Agriculture Canada

Research Branch

Direction générale de la recherche

Soils of the Cormack-Deer Lake area, Newfoundland

Report No. 5
Newfoundland Soil Survey

Canada

Soils of the Cormack-Deer Lake area, Newfoundland

Report No. 5
Newfoundland Soil Survey

R.G. BUTTON
Formerly of
Soil Research Institute
St. John's

Report No. 5 Newfoundland Soil Survey

Land Resource Research Institute
Publication 82-49

Research Branch
Agriculture Canada
1983

Copies of this report available from
Land Resource Research Institute
St. John's West Research Station
Agriculture Canada
Box 7098
St. John's West, Newfoundland
A1E 3Y3

Produced by Research Program Service

Cat. No. A57-115/1983E
ISBN: 0-662-12794-3

CONTENTS

ABSTRACT

This survey was conducted as a joint federal-provincial project to determine the soil resources of the Cormack-Deer Lake area in western Newfoundland. The report contains geographic and background information on the area and a detailed description of the many different kinds of soils and their origins, with special reference to their productive potential. Analytical data are presented for most of the soils. A soil map at a scale of 1:63 360 accompanies the report.

RÉSUMÉ

Cette étude sur les ressources pédologiques de la région de Cormack et du lac Deer dans l'ouest de Terre-Neuve a été conduite dans le cadre d'un projet fédéral-provincial. Ce rapport contient des données documentaires et géographiques sur la région ainsi qu'une description détaillée des différentes sortes de sol et de leur origine, et en particulier de leur productivité. Des données analytiques sur la plupart des sols, et une carte pédologique à l'échelle de 1:63 360, complètent ce rapport.

INTRODUCTION

This report concerns the portion of the Cormack-Deer Lake area outlined in Fig. 1. The Canadian system of soil classification was used to classify the soils in this area (Canada Soil Survey Committee, Subcommittee on Soil Classification 1978).

The soil information gathered during the survey of the Cormack-Deer Lake area has been delineated on maps and explained and interpreted in this report. It should be emphasized, however, that the soils of the area cannot be fully understood by studying the map only.

The soil map presents, in two dimensions, the areal extent of the various soils. A third dimension, depth, is described in the written descriptions of the soil vertical cross sections, or soil profiles. Thus, both the map and the report are necessary to understand the relationship of the soils and their suitability for use.

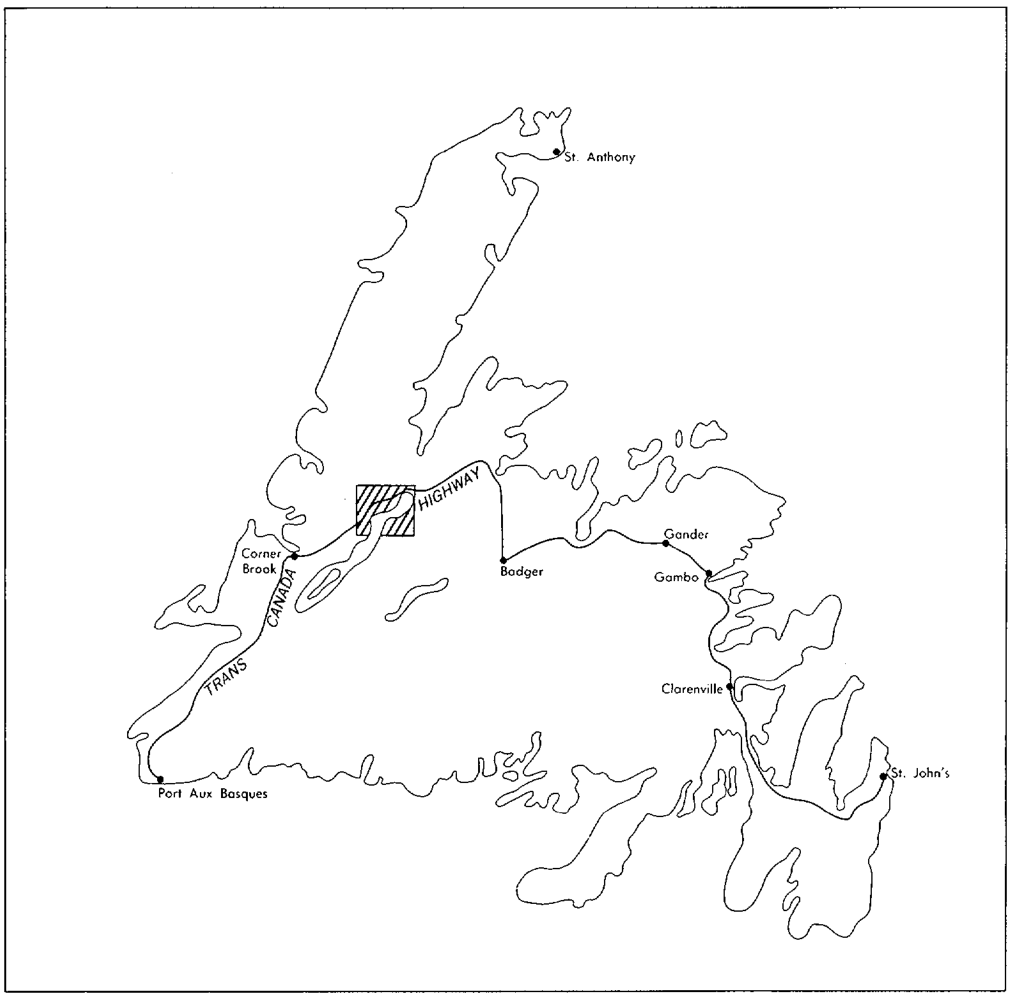


Fig. 1. Location of the Cormack-Deer Lake area

HOW TO USE THE SOIL MAP AND REPORT

Map legend

The map legend presents a systematic arrangement of the soils of the area and shows how they may be identified and located on the map. It also explains how to read the symbols and how to interpret the classification system.

In the legend, the soil series and complexes are arranged horizontally and in alphabetic order. The horizontal divisions of the legend present information pertinent to the separation of the map units, their extent, and their agricultural capability. This information is presented under the following headings from left to right: map color and symbol; map unit name; soil subgroup classification; parent material; surface texture and stoniness; and internal drainage.

Map color and symbol

The colors on the map and the printed symbols are used primarily to identify the map units and to show their location and extent throughout the map area.

Map unit name

A map unit represents a group of soils. In some map units most of the soils have soil horizons that are similar in physical and chemical properties and in their arrangement in the soil profile, and that have developed from parent material that has particular properties. In these "simple" map units most of the soils are classified in the same soil subgroup and belong to the same taxonomic soil series. In other more complex map units the soil components are more diverse in properties, as for example internal drainage covering a wider range, or parent material of more than one type. Commonly, the component soils in these complex map units are classified in different soil subgroups and therefore belong to different taxonomic soil series.

Soil subgroup classification

The subgroup is a subdivision in the Canadian system of soil classification.

Parent material

This section of the legend provides a brief description of the texture and kind of geological material from which each map unit has developed. More detailed descriptions of the parent materials are given in the report where the soils are described in detail.

Surface texture and stoniness

The approximate texture of the cultivated surface layer, or horizon, or the uppermost part of the natural soils that is ordinarily moved in tillage is shown in this column, together with the general surface stoniness.

Internal drainage

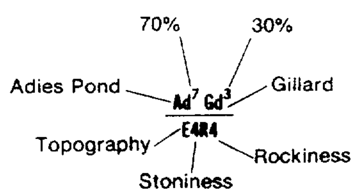
Under this heading each map unit is placed in a defined drainage class according to its general internal drainage.

Topography, rockiness, and stoniness

This section of the legend shows the symbols and the descriptive class used to indicate the average slope of the land (topography), the percentage of the area covered with rock, and the surface stoniness.

Sequence of map symbols

On the soil map each separate delineation is enclosed by a boundary and identified by a symbol. The symbol is composed of a number of elements which are explained below and more fully in the soil map legend.



Soil report

The soil report begins with a discussion of the physical features of the map area -- its location and extent, bedrock geology, surface deposits, topography and drainage, climate, and vegetation. This section gives a general picture of the geography of the area, so that it can be distinguished from other parts of the province. The next two sections deal with soil development and formation and how the soils were mapped and classified.

The main section deals with the kinds of soils and descriptions of the soil series. The descriptions of the soil series, complexes and land types are presented in alphabetic order of place name. These descriptions include information on soil properties that are pertinent to the establishment of agricultural land. The following topics are discussed: location, parent material, topography, drainage, vegetation, soil classification, profile description, range in characteristics, similar and associated soils, land use, and capability for use in agriculture and forestry. Rockiness and stoniness are discussed with the range in characteristics.

The final section gives a brief description of land use and discusses the possibility of establishing agricultural land in the Cormack-Deer Lake area. The use capability classification for agriculture and for forestry are discussed in this section.

An appendix containing pertinent tables concludes the report.

To use the map and report, locate the area of interest on the map and note the soil symbol on the area. Refer to the symbol in the map legend for information on the soil in the area. Further information can be obtained by reading the description of the soil and its use capability and management in the appropriate sections of the report.

GENERAL DESCRIPTION OF THE AREA

Location and extent

The area covered in this report lies in west central Newfoundland between 49°10' and 49°30' north latitude, and between 57° and 57°30' west longitude. The area is shown on the Cormack (12H/6) map sheet and on the top portion of the Deer Lake (12H/3) map sheet of the National topographic series, at a scale of 1:50 000. It covers approximately 1287 km^2, or 128 727 ha.

Bedrock geology

The northwest portion of the map area is underlain by Precambrian granites and granitic gneiss of the Long Range complex. Along the southwest edge of the Precambrian rocks lie the Cambrian schists, marble, and orthoquartzite. The St. George group of Ordovician age, consisting of medium- and fine-grained blue, pink, and white dolomitic limestone with bedded chert, occurs northwest of Deer Lake. A layer of argillite separates these rocks from the Cambrian orthoquartzite.

The Cambrian Labrador group, consisting of quartzmica and quartz-mica feldspar schists with minor quartzite, occurs west of Deer Lake. The Labrador group surrounds very tough, massive quartzite containing many prominent fault lines.

The rolling lowland of the Deer Lake area is underlain mainly by rocks of the Carboniferous age, which overlie Lower Paleozoic and Precambrian rocks. Two higher areas interrupt the lowland -- the Grand Lake uplift, and Birchy Ridge. These two areas are underlain by Mississippian rocks of the Anquille group. This group consists of gray and grayish green micaceous and arkosic sandstone and gray arkosic conglomerate with minor dark shale and argillite. The Birchy Ridge uplift is essentially an anticlinal feature with major faulting along its northwest flank.

In the vicinity of Deer Lake the underlying rocks belong to the Deer Lake group, which outcrops in a northeast - southwest direction within a major synclinal structure. The Deer Lake group has been subdivided into three conformable units -- the Humber Falls formation, the Rocky Brook formation, and a basal conglomerate. The contacts between the three units are gradational, marking a change in lithologies. The Humber Falls formation is the uppermost of the three units. It lies in a basin along both sides of the Humber River and consists of red quartzose sandstone and conglomerate with minor shale and siltstone. The formation is underlain by the Rocky Brook formation, which outcrops in a belt around the basin and in an anticline within the Humber Falls formation. The Rocky Brook formation is composed mainly of shales, siltstone, and limy beds. The basal conglomerate lies at the bottom of the Deer Lake group and unconformably overlies the Precambrian, Cambrian and Ordovician rocks. It consists mainly of a great variety of basal conglomerates with calcite and hematite cements, and with some siltstone, shale, and sandstone.

Surface deposits

The island of Newfoundland was completely glaciated during the Wisconsin glacial epoch. The ice sheets completely removed the existing preglacial soils and gouged out, picked up, and transported quantities of material from the underlying bedrock. When the ice sheet melted, the debris was deposited as a ground moraine of unsorted material (glacial till) or as glaciofluvial deposits of stratified silts, sand, and gravel. The similarity in composition of the glacial material indicates that ice movement was local and the drift was transported over short distances (MacClintock and Twenhofel 1940). A large part of the area remained as scoured bedrock. These deposits, along with the postglacial deposits of alluvial river terraces, recent alluvium, and organic deposits, constitute the parent materials from which the soils have developed.

The identification and separation of surface deposits, or parent material, is one of the basic operations in the separation of the soil series. The soils in the series reflect the drainage and profile development on a specific kind of parent material.

Glacial till deposits consist of a heterogeneous mixture of any material picked up by the ice in its travel and finally dropped on melting. The material from which the till was derived is similar to the underlying bedrock because of the local movement of the glaciers in the map area. Rock outcrops such as those found in the northwest portion of the map area are not parent materials. Rock outcrops are the result of severe scouring by the glaciers, or areas where no surficial materials were deposited, leaving the bedrock exposed. The map area is covered dominantly by glacial till deposits varying in thickness from 60 cm to 6 m and differing in geological or rock type origin. The kinds and sources of glacial till materials are described below.

Glacial till deposits

1. Dominantly rock outcrops interspersed with small areas of moderately coarse textured shallow till derived from granite and granitic gneiss. Very rocky and bouldery.

2. Moderately coarse to coarse textured till derived mainly from red sandstone and siltstone and containing numerous granitic gneiss and sandstone rocks.

3. Moderately coarse to moderately fine textured till derived from basal conglomerate, red sandstone, siltstone, and shale. Numerous organic deposits are associated with this material.

4. Medium to moderately fine textured till derived from gray and greenish shale and soft disintegrating sandstone, with a few large granitic rocks on the surface. The till contains localized areas with red sand lenses.

5. Moderately coarse textured, shallow till derived from shale and sandstone overlying dolomitic limestone.

6. Moderately coarse and coarse textured till derived from granitic rocks and sandstone containing localized areas of shale.

7. Medium textured till derived from dark gray siltstone, shale, and minor sandstone.

Glaciofluvial deposits include material such as coarse sands and gravel deposited by glacial meltwater. They occur in the form of outwash plains, eskers, kames, and crevasse fillings. The southeastern portion of the map area is a glacial outwash plain. Glaciofluvial deposits that have been modified by running water after glaciation occur along the Humber River northeastward from Nicholsville. They are intermixed with alluvial river terrace deposits, which were deposited in slow-moving water along the edge of the Humber River. The glaciofluvial parent materials are described below.

Glaciofluvial deposits

8. Coarse and moderately coarse textured deposits containing numerous granitic rocks and intermixed with extensive organic deposits.

9. Moderately coarse to coarse textured deposits of stratified sands, shale fragments, and gravel. The deposits contain numerous areas of alluvial sand and there are moderately fine textured alluvial river terraces along the Humber River.

Deposits being formed or deposited now are referred to as recent deposits. These deposits occur in localized areas along streams and rivers throughout the map area.

Recent deposits

10. Moderately fine textured alluvium consisting of red silt, clay, and fine sand. These deposits occupy river terraces along the Humber River from Nicholsville to Harrimans Steady.

11. Deposits of various textures along recent flood plains composed mainly of red silt and very fine sand, gray silt, shale, and gravel. The deposits are generally found in local areas that are too small to be shown on the map.

12. Materials of various textures moved downslope by gravity or local water action, or both (colluvium). This material occurs along steep creek or river banks and is usually very stony.

Organic soils are comparatively recent deposits developed from organic material accumulated in wet or poorly drained locations. These soils are derived from living plants that are decomposing. Extensive areas of organic soils occur throughout the map area. Most commonly, they are found in the southeastern part of the map area on glaciofluvial deposits, and in the central portion of the map area on both sides of the Humber River on glacial till deposits.

Organic deposits

13. These deposits consist of actively decomposing organic material. Extensive areas are associated with tills ("Glacial till deposits" 3) and glaciofluvial deposits ("Glaciofluvial deposits" 9). Some small, local deposits occur on all parent materials.

Topography and drainage

The Cormack-Deer Lake area is located in the Atlantic Upland and the Grand Lake-White Bay basin. A major proportion of the area consists of the Upper Humber River lowland running in northeasterly direction from Deer Lake to the edge of the map area.

This lowland is a crescent-shaped valley sloping southwesterly and rising on both sides of the Humber River to a height of 152-183 m. The lower portion of the basin (altitude 6-61 m) and the area between the Humber River and Grand Lake are essentially undulating to gently undulating. This area is dominantly imperfectly to very poorly drained and contains numerous peat bogs. The Humber and Adies rivers and their tributaries are the major drainage channels through which the lowlands drain into Deer Lake.

Extending from the western edge of the lowland to the foothills of the Long Range Mountains (altitude 183 m) and south to Deer Lake is a gently rolling glacial till plain. The plain is dissected by numerous intersecting valleys containing small brooks and poorly drained mineral and organic soils. The uplands are well to moderately well drained. This area is drained into the Humber River or Deer Lake.

The Humber River basin is joined on its western boundary by the Long Range Mountains and on its eastern boundary by Birchy Ridge. The Long Range Mountains rise from an altitude of 183-640 m in the northwest corner of the map area. The mountains are moderately to strongly rolling and contain numerous strongly sloping hillsides and steep cliffs, where the bedrock is exposed or near the surface. On the steep slopes the soils are well to imperfectly drained, but on the lower slopes the soils are poorly drained and there are many small lakes. The northwest section of the Long Range Mountains is drained by Deadwater Brook and many smaller brooks that drain into Adies Pond. The Adies River joins Adies Pond with the Humber River. The southern portion of the mountains is drained into Deer Lake.

Birchy Ridge is a gently to moderately rolling highland. The ridge is northeast-southwest oriented and has an altitude of 152-290 m. The soils are moderately well drained, with poorly drained areas on the lower slopes or downslope from local organic deposits. The top of the ridge flattens out to a gently rolling plain containing numerous very poorly drained organic deposits. Birchy Ridge is drained eastwardly into Sandy and Grand lakes, and westwardly into the Humber River.

The Deer Lake highlands are located in the southern section of the map area, between Deer Lake and Grand Lake. The highlands rise abruptly from the east side of Deer Lake to a plateau of 335 m elevation, then slope east and northeast to Grand Lake. The surface ranges from steeply sloping on the western edge to moderately to strongly sloping for the remainder. The soils are well to moderately well drained on the upper slopes and imperfectly to poorly drained on the mid-slopes and lower slopes. The highlands drain into Deer Lake and into a man-made canal that joins Grand Lake and Deer Lake. Formerly, Grand Lake drained directly into the Humber River through Junction Brook.

Climate

The island of Newfoundland has a modified continental climate, the sea being the dominating local influence. As an island, surrounded by the Atlantic Ocean and the Gulf of St. Lawrence, the water currents have a tempering effect that dampens rapid and extreme temperature changes. The cold Labrador current has a cooling effect, which makes the island colder than other coastal areas in similar latitudes. The current carries large quantities of ice in May and June, which retard the rise in spring air temperature. The winters are usually long and cold, springs are late and short, and the summers short and inclined to be cool with short, warm periods.

Because the Cormack-Deer Lake area is inland, the climate is not as greatly influenced by water currents as the coastal areas of the island. The winters are colder and the summers warmer than most coastal climates in Newfoundland.

The general climate prevailing over the map area is indicated by meteorological records from Deer Lake (altitude 22 m) airport. Elevation greatly influences the climate in the map area, resulting in decreased temperatures and higher winds with increasing elevation. However, the magnitude of the effect of elevation on climate is difficult to assess because of insufficient climatic data. The percentages of the area between an elevation of 0-30 m, 30-153 m, and 154-610 m are appoximately 5, 45 and 50%, respectively. Because the elevation of the Deer Lake station is 22 m, the climate for most of the surveyed area may not be properly represented using the data. For this reason, climatic data for Buchans meteorological station (altitude 272 m), occurring southeast and outside the map area, may be more applicable.

At Deer Lake and Buchans, the mean monthly temperature is below 0°C in the 4 months from December to March, and exceeds 15.5°C in the months from June to September. The highest mean monthly temperature occurs in July (Table 1). An extreme maximum of 35.5°C occurred in July and an extreme minimum of -37°C occurred in February, both at Deer Lake. The mean daily maximum is 1.8-2.8°C higher at Deer Lake than at Buchans.

Table 1. Precipitation and temperature at two locations in the Cormack-Deer Lake area

	Buchans						Deer Lake					
	Precipitation (mm)			Temperature (°C)			Precipitation (mm)			Temperature (°C)		
					Daily						Daily	
Month	Rain	Snow	Total	Mean	Max.	Min.	Rain	Snow	Total	Mean	Max.	Min.
January	24.9	63.8	88.9	-7.9	-4.1	-11.9	20.1	61.5	81.5	-6.5	-2.7	-10.4
February	17.5	69.9	87.4	-9.1	-4.6	-13.6	24.9	55.4	80.3	-7.3	-2.6	-12.1
March	14.0	51.3	65.8	-5.8	-1.6	-10.1	18.8	40.9	59.7	-3.9	0.7	-8.6
April	28.4	31.5	59.9	-0.7	3.2	-4.5	35.8	24.4	59.9	1.2	5.4	-3.2
May	52.1	5.1	57.4	5.3	10.3	0.3	70.9	3.0	72.9	6.7	11.9	1.3
June	65.3	1.8	66.8	11.1	16.7	5.3	74.9	0.8	75.7	11.9	17.6	6.1
July	78.0	0	78.0	15.4	21.1	9.7	78.0	0	78.0	16.4	22.1	10.7
August	91.7	0	91.7	14.7	20.0	9.4	105.9	0	105.9	15.8	20.9	10.7
September	90.4	0	90.4	10.7	15.7	5.6	89.4	0	89.4	11.6	16.7	6.7
October	88.4	4.3	92.7	5.2	9.3	1.1	93.7	1.0	94.7	6.6	10.8	2.3
November	79.8	25.7	105.7	0.6	3.8	-2.7	78.2	20.8	98.3	2.0	5.4	-1.4
December	33.0	58.4	91.7	-5.4	-1.9	-9.0	32.0	53.1	84.3	-3.6	-0.3	-6.9
Year	663.5	311.8	976.4	2.8	7.3	-1.7	722.6	260.9	980.6	4.3	8.8	-0.4

Table 2. Average dates of frost, number of frost-free days, duration of growing season, and approximate number of growing degree-days at two locations in the Cormack-Deer Lake area

	Deer Lake	Buchans
Elevation (m)	22	272
Earliest spring frost	8 May	18 May
Latest spring frost	30 June	28 June
Earliest fall frost	21 August	14 August
Latest fall frost	10 October	15 October
Frost-free period, days		
Longest	136	138
Shortest	57	55
Average	97	101
Start of growing season	10 May	14 May
End of growing season	11 October	11 October
Approximate growing degree-days	1266	1215

The average frost-free period in Deer Lake is 97 days and in Buchans it is 101 days (Table 2). The longest and shortest frost-free periods at Deer Lake are 136 and 57 days, and at Buchans they are 138 and 55 days, respectively. The average latest spring frost occurs on 8 June, and the average earliest fall frost occurs on 15 September.

In the map area, the Cormack district contains most of the farmed land, which occurs at an altitude of 91-153 m. At this altitude late spring frosts and early fall frosts are common and present a hazard, limiting the production of vegetable crops.

The approximate number of growing degree-days is 1266 at Deer Lake and 1215 at Buchans. Growing degree-days express the length and warmth of the growing season in a single figure. They are an accumulation of the number of degree above 5.5°C from the time the mean daily temperature rises above 5.5°C in the spring until it falls below this temperature in the fall. Vegetative growth ceases when the temperature falls below 5.5°C. The length of the growing season is approximately the same at the two stations.

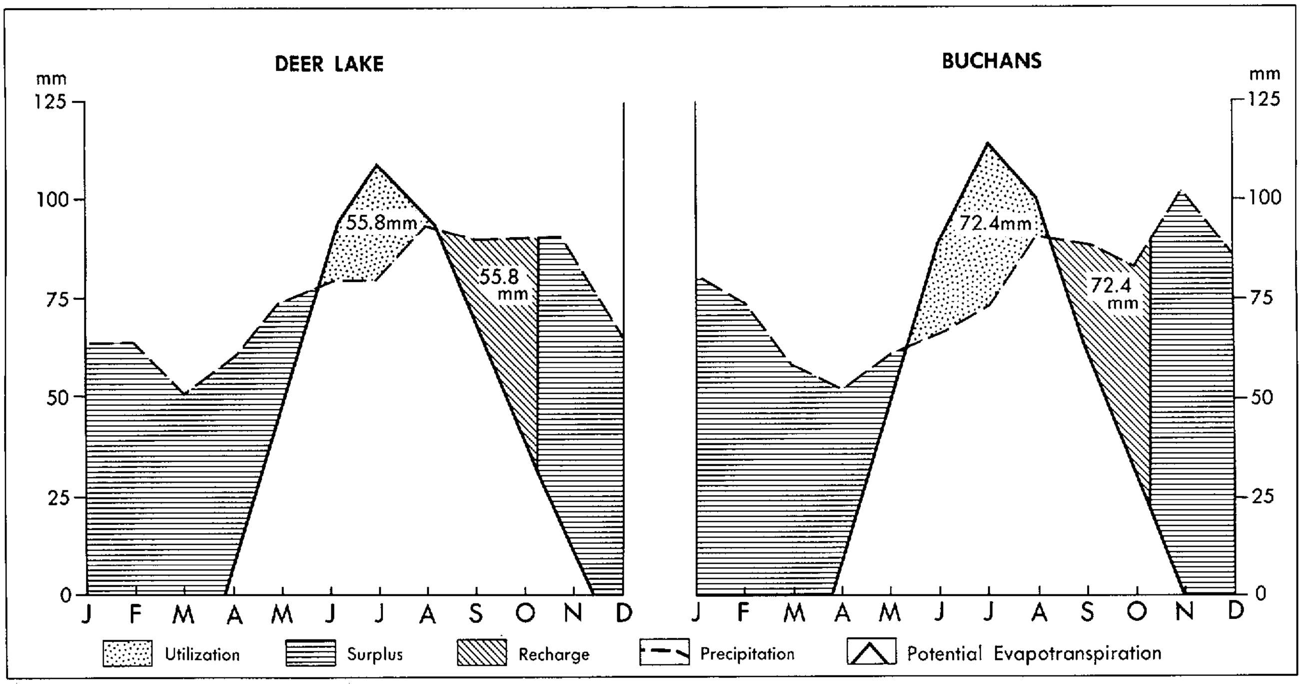


Fig. 2. Monthly changes in precipitation and soil moisture conditions at Deer Lake and Buchans

The total precipitation at Buchans is higher than at Deer Lake, but the latter station receives more rain (Table 1). Approximately 45% of the precipitation falls during the months from May to September. Snowfall is higher at Buchans during the winter months.

According to the Thornthwaite method (Thornthwaite 1948), the potential evapotranspiration for Deer Lake is 493 mm, and for Buchans it is 460 mm. The maximum storage capacity of the average soil is approximately the amount of water equal to 100 mm of rainfall. If the rainfall exceeds the evapotranspiration excess water results. This condition occurs in the fall, winter, and spring in the map area. Fig. 2 shows that no moisture deficiency occurs at either station during the summer. Stored moisture is reduced to 56 mm at Deer Lake and to 72 mm at Buchans. However, these are only average figures, and moisture deficiencies could occur in drier years, especially on the coarse textured soils that do not have a storage capacity equivalent to 100 mm of rainfall. Moisture deficiencies would be more pronounced at lower altitudes because of slightly higher temperatures, resulting in a higher potential evapotranspiration.

Vegetation

The map area is located in the Corner Brook and Newfoundland-Labrador Barrens sections of the boreal forest region of Canada (Rowe 1972). In the Corner Brook section the principal softwood species is balsam fir, growing in association with black spruce and white spruce. The conifers are the dominant species. However, the area is characterized by small stands of deciduous trees in which white birch is dominant and trembling aspen plays a lesser role. White pine occurs in some locations as a minor species.

The Newfoundland-Labrador Barrens section occurs on the upper levels of the Long Range Mountains. The vegetation is dominated by a stunted, open, and patchy growth of black spruce and balsam fir, alternating with moss and heath barrens, rock outcrops, and lakes.

The tree cover on well to moderately well drained sites is dominantly balsam fir with scattered white birch and white spruce. The ground cover consists of dominantly plume mosses with a minor occurrence of feather mosses and bunchberry. After fire, regeneration may establish black spruce and various heath plants (dominantly *Kalmia angustifolia*). This results in the formation of a woody, humic peaty layer and surface gleying in the soils.

On hillslopes influenced by groundwater seepage resulting in the formation of gleyed and gleysolic soils, the tree canopy is dominated by balsam fir with scattered white birch, white spruce, black spruce, and alder. White birch and alder are more prominent on these wetter soils than on well to moderately well drained soils. The understory consists of numerous herbaceous plants, such as ferns, with a ground cover of dominantly feather mosses and minor plume mosses. The wetter variant may contain sphagnum moss, sedges, and grasses. After a fire, these sites regenerate pure stands of black spruce or white birch, with alder occurring in the wetter areas.

Poorly to very poorly drained areas have a dominant tree cover of black spruce with a minor occurrence of alder and larch. The understory contains numerous heath plants, with a ground cover of sphagnum mosses and sedges. Organic surface layers from 25 to 120 cm thick are common in these areas.

The organic soils occur mainly on four types of sites: open raised bogs, stunted black spruce bogs, heath and black spruce bogs, and alder lows. The open raised bogs contain numerous ponds, or "flashets," and have a ground cover of dominantly sphagnum mosses, cotton grass, and sedges, with a minor occurrence of heath plants and stunted black spruce.

The stunted black spruce bogs have a tree cover of black spruce with scattered larch, an understory of heath plants, and a ground cover of sphagnum mosses with a minor occurrence of sedges. This type of bog commonly borders the open raised bogs.

The heath and black spruce bogs are dominated by a cover of black spruce with an understory of numerous heath plants, dominantly *Kalmia angustifolia*, and a ground cover of sphagnum and plume mosses, with lichens on the dry surface. The surface tends to be dry and the organic layer is moderately or well decomposed, and contains woody hummocks of *Kalmia* roots.

The alder lows have a tree cover of dominantly alder, with minor white spruce, black spruce, and maple. The understory consists mainly of annual herbaceous plants.

SOIL DEVELOPMENT AND FORMATION

The principal factors affecting soil development and formation are parent materials, relief and drainage, climate, vegetation and biological activity, and time. The formation of soil from the original parent material involves the following processes: physical weathering of rock fragments; chemical weathering of rocks and minerals; biological activity, including the growth of plants; decomposition of plant remains and the production of organic matter by soil microorganisms; transfer of materials from one part of the soil to another; and development of soil structure. As a result of these processes, changes appear in the original parent material in the form of a succession of visible layers, or horizons, extending from the surface downward. This succession of horizons down to and including the unchanged parent material is called a soil profile.

A particular soil is recognized and separated from other soils by the kinds and sequences that make up its profile. In the field, soil horizons are identified by differences in color, texture, structure, thickness, cementation, concretions or mottling, or a combination of these factors. Chemical differences between soils are determined in the laboratory on representative samples of the soils. These data are used in the classification of the soil.

The master soil horizons are designated by capital letters -- A, B, and C. Organic horizons containing more than 30% of organic matter and formed under poorly drained conditions are designated by the symbols Of, Om, or Oh, depending on the state of decomposition. Organic horizons containing less than 30% organic matter and formed under imperfectly to well drained conditions, usually under tree or shrub growth, are designated by the symbols L, F, and H. These organic layers overlie mineral soil profiles with horizons designated from the surface downward as A, B, and C. Further subdivision of the master mineral horizons may be made by the addition of lower case suffixes and numbers. The lower case suffixes are defined in the Canadian system of soil classification (Canada Soil Survey Committee 1978).

The main soils found in the area are Podzols, Gleysols, and Organic. The Podzolic soils occur throughout the map area on well to imperfectly drained sites. They are developed under cool, moist climates and usually under forest vegetation. Forest litter forms an organic surface horizon (LFH). In a few cases, organic Om or Oh horizons less than 40 cm thick may occur on the surface. Under cool, moist conditions, weathering and leaching are active. Organic matter, clay, sesquioxides (dominantly iron and aluminum oxides) bases, and salts are leached downward in the soil profile. A strongly leached, light-colored mineral horizon is formed under the organic surface horizon. Iron and aluminum oxides, clay, and organic matter accumulate to form an underlying B horizon. The accumulation of oxidized iron is a major factor contributing to the color of the B horizon. Different groups of Podzolic soils are recognized, depending on whether organic matter (h) or sesquioxides (Fe + Al) are the dominant accumulation products. A transition zone (BC) may develop between the B horizon and the relatively unweathered parent material, or C horizon.

Some of the Podzolic soils are shallow (lithic) with bedrock within 50 cm of the mineral surface. Others are gleyed and have indications of wetness and reducing conditions (mottling and dull colors) in some parts or all of the profile. Still others have strongly cemented B horizons.

Gleysolic soils occur throughout the area, but are less extensive than the Podzols. They are classified on the basis of their profile characteristics and morphology. The Gleysols are found on lower slope positions, flat and depressional areas, and on slopes influenced by seepage groundwater. Often, organic horizons from 20 to 40 cm thick occur on the surface of these soils. The soils may then be called peaty Gleysols. In the Gleysolic soils, the development of Podzolic characteristics has been restricted by lack of aera- tion and poor drainage. The soil horizons are mottled with gray and yellowish brown because of the reduction of iron compounds under such conditions. In very wet sites, the horizons may be dull gray.

Organic soils are developed on organic deposits (plant material) accumulated in wet, poorly drained flat areas or depressions. These soils are distinct from mineral soils in that they are derived from living plants and not from geological deposits. Organic soils are composed of plant material (usually mosses and sedges) in various stages of decomposition. If the plant material is undecomposed, the organic soils are classified as Fibrisols. If the plant material is partially decomposed, the soils are classified as Mesisols, and if totally decomposed or humified so that plant materials are unrecognizable, they are called Humisols.

Peat developed from sphagnum mosses is the dominant type of organic deposit in the map area. These soils are found on extensive flat areas and are referred to as raised bogs. The material beneath the surface is slightly to moderately decomposed and is more than 150 cm deep. Mesisols developed from grasses, sedges, and sphagnum mosses occur on the edges of raised bogs and in small depressions. Mesisols developed under ericaceous, or heath, plants (dominantly *Kalmia*) occur on upland sites. These soils have a hummocky microrelief and range in thickness from 40 to 90 cm.

Well decomposed organic soils, developed mainly under alder and numerous annual herbaceous plants, occur along the edges of some brooks. These Humisols are usually 40-150 cm thick and are higher in fertility than the other organic soils in the area.

The relationship of the soil development to topography and vegetation in the map area is shown in Fig. 3. From left to right in the diagram, peaty Gleysols and Humisols occur along small drainage channels on gently rolling till plains. The till plains are occupied mainly by well to moderately well drained soils of the Podzolic order. Treeless sphagnum Fibrisols containing numerous small ponds ("flashets") occur on extensive flat to depressional areas. They are surrounded by stunted black spruce, which grows on peaty Gleysols, Mesisols, and Humisols. Downslope from the wet organic areas or small lakes, seepage Gleysols are the dominant soils. A combination of rock

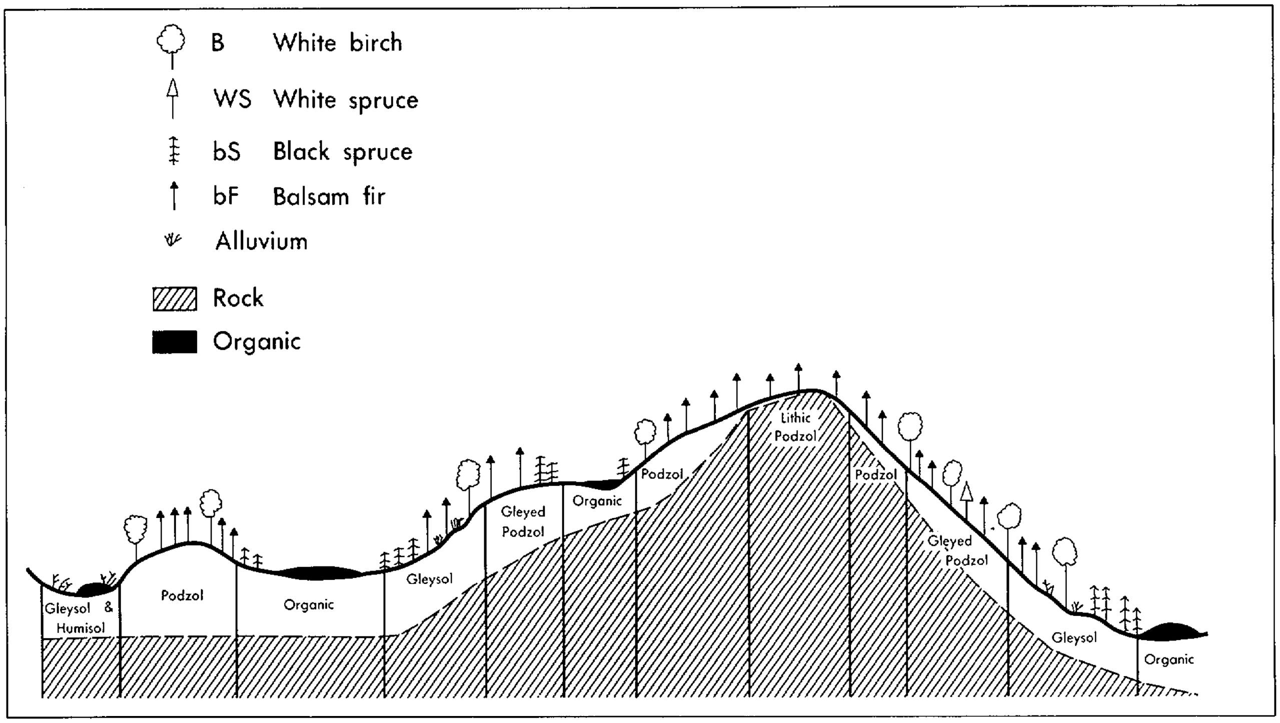


Fig. 3. Relationship of soil development to topography and vegetation

outcrops and shallow (lithic) Podzols usually occupies the hilltops of the moderately rolling terrain. On moderately to strongly sloping hillsides, the soils on the upper slopes are well drained Podzols. Downslope, the soils become gleyed Podzols and Gleysols, which are both influenced by seepage groundwater. The soils on the lower slopes and depressional areas are either peaty Gleysols, Gleysols, or Organic soils, interspersed with small ponds.

HOW THE SOILS WERE MAPPED AND CLASSIFIED

All available information on the physiography, relief, drainage, geology, vegetation, climate, and soils was studied in preparation for the survey. Stereoscopic examination of aerial photographs at a scale of 1:15 840 was used to delineate areas of similar topography, vegetation cover, drainage, and percentage of rock outcrops. Landform boundaries were the basis for most soil delineations, along with changes in forest vegetation. Forest inventory maps aided the separation of areas with different vegetative cover. Forest capability maps and reports were an excellent guide for the establishment of soil moisture conditions, and also contained a general description of the soils. In many instances the soil boundaries were similar to the boundaries delineated for forest capability.

Roads and trails were traveled to make a field examination of the area. Because of few access roads and their impassibility, most of the survey was done either by foot traverses or by boat. Boat travel on the streams and rivers was limited due to rapids. Limited transportation facilities made the survey difficult and time-consuming, hence it was only possible to investigate small areas of detail.

In the field, a soil scientist records everything about the soils that it is believed might affect their capacity to support plant growth, and their suitability for farming. The soil scientist also examines the surface and subsoil, measures slope, classifies stoniness, rockiness, and drainage, makes notes on the differences in the growth of crops, trees, and other vegetation, and establishes the agricultural capability class.

Information on the soils is obtained by digging holes and examining the soil layers (horizons), collectively known as the soil profile. The number of holes dug depends on the lie of the land, the scale of mapping, and the frequency of changes in the morphology of the soil profile. Each horizon is studied to see how it differs from others in the profile. Similar profiles are grouped into series and their boundaries are delineated on aerial photographs. One site, representative of each series, is sampled and returned to the laboratory for analysis. The soil boundaries and initial photo interpretations were checked in the office and then transferred to a base map at a scale of 1:50 000. Soil hectarages were determined by using a random dot grid with 10 dots per square centimeter.

The principal mapping individual used in the survey was the taxonomic soil series. A soil series is a group of soils having soil horizons that are similar in physical and chemical properties and arrangement in the soil profile, and that have been developed from a parent material that has particular properties. Each soil series is designated by place names or geographic features that usually give some indication of the area where the soil was first described and mapped. Individual soils usually do not occupy large continuous areas, but are associated with other soils in a complex landscape pattern. At the scale of mapping, it was impractical to separate closely related soils in areas of complex landscapes. Hence, the mapping units usually consist of two or more major soils in a soil complex.

The soils are classified according to the taxonomic system outlined in the Canadian system of soil classification (Canada Soil Survey Committee, Subcommittee on Soil Classification 1978). Table 3 presents a classification of the soils of the map area.

The soil phase is a subdivision of any class in the system but is not, in itself, a category of the system. The phase is used to describe a soil characteristic or combination of characteristics potentially significant to the use or the management of the land, apart from the properties used in the taxonomic classification. Rockiness, stoniness, and topography may be indicated as a phase at any level of the system.

In Table 4, the soils are classified by Subgroup and parent material, showing the relationship between soils in different Subgroups on the same parent material.

Table 3. Classification of the soils in the Cormack-Deer Lake area

Order*	Great group	Subgroup	Series, or map unit
Podzolic soils	Ferro-Humic Podzol	Orthic Ferro-Humic Podzol	
The well to imperfectly drained soils of this order have Podzolic B horizons in which the dominant accumulation product is amorphous material composed mainly of humified organic matter, combined in varying degrees with Al and Fe. Typically the soils occur in coarse to medium textured acid parent materials, under forest or heath vegetation, and in cool to very cold humic to perhumid climates.	The Ferro-Humic Podzols have Bhf horizons, at least 10 cm thick, that contain 5% or more organic C and 0.6% or more pyrophosphate extractable Al+Fe (0.4% in sands).	Profile type: LFH or O, Ae, Bhf, Bf, BC, C	Humber
	Humo-Ferric Podzol	Orthic Humo-Ferric Podzol	
	These soils have a podzolic B horizon at least 10 cm thick. The B horizon may include a thin Bhf subhorizon, but usually it is a Bf horizon only. A Bf horizon contains 0.5-5% organic C and 0.6% or more pyrophosphate extractable Al+Fe (0.4% in sands).	Profile type: LFH, Ae, Bf, BC, C	Big Falls Cormack Little Falls Reidville Birchy Ridge North Lake
		Gleyed Humo-Ferric Podzol	
		Profile type: LFH or O, Aegj, Bfgj, BCg, Cg These soils differ from the Orthic subgroup by having distinct or prominent mottles within 1 m of the surface.	Adies Pond Goose Arm Harrimans Lomond Wigwam Brook Deer Lake
		Ortstein Humo-Ferric Podzol	
		Profile type: LFH, Ae, Bfc, Bfj, C These soils have a strongly cemented ortstein horizon at least 3 cm thick in at least one-third of the lateral extent of the soil.	Howley Nicholsville Main Brook
Regosolic soils	Regosol	Gleyed Regosol	
Regosolic soils have a horizon development too weak to meet the requirements of any other order.	These are Regosolic soils that do not have an Ah horizon at least 10 cm thick at the mineral surface. They may have buried mineral-organic layers and organic surface horizons, but no B horizon at least 5 cm thick.	Profile type: Cgj These soils differ from the Orthic Regosols by having faint to distinct mottles within 50 cm of the mineral surface.	Alluvium

Table 3. Classification of the soils in the Cormack-Deer Lake area (continued)

Order*	Great group	Subgroup	Series, or map unit
Gleysolic soils	Gleysol	Orthic Gleysol	
The soils of the Gleysolic order have features indicative of periodic or prolonged saturation with water and reducing conditions. They have within 50 cm of the mineral surface either matrix colors of low chroma or distinct to prominent mottles of high chroma, which are indicative of localized oxidation of ferrous iron and deposition of hydrate ferric oxides.	Gleysols lack an Ah horizon more than 10 cm thick, a mixed surface horizon (Ap) at least 15 cm thick, and a Bt horizon. They have a gleyed B or C horizon and they may have an organic surface horizon.	Profile type: LFH or O, <u>Bg</u>, Cg These soils have strongly gleyed B and C horizons. The B horizon is at least 5 cm thick.	Gillard Junction Brook White River Hampden
		Rego Gleysol	
		Profile type: LFH or O, <u>Cg</u> These soils differ from the Orthic Gleysols by lacking a B horizon at least 5 cm thick. They consist of a gleyed C horizon with or without organic surface horizons, and a thin Ah or B horizon.	Alluvium Crooked Feeder North Brook
Organic soils	Fibrisol	Typic Fibrisol	
Soils of the organic order are composed mainly of organic materials that contain more than 17% organic C by weight. Most organic soils are saturated with water for prolonged periods.	The Fibrisols are composed mainly of relatively undecomposed fibric organic material. They have either a dominantly fibric middle tier or middle and surface tiers if a terric, lithic, or hydric contact occurs in the middle tier.	Profile type: Of or Om, <u>Of</u> If present, the middle and bottom tiers are dominantly fibric. A lithic contact may occur.	Sandy Lake
		Mesic Fibrisol	
		Profile type: Of or Om, <u>Of</u>, <u>Om</u>, Of These soils have a subdominant mesic layer thicker than 25 cm in the middle or bottom tier.	Sandy Lake
	Mesisol	Typic Mesisol	
	Soils of this great group are at a stage of decomposition between Fibrisols and Humisols. They have either a dominantly mesic middle tier or middle and surface tiers if a terric, lithic, or hydric contact occurs in the middle tier.	Profile Type: Of, Om or Oh, <u>Om</u> If present, the middle and bottom tiers are dominantly mesic. A lithic contact may occur.	McIsaacs Brook

Table 3. Classification of the soils in the Cormack-Deer Lake area (concluded)

Order*	Great group	Subgroup	Series, or map unit
		Terric Mesisol	
		Profile type: Of, Om or Oh, Om, C, Om These soils have a terric layer beneath the surface tier.	McIsaacs Brook Dancing Point
		Terric Humic Mesisol	
		Profile type: Of, Om or Oh, Om, Oh, C, Om These soils have a terric layer beneath the surface tier and a subdominant humic layer, thicker than 25 cm, within the control section.	McIsaacs Brook Dancing Point
	Humisol	Typic Humisol	
	The soils of this great group are at the most advanced stage of decomposition of the great groups of Organic soils. They have either a dominantly humic middle tier or middle and surface tiers if a terric, lithic, or hydric contact occurs in the middle tier.	Profile type: Om or Oh, Oh If present, the middle and bottom tiers are dominantly humic. A lithic contact may occur.	Mistaken Point

*For full definition of the categories see: Canada Soil Survey Committee, Subcommittee on Soil Classification. 1978. The Canadian system of soil classification. Agric. Can. Publ. 1646. Supply and Services Canada, Ottawa, Ont. 164 pp.

Table 4. Classification of the soils by parent materials and subgroup.

Dark reddish brown to reddish brown sandy loam to gravelly sandy loam derived from sandstone, siltstone, conglomerate, and granite.	
Orthic Humo-Ferric Podzol	- Little Falls
Gleyed Humo-Ferric Podzol	- Adies Pond
Dark brown to dark yellowish brown stony gravelly sandy loam till derived from granite.	
Gleyed Humo-Ferric Podzol	- Deer Lake
Orthic Gleysol	- Junction Brook
Olive brown to dark brown loam to sandy loam till derived from siltstone, shale, sandstone, and granite.	
Orthic Humo-Ferric Podzol	- Birchy Ridge
Gleyed Humo-Ferric Podzol	- Wigwam Brook
Orthic Gleysol	- Hampden
Dark brown sandy loam to loam till derived from sandstone, shale, and limestone.	
Orthic Humo-Ferric Podzol	- North Lake
Gleyed Humo-Ferric Podzol	- Goose Arm
Dark brown to dark grayish brown stony sandy loam till derived from granite and gneiss.	
Gleyed Humo-Ferric Podzol	- Lomond
Orthic Gleysol	- White River
Olive gray to dark grayish brown loam to sandy loam till derived from shale and soft sandstone.	
Orthic Ferro-Humic Podzol	- Humber
Orthic Humo-Ferric Podzol	- Cormack
Rego Gleysol	- North Brook
Brown sand to gravelly sandy loam glaciofluvial material.	
Ortstein Humo-Ferric Podzol	- Howley
Gleyed Ortstein Humo-Ferric Podzol	- Main Brook
Brown to olive gray sand, loamy sand, and sandy loam alluvial deposits.	
Orthic Humo-Ferric Podzol	- Reidville
Ortstein Humo-Ferric Podzol	- Nicholsville
Gleyed Regosol and Rego Gleysol	- Alluvium
Orthic Gleysol	- Gillard
Red to reddish brown loam to clay loam till from sandstone, siltstone, conglomerate, and granite.	
Orthic Humo-Ferric Podzol	- Big Falls
Gleyed Humo-Ferric Podzol	- Harrimans
Rego Gleysol	- Crooked Feeder
Organic deposits of sphagnum, sedges, and grasses.	
Typic and Terric Humic Mesisols	- McIsaacs Brook
Organic deposits of sphagnum mosses.	
Terric and Mesic Fibrisol	- Sandy Lake
Terric and Terric Humic Mesisols	- Dancing Point
Organic deposits of herbaceous plants and alder leaves.	
Terric Humisol	- Mistaken Point

DESCRIPTION OF THE SOILS

The soil map units, listed alphabetically, are described here. Although most map units are composed mainly of a taxonomic soil series, the delineations shown on the map mostly are compound map units composed of different soils. Nevertheless, the descriptions given are intended to apply to the soil series represented by the map unit name. The descriptions include the general location and hectarage, parent material, topography, drainage, vegetation, soil classification, range in characteristics, the occurrence of similar and associated soils, land use, and capability for use in agriculture and forestry.

For most map units, a detailed description of a profile representative of the soil series is given, but in a few instances, such as for organic soils, there is only a general description.

Adies Pond map unit 2596 ha

Location. These soils occur along the eastern edge of the Long Range Mountains.

Parent material. The soils have developed on very stony gravelly sandy loam till derived from red sandstone, red siltstone, granite, and granitic gneiss.

Topography. The soils occupy the lower slopes and mid-slopes on moderately to strongly sloping terrain. Slopes range from 10 to 30%. The material is often compact in the C horizon.

Drainage. The surface soil is well drained because of the slope, shallow organic surface cover, and numerous drainage channels. Seepage water flows over the partially cemented C horizon, resulting in imperfect drainage and wetness in the B horizon.

Vegetation. The main tree cover is balsam fir, with a minor amount of white birch. The ground cover consists of feather and plume mosses (*Hylocomium splendens, Pleurozium schreberi, Hypnum cristacastrensis*), bunchberry, clintonia, and a few ferns.

Soil classification. Gleyed Humo-Ferric Podzol.

Description of a representative profile. This profile was described on the west side of Deadwater Brook at 49° 21.3'N and 57° 22.6'W. The site is at an elevation of about 152 m and has a slope of 7% toward the southeast.

Horizon	Depth, (cm)	Description
L-H	8-0	Black (10YR 2/1 m), dark grayish brown (10YR 4/2 d) semi-decomposed organic matter; fibrous; abundant fine and medium roots; abrupt, smooth boundary; 13 cm thick; extremely acid; pH 3.2.

Ae	0-23	Light reddish brown (5YR 6/4 m), pinkish gray (7.5YR 7/2 d) sandy loam; amorphous; fine granular when dry; soft, friable; abundant very fine and fine oblique roots; abrupt, irregular boundary; 5-20 cm thick; extremely acid; pH 3.8.
Bfgj	23-46	Red (2.5YR 4/6 m), yellowish red (5YR 5/8 d) sandy loam; common, medium, faint mottles; amorphous to weak subangular blocky, crushing to fine granular when dry; slightly hard, friable; few fine roots; gradual, wavy boundary; very strongly acid; pH 4.8.
BCgj	46-61	Red (2.5YR 4/6 m), yellowish red (5YR 5/6 d) gravelly loamy sand; many, medium, distinct mottles; moderately coarse platy to amorphous; weakly cemented; firm, hard; very few fine roots; gradual, wavy boundary; 15-20 cm thick; very strongly acid; pH 5.0.
Cx	61+	Reddish brown (2.5YR 4/4m, 5/4 d) gravelly loamy sand; amorphous to medium platy; partially strongly cemented; firm, hard; some stones; medium acid; pH 5.8.

Range in characteristics. The surface texture ranges from sandy loam to loamy sand. There is considerable range in the thickness of the Ae horizon, and it may change abruptly. An Ae horizon, approximately 15 cm thick, is usually present, but may be absent because of tree fall or erosion, or both.

The B horizon is generally finer textured that the Ae horizon. It usually has more pronounced mottling and duller colors than the profile described here. Gleying is more pronounced on the lower slope positions. This horizon is brighter colored in the upper part, and could be divided into two horizons. The accumulation of clay in the B horizon sometimes meets the criterion for a Luvisol, but the structure, color, and lack of clay skins exclude these soils from the Luvisolic order.

The upper part of the C horizon is partially cemented and very compact, and may be regarded as a fragipan. The texture of this horizon ranges from gravelly sandy loam to gravelly loamy sand. Gravel pockets are common.

The surface may be very to exceedingly stony. Considerable clearing of stone is required before cultivation. Small, level areas of rock are exposed on the upper slopes. Soil depth is greater on the moderately well drained upper slopes than on the imperfectly drained lower slopes.

Similar soils. The Adies Pond soils are similar in texture and profile characteristics to the Deer Lake soils, but were separated on the basis of parent material differences. The better drained Adies Pond and Little Falls soils have parent materials of similar color and texture, but the Adies Pond soils usually have duller colored B horizons because of poorer drainage.

Associated soils. The Adies Pond soils occur in complexes with the poorly drained Junction Brook soils. The Junction Brook soils become more dominant downslope because of increased amounts of seepage water. On gently rolling to moderate slopes in the area around Deadwater Brook, the finer textured Big Falls soils are associated with the Adies Pond soils. The Lomond soils are similar to the Adies Pond soils in profile development, but are shallower (bedrock is within 50 cm of the surface) and occur on the slopes above the Adies Pond soils.

Land use. Generally, the Adies Pond soils are too stony, and the topography is too steep to make land improvement feasible. For agriculture, these soils are rated in capability Classes 5 and 7 and their use is limited by stoniness, topography, and wetness. Some local areas are suitable for improved pasture. Low fertility and moisture considerations place these soils in Classes 4 and 5 for forestry.

Alluvium map unit 811 ha

Soils included in the Alluvium map unit occur along active streams and rivers throughout the map area. The parent materials of these soils are derived from a variety of sources and have a wide range of textures. The alluvial soils along the Humber River and Rocky Brook are generally developed on nearly stone-free fine sand, silt, and clay. Others are developed dominantly from gravel, sand, silt, and shale, and have a range from moderately to excessively stony.

The soils are usually flooded in the spring, and often periodically during the summer and fall. Organic horizons, less than 40 cm thick and usually derived from annual herbaceous plants, commonly occur on the surface of alluvial soils.

Well to imperfectly drained alluvial soils that have no distinct profile characteristics are classified as Gleyed Regosols. Poorly to very poorly drained alluvial deposits are classified as Rego Gleysols.

The agricultural capability of these soils is either Class 5 or Class 7. Areas that are too wet to permit cultivation, or areas with organic surface horizons more than 30 cm thick are classified in Class 7 because of inundation or wetness, or both. Other areas are placed in Class 7 because of stoniness. A small area of land in capability Class 5i occurs along Rocky Brook.

Big Falls map unit 1346 ha

Location. These soils occur along Deadwater Brook and along the eastern edge of the Humber River.

Parent material. The soils have developed on stony loam to clay loam till derived from red siltstone, shale, and sandstone containing some conglomerate.

Topography. The soils occupy the upper slopes and mid-slopes on undulating to gently rolling terrain. Slopes range from 3 to 9%.

Drainage. The shallow organic surface layer and the gentle slope of the land ensure that the surface is usually well drained. Internal drainage is somewhat restricted by the fine texture of the lower B and the C horizons. The upper part of the B horizon is usually well drained.

Vegetation. The main tree cover is balsam fir, with minor amounts of white birch and black spruce. The ground cover consists of feather and plume mosses, bunchberry, and *Kalmia angustifolia*.

Soil classification. Orthic Humo-Ferric Podzol.

Description of a representative profile. The sampling site is located at 49° 22.3' N and 57°21.1' W. It is about 30 m west of Deadwater Brook on the road from Cormack to Adies Pond. The site has an elevation of about 122 m and a 4% slope toward the south.

Horizon	Depth, (cm)	Description
L-H	5-0	Very dark brown (10YR 2/2 m) semi-decomposed organic matter; fibrous; abundant fine and very fine roots; abrupt, smooth boundary.
Ae	0-5	Pinkish gray (7.5YR 6/2 m), light gray (10YR 5/1 d) sandy loam; amorphous to fine granular; soft, friable; abundant fine and very fine roots; abrupt, smooth boundary; 5-20 cm thick; extremely acid; pH 3.5.
Bf	5-35	Red (2.5YR 4/8 m, 5/8 d) sandy loam; amorphous to fine granular; soft, friable; abundant fine and medium roots; gradual, wavy boundary; strongly acid; pH 5.2.
C	35+	Red (10R 4/6 m, 5/6 d) sandy loam; amorphous; soft, friable; plentiful fine roots except very few roots below 50 cm; strongly acid; pH 5.3.

Range in characteristics. The organic surface layer is thin on the well drained sites, but thicker on the moderately well drained mid-slope positions. The texture of the Ae horizon is usually sandy loam. This horizon tends to be thicker and becomes redder with depth, where the soil is under *Kalmia* vegetation.

Generally, these soils have a highly chromic B horizon with a texture from loam to sandy clay loam. On the moderately well drained mid-slope sites, the lower B horizon is mottled and has duller colors because of impeded drainage. On the east side of the Humber River, the Big Falls soils have a subangular blocky structure in the B horizon.

The texture of the C horizon ranges from loam to clay loam, sometimes clay. When this horizon is very fine textured, it is compact, but not hard. It usually contains much soft, disintegrated, red shale, and some limestone. In some sites the till has only a few stones, whereas in others the till is very stony.

Similar soils. The soils of the Big Falls series are similar in texture to the Humber soils but have pinkish Ae, and reddish colored B and C horizons, and are easily distinguished from the Humber soils. The Big Falls and Little Falls soils are similar in color and profile development, but the Big Falls soils have finer textured B and C horizons. Harrimans soils are more poorly drained and have a thicker organic surface layer than the Big Falls soils.

Associated soils. The Big Falls soils occupy the better drained sites in association with the Adies Pond soils along Deadwater Brook. On the upper slopes and mid-slopes, the Crooked Feeder (Rego Gleysol) soils occupy the lower poorly drained positions in complexes with the Big Falls soils. Big Falls and Little Falls soils occur randomly when complexed.

Land use. Some areas of the Big Falls soils require stone clearing before they can be cultivated. The soils are marginal for vegetable production, but would make excellent improved pasture. Some local areas with sloping topography, which are slightly wetter, could also be used for pasture.

The main limitations to agricultural use are topography, stoniness, and unfavorable climate. The soils have a capability rating for agricultural use of Classes 4 and 5. For forestry, the soils have a use capability of Classes 4 and 5, and are limited in use by low fertility and lack of moisture.

Birchy Ridge map unit 1747 ha

Location. These soils occur on the top of Birchy Ridge.

Parent material. The soils have developed on exceedingly stony sandy loam to loam till derived from gray siltstone, gray shale, sandstone, and granite.

Topography. The soils occupy hilltops and upper slopes on gently to moderately sloping terrain. Slopes range from 5 to 12%.

Drainage. The shallow organic surface layer offers no resistance to drainage and the surface is well to moderately well drained. The soils are well to moderately well drained internally, but some mottling and wetness occur in the lower part of the profile.

Vegetation. The main tree cover is balsam fir, with minor amounts of white birch and black spruce. The ground cover consists of feather and plume mosses. Tree growth is stunted on hilltops because of the shallowness of the soils and lack of moisture.

Soil classification. Orthic Humo-Ferric Podzol.

Description of a representative profile. The sampling site is located beside the Cormack road on top of Birchy Ridge at 49°21.2'N and 57°1.9'W, at an elevation of approximately 204 m. The site has a 7% slope toward the east.

Horizon	Depth, (cm)	Description
L-H	5-0	Black (10YR 2/1 m) semi-decomposed organic matter; fibrous; abundant fine, medium, and coarse roots; abrupt, smooth boundary; 2-10 cm thick.

Ae	0-3	Light gray(10YR 6/1 m, 7/1 d) sandy loam; weak, fine granular; soft, friable, sticky; plentiful, fine, medium, and coarse roots; abrupt, smooth boundary; 1-8 cm thick.
Bf	3-20	Strong brown (7.5YR 5/6 m) loam; fine granular; soft friable, plastic; abundant medium, and plentiful fine roots; clear, wavy boundary; 13-20 cm thick.
Bfgj	20-46	Yellowish brown (10YR 5/6 m) shaly loam, few, faint mottles; soft, friable, plastic, sticky; few medium and fine roots; 30% shale or slate; gradual, wavy boundary; 20-30 cm thick.
BC and R	46+	Olive brown (2.5YR 4/4 m) very shaly loam; amorphous; grades into shaly siltstone and shale (80%) overlying bedrock.

Range in characteristics. The L-H and organic surface horizons are usually thin (less than 7.5 cm). The thickness of the B horizon differs with the depth of the soil to bedrock. The lower B horizon is frequently faintly mottled at the contact with the bedrock, particularly on the lower part of the upper slopes. The texture of the soil becomes finer, and there are fewer surface stones when increasing amounts of shale occur in the parent material. The Birchy Ridge soils tend to be coarser textured where they are associated with the Deer Lake soils.

The soil depth is usually less than 50 cm, but may have a range of 25-60 cm. These soils are exceedingly stony on the surface and in some areas the bedrock is exposed. The soils increase in depth downslope.

Similar soils. The Wigwam Brook soils have developed on the same parent material as the Birchy Ridge soils, but have deeper profiles, and gleyed B and C horizons. The finer textured Birchy Ridge soils are similar to the Humber soils except that bedrock is closer to the surface of the Birchy Ridge soils.

Associated soils. The Wigwam Brook, Hampden, and Deer Lake soils are associated with the Birchy Ridge soils. The Birchy Ridge soils occur on hilltops and upper slopes, the Wigwam Brook and Deer Lake soils occupy the mid-slopes and lower slopes, and the Hampden soils are found on the lower slopes and in depressions accompanied by organic soils.

Land use. Most of the Birchy Ridge soils are too shallow or stony to permit cultivation. There are some local areas that might be used for pasture. The soils were placed in agricultural capability Classes 5 and 7 because of rockiness and stoniness. For forestry, low fertility and lack of moisture are severe enough to place these soils in capability Class 5.

Cormack map unit 5800 ha

Location. These soils occur in a narrow area extending from north of Cormack to Deer Lake.

Parent material. The soils have developed on sandy loam to loam till derived from gray and greenish shale, and soft sandstone. The till contains scattered pockets of red sand.

Topography. The soils occupy undulating to gently rolling terrain. Slopes range from 3 to 7%.

Drainage. The soils are well drained on the surface and internally.

Vegetation. The main tree cover is balsam fir, with a minor amount of white birch. The ground cover consists of plume mosses, bunchberry, and a few feather mosses on the wet sites.

Soil classification. Orthic Humo-Ferric Podzol.

Description of a representative profile. The sampling site is located 2.4 km north of Little Falls at 49°14.2'N latitude and on a 3% slope toward the south. The site is at an elevation of about 90 m.

Horizon	Depth, (cm)	Description
L-H	2-0	Black (10YR 2/1 m) semi-decomposed organic matter; fibrous; abundant very fine and fine roots; abrupt, smooth boundary; contains some ash.
Ae	0-8	Gray (10YR 6/1 m), light gray (10YR 7/1 d) sandy loam; weak, fine granular; soft, friable; abundant very fine and fine oblique roots; abrupt, wavy boundary; 3-8 cm thick; extremely acid; pH 4.2.
Bf1	8-20	Yellowish red (5YR 4/6 m), brownish yellow (10YR 6/6 d) sandy loam; moderate fine granular; soft, friable, slightly plastic; plentiful fine and very fine roots; clear, wavy boundary; 8-20 cm thick; strongly acid; pH 5.4.
Bf2	20-36	Yellowish brown (10YR 5/4 m), light yellowish brown (10YR 6/4 d) sandy loam; amorphous to fine granular; soft, friable, slightly plastic; few fine oblique roots; gradual, wavy boundary; 15-23 cm thick; strongly acid; pH 5.4.
BC	36-51	Dark yellowish brown (10YR 4/4 m), pale brown (10YR 6/3 d) sandy loam; amorphous; soft, friable; few very fine roots; gradual, wavy boundary; 13-20 cm thick; medium to strongly acid; pH 5.5.
C	51+	Dark brown (10YR 4/3 m), pale brown (10YR 6/3 d) gravelly sandy loam; amorphous; slightly hard, friable; strongly acid; pH 5.4.

Range in characteristics. The Ae horizon is usually thin (less than 3.5 cm) but distinct. The accumulation in the B horizon meets the criterion for a Luvisolic B horizon, but lacks structure and the presence of clay skins.

The organic carbon content of the B horizon has a range of 4-12% and does not seem to be related to the color of the horizons. As the texture becomes finer, the organic matter in the B horizon increases. The lower horizons tend to be shaly. The shale is fairly hard and only partially disintegrated. The parent material has a textural range of sandy loam to loamy sand and contains very few stones. It is usually more than 7 m thick. In local areas, it contains pockets of dark red sand and loamy sand. Bands of dark gray shale, sandy loam till, and loamy sand are common. The surface stones consist of large granitic and sandstone boulders.

Similar soils. The Cormack soils are similar to the Humber soils in profile characteristics. The Humber soils contain more shale, are finer textured, and the bedrock is closer to the surface than in the Cormack soils. The Little Falls soils are distinghished from the Cormack soils by their redder color, thicker Ae horizon, coarser texture, and a compact, partially cemented upper C horizon.

Associated soils. The Cormack soils occur randomly in complex with the Humber soils. The Cormack soils occur on hilltops and slightly more undulating topography than the Humber soils. The Cormack soils are also associated with the North Brook soils, with the Cormack soils on the mid-slopes and upper slopes, and the North Brook soils (Rego Gleysols) occupying the lower slopes along brooks.

Land use. The Cormack soils have been rated in agricultural capability Classes 3-5. The major limitations to use are topography, climate, and stoniness. These soils require limited stone clearing before cultivation, although there are some small areas that require considerable clearing before they are suitable for use. These soils make excellent improved pasture. Vegetable production is limited by local climatic conditions, particularly the frost hazard. Low fertility and the lack of sufficient moisture limit the capability of the Cormack soils for forestry to Classes 4 and 5.

Crooked Feeder map unit 3225 ha

Location. These soils occur on both sides of the Humber River.

Parent material. The soils have developed on very to exceedingly stony loam to clay loam till derived from red siltstone, shale, sandstone, and sandstone conglomerate.

Topography. The soils occupy low depressional areas in undulating terrain.

Drainage. These soils have very poor surface drainage because of a peaty layer 15-40 cm thick on the surface. Retention of water by the surface layer and slow permeability caused by the compact underlying parent material, result in poor internal drainage.

Vegetation. The main tree cover is black spruce, with a minor amount of white birch and balsam fir. The ground cover consists of sphagnum mosses, fens with minor *Kalmia angustifolia*, feather and plume mosses, Labrador tea, and rhododendron.

Soil classification. Rego Gleysol.

Description of a representative profile. The sampling site is located 1.6 km west of Little Falls at 49°21.2'N and 57°15.9'W. The site is at an elevation of approximately 76 m on undulating topography with a slope of 2%.

Horizon	Depth, (cm)	Description
Of	23-5	Brown (10YR 5/3 m) undecomposed sphagnum; actively growing; clear, smooth boundary; 3-10 cm thick.
Om-Oh	5-0	Very dark brown (10YR 2/2 m) partially decomposed organic matter, becoming more humified in the lower 3-8 cm; abundant very fine and medium roots; abrupt, smooth boundary; 15-35 cm thick.
Aeg	0-18	Dark grayish brown (10YR 4/2 m), light brownish gray (10YR 6/2 d) sandy loam; few small distinct, yellowish brown (10YR 5/4 m) mottles; amorphous when wet, fine granular when dry; soft, friable; abundant fine roots; clear, smooth boundary; 3-18 cm thick; extremely acid; pH 4.3. The lower 7 cm of this horizon is more strongly gleyed and darker colored.
Bg	18-36	Dark reddish brown (5YR 3/3 m), brown (10YR 5/3 d) sandy loam; common, medium, prominent, yellowish brown (10YR 5/6 m) mottles; amorphous, soft, friable; few very fine roots; clear, wavy boundary; 15-25 cm thick; very strongly acid; pH 4.8.
Cg	36+	Red (10R 4/6 m), light red (10R 5/6 d) loam; few small, distinct, reddish yellow (5YR 6/6 m) mottles; amorphous; hard, firm, plastic, sticky; very strongly acid; pH 4.9. Loamy sand and sandy loam till below 100 cm; few small, black concretions, and some disintegrating schist.

Range in characteristics. The organic surface layer is usually 25-40 cm thick. The fibric upper part of this layer is shallower, and the underlying organic material is more decomposed under trees than in open bogs. When the organic surface layer is thick, the Aeg and Bg horizons are shallower, duller colored, and more mottled.

The upper part of the Aeg horizon is stained with organic matter and becomes darker and more strongly gleyed with depth. Small organic accumulations occur in the B horizon, and the contact between the B and C horizons is abrupt. Gleying decreases with depth in the C horizon.

The parent material has a sandy loam to clay loam texture. It contains small concretions (0.5 mm), small disintegrating yellowish stones, and coarse sandy pockets. A layer of clay loam texture commonly occurs within 30-90 cm of the mineral surface. It is derived from disintegrating shale, or water modified till.

The surface stones are mainly of sandstone conglomerate. The surface may be very to exceedingly stony.

Similar soils. Harrimans soils are similar to the Crooked Feeder soils, but have better drainage, less gleying and brighter colors. The Crooked Feeder soils are difficult to separate from the Junction Brook and North Brook soils, because they all have dull, drab colors, but there are differences in the parent materials.

Associated soils. The Crooked Feeder soils are commonly mapped in a complex with the Harrimans and the Big Falls soils. In this association, the Crooked Feeder soils occupy the lower slopes. Organic soils, mainly the McIsaacs Brook series, always occur in association with the Crooked Feeder soils.

Land use. The Crooked Feeder soils are too wet, stony, and difficult to drain for agricultural use. They have been rated in agricultural capability Class 7, with limiting factors of wetness and stoniness. Wetness and low fertility place these soils in Class 6 for forestry.

Dancing Point map unit 3438 ha

Location. These soils occur on gently undulating till and glaciofluvial plains throughout the map area.

Parent material. The soils have developed on moderately decomposed, nutrient-poor organic matter less than 127 cm thick, derived mainly from leaves, roots, and leaf litter of ericaceous shrubs (usually *Kalmia angustifolia*), together with sphagnum and plume mosses. These organic deposits are underlain by mineral soils with an imperfectly drained surface horizon, and wet to moderately well drained parent materials.

Topography. The soils occupy gently undulating to gently rolling terrain. Slopes range from 1 to 7%.

Drainage. The surface and internal drainage are poor because of the high retention of water and the low permeability of the organic material.

Vegetation. The tree cover is usually an open stand of scrubby black spruce, with a dense undergrowth of ericaceous plants (mainly *Kalmia angustifolia*). The ericaceous plants occur as clumps that form a hummocky microrelief. The surface, which is usually dry around the *Kalmia* clumps, is dominated by plume moss and lichens (*Cladonia* spp.) Sphagnum mosses are commonly found in the wet areas, such as between the *Kalmia* clumps, and in depressional areas.

Soil classification. Terric Mesisol-Typic Mesisol.

General description of a profile

Horizon	Depth, (cm)	Description
Ofl	0-3	Very dark brown to black, mosses and undecomposed leaves; 2-5 cm thick.

Om1	3-43	Black, moderately decomposed leaf litter containing abundant medium roots of ericaceous shrubs; 36-61 cm thick.
Om2	43-55	Black, moderately well decomposed leaf litter; 7-31 cm thick.
Of	55-70	Black, well decomposed, greasy organic matter; 5-20 cm thick.
Aeg	70-91	Dark grayish brown to grayish brown, strongly gleyed sandy loam to loamy sand.

Range in characteristics. The Dancing Point soils have developed on materials low in nutrients, and with widely varying moisture conditions. Repeated fires favor the formation of these soils. They are mainly Typic Mesisols.

Similar and associated soils. The Dancing Point soils are associated with the Main Brook and Harrimans soils. The Dancing Point soils are organic, with more than 40 cm of peat on the surface. The Main Brook and Harrimans soils have less than 40 cm of peat on the surface. The McIsaac Brook and Dancing Point soils are both organic, but the Dancing Point soils have drier surfaces and contain more *Kalmia* and fewer sedges than the McIsaac Brook soils.

Land use. These soils have no assigned capability for agricultural use. They are placed in capability Class 7 for forestry because of their wetness and low fertility.

Deer Lake map unit 5402 ha

Location. These soils occur along the southern edge of the Deer Lake highlands and in a fringe along the west and south sides of Birchy Ridge.

Parent material. The soils have developed on an exceedingly stony gravelly sandy loam till derived from granite and sandstone, with localized areas containing small quantities of shale.

Topography. The soils occupy the mid-slopes on gently to strongly sloping terrain.

Drainage. The shallow organic surface horizon, good permeability in the upper horizons, and sloping topography, result in good surface drainage. Seepage water flowing from upper slopes over a compact, partially cemented C horizon, results in imperfect internal drainage.

Vegetation. The main tree cover is balsam fir and white birch, with black spruce occurring on the wetter areas. After cutting, the regenerated tree cover is dominantly white birch. The ground cover consists of feather and plume mosses and a few ferns.

Soil classification. Gleyed Humo-Ferric Podzol.

Description of a representative profile. The sampling site is located 1.6 km west-northwest of the southern point of Big Falls Pond at 49°19.2'N and 57°8.2'W. The site is on an 8% slope toward the west at approximately 152 m elevation.

Horizon	Depth, (cm)	Description
L	10-9	Very dark brown (10YR 2/2 m) undecomposed needles, leaves and mosses; abundant fine and very fine roots; abrupt, smooth boundary; 1-2.5 cm thick.
F+H	9-0	Black (10YR 2/1 m) semi-decomposed and humified organic matter; abundant fine and very fine horizontal roots; abrupt, smooth boundary; 5-15 cm thick.
Ae	0-10	Pinkish gray (7.5YR 6.5/2 m) sandy loam; weak, fine subangular blocky crushing to weak, fine granular; soft, friable; plentiful fine roots and abundant very fine roots; 10% stones; clear, smooth boundary; 0-13 cm thick.
AB	10-18	Light brown (7.5YR 6/4 m) sandy loam; few medium, faint mottles; weak, fine granular; soft, friable; few very fine and fine roots; 10% stones; clear, wavy boundary; 5-8 cm thick.
Bfgj1	18-36	Brown (7.5YR 5/4 m) sandy loam; common, medium, distinct, strong brown (7.5YR 5/6 m) mottles; weak, fine granular; soft, friable; slightly plastic, slightly sticky; very few fine and medium roots; gradual, wavy boundary; 15-25 cm thick.
Bfgj2	36-61	Dark brown (7.5YR 4/4 m) gravelly sandy loam; few medium, distinct, strong brown (7.5YR 5/6 m) mottles; amorphous; soft, friable; 20% stones; clear, wavy boundary; 17-36 cm thick.
Cxj	61+	Dark brown (7.5YR 4/4 m) gravelly sandy loam; few faint mottles; amorphous to moderate medium platy; slightly cemented (fragipan); firm, slightly hard; 30% stones.

Range in characteristics. The organic surface layer is generally 7.5-15 cm thick. The thickness of the Ae horizon changes abruptly within a short distance, possibly because of tree fall and subsequent erosion. The B horizon is distinctly mottled, because the compact C horizon restricts drainage of the seepage water. The Deer Lake soils are better drained and more strongly developed on the upper mid-slopes. On the lower slopes the drainage becomes poorer and the Deer Lake soils grade into the gleysolic Junction Brook soils.

The compact C horizon has a weak platy structure, is slightly cemented, and may be regarded as a fragipan. Gravel and gravelly loamy sand pockets are common in the parent material, especially when associated with the Main Brook soils. The Deer Lake soils are very to exceedingly stony and have numerous large granite rocks on the surface.

Similar soils. The Deer Lake soils are similar to the Junction Brook and Harrimans soils. The Junction Brook soils are Gleysols with duller colors and more prominent mottling than the Deer Lake soils. The Harrimans soils are gleyed from the surface downward because of a thick organic surface horizon, but they do not have seepage water running through the B horizon. Adies Pond and Deer Lake soils have somewhat similar profile characteristics, but are separated on parent material differences. The Deer Lake soils have duller colors than the Adies Pond soils.

Associated soils. The Deer Lake soils commonly occur in association with the Junction Brook soils. The Deer Lake soils occur on the mid-slopes and the Junction Brook soils on the lower slopes. The Harrimans soils are imperfectly drained under scrubby black spruce and heath vegetation in association with the Deer Lake soils. The Deer Lake, Birchy Ridge, and Wigwam Brook soils are associated wherever one parent material grades into another.

Land use. The Deer Lake soils have been placed in agricultural capability Classes 5 and 7 because of the limiting factors of stoniness and topography. Steep slopes and too many stones generally make improvement for crop production uneconomic. The soils are suitable for improved pasture, and some of the wetter areas could be used for this purpose if the trees were removed. Low fertility is the main factor limiting the use of these soils for forestry, and their capability for this purpose has been rated in Classes 4 and 5.

Gillard map unit 513 ha

Location. These soils occur along the Humber River from Nicholsville to Harrimans Brook.

Parent material. The soils have developed on alternating layers of alluvial sand, silt, and clay, sometimes overlying glaciofluvial gravelly loamy sand.

Topography. The soils occupy the lower slopes and depressions of gently undulating to gently rolling terrain. Slopes range from 1 to 7%.

Drainage. These soils usually have poor surface and internal drainage because of thick organic surface layers and a high water table. The surface is imperfectly drained on slopes and seepage water occurs within 30 cm of the surface.

Vegetation. On topography receiving seepage water from upper slopes, the main tree cover is balsam fir and white birch, with scattered patches of black spruce and alder. The ground cover consists of feather and plume mosses, a few ferns, and sphagnum mosses in wetter areas. In the depressions, the tree cover is mostly black spruce, with an undergrowth of heath plants and a ground cover of sphagnum and plume mosses.

Soil classification. Orthic Gleysol.

Description of a representative profile. The sampling site is located on the east side of the road 0.4 km from the airport at 49°12'N and 57°24.7'W. The site is at an elevation of 15 m and on a slope of 2%.

Horizon	Depth, (cm)	Description
L-F	20-10	Black (10YR 2/1 m), dark gray (10YR 4/1 d) partially decomposed organic matter; abundant fine and medium roots; clear, wavy boundary; 5-13 cm thick.
H	10-0	Very dark gray (10YR 3/1 m), dark gray (10YR 4/1 d) humified, greasy, organic matter; abundant fine roots, few medium roots; abrupt, smooth boundary; 7-20 cm thick.
Aeg	0-3	Very dark grayish brown (10YR 3/2 m), grayish brown (10YR 5/2 d) loamy sand; single grain; soft, friable; abundant fine and very fine roots; clear, wavy boundary; 2.5-8 cm thick; extremely acid; pH 3.9. Stained with organic matter.
Bg	3-53	Very dark brown (10YR 2/2 m), dark brown (10YR 3/3 d) loamy sand; amorphous; soft, friable; plentiful very fine roots; abrupt, smooth boundary; 20-50 cm thick; extremely acid; pH 4.4.
Cg	53+	Olive gray (5Y 5/2 m), light gray (5Y 7/2 d) silt loam; amorphous; firm, friable, plastic, sticky; extremely acid; pH 4.4.

Range in characteristics. The profile was taken in a depression. Generally, the texture becomes coarser with depth, especially on sloping topography. On these sites, the organic matter is thinner, the Ae horizon is better developed, and both the Ae and B horizons may be mottled. In depressions, the organic surface layer may be 12-40 cm thick and the water table is about 15 cm below the surface.

On the west side of the Humber River, the amount of sand usually increases with depth, and is underlain by gravelly and stony layers. There are very few stones on the surface or in the upper part of the profile.

Similar soils. The Gillard soils are similar to the Junction Brook and Crooked Feeder soils, but have developed on non-stony to moderately stony alluvial deposits, whereas the other soils have developed on glacial till.

Associated soils. The soils of the Howley, Nicholsville, and Reidville series are associated with the Gillard soils. In all cases, the Gillard soils occupy the lower slopes and depressions, where they are also in association with organic soils, particularly the McIsaac Brook soils.

Land use. When the Gillard soils are drained they are suitable for improved pasture. They have been rated in agricultural capability Classes 5 and 7 because of wetness.

Goose Arm map unit 690 ha

Location. These soils occur along the Lomond road on the west side of the map area.

Parent material. The soils have developed on gravelly sandy loam till derived from sandstone and shale, overlying and containing dolomitic limestone.

Topography. The soils occupy the mid-slopes of moderately to steeply sloping terrain.

Drainage. The steep slopes and shallow organic surface horizons ensure good surface drainage. Internally, the soils are only moderately well drained because of seepage water flowing through the B horizon over the bedrock.

Vegetation. The main tree cover is balsam fir, with a few white birch and black spruce. The ground cover consists of feather and plume mosses, ferns, ash, and bunchberry.

Soil classification. Gleyed Humo-Ferric Podzol.

General description of a profile

Horizon	Thickness, (cm)	Description
L-H	10-20	Black, semi-decomposed leaf litter.
Ae	5-15	Light brownish gray sandy loam.
Bf	8-23	Reddish brown gravelly sandy loam to loam.
BCgj	20-30	Dark brown gravelly sandy loam to loam; mottled.
Cg		Dark brown gravelly sandy loam to loam till; mottled; overlies dolomitic limestone at 40-90 cm from the surface.

Range in characteristics. The seepage water flowing over the bedrock keeps the soil moist, and results in dull colors and mottling in the B and C horizons.

Similar soils. The Goose Arm soils are similar to the North Lake soils. They have developed on the same parent material, but the North Lake soils are not as strongly gleyed as the Goose Arm soils.

Associated soils. The Goose Arm soils are associated with the North Lake, McIsaacs Brook, and Dancing Point soils. The North Lake soils occur on the upper slopes, the Goose Arm soils on mid-slopes, and the organic, McIsaacs Brook and Dancing Point soils on lower slopes and depressions. Some Gleysols and peaty Gleysols also occur on the lower slopes.

Land use. The Goose Arm soils are too shallow, rocky and steep to permit cultivation. These limitations are severe enough to place the soils in agricultural capability Class 7. For forestry, the soils are rated in capability Class 5, with moisture and low fertility limiting the use of the soils.

Hampden map unit 964 ha

Location. These soils occur on the top of Birchy Ridge.

Parent material. The soils have developed on sandy loam to loam till derived from gray siltstone and shale, with some sandstone and granite.

Topography. The soils occupy depressional areas and the lower slopes of moderately to strongly sloping terrain.

Drainage. The surface soil is moderately well drained on slopes, where the shallow organic surface layer only slightly hampers drainage. In the depressions, the surface is moderately well to poorly drained. The internal drainage is poor because of a seepage water table near the surface.

Vegetation. The main tree cover is balsam fir and white birch, with scattered patches of alder. The ground cover is mainly feather mosses with some plume mosses. The depressional areas have thicker organic surface horizons, some sphagnum mosses, and poorer tree growth than on the slopes.

Soil classification. Orthic Gleysol.

General description of a profile

Horizon	Thickness, (cm)	Description
L-H	7-18	Black, semi-decomposed organic matter.
Aeg	7-13	Grayish brown sandy loam to loam; mottled.
Bg	15-25	Dark krown loam to sandy loam; mottled.
BCg	10-20	Dark brown to brown loam to sandy loam; mottled.
Cg		Dark brown to very dark brown loam to sandy loam; mottled.

Range in characteristics. On sloping topography, the Hampden soils have well developed Aeg and Bg horizons that are prominently mottled. The water table is within 35 cm of the surface. In the depressions, the organic surface horizon is thicker, and the profile has duller colors and is not as strongly mottled. Here, the water table is closer to the surface.

Similar soils. The Hampden soils are similar to the Deer Lake soils, but they are fine textured and not so stony.

Associated soils. The Birchy Ridge, Wigwam Brook, Hampden, and McIsaac Brook soils occur as a catenary sequence. The Birchy Ridge soils occupy the upper slopes, the Wigwam Brook soils occupy the mid-slopes; the Hampden soils occupy the lower slopes, and the McIsaacs Brook soils occupy the depressional areas.

Land use. The Hampden soils are too wet, and some areas are also too stony to be of any agricultural use. They have been placed in agricultural capability Class 7. The soils are better suited for forestry, but are limited by low fertility, and have been rated as Class 4 for this purpose.

Harrimans map unit 5830 ha

Location. These soils occur on both sides of the Humber River from Reidville north to the edge of the map area.

Parent material. The soils have developed on very to exceedingly stony sandy loam to clay loam till derived from sandstone conglomerate, sandstone, red siltstone, and shale.

Topography. The soils occupy the upper slopes and mid-slopes of undulating to gently rolling terrain.

Drainage. The peaty organic surface layer, 15-45 cm thick, retains the water and causes poor surface drainage. This keeps the profile moist and slows internal drainage. The Ae horizon and the upper half of the B horizon are imperfectly drained. The drainage improves with depth and the lower B horizon and the C horizon are moderately well to well drained.

Vegetation. The main tree cover is black spruce, with minor amounts of balsam fir. Some areas contain stunted black spruce and some only *Kalmia*. The understory is a dense cover of heath plants, mainly *Kalmia*, with a ground cover of lichens and plume and sphagnum mosses.

Soil classification. Gleyed Humo-Ferric Podzol.

Description of a representative profile. The sampling site is located 1.6 km west of Little Falls at 49°21.4'N and 57°15.9'W. The site is at an elevation of approximately 76 m on the southern side of a 3% slope.

Horizon	Depth, (cm)	Description
F+H	15-0	Black (10YR 2/1 m), dark grayish brown (10YR 4/2 d) partially decomposed and humified organic matter; numerous hummocks of woody roots, abundant very fine, fine, and medium roots; abrupt, smooth boundary; 15-40 cm thick.
Aegj	0-10	Reddish gray (5YR 5/2 m), pinkish gray (5YR 7/2 d) sandy loam; common medium, distinct, reddish brown (5YR 4/4 m) mottles; amorphous, crushing to fine granular when dry; soft, friable; abundant fine roots; abrupt, wavy boundary; 7-15 cm thick; extremely acid; pH 4.2.

Bfgj1	10-18	Dark reddish brown (5YR 3/3 m), reddish brown (5YR 5/3 d) gravelly sandy loam; many medium, prominent, yellowish red (5YR 4/6 m) mottles; amorphous, crushing to very fine granular; soft, friable; plentiful fine roots; clear, wavy boundary; 5-10 cm thick; extremely acid; pH 4.5.
Bfgj2	18-36	Yellowish red (5YR 4/6 m), reddish yellow (7.5YR 6/6 d) gravelly sandy loam; few faint, yellowish red mottles; amorphous; soft, friable; plentiful fine roots; gradual, wavy boundary; strongly acid; pH 5.2.
BCgj	36+	Brown (7.5YR 5/4 m), light brown (7.5YR 6/4 d) gravelly loam till; few faint, strong brown mottles; amorphous to weak, coarse platy; strongly cemented (fragipan); hard, friable; many large vesicular pores; strongly acid; pH 5.3. There is yellowish staining between the plates; contains disintegrating stones.

Range in characteristics. The organic surface layer is between 12 and 40 cm thick and contains numerous woody hummocks of *Kalmia* roots. The thicker the organic horizon the greater its content of sphagnum moss and the amount of gleying in the underlying Ae and B horizons, because of the greater retention of water by the organic matter. The upper part of the B horizon has considerable organic matter, but it is too thin to qualify for a Bh horizon. The lower part of the B horizon may be cemented (ortstein), but this is not common. Gleying decreases with depth.

The C horizon is a red to strong brown gravelly sandy loam to loam. It commonly has the characteristics of a fragipan. A red layer of clay loam texture, derived from shale and siltstone, commonly occurs at a depth of 35-90 cm below the surface. This layer may be 75 cm or more in thickness.

Numerous stones and boulders of sandstone conglomerate and granitic rocks are embedded in the surface, and bedrock is exposed in some areas. The surface is usually exceedingly stony.

Similar soils. The Harrimans soils have developed on the same parent material as the Crooked Feeder soils, but are not as strongly gleyed, and usually have a thinner organic surface horizon than the Crooked Feeder soils. The surface horizons of the Harrimans soils are gleyed, and those of the Big Falls and Little Falls soils, developed on similar parent material, are not gleyed.

Associated soils. The Harrimans soils are associated with the Crooked Feeder, Big Falls, and Little Falls soils. The Harrimans soils occur on undulating topography, with a peaty surface layer derived from heath plants, and the Crooked Feeder soils occupy depressional areas. The Big Falls and Little Falls soils occupy the upland sites that are not covered with peaty organic surface layers and heath plants.

Land use. Most of the Harrimans soils are difficult to drain for agricultural use because they are too stony and wet. Possibly, if the organic heath layer was removed either by fire or by mechanical means, the exceedingly stony areas, which require considerable clearing to permit cultivation, could be cleared and used for improved pasture. These soils are rated in agricultural capability Classes 5 and 7, depending on the severity of the wetness and stoniness. For forestry, the soils are rated in Classes 5 and 6, and their use for this purpose is limited because of lack of moisture, low fertility, or wetness, or a combination of these factors.

Howley map unit 2811 ha

Location. These soils occur along the western edge of Sandy Lake, and between Sandy Lake and Deer Lake.

Parent material. The soils have developed on glaciofluvial sand and gravelly loamy sand deposits containing numerous granitic rocks.

Topography. The soils occupy the upper slopes and mid-slopes of undulating and gently rolling terrain. Slopes range from 3 to 7%.

Drainage. The soils have good surface and internal drainage. After a heavy rainfall, water may remain for a time on the cemented (ortstein) B horizon.

Vegetation. The tree cover is an open black spruce stand, with scattered balsam fir. The understory consists of heath plants (*Kalmia* and *Vaccinium* spp.), reindeer moss (*Cladonia* spp.), and a few plume mosses.

Soil classification. Ortstein Humo-Ferric Podzol.

Description of a representative profile. The sampling site is located in a gravel pit 0.4 km north of the Trans-Canada highway and 1.3 km west of where Junction Brook crosses the highway at 49°12.9'N and 57°20.5'W. The site is at an elevation of approximately 45 m on a slope of 2%.

Horizon	Depth, (cm)	Description
L-H	7-0	Black (10YR 2/1 m), dark gray (10YR 4/1 d) semi-decomposed organic matter; abundant very fine, fine, and medium roots; abrupt, smooth boundary; (1 cm of undecomposed needles and mosses; 6 cm of partially to well decomposed organic matter).
Ae	0-8	Pinkish gray (7.5YR 6/2 m), white (7.5YR 7.5/2 d) sandy loam; amorphous, crushing to fine granular and single grain; soft, friable; abundant fine and very fine roots; 30% stones; clear, wavy boundary; 7-23 cm thick; extremely acid; pH 3.9.
Bfjcj	8-20	Yellowish red (5YR 4/8 m), reddish yellow (7.5YR 6/6 d) gravelly sandy loam; weak, fine granular, with some weakly cemented subangular blocks; soft, friable; abundant fine and very fine roots; 40% stones; gradual, wavy boundary; 5-18 cm thick; pH 5.0. The Ae tongues into the B horizon.
Bfc	20-64	Yellowish red to strong brown(5YR-7YR 5/8 m), yellow (10YR 7/6 d) gravelly sand; coarse, subangular blocky; strongly cemented; crushes to single grain; very hard, very firm; very fine roots in top 8 cm; 70% stones; gradual, wavy

		boundary; 35-50 cm thick; strongly acid; pH 5.5. Dark reddish brown (5YR 3/4 m) stainings on the surface of the cemented blocks.
BC	64+	Brown (7.5YR 4/4 m), light yellowish brown (10YR 6/4 d) gravelly coarse sand; single grain; 80% stones; strongly acid; pH 5.3. Banded layers, more than 10 m deep, of coarse sand, gravel, and fine sand.

Range in characteristics. The organic surface layer is usually thin. Some cementation of the B horizon usually occurs in these soils. On the steeper slopes the Ae horizon is thicker and the B horizon is not as strongly cemented as that on the more level areas.

Most areas of these soils are exceedingly stony, except for the area from Deer Lake along the north side of the Humber River to Harrimans. Here, the Howley soils are moderately to very stony, and contain bands of sand that are stone-free and with some shale fragments. The B horizon of the Howley soils is not cemented in this area.

Similar soils. The Howley soils are similar to the Main Brook and the Nicholsville soils. The Howley soils have a thinner organic surface layer and better drainage in the upper mineral horizons than the Main Brook soils. The Nicholsville soils have developed on medium and coarse sands containing very few stones, whereas the Howley soils are very gravelly and contain many granitic rocks.

Associated soils. The Howley soils are associated with the Main Brook, Dancing Point, and Sandy Lake soils. The Howley soils occur on upper slopes, Main Brook soils on the mid-slopes and lower slopes, and the Sandy Lake and Dancing Point soils in the depressions.

Land use. The cultivation and production of agricultural crops is not feasible on the Howley soils. The limiting factors are excessive stoniness, low moisture-holding capacity, and strongly cemented Bfc horizons. These soils were placed in agricultural capability Class 7. The Howley soils have a capability for forestry use of Class 6, and tree growth is limited mainly by lack of moisture.

Humber map unit 4605 ha

Location. These soils occur in a band 3.2 km wide from the west side of Deer Lake, parallel to the Humber River, through Cormack.

Parent material. The soils have developed on moderately stony loam to clay loam till derived from greenish and dark gray shale.

Topography. The soils occupy the upper slopes and mid-slopes of undulating to gently rolling terrain. Slopes range from 3 to 8%.

Drainage. The soils have good surface drainage and are moderately well drained in the B and C horizons.

Vegetation. The main tree cover is balsam fir, with a minor amount of white birch. The ground cover is mainly plume mosses and bunchberry, with some feather mosses on the wetter sites.

Soil classification. Orthic Ferro-Humic Podzol.

Description of a representative profile. The sampling site is located 3.2 km southwest and 0.8 km southeast of Cormack at 49°16.3'N and 57°25.2'W. The site has a 3% slope toward the south and is at an elevation of approximately 137 m.

Horizon	Depth, (cm)	Description
L-F	5-0	Very dark brown (10YR 2/2 m), dark grayish brown (10YR 4/2 d) semi-decomposed organic matter; abundant fine roots, and medium horizontal roots; abrupt, smooth boundary.
Ae	0-1	Light brownish gray (10YR 6/2 m), white (5YR 8/1 d) silty clay; weak, medium, subangular blocky, crushing to fine granular when dry; slightly hard, friable, plastic, sticky; abundant fine and very fine roots; clear, smooth boundary; 1-8 cm thick; extremely acid; pH 3.7.
Bhf	1-15	Reddish brown (5YR 4/6 m), brownish yellow (10YR 6/6 d) shaly clay; amorphous, crushing to medium granular when dry; soft, friable, sticky, plastic; abundant fine and very fine roots; clear, wavy boundary; 7-18 cm thick; very strongly acid; pH 4.6.
Bf	15-41	Light live brown (2.5Y 5/4 m), yellow (2.5Y 7/6 d) very shaly clay; few faint mottles; amorphous, crushing to fine granular when dry; slightly hard, friable, plastic, sticky; few fine roots; gradual wavy boundary; 20-30 cm thick; strongly acid; pH 5.2.
BC	41-66	Light olive brown (2.5Y 5/4 m), light yellowish brown (2.5Y 6/4 d) very shaly clay loam; few faint mottles; amorphous; soft, friable, plastic, sticky; gradual, wavy boundary; 20-30 cm thick; strongly acid; pH 5.0.
C	66+	Dark grayish brown to olive brown (2.5Y 4/2-4/4 m), light olive brown (2.5Y 5/4 d) very shaly loam; few faint mottles; amorphous; soft, friable, slightly sticky, slightly plastic; strongly acid; pH 5.3.

Range in characteristics. The Humber soils have a thin organic surface layer overlying a thin Ae horizon. The Ae horizon is thicker on better drained and lighter textured materials. In some places, the Ae may be mixed into the B horizon by tree fall. The B horizon is usually finer textured than the other horizons in the profile and shows an accumulation of both organic matter and clay. Lack of structure and the absence of clay skins seem to exclude this soil from the Luvisols.

On lower mid-slope positions, gleying is common in the lower B horizon and in the C horizon. Consequently, small areas of somewhat gleyed Humber soils occur within the boundaries of the Humber soils. There are a few large granitic rocks on the surface, but these are easily removed during land clearing.

Similar soils. The Humber soils are finer textured, contain more disintegrated and softer shale, and have higher organic matter content in the B horizon than the Cormack soils. The Big Falls soils are redder, contain less shale, and are usually coarser textured than the Humber soils.

Associated soils. The Humber soils are associated with the Cormack and the North Brook soils. The Cormack soils are randomly mixed with the Humber soils, but usually occur on the higher slopes. The North Brook soils occupy the lower poorly drained positions in the undulating landscape of the Humber and Cormack soils.

Land use. The Humber soils are used for vegetable and forage crop production. They require limited stone picking, and are fine textured enough to withstand droughty periods. These soils have been placed in agricultural capability Classes 3 and 4. The main limiting factor in the use of these soils is the hazard of late spring and early fall frosts. Some small areas are also subject to frost during the summer months. Low fertility is the limiting factor in the production of trees and the soils have been rated as capability Class 4 for forestry.

Junction Brook map unit 5548 ha

Location. These soils occur on the southern edge of the Deer Lake highlands, and along the western and southern part of Birchy Ridge.

Parent material. The soils have developed on exceedingly stony gravelly sandy loam till derived from sandstones and granitic rocks, with local areas containing small amounts of shale.

Topography. The soils occupy depressions and the lower mid-slopes and lower slopes of gently to strongly sloping terrain. Slopes range from 2 to 10%.

Drainage. The surface is moderately well to well drained on slopes but poorly drained in the depressions. In depressional areas, the internal drainage is poor to very poor. More commonly, the internal drainage is imperfect to poor on the slopes because of seepage water. The seepage water passes readily through these soils, but the water table is 15-30 cm from the surface, which makes the soils poorly drained.

Vegetation. The main tree cover on sloping topography is balsam fir, white birch, and minor amounts of black spruce. The ground cover is mainly feather mosses. In the depressions, black spruce is the dominant tree cover and the ground cover consists of feather mosses, sphagnum, and a few heath plants.

Soil classification. Orthic Gleysol.

Description of a representative profile. The sampling site is located on the south side of the Trans-Canada highway 3.2 km west of where Junction Brook crosses the highway at 49°12.4'N and 57°21.8'W. The site is at an elevation of approximately 61 m, and has a 5% slope toward the north.

Horizon	Depth, (cm)	Description
L	15-13	Very dark brown (10YR 2/2 m), very dark grayish brown (10YR 3/2 d) undecomposed needles, roots and moss; abundant fine, very fine, and medium roots; abrupt, smooth boundary; 3-5 cm thick.
F+H	13-0	Black (10YR 2/1 m), very dark gray (10YR 3/1 d) partially decomposed and humified organic matter; fibrous; abundant very fine and fine roots and medium, horizontal roots; abrupt, smooth boundary; 8-18 cm thick.
Aeg	0-10	Brown (10YR 5/3 m), pale brown (10YR 6/3 d) sandy loam; few small, prominent, reddish yellow (7.5YR 6/6 m) mottles; amorphous, crushing to fine granular; soft, friable, slightly plastic, slightly sticky; plentiful fine and very fine roots; clear, smooth boundary; 8-15 cm thick; strongly acid; pH 5.3.
Bg	10-25	Dark brown (7.5YR 4/4 m), light yellowish brown (10YR 6/4 d) gravelly sandy loam; common distinct, fine, reddish yellow (7.5YR 6/6 m) mottles; amorphous, crushing to fine granular when dry; slightly hard, friable, slightly plastic, slightly sticky; plentiful fine and very fine roots; clear, wavy boundary; 30% stones; 12-25 cm thick; strongly acid; pH 5.5.
BCg	25-61	Brown (7.5YR 5/4 m), light brown (7.5YR 6/4 d) gravelly sandy loam; many medium, prominent, strong brown (7.5YR 5/8 m) mottles; weakly cemented; firm, very hard, slightly plastic, slightly sticky; 30% stones; gradual, wavy boundary; 20-40 cm thick; strongly acid; pH 5.4.
Cg	61+	Dark yellowish brown (10YR 4/4 m), pale brown (10YR 6/3 d) gravelly sandy loam; common medium, prominent, strong brown (7.5YR 5/8 m) mottles; friable, very hard, slightly sticky, nonplastic; 30% stones; medium acid; pH 5.9. Pockets of gravelly loamy sand till with a few small, greenish shale and disintegrating sandstone fragments, and many granitic stones.

Range in characteristics. On sloping terrain, the organic surface horizon is 10-15 cm thick. In depressions, it may be up to 22 cm thick. In the depressions, the Junction Brook soils are associated with peaty Gleysols and organic soils. Here, the Aeg horizons are thinner, and both the Ae and B horizons are duller colored and have less mottling than on the slopes. The water table is about 20-25 cm below the surface on the slopes, but is at the surface in the depressions.

The C horizon has a texture of gravelly sandy loam and contains pockets of loamy sand. It is compact and has a weak platy structure characteristic of a fragipan. The loamy sand texture is more common where the Junction Brook soils are associated with the Main Brook soils. The soils are exceedingly stony.

Similar soils. The Junction Brook soils are similar to the Hampden soils, but are separated on differences in the parent material. The Junction Brook soils have poorer drainage than the Deer Lake and Harrimans soils.

Associated soils. The Junction Brook soils are associated with the Deer Lake, Harrimans, Crooked Feeder, and organic soils. On sloping topography, the Deer Lake and Junction Brook soils occupy the poorly drained sites mainly on the lower slopes, and small areas on the mid-slopes, where the tree cover is black spruce.

On undulating and gently rolling topography, the Junction Brook soils occupy the lower slopes and depressions, with Harrimans soils on the upper slopes and mid-slopes. The Junction Brook and Crooked Feeder soils are complexed where the parent materials of the two series are in contact.

Land use. The Junction Brook soils are unsuitable for agricultural use. They have an agricultural capability of Class 7 and a forest use capability of Classes 4-6. Wetness and low fertility are the limiting factors.

Little Falls map unit 4825 ha

Location. These soils occur on the east side of the Humber River, from Junction Brook to the north edge of the map area, along the Adies River, and between the Adies and Humber rivers.

Parent material. The soils have developed on sandy loam till derived from red sandstone conglomerate, sandstone, and siltstone.

Topography. The soils occupy the upper slopes and mid-slopes of undulating and gently rolling terrain.

Drainage. The surface is mostly well drained. There are some moderately well drained areas caused by the occurrence of heath plants, and a shallow organic layer on the surface. The subsurface horizons are well drained. In some cases, the lower horizons are moderately well to imperfectly drained where the parent material is compact and partially cemented.

Vegetation. The main tree cover is balsam fir and black spruce, with scattered white birch. Beneath the black spruce, an understory of heath plants (dominantly *Kalmia*) is common. The ground cover consists of plume mosses, bunchberry, a few feather mosses and, under heath, reindeer moss.

Soil classification. Orthic Humo-Ferric Podzol.

General description of a profile

Horizon	Thickness, (cm)	Description
L-H	5-10	Black, semi-decomposed organic matter.
Ae1	5-13	Pinkish gray loamy sand.
Ae2	3-7	Reddish brown loamy sand to sandy loam.
Bf1	0-10	Red to yellowish red sandy loam (sometimes absent).
Bf2	20-46	Red to yellowish red gravelly sandy loam; sometimes cemented.
BCgj	10-15	Dark red to reddish brown gravelly sandy loam; a few mottles.
Cx		Dark red to reddish brown gravelly sandy loam till; hard; compact.

Range in characteristics. The organic surface horizon is usually thin and the coarse textured Ae horizon becomes redder with depth. A thin upper B horizon yellower than the underlying friable Bf horizon may be present. The BC horizon is partially cemented and usually faintly mottled. The C horizon is compact and hard. It is more weakly cemented on moderately to strongly sloping topography. In a few areas, the C horizon contains a layer of red clay loam material. There are numerous granite rocks on the surface.

Similar soils. The Little Falls and Big Falls soils are similar in color, but the Little Falls soils have a thicker Ae horizon, a more compact C horizon, and contain more sand throughout the profile. The Adies Pond soils are more strongly gleyed and contain more granitic rocks than the Little Falls soils.

Associated soils. The Little Falls soils are mapped in a complex with the Big Falls, Harrimans, and Crooked Feeder soils. The Crooked Feeder soils occur on the lower slopes, whereas the other three soil series occupy the upper and mid-slopes of undulating topography. The Harrimans soils have a tendency to occur on level areas under thick heath vegetation. When associated with the Adies Pond soils, the Little Falls soils occupy the well drained sites and the Adies Pond soils occupy the imperfectly drained ones.

Land use. Surface stoniness and rockiness limit the agricultural use capability of the Little Falls soils to Classes 4 and 5. The soils are well suited to improved pasture, but would require extensive stone removal for the production of vegetable crops. Use of the soils for forestry is severely limited because of lack of moisture and low fertility; they are rated in forestry capability Class 5 for this purpose.

Lomond map unit 7243 ha

Location. These soils occur in the Long Range mountains on the west side of the map area.

Parent material. The soils have developed on excessively stony, exceedingly rocky, gravelly sandy loam till derived from granitic gneiss and granite.

Topography. The soils occupy the mid-slopes of strongly to steeply sloping terrain. Slopes range from 9 to 30%.

Drainage. The steep slopes ensure good surface drainage, but seepage water flowing through the lower horizons results in only moderately good to imperfect drainage in the lower part of the profile.

Vegetation. The main tree cover is black spruce, with a few white birch. On exceedingly rocky sites, the balsam fir growth is stunted and sparse, with better growth on the less rocky areas. The ground cover is feather and plume mosses.

Soil classification. Gleyed Humo-Ferric Podzol (lithic phase).

Description of a representative profile. The sampling site is located on the road from Adies Pond to Whites River at 49°26.3'N and 57°24.2'W. The site is at an elevation of approximately 500 m on a 14% slope with southern exposure.

Horizon	Depth, (cm)	Description
L-H	2-0	Black (10YR 2/1 m), dark gray (10YR 4/1 d) semi-decomposed organic matter; abundant very fine, fine, and medium roots; abrupt, smooth boundary; numerous rock outcrops on the surface.
Ae	0-7	Pinkish gray (7.5YR 6/2 m), light gray (10YR 7/1 d) sandy loam; very thin layer.
Bfgj1	7-15	Strong brown (7.5YR 4/6 m), yellowish brown (10YR 5/4 d) gravelly sandy loam; few faint mottles; fine granular; soft, friable; abundant fine and very fine roots; gradual, wavy boundary; 10-18 cm thick; bedrock within the horizon.
Bfgj2	15-36	Dark brown (7.5YR 4/4 m), yellowish brown (10YR 5/4 d) gravelly sandy loam; many medium, distinct, strong brown (10YR 5/6 m) mottles; amorphous; soft, friable; plentiful

fine roots; gradual, wavy boundary; 10-18 cm thick; bedrock within the horizon.

Cgj	36+	Dark grayish brown (2.5Y 4/2 m), light brownish gray (2.5Y 6/2 d) gravelly sandy loam; few medium, distinct mottles.

Range in characteristics. The parent material is thin and bedrock is usually exposed on the hilltops. Drainage becomes poorer downslope and the B horizons are strongly gleyed. The Ae horizon is thin (1-5 cm) to nonexistent, possibly due to erosion. The B horizon may be developed down to bedrock. Boulders cover more than 50% of the ground surface.

Similar soils. The Lomond soils are somewhat similar to the White River soils but are not as wet or as strongly gleyed.

Associated soils. The Lomond soils occur in association with the White River soils and rock outcrops. The Lomond soils occupy the mid-slopes and the White River soils occupy the lower slopes. Rock outcrops occur throughout this soil area but are more prominent on the upper slopes.

Land use. The Lomond soils were rated in agricultural capability Class 7 because of their rockiness and topography. They are unsuitable for agriculture. For forestry, the soils are rated in Classes 5 and 6, and are limited in use by low moisture, low fertility, rockiness, and exposure to wind.

Main Brook map unit 4812 ha

Location. These soils occur along the western edge of Sandy Lake and between Sandy and Deer lakes.

Parent material. The soils have developed on glaciofluvial sand and gravel deposits containing numerous granitic stones.

Topography. The soils occupy the lower slopes and mid-slopes of undulating terrain. Slopes range from 2 to 5%.

Drainage. The surface is poorly drained in part because of the retention of water by a peaty surface layer. This results in imperfect drainage of the A and upper B horizons. In addition, a cemented (ortstein) B horizon restricts the movement of water. The ortstein layer and the C horizon are well drained.

Vegetation. The main tree cover is a scrubby, scattered, black spruce stand, with a few larch. The undergrowth is dominantly heath plants (*Kalmia* and *Vaccinium* spp.), with reindeer moss (*Cladonia* spp.) on the surface. The wetter sites with thick (25-40 cm) organic surface layers contain sphagnum moss.

Soil classification. Gleyed Ortstein Humo-Ferric Podzol.

Description of a representative profile

Horizon	Depth, (cm)	Description
F+H	33-0	Black (10YR 2/1 m), dark gray (10YR 4/1 d) partially to well decomposed organic matter; abundant very fine, fine, and medium roots; woody hummocks of *Kalmia*; abrupt, smooth boundary.
Aegj	0-13	Brown (7.5YR 5/2 m), light brownish gray (10YR 6/2 d) gravelly loam sand; common medium, distinct, reddish brown (5YR 5/4 m) mottles; amorphous to single grain; soft, friable; abundant fine and very fine roots; clear, wavy boundary; 8-18 cm thick; the lower 2.5 cm is slightly darker with organic staining.
Bfgj	13-23	Reddish brown to dark reddish brown (5YR 4/3-3/4 m), reddish brown (5YR 5/3 d) gravelly sandy loam; few medium, distinct, yellowish red (5YR 4/6 m) mottles; single grain to fine granular; soft, friable; plentiful fine and very fine roots; clear, wavy boundary; 8-20 cm thick; organic matter straining; fine, weakly cemented, subangular blocks at a depth of 20-23 cm.
Bfc	23-79	Yellowish red (5YR 5/8 m), yellow (10YR 7/6 d) gravelly sand; coarse, subangular blocky; strongly cemented; crushes to single grain; very hard, very firm; gradual, wavy boundary; 40-60 cm thick; 70% stones; dark reddish brown staining on the surface of the subangular blocks, concentrated in the upper 15 cm of this horizon; the upper 7 cm of the horizon is often faintly mottled.
BC	79+	Brown (7.5YR 4/4 m), light yellowish brown(10YR 6/4 d) gravelly coarse sand; single grain; 80% stones; banded layers of coarse sand, gravelly coarse sand, and gravelly loamy sand.

Range in characteristics. The organic surface layer has a thickness of 12-40 cm. The thinner organic layers are hummocky and composed of woody material derived from mainly *Kalmia*. As the layer becomes thicker, it contains more sphagnum mosses, which hold the water and make the underlying soil wetter. The Aeg horizon is gleyed, mottled, and stained with organic matter. The upper B horizon may accumulate considerable organic matter but usually is not thick enough to qualify as a Bh horizon. The lower B horizon is mottled and also stained with organic matter. The Bfc horizon has dark, organic stains between the cemented subangular blocks.

The parent material consists of layers of coarse sand, loamy sand, and gravel containing numerous large granitic stones. The surface of these soils is exceedingly stony.

Similar soils. The Main Brook soils are similar to the Howley soils. The Main Brook soils have peaty surface layers 15-40 cm thick, and are gleyed in the A and upper B horizons, whereas the Howley soils are not.

Associated soils. The Sandy Lake, Dancing Point, Howley, and Junction Brook soils are associated with the Main Brook soils. The Howley soils occupy the drier upper slopes and mid-slopes, the Main Brook soils occupy the mid-slopes and lower slopes, and the organic Sandy Lake and Dancing Point soils occupy the depressional sites. The Junction Brook soils occur with the Main Brook soils on the sloping drier sites in areas where sandy loam till overlies gravel and sand.

Land use. Generally, the production of agricultural crops is not feasible on the Main Brook soils. The limiting factors are stoniness, low moisture-holding capacity, thick organic surface horizons, and cemented impermeable B horizons. The production of lowbush blueberries is a possibility if the *Kalmia* could be removed. The soils were placed in agricultural capability Class 7 for the above reasons. Low moisture-holding capacity and surface wetness severely affect the use of the Main Brook soils for forestry and they have been rated in forestry capability Classes 6 and 7 for this purpose.

McIsaacs Brook map unit 8238 ha

Location. These soils are scattered throughout the map area.

Parent material. The soils have developed on moderately well to well decomposed organic material derived mainly from sphagnum mosses, sedges, grasses, and herbs.

Topography. The soils occupy the lower slopes of very gently sloping to strongly sloping terrain, and in depressions of gently undulating topography.

Drainage. The McIsaacs Brook soils have very poor surface and internal drainage in part because of the high water-holding capacity and slow permeability of the organic matter.

Vegetation. The main tree cover is scrubby black spruce, but these soils also occur under open treeless bogs. The black spruce-covered bogs contain some larch and balsam fir. The understory consists of various densities of different shrubs such as *Kalmia* spp., *Rhododendron* spp., and leather leaf. The ground cover is dominated by sphagnum moss, together with sedges, grasses, wintergreen, *Clintonia* spp., rushes, reeds and herbs. The treeless bogs are covered mainly with sphagnum mosses and sedges. Other plants include *Kalmia* spp., leather leaf, Labrador tea, rhododendron, brunet, and clintonia.

Soil classification. Typic Mesisol, Terric Mesisol, Terric Humic-Mesisol.

General description of a profile

Horizon	Thickness, (cm)	Description
Ofl	3-15	Very dark brown, slightly decomposed and actively growing organic matter; the water table is usually within 15 cm of the surface.

Om	51-127	Black to very dark brown, moderately well decomposed organic matter, mainly derived from sedges and sphagnum moss. This horizon is often layered with peat containing various amounts of sedge and sphagnum moss, and then woody layers, 5-10 cm thick.
Of2	25-51	Black, well decomposed organic matter.

Range in characteristics. The McIsaacs Brook soils are predominantly Terric Humic-Mesisols, with significant areas of Terric and Typic Mesisols. Under scrub black spruce vegetation, they are moderately well to well decomposed, and usually less than 127 cm thick. Decomposition increases with depth.

The soils have developed on a mixture of grasses, sedges, and sphagnum moss on the borders of raised bogs. The surface vegetation is mainly sedges and plants with a high nutrient requirement. In the depressions, the soils have developed on a mixture of *Carex* spp., cottongrass, and sphagnum mosses. Here, the soils are dominantly Typic Mesisols. Sedges and ferns comprise about 50% of the peat. These soil areas are usually less than 120 ha.

Similar and associated soils. The McIsaacs Brook and the Sandy Lake soils are often mapped in a complex. Of these two organic soils, the McIsaacs Brook soils are more decomposed, contain more sedges and less sphagnum, and do not have ponds, or "flashets," as compared to the Sandy Lake soils. The McIsaacs Brook soils occupy the low areas near the border of the bog and the Sandy Lake soils occupy the central raised part of the open bog. The Dancing Point soils are not as wet as the McIsaacs Brook soils and contain less sedge and more *Kalmia*. The McIsaacs Brook soils are often complexed with peaty Gleysols where the soils have less than 40 cm of organic matter on the surface.

Land use. The McIsaacs Brook soils are unsuitable for agriculture. For forestry, they are severely limited by wetness and low fertility and have been placed in capability Classes 6 and 7.

Mistaken Point map unit 2121 ha

Location. These soils occur in a band parallel to the Humber River, from the west side of Deer Lake to Alder Pond.

Parent material. The soils have developed on well decomposed, nutrient-rich organic material less than 137 cm thick, derived from alder leaves and annual herbaceous plants.

Topography. The soils occupy low areas along brooks on gently undulating terrain, slopes in valleys dissecting undulating to gently rolling till plains, and flooded alluvial material. Slopes range from 0.5 to 3%.

Drainage. The Mistaken Point soils have poor surface drainage in part because of the thick organic layer on the surface. Internally they are very poorly drained because of a stagnant high water table, high water retention, and low permeability of the highly decomposed organic matter.

Vegetation. The main tree cover is alder, with some maple and scattered balsam fir and white birch on the drier sites. The understory consists of ferns, horsetails, raw parsnip, clintonia, plume mosses, grasses, and sedges.

Soil classification. Typic Humisol.

General description of a profile

Horizon	Thickness, (cm)	Description
Of	2-5	Very dark brown, partially decomposed organic matter.
Oh	41-127	Black to very dark brown, greasy, humified organic matter. The water table is 15-40 cm from the surface.
Cg		Dark greenish gray loam to sandy loam till.

Range in characteristics. The Mistaken Point soils are always well decomposed. The organic deposit is 40-127 cm thick. The water table in these soils is usually within 30 cm of the surface but has a range from a few centimetres to 40 cm below the surface.

Similar soils. The North Brook and McIsaacs Brook soils are similar to the Mistaken Point soils. The North Brook soils are Rego Gleysols, with an organic surface layer less than 40 cm thick. The McIsaacs Brook soils have a less decomposed layer, contain more sphagnum moss, and have a more dense tree cover of scrubby spruce than the Mistaken Point soils.

Associated soils. The Mistaken Point soils are often complexed with the North Brook soils and occur on similar topography and under similar vegetation.

Land use. Generally, the Mistaken Point soils are too wet for cultivation. Because of their relatively high fertility, some of the drier areas would grow excellent crops of grass if drainage could be improved. These soils were rated in agricultural capability Class 7, and also in Class 7 for forestry, mainly because of their wetness.

Nicholsville map unit 960 ha

Location. These soils occur along the Humber River between Nicholsville and Junction Brook.

Parent material. The soils have developed on alluvial, coarse, and medium sand to loamy sand containing a few fine sand and silt bands.

Topography. The soils occupy well drained slopes (2-5%) on gently undulating terrain.

Drainage. The thin organic surface horizon and coarse texture permit good surface drainage. The internal drainage is good to rapid.

Vegetation. The main tree cover is balsam fir. The ground cover consists of club and plume mosses, and bunchberry.

Soil classification. Ortstein Humo-Ferric Podzol.

Description of a representative profile. The sampling site is located 0.4 km east of Nicholsville at 49°11'N. and 57°26.6'W. The site is at an elevation of approximately 15 m on a 2% slope.

Horizon	Depth, (cm)	Description
L-F	8-0	Black (10YR 2/1 m), dark gray(10YR 4/1 d) semi-decomposed organic matter; abundant very fine, fine, and medium roots; abrupt, smooth boundary; 1-8 cm thick.
Ae	0-31	Light reddish brown (5YR 6/3 m), pinkish gray (7.5YR 7/2 d) sand; single grain; abundant very fine and fine roots; soft, friable; gradual, irregular boundary; 20-30 cm thick; extremely acid; pH 4.2.
Bfcj	31-61	Strong brown (7.5YR 4/6 m), yellowish brown(10YR 5/6 d) sand; single grain; weakly cemented, moderate, coarse subangular blocks; hard, very firm; plentiful fine roots; 20-30 cm thick; very strongly acid; pH 4.9.
Bfc	61-102	Strong brown (7.5YR 5/8 m), yellowish brown (10YR 5/8 d) sand; strongly cemented, coarse subangular blocky and single grain; hard, very firm; gradual, wavy boundary; strongly acid; pH 5.4. Dark reddish brown stains on the inside of the peds.
C	102+	Brown (7.5YR 5/4 m), pale brown (10YR 6/3 d) sand; single grain; soft, friable; strongly acid; pH 5.3. Stone free and very little gravel.

Range in characteristics. The Nicholsville soils cover only small areas. In depressions, the organic surface horizon is thicker and the lower B horizon is weakly gleyed. The water table is within 90-120 cm of the surface. The parent material may be gravelly below a depth of 120 cm.

Similar soils. The Nicholsville soils are similar in texture and profile characteristics to the Howley soils. The Nicholsville soils occur on more level topography and contain less stones and gravel than the Howley soils.

Associated soils. Organic soils occupy the low poorly drained sites associated with the Nicholsville soils.

Land use. Under irrigation, the Nicholsville soils are suitable for improved pasture or vegetable production. In dry years, moisture deficiency limits plant growth. This limiting factor gives these soils an agricultural capability rating of Class 4. Moisture deficiency and low fertility are also factors limiting the use of these soils for forestry, for which their capability is rated as Class 5.

North Brook map unit 3986 ha

Location. These soils occur in a band 3.2 km wide parallel to the Humber River, from the west side of Deer Lake through Cormack.

Parent material. The soils have developed on sandy loam to loam till derived from gray and greenish shale and soft sandstone.

Topography. The soils occupy the lower slope positions along small drainage channels of mainly undulating but sometimes gently rolling terrain.

Drainage. The surface and internal drainage are very poor in part because of a thick (25-40 cm) organic surface layer and a high water table within 15-30 cm of the surface.

Vegetation. The main tree cover is alder and maple, with a few white birch, balsam fir, and white spruce. The understory is mainly annual herbaceous plants such as cow parsnip, ferns, clintonia, and horsetails.

Soil classification. Rego Gleysol.

Description of a representative profile. The sampling site is located 180 m southeast of the Cormack road and 0.4 km southwest of the junction of the Cormack and Adies Pond roads at 49°20.8'N. and 57°19.6'W. The site is at an elevation of approximately 106 m and is on a slope of 2%.

Horizon	Depth, (cm)	Description
L+F	33-31	Very dark brown (10YR 2/2 m), dark grayish brown (10YR 4/2 d) undecomposed and semi-decomposed organic matter; abundant fine and very fine roots; clear, smooth boundary.
H	31-0	Black (10YR 2/1 m), dark gray (10YR 4/1 d) humified organic matter; abundant very fine, fine, and medium roots from 30-15 cm, few fine and medium roots from 15-0 cm; abrupt, smooth boundary.
Cg1	0-20	Olive gray (5Y 5/2 m), light brownish gray (2.5Y 6/2 d) shaly loam; many coarse, prominent, yellowish red (5YR 5/8 m) mottles; amorphous; firm, hard, slightly sticky, slightly plastic; gradual, wavy boundary; slightly acid; pH 6.2.
Cg2	20-51	Olive (5Y 4/3 m), light brownish gray (2.5Y 6/2 d) shaly sandy loam; few medium, prominent, yellowish red (5YR 5/6 m) mottles concentrated in the top of the horizon; amorphous; firm, hard, slightly sticky, slightly plastic; slightly alkaline; pH 7.2.

Range in characteristics. The organic surface layer is 25-40 cm thick. These soils are associated with Terric Humisols in a complex pattern. On the upper slopes, the organic surface is thinner and the North Brook soils grade into Orthic Gleysols that have Ae and Bg horizons, but these areas are very small. As the organic layer becomes thicker, the underlying mineral soil becomes more gleyed. The water table is usually at a depth of about 30 cm, but may be at or nearer the surface. The parent material contains some hard, unweathered shale.

Similar soils. The North Brook soils have characteristics similar to other Gleysolic soils in the map area (Crooked Feeder, Junction Brook), except that they occur usually under alder vegetation, with a good cover of herbaceous plants. The North Brook soils have no B horizon and contain more shale than the other Gleysols in the area.

Associated soils. The North Brook soils are complexed with the Humber, Cormack, and Mistaken Point soils. The Humber and Cormack soils occupy the upper slopes and mid-slopes of undulating to gently rolling topography, and the North Brook and Mistaken Point (organic) soils occupy the lower gently undulating positions.

Land use. The North Brook soils make excellent improved pasture where the water table can be lowered to permit seeding. When complexed with organic soils, the North Brook soils are too wet for cultivation. Removal of the alder cover may improve drainage enough to establish excellent grazing land. The North Brook soils have an agricultural capability rating of Classes 5 and 7, and their use is limited because of wetness and stoniness. Wetness severely limits the use of the soils for forestry and their capability for this purpose is rates as Class 7.

North Lake map unit 142 ha

Location. These soils occur along the Lomond road on the west side of the map area.

Parent material. The soils have developed on gravelly sandy loam till derived from sandstone and shale overlying and containing dolomitic limestone.

Topography. The soils occupy the upper slopes and hilltops on moderately to steeply sloping terrain.

Drainage. The surface and internal drainage are good.

Vegetation. The main tree cover is balsam fir, with a few white birch. The ground cover consists of plume mosses and bunchberry.

Soil classification. Orthic Humo-Ferric Podzol.

Description of a representative profile. The sampling site is located near the fire tower 1.2 km north of the junction of the Lomond and Cormack roads at 49°14.2'N. and 57°28.2'W. The site has an elevation of approximately 183 m and a 9% slope toward the southeast.

Horizon	Depth, (cm)	Description
L	15-13	Very dark brown (10YR 2/2m), dark gray (10YR 4/1 d) undecomposed moss, needles, and roots; abundant fine and very fine roots; abrupt, smooth boundary.
F+H	13-0	Black (10YR 2/1 m), dark gray (10YR 4/1 d) partially decomposed and humified organic matter; fibrous; abundant very fine, fine, and medium roots; abrupt, smooth boundary; decomposition increases with depth.
Ae	0-5	Pinkish gray (5YR 6/2 m), pinkish white (5YR 8/2 d) loam; weak, coarse subangular blocky, crushing to fine granular when dry; slightly hard, friable, slightly sticky, slightly plastic; abundant fine and very fine roots; abrupt, wavy boundary 3-18 cm thick; extremely acid; pH 3.9.
Bf	5-15	Yellowish red (5YR 4/6 m), reddish yellow (7.5YR 6/6 d) gravelly sandy loam; medium granular, crushing to fine granular; soft, friable; many fine roots; clear, wavy boundary; 10-20 cm thick; extremely acid; pH 4.3; few organic stains.
BCg1	15-36	Brown (7.5YR 4/4 m), light yellowish brown (10YR 6/4 d) gravelly sandy loam; few fine, distinct, strong brown (7.5YR 5/6 m) mottles; amorphous; slightly hard, friable; many fine and medium roots; gradual, wavy boundary; 20-35 cm thick; very strongly acid; pH 4.8; a few black organic stains.
BCg2	36+	Dark brown (7.5YR 4/4 m), light yellowish brown (10YR 6/4 d) gravelly sandy loam; few fine, distinct, yellowish red (5YR 5/6 m) mottles; amorphous; few fine and medium roots; medium acid; pH 5.7; contains numerous large dolomitic limestone boulders; water table at 80 cm; no roots below 66 cm.

Range in characteristics. The organic surface is thin. The Ae horizon has considerable variation in thickness and in some places may occur as whitish streaks in the upper B horizon because of tree fall and root disturbance. The lower B horizon and the C horizon are often mottled and contain large boulders of whitish dolomitic limestone. Black coatings of organic material occur around the edges of the limestone boulders. The soils are shallow (15-25 cm) over bedrock and on hilltops bedrock exposure is common. Downslope, the bedrock usually is found at a depth of 50-60 cm from the surface. Gleying increased downslope.

Similar soils. The profile of the North Lake soils is somewhat similar to that of the Cormack and Goose Arm soils. However, the North Lake soils have dolomitic limestone within 50 cm of the surface and are not as strongly leached as the other two soils. The Goose Arm soils have duller colors and more mottling than the North Lake soils and occur on lower slopes and under wetter vegetation, with better tree growth.

Associated soils. The North Lake soils are associated with the Goose Arm soils. The latter soils occupy the mid-slopes and the North Lake soils occupy hilltops.

Land use. Steep topography, stoniness, and rockiness make the North Lake soils unsuitable for agriculture. They have been placed in capability Class 7. The soils have a forest capability of Class 5, and are limited by moisture deficiency, low fertility, and a combination of unfavorable soil factors.

Reidville map unit 455 ha

Location. These soils occur along the edge of the Humber River from Deer Lake to Harrimans Brook.

Parent material. The soils have developed on sandy loam to clay loam alluvial material composed of red sand, silt, and clay. The sand content increases with depth.

Topography. The soils occupy level river terraces and slopes adjacent to the Humber River. Slopes range from 1 to 12%.

Drainage. These soils have good surface drainage. They also have good internal drainage except on the more level areas (slopes 1-2%), where they are only moderately well drained.

Vegetation. The main tree cover is balsam fir, with a few white birch. The ground cover consists of plume mosses and bunchberry.

Soil classification. Orthic Humo-Ferric Podzol.

Description of a representative profile. The sampling site is located on the edge of the Humber River 1.6 km northeast of Reidville at 49°14.3'N and 57°22.2'W. The elevation is 15 m, on gently undulating topography.

Horizon	Depth, (cm)	Description
L-F	3-0	Black (10YR 2/1 m), dark gray (10YR 4/1 d) undecomposed and partially decomposed organic matter; abundant very fine and fine roots; abrupt, smooth boundary; 2.5-10 cm thick.
Ae	0-5	Pinkish gray (5YR 6/2 m), pinkish white (5YR 8/2 d) silt loam; amorphous, crushing to fine granular when dry; soft, friable, slightly plastic, slightly sticky; abundant very fine and fine roots; clear, wavy boundary; 0-10 cm thick; extremely acid; pH 4.5.

Bf1	5-20	Yellowish red (5YR 4/6 m), reddish yellow (7.5YR 6/6 d) loam; weak, fine granular; soft, friable, plastic, sticky; plentiful fine roots; gradual, wavy boundary; 10-20 cm thick; strongly acid; pH 5.2.
Bf2	20-43	Yellowish red (5YR 4/6 m), reddish yellow (7.5YR 5.5/6 d) sandy loam; fine granular; soft, friable; plentiful very fine roots; clear, smooth boundary; 15-30 cm thick; strongly acid; pH 5.1.
IIBC	43-66	Reddish brown (5YR 4/4 m), brown (7.5YR 5/4 d) loamy sand; single grain; soft, very friable; few fine roots; clear, smooth boundary; very strongly acid; pH 5.0; very weakly cemented.
IIC	66-83	Brown (7.5YR 4/4 m, 5/4 d) loamy sand; single grain; soft, very friable; very few medium roots; very strongly acid; pH 5.0; banded layers of fine loamy sand and silt of variable thickness.

Range in characteristics. The soils have a considerable range in texture both horizontally and vertically because of the nature of deposition of the parent material. Generally, the texture is somewhat finer at the surface and becomes coarser with depth. The Reidville soils resemble Podzols, but the B horizon does not meet the chemical criteria required for a Podzolic B horizon. They usually have a thin organic surface horizon overlying a distinct Ae horizon. The Reidville soils are usually free from stones. The flat river terraces are well drained on the edge of the sloping escarpment along the river, but drainage becomes progressively poorer with distance away from the river.

Similar soils. The Reidville soils are similar to but finer textured and less stony than the Nicholsville soils.

Associated soils. The Reidville soils are associated with the Gillard and organic soils and occupy the well drained sites. The Gillard and organic soils (Dancing Point and McIsaacs Brook) occupy the imperfectly and poorly drained sites, respectively.

Land use. The Reidville soils are probably the most suitable for agriculture of any of the soils in the map area. The more level areas can be used for vegetable production and improved pasture. The steeper slopes are useful only for improved pasture. The main factors limiting their use are climate (frost hazard) and topography. The soils have been rated in agricultural capability Classes 3 and 5, depending on the severity of the limiting factors. They have been rated in Classes 3-5 for forestry because of low moisture-holding capacity and low fertility.

Rock Land map unit 16 472 ha

Rock Land is a land type consisting of areas that are dominantly rock outcrops, areas with enough boulders to submerge other soil characteristics (more than 80% boulders), and areas with very shallow mineral layers (less than 10 cm) or shallow organic layers. Rock outcrops in the map area occur mainly on the tops of hills that have very rocky slopes and shallow (less than 30 cm) organic soils in low areas or at the bottom of slopes.

The largest area of Rock Land occurs in the Long Range Mountains. This area consists of granitic gneiss and granitic bedrock outcrops, or boulder strewn surfaces. Small areas of sandstone conglomerate outcrop near Little Falls. The Lomond and White River soils are often complexed with Rock Land. In these areas, the Lomond and White River soils have bedrock within 50 cm of the surface, which is covered with numerous boulders.

The areas mapped as Rock Land are classified in agricultural capability Class 7. They are too rocky to be of any use for agriculture. This land type is also unsuitable for forestry because of rockiness and exposure to wind. It has been rated in capability Class 7 for forestry.

Sandy Lake map unit 18 408 ha

Location. These soils occur throughout the map area, but are most extensive in narrow areas on both sides of the Humber River and parallel to it. They also occur on glaciofluvial deposits between Deer and Sandy lakes.

Parent material. The soils have developed mainly on slightly decomposed, nutrient-poor sphagnum mosses.

Topography. The soils are raised bogs with gently undulating to undulating surface. These bogs are higher at the center than at the edges and cover extensive areas of undulating glacial till and glaciofluvial deposits.

Drainage. These soils are very poorly drained both internally and on the surface because of the high water-holding capacity and poor permeability of the organic material. The surface of these organic deposits is covered with numerous ponds, or "flashets."

Vegetation. The soils are dominantly composed of various species of sphagnum mosses. The surface has a hummocky microrelief. The hummocks consist mainly of sphagnum mosses and are covered with ericaceous plants (*Kalmia*), lichens, and sometimes, scrub spruce. The hollows between the hummocks are wet areas dominated by more water-tolerant sphagnum species, sedges, pitcher plant, and cotton grass. Around the edges of raised bogs, the peat is shallower and primarily developed from sphagnum but contains more nutrient-rich plants such as cotton grass and other sedges.

Soil classification. Typic Fibrisol.

General description of a profile

Horizon	Thickness, (cm)	Description
Of1	46-127	Very dark grayish brown to dark brown, undecomposed to slightly decomposed organic matter; mainly sphagnum.
Of2	46-152	Very dark brown, slightly decomposed organic matter; mainly sphagnum.
Of-Om	61-150	Very dark brown to black, slightly to moderately decomposed organic matter; mainly sphagnum and sedges.

Range in characteristics. These organic soils are usually more than 2 m thick. Around the edges of bogs the deposits are shallower and more decomposed, developing into Terric Mesic Fibrisols and Terric Mesisols. The upper and middle tiers are dominantly slightly decomposed sphagnum moss. Decomposition usually increases with depth. The bottom tier (below 120 cm) may contain some mesic material derived from sphagnum moss and sedge. Where the bottom tier is dominantly mesic material, the soils are called Mesic Fibrisols.

The Sandy Lake soils are mainly Typic Fibrisols with sphagnic surface (40 cm) tiers. Smaller areas of Mesic Fibrisols and Terric Fibrisols occur around the borders of the bogs. Some small areas that are not raised bogs were included with the Sandy Lake soils. The organic soils in these areas are more decomposed than similar materials in the raised bogs and are classified as Mesic Fibrisols. The differences in stage of decomposition in different layers over a small area, made it difficult to map these soils separately.

Similar and associated soils. The soils of the Sandy Lake series are similar to and complexed with the McIsaacs Brook soils. The McIsaacs Brook soils are more decomposed (Mesisols) and are usually covered with more black spruce than the Sandy Lake soils.

Land use. The occurrence of numerous ponds, or "flashets," and poor drainage make the Sandy Lake soils unsuitable for agricultural crops. There are some areas with very few "flashets" that could be drained by ditching and used for the production of some crops. These soils are too wet and infertile for the growth of commercial forest. They have been rated in capability Class 7 for this purpose.

White River map unit 1993 ha

Location. These soils occur in the Long Range Mountains on the west side of the map area.

Parent material. The soils have developed on excessively stony, exceedingly rocky, gravelly sandy loam to loamy sand till derived from granitic gneiss and other granitic rocks.

Topography. The soils occupy the lower slopes and mid-slopes of moderately to steeply sloping terrain. Slopes range from 9 to 30%.

Drainage. The surface soil is well drained because of slope, but the internal drainage is poor because seepage water from the upper slopes maintains the water table close to the surface.

Vegetation. The main tree cover is balsam fir and white birch, with black spruce growing on the lower slopes in wet sites with a stagnant water table. Generally, tree growth is poor because bedrock is close to the surface. The ground cover consists mainly of feather and plume mosses, with sphagnum moss on the wet areas.

Soil classification. Orthic Gleysol.

Description of a representative profile

Horizon	Depth, (cm)	Description
F+H	10-0	Black (10YR 2/1 m), dark gray (10YR 4/1 d) partially and well decomposed organic matter; abundant very fine, fine, and medium roots; abrupt, smooth boundary; top 1 cm undecomposed leaf litter; exceedingly rocky; 8-20 cm thick.
Aeg	0-13	Grayish brown (10YR 5/2 m), light gray (10YR 7/1 d) gravelly sandy loam; many medium, prominent, strong brown (7.5YR 5/6 m) mottles; amorphous, crushing to fine granular; soft, friable; abundant fine and very fine roots; clear, wavy boundary; 8-15 cm thick; exceedingly rocky.
Bg	13-41	Dark brown (7.5YR 3/2 m, 4/3 d) gravelly sandy loam; many medium, prominent, reddish brown (5YR 4/6 m) mottles; weak, fine granular to amorphous; soft, friable; plentiful fine roots; gradual, wavy boundary; 20-36 cm thick; exceedingly rocky and stony; water table at 30 cm from the surface.
Cgj	41+	Dark brown (7.5YR 3/2 m), brown (7.5YR 5/2 d) gravelly sandy loam; few faint mottles; amorphous; slightly hard, friable; horizon very thin or nonexistent over granitic bedrock.

Range in characteristics. The thickness of the organic surface layer and its content of sphagnum moss increases downslope. The underlying mineral horizons are strongly to weakly gleyed and mottled. At the bottom of slopes there is little profile development, and the soils grade into organic soils. The depth to the water table decreases downslope. The soil area contains many exposures of bedrock and the soils are exceedingly rocky on the surface and throughout the profile. Generally, they are deeper and not as rocky as the Lomond soils.

Similar soils. The White River soils differ from the somewhat similar Junction Brook soils in their shallowness to bedrock and the numerous granitic outcrops.

Associated soils. The White River soils are associated with the Lomond soils and generally occur between the rock outcrops.

Land use. The rockiness, stoniness, and wetness of the White River soils prevent the use of these soils for agriculture. The severity of these factors places the soils in capability Class 7 for agriculture. For forestry, the soils have a use capability of Class 5 and the same factors, including exposure to wind, restrict the use of the soils.

Wigwam Brook map unit 2165 ha

Location. These soils occur on Birchy Ridge in the northeast section of the map area.

Parent material. The soils have developed on loam to sandy loam till derived from gray siltstone, gray shale, sandstone, and a few granitic rocks.

Topography. The soils occupy the mid-slopes of moderately to strongly sloping terrain. Slopes range from 7 to 12%.

Drainage. The surface soil is well drained, but the soils are imperfectly drained internally because of seepage water moving through the B and C horizons.

Vegetation. The main tree cover is balsam fir, with scattered white birch and white spruce. The ground cover consists of feather and plume mosses, ferns, and bunchberry.

Soil classification. Gleyed Humo-Ferric Podzol.

General description of a profile

Horizon	Thickness, (cm)	Description
L-H	7-13	Black, semi-decomposed leaf litter, moss, and roots.
Aegj	3-10	Light gray to gray sandy loam, faint mottles.
Bfgj1	15-31	Strong brown to brown sandy loam; mottled.
Bfgj2	20-36	Brown to dark yellowish brown sandy loam; strongly mottled.
Cg		Dark grayish brown to dark brown loam to sandy loam; mottled.

Range in characteristics. Seepage water moving downslope results in mottling in the B and C horizons. As the shale content of the parent material increases, the horizons become finer textured. Generally, the bedrock is more than 50 cm from the surface. Some local areas have bedrock at the surface, especially on the upper mid-slopes. The Wigwam Brook soils are very to exceedingly stony.

Similar soils. The Wigwam Brook soils have profile characteristics similar to those of the Deer Lake soils, but they are finer textured and contain more shale and gray siltstone than the Deer Lake soils.

Associated soils. The Wigwam Brook, Birchy Ridge, and Hampden soils have developed on the same parent material and form a catena. The Birchy Ridge soils occupy the upper slopes, the Wigwam Brook soils the mid-slopes, and the Hampden soils the lower slopes.

Land use. Steep slopes, abundant stones, and localized wet areas discourage the cultivation of the Wigwam Brook soils. In some areas the soils are suitable for improved pasture. These soils are rated in capability Classes 5 and 7 for agriculture, and in Classes 5 and 4 for forestry. Their use for forestry is limited because of low fertility and lack of moisture.

LAND USE

Soil capability classification for agriculture

The soil capability classification for agriculture is an interpretive grouping of soils based on the characteristics of the soil mapping units. In this classification, the mineral soils are grouped into seven classes according to their suitability and limitations for agricultural use. The limitations become increasingly severe from Class 1 to Class 7.

Classes 1-3 are capable of sustained production of common cultivated crops; Class 4 is marginal for sustained arable culture. The soils in Classes 1-4 are also capable of use for perennial forage crops.

Class 5 is suitable only for permanent pasture or hay, Class 6 can be used only for natural grazing, and Class 7 is not suitable for agricultural use. The soils in all classes may be suitable for forestry, wild life, or recreation.

The classification consists of two main categories: (1) the capability class, which is a grouping of subclasses having the same relative *degree* of limitation, and (2) the subclass, which includes soils that have the same *kind* of limitation. Because all the soils in the map area have low natural fertility (f), this subclass was not designated on the soil map.

The soils of the area have one or more of the following kinds of limitations to agriculture use:

- c - adverse climate
- d - undesirable soil structure or permeability, or both
- i - inundation, or flooding
- m - moisture deficiency
- p - stoniness
- r - restriction of rooting zone by bedrock
- s - adverse effect of two or more limitations such as d, m, or f
- t - topography
- w - excessive water

The class and subclass are designated by a class numeral followed by one or more subclass letters, for example 4p,t denotes a soil with Class 4 (severe) limitations of stoniness and topography. This classification applies only to mineral soils.

There are no soils in the area that qualify as Class 1 or Class 2 soils. Although moisture is adequate, low natural fertility and adverse climate (insufficient heat and frost hazard) limit the range of crops and productivity required for soils in these two classes.

Class 3 soils have moderately severe limitations that restrict the range of crops or require special conservation practices. Under good management, these soils are fair to moderately high in productivity for a fairly wide range of crops adapted to the region. The main limitations that restrict cultivation, ease of tillage, planting and harvesting, and maintenance of conservation practices of the soils in this class are adverse climate, topography, and stoniness, or a combination of these factors.

The soils in Class 3 include some of the Reidville and Humber series along the Humber River near Deer Lake. They occur in a slightly warmer local area between an elevation of 6 and 45 m. A few small areas of Cormack soils are also included in this class. Above an elevation of 45 m the soils have a frost hazard, in addition to limitations of topography and stoniness, which downgrades them to Classes 4 or 5.

The soils in Class 4 have severe limitations that restrict the range of crops or require special conservation practices, or both. They are suitable for only a few crops; the yield for a range of crops is low and the risk of crop failure is high. The limitations may affect such farm practices as the timing and ease of tillage, planting and harvesting, and the application and maintenance of conservation practices.

The main limitations of the soils in Class 4 are adverse climate, stoniness, topography, and moisture deficiency, or a combination of these factors. The soils in this class include the Humber, Cormack, Nicholsville, and small areas of the Reidville and the moderately stony Howley and Big Falls series. The Nicholsville and Howley soils have a climate suitable for Class 3 soils, but they are limited by moisture deficiency because of their coarse texture. The Howley soils are limited also by their stoniness and topography.

Class 5 soils have severe limitations that restrict their use to producing perennial forage crops, but improvement practices are feasible. The soils in this class have such serious soil, climatic, or other limitations that they are not capable of use for sustained production of annual field crops. The main limitations of the soils in this class in the map area are excessive water, inundation, stoniness, topography, or restriction of rooting zone by bedrock, or a combination of two or more of these factors.

The soils in Class 5 include the major proportion of the Gillard, Little Falls, North Brook, and Wigwam Brook series, together with smaller areas of the Adies Pond, Alluvium, Big Falls, Birchy Ridge, Cormack, Deer Lake, Harrimans, Humber, and Reidville series. The North Brook soils are the most fertile of any of the soils in the area, but their use is limited by excessive wetness. The North Brook soils and the moderately stony Cormack soils on moderately rolling topography are the better soils in this class.

The soils in Class 6 are capable only of producing perennial forage crops, and improvement practices are not feasible because of serious soil, climatic, or other limitations. None of the soils of the area have the properties specified for Class 6. There are no areas supporting enough grass to sustain animal growth. Although some of the areas could be cleared and seeded, cultivation would be impractical.

Soils with limitations severe enough to make them unsuitable for arable agriculture or permanent pasture are placed in Class 7. The main limitations in this class are stoniness, excessive water, flooding, restriction of rooting zone by bedrock, undesirable soil structures, moisture deficiency, and topography, or a combination of these factors. The soil series, or map units, in this class are the Adies Pond, Alluvium, Birchy Ridge, Crooked Feeder, Deer Lake, Goose Arm, Hampden, Harrimans, Howley, Junction Brook, Lomond, Main Brook, North Lake, White River, and Rock Land. Small areas of the Gillard, Little Falls, North Brook, and Wigwam Brook soils have sufficient limitations to be in this class.

The Cormack and Humber soils are the most widely utilized for agriculture in the map area. They are cultivated and used for the production of vegetable crops and improved pasture. In the Cormack area, late spring and early fall killing frosts limit sustained vegetable production. In many cases, the potato crops remain in the field because of late maturity, wet harvesting conditions, and early snowfalls. Climatically, small areas of cultivable agricultural land along the Humber River near Deer Lake would be better suited to vegetable production than the Cormack area.

The map area has tremendous potential for the establishment of hay land, improved pasture, and grazing land. Most of the land requires tree clearing to permit cultivation. Many areas have already been logged and would require only minimum clearing. A large area north of Cormack has been burned and could easily be cleared.

There are approximately 12 545 ha of Class 4 land (Table 5) suitable for the production of vegetables or hay, or both. Some of the less severely limited land in Class 5 is suitable for cultivation and hay production if drainage is improved and with moderate stone removal. Also, some of the more severely limited land in Class 5 would make good grazing land, but requires extensive stone picking to permit repeated cultivation and the cutting of hay.

Table 5. Area, agricultural capability class, and factors limiting the use of the soils

Series or map unit	Area (ha)	Agricultural capability class Dominant	Subdominant	Limiting factors
Adies Pond	2 596	7	5	p,t,w
Alluvium	811	7	5	w,i
Big Falls	1 346	4	5	t,c,p
Birchy Ridge	1 747	7	5	r,t,p
Cormack	5 801	4	3, 5	c,p,t
Crooked Feeder	3 225	7		w,p
Dancing Point	3 438	0		
Deer Lake	5 402	7	5	p,w,t
Gillard	513	5	7	w
Goose Arm	690	7		p,w,t,r
Hampden	964	7		w,p
Harrimans	5 830	7	5	p,w,r
Howley	2 811	7		m,d,p
Humber	4 605	4	3, 5	c,p,t
Junction Brook	5 548	7		w,p
Little Falls	4 825	5	7	p,t,r
Lomond	7 243	7		p,r,t
Main Brook	4 812	7		s,p,w
McIsaacs	8 238	0		
Mistaken Point	2 121	0		
Nicholsville	960	4		m
North Brook	3 986	5	7	w,p
North Lake	142	7		p,r,t
Reidville	455	3	4, 5	c,t
Rock Land	16 472	7		r
Sandy Lake	18 408	0		
White River	1 993	7		r,p,w
Wigwam Brook	2 165	5	7	p,t,w
Water	7 155			
Total area	124 287			

The establishment of a community pasture on the Cormack, Humber, and North Brook soils has shown that these soils produce excellent hay crops with adequate fertilization and liming. Generally, these soils require limited stone removal to permit cultivation after the trees have been cleared and the large stones removed during clearing. The North Brook soils are high in fertility and have adequate moisture to produce excellent hay, but cultivation may be hindered in early spring by excess water.

Soil capability classification for forestry

The soil capability classification for forestry is comparable to the capability classification for agriculture, wildlife, or recreation in that all systems have seven classes. The classification for forestry includes all mineral and organic soils in seven classes based on their inherent ability to grow commercial timber. The best lands for this purpose are in Class 1 and the least productive are in Class 7.

The capability class denotes the degree to which tree growth is limited by various environmental factors. Associated with the class is a productivity range expressed on gross merchantable cubic metre volume to a minimum diameter of 10 cm. It is based on the mean annual increment of the best species, or group of species, adapted to the site, at or near rotation age. Thus, the class is an expression of all the environmental factors that influence tree growth on a particular site.

The subclass denotes the kinds of limitations to tree growth. The soils of the area have one or more of the following kinds of limitations to forestry use:

f - low natural fertility
m - moisture deficiency
r - restriction of rooting zone by bedrock
s - a combination of soil factors, none of which by themselves would affect the class
u - exposure to wind
w - excessive water

The tree species that can be expected to yield the volume associated with each class is also considered and is indicated in the class symbol on forest capability maps. Table 6 shows the capability class rating and the subclass limitations for forestry of the soils of the area.

There are no soils in the map area that qualify for the first two capability classes for forestry. Class 3 soils have moderate limitations to the growth of forest. Productivity is usually from 4.96 to 6.29 m^3/ha per yr. Local small areas of the Reidville soils are the only areas that qualify for this class. The main limiting factors are moisture deficiency and low fertility.

Table 6. Forestry capability class and factors limiting the use of the soil

Series or map unit	Forestry capability class	Limiting factors
Adies Pond	4, 5	f,m
Big Falls	4, 5	m,f
Birchy Ridge	5	m,f
Cormack	4, 5	m,f
Crooked Feeder	6	w,f
Dancing Point	7	f,w
Deer Lake	4, 5	f
Gillard	-	-
Goose Arm	5	s,m,f
Hampden	4	f,w
Harrimans	5, 6	m,f,w
Howley	6	m
Humber	4	m
Junction Brook	4, 6	w,f
Little Falls	5	m,f
Lomond	5, 6	m,f,r,u
Main Brook	6, 7	m,w
McIsaacs Brook	6, 7	f,w
Mistaken Point	7	w
Nicholsville	5	m,f
North Brook	7	w
North Lake	5	m,f,s
Reidville	3, 5	m,f
Sandy Lake	7	w,f
White River	5	r,f,u
Wigwam Brook	5, 4	f,m

The soils in Class 4 have moderately severe limitations to the growth of commercial forests. Low fertility, moisture deficiency, or excessive water, or a combination of these factors limits tree growth on these soils. The soils in this class include the Adies Pond, Big Falls, Cormack, Deer Lake, Hampden, Humber, and Junction Brook series, and some areas of the Wigwam Brook series. They occupy approximately 22.7% of the area suitable for forestry. Productivity is 3.57-4.90 m^3/ha per yr. The Hampden and Junction Brook soils are Orthic Gleysols and their capability for tree growth is limited mainly by wetness caused by seepage water along the slopes or by high water tables. The other soils in this class are limited mainly by lack of moisture at some period of the year.

The soils in Class 5 occupy about 22% of the area suitable for forestry. They have severe limitations to the growth of commercial forests. All the soils in this class have low inherent fertility and suffer some moisture deficiency during the year. The tree growth on these soils is approximately 2.17-3.50 m^3/ha per y. The soils in this class include the Birchy Ridge, Goose Arm, Harrimans, Little Falls, Lomond, Nicholsville, North Lake, White River, and Wigwam Brook series. Small areas of Adies Pond, Cormack, Deer Lake, and Reidville soils are also included in this class. The White River soils are limited by shallowness to bedrock and by exposure to wind.

Class 6 soils have severe limitations of fertility, moisture deficiency, wetness, shallowness, or exposure, or a combination of these factors, for the growth of commercial forests. Productivity is only 0.77-2.10 m^3/ha per yr. The soils in this class are the Crooked Feeder, Howley, Main Brook, McIsaacs Brook, and some small areas of the Harrimans, Junction Brook, and Lomond series. They occupy about 16% of the area suitable for the growth of commercial forests.

The areas designated as Class 7 are not suitable for the growth of commercial forests. The most common limitations in the map area are shallowness, excessive soil moisture, extremes in climate, or exposure, or a combination of these limitations. The soils in this class are the Gillard, Dancing Point, Mistaken Point, North Brook, and Sandy Lake series, and Rock Land. Small areas of the Main Brook and McIsaacs Brook series, and Alluvial soils also occur in this class. These soils and land types comprise nearly 39% of the area.

REFERENCES

Canada Soil Survey Committee, Subcommittee on Soil Classification. 1978. The Canadian system of soil classification. Agric. Can. Publ. 1646. Supply and Services Canada, Ottawa, Ont. 164 pp.

MacClintock, P., and Twenhofel, W. H. 1940. Wisconsin glaciation of Newfoundland. Bull. Geol. Soc. Am. 51:729-1756.

Rowe, J. S. 1972. Forest regions of Canada. Environ. Can., Can. For. Serv. Publ. 1300. 172 pp.

Thornthwaite, C. W. 1949. An approach toward a more rational classification of climate. Geogr. Rev. 38:55-94.

APPENDIX

Physical composition of the sand fraction of selected horizons

Soil	Horizon	% 2-1 mm	% 1-0.5 mm	% 0.5-0.25 mm	% 0.25-0.1 mm	% 0.1-0.05 mm
Big Falls	Ae	8.13	15.61	10.69	20.66	15.15
	Bf	6.06	10.90	9.00	21.13	14.89
	C	4.94	7.80	10.28	24.62	14.10
Harrimans	Aegj	19.62	20.68	9.54	11.98	8.72
	Bfgj1	9.39	10.40	8.33	12.27	9.23
	Bfgj2	12.56	16.99	8.35	12.23	8.55
	BCgj	12.83	12.41	8.07	12.00	9.26
Junction Brook	Aeg	9.28	15.93	10.64	16.48	12.57
	Bg	11.28	16.38	14.36	20.39	11.06
	BCg	8.73	12.95	11.82	17.96	10.88
	Cg	10.83	17.44	11.78	19.67	13.16
Reidville	Ae	4.66	8.24	3.80	6.18	8.04
	Bf1	12.10	15.04	7.15	7.11	5.84
	Bf2	12.35	18.41	7.46	8.94	9.65
	IIBC	9.47	21.37	30.25	22.12	2.28
	IIC	7.90	23.95	32.89	12.67	1.72

Chemical and physical properties of selected soils

Adies Pond

	Horizon	Depth, (cm)	Loss on ignition %	pH H_2O	pH $CaCl_2$	Organic carbon %	Particle-size distribution* Gravel %	Sand %	Silt %	Clay %
2	Ae	0-23	1.4	3.8	3.2	0.54	7	57	38	5
3	Bfgj	23-46	4.3	4.8	4.1	2.22	15	60	32	8
4	BCgj	46-61	0.9	5.0	4.5	0.68	24	73	21	6
5	Cx	61+	0.9	5.3	4.7	0.26	37	77	19	4

	Exchangeable K	Ca	Mg	Al	Acidity	Sum bases	Base saturation	Extractable by Dithionite Fe	Dithionite Al	Oxalate Fe	Oxalate Al	Pyrophosphate Fe	Pyrophosphate Al	Pyrophosphate Mn	Available nutrients N	P	K	Ca
	meq/100 g soil						%	%						mg/kg	mg/kg			
2	0.07	0.16	0.07	1.53	11.1	1.6	12.6	0.2	0.04	0.04	0.1	0.03	0.04	10	0.5	0.5	2.0	0
3	0.04	0.43	0.06	2.22	17.1	1.3	7.1	1.3	0.5	0.9	0.8	0.69	0.67	7	0.5	0.5	1.0	0
4	0.08	0.14	0.04	0.06	10.3	0.8	7.2	1.0	0.4	0.4	0.5	0.31	0.33	73	0.5	0	1.5	0
5	0.06	0.16	0.03	0.33	8.4	0.5	5.6	0.6	0.2	0.2	0.4	0.06	0.16	50	0.5	0	1.0	0

* Gravel (>2 mm in diameter) is expressed as percentage of whole soil. The remainder (sand, silt and clay) is expressed as percentage of fine earth (that fraction of whole soil <2 mm in diameter). Sand is 2-0.05 mm, silt is 0.05-0.002 mm, and clay is <0.002 mm in equivalent diameter.

Big Falls

	Horizon	Depth, (cm)	Loss on ignition %	pH H_2O	pH $CaCl_2$	Organic carbon %	Particle-size distribution Gravel %	Sand %	Silt %	Clay %
2	Ae	0-5	1.4	3.5	3.1	0.64	3	70.2	26.2	3.6
3	Bf	5-35	5.0	5.2	4.6	1.34	14	61.9	24.7	13.4
4	C	35+	1.7	5.3	4.2	0.21	33	61.7	28.5	9.8

	Exchangeable K	Ca	Mg	Al	Acidity	Sum bases	Base saturation	Extractable by Dithionite Fe	Dithionite Al	Oxalate Fe	Oxalate Al	Pyrophosphate Fe	Pyrophosphate Al	Pyrophosphate Mn	Available nutrients N	P	K	Ca
	meq/100 g soil						%	%						mg/kg	mg/kg			
2	0.14	0.16	0.21	0.80	12.6	0.5	3.8	0.1	0.04	0.02	0.05	0.01	0.02	6	0.5	0.5	4.5	0
3	0.09	0.10	0.05	0.82	8.7	0.8	8.4	1.5	1.20	0.6	1.90	0.21	0.70	74	0.5	0	2.0	0
4	0.19	0.54	0.62	4.74	8.4	1.6	16.0	1.8	0.2	0.1	0.3	0.05	0.16	30	0.5	0	4.0	5

Cormack

	Horizon	Depth, (cm)	Loss on ignition %	pH H$_2$O	pH CaCl$_2$	Organic carbon %	Particle-size distribution Gravel	Sand	Silt	Clay
							%			
2	Ae	0-8	1.1	4.2	3.5	0.66	8	55	40	5
3	Bf1	8-20	9.2	5.4	4.2	3.24	18	52	37	11
4	Bf2	20-36	3.5	5.4	4.6	1.33	13	48	44	8
5	BC	36-51	0.9	5.5	4.7	0.34	18	57	35	8
6	C	51+	0.9	5.4	4.4	0.17	19	56	34	10

	Exchangeable K	Ca	Mg	Al	Acidity	Sum bases	Base saturation	Extractable by Dithionite Fe	Dithionite Al	Oxalate Fe	Oxalate Al	Pyrophosphate Fe	Pyrophosphate Al	Pyrophosphate Mn	Available nutrients N	P	K	Ca
	meq/100 g soil						%	%						mg/kg	mg/kg			
2	0.08	0.53	0.22	1.05	6.6	1.9	22.4	0.04	0.04	0.04	0.05	0.02	0.02	23	0.9	0	2.5	5
3	0.14	0.66	0.21	1.68	19.3	1.6	7.7	1.30	1.10	2.0	2.40	0.67	0.90	170	2.5	1	2.5	0
4	0.11	0.25	0.14	0.62	9.1	1.1	10.8	0.40	0.7	0.5	0.8	0.18	0.47	46	0.5	0	4.0	5
5	0.11	0.35	0.14	0.36	7.6	0.5	6.2	0.2	0.3	0.3	0.5	0.07	0.20	25	0.5	0	3.0	0
6	0.16	0.60	0.65	0.84	7.0	1.9	21.3	0.1	0.2	0.3	0.3	0.03	0.11	24	0.5	0	1.5	5

Crooked Feeder

	Horizon	Depth, (cm)	Loss on ignition %	pH H_2O	pH $CaCl_2$	Organic carbon %	Particle-size distribution Gravel %	Sand %	Silt %	Clay %
3	Aeg	0-18	2.0	4.3	3.6	0.85	9	59	39	2
4	Bg	18-36	2.9	4.8	3.9	1.24	16	57	34	9
5	Cg	36+	1.4	4.9	4.2	0.19	13	40	37	23

	Exchangeable K	Ca	Mg	Al	Acidity	Sum bases	Base saturation	Extractable by Dithionite Fe	Dithionite Al	Oxalate Fe	Oxalate Al	Pyrophosphate Fe	Pyrophosphate Al	Pyrophosphate Mn	Available nutrients N	P	K	Ca
	meq/100 g soil						%	%						mg/kg	mg/kg			
3	0.06	0.14	0.10	3.31	8.9	1.3	12.7	0.02	0.1	0.03	0.1	0.02	0.09	-	0.5	0	2.0	0
4	0.08	0.44	0.16	3.28	12.6	0.8	6.0	0.3	0.3	0.4	0.4	0.13	0.27	-	0.5	0	2.5	0
5	0.28	4.29	1.91	0.68	4.7	7.4	61.2	0.1	0.1	0.5	0.2	0.04	0.05	112	0.5	0	3.5	0

Gillard

	Horizon	Depth, (cm)	Loss on ignition %	pH H_2O	pH $CaCl_2$	Organic carbon %	Particle-size distribution Gravel %	Sand %	Silt %	Clay %
3	Aeg	0-3	3.7	3.9	3.2	1.62	0	77	19	4
4	Bg	3-53	2.9	4.4	3.7	1.34	0	80	15	5
5	Cg	53+	1.1	4.4	3.7	0.52	0	28	58	14

	Exchangeable K (meq/100 g soil)	Ca	Mg	Al	Acidity	Sum bases	Base saturation %	Extractable by Dithionite Fe %	Dithionite Al %	Oxalate Fe %	Oxalate Al %	Pyrophosphate Fe %	Pyrophosphate Al %	Pyrophosphate Mn mg/kg	Available nutrients N (mg/kg)	P	K	Ca
3	0.04	0.19	0.07	1.41	14.2	1.6	10.1	0.01	0.1	0.02	0.1	0.01	0.04	-	0.5	0.5	1.0	0
4	0.04	0.44	0.11	2.59	6.4	1.3	16.9	0.03	0.2	0.03	0.3	0.01	0.11	-	0.5	0.5	1.5	5
5	0.10	3.01	1.23	1.14	13.6	4.8	26.1	0.2	0.04	0.2	0.1	0.07	0.04	24	0.5	0	2.0	10

Harrimans

	Horizon	Depth, (cm)	Loss on ignition %	pH H_2O	pH $CaCl_2$	Organic carbon %	Particle-size distribution Gravel %	Sand %	Silt %	Clay %
2	Aegj	0-10	1.4	4.2	3.6	0.56	17	70.5	26.1	3.4
3	Bfgj1	10-18	8.1	4.5	3.8	1.96	26	49.6	36.7	13.7
4	Bfgj2	18-36	7.0	5.2	4.7	2.86	19	58.7	31.4	9.9
5	BCgj	36+	3.2	5.3	4.7	0.81	30	54.6	38.9	6.5

	Exchangeable K	Ca	Mg	Al	Acid-ity	Sum bases	Base satura-tion	Extractable by Dithionite Fe	Dithionite Al	Oxalate Fe	Oxalate Al	Pyrophosphate Fe	Pyrophosphate Al	Pyrophosphate Mn	Available nutrients N	P	K	Ca
	meq/100 g soil						%	%						mg/kg	mg/kg			
2	0.06	0.41	0.08	1.63	7.4	1.6	17.8	0.5	0.1	0.1	0.1	0.10	0.05	10	0.5	0.5	1.5	0
3	0.06	0.10	0.03	0.41	22.2	0.5	2.2	1.8	0.6	0.8	0.7	0.15	0.56	10	8.5	0.5	2.0	0
4	0.09	0.19	0.15	5.25	13.6	0.5	3.5	2.3	1.3	1.1	3.7	0.66	0.50	8	0.5	0.5	1.5	0
5	0.08	0.17	0.03	0.47	10.5	0	0	1.3	0.6	0.3	1.4	0.08	0.32	25	0.5	0	2.0	0

Howley

	Horizon	Depth, (cm)	Loss on ignition %	pH H_2O	pH $CaCl_2$	Organic carbon %	Particle-size distribution Gravel	Sand	Silt	Clay
							%			
2	Ae	0-8	0.3	3.9	3.3	0.50	10	61	35	4
3	Bfjcj	8-20	6.1	5.0	4.2	0.66	26	56	35	9
4	Bfc	20-64	1.2	5.5	4.8	2.70	0	88	10	2
5	BC	64+	0.6	5.3	4.6	0.48	38	96	2	2

	Exchangeable K	Ca	Mg	Al	Acidity	Sum bases	Base saturation	Extractable by Dithionite Fe	Dithionite Al	Oxalate Fe	Oxalate Al	Pyrophosphate Fe	Pyrophosphate Al	Mn	Available nutrients N	P	K	Ca
	meq/100 g soil						%	%						mg/kg	mg/kg			
2	0.07	0.21	0.09	1.23	5.4	0.8	12.9	0.4	0.04	0.02	0.1	0.01	0.02	-	0.5	0	2.0	0
3	0.04	0.15	0.05	0.06	15.2	0.8	5.0	3.3	1.2	1.8	3.1	0.04	0.23	36	0.5	0.5	2.0	0
4	0.06	0.06	0.05	1.37	6.0	0	0	2.5	1.1	1.2	4.3	0.34	0.55	-	0.5	0	1.0	0
5	0.03	0.05	0.04	0.06	6.6	1.1	14.3	1.5	0.5	0.3	0.7	0.04	0.15	55	0.5	0	1.0	0

Humber

	Horizon	Depth, (cm)	Loss on ignition %	pH H$_2$O	pH CaCl$_2$	Organic carbon %	Particle-size distribution: Gravel %	Sand %	Silt %	Clay %
2	Ae	0-1	7.2	3.7	3.0	2.99	7	7	48	45
3	Bhf	1-15	17.5	4.6	3.9	6.20	44	6	36	58
4	Bf	15-41	8.8	5.2	4.3	2.22	59	21	38	41
5	BC	41-66	6.4	5.0	4.3	1.34	78	41	29	30
6	C	66+	5.0	5.3	4.6	1.05	73	51	33	16

	Exchangeable K	Ca	Mg	Al	Acidity	Sum bases	Base saturation	Extractable by Dithionite Fe	Dithionite Al	Oxalate Fe	Oxalate Al	Pyrophosphate Fe	Pyrophosphate Al	Pyrophosphate Mn	Available nutrients N	P	K	Ca
	meq/100 g soil						%	%						mg/kg	mg/kg			
2	0.35	2.04	1.52	7.98	26.2	3.5	11.8	0.5	0.2	0.3	0.3	0.25	0.12	34	0.5	0.5	3.0	5
3	0.30	3.97	3.12	10.80	43.9	7.7	14.9	4.3	0.9	6.8	1.4	2.70	1.02	125	0.5	0	4.0	15
4	0.28	2.29	3.89	4.85	21.6	7.7	26.3	2.0	0.8	1.5	1.6	0.82	0.79	67	1.0	0.5	4.0	10
5	0.50	5.23	11.32	6.67	21.0	17.0	44.7	1.8	0.5	1.2	0.8	0.42	0.35	155	0.5	0.5	3.0	10
6	0.44	8.49	13.33	0.75	11.5	23.4	67.0	0.7	0.2	0.7	0.6	0.13	0.10	86	0.5	0	4.5	10

Junction Brook

	Horizon	Depth, (cm)	Loss on ignition %	pH H_2O	pH $CaCl_2$	Organic carbon %	Particle-size distribution Gravel %	Sand %	Silt %	Clay %
2	Aeg	0-10	2.0	5.3	4.3	1.05	13	64.9	27.8	7.3
3	Bg	10-25	1.7	5.5	4.4	0.83	18	73.5	20.4	6.1
4	BCg	25-61	0.6	5.4	4.6	0.27	20	62.3	27.9	9.8
5	Cg	61+	0.3	5.9	4.9	0.16	23	72.9	21.6	5.5

	Exchangeable K	Ca	Mg	Al	Acidity	Sum bases	Base saturation	Extractable by Dithionite Fe	Dithionite Al	Oxalate Fe	Oxalate Al	Pyrophosphate Fe	Pyrophosphate Al	Pyrophosphate Mn	Available nutrients N	P	K	Ca
	meq/100 g soil						%	%						mg/kg	mg/kg			
2	0.05	0.96	0.30	0.99	14.0	2.1	13.0	0.5	0.2	0.2	0.3	0.08	0.09	27	0.5	0	1.0	18
3	0.05	1.10	0.37	0.77	13.5	2.4	15.2	1.3	0.4	0.4	0.6	0.15	0.16	27	0.5	0	2.0	20
4	0.12	2.69	1.42	0.08	6.4	5.1	44.3	1.0	0.1	0.3	0.2	0.03	0.03	30	0.5	0	2.5	20
5	0.08	1.92	0.77	-	6.4	3.5	35.4	0.5	0.04	0.2	0.1	0.03	0.02	10	0.5	0	2.5	18

Nicholsville

	Horizon	Depth, (cm)	Loss on ignition %	pH H2O	pH CaCl2	Organic carbon %	Particle-size distribution Gravel	Sand	Silt	Clay
							%			
2	Ae	0-31	0	4.2	3.6	0.19	0	88	10	2
3	Bfcj	31-61	1.1	4.9	4.2	0.57	0	94	4	2
4	Bfc	61-102	1.1	5.4	4.6	0.58	0	94	4	2
5	C	102+	0	5.3	4.6	0.16	6	96	3	1

	Exchangeable K	Ca	Mg	Al	Acid-ity	Sum bases	Base satura-tion	Extractable by Dithionite Fe	Dithionite Al	Oxalate Fe	Oxalate Al	Pyrophosphate Fe	Pyrophosphate Al	Pyrophosphate Mn	Available nutrients N	P	K	Ca
	meq/100 g soil						%	%						mg/kg	mg/kg			
2	0.05	0.14	0.08	0.45	22.2	1.1	4.7	0.3	0.04	0.02	0.1	0.02	0.02	10	0.5	0	1.0	0
3	0.05	0.12	0.06	0.95	22.5	1.1	4.7	0.7	0.3	0.4	0.6	0.14	0.18	18	0.5	0	1.0	0
4	0.05	0.27	0.06	0.26	9.9	3.2	24.4	1.3	0.6	0.6	1.7	0.12	0.20	46	0.5	0	1.0	0
5	0.18	0.65	0.41	0.26	9.7	5.1	34.5	0.5	0.1	0.2	0.3	0.05	0.06	34	0.5	0	1.0	5

North Brook

	Horizon	Depth, (cm)	Loss on ignition %	pH		Organic carbon %	Particle-size distribution			
				H_2O	$CaCl_2$		Gravel	Sand	Silt	Clay
							%			
3	Cg1	0-20	4.1	6.2	6.0	0.47	24	49	36	15
4	Cg2	20-51	3.8	7.5	6.0	-	20	55	33	12

	Exchangeable							Extractable by							Available nutrients			
	K	Ca	Mg	Al	Acid-ity	Sum bases	Base satura-tion	Dithionite		Oxalate		Pyrophosphate			N	P	K	Ca
								Fe	Al	Fe	Al	Fe	Al	Mn				
	meq/100 g soil						%	%						mg/kg	mg/kg			
3	0.19	22.90	5.83	0.03	6.2	23.7	79.3	1.3	0.1	0.6	0.5	0.05	0.04	60	0.5	0	2.0	70
4	-	-	-	-	3.3	23.4	87.6	0.7	0.1	0.4	0.5	-	-	-	0.5	0	3.0	90

North Lake

	Horizon	Depth, (cm)	Loss on ignition %	pH H$_2$O	pH CaCl$_2$	Organic carbon %	Particle-size distribution Gravel	Sand	Silt	Clay
								%		
3	Ae	0-5	1.1	3.9	3.2	0.42	16	40	47	13
4	Bf	5-15	7.2	4.3	3.8	2.08	21	53	33	14
5	BCg1	15-36	2.0	5.7	4.9	1.13	26	57	33	10
6	BCg2	36+	3.7	4.8	4.2	0.25	33	56	34	10

	Exchangeable K	Ca	Mg	Al	Acid-ity	Sum bases	Base satura-tion	Extractable by Dithionite Fe	Dithionite Al	Oxalate Fe	Oxalate Al	Pyrophosphate Fe	Pyrophosphate Al	Pyrophosphate Mn	Available nutrients N	P	K	Ca
				meq/100 g soil			%				%			mg/kg		mg/kg		
3	0.07	0.32	0.10	2.94	8.9	0.8	8.2	0.4	0.04	0.05	0.1	0.04	0.04	-	0.5	0.5	1.5	0
4	0.11	0.29	0.28	5.03	18.7	1.1	5.6	1.8	0.3	0.9	0.5	1.02	0.40	10	0.5	1.0	2.0	0
5	0.07	0.25	0.15	2.51	11.5	1.1	8.7	0.8	0.4	0.4	0.6	0.23	0.31	38	0.5	0.5	1.0	0
6	0.10	2.74	1.43	0.10	6.2	4.5	42.1	0.7	0.1	0.4	0.3	0.11	0.09	63	0.5	0.5	1.5	20

Reidville

	Horizon	Depth, (cm)	Loss on ignition %	pH H$_2$O	pH CaCl$_2$	Organic carbon %	Particle-size distribution Gravel	Sand	Silt	Clay
							%			
2	Ae	0-5	0.9	4.5	3.8	0.46	4	30.9	63.2	5.9
3	Bf1	5-20	4.3	5.2	4.2	1.14	12	47.3	34.2	18.5
4	Bf2	20-43	4.0	5.1	4.2	0.97	13	56.8	29.5	13.7
5	IIBC	43-66	2.9	5.0	4.2	0.66	5	85.5	6.9	7.6
6	IIC	66-83	1.7	5.0	4.2	0.44	8	79.1	8.7	12.2

	Exchangeable K	Ca	Mg	Al	Acid-ity	Sum bases	Base satura-tion	Extractable by Dithionite Fe	Dithionite Al	Oxalate Fe	Oxalate Al	Pyrophosphate Fe	Pyrophosphate Al	Pyrophosphate Mn	Available nutrients N	P	K	Ca
	meq/100 g soil						%	%						mg/kg	mg/kg			
2	0.08	0.86	0.53	3.07	8.7	2.9	25.0	0.3	0.04	0.04	0.1	0.03	0.05	10	0.5	0	1.0	10
3	0.11	1.68	0.74	3.98	14.0	2.9	17.2	1.8	0.5	0.9	0.7	0.48	0.37	65	0.5	0.5	2.0	15
4	0.13	0.77	0.46	3.66	12.6	2.1	14.3	1.3	0.5	0.6	0.6	0.32	0.36	69	0.5	0.5	2.5	5
5	0.11	0.47	0.27	2.63	10.1	1.3	11.4	1.3	0.5	0.5	0.7	0.22	0.37	168	0.5	0	1.5	0
6	0.17	1.05	0.94	4.11	13.0	2.4	15.6	0.7	0.3	0.4	0.6	0.13	0.23	56	0.5	0	2.0	5

COMMON AND BOTANICAL NAMES OF PLANTS

American larch	*Larix laricina* (Du Roi) K. Koch
American mountain ash	*Sorbus americana* Marsh.
balsam fir	*Abies balsamea* (L.) Mill.
black spruce	*Picea mariana* (Mill.) BSP
bunchberry	*Cornus canadensis* L.
burnet	*Sanguisorba canadensis* L.
club moss	*Lycopodium* spp.
cotton-grass	*Eriophorum* L.
cow parsnip	*Heracleum lanatum* Michx.
dwarf raspberry	*Rubus pubescens* Raf.
feather moss	*Hylocomium splendens* (Hedw.) BSG.
haircap moss	*Polytrichum* spp.
Labrador-tea	*Ledum groenlandicum* Oedr.
leatherleaf	*Chamaedaphne calyculata* (L.) Moench
lowbush blueberry	*Vaccinium angustifolium* Ait.
mountain maple	*Acer spicatum* Lam.
pitcher plant	*Sarracenia purpurea* L.
plume moss	*Hypnum crista-castrensis* Hedw.
reindeer lichen	*Cladonia rangifera* (L.) Web.
Schreber's moss	*Pleurozium schreberi* (BSG.) Mitt.
sedge	*Carex* spp.
sheep laurel	*Kalmia angustifolia* L.
speckled alder	*Alnus rugosa* (Du Roi) K. Spreng.
wintergreen	*Gaultheria procumbens* L.
white birch	*Betula papyrifera* Michx.
white spruce	*Picea glauca* (Moench) Voss
yellow clintonia	*Clintonia borealis* (Ait.) Raf.