

## GENERAL DESCRIPTION OF THE NEEPAWA MAP SHEET AREA, 62J

The area comprises about 6100 square miles in south-central Manitoba. About 7 percent, or 420 square miles, of the area is occupied by Riding Mountain National Park and about 17 percent, or 1050 square miles, by Lake Manitoba.

The Manitoba Escarpment, which crosses the area from the northwest to the south-central part along the 1100-foot contour, divides the area into two broad physiographic units: the Western Upland above the Escarpment on the west, and the Manitoba Lowland below the Escarpment on the east.

Elevation in the area ranges from about 2400 feet above sea level at Riding Mountain in the west, to 800 feet at Lake Manitoba in the east. East of the escarpment, the land slopes very gradually toward Lake Manitoba. There is a steep rise in elevation on the escarpment and on the east slope of Riding Mountain. The topography of the Western Upland varies from smooth to gently undulating on the Newdale Till Plain to steeply undulating on Riding Mountain. The Upper Assiniboine Delta is smooth with occasional hilly dunes. The Manitoba Lowland is characterized by level to gently sloping topography, except for microrelief caused by many former strandlines. "Glenhope Island," which is 10 miles east of McCreary, is about 75 feet higher than the surrounding terrain.

The bedrock of the area ranges from dolostone, limestone, shale, and gypsum east of the escarpment to shales and sandstone west of the escarpment. The shale bedrock is exposed or close to the surface in many places along the east slope of Riding Mountain.

The entire area lies within the Nelson River drainage system. A well-defined system of rivers drains all of the area except the east. The Minnedosa River originates in the Riding Mountain upland and empties into the Assiniboine River. The Minnedosa and the Assiniboine rivers drain the southwestern part of the area, whereas the Whitemud River and its tributaries drain the south-central part into Lake Manitoba. The northwest is drained by the Ochre and Turtle rivers, which flow into Lake Dauphin. The Westlake-Interlake till plains have impeded drainage as a result of the flat topography and low sand and gravel ridges across the direction of landfall. In the central part of the area, the large amount of runoff water from the east slope of Riding Mountain is an additional drainage problem.

The population of the area is concentrated in the arable regions. The two main service centers are the towns of Minnedosa and Neepawa. In the settled regions, good roads are plentiful, but the more sparsely populated regions lack a good road system. Railway service is adequate to serve the needs of the area. The main source of income is agriculture and related industry and services. Recreation provides income in some localities close to Riding Mountain National Park. Forest operations are of no importance to the economy. Some sawmills have been operated in the area using timber from Riding Mountain. Locally some timber is cut for household and farm use.

### CLIMATE

The climate of the area is boreal-temperate, dry subhumid in the Manitoba Lowland and boreal-temperate, normal or median subhumid in the Riding Mountain upland. Short warm summers, long cold winters, and low precipitation are characteristic. The frost-free period varies from about 110 days in the Lowland to less than 90 days in the Riding Mountain region. The mean temperature in January is about 0°F in the Lowland and about -2°F in Riding Mountain, and the mean temperatures for July are 67°F and 64°F respectively. Average annual precipitation varies from about 18 inches in Minnedosa to about 20 inches in the central Lowland. Short-term data indicate that the east slope of Riding Mountain receives about 2 inches more precipitation than the Lowland region and Riding Mountain itself probably even more. About 60 percent of the precipitation falls from April through September. Potential evapotranspiration is between 22 and 23 inches in the Lowland region and between 20 and 22 inches in the Riding Mountain region. Well-drained sites under forest cover generally have a shortage of available moisture during parts of the growing season.

### LANDFORMS

The entire area was covered by ice during the Wisconsin age and probably also during previous ice ages. The glacier covered the area with till deposits composed of materials derived from the bedrock formations underlying the area; from bedrock formations to the north and east of the area; and from other sediments it advanced over in the north. The most extensive glacial till deposit is ground moraine, which are characterized by a topography of low knolls and depressions. The material is unsorted and contains stones and boulders. The texture ranges from loam to clay loam. Calcareousness varies from very strong in the Westlake-Interlake till plains, where the tills are composed of materials derived largely from limestone and dolostone, to moderate in the Newdale till plain, where the till is a mixture of materials derived from limestone, dolostone, shale, and Precambrian rocks. End moraines were formed south of Riding Mountain and on the Riding Mountain upland, at the margin of the ice sheet. These deposits are associated with rough to hilly topography. The materials are often water modified, unsorted, and very stony, and the texture ranges from sandy loam to clay loam.

After the retreat of the ice sheet, glacial Lake Agassiz covered the area below the 1300-foot contour. The Assiniboine River drained glacial Lake Souris into Lake Agassiz, forming an extensive delta. The Upper Assiniboine Delta, above the 1100-foot contour, is composed of coarse to medium and fine textured deposits. The coarse textured deposits have been modified by wind, and sand dunes occupy part of the region. The Lower Assiniboine Delta, below the 1100-foot contour, is a smooth sandy lacustrine plain. The sandy deposits vary from 3 to 15 feet deep over lacustrine clays and till. The southeastern part of the area is covered by fine textured lacustrine deposits of the Red River Plain. As the level of glacial Lake Agassiz subsided, the area was subjected to wave erosion and many beaches were formed.

Along the Manitoba Escarpment, especially along the east slope of Riding Mountain, stream-deposited alluvial sediments formed numerous fans. Alluvial sedimentation still occurs in the river valleys and in depressional locations where organic deposits accumulate.

In most of the area, Chernozemic Black and Dark Gray soils have formed. They are normally well developed on the lacustrine and till deposits in the southern part of the area, but are very shallow on the strongly calcareous tills of the Westlake and Interlake till plains. In the Riding Mountain region and its margin, Gray Luvisols form the most extensive soil type. Regosolic soils are found adjacent to streams that are periodically inundated. Gleyolic soils have developed in poorly drained locations, and Organic soils are found in very poorly drained locations, where a layer of peat 1 to more than 4 feet deep overlies mineral materials of various textures.

### FOREST ECOLOGY

Two ecologically significant site regions were recognized in the area. Most of the area is in site region 55d on the Index map. This site region lies almost completely within the Westlake-Interlake Section of the Boreal Forest Region. It is characterized by open hardwood stands, hardwood swamps, fringes of fens along streams, and grasslands. The dominant tree species are trembling aspen, balsam poplar, and species such as bur oak, Manitoba maple, green ash, and white elm. In the past, large parts of this region were covered by tall and mixed grass prairie. Most of this land is now under cultivation or in use as pasture. As a result, the forest cover is not very extensive. Especially in the south on the tills and finer lacustrine deposits, tree growth is confined to clumps of various sizes on imperfectly to poorly drained sites, and to fringes along streams and in gullies. The medium to coarse textured lacustrine soils in the south and the highly calcareous tills in the north support more extensive stands, however, these stands are often affected by grazing, logging, and burning.

Trembling aspen grows in this region on sites that vary widely in soil texture and soil moisture regime. The wetter sites are often occupied by balsam poplar or mixtures of balsam poplar and trembling aspen. The trembling aspen stands and clumps tend to expand into cultivated or grassland regions. Stand condition is often poor as a result of growing conditions and sometimes as a result of damage done by grazing and burning.

Dry, gravelly, and sandy sites support bur oak and stunted trembling aspen. Bur oak is often found mixed with trembling aspen and other hardwoods on riverbanks. The natural occurrence of Manitoba maple, green ash, and white elm is mainly restricted to the vicinity of streams. Good mixed stands of these species are found in the southeast on medium textured clays. Willows grow in very wet localities. The very poorly drained sites with organic deposits are covered by sedges. White birch occurs scattered throughout the area on dry sites.

Field and farmstead shelterbelts and small woodlots are found extensively throughout the area. The main species used include green ash, white spruce, Manitoba maple, cottonwood, and willow. White spruce does not occur naturally in this region, but the plantations indicate that it will grow very well on many sites, especially on imperfectly drained loams and moist sands. Once white spruce is established, natural regeneration may occur in some locations. Manitoba maple forms very dense shelterbelts among many farmsteads but is characterized by the same crooked form as in natural stands. The use of willow and cottonwood is less extensive. Cottonwood generally shows excellent growth, especially on well-drained loamy sands.

The part of the area in site region 55n is characterized by a mixture of deciduous and coniferous species. The northwest and north-central parts of this region lie in the Mixedwood Section of the Boreal Forest Region, and the part northeast of Lake Manitoba lies in the Manitoba Lowlands Section of the northern part of the Boreal Forest Region. The east slope of Riding Mountain and the region just east and south of Riding Mountain support good stands of hardwoods, predominantly trembling aspen but in the northeast mixtures of Manitoba maple, green ash, and white elm are also found. Coniferous species such as white spruce, black spruce, tamarack, and jack pine are not abundant in the mapped part of the region. The Riding Mountain upland is covered extensively by stands of these species as a result of the higher precipitation and more humid climate. Small stands of conifers, often open and mixed with hardwoods, occur in the area 10 miles east of McCreary.

The abundance of trembling aspen on the east slope and south of Riding Mountain may be the result of fire. Trembling aspen regenerates very well after fire by means of root suckering, making competition very difficult for other tree species such as white spruce. Fire eliminates most of the seed source for white spruce, and the vigorous development of shrubs, such as hazelnut, may hamper the growth of some species.

White spruce in pure stands or mixed with trembling aspen will form the climax forest on imperfectly to well-drained sites in the area. Jack pine is also found on the drier sites, probably as a result of fire. Tamarack occupies the fringes of very wet sites, often mixed with white spruce. Alder, willow, and sedges occupy the very poorly drained sites. Bur oak and stunted trembling aspen occur on very dry, sandy, and gravelly sites. Balsam fir occurs scattered throughout the region on moist sites and white birch on drier sites.

### LAND CAPABILITY FOR FORESTRY

Forest capability in the area is mainly limited by climate. As a result of the short growing season, low precipitation, and fairly high evapotranspiration rate, Class 4 is the highest rating in site region 55d and Class 3 in site region 55n. Very small units of higher classes may occur, but they have not been mapped because of their small size.

In site region 55d, the other main limiting factors are excessive or deficient soil moisture, nutrition problems associated with the high carbonate content of the soil, and excessive levels of soluble salts on poorly to imperfectly drained sites. Class 4 occurs on slightly imperfectly drained loams, clay loams, and loamy clays, along rivers and streams, and on alluvial deposits along the escarpment. Class 5 occurs on well-drained and imperfectly drained soils and on moderately (5M, 5W) and strongly calcareous loamy tills (5T, 5W). Heavy clays that are too wet in spring and too dry in summer are rated Class 5d, where a horizon with a very hard consistency when dry restricts root development, the classification is 5d. On steep slopes where erosion occurs, or may occur if vegetation is removed, the rating is Class 5E. Class 6 occurs in depressions (6W), which can be highly calcareous (6C) or have toxic levels of soluble salts (6S). Class 6 is found on excessively drained sites (6M), on exposed south-facing slopes (6S), and where the topsoil has eroded and the calcareous parent material appears at the surface or close to the surface (6C). Class 7 is found in very poorly drained depressions (7W), in locations that have high levels of soluble salts (7W), or very excessively drained sites (7M), and on exposed south-facing slopes (7S).

In site region 55n, the main limiting factors other than climate are excessive or deficient soil moisture and, to a lesser extent, calcareousness, shallowness of deposits over shale bedrock, and low fertility. Class 3 occurs on loamy sites, where water supply throughout the growing season is adequate. Class 4 is found on imperfectly (4W) and well-drained (4M) loamy soils along streams, and on sites that have good moisture-holding capacity but have profiles with compacted layers limiting root development (4D). Class 5 occurs on sandy and loamy sites that are too dry (5M) or too wet (5W), have high levels of carbonate content (5L), or are subject to erosion (5E). Soils that are low in natural fertility have been rated Class 5F. Class 6 occurs on wet sites (6W), very dry sites (6M), and on dry sites where shale bedrock restricts root development (6S). Sites subject to erosion have been rated Class 6E, and soils low in natural fertility are rated Class 6F. Class 7 is found on poorly to very poorly drained sites (7W) and on excessively drained sands and gravels (7M).

Soil survey reports No. 6: Rossburn and Virden, No. 7: Carberry, No. 8: West-Lake, and No. 12: Fisher and Teulon. Manitoba soil surv. Canada Dep. Agriculture, Manitoba Dep. Agriculture and Immigration, and the Soils Dep., Univ. of Manitoba.

### REFERENCES

Chapman, L. J., and D. M. Brown. 1966. The climates of Canada for Agriculture. The Canada Land Inventory Rep. No. 3. Canada Dep. Forestry and Rural Development.

Ehrlich, W. A., et al. 1957. Report of reconnaissance soil survey of Carberry map sheet area. Soils Rep. No. 7 and map. Manitoba Soil Surv.

—. 1958. Report of reconnaissance soil survey of West-Lake map sheet area. Soils Rep. No. 8 and map. Manitoba Soil Surv.

Fedoruk, A. N. 1970. Proposed watershed divisions of Manitoba. The Canada Land Inventory Rep. No. 10. Manitoba Dep. Mines and Natural Resources.

Rowe, J. S. 1959. Forest regions of Canada. Bull. 123 Forestry Branch, Canada Dep. Northern Affairs and National Resources.

Weir, T. P. (ed.) 1960. Economic atlas of Manitoba. Manitoba Dep. Industry and Commerce.

Zoltai, S. C., P. Gimbarovsky, A. Kabzems, and J. P. Senyk. 1967. Forest capability in Manitoba and Saskatchewan. The Canada Land Inventory Rep. No. 4. Canada Dep. Forestry and Rural Development.

Soil survey reports No. 6: Rossburn and Virden, No. 7: Carberry, No. 8: West-Lake, and No. 12: Fisher and Teulon. Manitoba soil surv. Canada Dep. Agriculture, Manitoba Dep. Agriculture and Immigration, and the Soils Dep., Univ. of Manitoba.

## DESCRIPTION DU TERRITOIRE DE LA FEUILLE DE NEEPAWA, 62J

Le territoire occupe une superficie d'environ 6 100 milles carrés dans le centre-sud du Manitoba. Environ 7% du territoire, soit 420 milles carrés, sont occupés par le parc national du mont Riding et environ 17%, soit 1 050 milles carrés, par le lac Manitoba.

L'escarpement du Manitoba, qui traverse le territoire du nord-ouest au centre-sud en suivant la courbe de niveau de 1 100 pi, partage le territoire en deux grandes régions structurales: les hautes terres occidentales qui dominent l'escarpement, dans l'est, et les basses terres du Manitoba, au pied de l'escarpement, dans l'est.

L'altitude, sur ce territoire, varie d'environ 2 400 pi sur le mont Riding, à l'ouest, sur les bords du lac Manitoba, dans l'est. A l'est de l'escarpement, le terrain descend en pente douce vers le lac Manitoba. Il y a un changement brusque d'altitude dans l'escarpement et sur le versant oriental du mont Riding. La topographie des hautes terres occidentales est variable: unie ou légèrement ondulée dans la plaine de till de Newdale, elle devient fortement ondulée sur le mont Riding. Le haut-delta de la rivière Assiniboine est une région sans relief renfermant quelques dunes. Une topographie unie ou en pente douce, exception faite des éléments de microrelief formés par d'anciennes lignes de rivage, caractérise les basses terres du Manitoba. "Glenhope Island," qui se trouve 10 milles à l'est de McCreary, domine de 75 pi environ les terrains environnants.

Sur le territoire, la roche en place comprend des dolomies, des calcaires, des shales et du gypse à l'est de l'escarpement et des shales ainsi que du grès à l'ouest. Les shales sont à découvert ou proches de la surface à plusieurs endroits le long du versant oriental du mont Riding.

Tout le territoire se trouve à l'intérieur du bassin hydrographique du fleuve Nelson. Un réseau hydrographique bien développé draine tout le territoire à l'exception de la partie orientale. La rivière Minnedosa prend naissance dans les hautes terres du mont Riding et se jette dans la rivière Assiniboine. Les rivières Minnedosa et Assiniboine drainent le sud-ouest du territoire tandis que la rivière Whitemud et ses affluents drainent le centre-sud avant de se jeter dans le lac Manitoba. Les rivières Ochre et Turtle qui se déversent dans le lac Dauphin égouttent le nord-ouest. Les plaines de till de Westlake-Interlake ont nui à l'établissement de bonnes conditions de drainage avec leur topographie plane et leurs rives basses de sable et de gravier perpendiculaires à la ligne de plus grande pente. Dans le centre du territoire, les eaux du ruissellement provenant du versant oriental du mont Riding sont tellement abondantes qu'elles posent un problème de drainage.

La population du territoire est concentrée dans les régions de terre arable. Les deux principaux centres de services sont les villes de Minnedosa et de Neepawa. Dans les régions habitées, les routes sont nombreuses; les régions moins densément peuplées, par contre, n'ont pas de réseau routier adéquat. Le service de transport ferroviaire suffit à répondre aux besoins du territoire. Les principales sources de revenus sont l'agriculture ainsi que les industries et les services associés. Les activités reliées à la récréation sont une source de revenus dans certaines agglomérations situées à proximité du parc national du mont Riding. L'industrie forestière n'a pas encore pris de place dans l'économie. Certaines scieries ont déjà été en opération et utilisent du bois coupé sur le mont Riding. Aujourd'hui on coupe du bois pour répondre aux besoins de la maison ou de la ferme.

### CLIMAT

Le climat du territoire est de type boreal-tempéré, semi-aride dans les basses terres du Manitoba et de type boreal-tempéré, normalement ou modérément subhumide dans les hautes terres du mont Riding. Des étés courts et chauds, des hivers longs et froids, et une précipitation faible le caractérisent. La durée de la période sans gel varie de 110 jours environ dans les basses terres à moins de 90 dans la région du mont Riding. En janvier, la température moyenne est d'environ 0°F dans les basses terres et d'environ -2 sur le mont Riding; en juillet, elle est respectivement de 67 et de 64. La précipitation annuelle varie d'environ 18 po à Minnedosa à environ 20 po dans la partie centrale des basses terres. Certaines données recueillies pendant une courte période indiquent que le versant oriental du mont Riding reçoit environ 2 po d'eau de plus que les basses terres et que le mont Riding en reçoit sans doute davantage. Environ 60% de la précipitation tombe d'avril à la fin de septembre. L'évapotranspiration potentielle varie de 20 à 22 po dans la région du mont Riding. Les régions bien drainées sous couvert forestier souffrent habituellement d'un manque d'humidité pendant certaines parties de la saison de croissance.

Tout le territoire a subi la glaciation au Wisconsin et, tout probablement, pendant les épisodes glaciaires précédents. Le glacier a abandonné sur tout le territoire des dépôts de till constitués de matériaux provenant des formations rocheuses sur lesquelles repose le territoire, de formations rocheuses apparaissant au nord et à l'est du territoire et d'autres matériaux provenant du nord. Les plus importants dépôts de till sont le fond de la vallée qui caractérise une dépression de buttes basses et de dépressions. Les marlins ne sont pas très nombreux, mais sont dispersés et variés, selon leur texture, des loams aux loams argileux. Le sable, qui est souvent très élevé dans les plaines de till de Westlake-Interlake où les till sont composés de matériaux provenant de la désagrégation de calcaires et de dolomies à modérés dans la plaine de till de Newdale où le till est un mélange de matériaux provenant de la désagrégation de calcaires, de dolomies, de shales et de roches précambriques. Des marlins terminaux ont été formés au sud du mont Riding et sur les hautes terres du mont Riding, en bordure du glacier. Ces dépôts sont associés à une topographie accidentnée et à un relief de collines. Ces matériaux ont souvent été remaniés par l'eau; ils ne sont pas triés, sont très pierreux et variés, selon leur texture, des loams sableux aux loams argileux.

Après le retrait du glacier, le lac glaciaire Agassiz a recouvert le territoire situé en-dessous de 1 300 pi d'altitude. La rivière Assiniboine a drainé les eaux du lac glaciaire Souris dans le lac Agassiz, formant un immense delta. Le haut-delta de la rivière Assiniboine, au-delà de 1 100 pi d'altitude, est constitué de dépôts de texture grossière, moyenne ou fine. Le vent a remanié les dépôts de texture grossière et il y a des dunes de 1 100 pi d'altitude, est une plaine lacustre sablonneuse, sans relief. L'épaisseur des dépôts sableux qui recouvrent le till et les argiles lacustres varie de 3 à 15 pi. Le sud-est du territoire est recouvert des dépôts lacustres de texture fine de la plaine de la rivière Rouge. Au fur et à mesure que baissent le niveau du lac glaciaire Agassiz, plusieurs plages se forment sous l'action des vagues. Le long de l'escarpement du Manitoba, et surtout le long du versant oriental du mont Riding, plusieurs cônes alluviaux se forment par suite de l'accumulation de dépôts transportés par les cours d'eau. La mise en place d'alluvions se produit toujours dans les vallées fluviales et les dépressions où s'accumulent des dépôts organiques.

Des sols noirs chernozemiques et des sols gris foncés sont formés dans la majeure partie du territoire. Ils sont habituellement bien développés sur le till et les dépôts lacustres du sud du territoire mais ils sont très minces sur les till fortifiés calcaires des plaines de till de Westlake-Interlake. Dans la région du mont Riding et dans son voisinage, les luvisols gris sont les sols les plus répandus. On trouve des sols régolitiques à proximité des cours d'eau qui sortent périodiquement de leur lit. Des sols gleyoliques se sont développés dans les endroits mal drainés et on trouve des sols organiques dans les endroits très mal drainés où une couche de tourbe d'une épaisseur de 1 à plus de 4 pi recouvre des matériaux minéraux de textures variables.

### ÉCOLOGIE

Deux sites différents sur le plan écologique ont été identifiés sur le territoire. La majeure partie du territoire appartient à la région 55d. Cette région se trouve presque entièrement à l'intérieur de la section de tremble et du chêne de la région boréale. Des peuplements clairsemés de feuillus, des bosquets de feuillus, des rangées d'arbres en bordure des cours d'eau et des prairies les recouvrent. Les