risk and 6 percent has a **Negligible** risk of water erosion. Management practices for these soils most at risk from water erosion focus primarily on maintaining adequate crop residues to provide sufficient surface cover during the early spring period. These practices include minimum tillage and suitable crop rotations.

An assessment of the status of land use in the RM of Blanshard in 1994 was obtained through analysis of satellite imagery. It showed that just over 72 percent of the land in the RM is in annual cropland with an additional 11.3 percent of the area in grassland, most of which is used for hay and pasture. Wooded areas cover about 5 percent of the land, mostly on steeper slopes and around poorly drained depressions. Production of perennial forages occurs on 1.5 percent of the area.. Natural wetlands cover some 6.5 percent of the municipality. Various non-agricultural uses such as recreation and infrastructure for urban areas and transportation occupy 2.9 percent of the land area in the RM (page 25).

While the majority of the soils in the RM of Blanshard have moderate to moderately severe limitations for arable agriculture, careful choice of crops and maintenance of adequate surface cover is essential for the management of sensitive lands with steep slopes. Implementation of minimum tillage practices and crop rotations including forage on a site-by-site basis will help to reduce the risk of soil degradation, maintain productivity and 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 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
Generalized Soil
Drainage
Management Considerations

<u>Interpretative Maps</u>
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 Land Resource Unit.

Slope Map.

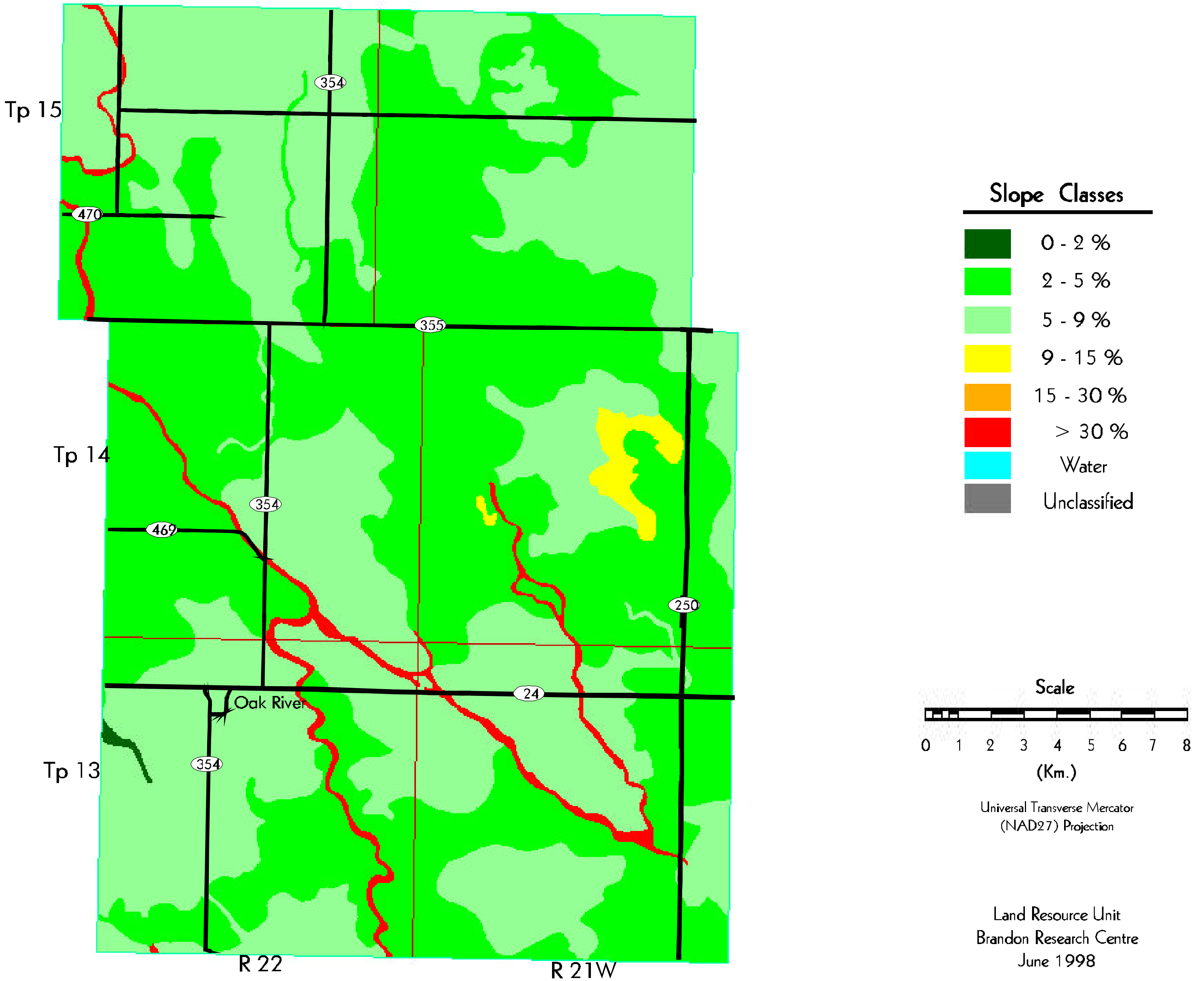
Slope describes the steepness of the landscape surface. The slope classes shown on this map are derived from the digital soil and terrain layer database. Specific colours are used to indicate the dominant slope class for each polygon in the RM. Additional slope classes may occur in each polygon area,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

Table 1. Slope Classes[1]

Slope Class	Area (ha)	Percent of RM
0 - 2 %	62	0.1
2 - 5 %	28942	49.9
5 - 9 %	27328	47.1
9 - 15 %	511	0.9
15 - 30 %	0	0.0
> 30 %	1195	2.1
Unclassified	0	0.0
Water	0	0.0
Total	58038	100.0

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

Slope Map


Tp 15
Tp 14
Tp 13
R 22
R 21W
354
470
355
469
250
24
Oak River
Slope Classes
0 - 2 %
2 - 5 %
5 - 9 %
9 - 15 %
15 - 30 %
> 30 %
Water
Unclassified
Scale
0 1 2 3 4 5 6 7 8
(Km.)
Universal Transverse Mercator
(NAD27) Projection
Land Resource Unit
Brandon Research Centre
June 1998

Generalized Soil Map.

The most recently available soil maps were digitized to produce the new digital soil map. For older reconnaissance soil maps, areas of overprinted symbols or significant differences in topography have been delineated as new polygons. All soil polygons have been digitized and translated into modern soil series equivalents.

The general soil groups provide a very simplified overview of the soil information contained in the digital soil map. The hundreds of individual soil polygons have been simplified into broad groups of soils with similar parent material origins, textures, and drainage classes. The dominant soil in each polygon determines the soil group, area, and colour for the generalized soil map. Gleysolic soils groups have poor to very poor drainage, while other mineral soil groups typically have a range of rapid, well, or imperfectly drained soils.

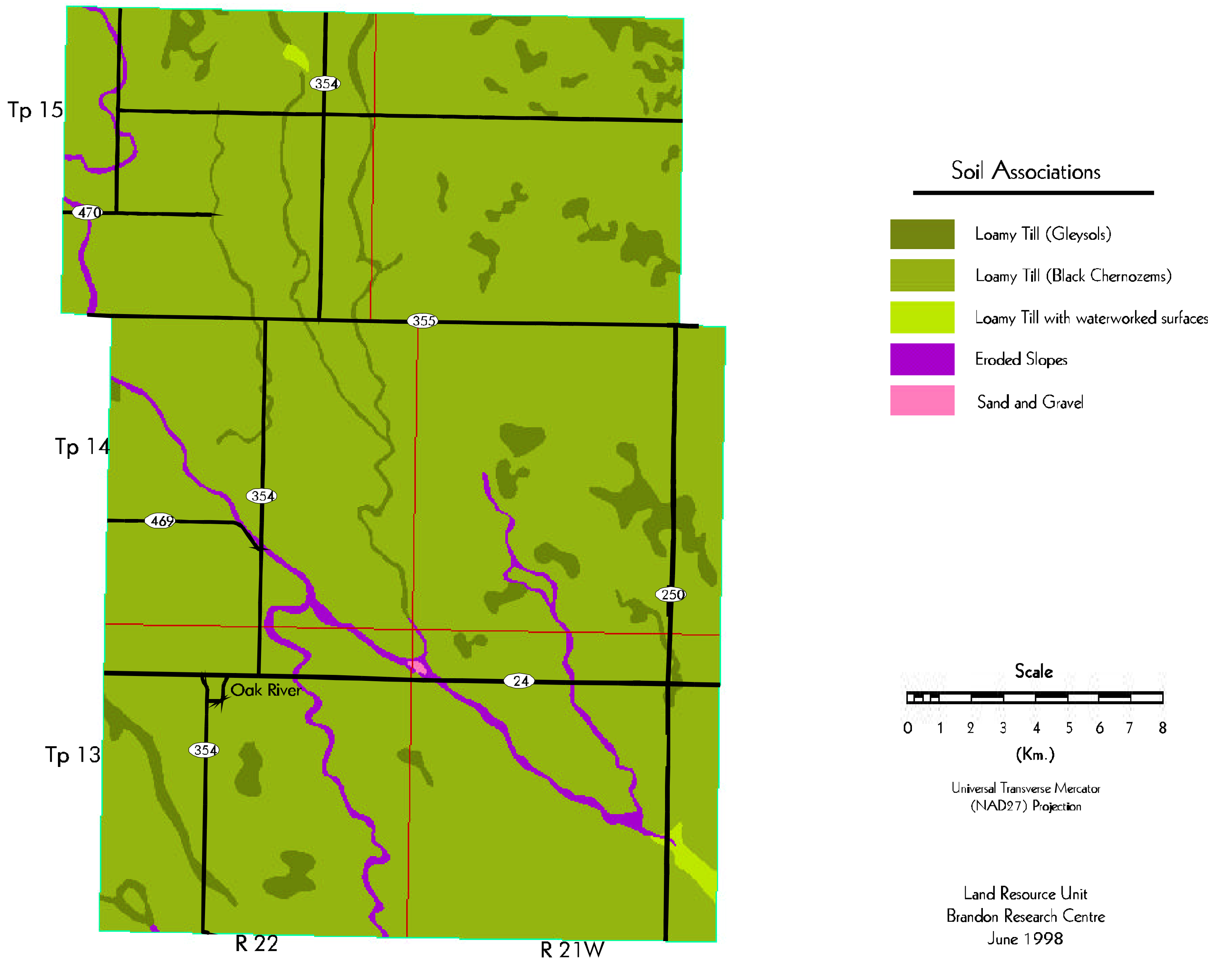
More detailed maps showing the dominant and subdominant soils in each polygon can also be produced at larger map scales.

Table 2. Generalized Soil Groups[1]

Soil Groups	Area (ha)	Percent of RM
Loamy Till (Gleysols)	**3589**	**6.2**
Loamy Till (Black Chernozem)	**53047**	**91.4**
Loamy Till with water worked surfaces	**192**	**0.3**
Eroded Slopes	**1195**	**2.1**
Sand and Gravel	**15**	**0.0**
Total	**58038**	**100.0**

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

Generalized Soil Map



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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.

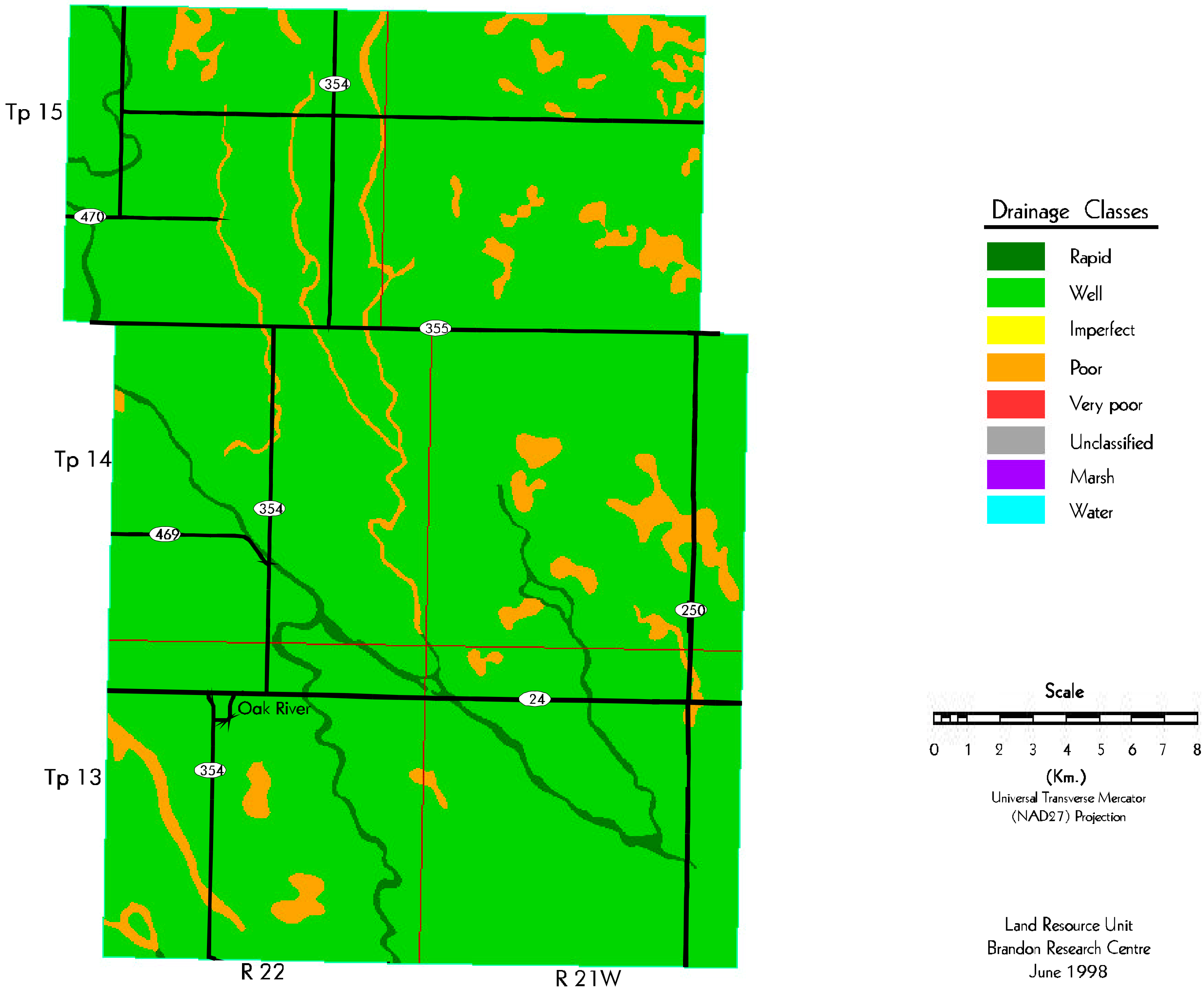
Drainage classification is based on the dominant soil series within each individual soil polygon.

Table 3. Drainage Classes[1]

Drainage Class	Area (ha)	Percent of RM
Very Poor	0	0.0
Poor	3589	6.2
Imperfect	0	0.0
Well	53253	91.8
Rapid	1195	2.1
Marsh	0	0.0
Unclassified	0	0.0
Water	0	0.0
Total	58038	100.0

[1] Area has been assigned to the dominant drainage class for each soil polygon.

Soil Drainage Map



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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.

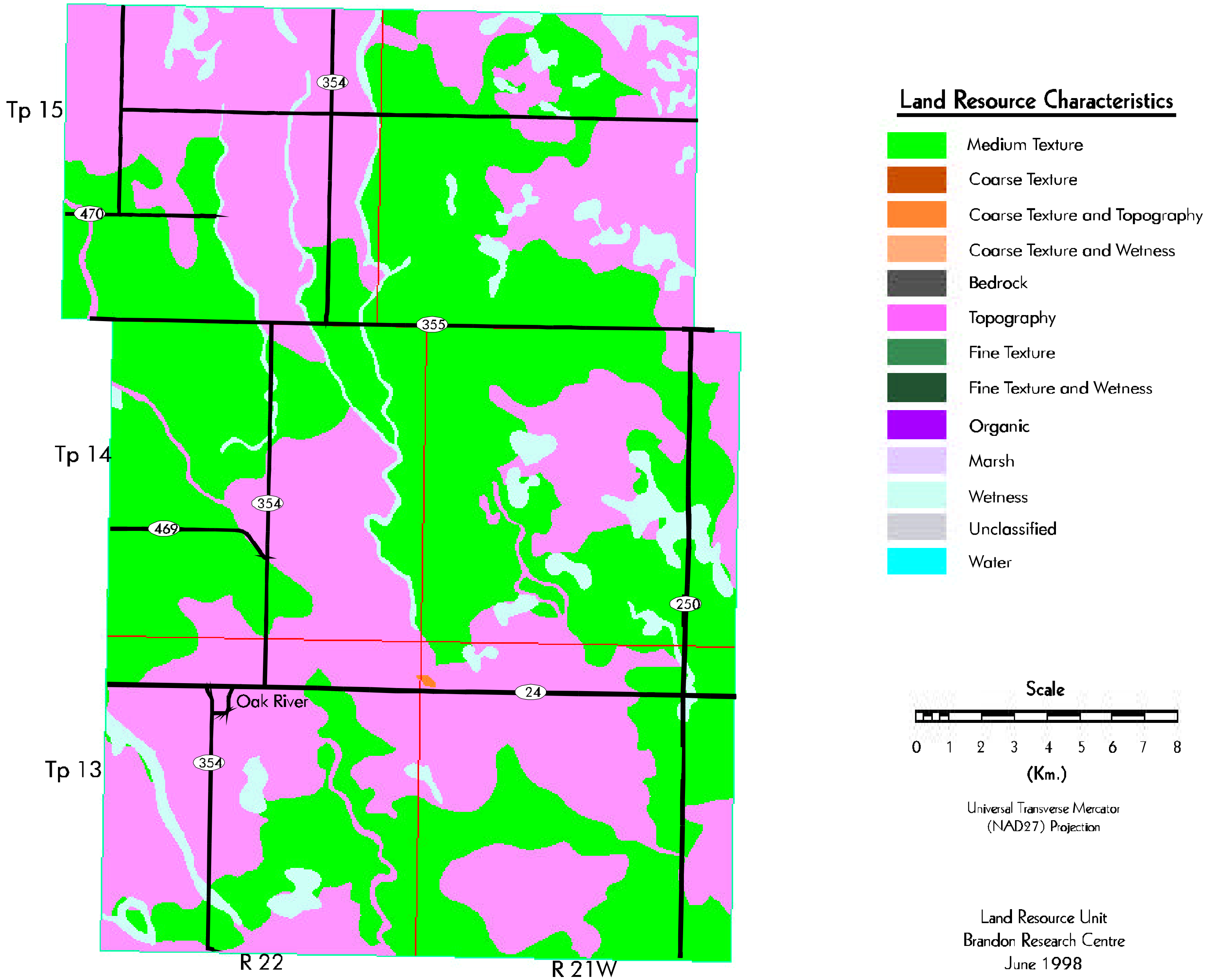
R = Bedrock - soil landscapes that have shallow depth to bedrock (< 50 cm) and/or exposed bedrock which may prevent the use of some or all tillage practices as well as the range of potential crops. They require special cropping and management practices to sustain agricultural production.

Table 4. Management Considerations[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	**27404**	**47.2**
Coarse Texture	**0**	**0.0**
Coarse Texture and Wetness	**0**	**0.0**
Coarse Texture and Topography	**15**	**0.0**
Topography	**27030**	**46.6**
Bedrock	**0**	**0.0**
Wetness	**3589**	**6.2**
Organic	**0**	**0.0**
Marsh	**0**	**0.0**
Unclassified	**0**	**0.0**
Water	**0**	**0.0**
Total	**58038**	**100.0**

[1] 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 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).

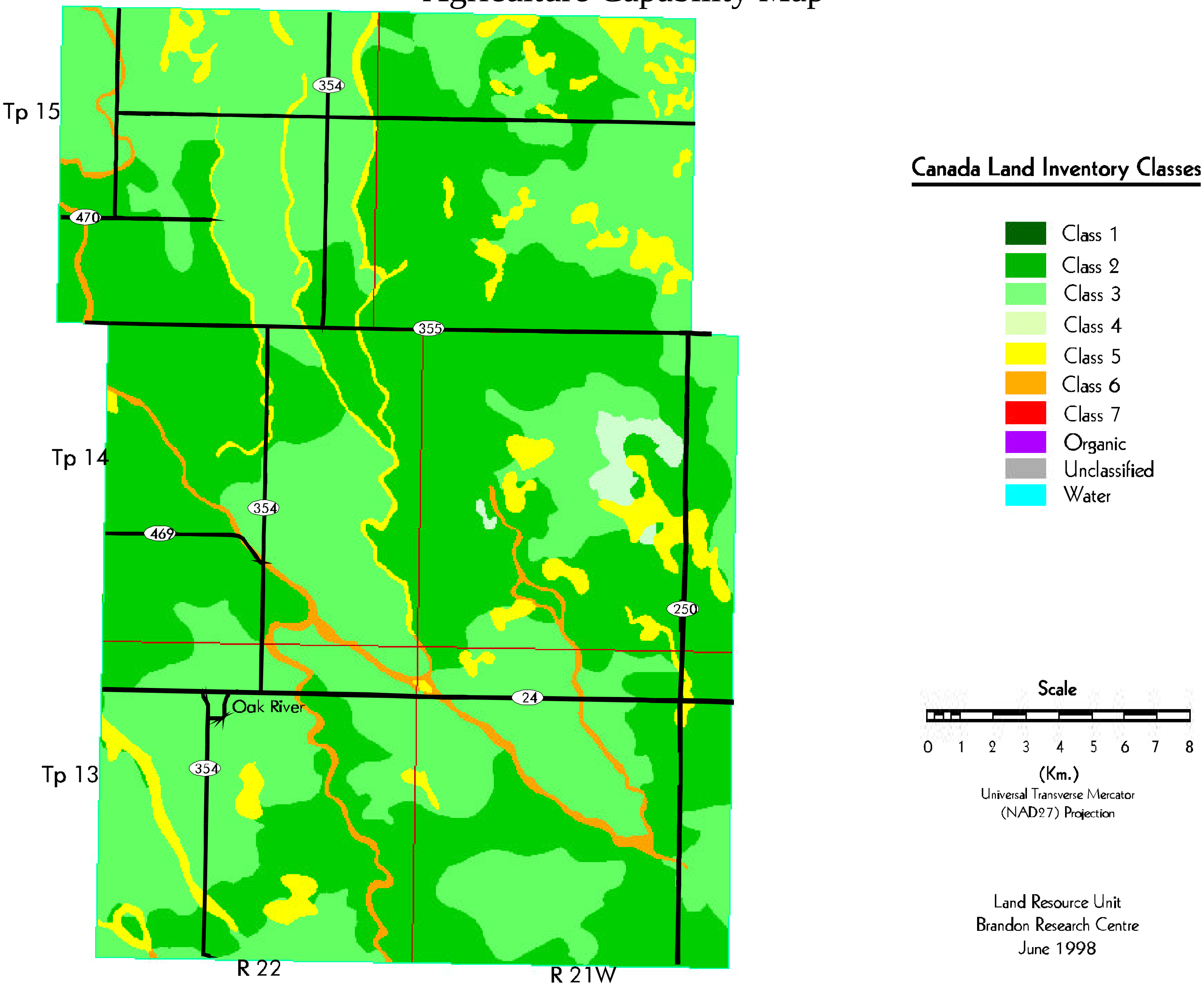
This generalized interpretive map is based on the dominant soil series and phases for each soil polygon. The CLI subclass limitations cannot be portrayed at this generalized map scale.

Table 5. Agricultural Capability[1]

Class Subclass	Area (ha)	Percent of RM
2	**27366**	**47.2**
2T	27353	47.1
2X	13	0.0
3	**25427**	**43.8**
3M	38	0.1
3MT	154	0.3
3T	25235	43.5
4	**446**	**0.8**
4T	446	0.8
5	**3604**	**6.2**
5	1990	3.4
5M	15	0.0
5W	1599	2.8
6	**1195**	**2.1**
6T	1195	2.1
Total	**58038**	**100.0**

[1] Based on the **dominant** soil series and slope gradient within each polygon.

Agriculture Capability Map



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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.

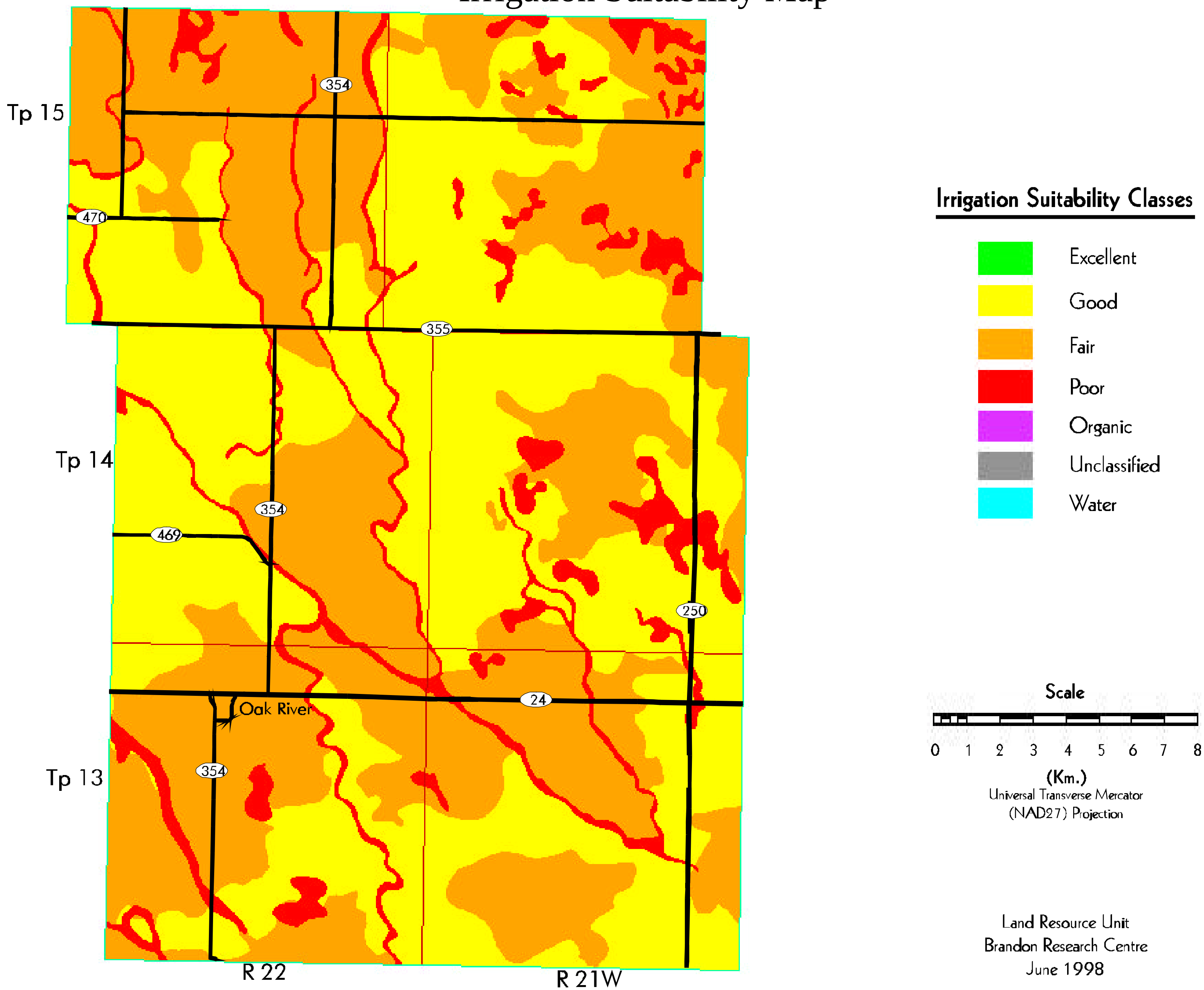
This generalized interpretive map is based on the dominant soil series for each soil polygon, in combination with the dominant slope class. The nature of the subclass limitations and the classification of subdominant components is not shown at this generalized map scale.

Table 6. Irrigation Suitability[1]

Class	Area (ha)	Percent of RM
Excellent	0	0.0
Good	27404	47.2
Fair	25834	44.5
Poor	4799	8.3
Organic	0	0.0
Unclassified	0	0.0
Water	0	0.0
Total	58038	100.0

[1] 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.

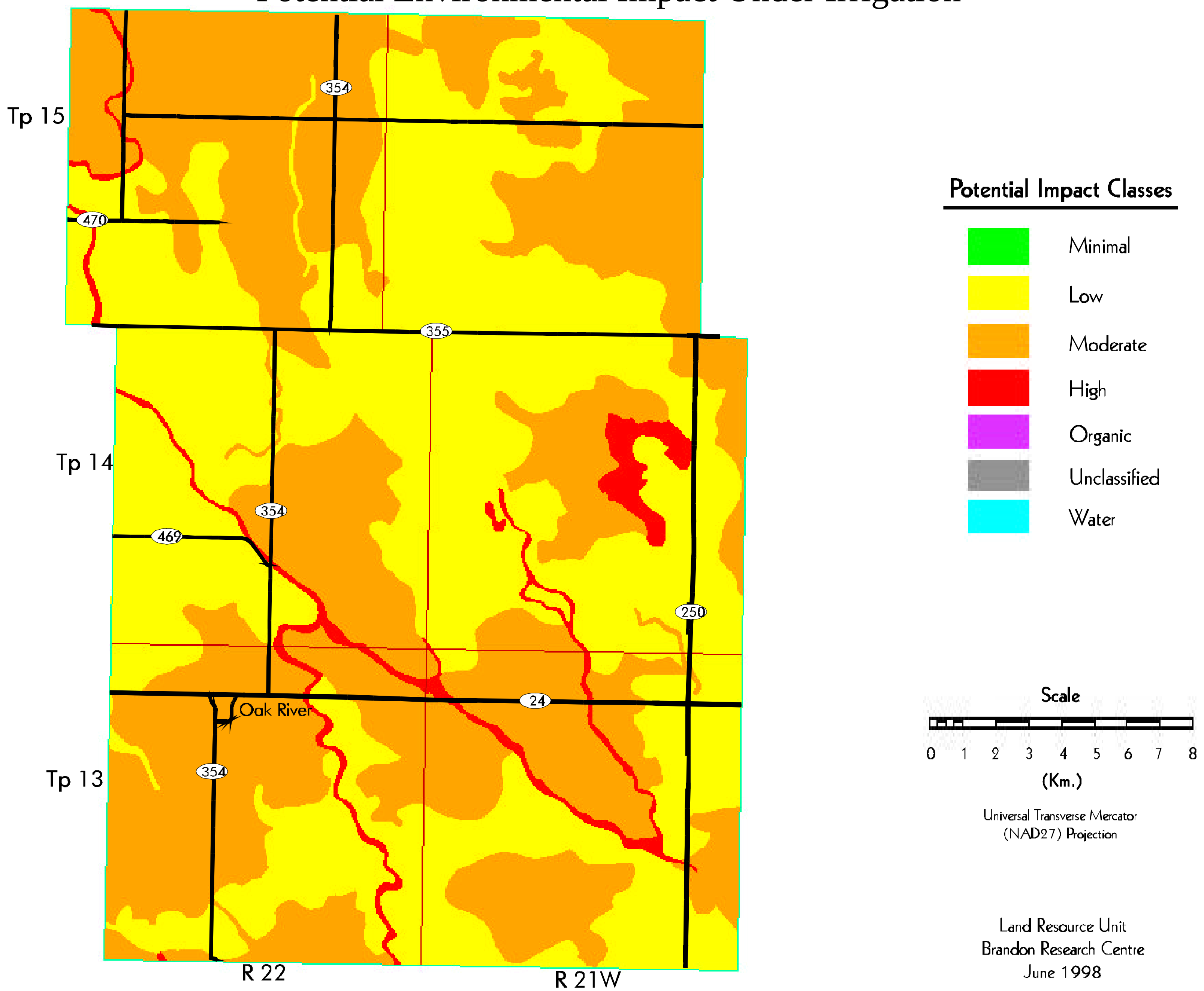
This generalized interpretive map is based on the dominant soil series and slope class for each soil polygon. The nature of the subclass limitations, and the classification of subdominant components is not shown at this generalized map scale.

Table 7. Potential Environmental Impact Under Irrigation[1]

Class	Area (ha)	Percent of RM
Minimal	**0**	**0.0**
Low	**28966**	**49.9**
Moderate	**27351**	**47.1**
High	**1721**	**3.0**
Organic	**0**	**0.0**
Unclassified	**0**	**0.0**
Water	**0**	**0.0**
Total	**58038**	**100.0**

[1] 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

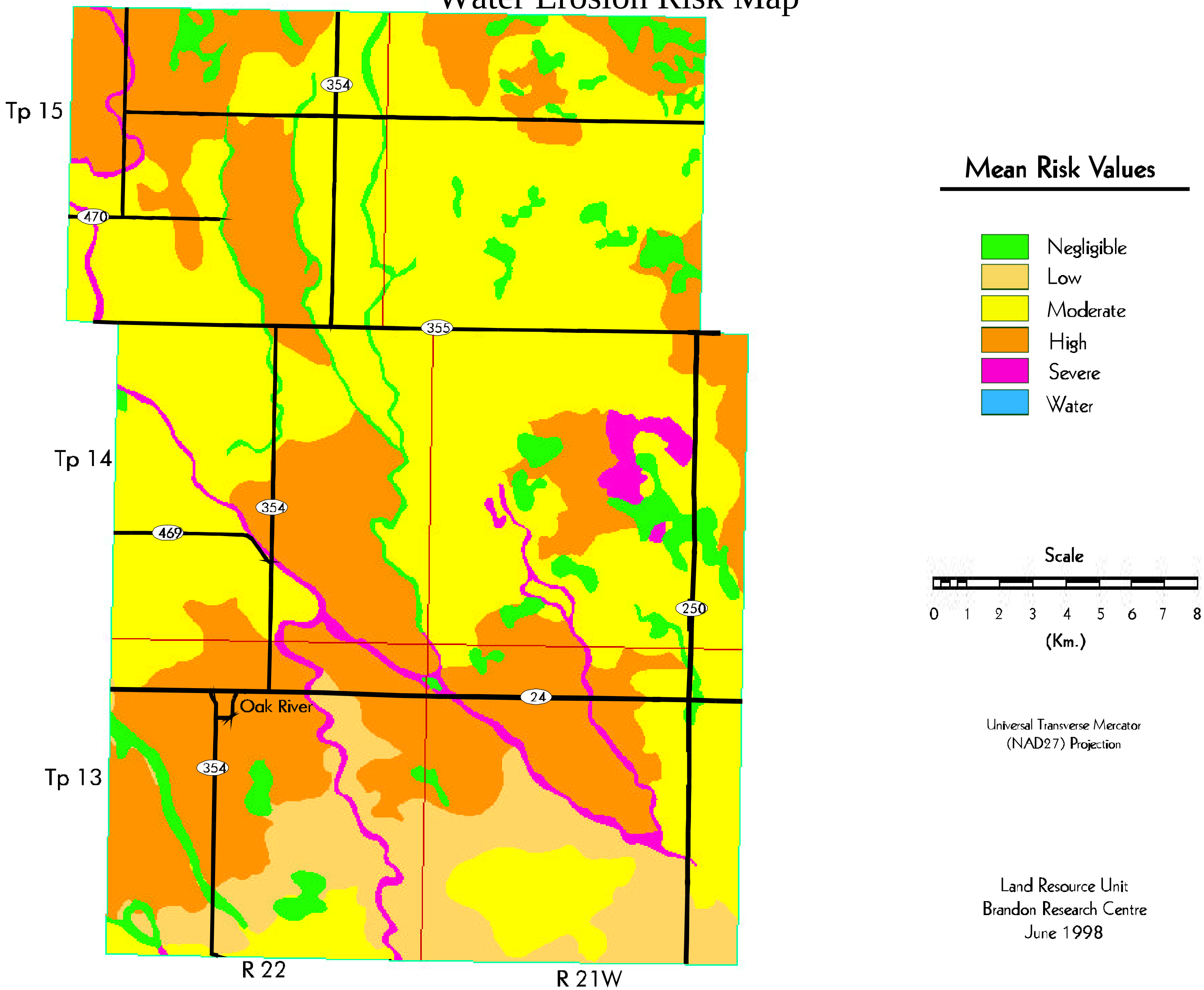
Cropping and residue management practices will significantly reduce this risk depending on crop rotation program, soil type, and landscape features.

Table 8. Water Erosion Risk[1]

Class	Area (ha)	Percent of RM
Negligible	**3604**	**6.2**
Low	**5330**	**9.2**
Moderate	**29133**	**50.2**
High	**18330**	**31.6**
Severe	**1641**	**2.8**
Unclassified	**0**	**0.0**
Water	**0**	**0.0**
Total	**58038**	**100.0**

[1] 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.

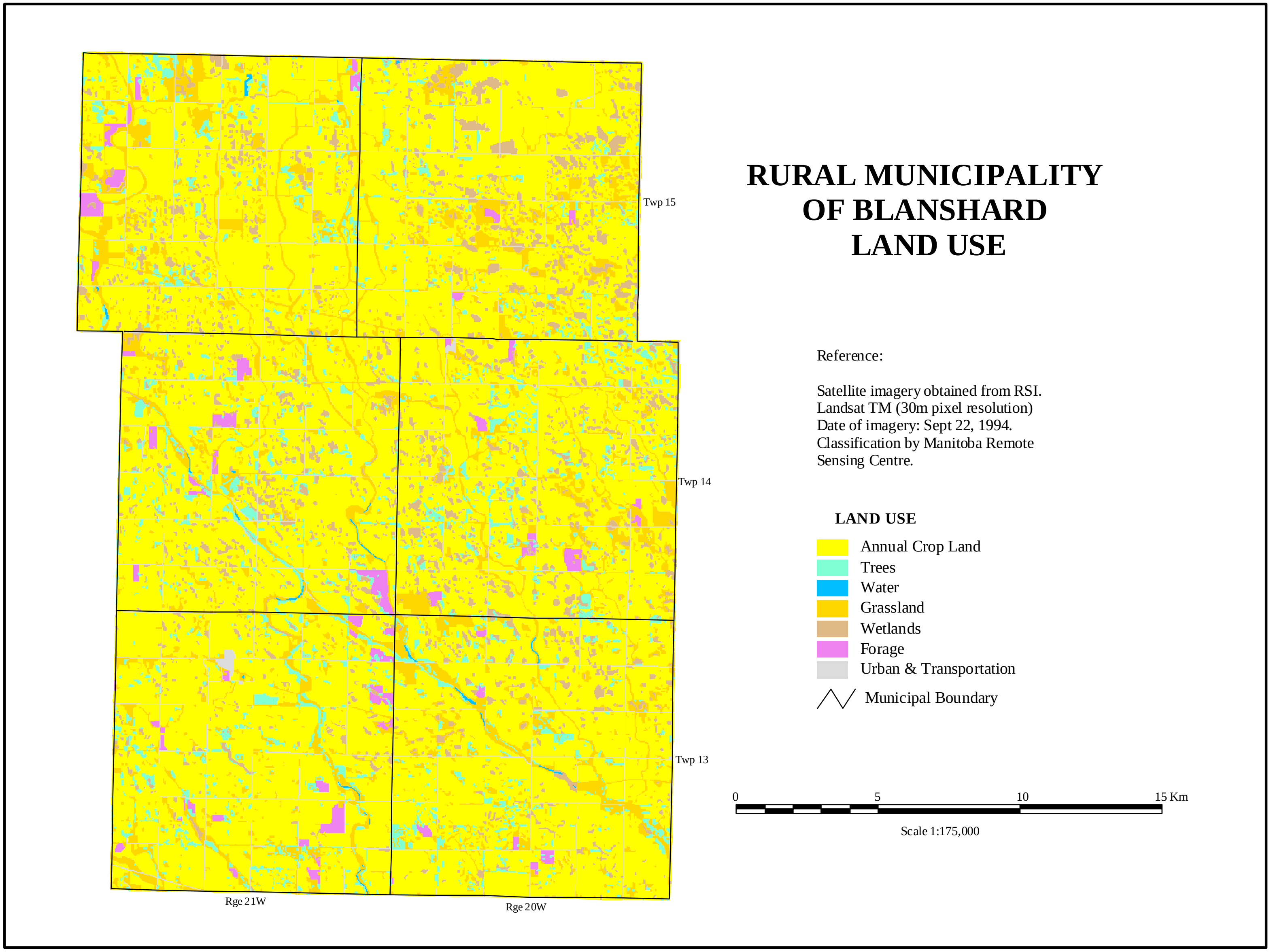
Water - open water - lakes, rivers streams, ponds, and lagoons.

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

Table 9. Land Use[1]

Class	Area (ha)	Percent of RM
Annual Crop Land	42320	72.3
Forage	872	1.5
Grasslands	6631	11.3
Trees	3096	5.3
Wetlands	3827	6.5
Water	74	0.1
Urban and Transportation	1693	2.9
Total	58513	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 BLANSHARD
LAND USE
Twp 15
Twp 14
Twp 13
Rge 21W
Rge 20W
Reference:
Satellite imagery obtained from RSI.
Landsat TM (30m pixel resolution)
Date of imagery: Sept 22, 1994.
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
Scale 1:175,000

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