

## GENERAL DESCRIPTION OF THE GRAND RAPIDS MAP SHEET AREA, 63G

The area covered by the Grand Rapids map sheet comprises about 5700 square miles, or 3,650,150 acres, in central Manitoba between 53° and 54° north latitude and 98° and 100° west longitude.

Most of the area lies within the Manitoba Lowlands physiographic region and a small part in the northeast lies in the Severn Upland region. The area was glaciated in the Pleistocene epoch and flooded by glacial Lake Agassiz. The bedrock formations underlying most of this area are Ordovician and Silurian limestones of Paleozoic age. Silurian limestones occur in the southwest. Ordovician limestones extend northward across the area and contact Precambrian rocks northeast of Playgreen Lake.

The area comprises three physiographic subdivisions, based on surficial deposits and topography: the Upper Nelson Plain, the Lake Winnipeg Terrace, and the Interlake - Westlake Plain.

The Upper Nelson Plain, which is part of the Severn Upland, occupies the region north and east of Playgreen Lake. It is an undulating plain, dominated by bogs and interspersed with esker remnants. In general, the bogs are underlain by lacustrine clay deposits.

The Lake Winnipeg Terrace follows the 850-foot contour along the western shore of Lake Winnipeg. Cobble limestone beaches are common in this region. Gently sloping sand beaches are characteristic of the south shore of Limestone Point and the north shore of Long Point.

The Interlake - Westlake Plain, the largest physiographic subdivision in the area, can be divided into The Pas moraine and the Moose Lake - Cedar Lake Plain. The Pas moraine extends across the southern part of the area, to Long Point on Lake Winnipeg. It is composed of fine to medium textured till, overlain by organic deposits. The Moose Lake - Cedar Lake Plain occupies all of the area north of The Pas moraine, except for the Lake Winnipeg Terrace and the Upper Nelson Plain regions. This gently rolling plain is composed of highly calcareous till and rock outcrops.

Lake Winnipeg dominates the eastern half of the area.

Above the 850-foot contour, the Moose Lake - Cedar Lake Plain is well drained and consists of till deposits. Rock terraces are common throughout this region, particularly near the larger lakes. Most of these terraces are small, and some are overlain by drift sediments. Till covers most of the region, however, it is thin or absent on limestone outcrops, which are more than 900 feet above sea level. The bedrock-controlled plain drops abruptly to a boggy lowland along the western shore of Lake Winnipeg. This escarpment, which is known as the Lake Winnipeg Terrace, is dominated by beach materials and is a prominent physiographic feature of the landscape. It follows approximately the 850-foot contour and is almost parallel to the present shoreline of Lake Winnipeg.

Lacustrine clay soils are the dominant surficial deposits below the 800-foot contour and are overlain by organic materials. The till deposits of The Pas moraine are also covered by organic materials. Organic deposits extend northward below the escarpment and across the northeastern part of the area. A zone of discontinuous permafrost occurs above a line that extends from between Moose and William lakes in the northwest to Limestone Bay and along the northern shore of Lake Winnipeg to just above Big Mossy Point. Isolated pockets of localized permafrost occur in organic soils below this line and east of the Lake Winnipeg Terrace, almost as far south as Grand Rapids.

The area lies entirely within the Nelson River drainage system. The Nelson, Saskatchewan, and William rivers are the main rivers that drain the area, but only the William River has a distinct drainage system. Playgreen Lake represents a channel of the Nelson River. The drainage system of the Saskatchewan River has become obscured by flooding as a result of the recent use of Cedar Lake as a reservoir for hydroelectric power.

The area lies in the Boreal Forest Region of Canada, which is characterized by black spruce (*Picea mariana*) as the climax species. However, extensive fires throughout the area have prevented the establishment of the black spruce climax forest. As a result, mature, well-developed stands with a thick feathermoss understory are rare.

Jack pine (*Pinus banksiana*) is the dominant species on well-drained burn sites. In old jack pine stands, black spruce occurs in its early stages of succession. In open jack pine stands, shrubs include alders (*Alnus spp.*), common juniper (*Juniperus communis*), and Canada buffaloberry (*Shepherdia canadensis*). Ground cover consists of bearberry (*Arctostaphylos uva-ursi*), blueberries (*Vaccinium spp.*), and bunchberry (*Cornus canadensis*).

White spruce (*Picea glauca*) is the dominant species on deep clay sites, such as along the shores of Cedar, Moose, and William lakes. Balsam fir (*Abies balsamea*) is a common understory species in white spruce stands. White spruce is also dominant on the sandy soils of Limestone Point on Lake Winnipeg.

The William River, north of Limestone Bay, flows through vast black spruce muskeg and larch fens. However, the well-drained river borders of rich alluvium support white spruce, white birch (*Betula papyrifera*), trembling aspen (*Populus tremuloides*), and jack pine with a dense understory of willows (*Salix spp.*), roses (*Rosa spp.*), red-fruited choke cherry (*Prunus virginiana*), and red-osier dogwood (*Cornus stolonifera*). Ground cover includes red baneberry (*Actaea rubra*), dogbanes (*Apocynum spp.*), cow-parsnip (*Heracleum lanatum*), violets (*Viola spp.*), yarrow (*Achillea spp.*), horsetails (*Equisetum spp.*), strawberries (*Fragaria spp.*), and goldenrods (*Solidago spp.*).

The lowlands south of Grand Rapids are characterized by bog vegetation. North of Grand Rapids, the lowlands along the western shore of Lake Winnipeg are characterized by bog vegetation, localized permafrost, and many shallow, spring-fed, gravel-bottomed ponds at the foot of bedrock escarpments. The lowland at the north end of Lake Winnipeg is characterized by peat plateaus, palsas, and vast patterned fens. These permafrost landforms mark the southern limit of discontinuous permafrost in Manitoba. Collapse scars of palsas are a common feature of this region. The peat plateaus and palsas are better-drained than the surrounding bogs and fens.

### CLIMATE

The area has a continental subhumid climate, characterized by warm, short summers and very cold, long winters. July, the warmest month has a mean monthly temperature of 65°F, and January, the coldest, has a mean monthly temperature of -6°F. The mean annual temperature at Grand Rapids is 32°F.

The mean date of the last spring frost occurs on May 25 and the mean date of the first fall frost occurs on September 10. The growing season is about 154 days and the frost-free period is 90 to 110 days annually. Sites close to Lake Winnipeg have the most frost-free days. The short growing season (1750 to 2250 degree-days) is offset to some extent by the longer photoperiod in northern latitudes.

The mean annual precipitation for the area is 19 inches; mean annual rainfall is about 14 inches and mean annual snowfall is about 52 inches. Therefore, well-drained sites under a dense forest cover have a shortage of available moisture during parts of the growing season in an average year.

### SOILS AND AGRICULTURAL CAPABILITY

Two climatic subregions are recognized in the area. Most of the area is in Subregion II Ch, where Brunisolic and Organic soils predominate. The part of the area north of Lake Winnipeg is in Subregion II Ch and is dominated by Organic and Cryic Organic soils.

Organic soils occupy about 20 percent of the area. Fibrisols and Mesisols are the dominant Organic soils; about 20 percent of these are Cryic or perennially frozen. Fibrisols have developed mainly from poorly drained sphagnum peat, derived chiefly from sphagnum mosses. They consist of relatively undecomposed material. Mesisols represent an intermediate stage of decomposition. They have developed on very poorly drained fen peat, derived mainly from sedges and mosses, and on poorly drained forest peat, derived from black spruce, tamarack, ericaceous shrubs, and feathermosses. The perennially frozen or Cryic Organic soils of the area are associated with forest and sphagnum peat materials and are above the groundwater table. In their natural state, the Organic soils are unimportant for agriculture and are rated Class 0.

Gleysols soils comprise about 4 percent of the area. These soils are saturated with water for part or all of the year, unless they are artificially drained. Gleysols are the dominant Gleysolic soils in the area. They are characterized by a very thin, dark, surface mineral horizon high in organic matter. These soils have developed under hydrophytic vegetation and usually have a dominantly sphagnum peat surface layer up to 24 inches thick. Gleysols have developed on all parent materials in the area and are usually forested. Agricultural capability classes for Gleysols range from Class 5 to Class 6, with the main limitations being wetness, stoniness, and poor soil structure.

Brunisolic soils are the dominant well-drained soils in about 22 percent of the area. Eutric Brunisols predominate and are characterized by thin, organic surface horizons underlain by a thin leached horizon and a brownish-colored, mellowed horizon. They occur mainly on the extremely calcareous, stony, medium textured glacial till deposits. The agricultural capability of these soils ranges from Class 4 to Class 6; stoniness, low fertility, and bedrock are the main limitations.

Luvisolic soils are found in about 1 percent of the area. These are well to imperfectly drained Gray Luvisols that have organic surface horizons, light-colored eluvial horizons, and brownish-colored illuvial horizons in which clay is the main accumulation product. These soils are found chiefly on the fine-textured, moderately calcareous, till and lacustrine deposits, but also occur associated with Eutric Brunisols on the medium textured, high lime till. Agricultural capabilities of these soils in the area are Classes 5 and 6, with the main limitations being drainage, stoniness, and poor soil structure.

### SETTLEMENT AND LAND USE

The Saskatchewan River has formed a large delta west of the area and drains via Cedar Lake, Cross Bay, and the Grand Rapids into Lake Winnipeg, at which point the town of Grand Rapids is located. During the fur trade era, Grand Rapids was on the main fur trade route to the northwest and settlement consisted of a few fur traders.

Control of this location determined control of the inland fur trade of the region. Settlement remained relatively unchanged until a dam and dikes for development of hydroelectric power were constructed to utilize the natural drop in elevation at Grand Rapids. The water levels in Cedar and Moose lakes were raised to form a large reservoir, which resulted in extensive flooding, especially along the shoreline of Cedar Lake. A road was constructed from Gypsumville to provide land access.

Since the opening of the power station in November, 1965, the town of Grand Rapids has expanded to include a hospital, motel, schools, essential services, and recreation facilities.

The area is accessible via Provincial Trunk Highway No. 6, which connects Winnipeg, Grand Rapids, and Thompson. A gravel road connects the settlement of Easterville, situated on the southeast shore of Cedar Lake, with the town of Grand Rapids. Several construction roads provide access to the Cross Bay vicinity. A major winter road connects Grand Rapids with Norway House.

Grand Rapids, the main population center in the area, has about 500 inhabitants. Easterville is a new settlement that has a population of about 400, mainly Indians from the flooded parts of the Chemahawin Reserve.

The main sources of income are fishing, construction, and trapping. Some timber cutting has been done in the Moose Lake region. Most of the area will probably be logged to supply the new forestry industry near The Pas.

The soils in the area are too stony and thin, or too wet for arable agriculture. Climate is a further limitation to the development of these soils. In their natural wetness and stoniness respectively. Gleysols are limited for agriculture because of wetness. If improvements were made, these soils would probably be limited to the production of forage crops. Luvisols, if improved, would probably be limited to the production of grasses and legumes.

**Capability classification by B. T. Heal, Manitoba Department of Mines, Resources and Environmental Management.**

**Description by B. T. Heal and G. C. Jenkins, Manitoba Department of Mines, Resources and Environmental Management and Dr. G. J. Beke, Canada Department of Agriculture.**

### REFERENCES

Chapman, L. J., and D. M. Brown. 1966. The climates of Canada for agriculture. Rep. No. 3, Queen's Printer, Ottawa. 23 pp.

Ehrlich, W. A. et al. 1960. Report of detailed soil survey of the Pasquia map area in northern Manitoba. Soils Rep. No. 11. Manitoba Soil Survey, Winnipeg. 44 pp.

Weir, T. R. 1960. Economic atlas of Manitoba. Manitoba Dep. Industry and Commerce, Winnipeg. 81 pp.

## DESCRIPTION DU TERRITOIRE DE LA FEUILLE DE GRAND RAPIDS - 63G

Le territoire représenté sur la feuille de Grand Rapids occupe une superficie d'environ 5 700 milles carrés ou de 3 650 150 acres dans le centre du Manitoba, entre 53 et 54° de latitude nord et 98 et 100 de longitude ouest.

La majeure partie du territoire appartient à la région structurale des basses terres du Manitoba et une petite partie du nord-est, à la région des hautes terres Severn. Le territoire subit la glaciation au pléistocène et fut inondé par le lac glaciaire Agassiz. Les assises rocheuses sur lesquelles reposent la majeure partie du territoire sont des calcaires paléozoïques ordoviciens et siluriens. Les calcaires siluriens apparaissent dans le sud-ouest. Les calcaires ordoviciens traversent le territoire et continuent vers le nord; ils entrent en contact avec le roc précambrien au nord-est du lac Playgreen.

Compte tenu des formations meubles présentes et de la topographie, le territoire se partage entre trois régions structurales: la plaine du Haut-Nelson, la terrasse du lac Winnipeg et la plaine Interlake-Westlake.

La plaine du Haut-Nelson, fait partie des hautes terres Severn et occupe une région située au nord et à l'est du lac Playgreen. C'est une plaine ondulée, marécageuse et parsemée de vestiges d'escars. Les marais recouvrent habituellement des argiles lacustres.

La terrasse du lac Winnipeg suit la courbe de niveau de 850 pi le long de la rive occidentale du lac Winnipeg. Les plages de calcaire caillouteux sont communes dans cette région. Les plages de sable en pente douce caractérisent la rive sud de Limestone Point et la rive nord de Long Point.

La plaine Interlake-Westlake, la plus importante subdivision structurale du territoire, peut se diviser en deux parties: la moraine The Pas et la plaine Moose Lake/Cedar Lake. La moraine The Pas traverse le sud du territoire pour se terminer à Long Point sur le lac Winnipeg. Elle se compose de till de texture fine ou moyenne, recouvert de dépôts organiques. La plaine Moose Lake/Cedar Lake comprend toute la région située au nord de la moraine The Pas, exception faite des secteurs qu'occupent Winnipeg Lake Terrace et la plaine du Haut-Nelson. Cette plaine légèrement vallonnée se compose de till très calcaire et d'affleurements rocheux.

Le lac Winnipeg domine le paysage dans la moitié orientale du territoire.

Au-dessus de la courbe de niveau de 850 pi, la plaine Moose Lake/Cedar Lake est bien drainée et constituée de dépôts de till. Les terrasses rocheuses sont communes à travers cette région, surtout à proximité des plus grands lacs. La plupart des ces terrasses sont petites et quelques-unes sont recouvertes de matériaux glaciaires. La majeure partie de cette région est couverte de till; il est toutefois mince ou absent sur les affleurements calcaires qui atteignent une altitude supérieure à 900 pi. La plaine dont le relief traduit l'influence de la roche en place s'abaisse brusquement jusqu'à une région de basses terres marécageuses le long de la rive occidentale du lac Winnipeg. Cet escarpement est connu sous le nom de Lake Winnipeg Terrace; des dépôts de plage le caractérisent et il constitue un élément majeur des paysages. Presque parallèle au rivage actuel du lac Winnipeg, il suit à peu près la courbe de niveau de 850 pieds.

Les sols apparus sur des argiles lacustres sont les formations meubles qui dominent en dessous de la courbe de niveau de 800 pi et ils sont recouverts de matériaux organiques. Les dépôts de till de la moraine The Pas sont également recouverts de matériaux organiques. Ces derniers continuent vers le nord en dessous du niveau de l'escarpement et on en trouve à travers tout le nord-est du territoire. Une zone discontinue de pergélisol apparaît au-dessus d'une ligne dont l'extrémité se situe entre les lacs Moose et William dans le nord-ouest, va jusqu'à Limestone Bay puis longe la rive nord du lac Winnipeg pour s'arrêter juste un peu passé Big Mossy Point. On trouve des poches isolées de pergélisol dans les sols organiques en dessous de cette ligne et à l'est de Lake Winnipeg Terrace presque aussi loin que Grand Rapids.

Tout le territoire appartient au réseau hydrographique du fleuve Nelson. Les rivières Nelson, Saskatchewan et William sont les principaux cours d'eau qui drainent le territoire mais seule la rivière William a un réseau indépendant. Le lac Playgreen est une passe conduisant au fleuve Nelson. Le réseau hydrographique de la rivière Saskatchewan n'est plus apparent par suite des inondations résultant de l'utilisation récente du lac Cedar comme réservoir destiné à la production d'énergie hydroélectrique.

Le territoire appartient à la région de la forêt boréale où l'épinette noire (*Picea mariana*) est l'essence caractéristique de la forêt climax. De gros feux de forêt ont toutefois dévasté le territoire, empêchant la formation de la forêt climatique d'épinette noire. Les beaux peuplements parvenus à maturité associés à un épais sous-bois d'hypnum sont donc rares.

Le pin gris (*Pinus banksiana*) est l'essence dominante sur les stations bien drainées que l'incendie a dévastées. Dans les vieux peuplements de pin gris, l'épinette noire apparaît lors des premiers stades de la succession végétale. Dans les peuplements clairsemés de pin gris, les arbisseaux comprennent les aulnes (*Alnus spp.*), le genévrier commun (*Juniperus communis*) et la shéphède du Canada (*Shepherdia canadensis*). La couverture végétale du terrain se compose d'arctostaphyle raisin d'ours (*Arctostaphylos uva-ursi*), de bleuets (*Vaccinium spp.*) et de cornouiller du Canada (*Cornus canadensis*).

L'épinette blanche (*Picea glauca*) domine sur les argiles épaisses comme celles qu'on trouve le long des rives des lacs Cedar, Moose et William. Le sapin baumier (*Abies balsamea*) est une espèce de sous-bois, commune dans les peuplements d'épinette blanche. L'épinette blanche est également l'essence dominante sur les sols sableux de Limestone Point, sur le lac Winnipeg.

La rivière William, au nord de la baie Limestone, coule à travers de vastes étendues de marécages et de tourbières où croissent respectivement l'épinette noire et le mélèze laricin. On trouve toutefois, sur les alluvions bien drainées, en bordure de la rivière, l'épinette blanche, le bouleau blanc (*Betula papyrifera*), le peuplier faux-tremble (*Populus tremuloides*) et le pin gris ainsi qu'un épais sous-bois de saules (*Salix spp.*), rosiers (*Rosa spp.*), cerisiers de Virginie (*Prunus virginiana*) et cornouiller stolonifère (*Cornus stolonifera*). La couverture végétale du terrain comprend différentes espèces: herbe de Saint-Christophe (*Actaea rubra*), apocyn (*Apocynum spp.*), angélique sauvage (*Heracleum lanatum*), violettes (*Viola spp.*), achillées (*Achillea spp.*), prêles (*Equisetum spp.*), fraisiers (*Fragaria spp.*) et verges d'or (*Solidago spp.*).

Une végétation de marécages caractérise les basses terres au sud de Grand Rapids. Au nord de Grand Rapids, des basses terres longent la rive occidentale du lac Winnipeg; on y remarque une végétation marécageuse des secteurs de pergélisol nettement localisés et, au pied des escarpements rocheux, un grand nombre d'étangs peu profonds; leur lit est recouvert de gravier et ils se remplissent au printemps. Dans les basses terres situées à l'extrême nord du lac Winnipeg on rencontre des plateaux de tourbe, de palsas et de vastes tourbières réticulées. Ces modèles de terrain reliés à la présence de pergélisol marquent la limite méridionale du pergélisol discontinu au Manitoba. La présence de palsas caractérise la région. Les plateaux de tourbe et les palsas sont mieux drainés que les marais et les tourbières des environs.

### CLIMAT

Le territoire jouit d'un climat continental sub-humide: étés courts et chauds, hivers longs et très froids. En juillet, le mois le plus chaud, la température mensuelle moyenne est de 65°F; elle est de -6 en janvier, le mois le plus froid. La température annuelle moyenne, à Grand Rapids, est de 32°.

Au printemps, le dernier gel se produit en moyenne le 25 mai et le premier gel automnal, le 10 septembre. La saison de végétation dure environ 154 jours et la période sans gel de 90 à 110 par année. Ce sont les stations proches du lac Winnipeg qui comptent le plus de jours sans gel. La longueur de la période d'ensoleillement sous ces latitudes septentrionales compense quelque peu pour la brièveté de la saison de végétation (1 750 à 2 250 degrés-jours).

La précipitation annuelle moyenne pour le territoire est de 19 po; la chute de pluie annuelle moyenne est d'environ 14 po et la chute de neige, d'environ 52 po. Sur les stations bien drainées, sous un couvert forestier dense, on remarque un manque d'eau absorbable pendant certaines parties de la saison de végétation, au cours d'une année moyenne.

### SOLS ET POSSIBILITÉS AGRICOLES

Le territoire renferme deux sous-régions climatiques. La majeure partie du territoire appartient à la sous-région II Ch où prédominent les sols brunisoliques et organiques. La partie du territoire située au nord du lac Winnipeg appartient à la sous-région II Ch où dominent les sols organiques et cryiques.

Les sols organiques occupent environ 20% du territoire. Les fibrisols et les mésisols sont les principaux types de sols organiques; environ 20% de ces derniers sont des sols cryiques ou gelés en permanence. Les fibrisols