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Rural Municipality of Hillsburg

Information Bulletin 97-26

Soils and Terrain

An introduction to the land resource

Land Resource Unit
Brandon Research Centre

Canada

Rural Municipality of Hillsburg

Information Bulletin 97-26

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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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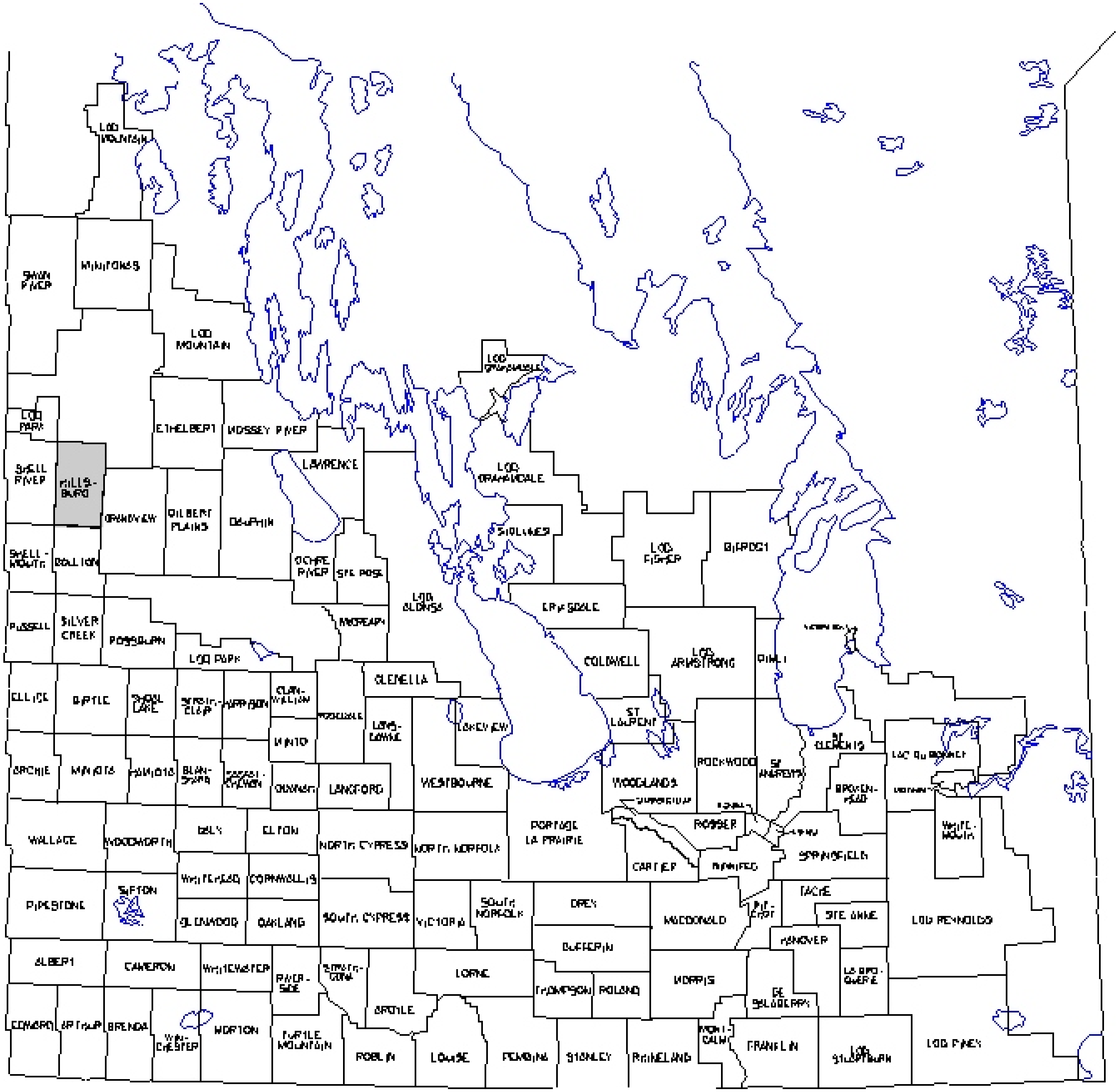


Figure 1. Rural municipalities of southern Manitoba.

INTRODUCTION

The location of the Rural Municipality of Hillsburg 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.

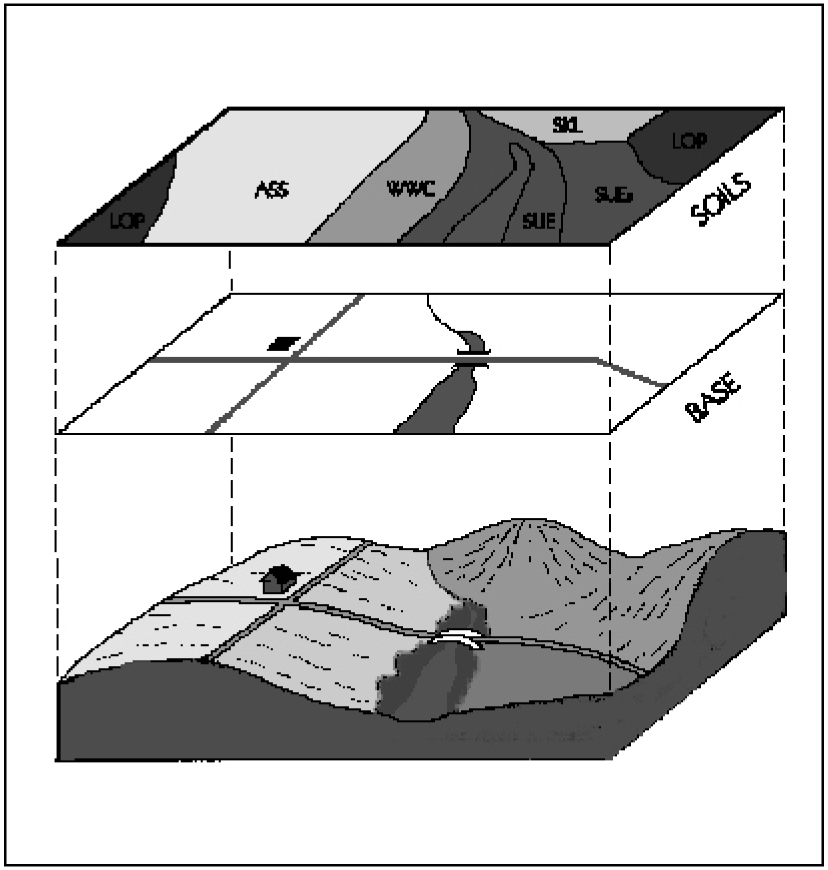


Figure 2. Soil and Base Map data.

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 classes were also added, based on photo-interpretation.

Older, reconnaissance scale soil maps (1:126 720 scale) represented the only available soil data source for many rural municipalities. These maps were compiled on a **soil association** basis, in which soil landscape patterns were identified with unique surficial geological deposits and textures. Each soil association consists of a range of different soils ("associates") each of which occurs in a repetitive position in the landscape. Modern soil series that best represent the soil association were identified for each soil polygon. The soil and modifier codes provide a link to additional databases of soil properties. In this way, both detailed and reconnaissance soil map polygons were related to soil drainage, surface texture, and other soil properties to produce various interpretive maps. Slope length classes were also added, based on photo-interpretation.

SOIL AND TERRAIN OVERVIEW

The Rural Municipality (RM) of Hillsburg covers an area of 8 townships (approximately 70 700 hectares) of land in western Manitoba (page 3). The Duck Mountain Forest Reserve covers about 35 percent of the land area in the northeastern part of the municipality. A portion of the Valley River Indian Reserve also occurs in the municipality. Though land resource information exists for the Duck Mountain Forest Reserve, it was not classified in this generalized report. There are no major population centres in the municipality and agriculture services generally are provided from larger towns in the surrounding region.

The climate in the municipality can be related to weather data from several stations within the area. The mean annual temperature at Roblin is 0.2˚C and the mean annual precipitation is 476 mm (Environment Canada, 1982). The average frost-free period varies from 96 to 108 days, and degree-days above 5^0C range from 1450 to 1500 (Ash, 1991). The calculated seasonal moisture deficit for the period between May and September for the area is 200 to 250 mm. The estimated effective growing degree days (EGDD) above 5˚C accumulated from date of seeding to the date of the first fall frost is 1200 to 1300 (Agronomic Interpretations Working Group, 1995). These parameters provide an indication of length of growing season and the moisture and heat energy available for crop growth.

Physiographically, the RM of Hillsburg is part of the Saskatchewan Plain (Canada-Manitoba Soil Survey, 1980). The majority of the RM is located in the Duck Mountain and Riding Mountain Uplands. Lower elevations in the central part of the RM are in the Valley River Plain. Elevations range from 645 m above sea level (asl) in the Duck Mountain Upland to 480 m asl in the Valley River Plain. The land surface in the uplands is generally hummocky with local relief of 3 to 8 m and slopes of 5 to 9 percent. Areas of higher relief in excess of 8 m with 9 to 15 percent slopes occur in the Duck Mountain Uplands. Several glacial meltwater channels in the uplands are characterized by slopes in excess of 30 percent. Undulating to near level areas with local relief under 3 m and slopes of 2 to 5 percent occur in the southern portion of the RM (page 9).

The soil materials in this RM consist primarily of loamy textured glacial till deposits. Minor areas of thin, loamy lacustrine sediments underlain by loamy glacial till occur in the Valley River Plain. Clayey lacustrine deposits are locally important in the Duck Mountain Uplands. Areas of sand and gravel deposits and waterworked, stony till are common near the glacial meltwater valleys (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 Grandview Map Sheet Area (Ehrlich et al., 1959). According to the Canadian System of Soil Classification (Expert Committee on Soil Survey, 1987), the soils in the municipality are classified as dominantly Gray Luvisols (Waitville and Duck Mountain Associations) and Dark Gray Chernozems (Erickson and Onanole Associations). Local areas of poorly drained soils (Gleysols) and shallow organic (peat) soils are common in depressional areas. Regosolic soils occur on minor stream deposits in the valleys, and on steeply sloping areas of eroded slopes (page 11). A more detailed and complete description of the soils in the municipality is provided in the published reconnaissance soil survey.

Surface drainage of the RM is facilitated by a network of rivers and streams tributary to the Shell and Valley Rivers. Hummocky terrain in the municipality is characterized by numerous poorly drained depressions and potholes containing shallow ponds and small lakes. The majority of soils in the RM are well drained with minor areas of imperfect drainage on lower slopes. Areas of poorly drained and peaty soils are common in the depressional areas throughout this landscape (page 13).

Major management considerations are related to topography and drainage (page 15). Soil textural considerations (sandy or clayey soils) are minor in extent and there are no significant bedrock outcrops. Although variably stony soils occur throughout the area, very stony conditions are of particular concern bordering some river valleys and meltwater channels. The soils at these locations are modified by stream erosion and as a result, are coarse textured and in many places very stony.

Twenty-eight percent of the land in the RM is rated as **Class 3** for agriculture capability (page 17) and about 32 percent of the area is rated **Fair** for irrigation suitability (page 19). Topography is the main limitation. Well drained soils in gently sloping landscapes are rated in **Class 2** for agriculture and **Good** for irrigation. Poorly and very poorly drained soils, organic (peaty) soils and steeply sloping lands are rated in **Class 5** or **6** for agriculture. These soils are rated **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, some 26 percent of the RM is at **Moderate** risk of degradation and 12 percent of the area is at a **Low** risk. However, steeply sloping soils and waterworked areas with sandy and gravelly soils are rated as having a **High** potential for impact on the environment under irrigation. These conditions increase the risk or potential for rapid runoff from the soil surface into adjacent wetlands or water bodies and for deep leaching of potential contaminants on the soil surface. 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). Approximately 62 percent of thr RM, outside of the Duck Mountain Uplands, has been rated for water erosion risk. The majority of the land areais at a **Severe** to **High** risk of degradation. A further 4.2 percent of the RM is considered to have a **Low** to **Moderate** risk of water erosion whereas nearly 8 percent is rate as having a **Negligible** risk. Although agriculture is a major land use in the RM, many of the steeply sloping soils in the agriculture area and the land within the Forest Reserve remain in tree cover. Management practices for land in annual crop focus primarily on maintaining adequate crop residues to provide sufficient surface cover. However, adequate protection of the steeper sloping lands most at risk may require a shift in land use away from annual cultivation to production of perennial forages and pasture or permanant tree cover.

An assessment of the status of land use in the RM of Hillsburg in 1994 was obtained through analysis of satellite imagery. It showed that nearly 40 percent of the land in the RM remains in woodland and an additional 28 percent of the area is in grassland. Although most of the wooded area occurs in the Duck Mountain Forest Reserve, many steeper sloping soils in the agricultural area are also tree covered. Agricultural land use consists of annual cropland (19.2%), production of perennial forages (2.6%) and use of the grassland area for hay and pasture. Portions of the woodland area outside the Forest Reserve also provide native pasture for livestock. Wetlands and small water bodies occupy about 9% of the RM. Various non-agricultural uses such as recreation and infrastructure for urban areas and transportation utilize about 2 percent of the land base within the municipality (page 25).

While the majority of the soils in the RM of Hillsburg have 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 steeper slopes. This includes leaving adequate crop residues on the surface to provide sufficient trash cover during the early spring period. 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 Classes
Generalized Soil
Drainage
Management Consideration

<u>Interpretative Maps</u>
Agricultural Capabilities
Irrigation Suitability
Potential Environmental Impact
Water Erosion Risk
Land Use.

The maps have all been reduced in size and generalized (simplified) in order to portray conditions for an entire rural municipality on one page. These generalized maps provide a useful overview of conditions within a municipality, but are not intended to apply to site specific land parcels. On-site evaluations are recommended for localized site specific land use suitability requirements.

Digital databases derived from recent detailed soil inventories contain additional detailed information about significant inclusions of differing soil and slope conditions in each map polygon. This information can be portrayed at larger map scale than shown in this bulletin.

Information concerning particular interpretive maps, and the primary soil and terrain map data, can be obtained by contacting the Manitoba Soil Resource Section of Manitoba Agriculture, the local PFRA office, or the Manitoba Land Resource Unit.

Slope Map.

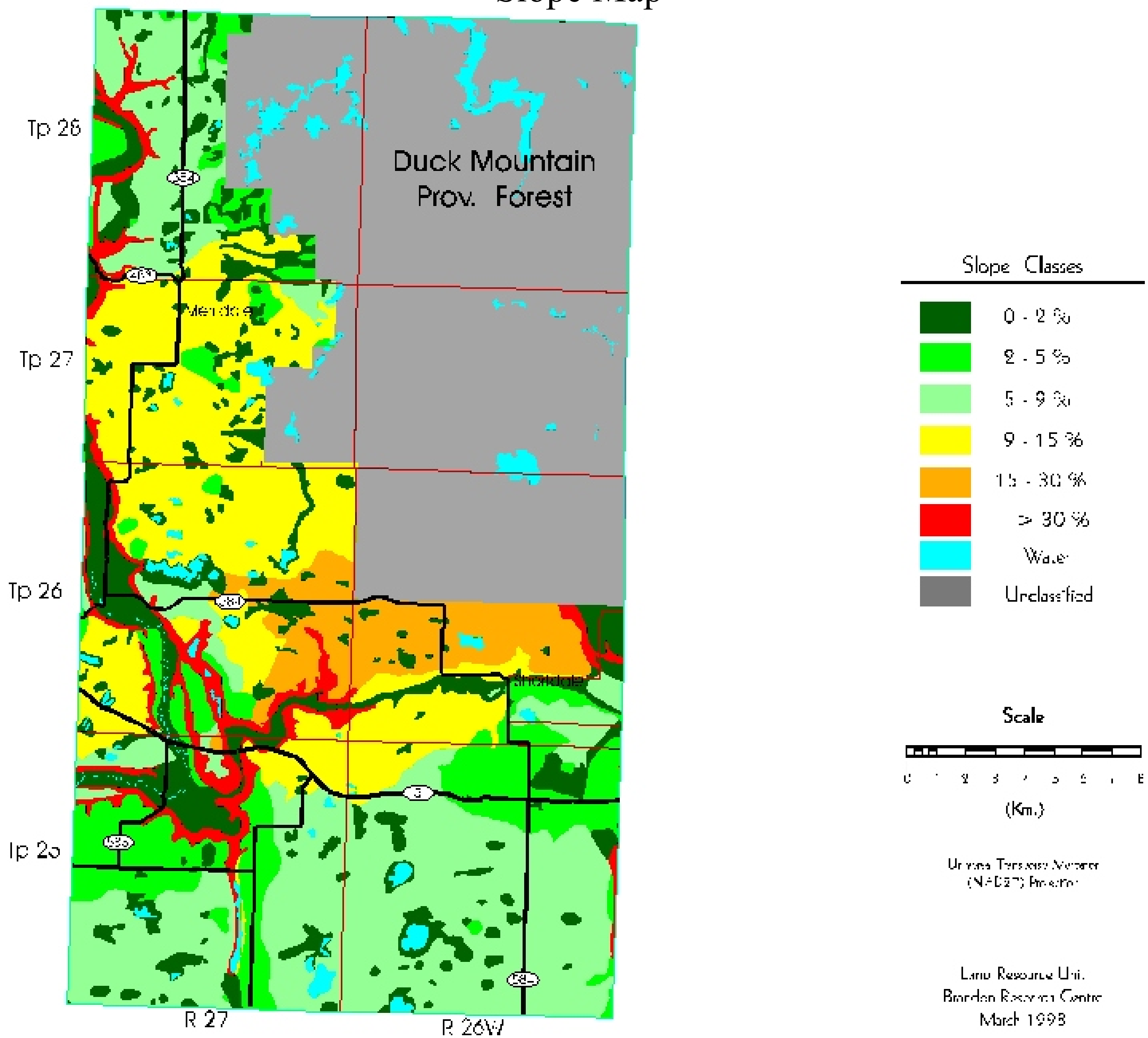
Slope describes the steepness of the landscape surface. The slope classes shown on this map are derived from the digital soil layer database. Specific colours are used to indicate the dominant slope class for each soil polygon in the RM. Additional slope classes may occur in each polygon area, but cannot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

Table 1. Slope Classes[1]

Slope Class	Area (ha)	Percent of RM
0 - 2 %	6990	9.9
2 - 5 %	5932	8.4
5 - 9 %	14466	20.4
9 - 15 %	10794	15.3
15 - 30 %	3198	4.5
> 30 %	2592	3.7
Unclassified	24855	35.1
Water	1913	2.7
Total	70739	100.0

[1] Area has been assigned to the most significant limiting slope for each terrain polygon. Significant areas of lesser slope, and smaller areas of greater slope may occur in each terrain polygon.

Slope Map


Tp 28
Tp 27
Tp 26
Duck Mountain
Prov. Forest
R 27
R 26W
Slope Classes
0 - 2 %
2 - 5 %
5 - 9 %
9 - 15 %
15 - 30 %
> 30 %
Water
Unclassified
Scale
(Km.)
Land Resource Unit
Brandon Research Centre
March 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.

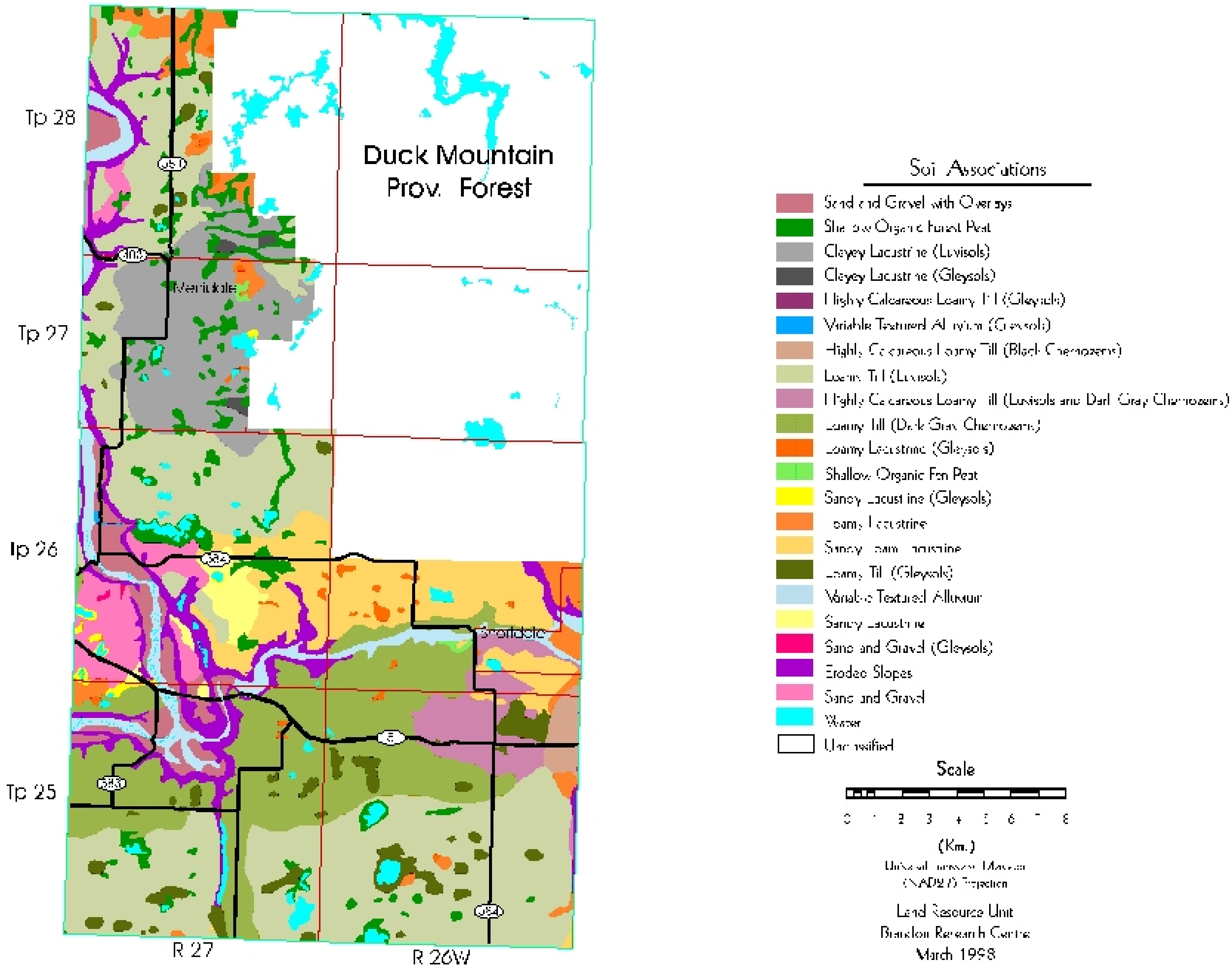
More detailed maps showing the dominant and subdominant soils in each polygon can also be produced at larger map scales.

Table 2. Generalized Soil Groups[1]

Soil Groups	Area (ha)	Percent of RM
Sand and Gravel with overlays	1410	2.0
Organic Forest Peat	2088	3.0
Clayey Lacustrine (Luvisols and Dark Gray Chernozems)	3829	5.4
Clayey Lacustrine (Gleysols)	97	0.1
Highly Calcareous Loamy Till (Gleysols)	2	0.0
Variable Textured Alluvium (Gleysols)	19	0.0
Highly Calcareous Loamy Till (Black Chernozems)	374	0.5
Loamy Till (Luvisols)	14236	20.1
Highly Calcareous Loamy Till (Brunisols and Dark Gray Chernozems)	1491	2.1
Loamy Till (Dark Gray Chernozems)	7251	10.3
Loamy Lacustrine (Gleysols)	244	0.3
Shallow Organic Fen Peat	83	0.1
Sandy Lacustrine (Gleysols)	137	0.2
Loamy Lacustrine	1389	2.0
Sandy Loam Lacustrine	3827	5.4
Loamy Till (Gleysols)	1328	1.9
Variable Textured Alluvium (Regosols)	1619	2.3
Sandy Lacustrine	549	0.8
Sand and Gravel (Gleysols)	19	0.0
Eroded Slopes	2592	3.7
Sand and Gravel	1385	2.0
Water	1913	2.7
Unclassified	24855	35.1
Total	70739	100.0

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

Generalized Soil Map



Soil Drainage Map.

Drainage is described on the basis of actual moisture content in excess of field capacity, and the length of the saturation period within the plant root zone. Six drainage classes plus four land classes are shown on this map.

Very Poor - Water is removed from the soil so slowly that the water table remains at or on the soil surface for the greater part of the time the soil is not frozen. Excess water is present in the soil throughout most of the year.

Poor - Water is removed so slowly in relation to supply that the soil remains wet for a large part of the time the soil is not frozen. Excess water is available within the soil for a large part of the time.

Imperfect - Water is removed from the soil sufficiently slowly in relation to supply to keep the soil wet for a significant part of the growing season. Excess water moves slowly down the profile if precipitation is the major source.

Moderately Well - Water is removed from the soil somewhat slowly in relation to supply. Excess water is removed somewhat slowly due to low perviousness, shallow water table, lack of hydaulic gradient, or some combination of these.

Well - Water is removed from the soil readily but not rapidly. Excess water flows downward readily into underlying materials or laterally as subsurface flow.

Rapid - Water is removed from the soil rapidly in relation to supply. Excess water flows downward if underlying material is pervious. Subsurface flow may occur on steep slopes during heavy rainfall.

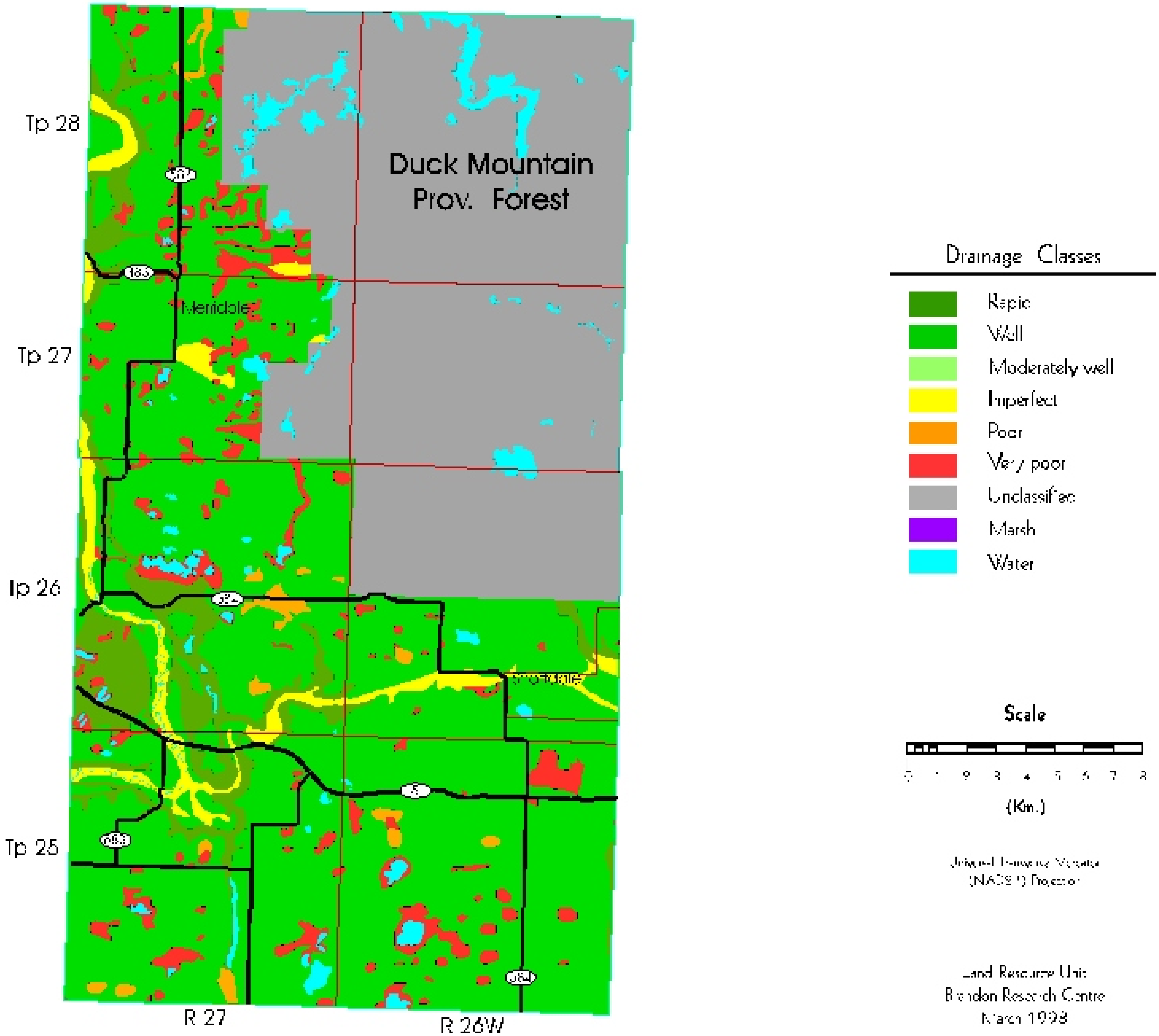
Drainage classification is based on the dominant soil series within each individual soil polygon.

Table 3. Drainage Classes[1]

Drainage Class	Area (ha)	Percent of RM
Very Poor	3409	4.8
Poor	610	0.9
Imperfect	1837	2.6
Moderately Well	0	0.0
Well	34139	48.3
Rapid	3977	5.6
Marsh	0	0.0
Unclassified	24855	35.1
Water	1913	2.7
Total	70739	100.0

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

Soil Drainage Map



Management Considerations Map.

Management consideration maps are provided to focus on awareness of land resource characteristics important to land use. This map does not presume a specific land use. Rather it portrays the most common and wide spread attributes that apply to most soil landscapes in the province.

These maps **highlight attributes** of soil-landscapes that the land manager must consider for any intended land use.

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

F = Fine texture - soil landscapes 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.

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.

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.

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.

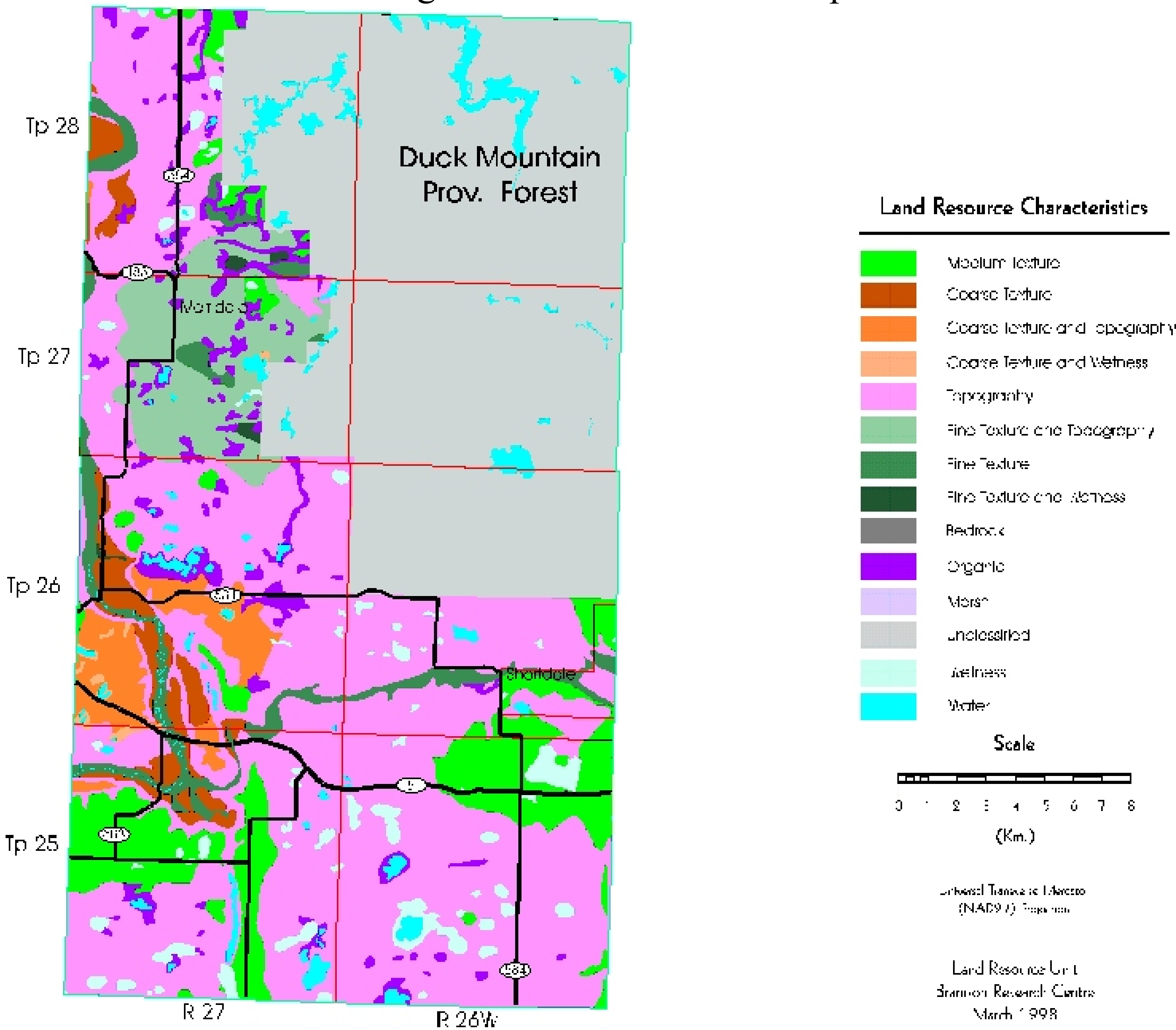
R = Bedrock - soil landscapes that have shallow depth to bedrock (< 50 cm) and/or exposed bedrock which may prevent the use of some or all tillage practices as well as the range of potential crops. They require special cropping and management practices to sustain agricultural production.

Table 5. Management Considerations[1]

Land Resource Characteristics	Area (ha)	Percent of RM
Fine Texture	1936	2.7
Fine Texture and Wetness	116	0.2
Fine Texture and Topography	3511	5.0
Medium Texture	5380	7.6
Coarse Texture	1586	2.2
Coarse Texture and Wetness	157	0.2
Coarse Texture and Topography	1758	2.5
Topography	25781	36.4
Topography and Bedrock	0	0.0
Wetness	1574	2.2
Wetness and Topography	0	0.0
Bedrock	0	0.0
Organic	2172	3.1
Marsh	0	0.0
Unclassified	24855	35.1
Water	1913	2.7
Total	70739	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]

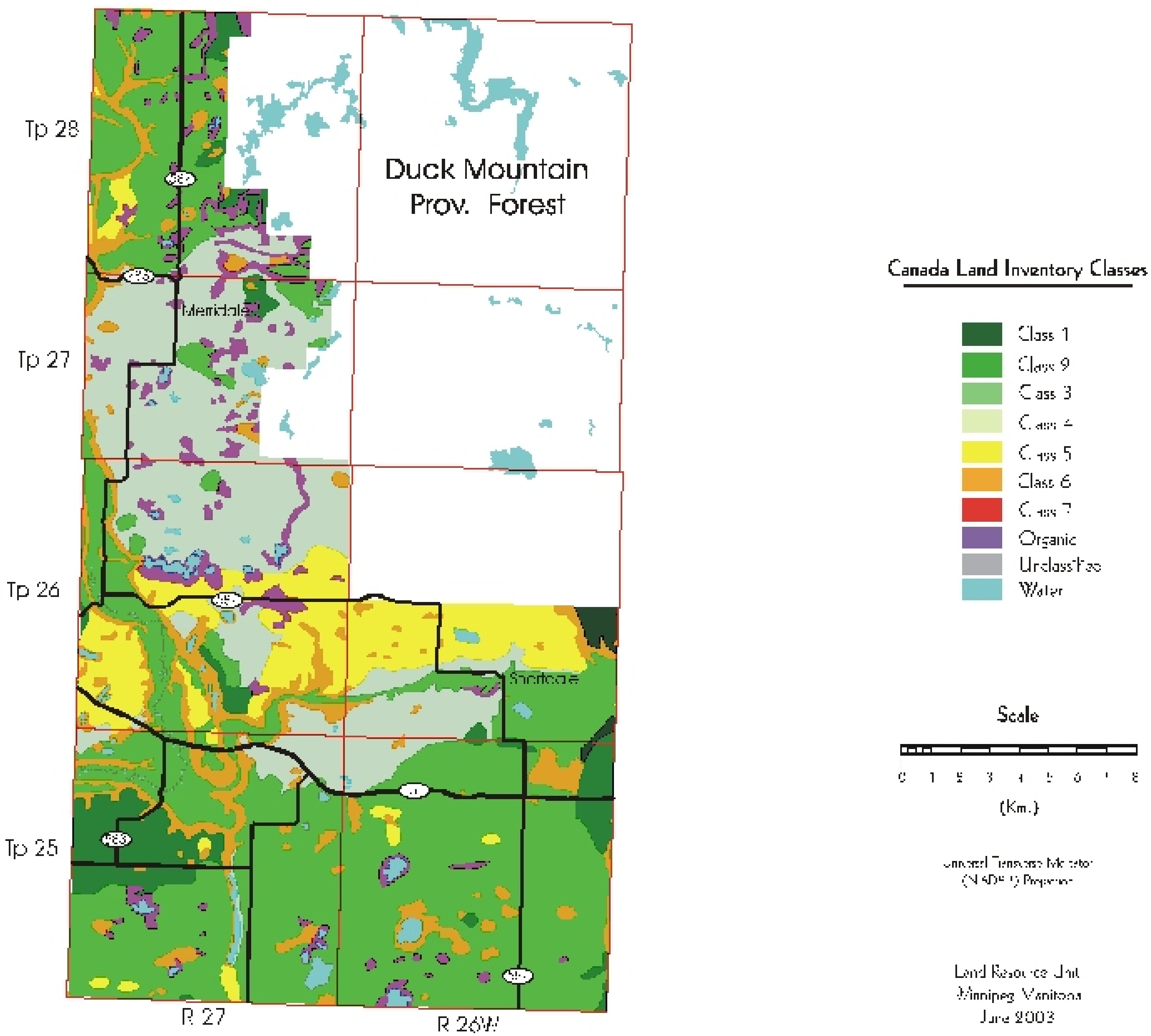
Class Subclass	Area (ha)	Percent of RM
1	**244**	**0.3**
2	**2537**	**3.6**
2T	2461	3.5
2X	77	0.1
3	**20004**	**28.3**
3I	1602	2.3
3M	1284	1.8
3MT	157	0.2
3P	808	1.1
3T	14087	19.9
3X	2066	2.9

Table 6. Agricultural Capability[1](cont)

Class Subclass	Area (ha)	Percent of RM
4	**9935**	**14.0**
4T	9935	14.0
5	**4724**	**6.7**
5M	1363	1.9
5T	3094	4.4
5W	267	0.4
6	**4130**	**5.8**
6T	2553	3.6
6W	1558	2.2
6WI	19	0.0
Unclassified	**25159**	**35.5**
Water	**1898**	**2.7**
Organic	**2165**	**3.1**
Total	**70797**	**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.

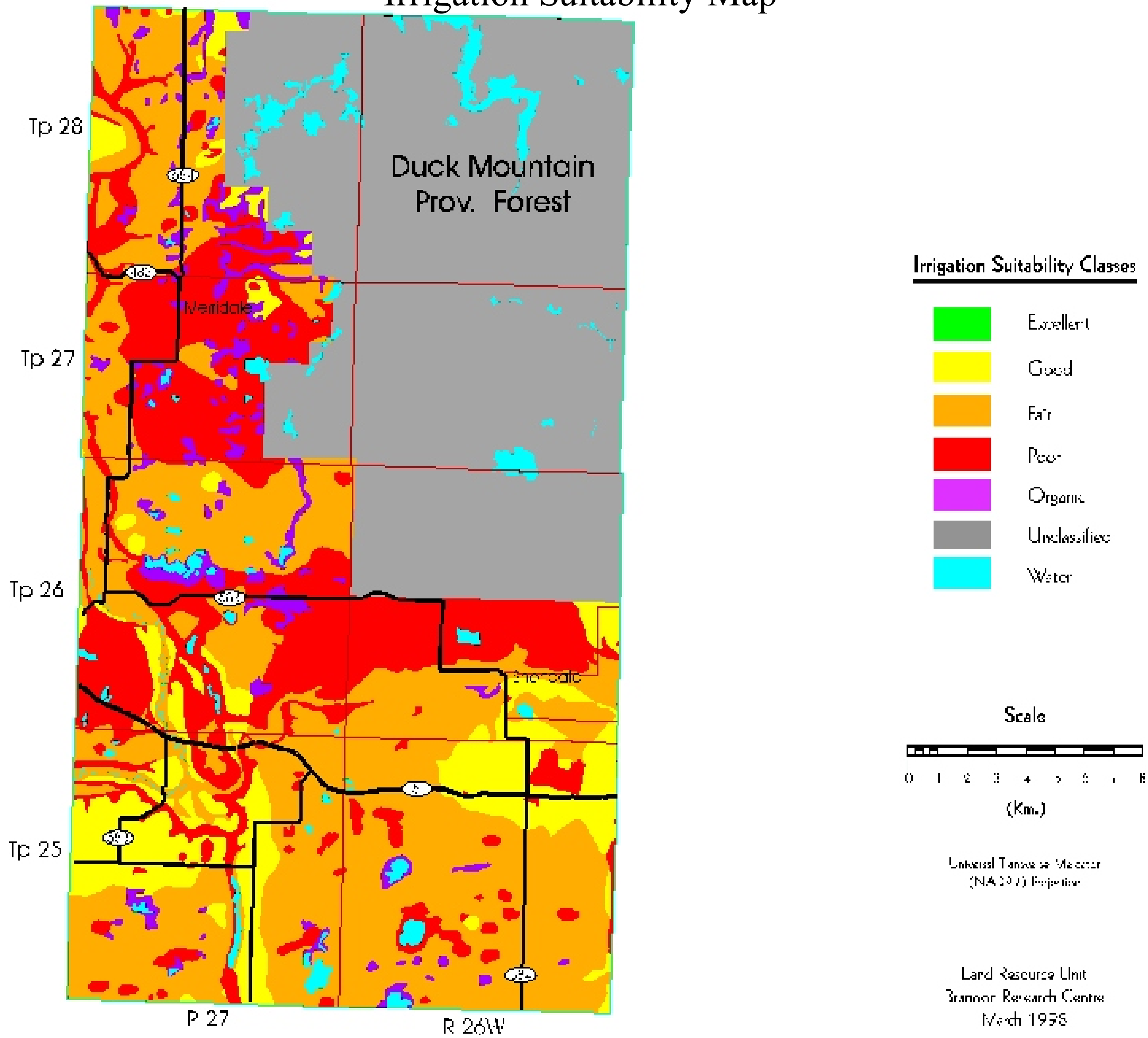
This generalized interpretive map is based on the dominant soil series for each soil polygon, in combination with the dominant slope class. The nature of the subclass limitations and the classification of subdominant components is not shown at this generalized map scale.

Table 7. Irrigation Suitability[1]

Class	Area (ha)	Percent of RM
Excellent	0	0.0
Good	6277	8.9
Fair	22890	32.4
Poor	12633	17.9
Organic	2172	3.1
Unclassified	24855	35.1
Water	1913	2.7
Total	70739	100.0

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

Irrigation Suitability Map



Potential Environmental Impact Under Irrigation Map.

A major concern for land under irrigated crop production is the possibility that surface and/or ground water may be impacted. The potential environmental impact assessment provides a relative rating of land into 4 classes (minimal, low, moderate and high) based on an evaluation of specific soil factors and landscape conditions that determine the impact potential.

Soil factors considered are those properties that determine water retention and movement through the soil; topographic features are those that affect runoff and redistribution of moisture in the landscape. Several factors are specifically considered: soil texture, hydraulic conductivity, salinity, geological uniformity, depth to water table and topography. The risk of altering surface and subsurface soil drainage regimes, soil salinity, potential for runoff, erosion and flooding is determined by specific criteria for each property.

Use of this rating is intended to serve as a warning of potential environmental concern. It may be possible to design and/or give special consideration to soil-water-crop management practices that will mitigate any adverse impact.

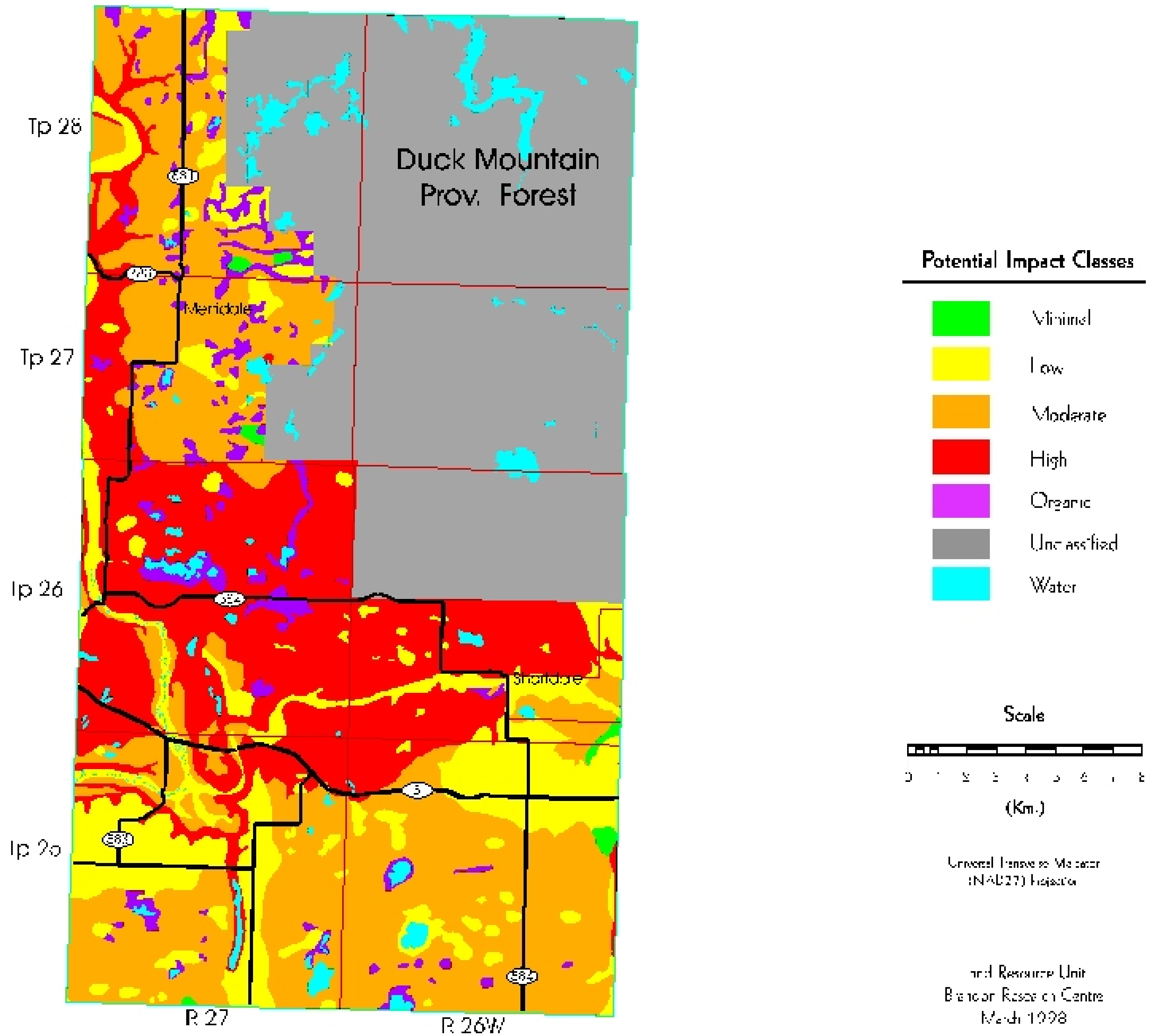
This generalized interpretive map is based on the dominant soil series and slope class for each soil polygon. The nature of the subclass limitations, and the classification of subdominant components is not shown at this generalized map scale.

Table 8. Potential Environmental Impact Under Irrigation[1]

Class	Area (ha)	Percent of RM
Minimal	237	0.3
Low	8766	12.4
Moderate	18532	26.2
High	14265	20.2
Organic	2172	3.1
Unclassified	24855	35.1
Water	1913	2.7
Total	70739	100.0

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

Potential Environmental Impact Under Irrigation



Water Erosion Risk Map.

The risk of water erosion was estimated using the universal soil loss equation (USLE) developed by Wischmeier and Smith (1965). The map shows 5 classes of soil erosion risk based on bare unprotected soil:

negligible
low
moderate
high
severe.

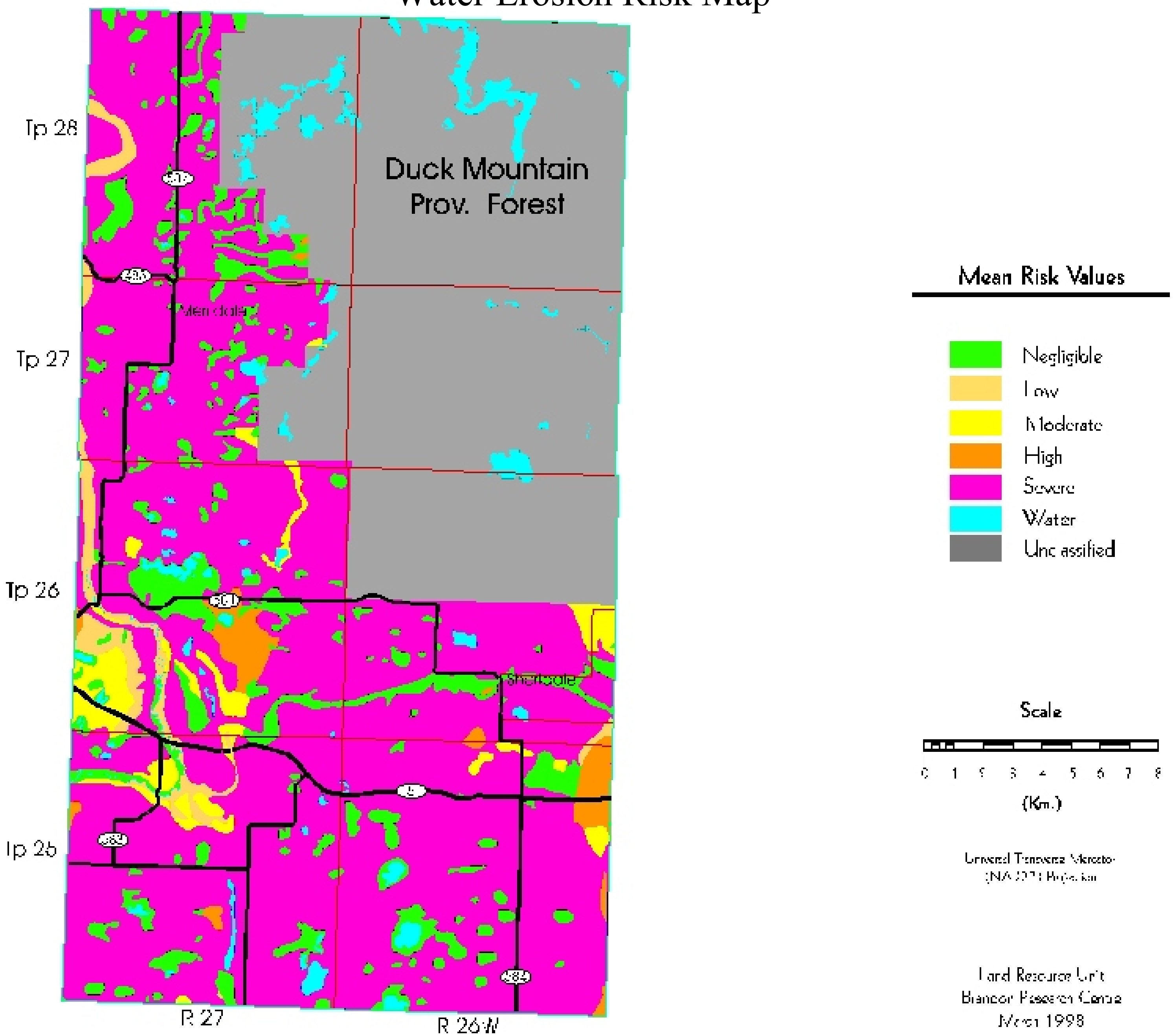
Cropping and residue management practices will significantly reduce this risk depending on crop rotation program, soil type, and landscape features.

Table 9. Water Erosion Risk[1]

Class	Area (ha)	Percent of RM
Negligible	**5210**	**7.4**
Low	**1269**	**1.8**
Moderate	**1683**	**2.4**
High	**1064**	**1.5**
Severe	**34745**	**49.1**
Unclassified	**24855**	**35.1**
Water	**1913**	**2.7**
Total	**70739**	**100.0**

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

Water Erosion Risk Map



Land Use Map.

The land use classification of the RM has been interpreted from LANDSAT satellite imagery, using supervised computer classification techniques. Many individual spectral signatures were classified and grouped into the seven general land use classes shown here. Although land use changes over time, and some land use practices on individual parcels may occasionally result in similar spectral signatures, this map provides a general representation of the current land use in the RM.

The following is a brief description of the land use classes:

Annual Crop Land - land that is normally cultivated on an annual basis.

Forage - perennial forages, generally alfalfa or clover with blends of tame grasses.

Grasslands - areas of native or tame grasses, may contain scattered stands of shrubs.

Trees - lands that are primarily in tree cover.

Wetlands - areas that are wet, often with sedges, cattails, and rushes.

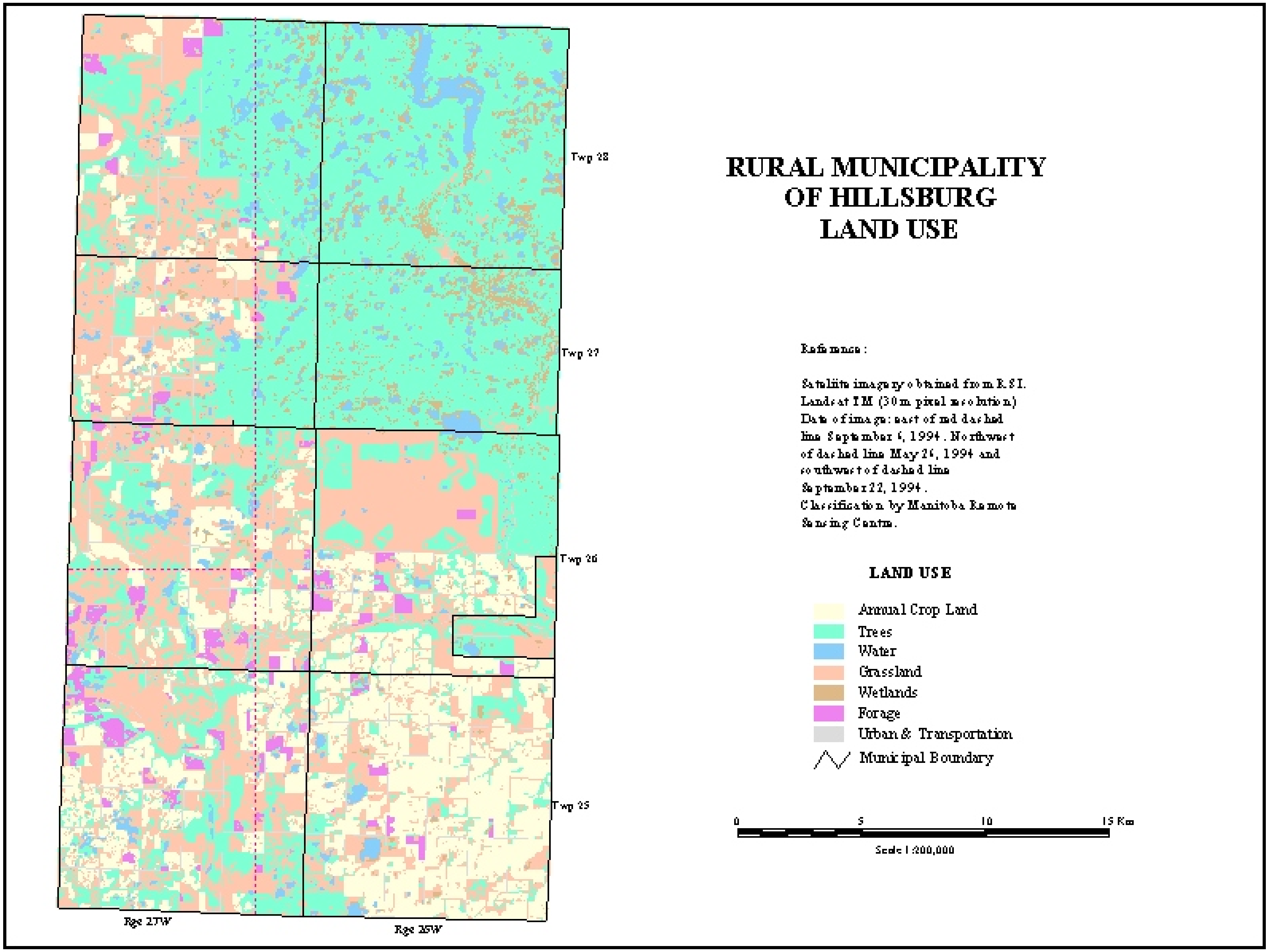
Water - open water - lakes, rivers streams, ponds, and lagoons.

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

Table 10. Land Use[1]

Class	Area (ha)	Percent of RM
Annual Crop Land	13604	19.2
Forage	1867	2.6
Grasslands	19564	27.7
Trees	28136	39.8
Wetlands	2938	4.2
Water	3393	4.8
Urban and Transportation	1208	1.7
Total	70710	100.0

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


RURAL MUNICIPALITY
OF HILLSBURG
LAND USE
Twp 28
Twp 27
Twp 26
Twp 25
Rge 27W
Reference:
Satellite imagery obtained from R.S.I. Landsat TM (30 m pixel resolution) Date of image: east of red dashed line September 6, 1994. Northwest of dashed line May 26, 1994 and southwest of dashed line September 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 1:200,000

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