



Agriculture and
Agri-Food Canada

Agriculture et
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Rural Municipality of Winchester

Information Bulletin 97-4

Soils and Terrain

An introduction
to the land resource

Land Resource Unit
Brandon Research Centre



Canada 

Rural Municipality of Winchester

Information Bulletin 97-4

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Printed March, 1998

PREFACE

This is one of a new series of information bulletins for individual rural municipalities of Manitoba. They serve to introduce the newly developed digital soil databases and illustrate several typical derived and interpretive map products for agricultural land use planning applications. The bulletins will also be available in diskette format for each rural municipality.

Information contained in this bulletin may be quoted and utilized with appropriate reference to the originating agencies. The authors and originating agencies assume no responsibility for the misuse, alteration, re-packaging, or re-interpretation of the information.

This information bulletin serves as an introduction to the land resource information available for the municipality. More detailed information, including copies of the primary soil and terrain maps at larger scales, may be obtained by contacting

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CITATION

Manitoba Land Resource Unit, 1997. Soils and Terrain. An Introduction to the Land Resource. Rural Municipality of Winchester. Information Bulletin 97-4, Brandon Research Centre, Research Branch, Agriculture and Agri-Food Canada.

ACKNOWLEDGEMENTS

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

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

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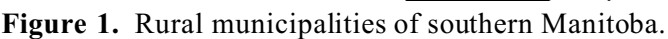
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Professional expertise for data conversion, correlation, and interpretation was provided by:

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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.

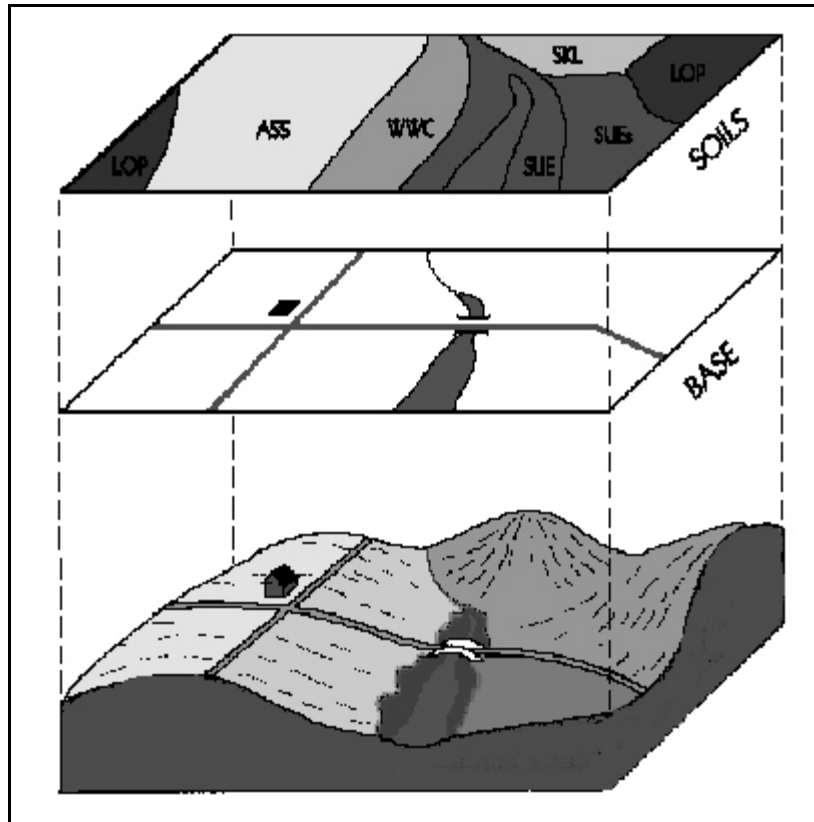


Figure 2. Soil and Base Map data.

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 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 Winchester covers an area of 8 townships (approximately 77 700 hectares) of land immediately north of the Canada-United States boundary in southwestern Manitoba (page 3). Deloraine is the main population and agriculture service centre in the municipality. The majority of the population is farm and rural-based.

The climate in the municipality can be described by weather data from Deloraine. The mean annual temperature is 3.2°C and the mean annual precipitation is 475 mm (Environment Canada, 1993). The degree-days above 5°C average 1628 and the average frost-free period is 111 days (Ash, 1991). The calculated seasonal moisture deficit for the period between May and September ranges from 250 to slightly less than 200 mm. The estimated effective growing degree days (EGDD) above 5°C accumulated from date of seeding to date of the first fall frost decreases from 1500 at lower elevations to less than 1400 at higher elevations in the Turtle Mountain uplands (Agronomic Interpretations Working Group, 1995). These parameters provide an indication of moisture and heat energy available for crop growth. The climate is generally adequate for production of a wide range of grain and oilseed crops adapted to western Canada.

Physiographically, the RM of Winchester is located in the Saskatchewan Plain. The largest part of the municipality consists of the Boissevain Plain while Turtle Mountain occupies the high elevation area to the south along the Canada-United States boundary (Canada-Manitoba Soil Survey, 1980). Turtle Mountain is a hummocky upland rising to 683 metres above sea level (m asl). Local relief is typically 3 and 8 m, with slopes of 9 to 15 percent. Areas in the central part of the upland have lower relief with irregular slopes ranging from 2 to 9 percent. The Mountainside Escarpment surrounding this upland decreases in elevation to the north and west at rates approaching 23 metres per km, with an elevation of about 547 m asl at the toe of the escarpment. Greatest local relief exceeds 8 m with slopes in excess of 15 to 30 percent within to the numerous drainage channels dissecting the escarpment

area. The Boissevain Plain surrounds Turtle Mountain, sloping northward from the escarpment, initially at a rate of 10 m per km and then more gradually as the elevation decreases to about 488 m asl along the northern boundary of the municipality. The Boissevain Plain has generally low relief and level terrain with less than 2 percent slope around Whitewater Lake and gently undulating areas with local relief of about 3 metres and slopes of 2 to 5 percent in the northern part of the municipality (page 9).

The soil materials in this municipality are primarily loam textured comprised of thin lacustrine sediments overlying glacial till and slightly to moderately stony loamy glacial till. Loam textured lacustrine sediments and minor areas of sand and gravel glaciofluvial outwash deposits occur in the vicinity of Whitewater Lake. Mixed fine sandy loam textured materials underlain by Boissevain sandstone occur along the western edge of the municipality adjacent to the Turtle Mountain (page 11).

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 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. Humic Gleysols are the major soils in depressional areas. Dark Gray Chernozem soils associated with minor areas of Gray Luvisol soil are dominant at higher elevations in the Turtle Mountain. Thin Black soils and Regosolic soils are common on the knolls and ridges in undulating topography and on steeply sloping areas of eroded slopes. 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.

The majority of the soils in the RM are well drained, with imperfect drainage being most common in level areas of the Whitewater Lake basin and on lower slopes in undulating terrain. The Turtle Mountain Upland is characterized by well drained soils and numerous small to moderate size lakes and wetlands. Runoff from this upland drains into the Boissevain Plain and Whitewater Lake. Extensive areas surrounding Whitewater Lake are affected by poor

drainage, high water tables and surface ponding during wet years. Lower lying areas are characterized by marsh vegetation. Drainage of undulating portions of the Boissevain Plain is largely local in nature, as runoff from snowmelt or heavy rainfall accumulates in numerous poorly drained depressions, many of which contain shallow ponds and small lakes in wet seasons (page 13).

Although the majority of soils are non-saline, salinity is widespread surrounding Whitewater Lake and occurs locally in lower slopes, depressions and shallow drainage channels in till landscapes (page 15). In addition to salinity, other management considerations within the RM are primarily related to topography and wetness (page 17). Slightly to moderately stony soil conditions are associated with the till soils throughout the municipality.

The majority of the soils in the RM (69%) are rated in **Class 2** and **3** for agriculture capability (page 19). About 50 percent of the municipality is classified as **Good** for irrigation suitability (page 21). Topography (steep slopes), wetness and salinity are the main limitations for agriculture. Well and imperfectly drained soils in gently sloping landscapes are generally rated **Class 2** for agriculture and **Good** for irrigation. Poorly drained soils and saline 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, over three-quarters of the soils in the RM are at **Low to Moderate** risk of degradation. Areas of steeply sloping soils are rated as having a **High** potential or risk for environmental impact under irrigation. These landscapes have a high potential for rapid runoff from the soil surface into adjacent wetlands or water bodies. 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 12 percent of the soils in the RM and an additional 55 percent of the area is at a **Low to Moderate** risk. Hummocky terrain is at **High** risk of water erosion and knolls in these areas are also susceptible to erosion by wind. Steeper sloping areas in the Turtle Mountain and the Mountainside Escarpment area, particularly adjacent to stream channels, have a **Severe** risk of water erosion. Management practices focus primarily on maintaining adequate crop residues to provide sufficient surface cover during the early spring period. To provide adequate protection for the land most at risk to water 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 Winchester is primarily agriculture. An assessment of the status of land use in 1993 was obtained through an analysis of satellite imagery. It showed that annual crops occupied about 56 percent of the land in the RM, while the remaining areas were in grassland (16.4%), forage production (2.3%) and tree cover (13.7%). Most of the wooded area occurs in the Turtle Mountain upland and on steeper sloping soils in the agricultural area. Wetlands, including Whitewater Lake cover 7.7 percent of the area and small water bodies occupy 1.1 percent of the municipality. 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 2.8 percent of the RM (page 27).

While most of the soils in the RM of Winchester 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.

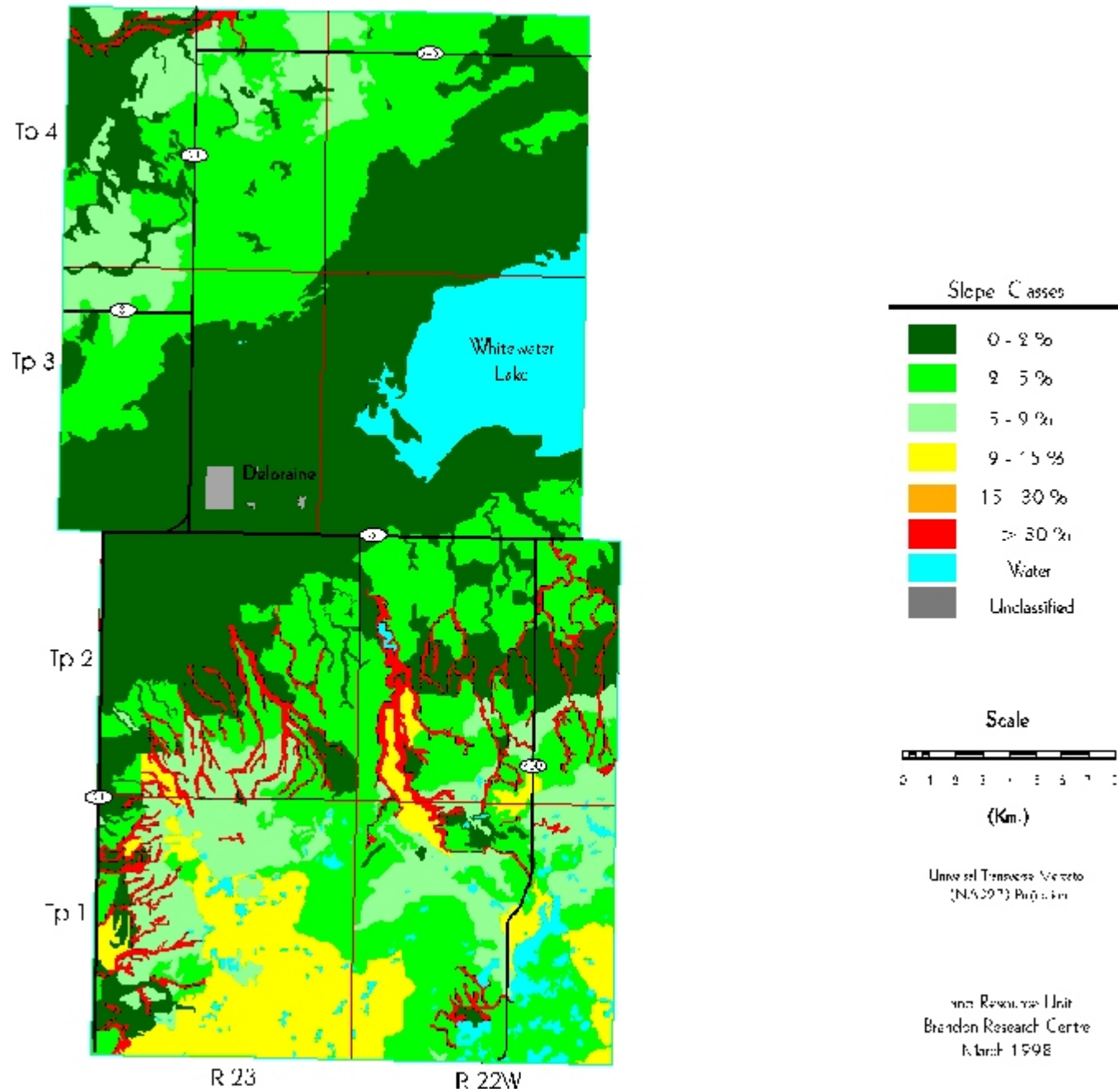
Slope describes the steepness of the landscape surface. The slope classes shown on this map are derived from the digital soil layer database. Specific colours are used to indicate the dominant slope class for each soil polygon in the RM. Additional slope classes may occur in each polygon area, but cannot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

Table 1. Slope Classes¹

Slope Class	Area (ha)	Percent of RM
0 - 2 %	27876	35.9
2 - 5 %	24466	31.5
5 - 9 %	10317	13.3
9 - 15 %	5811	7.5
15 - 30 %	0	0.0
> 30 %	3235	4.2
Unclassified	183	0.2
Water	5770	7.4
Total	77659	100.0

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

Slope Map



Surface Texture Map.

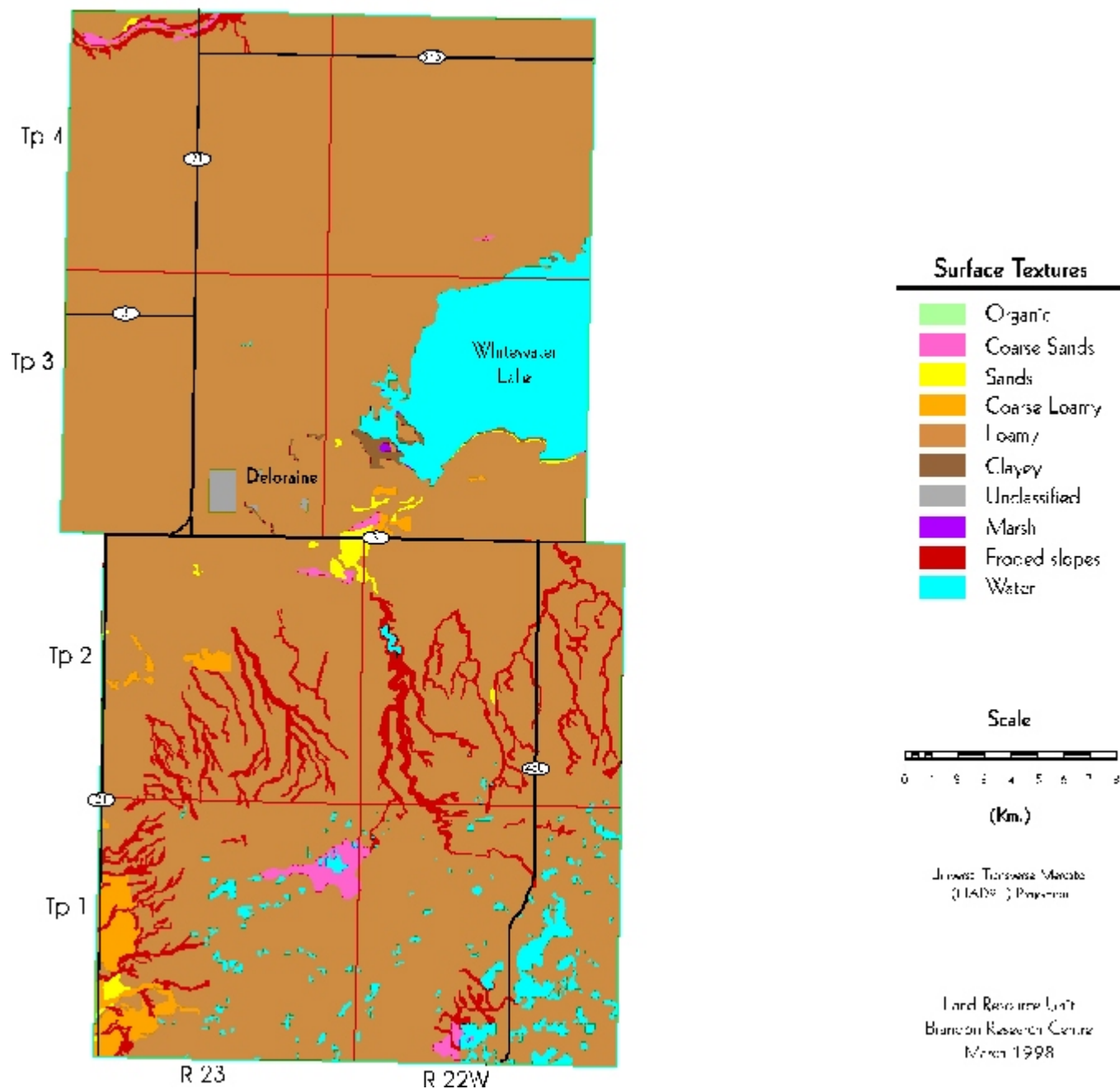
The soil textural class for the upper most soil horizon of the dominant soil series within a soil polygon was utilized for classification. Texture may vary from that shown with soil depth and location within the polygon.

Table 2. Surface Texture¹

Surface Texture	Area (ha)	Percent of RM
Organics	0	0.0
Coarse Sands	565	0.7
Sands	396	0.5
Coarse Loamy	1099	1.4
Loamy	66189	85.2
Clayey	205	0.3
Eroded Slopes	3235	4.2
Marsh	16	0.0
Unclassified	183	0.2
Water	5770	7.4
Total	77659	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.

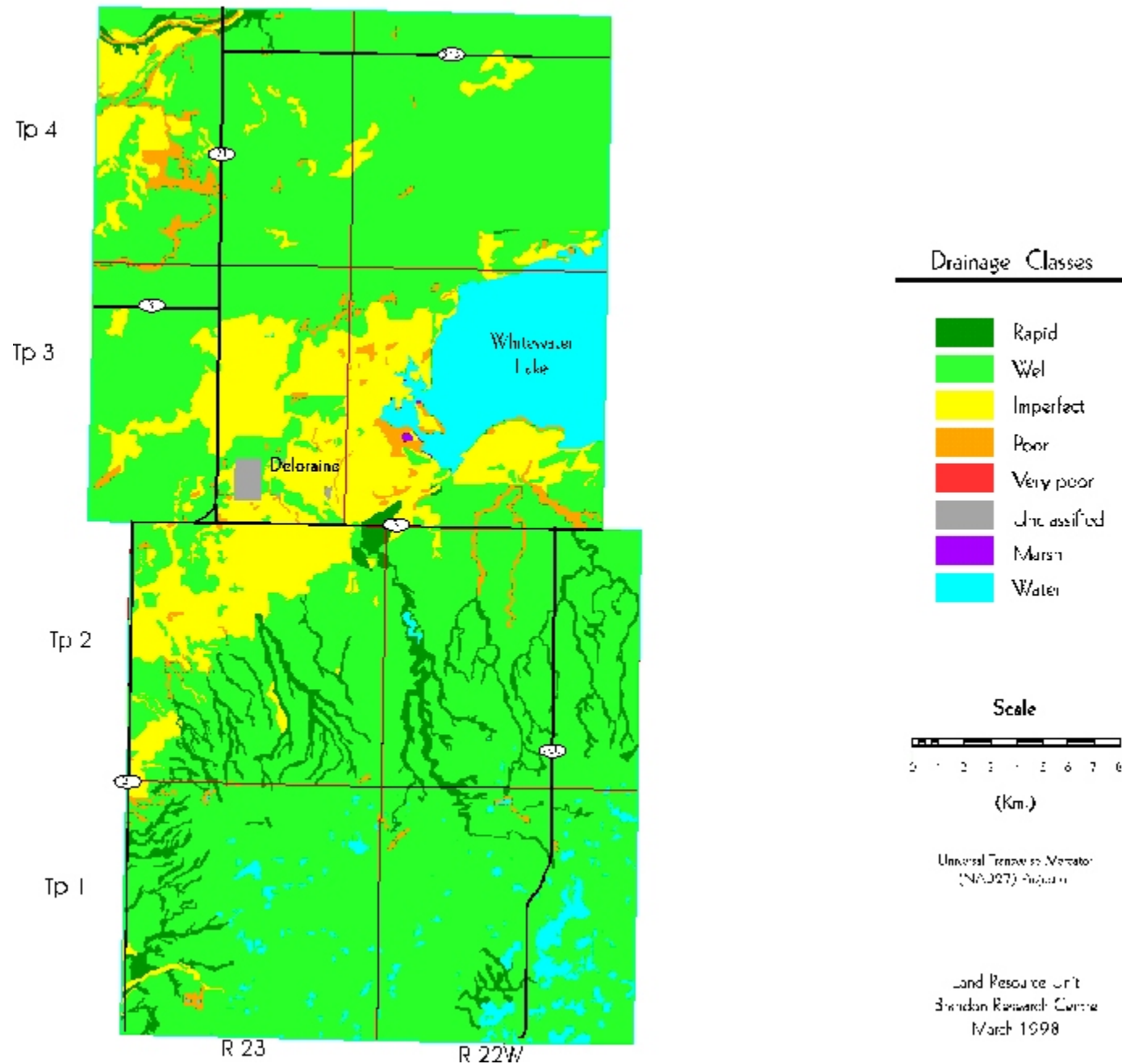
Drainage classification is based on the dominant soil series within each individual soil polygon.

Table 3. Drainage Classes¹

Drainage Class	Area (ha)	Percent of RM
Very Poor	0	0.0
Poor	1783	2.3
Imperfect	11513	14.8
Well	54809	70.6
Rapid	3585	4.6
Marsh	16	0.0
Unclassified	183	0.2
Water	5770	7.4
Total	77659	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.

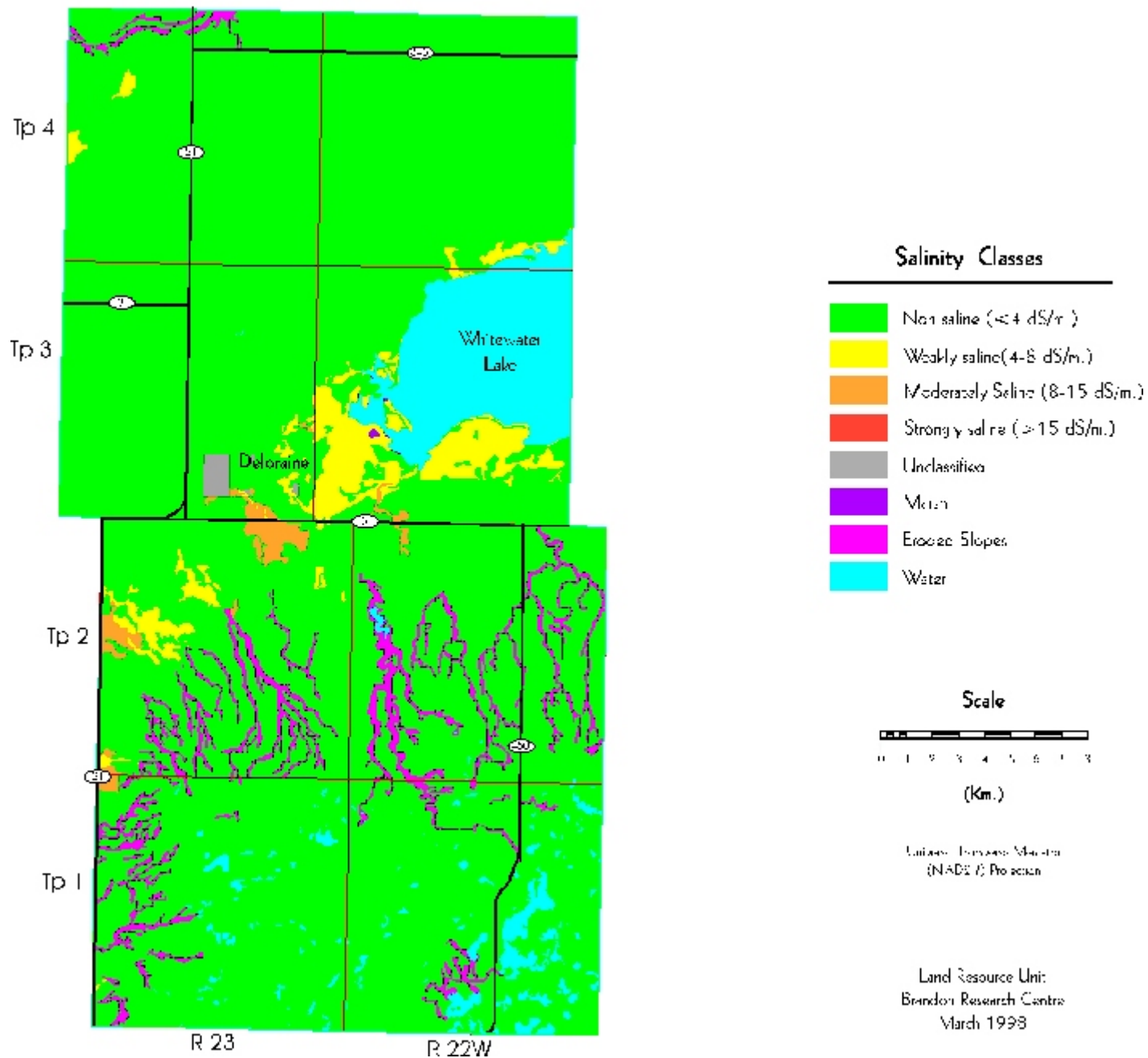
The salinity classification of each individual soil polygon was determined by the most severe salinity classification present within that polygon.

Table 4. Salinity Classes¹

Salinity Class	Area (ha)	Percent of RM
Non Saline	64863	83.5
Weakly Saline	2873	3.7
Moderately Saline	718	0.9
Strongly Saline	0	0.0
Eroded Slopes	3235	4.2
Marsh	16	0.0
Unclassified	183	0.2
Water	5770	7.4
Total	77659	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.

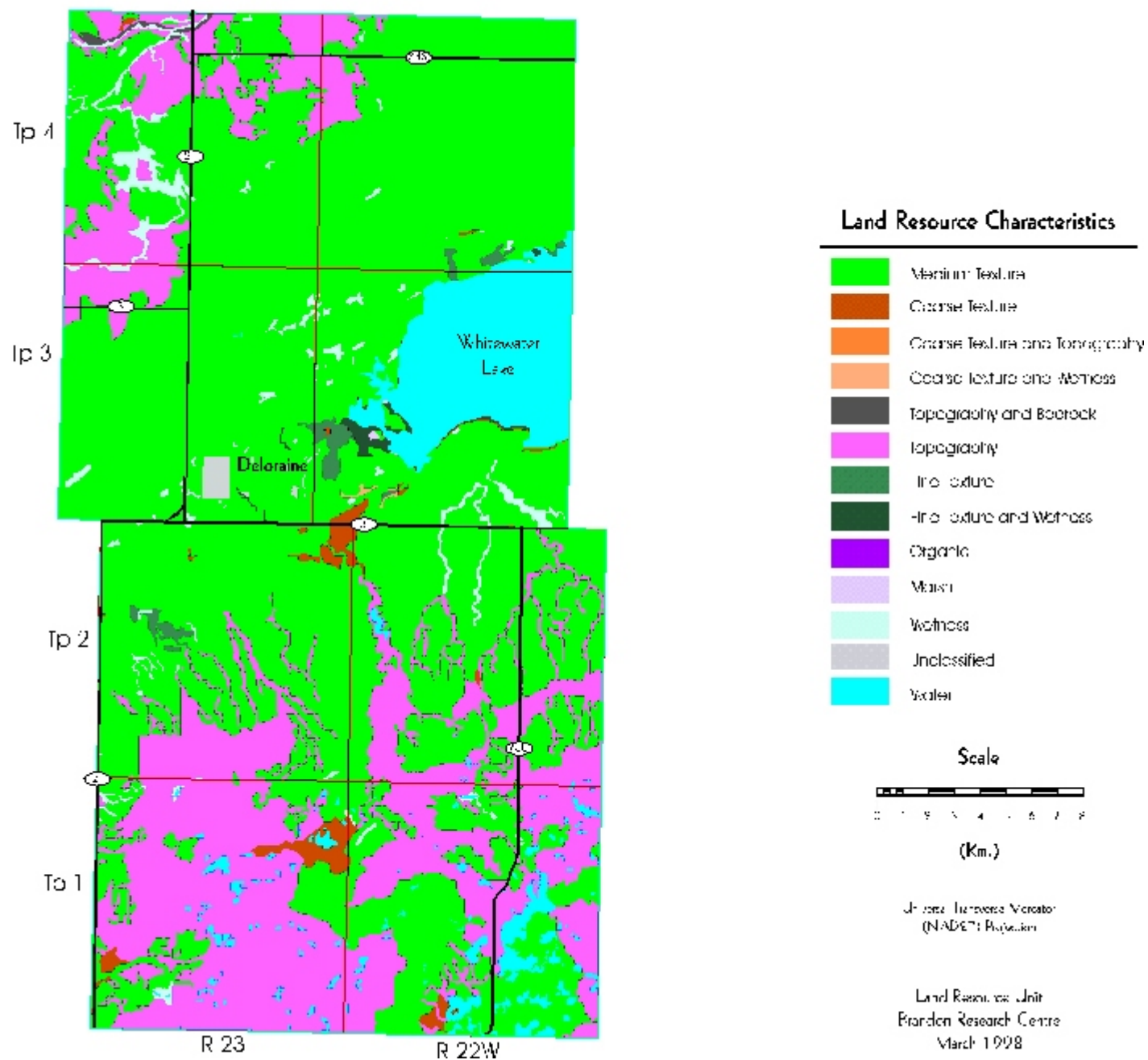
R = Bedrock - soil landscapes that have **shallow depth to bedrock (< 50 cm) and/or exposed bedrock** which may prevent the use of some or all tillage practices as well as the range of potential crops. They require special cropping and management practices to sustain agricultural production.

Table 5. Management Considerations¹

Land Resource Characteristics	Area (ha)	Percent of RM
Fine Texture	451	0.6
Fine Texture and Wetness	198	0.3
Fine Texture and Topography	0	0.0
Medium Texture	49219	63.4
Coarse Texture	838	1.1
Coarse Texture and Wetness	36	0.0
Coarse Texture and Topography	0	0.0
Topography	19311	24.9
Topography and Bedrock	0	0.0
Wetness	1549	2.0
Wetness and Topography	0	0.0
Bedrock	0	0.0
Organic	0	0.0
Marsh	16	0.0
Unclassified	183	0.2
Water	5770	7.4
Total	77659	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 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 6. Agricultural Capability¹

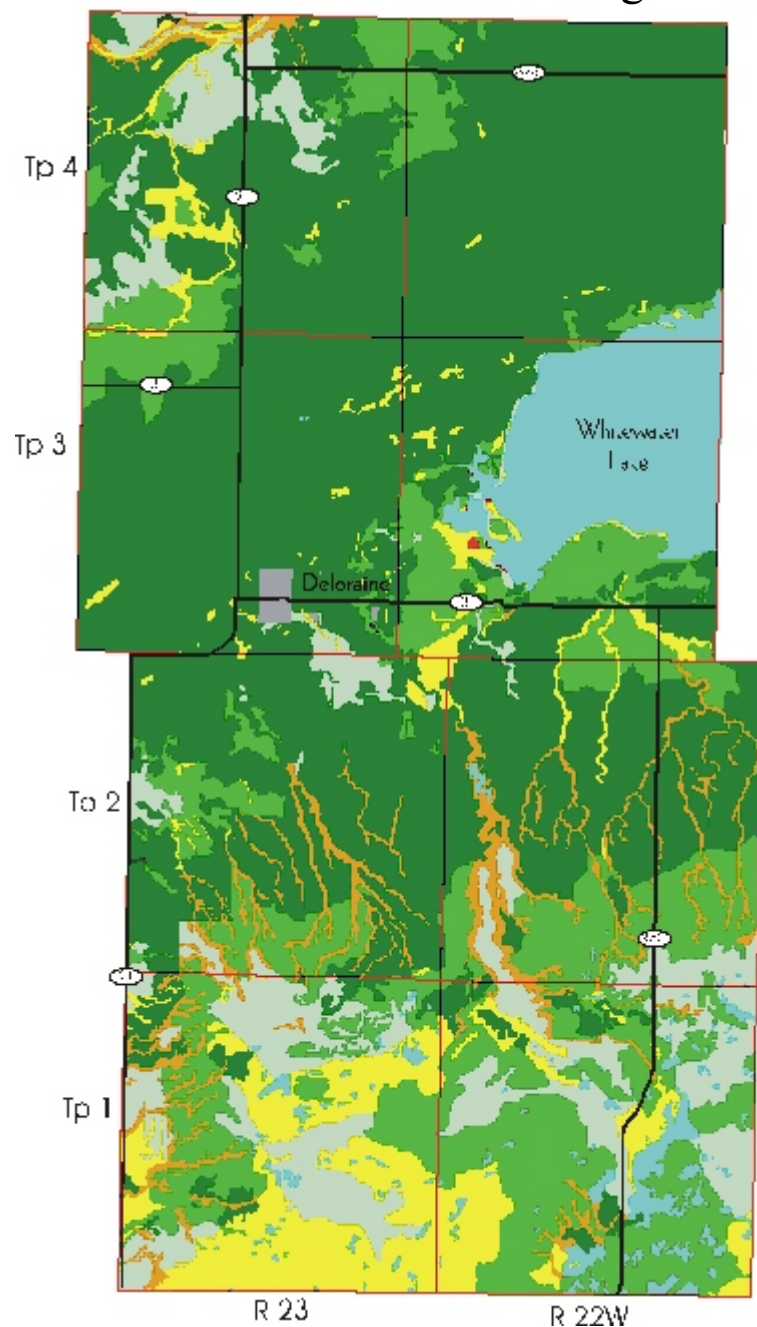
Class Subclass	Area (ha)	Percent of RM
1	22	0.0
2	38278	49.3
2E	1009	1.3
2IW	26	0.0
2M	86	0.1
2ME	27	0.0
2P	110	0.1
2T	12555	16.2
2TE	3930	5.1
2TP	114	0.1
2TW	234	0.3
2W	7448	9.6
2X	12739	16.4
3	15356	19.8
3ET	885	1.1
3EW	1	0.0
3I	3	0.0

Table 6. Agricultural Capability¹(cont)

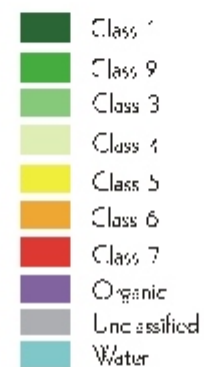
Class Subclass	Area (ha)	Percent of RM
3M	261	0.3
3N	2678	3.5
3T	9446	12.2
3TE	2039	2.6
3TP	42	0.1
4	8081	10.4
4DN	723	0.9
4ET	1640	2.1
4I	91	0.1
4M	68	0.1
4R	501	0.6
4RE	89	0.1
4RM	88	0.1
4T	4882	6.3
5	6640	8.6
5ER	187	0.2
5M	740	1.0
5T	3746	4.8
5W	1953	2.5
5WI	13	0.0
6	3250	4.2
6M	8	0.0
6T	3242	4.2
7	16	0.0
7W	16	0.0
Unclassified	184	0.2
Water	5752	7.4
Total	77579	100.0

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

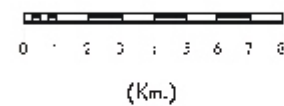
Agriculture Capability Map



Canada Land Inventory Classes



Scale



Universal Transverse Mercator
(NAD83) Projection

Land Resource Unit
Winnipeg Manitoba
June 2003

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.

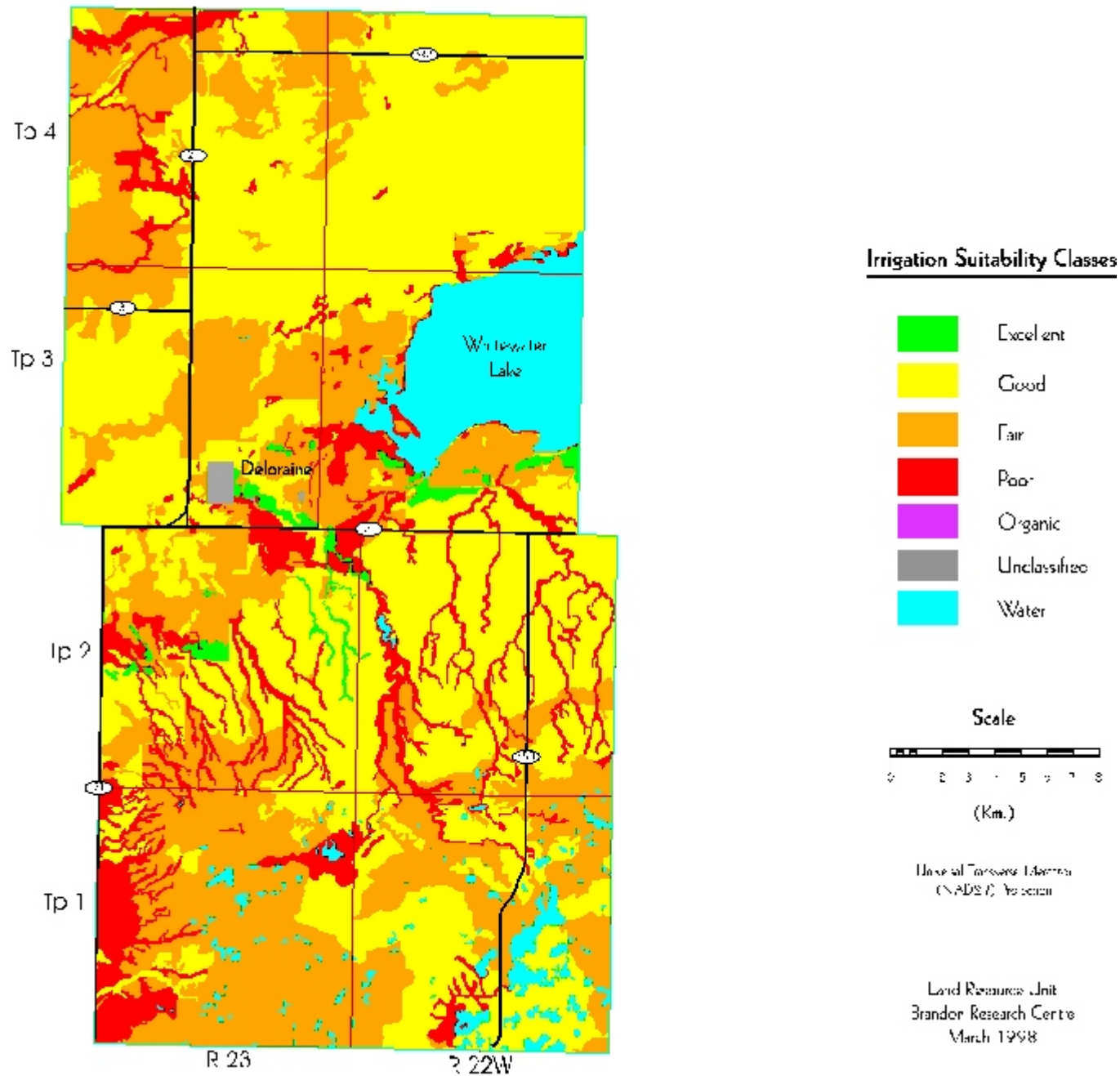
This generalized interpretive map is based on the dominant soil series for each soil polygon, in combination with the dominant slope class. The nature of the subclass limitations and the classification of subdominant components is not shown at this generalized map scale.

Table 7. Irrigation Suitability¹

Class	Area (ha)	Percent of RM
Excellent	825	1.1
Good	37816	48.7
Fair	25137	32.4
Poor	7928	10.2
Organic	0	0.0
Unclassified	183	0.2
Water	5770	7.4
Total	77659	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.

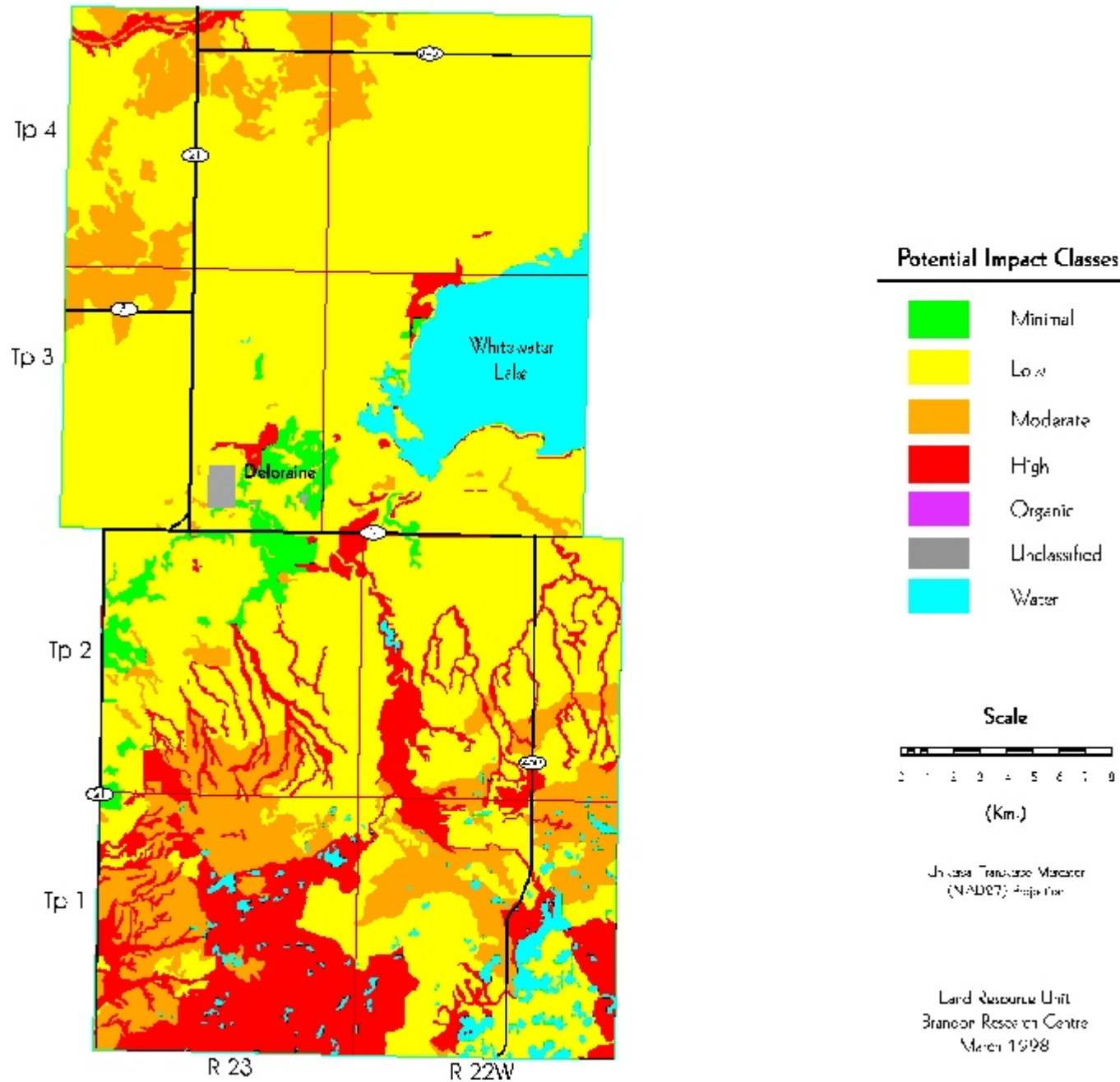
This generalized interpretive map is based on the dominant soil series and slope class for each soil polygon. The nature of the subclass limitations, and the classification of subdominant components is not shown at this generalized map scale.

Table 8. Potential Environmental Impact Under Irrigation¹

Class	Area (ha)	Percent of RM
Minimal	1697	2.2
Low	48128	62.0
Moderate	11426	14.7
High	10455	13.5
Organic	0	0.0
Unclassified	183	0.2
Water	5770	7.4
Total	77659	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:

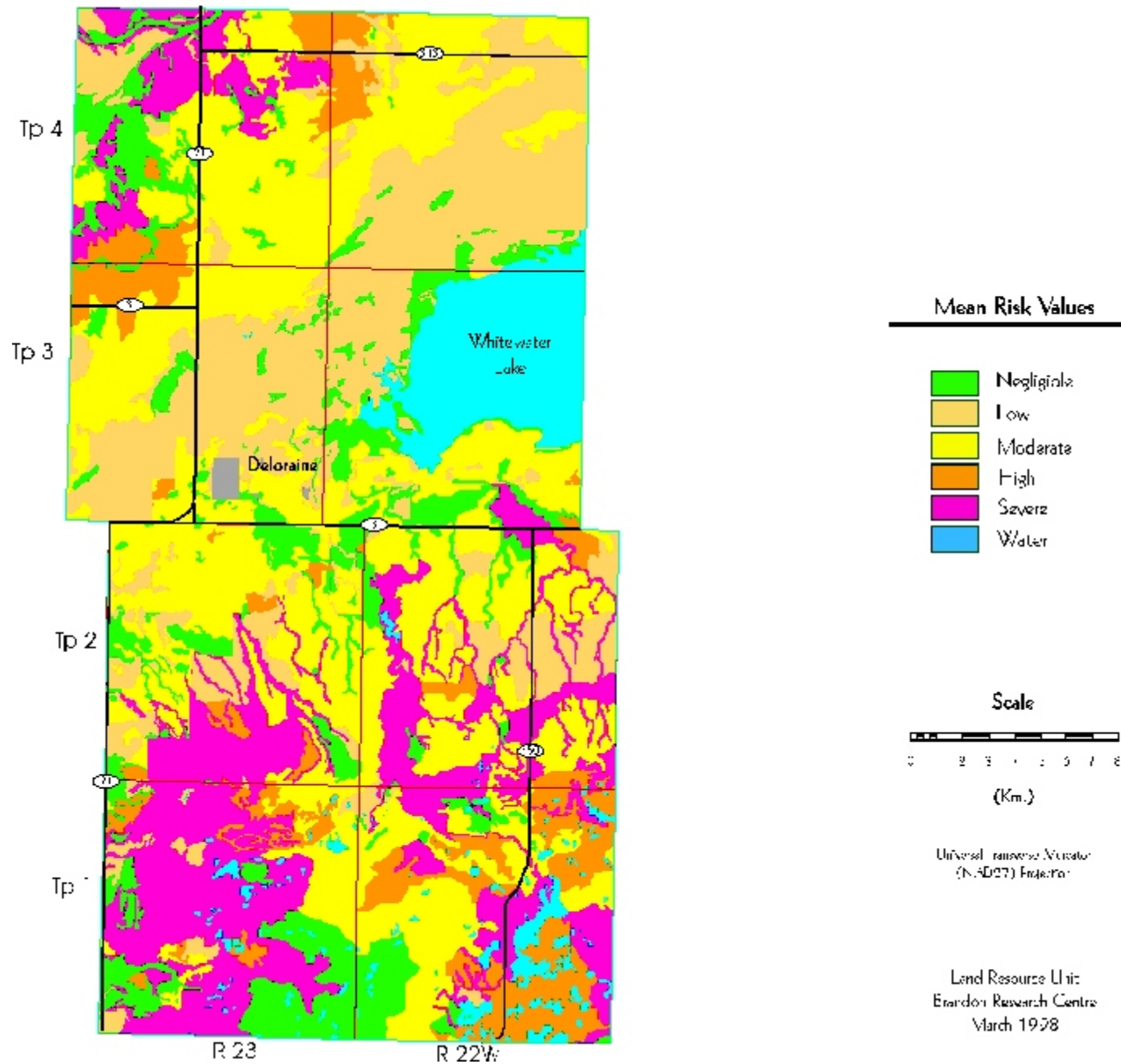
negligible
low
moderate
high
severe.

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

Table 9. Water Erosion Risk¹

Class	Area (ha)	Percent of RM
Negligible	8989	11.6
Low	16382	21.1
Moderate	26492	34.1
High	6436	8.3
Severe	13407	17.3
Unclassified	183	0.2
Water	5770	7.4
Total	77659	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.

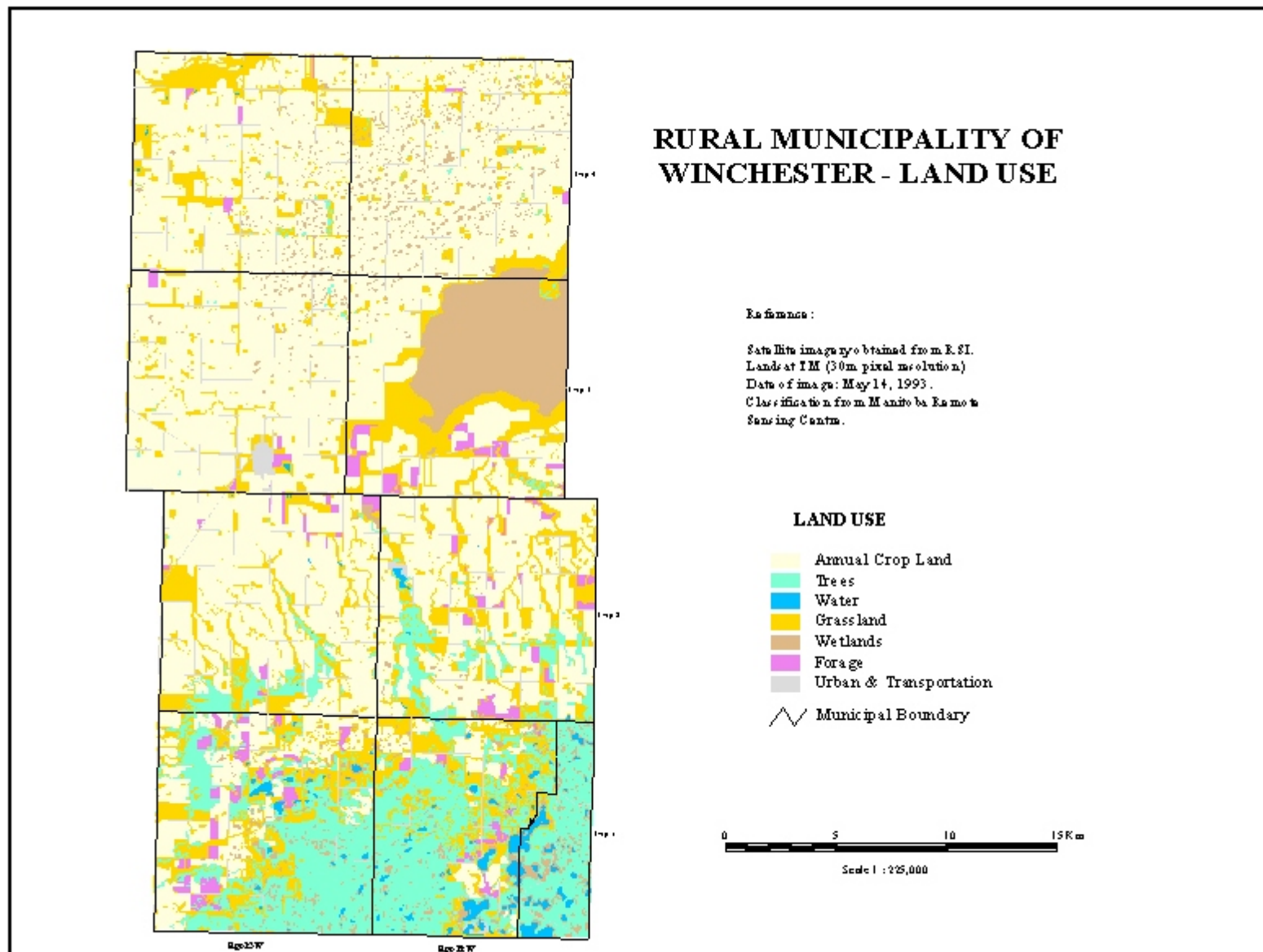
Water - open water - lakes, rivers streams, ponds, and lagoons.

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

Table 10. Land Use¹

Class	Area (ha)	Percent of RM
Annual Crop Land	43794	56.1
Forage	1814	2.3
Grasslands	12822	16.4
Trees	10668	13.7
Wetlands	6010	7.7
Water	842	1.1
Urban and Transportation	2152	2.8
Total	78102	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.



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