

## GENERAL DESCRIPTION OF THE SWAN LAKE MAP SHEET AREA, 63C

The area covered by the Swan Lake map sheet comprises about 5900 square miles or 3,734,850 acres in the west-central part of Manitoba and the east-central part of Saskatchewan. The area lies between 52° and 53° north latitude and 100° and 102° west longitude.

The area includes parts of two main physiographic regions. The gently rolling to hilly Western Upland or Saskatchewan Plain lies to the west and is separated by a steeply sloping escarpment from the level to gently undulating plain of the Manitoba Lowland to the east. Bedrock formations underlying the area are dominantly Paleozoic limestones and dolostones in the Manitoba Lowland and Cretaceous shales and sandstones in the Western Upland. The area was glaciated during the Pleistocene epoch and the Manitoba Lowland was subsequently covered by the waters of glacial Lake Agassiz.

The Manitoba Lowland, lying mainly below the 1250-foot contour, is represented by three physiographic subdivisions. The lowlands include a part of the level to very gently sloping Lower Red Deer Plain north of the Porcupine Hills, the gently sloping to level Lower Swan River Plain, which is between the Porcupine Hills and the Duck Mountains, and the very gently to gently undulating Westlake Plain, which occupies the eastern part of the area between Lake Winnipegosis and the Swan River and the Red Deer Plains. The Westlake Plain has a prominent northeast to southwest oriented drumlinized pattern on the land surface.

The Western Upland part of the area also has three physiographic subdivisions. The gently to strongly rolling Porcupine Hills is in the west-central part; the gently undulating Upper Swan River Plain occurs in the southwest; and the strongly rolling to hilly Duck Mountains lie in the south-central part of the area. The north- and east-facing slopes of the Porcupine Hills and the Duck Mountains are characterized by a prominent, strongly dissected escarpment.

Elevations range from 2700 feet above sea level in the Porcupine Hills in the west to 830 feet above sea level, which is the average level of Lake Winnipegosis in the east. The entire area drains eastward into Lake Winnipegosis. Drainage is provided by the Woody, Bowman, Swan, Bell, Steeprock, Duck, Red Deer, Shoal, and Pelican rivers. About 18 percent of the area is covered by lakes, the most prominent of which are Armit, Steeprock, Bell, Whitefish, Red Deer, Swan, Pelican, and Winnipegosis.

Surface deposits in the lowlands include medium to moderately fine textured recent alluvium; thin, coarse to fine textured lacustrine materials overlying extremely calcareous stony, medium textured till; large regions of extremely calcareous, stony, medium textured till; coarse textured outwash and beach materials; regions of organic terrain consisting mainly of forest and fen peat materials and a few sites of exposed bedrock. All of the ground moraine in the lowland is modified by wave action resulting in gravelly and cobble lenses at or near the surface of the higher sites and accumulations of the finer textured material in adjoining depressions.

The uplands are dominated by medium textured, moderately calcareous glacial till; thin, coarse to fine textured lacustrine deposits overlying till; moderately coarse to fine textured lacustrine materials; outwash sands and gravels, and regions of moderately deep peat.

The area lies entirely within the Boreal Forest Region. Vegetative cover in the Manitoba Lowland Section includes mixed grasslands (*Agropyron spp.*, *Koeleria spp.*, *Agrostis spp.*, and *Calamagrostis spp.*) with patches of trembling aspen (*Populus tremuloides*) and balsam poplar (*Populus balsamifera*) in the southwest corner. Trembling aspen and balsam poplar occur in pure association or mixed with white spruce (*Picea glauca*) and jack pine (*Pinus banksiana*) in the north. Mixed woods occur more frequently adjacent to lakes and rivers in the northern part of the area. Jack pine dominates the tree species on exposed bedrock with alders (*Alnus spp.*) and junipers (*Juniperus spp.*) forming the shrub understory.

Vegetative cover in the Western Upland consists of varying combinations of black spruce, jack pine, white spruce, trembling aspen, white birch (*Betula papyrifera*), balsam poplar, and balsam fir (*Abies balsamea*). Willows (*Salix spp.*), alders, high bush-craberry (*Vaccinium trilobum*), saskatoon (*Amelanchier alnifolia*), red-osier dogwood (*Cornus stolonifera*), roses (*Rosa spp.*), and red-fruited choke cherry (*Prunus virginiana*) make up the understory. Forbs include willowherbs (*Epilobium spp.*) and bunchberry (*Cornus canadensis*).

Black spruce is the climax species for the northern parts of the area and for the higher elevations of the Porcupine Hills and the Duck Mountains. As a result of fire history, jack pine or trembling aspen frequently become the dominant forest species. Sedges (*Carex spp.*), grasses, and lichens (*Cladonia spp.*) occur throughout the area.

Organic soils in the southern part of the area are characterized by open fens with a cover of sedges, mosses (*Drepanocladus spp.*), and rushes (*Juncus spp.*). In the north and at higher elevations in the Western Upland, the organic soils support forests ranging from dense stands of black spruce to sparse stands of tamarack (*Larix laricina*). Dominant shrubs associated with the black spruce forest are Labrador-tea (*Ledum groenlandicum*), dwarf birch (*Betula glandulosa*), and willows. The tamarack forests are usually characterized by an understory of willows, dwarf birch, sedges, and reeds (*Phragmites spp.*). Dominant forbs include horsetails (*Equisetum spp.*) and willowherbs. Sphagnum mosses (*Sphagnum spp.*) and feathermosses (*Hylocomium splendens* and *Pleurozium schreberi*) constitute the ground cover.

### CLIMATE

The area has a continental, subhumid climate characterized by short, moderately warm summers, long cold winters, and moderately low average annual precipitation.

Variation in climate within the area is closely related to the main physiographic features and topographic pattern. Average annual precipitation for the eastern and southwestern parts of the area is 18 inches and the growing season rainfall is 14 inches. Precipitation is slightly greater at higher elevations in the Duck Mountains and Porcupine Hills, which results in increased humidity and greater moisture efficiency. The mean annual temperature is 33°F. July is the warmest month with a mean temperature of 66°F. January is the coldest month with a mean temperature of -4°F. The frost-free period ranges from about 110 days at lower elevations and in the southern parts of the area to about 70 days at the higher elevations. The average growing season near Swan River is 160 days, but decreases to the north and at higher elevations.

The Duck Mountains, Porcupine Hills, and the northeast parts of the area have varying degrees of limitation caused by seasonal climate. These regions are indicated on the map as climatic subregion II Ch and are characterized by a fairly short growing season, moderately low accumulation of growing degree-days, and a short frost-free period.

### SOILS AND AGRICULTURAL CAPABILITY

The soils in the area occur in three zones or regions. Black and Dark Gray Chernozemic, Eutric Brunisolic, and Organic soils are dominant in the southern, central, and northwestern parts of the area. Gray Luvisolic soils are dominant in the hilly uplands of the Duck Mountains and the Porcupine Hills. The northeastern part of the area is characterized by Eutric Brunisols, Gray Luvisols, and Organic soils.

Luvisolic soils cover about 20 percent of the area. These soils have developed on medium textured glacial till and fine textured lacustrine materials under cool humid conditions at higher elevations. Luvisolic soils are rated Classes 3 to 6 depending on the combination of limiting factors such as climate, steepness of slope, and stoniness.

Organic soils, dominantly Mesisols and Fibrisols, cover about 19 percent of the area. Mesisols associated with very poorly drained fen peat are most common in the southeast. Mesisols consisting of poorly drained forest peat derived from the remains of feathermosses, ericaceous shrubs, and black spruce, occur throughout the area. They are most common at higher elevations of the Duck Mountain and Porcupine Hills and in the northern part of Westlake Plain and Red Deer Plain. Fibrisols consist mainly of poorly drained, strongly acid, undecomposed sphagnum peat. They can vary in thickness from 24 inches to more than 5 feet.

The larger regions of Organic soils occur in long, broad, poorly drained swales between the stony ridges in the Westlake Plain, in large smooth depressions south and north of Swan Lake, and in the low-lying, level parts of the Red Deer Plain. At present, most of the Organic soils are in their virgin state and have not been classified for agricultural capability.

Brunisolic soils comprise about 16 percent of the area. These soils are characterized by an organic surface horizon underlain by a thin, weakly leached horizon and a brownish-colored B horizon. Eutric Brunisols are the dominant profile developed on the extremely calcareous medium textured till in the Westlake Plain. These soils range in capability from Class 4 to 6, depending on the degree of stoniness and wetness.

Dystric Brunisols occur on acid, coarse textured outwash and beach deposits. These soils have been rated Class 6 because of very low moisture-holding capacity and low natural fertility.

About 12 percent of the area is covered by Chernozemic Black and Dark Gray soils developed on the sediments deposited by the upper and lower Swan River plains. Most of the agricultural development is restricted to these soils, some of which are among the most productive soils in Manitoba. The medium and moderately fine textured, well-drained soils have no significant limitation for production of regionally adapted crops and are rated Class 1; many of these soils are reduced to Class 2 when limited by topography, stoniness, wetness, or the cumulative effects of several minor factors. The coarse textured soils are rated Class 3 or 4 because of the increased limitation of the moisture-holding capacity and in some cases of past erosion damage. The fine textured soils are rated Class 2 or 3 depending on severity of limitations such as structure, wetness, or poor internal drainage.

Gleysolic soils occur over about 12 percent of the area. These soils are saturated with water for part or all of the year unless they are artificially drained. They are found on all parent materials in the area. Some of these soils occurring on lacustrine and alluvial materials have been artificially drained to permit cultivation. However, drainage over most of the area is difficult to improve and the soils are almost entirely in their natural state. Gleysols in their natural state usually have a thin layer of peat on the surface. In regions with improved drainage in the Swan River Plain, these soils are rated Class 3 to 5, whereas in the undrained parts of the area, Gleysols range from Class 4 to 7.

Regosolic soils comprise about 2 percent of the area. These soils generally occur on recent alluvial deposits associated with the rivers and streams in the Red Deer Plain and the lower Swan River Plain and with the many small alluvial fans at the foot of the escarpment. Agricultural capability ratings range from Class 2 to Class 4 and the main limitations are wetness and susceptibility to flooding.

Bedrock outcrops cover about 1 percent of the area and are common only in the northeastern part of the area. The rock outcrops have less than 4 inches of extremely stony surface materials and are frequently associated with thin Brunisolic soils. These regions are unimportant for agriculture and are rated Class 7R.

### SETTLEMENT AND LAND USE

Fur trade activity in the area was initiated early in the 1700s by the French and

English. The fur trade continued as the only industry until the prospect of a railway opened up the country for agricultural development. The railway reached Cowan in 1898 and an extension around the Porcupines and into Saskatchewan in 1899 provided access through the area; settlement proceeded rapidly. Also in 1899, the villages of Minto, Swan River, and Bowman were established.

Coincident with the initial agricultural settlement was a rapid increase in lumbering activity. Sawmills were operated at Birch River, Bowman, Mafeking, and Barrows. In 1925, new markets for pulpwood further stimulated utilization of the forests in the area.

The early settlers were mainly Canadian and British and were later followed by Americans. Present agricultural settlement is concentrated in the southwest and central parts of the area, known as the Swan River valley. Census data from 1966 indicate the total population for the area is about 10,000, of which about 6500 are non-farm population living in towns and villages and 3600 are rural farm population. Swan River is the largest center with a population of 3717. Other towns and villages account for 1800 people and Indian Reserves account for about 1000 people. Small settlements exist in the Cowan-Camperville region and around the periphery of the Porcupine Hills from Mafeking through to Saskatchewan.

Provincial Trunk Highway 10 and the Canadian National Railways line link the agricultural region around Swan River with populated centers in the south and with the mining communities in northern Manitoba. A well-developed secondary road system provides access to the farming communities of the area and also to the shores of Lake Winnipegosis and the Porcupine Forest Reserve. The economy of the area depends largely on agriculture and lumbering with some trapping, fishing, and limestone quarrying. More recently, tourism and recreation have become increasingly important.

The agriculture of the area varies from the very highly developed and productive farming on the Black and Dark Gray soils of the Swan River valley, where 70 percent of the land is under cultivation, to isolated regions characterized by little land improvement and a high proportion of less suitable agricultural soils. Two-thirds of the area is largely undeveloped because of the nature and severity of the limitations imposed by soil and climatic conditions.

Under the combined influences of climate, growing season, and markets, the dominant type of farming has become mixed-grain and combination grain-livestock operations with considerable emphasis on specialty crops such as oil seed and forage seeds. Wheat occupies about one-third, barley occupies about one-quarter, and oats occupy one-eighth of the improved acreage in the Swan River valley. Oil seeds including flax, and more particularly rapeseed, have in recent years approached 15 percent of the improved acreage. Seeded forage crops account for another 10 to 15 percent of the cropped land, and a significant part of this acreage is devoted to seed production.

Livestock enterprises are widely distributed but are predominantly on a smaller scale. The main livestock emphasis is beef cattle and hog production. Pasture for cattle production is provided by suitable and accessible unimproved land, which is augmented by forage on some of the improved land. Many farms produce poultry, and sheep are raised by a few farmers.

The cropping system is dominantly a 2 or 3 year rotation. On the average, over 60 percent of the improved land is in crop, about 25 percent is in summerfallow, and the rest is in pasture and forage crops.

Farms in the area have been steadily increasing in size and according to the 1966 census, the average farm is 424 acres. The extent of farm consolidation in the area is comparable with other parts of the prairies in that the average size of farms is increasing and the number of farms is decreasing.

**Capability classification by G. F. Mills, Pedologist, Manitoba Soil Survey, R. E. Smith, Pedologist, Manitoba Soil Survey, H. B. Stonehouse, Pedologist, Saskatchewan Institute of Pedology, and G. C. Jenkins, Agrologist, Canada Land Inventory (Manitoba), based on field investigations and soil information contained in Manitoba and Saskatchewan Soil Survey Reports.**

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## DESCRIPTION DU TERRITOIRE DE LA FEUILLE DE SWAN LAKE, 63C

Le territoire représenté sur la feuille de Swan Lake occupe environ 5 900 milles carrés ou 3 734 850 acres dans le centre-ouest du Manitoba et dans le centre-est de la Saskatchewan. Le territoire se situe entre 52 et 53° de latitude nord et 100 et 102 de longitude ouest.

Le territoire se partage entre deux grandes régions structurales. L'ouest, au relief légèrement vallonné évoluant vers un relief collinaire, appartient à la plaine de la Saskatchewan ou bas-plateau de l'Ouest; un escarpement en pente raide sépare la plaine des basses terres du Manitoba, à l'est, dont le relief est plat ou légèrement onduleux. Les formations rocheuses sous-jacentes sont pour la plupart des calcaires et des roches dolomiques paléozoïques dans les basses terres du Manitoba et des shales et des grès crétacés dans la région du bas-plateau occidental. Le territoire a subi la glaciation au pléistocène; les eaux du lac glaciaire Agassiz ont ensuite envahi les basses terres du Manitoba.

Les basses terres du Manitoba, dont l'altitude est habituellement inférieure à 1 250 pi comptent trois subdivisions structurales. Elles comprennent, au nord des collines Porcupine, la plaine du cours inférieur de la rivière Red Deer au relief plat ou en pente très douce, la plaine du cours inférieur de la rivière Swan entre les collines Porcupine et le mont Duck, et la plaine du cours supérieur de la rivière Swan, où le relief est légèrement onduleux, qui occupe la partie orientale du territoire, entre le lac Winnipegosis et les plaines de la rivière Swan et de la rivière Red Deer. Dans la plaine de Westlake, les éléments du relief ont la forme de drumlins et sont pour la plupart de direction nord-est, sud-ouest.

La partie du territoire appartenant au bas-plateau de l'Ouest comporte aussi trois subdivisions structurales. Dans le centre-ouest, on trouve les collines Porcupine au relief légèrement ou fortement vallonné; la plaine du cours supérieur de la rivière Swan, au relief légèrement onduleux apparaît dans le sud-ouest; dans le centre-sud du territoire, enfin, on trouve le mont Duck qui présente un relief très vallonné ou un relief de collines. Un vigoureux escarpement fortement déséquilibré caractérise le territoire à l'est.

L'altitude varie de 2 700 pi dans les collines Porcupine et du mont Duck, à 830 au niveau moyen du lac Winnipegosis à l'est. Toutes les eaux du territoire sont drainées vers le lac Winnipegosis. Les rivières Woody, Swan, Bell, Steeprock, Duck, Red Deer, Shoal, et Pelican assument le drainage. Environ 18% du territoire sont couverts de lacs dont les plus importants sont les lacs Armit, Steeprock, Bell, Whitefish, Red Deer, Swan, Pelican et Winnipegosis.

Dans les basses terres, les formations meubles comprennent des alluvions d'origine récente, de texture moyenne ou modérément fine, des matériaux lacustres en couches minces dont la texture varie de grossière à fine et qui recouvrent un till très calcaire, pierreux, de texture moyenne; de vastes régions de till très calcaire, pierreux, de texture moyenne, des dépôts de plage et des épandages de texture grossière; des secteurs de matériaux organiques comprenant surtout des tourbes forestières et des tourbes de "fen" et quelques secteurs d'affleurements rocheux. Tous les dépôts de moraine de fond des terres fertiles sont remaniés sous l'action des vagues qui ont formé des lentilles graveleuses ou caillouteuses en surface ou près de la surface sur les terrains les plus élevés et entraîné l'accumulation de matériaux plus fins dans les dépressions voisines.

Sur le bas-plateau, on trouve surtout du till glaciaire modérément calcaire de texture moyenne; des dépôts lacustres minces dont la texture varie de grossière à fine qui masquent le till; des dépôts lacustres dont la texture varie de modérément grossière à fine, des sables et des graviers d'épandage et des secteurs de tourbe forestière modérément épaisse.

Tout le territoire appartient à la région de la forêt boréale. Dans la section des basses terres du Manitoba, le couvert végétal est formé de graminées diverses (*Agropyron spp.*, *Koeleria spp.*, *Agrostis spp.* et *Calamagrostis spp.*) et d'îlots de peuplier faux-tremble (*Populus tremuloides*) et de peuplier baumier (*Populus balsamifera*) dans le coin sud-ouest. Le peuplier faux-tremble et le peuplier baumier forment des peuplements purs ou sont mêlés à l'épinette blanche (*Picea glauca*) dans le sud et à des forêts d'épinette noire (*Picea mariana*) et de pin gris (*Pinus banksiana*) dans le nord. Les forêts mêlées sont plus communes dans le voisinage des lacs et des rivières dans la partie septentrionale du territoire. Le pin gris domine dans les secteurs d'affleurements rocheux; le sous-bois y est formé d'aubres (*Alder spp.*) et de genévrier (*Juniperus spp.*).

Le couvert végétal, sur le bas-plateau de l'Ouest, est formé de différents mélangeons: épinette noire, pin gris, épinette blanche, peuplier faux-tremble, bouleau blanc (*Betula papyrifera*), peuplier baumier et sapin baumier (*Abies balsamea*). Un mélange de saules (*Salix spp.*), aulnes, viorne trilobée (*Vaccinium trilobum*), saskatoon (*Amelanchier alnifolia*), cornouiller stolonifère (*Cornus stolonifera*), rosiers (*Rosa spp.*) et cerisier de Virginie (*Prunus virginiana*) constituent la sous-bois. Les herbes comprennent des épibolées (*Epilobium spp.*) et le quatre-temps (*Cornus canadensis*).

L'épinette noire est l'essence climatique dans les régions septentrionales du territoire et sur les terrains les plus élevés des collines Porcupine et du mont Duck.

Après des incendies répétés, le pin gris ou le peuplier faux-tremble forment souvent le couvert forestier dominant. Il y a des carex (*Carex spp.*), des graminées et des lichens (*Cladonia spp.*) sur tout le territoire.

Des "fens" non boisés portant un couvert de carex, de mousses (*Drepanocladus spp.* et de juncs (*Juncus spp.*)), caractérisent les secteurs de sols organiques, dans la partie méridionale du territoire. Dans le nord et sur les plus hautes terres du bas-plateau de l'Ouest, croissent sur les sols organiques des peuplements denses d'épinette noire et des peuplements clairsem