

## GENERAL DESCRIPTION OF THE WEKUSKO LAKE MAP SHEET AREA, 63J

The area covered by the Wekusko Lake map sheet comprises about 5570 square miles, or 3,564,310 acres, in central Manitoba. About 60 percent of the area is covered by organic soil, 22 percent by mineral soil, 12 percent by water, and 6 percent by exposed bedrock.

Glaciation of the area during the late Wisconsin stage resulted in the formation of two morainic belts and esker chains. When the glaciers retreated, Lake Agassiz covered the entire area except for some small islands in the northwest. As the lake receded, well-defined beaches were formed.

The area contains parts of three physiographic regions: the Kazan Upland, the Manitoba Lowlands, and the Severn Upland. The Kazan Upland, situated in the northwest, occupies about 25 percent of the area. This region is 800 to 1000 feet above sea level and is dominated by Precambrian volcanic, gneissic, and granitic bedrock. The localities underlain by volcanic and gneissic bedrock are characterized by strongly rolling to hilly topography, whereas the localities underlain by granitic material are characterized by more gentle topography with rounded hills. Shallow till occurs on knolls, and deeper till and lacustrine clays are found in the valleys. Peats occupying depressions may contain permafrost. This region is drained by the Grass River.

The Manitoba Lowlands located in the southwest comprise 35 percent of the area. This region is underlain by Ordovician dolomitic limestone and has flat to undulating topography with elevations ranging from 700 to 940 feet above sea level. Above the 900-foot contour, thin rubby till covers bedrock plateaus and thick calcareous till occurs on slopes and flats. Lacustrine clay is found generally below the 900-foot contour. A morainic belt consisting of clay till and lacustrine clay materials extends from the northwestern Precambrian part of the area through the southeast. Eskers, composed of gravelly sand, fine sand, and silt, occur east of the belt. The well-defined Ponton beaches lie to the west of the belt. Peats, some of which contain permafrost, occur in depressions throughout the region. Drainage is provided by the Mitishto, Hargrave, and Minago rivers.

The Severn Upland covers the eastern half of the area. This region is mainly composed of Precambrian bedrock, which is exposed or overlain by lacustrine clays or peat, the Sipiwek moraine, and several esker chains. The Sipiwek moraine, which lies west of Sipiwek Lake, is a main feature of the Severn Upland; it consists of clay with varying amounts of varved clays and sands and Precambrian till deposits. Discontinuous permafrost occurs in peat throughout this region and in mineral soils at the northern fringe. This physiographic region ranges in elevation from 600 to 700 feet above sea level and has undulating to gently rolling topography. Drainage is by the Minago River, which flows into the Nelson River at the eastern edge of the area.

The area is covered predominantly by coniferous forest. Some mixed woods can be found in the Wekusko Lake, Sipiwek Lake, and Wabowden regions. Muskeg vegetation dominates the southern and central parts of the area. Black spruce (*Picea mariana*) is the climax species for the entire area, although fire has prohibited establishment of climax forest on most sites.

Coniferous forests on organic soils range from dense stands of black spruce to sparse stands of tamarack (*Larix laricina*). Dominant shrubs associated with black spruce forest are dwarf birch (*Betula glandulosa* var. *glandulifera*) and Labrador tea (*Ledum groenlandicum*). Dominant forbs include horsetails (*Equisetum spp.*) and willow herbs (*Epilobium spp.*). Sphagnum mosses (*Sphagnum spp.*) and feathermosses (*Hylocomium splendens* and *Pleurozium schreberi*) constitute the ground cover.

Black spruce and white spruce (*Picea glauca*) are the dominant species on lacustrine and till deposits. Jack pine (*Pinus banksiana*) and trembling aspen (*Populus tremuloides*) occur as fire successional species. Alders (*Alnus spp.*) are the dominant shrub. Jack pine is the dominant tree species on exposed bedrock and alders and junipers (*Juniperus spp.*) constitute the shrub understory.

Mixed-wood forests generally occur on the well-drained clays and tills adjacent to lakes and rivers. Vegetation consists of combinations of black spruce, white spruce, trembling aspen, jack pine, balsam fir (*Abies balsamea*), white birch (*Betula papyrifera*) and balsam poplar (*Populus balsamifera*). Willows (*Salix spp.*), alders, high bush-cranberry (*Vaccinium trilobum*), saskatoon (*Amelanchier alnifolia*), red-fruited choke cherry (*Prunus virginiana*), red-osier dogwood (*Cornus stolonifera*), and roses (*Rosa spp.*) make up the understory. Forbs include willow herbs and bunchberry (*Cornus canadensis*).

Open fens with a cover of sedges (*Carex spp.*), rushes (*Juncus spp.*), and feathermosses (*Drepanocladus spp.*) occur throughout the area. Ribs in the fens support stunted tamarack and black spruce cover.

Sedges, grasses (*Bromus spp.* and *Calamagrostis spp.*), and lichens (*Cladonia spp.*) occur throughout the area.

### CLIMATE

Climatic data for the area was obtained from the Wabowden Meteorological Station in the northeast.

The area has a humid continental climate, characterized by short, warm summers and long, cold winters. There is a gradual transition to warmer temperatures in the southern part of the area.

The average annual frost-free period is 95 days. The mean date of the last spring frost is June 3 and the mean date of the first fall frost is September 6. The short growing season (2058 degree-days) is somewhat counteracted by the long photoperiod of the northern latitude.

January, the coldest month, has a mean monthly temperature of -10°F, and July, the warmest month, has a mean monthly temperature of 62°F. The mean annual temperature is 27°F. This cool climate marks the beginning of discontinuous permafrost in central Manitoba. Annual precipitation is 17.5 inches, 60 percent of which falls during the growing season.

### SOILS AND AGRICULTURAL CAPABILITY

The area lies within two climatic subregions. The more northerly Subregion II Ch is characterized by Brunisolic-Luvisolic and discontinuous Cryic Organic soils. The dominant soils in this zone are Organics, Luvisols, Gleysols, and Brunisols; discontinuous permafrost occurs in the Organics and to some extent in the poorly drained fine textured soils. The southern Subregion II Ch is a small narrow band in the southwest characterized by Brunisolic, Luvisolic, and Organic soils; Organic and Brunisolic soils are dominant. The boundary between the two subregions coincides approximately with the southern boundary of the Discontinuous Permafrost Zone, which has a mean annual temperature of 30°F. Thus, the climate is moderate in the southern part of the area and more severe to the north, where permafrost occurs not only in the organic soils but also in the poorly drained, fine textured mineral soils.

Organic soils, mainly Mesiols and Fibrisols, comprise about 60 percent of the area. The Mesiols are associated with very poorly drained fen peat, derived from sedges, mosses, and some tamarack plant materials, and with poorly drained forest peat, derived from black spruce, tamarack, ericaceous shrubs, and feathermosses. Fibrisols are mainly associated with poorly drained sphagnum peat, derived chiefly from sphagnum mosses and composed of relatively undecomposed material. Permafrost occurs in about one-third of the organic soils. These perennially frozen, Cryic Organic soils are associated mainly with forest and sphagnum peat materials and lie above the water level in the form of palsas or peat plateaus. Disturbance of the vegetative cover and insulating peat layer causes the permafrost to melt and the mounds to collapse. The main limitations of these organic soils for agriculture are wetness and low soil fertility.

Luvisolic soils, dominantly Gray Luvisols, comprise about 15 percent of the area. They are well to imperfectly drained soils with organic surface horizons, light-colored eluvial horizons, and brownish illuvial horizons in which clay is the main accumulation product. Gray Luvisols are found dominantly on the fine textured lacustrine deposits. They have been rated Class 5 for agriculture, with the main limitations being soil structure and wetness.

Gleysolic soils comprise 5 percent of the area. These soils are saturated with water for part or all of the year. Gleysols are characterized by a very thin, dark, surface mineral horizon, high in organic matter, which is overlain by less than 16 inches of moderately decomposed fen or forest peat. Gleysols have developed on all parent materials in the area. They have been rated Class 6 for agriculture, with the main limitation being wetness.

Brunsiolic soils comprise less than 5 percent of the area. These are well and imperfectly drained soils with organic surface horizons underlain by a thin leached horizon and a brownish-colored horizon that is base saturated. These soils have developed on extremely calcareous medium textured till and sandy deposits as well as on acid Precambrian sandy loam till. They have been rated Class 6 for agriculture, with the main limitations being coarse texture, stoniness, low fertility, wetness, and shallow depth to bedrock.

Bedrock outcrops, composed of Precambrian granites and basalts and Ordovician dolomitic limestone, comprise 5 percent of the area. The bedrock outcrops have less than 4 inches of very stony surface materials and are frequently associated with the thin Brunisolic soils. Bedrock outcrops have no agricultural value and have been rated Class 7.

### SETTLEMENT AND LAND USE

The Nelson River was an important fur trade route in the early 1700s. York boats transported furs from the trappers to the company posts at York Factory on Hudson Bay. Fur traders navigated Moose Lake, and Minago channel, and the Grass River to reach the Nelson River.

The construction of the Hudson Bay Railroad through the area between 1911 and 1918 led to the discovery of gold at Herb Lake in 1914. Mining was begun at Herb Lake in 1918. Mining of copper and zinc began in 1962 at the Osborne Lake mine northwest of Wekusko Lake. Construction of the Mannbridge nickel and copper mine south of Wabowden began in 1970, and mines are being constructed at Bowden and Bucko lakes.

At present, there are two hamlets and one village in the area: Herb Lake, which has a population of 11; Wekusko, which is a railroad stop with a population of 23; and Wabowden, which has a population of 594, composed mostly of Cree Indians and mining personnel.

The Canadian National Railway to Churchill on Hudson Bay runs through the area. Provincial roads 391 and 392 service Wabowden, the Osborne Lake mines, Wekusko and the provincial campsite at Wekusko Falls. Provincial Highway 6 provides access to the area from the south and joins Provincial Road 391 near Ponton. There is an airport at Wabowden.

Interest in agriculture began in the area as early as 1925. A soil survey in 1952 led to the establishment of an agriculture experimental station at Wabowden in 1954. Experimental work began in 1955 and continued until 1965, when the station was closed.

Wheat, barley, oats, flax, and rapeseed were tested, but barley was the only successful crop grown. Forage crops such as alfalfa, red clover, sweet clover, grasses, and grass-legume mixtures showed promising results. Some species of small fruits and vegetables and all hardy ornamentals grown elsewhere in Manitoba proved successful at Wabowden.

Potential for agriculture in the area is restricted to the well and imperfectly drained clays. Cultivation of organic soils is impractical because of the high costs of drainage and high incidence of permafrost. All soils in the area are subject to frost.

The surface horizons of the soils in the area are deficient in plant nutrients. Decomposition of organic matter and mineralization is slower at this northern latitude; therefore, fertilizer requirements are higher than on comparable soils in more southerly areas. These soils are limited by poor soil structure. Forage crops can improve the till and, with proper levels of fertilization, good crops of forages and regionally adapted cereals can be grown.

Much of the organic layer on clay soils has been lost by fire. In order to improve tilth and fertility, the organic layer must be preserved during land clearing and worked into the soil.

Demands for agricultural products by an increasing population in the north may make development of the land for agriculture feasible. The production of vegetables, bush fruits, and potatoes is promising. Other potential agricultural enterprises in the area include beef and dairy cattle, forage, feed barley, and forage seed. Crop production in the area will be expensive because of the high costs of land clearing and fertilizer requirements essential for high yields and good-quality produce.

Capability classification by T. H. Lamont and G. C. Jenkins, Canada Land Inventory Project for Manitoba, Manitoba Department of Mines, Resources and Environmental Management, Winnipeg, and C. Tarnocai, Manitoba Soil Survey, Canada Department of Agriculture, Winnipeg. General area description by Charles Tarnocai, Canada Department of Agriculture, Winnipeg, and G. C. Jenkins and T. H. Lamont, Canada Land Inventory Project for Manitoba.

### REFERENCES

Dryden, R. D., and P. Braun. 1969. Crops and soil management for the Wabowden area of northern Manitoba. Publ. 1164. Queen's Printer, Ottawa. 23 p.

Ehrlich, Pratt, and others. 1959. Soil survey of the Upper Nelson River Basin in northern Manitoba. Rep. No. 10. Manitoba Dep. Agr. and Conserv., Winnipeg. 48 pp.

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

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

## DESCRIPTION DU TERRITOIRE DE LA FEUILLE DE WEKUSKO LAKE - 63J

Le territoire représenté sur la feuille de Wekusko Lake occupe une superficie approximative de 5 570 milles carrés ou de 3 564 310 acres dans le centre du Manitoba. Les sols organiques apparaissent environ 60% de cette superficie, les sols minéraux, 22%, les nappes d'eau, 12%, et la roche en place est à nu sur 6% du territoire.

L'épisode glaciaire de la fin du Wisconsin a vu l'apparition de deux cordons morainiques et de chaînes d'escars. Au fur et à mesure du retrait du glacier, le lac Agassiz a inondé tout le territoire à l'exception de quelques îlots dans le nord-ouest. En même temps que le niveau des eaux baissait dans le lac sont apparues des plages aux lignes bien définies.

Le territoire renferme des parties de trois régions structurales: les hautes terres de Kazan, les basses terres du Manitoba et les hautes terres Severn. Les hautes terres de Kazan, situées dans le nord-ouest, occupent environ 25% du territoire. L'altitude y varie entre 800 et 1 000 pi au-dessus du niveau de la mer et l'assise rocheuse est constituée d'éléments volcaniques, gneissiques et granitiques précambriens. Une topographie très vallonnée ou un relief de collines caractérise les régions qui reposent sur des roches volcaniques et gneissiques; le relief est moins marqué et les collines sont arrondies dans les secteurs de roches granitiques. Un till mince recouvre les buttes; on trouve un till plus épais et des argiles lacustres dans les vallées. Les tourbes qui occupent les dépressions peuvent renfermer du pergélisol. La rivière Grass draine cette région.

Les basses terres du Manitoba, situées dans le sud-ouest, occupent 35% du territoire. Cette région repose sur des calcaires dolomitiques ordoviciens et présente un relief plat ou ondulé; l'altitude y varie de 700 à 940 pi. Au-dessus de la courbe de 900 pi, un till mince recouvre les plateaux de roche en place et un till calcaire épais apparaît sur les versants et les replats. Les argiles lacustres apparaissent habituellement en-dessous de 900 pi d'altitude. Un cordon morainique constitué de till argileux et d'argile lacustre traverse le territoire du coin sud-est du secteur précamalien au coin sud-est du territoire. À l'est de ce cordon, on trouve des escars composés de sable graveleux, de sable fin et de limon, et, à l'ouest, les plages de Ponton, faciles à délimiter. Dans toute cette région, les dépressions sont remplies de tourbes dont certaines renferment du pergélisol. Les rivières Mitishto, Hargrave et Minago drainent cette région.

Les hautes terres de Severn occupent la moitié orientale du territoire. La majeure partie de cette région est composée de roches précambraines qui sont à découvert ou disparaissent sous des argiles lacustres ou de la tourbe, sous la moraine de Sipiwek et plusieurs chaînes d'escars. La moraine de Sipiwek, à l'ouest du lac Sipiwek, est un des éléments caractéristiques des hautes terres de Severn; elle est constituée d'argile et renferme des quantités variables d'argiles et de sables varvés ainsi que des dépôts de till formé d'éléments précambriens. D'un bout à l'autre de cette région, il y a du pergélisol discontinu dans la tourbe et, à la limite septentrionale, dans les sols minéraux. L'altitude de cette région structurale varie de 600 à 700 pi et sa topographie est ondulée ou légèrement vallonnée. La rivière Minago qui se jette dans le fleuve Nelson à la limite orientale du territoire, draine la région.

### CLIMAT

Les données climatologiques utilisées pour ce territoire ont été recueillies à la station météorologique de Wabowden, dans le nord-est.

Le territoire jouit d'un climat continental humide: étés courts et chauds, hivers longs et froids. Les températures augmentent graduellement à mesure qu'on descend vers le sud.

La période sans gel dure en moyenne 95 jours par année. Le dernier gel printanier se produit en moyenne le 3 juin et le premier gel automnal, le 6 septembre. La longueur de la photopériode sous les latitudes septentrionales compense quelque peu pour la brièveté de la saison de végétation (2 058 degrés-jours).

La moyenne mensuelle des températures est de -10°F en janvier, le mois le plus froid, et de 62 en juillet, le mois le plus chaud. La température annuelle moyenne est de 27°F. Ce climat frais marque le commencement du pergélisol discontinu dans le centre du Manitoba. La précipitation annuelle est de 17.5 po; 60% de cette quantité tombe pendant la saison de végétation.

### ÉCOLOGIE

La forêt coniférée domine sur le territoire. On trouve des bois mixtes dans les régions de Wekusko Lake, de Sipiwek Lake et de Wabowden. Une végétation de marécage domine dans le sud et le centre du territoire. L'épinette noire (*Picea mariana*) est l'essence de la forêt climax à travers tout le territoire malgré que des incendies de forêt aient empêché l'apparition de la forêt climax sur la plupart des stations.

En présence de sols organiques, les forêts de conifères vont des peuplements denses d'épinette noire aux peuplements clairsemés de mélèze laricin (*Larix laricina*). Les espèces dominantes d'arbisseaux associées à la forêt d'épinette noire, sont le bouleau nain (*Betula glandulosa* var. *glandulifera*) et le thé du Labrador (*Ledum groenlandicum*). Les espèces dominantes de dicotylédones herbacées comprennent les prêles (*Equisetum spp.*) et les épilobes (*Epilobium spp.*). Les mousses de sphagne (*Sphagnum spp.*) et les feathermosses (*Hylocomium splendens* et *Pleurozium schreberi*) forment le tapis végétal.

L'épinette noire et l'épinette blanche (*Picea glauca*) dominent sur les tills et les dépôts lacustres. Le pin gris (*Pinus banksiana*) et le peuplier faux-tremble (*Populus tremuloides*) sont les premières essences colonisatrices après un incendie. Les aulnes (*Alnus spp.*) sont les arbisseaux dominants. Le pin gris est l'essence dominante dans les régions de roche à nu, les aulnes et les genévrier (*Juniperus spp.*) composant le sous-bois.

Les forêts mélangées croissent habituellement sur les argiles et les tills bien drainés, dans le voisinage des lacs et des rivières. Elles comprennent différentes combinaisons: épinette noire, épinette blanche, peuplier faux-tremble, pin gris, sapin baumier (*Abies balsamea*), bouleau blanc (*Betula papyrifera*) et peuplier baumier (*Populus balsamifera*). Le sous-bois se compose de saules (*Salix spp.*), d'aulnes, de viorne trilobée (*Vaccinium trilobum*), d'amélanchier (*Amelanchier alnifolia*), de prunier de Virginie (*Prunus virginiana*), de cornouiller stolonifère (*Cornus stolonifera*) et de rosiers (*Rosa spp.*). Parmi les herbes présentes, on trouve des épilobes et le cornouiller du Canada (*Cornus canadensis*).

A travers tout le territoire se rencontrent des tourbières déboisées qu'occupent des carex (*Carex spp.*), des juncs (*Juncus spp.*) et des feathermosses (*Drepanocladus spp.*). Le mélèze laricin et l'épinette noire croissent sur les lanières qui parcouruent les tourbières.

Des carex, des graminées (*Bromus spp.* et *Calamagrostis spp.*) et des lichens croissent à travers tout le territoire.

### SOLS ET CLASSEMENT

Le territoire appartient à deux sous-régions climatiques. La présence de sols brunisoliques et luvisoliques et de sols organiques cryiques