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Soils of the Horsefly Area, British Columbia

Report No. 32 British Columbia Soil Survey 1984

Canada

Cover photo: Cariboo Lake at Keithley Creek

Soils of the Horsefly Area, British Columbia

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Report No. 32 of the
British Columbia Soil Survey

Land Resource Research Institute
Contribution No. 84-11

(Map sheets 93 A/SW and 93 A/NW)

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Cat. No.: A57-432E
ISBN: 0-662-13206-8

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ACKNOWLEDGMENTS

Assistance and support were provided by the following agencies and individuals: L. Farstad (retired), former Head, Soil Survey Unit, Agriculture Canada, Vancouver, B.C., for direction of the soil survey; Paul Christie, who assisted in the field mapping; L. Chan, for conducting much of the laboratory analysis; J. Melzer, for typing the manuscript; G.E. Cheesman, for climate information; R. Annas and R. Coupe, for helpful advice on vegetation; Cartography Section, Land Resource Research Institute, Agriculture Canada, Ottawa, Ont., for providing base maps, for drafting figures, and for preparing the final soil maps; Technical Services Unit, Terrestrial Studies, B.C. Ministry of Environment, Victoria, B.C., for drafting and preparing the soil-landform manuscript maps and legends; and Susan Norman, Talisman Projects Inc., who supplied some of the plate illustrations.

Pedologists Al Dawson, Neville Gough, and Ivan Cotic of the B.C. Ministry of Agriculture and Food, Bill Watt of the B.C. Ministry of Forests, and Keith Valentine of the Soil Survey Unit, Agriculture Canada, provided advice and much help in the form of soils data from published reports and reports in preparation, and through personal communication. Charles Tarnocai, Land Resource Research Institute, reviewed the manuscript and the map legend. Roxy Beale Kuurne organized the resource data and compiled the report while working under contract to the Land Resource Research Institute.

PREFACE

This report and the soil maps it contains (map sheets 93 A/SW and 93 A/NW in the National Topographic System) cover about 755 500 ha of land lying east of the Fraser River and east and north of the city of Williams Lake.

The report describes the characteristics of the soils and map units and specifies their location and extent. It gives short accounts of the history and natural features of the map area. The soil maps show the distribution of the soils. The soil survey was undertaken to provide an inventory of land resources through the Canada Land Inventory (CLI) program. Land capability maps were published during the 1970s. Manuscript soil-and-terrain maps at a scale of 1:50 000 covering this map area and surrounds are available from the B.C. Ministry of Environment.

This publication is one of a series (Lord and Mackintosh 1982; Lord and Green, in preparation; Valentine and Schori 1980; Valentine et al., in preparation; Gough, in preparation), covering the Cariboo-Chilcotin region. These publications provide soils information on the region by presenting maps at scales of 1:100 000 and 1:125 000, legends, and textual descriptions in which simplified map units, extended map legends, and simple map unit symbols are used.

GENERAL DESCRIPTION OF THE AREA

Location and extent

The surveyed area (Fig. 1) is principally in the Interior Plateau of central British Columbia. The area extends from 52°00' to 53°00' north latitude and from 121°00' to 122°00' west longitude. It comprises an area of approximately 755 500 ha. The communities of Horsefly and Likely lie 50 to 60 km northeast of Williams Lake, which lies southwest of the map area.

History and resources

Although Alexander Mackenzie was the first white man to explore the Cariboo country in 1792 and Simon Fraser introduced the fur trade in 1808, few settlers arrived until the Cariboo gold rush of 1859. Gold (Plate Ia) was discovered first at Cariboo Lake, then at Keithley Creek and thence on up the Old Gold Field Trail (Plate Id) to Barkerville (Lindsay 1958). Trade and settlement increased with the completion in 1864 of the Cariboo Road from Yale to Quesnel and received a further impetus by the construction of the British Columbia Railway (formerly the Pacific Great Eastern Railway) to Quesnel in 1919.

The growing of grain and vegetables was attempted on the bottomlands along Horsefly River and Horsefly Bay, but midsummer frosts and a short growing season limited the success of vegetable growing. By the 1900s the growing of forages and hay for beef cattle was the main type of agriculture (Plate Ib). Today, agriculture, mainly ranching, is a secondary industry.

Logging operations form the leading industry in the area at present (Plate IIa). The industry includes lumber and planer mills and chip and pulp mills located out of the area in Williams Lake and Quesnel.

The tourist industry continues to expand with the rapid improvements in access to the plateau country. Recreational pursuits include fishing, hunting, hiking (Plate Ic), camping, and boating.

Physiography

The survey area lies in the Interior Plateau and contains sections of the Fraser Plateau, the Quesnel Highland, and Fraser Basin (Fig. 2)(Holland 1976). The main drainage channels in the map area are the Cariboo and Horsefly rivers, which are tributary to the Quesnel River and subsequently to the Fraser River. Three large lakes, Cariboo, Horsefly, and Quesnel (Plate IIb), occur within the survey area. These drainage basins have relatively low valleys, only becoming deeply incised after they join the Quesnel River valley. The general drainage pattern of this area is westward and northward to the Fraser River.

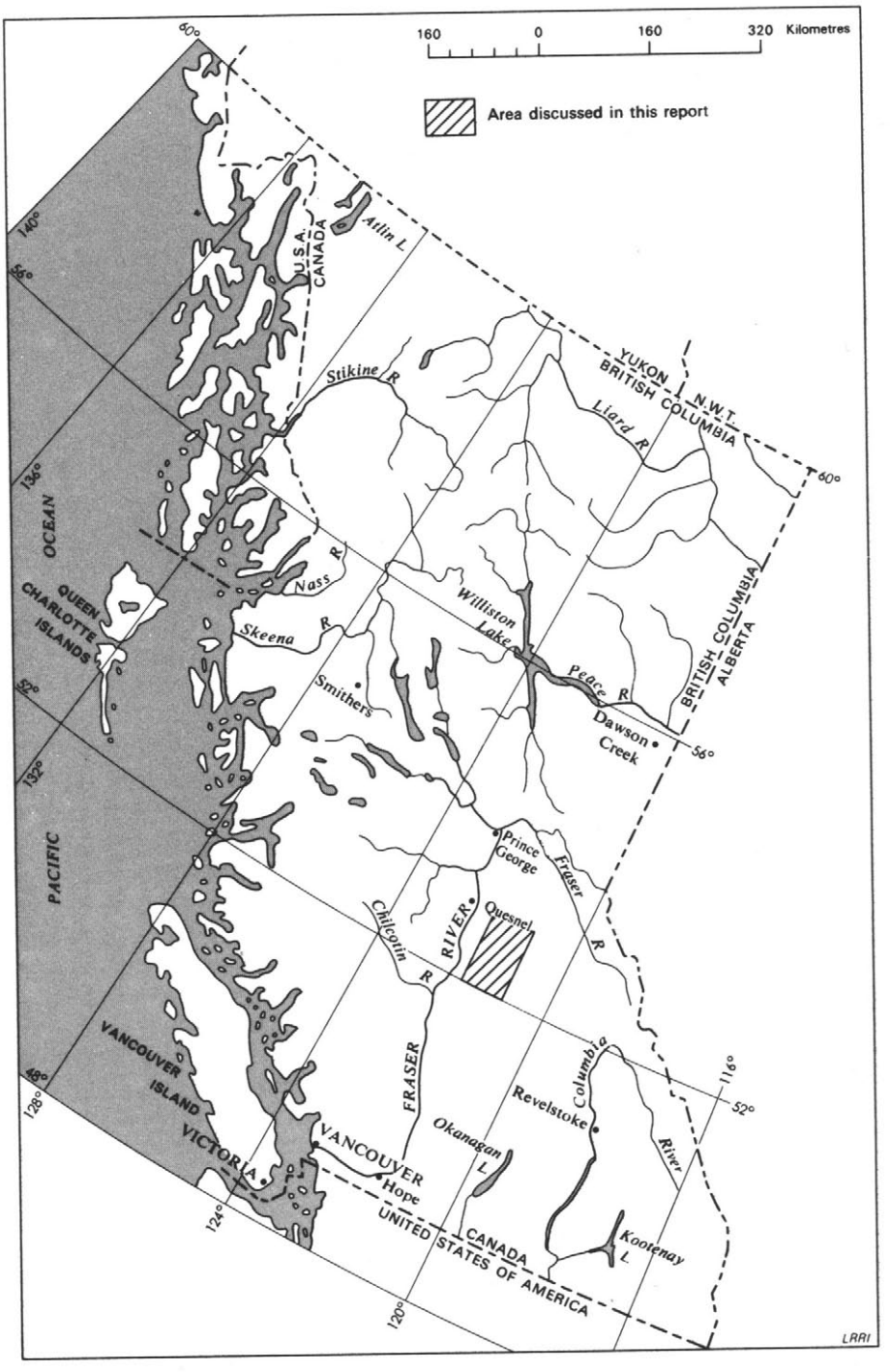

Figure 1. Location of the Horsefly map area in British Columbia.

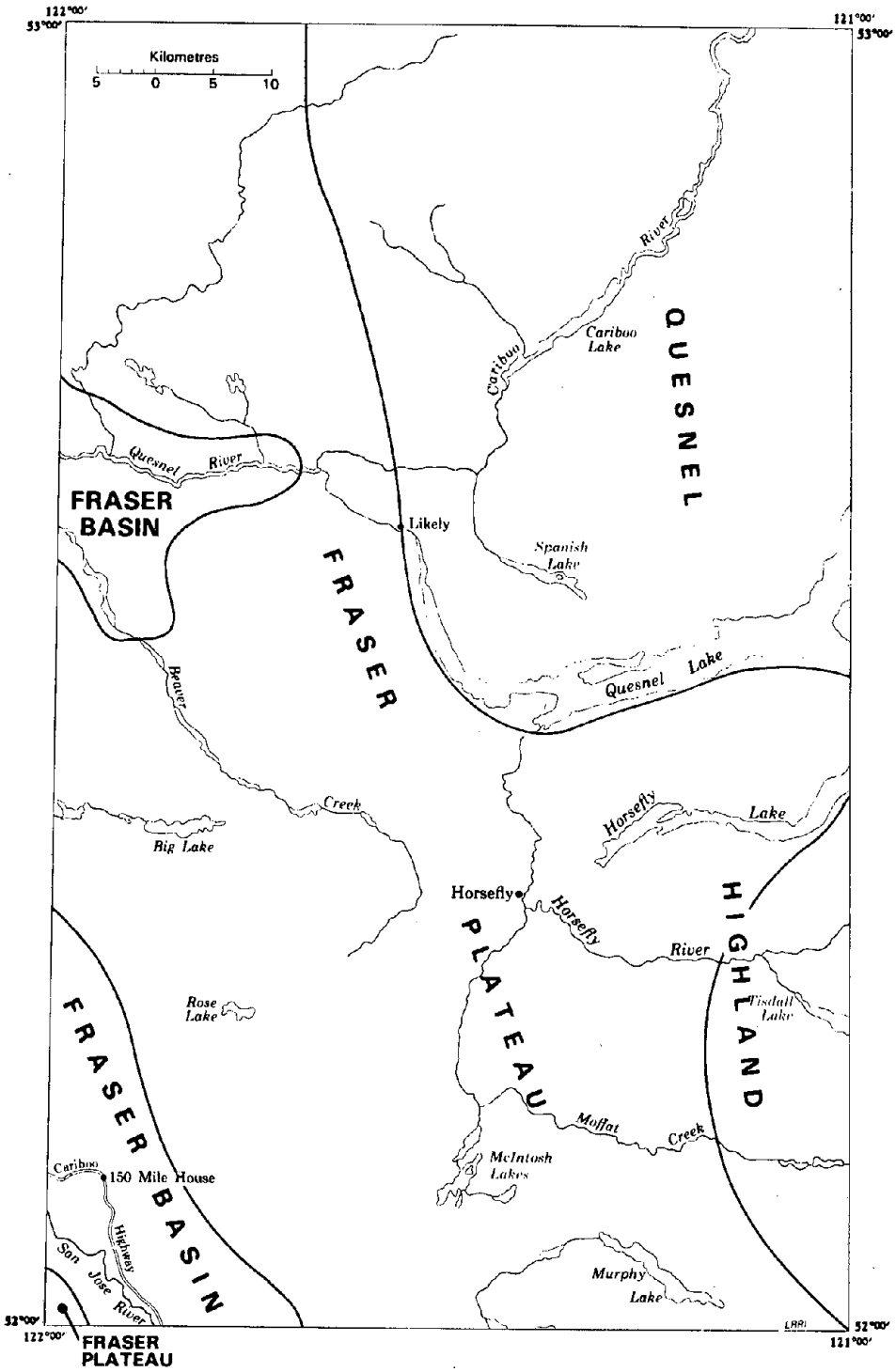

Figure 2. Physiography and drainage in the Horsefly area.

Plate I

(a) "The Bullion Pit" near Likely, where glaciofluvial gravels were hydraulically mined down to bedrock in search of placer gold.
(b) Aspen clumps and stubble field on Ridge Road soil north of Big Lake.
(c) Alpine landscape at 2100 m on Two Sisters Mountain, just north of the map area.
(d) Quesnel Forks on the Gold Field Trail, a remnant of the Cariboo gold rush of 1859.
(e) A hay meadow on Spokin soil, a Typic Humisol on the lava plateau east of 150 Mile House.

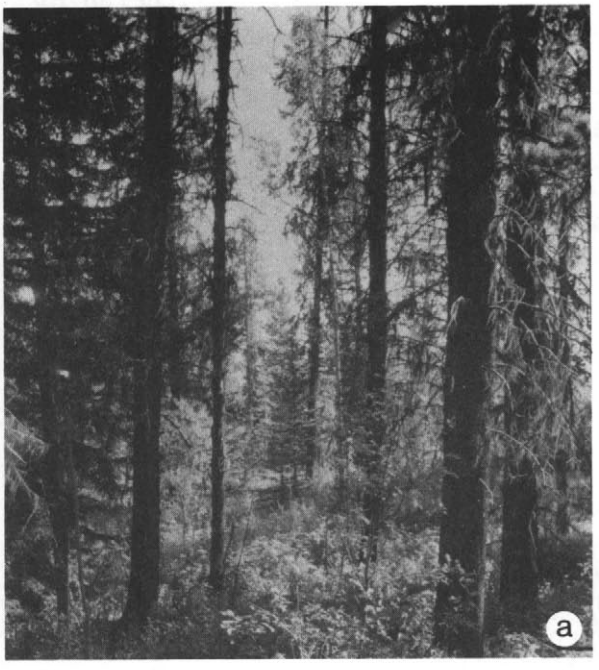

Plate II

(a) Typical forest of Douglas fir and lodgepole pine near Big Lake.
(b) North Arm, Quesnel Lake.
(c) Gravelly glaciofluvial materials (Alix soils) and organic materials (Chief soils) bordering Big Lake.
(d) Subalpine parkland at 1900 m on the Yanks Peak trail. Sombric Humo-Ferric Podzols (Yanks Peak soils) are common.

The Fraser Plateau is a rolling, drumlinized till plain dissected by deep valleys and containing many upland surfaces lying between 1200 and 1500 m. Within the study area the plateau has moderately low relief. Much of the plateau is underlain by flat or gently dipping lava flows of Miocene or Pliocene age. In the main, the plateau lies at 1200 m above sea level; its elevation decreases gradually to the west.

Minor extensions of the Fraser Basin occupy parts of the Quesnel and San Jose river valleys to elevations near the 900-m contour. Bedrock is mainly volcanic, with some inclusions of sedimentary rocks.

The Quesnel Highland lies east of the Fraser Plateau. These uplands are largely remnants of a highly dissected plateau of moderate relief occurring between 1500-m and 2300-m elevation.

Bedrock geology

The bedrock geology of the survey area has been mapped and described by the Geological Survey of Canada (1959, 1960). A generalized map showing the location and extent of the various rock types is presented in Fig. 3. Outcrops of volcanic rock occur primarily in the south half of the area. Sedimentary rocks outcrop in the northeast, whereas intrusive rocks occupy small areas in the east. The Quesnel Highland is largely underlain by closely folded, schistose, sedimentary rocks containing infolds of volcanic and sedimentary rocks. Limestone and quartzite formations form many of the highest peaks.

Surficial geology and soil parent materials

The glacial geomorphology and the Pleistocene history of central British Columbia have been discussed extensively by Tipper (1971). The relationship of surficial deposits to parent materials of the soils is discussed in this section. The deposits have been described and classified according to the Canada Soil Survey Committee (1978).

Most of the area is covered by a morainal blanket of unconsolidated geologic materials in the form of till (morainal), fluvial, lacustrine, and colluvial deposits. This mantle appears to be thickest in a wide zone running diagonally through the area from northwest to southeast. The widespread dispersal and mixing of the rock types by glacial action have tended to minimize their individual influence on soil development. But some effects can be noted, especially when considering the directions and origins of ice flow (Fig. 4). This aspect is discussed more fully in the sections following.

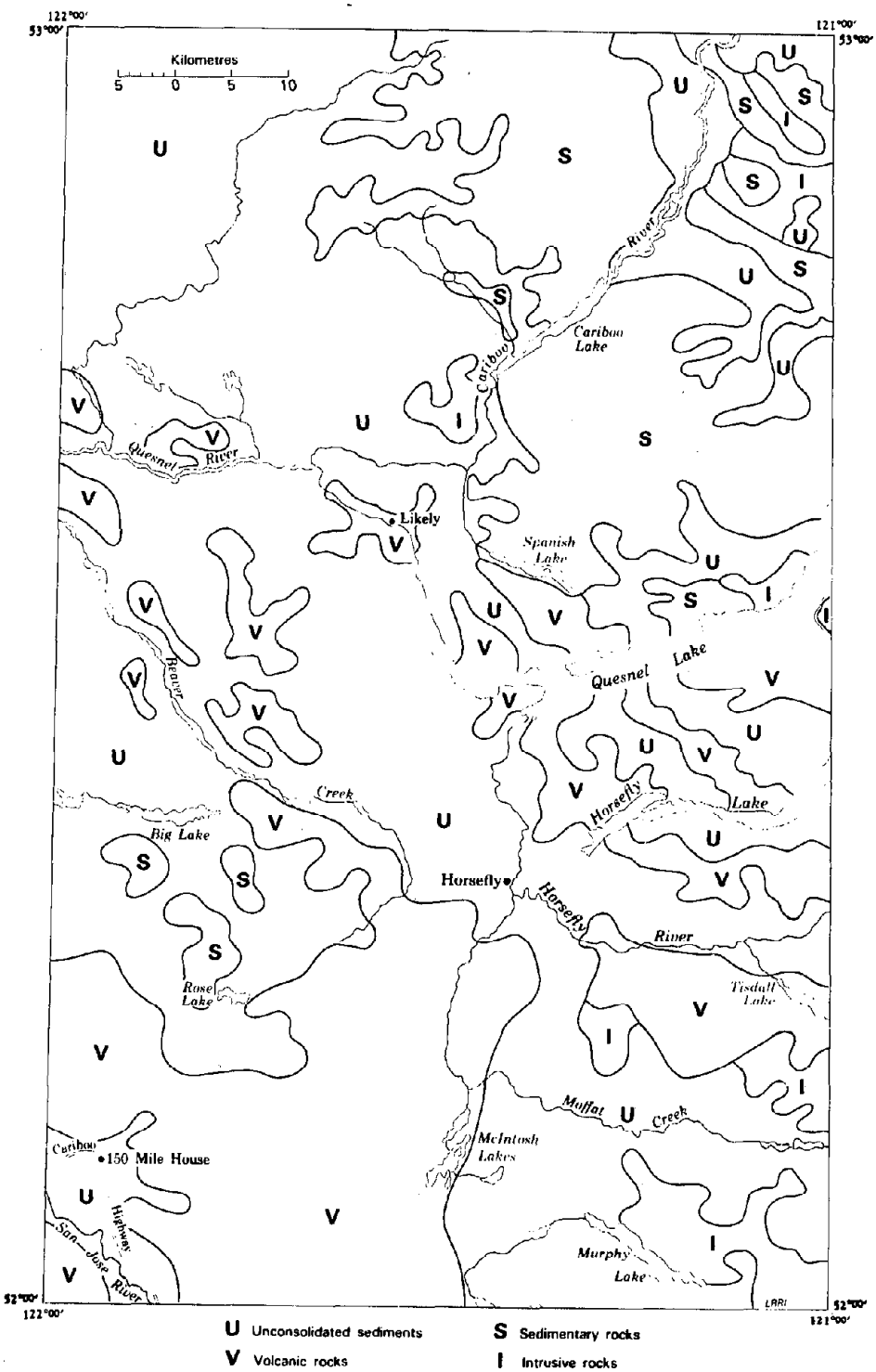

Figure 3. Generalized bedrock geology.

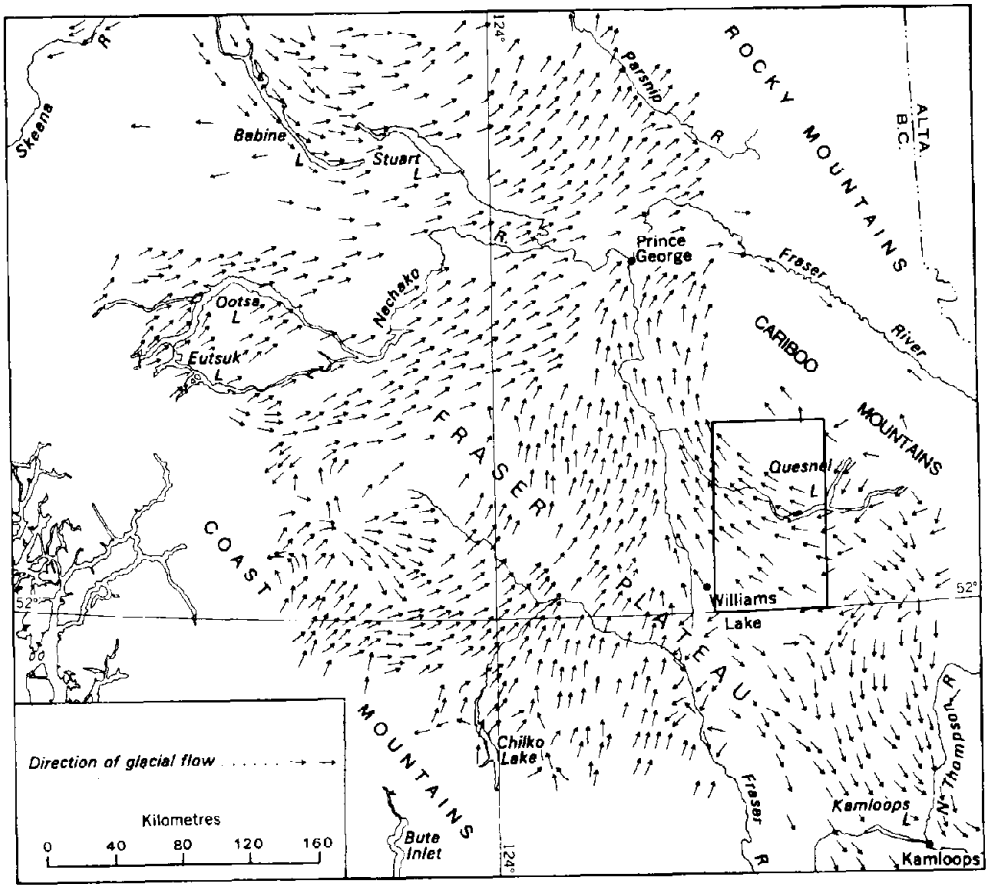

Figure 4. Direction of ice movement in central British Columbia.

Colluvial deposits

Colluvial deposits occur predominantly in the Quesnel Highland region of the survey area. The parent materials of the soils derived from these deposits are influenced by the nature of the underlying bedrock. The Lynn and Heger soils, which have developed from volcanic and metavolcanic materials, tend to be sandy and loamy textured. Intrusive bedrock forms the principal parent material of Bearpaw Ridge, Torpy River, and Dezaiko soils. These soils are sandy or loamy in texture and slightly calcareous. Weathered products of sedimentary and metasedimentary bedrock tend to be loamy textured and moderately to strongly calcareous.

Fluvial deposits

Fairly extensive areas of river terraces and floodplains have formed adjacent to the river and stream systems within the survey area. They vary in their extent and mode of formation and are characterized by level to gently sloping topography. Each successive terrace is separated by a steep escarpment. On the lower terraces the topography is often interrupted by postglacial stream meanders up to a depth of several metres. These fluvial materials are generally gravelly with occasional sandy and loamy deposits. Fluvial deposits are parent materials for soils of the Barkerville, Guilford, Fontoniko, Saxton, Sugarcane, and Tumuch soil associations.

Glaciofluvial materials are widespread throughout the plateau area and are commonly associated with morainal deposits. This complex interrelation with the till deposits precludes, in most instances, the mapping of units of pure glaciofluvial materials. These deposits characteristically occur as shallow veneers overlying till ridges or as fillings in intervening hollows between drumlins. In general, the deposits appear to be recessional, with areas of esker-kame complexes, pitted outwash plains, and minor kame terraces interspersed. Texturally, these deposits are gravels, gravelly sands, and gravelly loamy sands. Glaciofluvial deposits are parent materials for the Ramsey soil association on the lower plateau slopes, for Ptarmigan soils on outwash plains, and the Hawks Association on esker-kame complex deposits. Soils of the Alix Association occur mainly on gravelly river terraces.

Lacustrine deposits

Most of the lacustrine deposits of the Horsefly survey area are of glaciolacustrine origin. These are primarily sediments that were deposited in large glacial lakes and in smaller ponding basins throughout the mountains. Sediments extend along the Quesnel River to Quesnel Lake. The silty textured Bednesti soils are associated with the extensive glaciolacustrine deposits of former glacial lakes of the north central interior.

Horsefly soils occur in small local laking basins associated with the Horsefly River and the Beaver Creek valley. These deposits are commonly silt loam and occasionally clay loam and fine sandy loam in texture. The clayey Aleza soils are poorly drained.

Morainal deposits

Morainal (till) deposits, the most common surficial materials in the area, are derived mainly from the weathered lavas and volcanic rocks of the plateau. They form parent materials of Chimney, Dominion, Helena, Spout, Tyee, and Williams Lake soil associations. Part of the plateau landscape consists of drumlinized terrain in which Deserters soils predominate. Dragon soils occupy shallow materials on bedrock ridges associated with acidic granitic rock types.

On higher elevations of the Quesnel Highland a diverse complex of geologic materials forms the morainal parent materials of such soil associations as Alkali, Archie, Art, Captain Creek, Helmcken, Larghetto, and Yanks Peak. Thicker mantles of till on more subdued landforms are associated with Keno Lake, Lanezi, and Moffat Lakes soils. Spakwaniko soils occur on loamy morainal and colluvial materials.

Ridge Road and Jumeau associations are common to areas of limestone formations. The Spanish Lake Association is restricted to morainal materials derived from black phyllites and siltstone of the Midas formation. Parent materials of Cinema soils are gravelly, loamy, and weakly calcareous.

In general, soils developed on morainal materials derived from predominantly volcanic rocks tend to have loamy to clayey textures and are slightly calcareous. Those soils developed on morainal materials derived primarily from intrusive rocks with some minor fine textured metasedimentary and metavolcanic rocks tend to be loamy to sandy textured with slightly calcareous parent materials. Soils developed on morainal materials derived from fine textured sedimentary rocks tend to be loamy to clayey with calcareous parent materials.

Organic deposits

Many small areas of organic materials occur in the map area. Within the plateau, Chief soils occupy scattered, irregularly shaped units on each side of the Quesnel River. East of 150 Mile House an intricate network of well humified soils of the Spokin Association has developed over flat-lying lava formations. South of here the more mesic Rail soils predominate.

The Keithley Association is confined to cold, high-elevation valleys and plateaus of the Quesnel Highland. Soils of the Catfish Creek Association include mesic and fibric materials on fen and bog landforms developed in the cool moist valleys of the Highland.

Climate

The climate of the Cariboo forest region is described in some detail by Annas and Coupé. (1979), with additional data supplied by Cheesman (1980). The general trends of climate within the region are governed primarily by elevation, latitude, and position in relation to the mountains.

The climate of the Horsefly area is strongly influenced by proximity to the Quesnel Highland. Precipitation increases rapidly from Williams Lake northeast, tripling in amount at Barkerville some 110 km distant. Table 1 also shows a sharp increase in snowfall east of the Fraser River toward the highlands and at high elevations.

Only in the southwest, near 150 Mile House and the San Jose valley does the climate approach the semiarid conditions found near the Fraser River.

Vegetation

The vegetation of the ecological zones of the Cariboo forest region has been described on a broad scale by Annas and Coupé (1979). Five of the eight biogeoclimatic zones occur in the Horsefly survey area (Fig. 5). A biogeoclimatic zone is defined as a geographical area in a broadly homogeneous macroclimate under which vegetation, soils, and nutrient cycling form similar patterns. The zones may be subdivided into more homogeneous subzones. Botanical and common names of plant species are from Vascular Plants of British Columbia (Taylor and MacBryde 1977).

Alpine tundra zone

The alpine tundra zone (AT) covers a small but significant portion of the survey area. The tree species occurring in this zone are subalpine fir (alpine fir) (Abies lasiocarpa), whitebark pine (Pinus albicaulis), lodgepole pine (Pinus contorta var. latifolia), and Engelmann spruce (Picea engelmannii). The shrub layer is poorly developed, consisting mostly of dwarf willows (Salix spp.) and common juniper (Juniperus communis). The zone is perhaps best known for the richness and variety of herbaceous flora and plant communities.

Engelmann spruce - subalpine fir zone

The wet subzone of the Engelmann spruce - subalpine fir zone (ESSFh) occupies the northeast part of the survey area at elevations greater than 1200 m. Subalpine fir and Engelmann spruce are the characteristic and most dominant trees of the subzone. The very well developed shrub layer includes white-flowered rhododendron (Rhododendron albiflorum), blueberries (Vaccinium spp.), Sitka mountain alder (Alnus viridis subsp. sinuata), and devil's-club (Oplopanax horridus). The herb layer, also well developed, contains Sitka valerian (Valeriana sitchensis), oak fern (Gymnocarpium dryopteris var. disjunctum), Canadian bunchberry (Cornus canadensis), and simple-stemmed twistedstalk (Streptopus roseus).

Table 1. Selected climatic data

Station	Location	Elev. (m)	Mean temperature(°C) Annual	January	July	Mean precipitation(mm) Annual	May-Sept.	Growing degree-days[1]	Freeze-free period[2] (days)	Average annual snowfall (cm)	Climatic moisture balance[3] (mm)
Barkerville*	5304 N 12131 W	1274	1.4	-9.8	12.3	1149	474	738	49	582	+165
Big Slide	5223 N 12043 W	1058			13.8	974[e]	414	1030[e]	36		+17
Black Creek	5217 N 12107 W	867	4.4	-9.6	15.8	566[e]	252	1356	60		-261
Boss Mtn.*	5207 N 12055 W	1532	1.3	-8.0	12.3	1321	414	696	94		+231
Gavin L.	5229 N 12141 W	1033			14.2	686e	327	1077[e]	55		-52
Horsefly L.*	5223 N 12117 W	788	4.2	-8.7	15.2	724	390	1248	105	193	-128
Likely	5236 N 12132 W	724	4.0	-10.3	15.4	709	260	1257	63		-216
McLeese L.-Granite*	5231 N 12216 W	1123	3.2	-10.0	14.3	518	291	1110	77		-84
150 Mile House*	5207 N 12156 W	738	4.1	-11.2	15.8	426	222	1258	76	143	-277
Spanish 42	5232 N 12123 W	1311			14.3	899[e]	390	1093[e]	100		+146
Trio Lake	5231 N 12142 W	1128			15.0	688[e]	314	1152	90		-22
Williams Lake A.*	5208 N 12208 W	941	4.0	-10.2	15.7	402	207	1322	92	153	-157

[1]Growing degree-days: degree days accumulated above 5°C.
[2]Freeze-free period: days above 0°C.
[3]Climatic moisture balance: moisture deficit (-) or surplus (+).
*most reliable.
[e]estimate.
Reference: Personal communication - G.E. Cheesman, Waste Management Branch, Ministry of Environment.

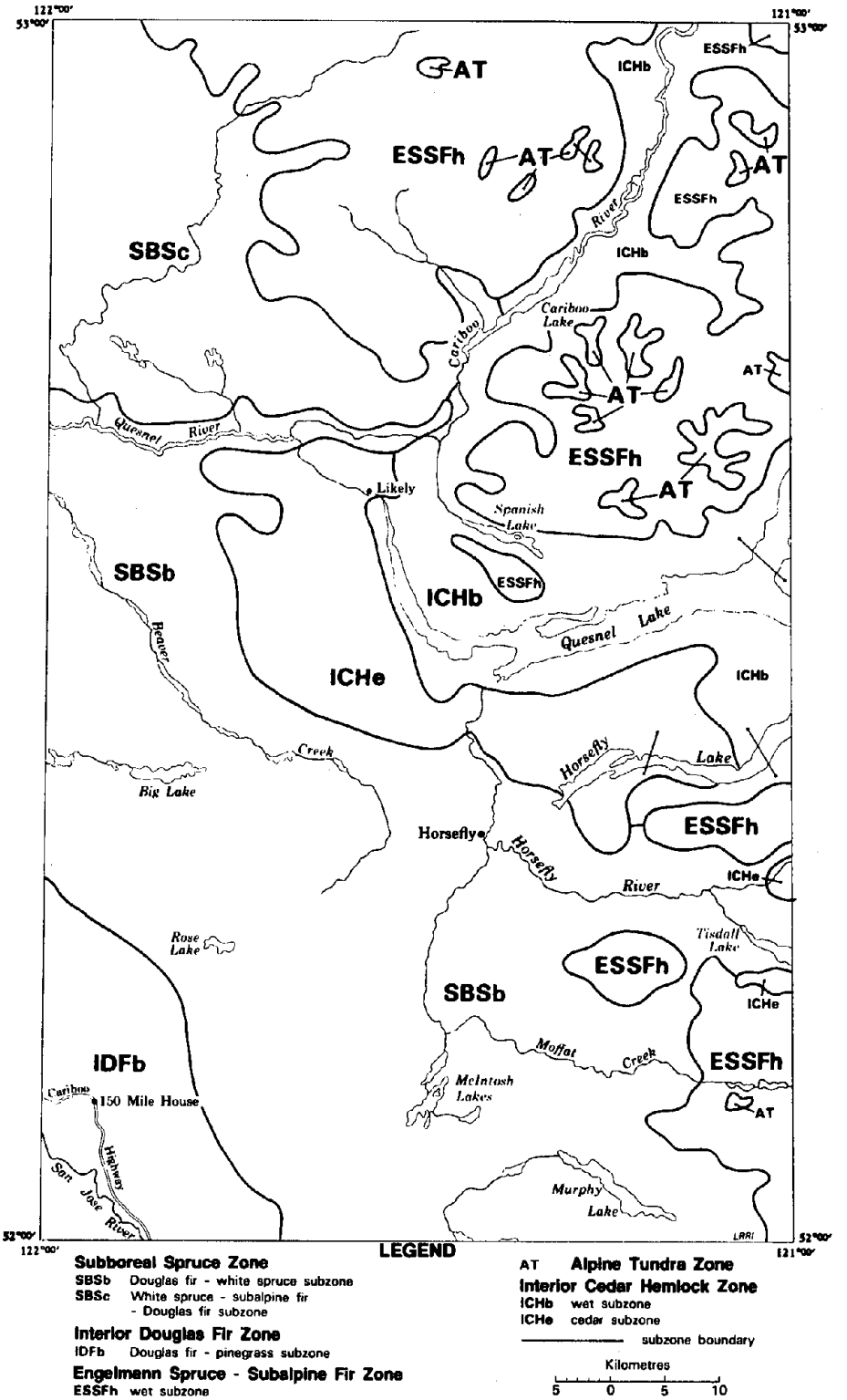

Figure 5. Biogeoclimatic Zones

Interior cedar-hemlock zone

The interior cedar-hemlock zone is divided into two subzones, both of which occur in the survey area. The cedar subzone (ICHe) is placed in this zone even though western hemlock (Tsuga heterophylla) is absent. Annual precipitation (>700 mm) is greater in this zone than in the subboreal spruce zone to the west and falls within the limits set by Krajina (1969) for the interior western hemlock biogeoclimatic zone. Additionally, many species characteristic of the zone are present. Western red cedar (Thuja plicata), white spruce (Picea glauca), and Rocky Mountain Douglas fir (Pseudotsuga menziesii) are the main tree species. Under an open canopy the shrub and herb layers are often well developed. Generally an abundant moss layer is present under a closed canopy.

The wet subzone (ICHb) of the interior cedar-hemlock zone lies primarily within the Quesnel Highland at elevations <1200 m. The most common trees are western red cedar, western hemlock, white spruce, Douglas fir, lodgepole pine, and black cottonwood (Populus balsamifera subsp. trichocarpa). Where the canopy is sufficiently open, the shrub and herb layers are well developed. Where the canopy is more closed, a nearly continuous carpet of mosses occurs.

Subboreal spruce zone

The subboreal spruce zone is the largest biogeoclimatic zone in the Cariboo forest region and two of its subzones occur in the Horsefly area. In the Douglas fir - white spruce subzone (SBSb), Douglas fir, white spruce, lodgepole pine, trembling aspen (Populus tremuloides), and common paper birch (Betula papyrifera) are the most common trees. The well-developed shrub layer includes western thimbleberry (Rubus parviflorus), Oregon boxwood (Paxistima myrsinites), Rocky Mountain maple (Acer glabrum var. douglasii), and blueberries. Pine grass (Calamagrostis rubescens) is sparse, but herbs such as wild sarsaparilla (Aralia nudicaulis), Canadian bunchberry, and asters (Aster spp.) are common. The moss layer generally becomes well developed on most sites as the forest stands approach climax. The white spruce - subalpine fir - Douglas fir subzone (SBSc) occurs in the northwestern portion of the map area and is strongly influenced by the cold continental climate from the north. White spruce and subalpine fir are the characteristic tree species, but Douglas fir, lodgepole pine, trembling aspen, common paper birch, and black cottonwood are common. The understory vegetation is largely dominated by a nearly continuous carpet of mosses with few shrubs or herbs present.

Interior Douglas fir zone

The Douglas fir - pine grass subzone (IDFb) (northern phase) of the interior Douglas fir zone occupies the southwestern portion of the Horsefly area. Although several tree species occur, Douglas fir is diagnostic for this mild, relatively dry subzone. Common shrubs found here are prickly rose (Rosa acicularis), soopolallie (Shepherdia canadensis), willows, and common juniper. Pine grass, a characteristic grass, is found with other herbs such as blue-leaved wild strawberry (Fragaria virginiana), northern twinflower (Linnaea borealis), and star-flowered false Solomon's-seal (Smilacina stellata).

SOILS

SOIL SURVEY METHODS AND MAPPING PROCEDURES

The soil surveys conducted under the Canada Land Inventory (CLI) (Canada Land Inventory 1970) had a common objective and well defined guidelines that have been followed in preparing this report (Working group on soil survey data 1983). For detailed accounts of survey methods and mapping procedures used, interested readers or users unfamiliar with soil reports are referred to A Soil Mapping System for Canada: Revised (Mapping systems working group 1981), The Soil Landscapes of British Columbia (Valentine et al. 1978), and to recent soil survey reports of British Columbia, in particular to Soil Report No. 25 (Valentine and Schori 1980).

Methods and conditions discussed in Report No. 25 under the sections "Survey and Mapping Procedures" and "Reliability" apply closely to the Horsefly survey. In the Horsefly report the scale of the published soil map is 1:100 000. Soils are classified and defined according to guidelines established by the Canada Soil Survey Committee (1978). The definition of soil association used in this report is the same as that in Report No. 25; viz., a soil association is a group of related soils developed on similar parent materials, which differ because of different soil water regimes or because of variations in other characteristics such as depth to bedrock. A soil association occurs when climatic conditions are similar, usually within one physiographic area or vegetation zone. Although a soil association is named after its most common soil, it contains several other different but related soils. The full range of soils is not represented in every part of the landscape where a soil association occurs. Each soil association is shown on the map by one or more map units, each of which is given a particular combination of letters and numbers.

There are two types of map units: a single map unit and a compound map unit. A single map unit contains soils from only one association, e.g., Deserters Association (D). The map unit D comprises dominantly deep, moderately well drained Luvisolic soils derived from gravelly loamy till; the map unit D(E) is similar to D except that there are significant inclusions of eroded soils. A compound map unit contains soils from two (or three) associations, e.g., Deserters (D) and Ramsey (R) associations. The map unit D-R comprises dominantly deep, moderately well drained soils derived from gravelly loamy till, with significant inclusions of gravelly, stony, excessively drained soils (R) derived from glaciofluvial materials. For definitions of terms used in soil science refer to Glossary of Terms in Soil Science (Canada Soil Survey Committee 1976).

The soil associations of the Horsefly area fall within two main physiographic regions: the Fraser Plateau and the Quesnel Highland (Fig. 2). These two areas are separated on the legend and on the soil maps by color hues. The individual soil associations are separated by combinations of hue (e.g., yellow and red), chroma (intensity), and value (lightness).

SOIL ASSOCIATIONS OF THE FRASER PLATEAU

Within the boundaries of the survey area the Fraser Plateau is confined to an elevation range of 920-1500 m. The valleys of the Quesnel and San Jose rivers, at elevations of 600-900 m, contain silty textured glaciofluvial sediments and fluvial soils associated with the Fraser Basin physiographic subdivision. The associations occurring in these inextensive valley units contain the Bednesti, Chimney, Saxton, and Sugarcane soils.

The plateau is composed predominantly of volcanic bedrock with inclusions of sedimentary and granitic rock in some areas. In the southwest, nearly level areas of flat-lying basaltic lava flows correspond closely with the dry semiarid landscape of the interior Douglas fir zone. Here, the Luvisolic soil associations developed on morainal materials - Cinema, Helena, Spout, Tyee, and Williams Lake - occur with the gravelly Alix, Hawks, and Ramsey soils derived from glaciofluvial deposits. Organic soils belong to Rail, Spokin, and Chief associations.

In the wetter subboreal spruce zone, Deserters, Dominion, and Ridge Road soils occur on morainal materials that are predominantly derived from volcanic materials. Granitic rock types have influenced the deposits that form parent materials for Dragon, Keno Lake, and Moffat Lakes soils. Jumeau soils are associated with limestone outcrop areas.

Local lacustrine deposits within the plateau are parent materials of the Horsefly and Aleza associations.

The soil associations of the Fraser Plateau physiographic area are arranged and described in the same way as they are shown in the map legend. Profile descriptions and analysis of common or typical soils are given. The map units of each association are described briefly below.

Aleza Association (AZ)

The Aleza Association consists of clayey soils developed from glaciolacustrine materials. The soils occur on nearly level and depressional lands found within former stream channels and lake basins. The Aleza soils are associated with the Dominion and Chief associations at elevations from 920 - 1200 m in the Swift River drainage basin. The Aleza Association does not predominate in any map unit of the Horsefly map area.

The detailed description of an Orthic Luvic Gleysol of the Aleza Association, from Soils of the Prince George Area (Dawson, in preparation), is given in the Appendix.

Aleza soils were first described in the Aleza Lake area (Hortie et al. 1970).

The soils appear in this report as subdominant components of the Dominion-Aleza (DO-AZ) and the Chief-Aleza (CF-AZ) map units.

Aleza soils provide browze and forage for livestock and wild ungulates.

Alix Association (AX)

The Alix Association consists of sandy-skeletal soils developed on glaciofluvial materials. The soils occur on level to strongly sloping lands of stream valleys. Elevations are generally less than 1000 m. The association predominates in less than 1% of the map area.

The mean annual precipitation is 300-400 mm. The freeze-free period is 30-89 days and there are 780-1309 growing degree-days above 5°C. Lodgepole pine is a common tree, but other species characteristic of the subboreal spruce zone - white spruce, Douglas fir, trembling aspen, and common white birch - occur with a ground cover of blueberries, Oregon boxwood, pine grass, and mosses.

The parent material of the Alix soils (Plate IIc) is sandy-skeletal glaciofluvial material of variable thickness overlying till or bedrock. Although the predominant terrain form is a nearly level terrace, hummocky and kettled landforms occur. The soils are rapidly drained, are rapidly pervious, and have a subhumid to humid soil moisture regime.

The classification of the soils is Dystric Brunisol with the orthic subgroup dominating in most map units and the eluviated subgroup occurring in slightly moister environments. The more leached soils have a thin surface layer of grayish sandy loam. Subsoils are yellowish brown, gravelly sandy loam overlying very gravelly material that may occasionally be calcareous. A complete profile description of an Eluviated Dystric Brunisol of the Alix Association, from Soils of the Nechako - Francois Lake Area (Cotic et al. 1976), is given in the Appendix.

Soils of the Alix Association have many characteristics associated with other sandy-skeletal and gravelly soils of the Ramsey Association.

The Alix Association provides lodgepole pine pulpwood and has potential for recreation and wildlife.

The Alix soils were first described in the Quesnel area by Mackintosh et al. in 1965 (unpublished manuscript).

Map units

One map unit, AX, occurs in the Alix Association.

AX Alix (885 ha): The AX map unit occurs in the Big Lake Creek valley as two map delineations. The deep, rapidly drained soils of the association occur with small pockets of poorly drained mineral and organic soils. The topography is generally smooth and level to gently sloping and irregular.

Bednesti Association (B)

The Bednesti Association consists of fine loamy soils developed on silty, stratified, glaciolacustrine deposits. The soils occur on level to strongly sloping lands that are concentrated along the valley of the Quesnel River. For the most part, the Bednesti soils are found near the margins of former lake basins at elevations ranging from 700 to 1100 m. The association predominates in less than 1% of the map area.

The mean annual precipitation is 300-400 mm. The freeze-free period is 50-89 days and there are 1030-1309 growing degree-days above 5°C. Lodgepole pine is a common tree, but other species characteristic of the subboreal spruce zone - white spruce, Douglas fir, trembling aspen, and common white birch - occur with a ground cover of blueberries, pine grass, and mosses.

Although the parent material of the Bednesti soils is generally nonstony silty loam or fine sandy loam, stones occur where shallow deposits overlie till. The soils are moderately well drained, are moderately pervious, and have a subhumid to humid soil moisture regime.

The classification of the dominant soil of the association is Brunisolic Gray Luvisol. Podzolic Gray Luvisols frequently develop on the coarse loamy deposits. Under thin litter horizons of needles, twigs, and leaves, the typical profile has a grayish surface horizon underlain by a yellowish brown, silty horizon and a thick, well-developed silty horizon containing some clay. The grayish, stratified parent material is often calcareous. A complete profile description of a Brunisolic Gray Luvisol of the Bednesti Association, from Soils of the Prince George Area (Dawson, in preparation), is given in the Appendix.

The Bednesti soils were first described and mapped near Prince George by Kelley and Farstad (1946). The soils have since been recognized in numerous reports dealing with soils of the north central interior. Recent soil association names for these silty, erodible, lacustrine soils recognize the need for identifying them in the climatic and vegetational zones in which they occur.

Most units of the Bednesti Association are harvested for timber and farmed in areas that are accessible and of suitable topography.

Map units

Three map units occur in the Horsefly map area: an eroded phase, B(E), and two compound units, B-D and B-GF.

B(E) Bednesti (eroded phase) (4499 ha): Long, narrow map delineations of the eroded phase are found along the Quesnel River upstream as far as Likely. Active mudslides and bank failures are common on the extremely eroded and gullied riverbanks.

B-D Bednesti-Deserters (904 ha): The one area of this map unit occurs in the Quesnel River valley along the extreme edge of the glacial lake basin. Elevations range up to 1000 m over moderately to strongly sloping valley sides. Deserters soils occupy about 40% of the unit.

B-GF Bednesti-Guilford (1380 ha): A single delineation of this map unit occupies gently to moderately sloping bottomlands in the Quesnel River valley. Small alluvial terraces are interspersed throughout about 30% of the map unit.

Chief Association (CF)

The Chief Association consists of Organic soils developed on sedge and sphagnum peat materials associated with fen and bog types of peat landforms. The soils occupy depressional or very gently sloping areas generally below elevations of 1200 m. Although Chief soils (Plate IIc) are mapped extensively near Quesnel and Prince George (Farstad and Laird 1954), the Horsefly area contains relatively few map delineations of these Organic soils (less than 1% of the total area).

The Chief Association includes a wide range of organic materials in various states of decomposition. Most profiles are classified as Mesisols, but Fibrisols predominate in some areas. The surface tier of a typical profile is composed of 5-20 cm of fibric moss peat or sedge peat material that overlies more decomposed layers of dark brown, acidic peat materials. The fens have a vegetative cover of sedges and grasses. Vegetation on bogs is black spruce (Picea mariana), lodgepole pine, ericaceous shrubs, and mosses.

Many soils of the Chief Association support wildlife and livestock grazing. Some map units produce hay from native sedge vegetation or from seeded grasses.

Map units

One map unit, CF-AX, is recognized in the survey area.

CF-AZ Chief-Aleza (2 218 ha): The irregularly-shaped map delineations are mainly in drainageways of the Swift River and its tributaries. During the

gold rush they formed part of extensive canal and flume systems built by early miners. Gleysols (Aleza soils) comprise significant amounts (20-40%) of the map unit.

Chimney Association (CY)

The Chimney Association consists of loamy-skeletal soils developed on morainal materials in the vicinity of 150 Mile House and Big Lake. The terrain is gently to moderately sloping with occasional areas of strongly sloping or nearly level topography. Elevations are generally less than 900 m. The association predominates in less than 1% of the map area.

The mean annual precipitation is 300-400 mm. The freeze-free period is 60-89 days and there are 1030-1309 growing degree-days above 5°C. Douglas fir and trembling aspen occur with a ground cover of blueberries, pine grass, and mosses.

The parent materials of the Chimney soils are loamy-skeletal morainal deposits. Stones and gravel occur in moderate amounts. The soils are well drained, are moderately pervious, and have a subhumid soil moisture regime.

The classification of the soils is Dark Gray Chernozemic with the orthic subgroup dominating in the map units. The surface soils are dark grayish brown loam. Subsoils are brown and grayish brown gravelly loam overlying calcareous parent material. A complete profile description of an Orthic Dark Gray Chernozemic soil, from Soils of the Taseko Lakes Area (Valentine et al., in preparation), is given in the Appendix.

Chimney soils support a grassland and shrub vegetation that forms an important part of the natural grazing lands of the Cariboo country. The soils were first described in the Williams Lake area.

Map units

Three map units are identified in the Horsefly map area: one single unit, CY, and two compound units, CY-SZ and CY-WL.

CY Chimney (1409 ha): The landscape occupied by two map delineations of this unit is characterized by hummocky, strongly rolling terrain dominated by grasslands on southwesterly aspects of the San Jose valley.

CY-SZ Chimney-Spokin (1693 ha): Strongly rolling hummocks and steep-sided ridges are separated by numerous small depressions comprising about 30% Organic and Gleysolic soils in the San Jose valley.

CY-WL Chimney-Williams Lake (3184 ha): The hummocky, rolling landscape pattern of open grassland among bluffs of trembling aspen and Douglas fir is typical of this map unit of the San Jose valley. The wooded areas (Williams Lake soils) comprise about 20-30% of the unit.

Cinema Association (C)

The Cinema Association consists of gravelly loamy soils developed on morainal materials in the southwest part of the map area. The soils occur on strongly sloping lands north and west of Big Lake. Elevations are mainly less than 1000 m. The association predominates in less than 1% of the map area.

The mean annual precipitation is 300-400 mm. The freeze-free period is 60-89 days and there are 1030-1309 growing degree-days above 5°C. Lodgepole pine is a common tree, but other species characteristic of the subboreal spruce zone - white spruce, Douglas fir, trembling aspen, and common white birch - occur with a ground cover of blueberries, Oregon boxwood, pine grass, and mosses.

The parent material of the Cinema soils is gravelly loamy morainal material of variable thickness. Reaction of the parent material ranges from neutral to weakly calcareous. Drumlinized or grooved landforms are common. The soils are well drained, are moderately pervious, and have a subhumid soil moisture regime.

The classification of the dominant soil is Orthic Gray Luvisol. The surface soils are brownish gray, sandy loams that overlie a brownish clay loam subsoil. Below this horizon is a gravelly, often stony material that may occasionally be calcareous. A complete profile description of an Orthic Gray Luvisol of the Cinema Association, from a map unit near Marguerite (Lord and Mackintosh 1981), is given in the Appendix.

In the natural state, the ground vegetation and shrubs associated with the Cinema Association provide considerable grazing, but only where the topography is not too severe.

The soils of the Cinema Association were first described by Mackintosh et al. in 1965 (unpublished manuscript) on the dry lower plateau slopes south of Quesnel.

Map units

Two map units, C and C-AX, occur in the Cinema Association.

C Cinema (4345 ha): The three delineations of this map unit occur in the Big Lake area. A large area on south-facing slopes north of Big Lake contains Dark Gray Chernozemic soils of the Chimney Association. Another Orthic Gray Luvisol, described as a dominant component of the Tyee Association, is associated with Cinema soils in two areas south of Marguerite Lake.

C-AX Cinema-Alix (1756 ha): This map unit occupies irregular, hummocky terrain near Big Lake. Veneers and pockets of gravel (Alix) are common in the unit and make up about 20-50% of the soils.

Deserters Association (D)

The Deserters Association consists of gravelly loamy soils developed on morainal materials over topography ranging from moderate to very steep slopes. The elevations are from 800 m to about 1200 m. The Deserters Association is dominant over 9.6% of the map area.

The mean annual precipitation is 300-750 mm. The freeze-free period is 30-74 days and there are 780-1169 growing degree-days above 5°C. Lodgepole pine is a common tree, but other species characteristic of the subboreal spruce zone - white spruce, Douglas fir, trembling aspen, and common white birch - occur with a ground cover of blueberries, Oregon boxwood, pine grass, and mosses.

The parent material of Deserters soils is gravelly loam till, greater than 1 m thick over bedrock. Areas of drumlinized landform may have 30-50 cm of gravelly washed materials. Parent materials are mainly neutral and free from lime to depths of about 1 m. The soils are moderately well to well drained, are moderately to slowly pervious, and have a humid to subhumid soil moisture regime.

The dominant soils are Brunisolic Gray Luvisols, but Podzolic Gray Luvisols and gleyed subgroups are common. The soils have brownish surface horizons and grayish brown subsoils. A complete profile description of a Brunisolic Gray Luvisol of the Deserters Association, from Soils of the Nechako - Francois Lake Area (Cotic et al., 1974), is given in the Appendix.

Soils of the Cinema Association are Orthic Gray Luvisols that occur on parent material similar to that of Deserters soils but under a slightly drier environment.

The soils are largely under forest that is currently being cut for pulpwood and sawlogs.

The Deserters Association was first identified and characterized in the Prince George area by Dawson (Soils of the Prince George Area, in preparation).

Map units

Four map units occur in the Quesnel area: one single, D, and three compound, D-DN, D-DO, and D-JU.

D Deserters (13 273 ha): Most delineations of this map unit contain drumlinized terrain in which 15-30% of the soils may be sandy and gravelly. Orthic Gray Luvisols occupy drier aspects and Humo-Ferric Podzols occur at higher elevations.

D-DN Deserters-Dragon (1617 ha): This map unit generally lies on mid to upper slopes of ridges, below the shallower, more rocky Dragon map units. Most delineations carry a significant component (30-60%) of these Podzolic soils developed on colluvium.

D-DO Deserters-Dominion (46 701 ha): The uplands and stream valleys tributary to the Quesnel River contain several large delineations of this map unit. Luvisolic Humo-Ferric Podzols of the Dominion Association comprise 30-40% of the unit.

D-JU Deserters-Jumeau (10 851 ha): The five delineations of this map unit lie to the south of Big Lake where Deserters soils are associated with variable amounts of soils derived from limestone (Jumeau Association); Jumeau soils occupy 20-30% of the unit.

Dominion Association (DO)

The Dominion Association consists of gravelly loamy soils developed on morainal materials. These soils have extensive occurrences to the northwest of the Horsefly area. In the Horsefly area the Dominion soils occur at elevations from 920 to 1200 m. The association is dominant over 3.1% of the map area.

The mean annual precipitation is 400-750 mm. The freeze-free period is 60-89 days and there are 1030-1309 growing degree-days above 5°C. Lodgepole pine is a common tree, but other species typical of the subboreal spruce zone - white spruce, Douglas fir, trembling aspen, and common white birch - occur with a ground cover of blueberries, Oregon boxwood, pine grass, and mosses.

The parent material of the Dominion soils is gravelly, loamy, and neutral in reaction. The soils are well drained, are moderately pervious, and have a humid soil moisture regime.

The predominant soil, a Luvisolic Humo-Ferric Podzol, has brownish silty surface horizons and gravelly loam subsoil and parent material. A complete profile description of a Luvisolic Humo-Ferric Podzol of the Dominion Association, from Soils of the Prince George Area (Dawson, in preparation), is given in the Appendix.

Dominion soils produce productive stands of white spruce and Douglas fir.

Dominion soils were first recognized and described in the Prince George area by Dawson (in preparation).

Map units

Three map units, DO, DO-AZ, and DO-DN, occur in the northwest part of the map sheet.

DO Dominion (6704 ha): This map unit occurs on gently and moderately sloping terrain associated with the Swift River valley in the northwest part of the map area. Imperfectly drained gleyed soils are common in the map area.

DO-AZ Dominion-Aleza (13 532 ha): This undulating to gently sloping map unit is found mainly in the valley of the Swift River where it occurs with 15-30% Organic soils (Chief) and Gleysols (Aleza) as important components of the map unit.

DO-DN Dominion-Dragon (3539 ha): Some 30-50% of the soils in these strongly sloping delineations are developed on the coarser textured colluvium, parent material of the Podzolic Dragon soils.

Dragon Association (DN)

The Dragon Association consists of loamy and sandy soils developed on colluvial and morainal materials. The soils occur on strongly sloping terrain above elevations of 900 m. The Dragon Association occurs as a few delineations of one map unit at the highest elevations in the Swift River area. The association predominates in less than 1% of the map area.

The mean annual precipitation is 300-750 mm. The freeze-free period is 30-49 days or less and there are 670-1029 growing degree-days above 5°C. Subalpine fir and Engelmann spruce are the dominant and characteristic trees of the subalpine fir zone. The well-developed understory includes white-flowered rhododendron, blueberries, devil's-club, Sitka valerian, Canadian bunchberry, and mosses.

The parent material is shallow (< 1 m) colluvium that is derived from bedrock of variable composition. The soils are well drained, are moderately pervious, and have a humid to perhumid soil moisture regime.

The classification of the soils is Humo-Ferric Podzol, with the orthic subgroup dominating in most areas in association with lithic soils and bedrock. The soils have thin, grayish surface horizons. The subsoils are reddish brown, sandy loams and loams that overlie gravelly loamy materials. A complete profile description of an Orthic Humo-Ferric Podzol of the Dragon Association, from Soils of the Nechako - Francois Lake Area (Cotic et al. 1974), is given in the Appendix. The forested soils of the Dragon Association are logged in some areas for pulpwood and sawlogs.

Map units

A single map unit, DN, was recognized in the Horsefly area.

DN Dragon (4295 ha): The dominant soil of this map unit is formed on morainal and colluvial materials that average less than 1 m thick over hard bedrock. Areas at 1200-1500 m elevation are very steep to extremely steep. The predominant soils are well drained, stony, and gravelly sandy loams and loams. Lithic soils (<50 cm over rock) are the principal associates.

Hawks Association (HS)

The Hawks Association consists of gravelly, sandy-skeletal soils developed on glaciofluvial deposits. The terrain is undulating and ridged with gentle to moderate slopes. Elevations are mainly between 900 and 1200 m along the Hawks Creek valley. The association is of limited extent and predominates in less than 1% of the Horsefly map area.

The mean annual precipitation is about 400 mm, the freeze-free period is about 75-89 days, and there are about 1170-1310 growing degree-days above 5°C.

The Hawks Association occurs most commonly in the interior Douglas fir zone where Douglas fir is the dominant tree associated with trembling aspen, pine grass, blueberries, and mosses.

The parent materials are gravelly, sandy glaciofluvial deposits that are moderately calcareous. Stones and cobbles are common. The soils are rapidly drained, are rapidly pervious, and have a subhumid to semiarid soil moisture regime.

The most common soils are Orthic Eutric Brunisols. They have thin, grayish surface horizons and brown subsoils overlying yellowish brown parent material. A complete description of a typical profile of the Hawks Association, from Soils of the Taseko Lakes Area (Valentine et al., in preparation), is given in the Appendix.

Hawks soils were first described in the Williams Lake area. The soils have some uses as sources for gravel and production of native forage.

Map units

One map unit, HS, occurs in the Horsefly map area.

HS Hawks (1979 ha): This map unit occurs with Tyee soils in the Hawks Creek valley and at Rose Lake. Hawks soils closely resemble Alix soils but are more calcareous throughout the profile.

Helena Association (HL)

The Helena Association consists of gravelly, sandy, and gravelly loamy soils developed on morainal materials in the Knife Creek valley, along the south boundary of the map area. The terrain is mainly gently to moderately sloping. Elevations are between 900 and 1200 m. The association is dominant over 1.2% the survey area.

The mean annual precipitation is approximately 425 mm, the freeze-free period is 60-89 days, and there are about 1030-1309 growing degree-days above 5°C.

The Helena Association occurs within the interior Douglas fir zone. Douglas fir and trembling aspen are the dominant trees with a ground cover of blueberries, pine grass, and mosses.

Parent materials are gravelly, sandy, and loamy. Stones and gravel are common. The soils are well drained, are moderately pervious, and have a subhumid to semiarid soil moisture regime.

The most common soils of the Helena Association are Orthic Gray Luvisols. They have a grayish surface horizon and brownish subsoil that overlies the yellowish brown parent material. A complete description of a profile of the Helena Association, from Soils of the Lac la Hache - Clinton Area (Valentine and Schori 1980), is given in the Appendix.

Helena soils support semiopen stands of Douglas fir, lodgepole pine, shrubs, herbs, and grasses and produce sawlogs, pulpwood, and forage.

These soils were first recognized and described in the Lac la Hache area.

Map units

One map unit, HL-ST, was recognized in the Horsefly map area.

HL-ST Helena-Spout (9480 ha): Two large map delineations of this unit occur in the Knife Creek valley. These gently sloping areas are the northern extension of more extensive units mapped in the adjoining Lac la Hache - Clinton map area (Valentine and Schori 1980). Spout soils with some imperfectly drained soils comprise 20-40% of the unit.

Horsefly Association (HF)

The Horsefly Association consists of loamy soils developed on lacustrine deposits in the Horsefly River and Beaver Creek valleys. The landform is mainly level to undulating on gentle to moderate slopes, but

strongly sloping terrain occurs. Elevations range between 700 and 900 m. The association is limited in extent and predominates in less than 1% of the map area.

The mean annual precipitation is approximately 725 mm. The freeze-free period is 90-119 days and there are about 1170-1309 growing degree-days above 5°C.

The Horsefly Association occurs mainly in the subboreal spruce zone where white spruce and Douglas fir are associated with a ground cover of blueberries, Oregon boxwood, pine grass, and mosses.

The parent materials of Horsefly soils are nonstony silt loam or very fine sandy loam. The soils are well drained, are moderately pervious, and have a humid soil moisture regime.

The most common soils are Orthic Gray Luvisols. They have grayish surface horizons and a brownish silt loam subsoil that is underlain by olive colored silty parent material. A complete description of an Orthic Gray Luvisol of the Horsefly Association, described near the community of Horsefly, is given in the Appendix.

Soils of the Horsefly Association produce pasture, hay, coarse grains, and some vegetables on cleared land in the Beaver Creek valley and around the community of Horsefly.

The Horsefly soils were first described during the soil survey of the Horsefly area.

Map units

Two map units occur in the area: one single, HF, and one compound, HF-HS.

HF Horsefly (1536 ha): Map delineations of this unit may contain inclusions of Cumulic Regosols of the Guilford Association on sandy fluvial deposits and Eutric Brunisols developed on glaciolacustrine materials.

HF-HS Horsefly-Hawks (2805 ha): This unit contains about 40 - 60% inclusions of the gravelly Orthic Eutric Brunisols of the Hawks Association.

Jumeau Association (JU)

The Jumeau Association consists of loamy-skeletal soils developed on colluvial materials. The terrain is strongly and steeply sloping. Elevations are generally above 1050 m. This association occurs mainly near Big Lake and predominates in less than 1% of the Horsefly map area.

The mean annual precipitation is about 974 mm. The freeze-free period is 30-49 days and there are 780-1029 growing degree-days above 5°C.

The Jumeau Association occurs most frequently in the subboreal spruce zone where white spruce, Douglas fir, trembling aspen, and common white birch are associated with a ground cover of blueberries, Oregon boxwood, pine grass, and mosses.

The parent materials are loamy-skeletal, colluvial deposits derived from and associated with limestone bedrock. The materials are generally less than 1 m thick over bedrock, with rock outcrops and stones commonly occurring. The soils are well drained, are moderately to rapidly pervious, and have a humid to subhumid soil moisture regime.

The most common soils of the Jumeau Association are Eluviated Dystric Brunisols, lithic phase. They have a grayish surface horizon with a reddish brown subsoil overlying limestone bedrock usually at less than 50 cm depth. A complete profile of a soil of the Jumeau Association is not described in this report.

The Jumeau soils were mapped during the soil survey of the Horsefly map area.

Map units

There is a single map unit, JU, identified in the Horsefly map area.

JU Jumeau (1727 ha): Seven small delineations of this unit occur in the vicinity of Big Lake. They occupy the abraded crests of ridges and low hills composed of massive limestone, pyroxene-bearing andesite, and other volcanic rocks.

Keno Lake Association (KO)

The Keno Lake Association consists of loamy soils developed on morainal materials in the Quesnel and Horsefly lakes area. Terrain is undulating and rolling with strong to steep slopes in some map units. Elevations range from 750 to 1200 m. This relatively extensive association is dominant over 7.3% of the map area.

The mean annual precipitation is about 725 mm or greater, the freeze-free period is 75-109 days, and there are about 1170-1504 growing degree-days above 5°C. The association is confined to the subzones of the interior cedar-hemlock zone. Western red cedar, white spruce, and Douglas fir are the main trees of the wet subzone. Western hemlock is absent in the cedar subzone but lodgepole pine, common paper birch, black cottonwood and trembling aspen are common in both subzones. Shrubs and herbs such as Rocky Mountain maple, Oregon boxwood, blueberries, Canadian bunchberry, and mosses are characteristic of the zone.

Parent materials of the association are mostly loam in texture, slightly acidic to neutral in reaction, and generally very compact. The soils are well drained, are moderately pervious, and have a humid soil moisture regime.

The most common soils of the association are Orthic Humo-Ferric Podzols. They have a thin, grayish surface horizon with a reddish brown subsoil overlying the yellowish brown parent material. The description of an Orthic Humo-Ferric Podzol, from near Quesnel Lake, is given in the Appendix.

Soils of the association produce good yields of timber.

The Keno Lake soils were first described during the soil survey of the Horsefly area.

Map units

Of the eight different map units mapped in the Horsefly area, three are single - KO1, KO2, and KO4 - and five are compound - KO-RO, KO-PM, KO-HR, KO-LZ, and KO-SS.

KO1 Keno Lake 1 (15 745 ha): Several large delineations of this unit occupy gently rolling land between Quesnel and Horsefly lakes. Lithic phases and gleyed Podzolic soils occur throughout the unit.

KO2 Keno Lake 2 (8471 ha): The few areas of KO2 are associated with gleyed subgroups and Gleysols on nearly level and undulating topography.

KO4 Keno Lake 4 (7628 ha): Lithic soils and some rock outcrop are significant components of this map unit. It occurs on steep, upland ridges where the mantle of till is shallow.

KO-RO Keno Lake - Rockland (1960 ha): The components of this map unit are similar to those of the KO4 unit, but occurrences of bedrock (> 40%) and extreme slopes are much higher.

KO-PM Keno Lake - Ptarmigan (4670 ha): Gravelly, sandy soils of the Ptarmigan Association form veneers that overlie morainal materials and occupy 20-40% of the map unit.

KO-HR Keno Lake - Heger (1984 ha): Dystric Brunisols (Heger) are associated with Humo-Ferric Podzols as 30% inclusions on very steep terrain; shallow mantles of till and colluvium are common.

KO-LZ Keno Lake - Lanezi (12 643 ha): Relatively large areas of this unit surround Quesnel Lake. The terrain is undulating to rolling. Keno Lake soils occur with 30-50% of the heavier textured Lanezi soils in a complex landscape pattern.

KO-SS Keno Lake - Spanish Lake (2430 ha): One large area of this unit occupies steep slopes on the southerly aspects of Spanish Mountain. The map unit contains a significant component of Spanish Lake soils (about 30%) that are derived from black quartzose phyllite rocks of the Midas Formation.

Moffat Lakes Association (MF)

The Moffat Lakes Association consists of gravelly, sandy-skeletal, and loamy-skeletal soils developed on morainal materials. The terrain is generally undulating and smooth, with gentle to strong and occasionally very strong slopes. Elevations range from 750 to about 1500 m. This association occupies large areas between Horsefly and Spout lakes. It is dominant over 9.4% of the map area.

The mean annual precipitation ranges from 426 to over 899 mm. The freeze-free period ranges from 50 to 89 days and there are 1030-1309 growing degree-days above 5°C.

The association occurs most commonly in the interior Douglas fir zone where Douglas fir is the dominant tree. However, in conjunction with its associated soils, the Moffat Lakes soils are also found in the Engelmann spruce - subalpine fir zone where subalpine fir and Engelmann spruce are the dominant and characteristic trees. The well-developed understory includes white-flowered rhododendron, blueberries, devil's-club, Sitka valerian, Canadian bunchberry, and mosses.

The parent material of the Moffat Lakes soils is gravelly, sandy-skeletal, and loamy-skeletal till that has veneers and small inclusions of acidic glaciofluvial gravels, derived mainly from granitic rock sources. The soils are well drained, are moderately to rapidly pervious, and have a humid to subhumid soil moisture regime.

Moffat Lakes soils are similar to those of the Trurans Association, mapped south of the Horsefly area (Valentine and Schori 1980). Both associations are dominated by Eluviated Dystric Brunisols but the Moffat Lakes Association includes Podzolic soils. A complete description of an Orthic Humo-Ferric Podzol profile, from the Moffat Lakes area, is given in the Appendix.

The Moffat Lakes soils support stands of mixed tree species, currently being logged. These soils were first described and mapped during the soil survey of the Horsefly area.

Map units

Eight map units occur south of Quesnel Lake, mainly within the drainage basins of the Moffat and Beaver creeks and the Quesnel River. The units are associated with the boundary zone between flat-lying basaltic lavas and granodiorite and monzonite plutonic rocks east of the Moffat River valley.

Identified in the Horsefly map area are two single map units, MF1 and MF2, and six compound map units, MF-ST, MF-TE, MF-LZ, MF-RL, MF-KY, and MF-HS.

MF1 Moffat Lakes 1 (14 155 ha): Map delineations of this unit may have inclusions of up to 20% Orthic Humo-Ferric Podzols on irregular undulating to gently rolling terrain.

MF2 Moffat Lakes 2 (12 049 ha): About 40-60% of this unit may consist of Orthic Humo-Ferric Podzols; the unit occurs in the upper Moffat Creek valley.

MF-ST Moffat Lakes-Spout (28 954 ha): Map delineations of this unit contain 40 - 60% inclusions of the gravelly loamy Podzolic Gray Luvisols of the Spout Association, south of the community of Horsefly.

MF-TE Moffat Lakes-Tyee (2606 ha): This unit contains significant amounts (20-30%) of the heavier textured Brunisolic Gray Luvisols of the Tyee Association, mainly lying east of Beaver Creek valley.

MF-LZ Moffat Lakes - Lanezi (5413 ha): About 40-60% of this map unit has inclusions of the loamy Luvisolic Humo-Ferric Podzols of the Lanezi Association.

MF-RL Moffat Lakes - Rail (2496 ha): The components of this map unit are similar to those of the MF-KY map unit, but in this case the mineral soils are mainly Dystric Brunisols and the Organic soils are basic or neutral in reaction; they occupy 30-50% of the unit.

MF-KY Moffat Lakes - Keithley (3140 ha): The two delineations of MF-KY are restricted to higher plateau elevations where Podzolic Moffat Lakes soils are associated with 30-50% of acidic, organic areas of Keithley soils.

MF-HS Moffat Lakes - Hawks (2265 ha): This unit has significant inclusions (20-40%) of the more basic Eutric Brunisols of the Hawks Association, near Antoine Lake.

Rail Association (RL)

The Rail Association consists of Organic soils developed on accumulations of moderately decomposed sedges and mosses. The terrain is

level to depressional. This association occurs throughout the southern Fraser Plateau, particularly south of Horsefly Lake. It predominates in less than 1% of the Horsefly map area.

The mean annual precipitation is greater than 426 mm, the freeze-free period is less than 75 days, and there are less than 1309 growing degree-days above 5°C.

The Rail soils commonly occur in the interior Douglas fir zone. The hydrophytic vegetation is dominated by sedges, reeds, grasses, willows, and herbs.

Parent materials of the Rail soils are partly decomposed organic material that has been derived from water-loving plants common to fen landforms; it is neutral to acid in reaction. The soils are very poorly drained, are moderately pervious, and have an aquic soil moisture regime.

The most common soils of the association are Typic Mesisols. They have a mesic middle tier and are commonly 160 cm or greater in depth. A complete description of a Typic Mesisol, from the map area immediately south of the Horsefly area (Valentine and Schori 1980), is given in the Appendix. The Rail soils were first described in the Lac la Hache area.

Rail soils provide a source of hay and grazing for the cattle industry and browse for wild ungulates.

Map units

A single map unit, RL, of the Rail Association occurs in the Horsefly map area.

RL Rail (3454 ha): This unit may contain up to 20% inclusions of Gleysolic soils and shallow (terric) Organic soils. Rail soils tend to be somewhat less decomposed than the more humified soils of the Spokin Association. They are found south of the community of Horsefly.

Ramsey Association (R)

The Ramsey Association consists of sandy-skeletal and coarse-loamy soils developed on glaciofluvial materials. The soils occur on nearly level and hummocky lands in the valleys of the Swift and Quesnel rivers. Elevations are about 1000 m. The association predominates in less than 1% of the map area.

The mean annual precipitation is 400-750 mm. The freeze-free period is 30-59 days and there are 1030-1169 growing degree-days above 5°C. Lodgepole pine is a common tree, but other species characteristic of the subboreal spruce zone - white spruce and common white birch - occur with a ground cover of blueberries, Oregon boxwood, and mosses.

The parent materials of the Ramsey soils are variable in origin and form. They include recessional outwash, deltas, terraces, and kames. The soils are well to rapidly drained, are rapidly pervious, and have a humid soil moisture regime.

The classification of the soils is Orthic Humo-Ferric Podzol. These leached soils have thin surface horizons of grayish and reddish sandy loam. Subsoils are yellowish brown, gravelly sand that overlies very gravelly material. The complete profile description of an Orthic Humo-Ferric Podzol of the Ramsey Association, from Soils of the Nechako - Francois Lake Area (Cotic et al. 1976), is given in the Appendix.

Alix soils occur on similar materials but are classified as Dystric Brunisols.

Ramsey soils are forested and are used mainly for logging purposes. The soils were first described in the Quesnel area.

Map units

Four map units are described: one single, R, and three compound, R-CF, R-D, and R-GF.

R Ramsey (556 ha): The few map delineations of this unit are quite pure. They contain no more than 15-20% Organic soils or areas of till. The topography is rolling and hummocky.

R-CF Ramsey-Chief (311 ha): Within the hummocky and depressional parts of this map unit poorly drained soils and organic deposits may constitute 30 - 50% of the soils.

R-D Ramsey-Deserters (2142 ha): This map unit is represented by a few small delineations of moderately and strongly sloping ridges. The veneer of gravelly soils is broken by frequent occurrences (30-50%) of loamy till materials (Deserters).

R-GF Ramsey-Guilford (1104 ha): The single delineation of this map unit is in the floodplain of the upper Swift River. The Regosolic Guilford soils are subject to periodic flooding; they occur in about 30% of the unit.

Ridge Road Association (RR)

The Ridge Road Association consists of gravelly loamy soils developed on morainal materials associated with limestone bedrock in the Big Lake vicinity. The terrain is very gently to moderately sloping. A series of low, parallel ridges is typical of the land pattern. Elevations range from 900 to over 1200 m. The association predominates in less than 1% of the map area.

The mean annual precipitation is about 700 mm, the freeze-free period is less than 90 days, and there are less than 1170 growing degree-days above 5°C.

The Ridge Road soils (Plate Ib) commonly occur in the subboreal spruce zone where subalpine fir and white spruce are the dominant trees. Ground cover plants include blueberries, Oregon boxwood, and mosses.

The parent materials of the Ridge Road soils are gravelly loamy, morainal materials, which are slightly to moderately calcareous. Stones are common. The soils are moderately well drained, are slowly pervious, and have a humid soil moisture regime.

The most common soils are Brunisolic Gray Luvisols. They have a grayish surface horizon that grades through a reddish brown loam to a brown clay loam, compact, subsoil that overlies the yellowish brown clay parent material. A complete profile description of a Brunisolic Gray Luvisol of the Ridge Road Association, from the large map delineation north of Big Lake, is given in the Appendix.

Pasture, coarse grain crops, cattle raising, and logging are the main activities on the map unit.

Similar soils were mapped and described in a detailed soil survey of the Big Lake area (Talisman 1980).

Map units

One compound map unit, RR-D, occurs in the Horsefly map area.

RR-D Ridge Road - Deserters (5801 ha): This large map delineation is north of Big Lake where most of the soils of the unit have been cleared for farming. Stones are generally a problem in clearing the land. Deserters soils occupy about 20-40% of the map unit.

Saxton Association (S)

The Saxton Association consists of sandy soils developed on fluvial materials in the upper valley of Beaver Creek. The soils occupy a few areas of irregular, terraced terrain at elevations below 800 m. The association predominantes in less than 1% of the map area.

The mean annual precipitation is 400-750 mm. The freeze-free period is 50-74 days and there are 1030-1169 growing degree-days above 5°C. Lodgepole pine is a common tree, but other species characteristic of the subboreal spruce zone - white spruce, Douglas fir, trembling aspen, and common white birch - occur with a ground cover of blueberries, Oregon boxwood, pine grass, and mosses.

The parent materials of the Saxton soils are sandy fluvial deposits that are generally stone free and neutral in reaction. The predominant landform is a nearly level terrace, with hummocky and ridged relief. The soils are well to rapidly drained, are rapidly pervious, and have a subhumid to humid soil moisture regime.

Most of the soils of the Saxton Association are Dystric Brunisols with the eluviated subgroup predominating. The soils have sandy surface horizons, yellowish brown, loamy sand subsoils, and coarse, sandy parent materials. An Eluviated Dystric Brunisol profile, from Soils of the Prince George Area (Dawson, in preparation), is given in the Appendix.

Alix soils are also Dystric Brunisols but have developed on gravelly glaciofluvial materials.

Soils of the Saxton Association are used for many purposes including recreation, residential projects, forestry, and agriculture.

These soils were first described during the soil survey of the Prince George area (Kelley and Farstad 1946).

Map units

Two single map units, S and S(E), are described in the area.

S Saxton (483 ha): Soils of this map unit occur on undulating and terraced terrain. Poorly drained soils and Regosols comprise less than 20% of the unit. The map unit is confined to a small part of the Beaver Creek valley.

S(E) Saxton, eroded phase (349 ha): About 40-60% of the soils in this map unit are gullied or have rough, broken topography.

Spokin Association (SZ)

The Spokin Association consists of well-humified Organic soils developed on accumulated organic materials derived from sedges and mosses. The terrain is level, undulating, or depressional. Elevations range between 900 and 1200 m. This association has many small and medium-sized units scattered throughout the Spokin Lake area. It is dominant over 1.1% of the Horsefly map area.

The mean annual precipitation ranges between 426 and 566 mm, the freeze-free period is 60-74 days, and there are more than 1170 growing degree-days above 5°C.

The Spokin Association occurs in the interior Douglas fir zone. The vegetation on the fens is dominated by sedges, reeds, and coarse grasses with variable amounts of willows and other shrubs.

The Spokin soils are formed on well to moderately decomposed (humified) medium acid peat materials. The soils are very poorly drained, are moderately pervious, and have an aquic moisture regime.

The predominant soils of the Spokin Association are Typic Humisols. They have a well-decomposed black to very dark gray humic middle tier and are at least 160 cm thick. A mesic soil of the Spokin Association is similar to the profile described in the Appendix under the Rail Association.

Spokin soils provide native hay, tame hay when seeded, and grazing.

The association was first named and described during the soil survey of the Horsefly area.

Map units

One map unit, SZ, is described.

SZ Spokin (8361 ha): Spokin soils are confined mainly to the flat-lying lava plateau that occupies an extensive area east of 150 Mile House. Here the Spokin soils are mapped in more than 120 small and large, irregularly shaped delineations. The map unit encompasses Organic soils that are shallow and less decomposed than the Typic Humisols, as well as poorly drained mineral soils.

Spout Association (ST)

The Spout Association consists of gravelly loamy soils developed on morainal materials in the Fraser Plateau area south of Horsefly Lake. The terrain is mainly undulating on gentle to strong slopes. Elevations range from 900 to over 1200 m. The association is dominant over 2.6% of the Horsefly map area.

The mean annual precipitation is greater than 566 mm, the freeze-free period is less than 60 days, and there are less than 1310 growing degree-days above 5°C.

The Spout Association occurs most frequently in the interior Douglas fir zone where Douglas fir is the dominant tree. The ground cover includes blueberries, pine grass, and mosses.

Parent materials of the Spout soils are gravelly loamy, morainal materials that are slightly acid to neutral in reaction. Stones are common. The soils are moderately well drained, are moderately to slowly pervious, and have a humid moisture regime.

The most common soils of the Spout Association are Podzolic Gray Luvisols. They have a very thin, grayish loam surface horizon with a reddish brown loam and brown clay loam subsoil overlying yellowish brown, loamy parent material. A complete profile description, from Soils of the Lac la Hache - Clinton Area (Valentine and Schori 1980), is given in the Appendix.

The Spout Association was first recognized and described in the Lac la Hache area.

Map units

Three single map units, ST1, ST2, and ST3, and one compound unit, ST-AC, were recognized in the Horsefly area.

ST1 Spout 1 (7422 ha): The map areas are scattered throughout the Moffat River drainage on gentle to moderate slopes. The deep, well-drained Spout soils occur with small areas of imperfectly drained soils near Murphy Lake.

ST2 Spout 2 (6536 ha); Deep, well-drained soils developed on slightly acid, gravelly loamy till occur with small areas of lithic soils (<50 cm thick over bedrock) and imperfectly drained soils. Terrain is moderately to steeply sloping.

ST3 Spout 3 (2838 ha): North of Spout Lake there is an area that contains some Orthic Gray Luvisols developed on deep, moderately well drained soils. These soils are very similar to the Bobtail soils mapped in the survey area to the south (Valentine and Schori 1980).

ST-AC Spout-Archie (3006 ha): Near Murphy Lake are two delineations of deep, well-drained Spout soils that are associated with inclusions of granitic rock, and 20-40% soils developed on coarse textured, acidic material (Archie). The topography is moderately to strongly sloping.

Sugarcane Association (SU)

The Sugarcane Association consists of loamy soils developed on calcareous fluvial deposits of the San Jose River. The terrain is level and gently undulating. Elevations are less than 900 m. This localized association predominates in less than 1% of the Horsefly map area.

The mean annual precipitation is 426 mm. The freeze-free period is 75-89 days and there are 1170-1309 growing degree-days above 5°C.

The Sugarcane Association occurs in the interior Douglas fir zone. The native vegetation is dominated by sedges, rushes, and grasses.

The parent materials of the Sugarcane soils are calcareous silt loam and silty clay loam fluvial deposits that include saline materials. They are generally nonstony except at depth. The soils are imperfectly to poorly drained, are moderately to slowly pervious, and have a humid to subaquic soil moisture regime.

The most common soils of the Sugarcane Association are Gleyed Regosols, carbonated phase. They are mottled throughout.

Although the soils of the association are not described here in detail, information on their characteristics and management is given in A Soil Resource and Land Use Survey of the Williams Lake Indian Reserve (Leskiw et al. 1973). In this report soils of the Sugarcane Association are identified under soil units 1-5 in the legend and discussed under management areas A, B, and C in the report. Most Sugarcane soils are suitable for forage production and grazing. The association was named and described during the soil survey of the Horsefly area.

Map units

Two map units, SU and SU-CY, are recognized in the survey area.

SU Sugarcane (407 ha): Of the three areas of this map unit in the San Jose valley, the largest is near the mouth of the river. The detailed survey of the Williams Lake Indian Reserve (Leskiw et al. 1973) delineates five map units in the floodplain and delta areas. These units separate components of the Sugarcane Association into two areas: Gleyed Regosol (carbonated and saline phases), and Black and Dark Gray Chernozemic soils (orthic subgroup and carbonated phase).

SU-CY Sugarcane-Chimney (919 ha): Sugarcane soils occur with variable amounts (20-40%) of deep, well-drained Chimney soils that have developed on calcareous gravelly loam till. The terrain is hummocky and ridged.

Tyee Association (TY)

The Tyee Association consists of gravelly loamy soils developed on morainal materials, mainly south of Big Lake. The terrain is mostly undulating and rolling with some moderate to strong slopes. Elevations are primarily above 900 m. This relatively extensive association is dominant over 10.5% of the Horsefly map area.

The mean annual precipitation ranges between 426 and 566 mm, the freeze-free period is 60-74 days, and there are more than 1170 growing degree-days above 5°C.

The Tyee Association occurs most commonly in the interior Douglas fir zone where Douglas fir is the dominant tree. The open forest has a ground cover of pine grass, herbs, and blueberries.

Parent materials of the Tyee soils are gravelly loam and clay loam deposits which are moderately calcareous. Stones and gravel occur frequently. Variable amounts of volcanic ash cover the soils or are incorporated in the upper profile. The soils are moderately well drained, are moderately to slowly pervious, and have a humid to subhumid soil moisture regime.

The most common soils of the Tyee Association are Orthic Gray Luvisols. They have grayish surface horizons and compact, brown clay loam subsoils underlain by the yellowish brown loam parent material. A complete description of a typical soil of the Tyee Association, from Soils of the Lac la Hache - Clinton Area (Valentine and Schori 1980), is given in the Appendix. The profile of a Tyee soil has a thicker Ae horizon and a more deeply leached solum than that of a Williams Lake soil.

Soils of the Tyee Association provide timber and grazing throughout the Cariboo area.

Tyee soils were first described and mapped in the Williams Lake area.

Map units

Five map units are recognized in the Horsefly map area: three single, TE1, TE3, and TE5, and two compound, TE-HS and TE-SZ.

TE1 Tyee 1 (29 496 ha): This map unit predominates in the drier plateau area to the southwest. The gently undulating landscape is dominated by Orthic Gray Luvisols with minor amounts of imperfectly drained soils.

TE3 Tyee 3 (2992 ha): On higher portions of the plateau the few areas of this unit contain some shallow or lithic phases of the Tyee soils.

TE5 Tyee 5 (21 426 ha): Soils in this map unit reflect the more humid environment associated with proximity to the Quesnel Highland. Brunisolic Gray Luvisols are common associates on undulating and gently rolling terrain.

TE-HS Tyee-Hawks (2218 ha): Small areas of this map unit are present in the Hawks Creek valley and Rose Lake area. The gravelly sandy Hawks soils occur as thick veneers over till or as gravelly pockets surrounded by Tyee soils.

TE-SZ Tyee-Spokin (23 000 ha): The one very large area of this map unit occupies the nearly level lava plateau east of 150 Mile House. The organic Spokin soils occur in the many very small depressional areas throughout the map unit.

Williams Lake Association (WL)

The Williams Lake Association consists of gravelly loamy soils developed on morainal material in the vicinity of 150 Mile House. The terrain is mainly undulating or rolling, with occasional strong slopes. Elevations range between 750 and 1050 m. This association is dominant over 1.9% of the Horsefly map area.

The mean annual precipitation is about 426 mm, the freeze-free period is 75-89 days, and there are 1170-1309 growing degree-days above 5°C.

The Williams Lake Association occurs in the interior Douglas fir zone where Douglas fir is the dominant tree. The open forest includes shrubs and herbs such as soopolallie, prickly rose, and pine grass.

The soil parent material is gravelly clay loam till, which is slightly to moderately calcareous. Stones occur frequently. The soils are moderately well drained and moderately pervious, with a subhumid to semiarid soil moisture regime.

The most common soils of the association are Orthic Gray Luvisols. They have a grayish surface horizon and a brownish, clay loam compact subsoil underlain by the yellowish brown parent material. A complete description of an Orthic Gray Luvisol of the Williams Lake Association, from Soils of the Lac la Hache - Clinton Area (Valentine and Schori 1980), is given in the Appendix. The profile of a Williams Lake soil has a thinner Ae horizon and a less deeply leached solum than that of a Tyee soil.

Soils of the association have limited value for timber production but provide an important grazing capacity.

Map units

Three map units of the Williams Lake Association are identified in the Horsefly map area: two single, WL1 and WL2, and one compound, WL-HS.

WL1 Williams Lake 1 (8544 ha): Soils of the map unit occur with Chimney soils in a dry environment near 150 Mile House. Williams Lake soils are less deeply leached than Tyee soils. Lime is encountered at 60-70 cm, and Ae horizons are thin (5 cm) compared with those of Tyee soils (18 cm).

WL2 Williams Lake 2 (4460 ha): From 150 Mile House to the city of Williams Lake, Highway 97 cuts through a typical WL2 map unit. The rolling, hummocky terrain is pockmarked with small depressions and boulder-capped ridges where Orthic Dark Gray soils of the Chimney Association occupy grassland areas.

WL-HS Williams Lake - Hawks (1310 ha): This map unit is inextensive, but near 150 Mile House it is composed of Williams Lake soils complexed with 20-40% gravelly Hawks soils on irregular hummocky terrain.

SOIL ASSOCIATIONS OF THE QUESNEL HIGHLAND

Within the Horsefly survey area the Quesnel Highland lies mainly above an elevation of 1500 m. The highland is composed primarily of quartzite, quartzose phyllite, slate, argillite, and conglomerate bedrock, with large inclusions of limestone in the northeast portion. The topography is strongly rolling and steep where incised by the Cariboo River and its tributaries. Parent materials of the soils are derived primarily from morainal, colluvial and fluvial deposits. These materials are generally shallow, with bedrock outcrops occurring along stream banks and ridge tops.

Along the western edge of the Highland in the southeast part of the survey area, soils of the Alkali, Archie, Art, Heger, Helmcken, Larghetto, and Lynn associations occur on materials derived from basaltic and granitic bedrock in the Engelmann spruce - subalpine fir zone. North of Quesnel Lake a number of soil associations occupy this high elevation vegetation zone on quartzitic and sedimentary limestone rocks. These associations include Bearpaw Ridge, Captain Creek, Dezaiko, Spakwaniko, Tumuch, and Yanks Peak.

Spanish Lake soils are formed on extensive exposures of black phyllites and argillites. Lanezi soils lie near the western edge of the highland in the cedar-hemlock zone.

The generally narrow mountain valleys may contain fluvial deposits associated with Guilford, Catfish Creek, Ptarmigan, Barkerville, and Fontoniko soils. The organic Keithley soil association is confined to high-elevation mountain valleys and highlands.

The soil associations of the Quesnel Highland are arranged and described in the same way as they are shown on the map legend. Profile descriptions and analyses of common soils are given.

The map units of each soil association are described briefly below.

Alkali Association (AK)

The Alkali Association consists of gravelly loam and gravelly clay loam soils developed on morainal materials on steeply sloping mountainous terrain. Elevations exceed 1200 m. The association predominates in less than 1% of the Horsefly map area.

The mean annual precipitation is greater than 566 mm, the freeze-free period is less than 50 days, and there are less than 1030 growing degree-days above 5°C. The association occurs in the Engelmann spruce - subalpine fir zone. Subalpine fir and Engelmann spruce are the dominant and characteristic trees. The well-developed understory includes white-flowered rhododendron, blueberries, devil's-club, Sitka valerian, Canadian bunchberry, and mosses.

The Alkali soils are Podzolic Gray Luvisols developed on shallow materials over bedrock. Textures are commonly clay loams in the slightly acidic grayish brown parent materials. A typical profile description, from B.C. Soil Report No. 24 (Gough, in preparation), is given in the Appendix. These soils were named and described in Report Area No. 24.

Map units

One map unit, AK-HN, is recognized.

AK-HN Alkali-Helmcken (1710 ha): This single, variable map unit occupies the crest of Horsefly Mountain. Significant amounts (20-40%) of Orthic Humo-Ferric Podzol (Helmcken) are included in the unit.

Archie Association (AC)

The Archie Association consists of soils developed on gravelly loamy morainal materials in highlands south of Moffat Lakes. The terrain is rolling to steeply sloping. Elevations are generally above 1200 m. This association is dominant over 1.8% of the Horsefly map area.

The mean annual precipitation is greater than 566 mm, the freeze-free period is less than 50 days, and there are less than 1169 growing degree-days above 5°C.

The Archie Association occurs most commonly in the Engelmann spruce - subalpine fir zone. Subalpine fir and Engelmann spruce are the dominant and characteristic trees. The well-developed understory includes white-flowered rhododendron, blueberries, devil's-club, Sitka valerian, Canadian bunchberry, and mosses.

The parent materials of the Archie soils are gravelly sandy loam and gravelly loam morainal materials that are slightly acidic to neutral. Stones are moderately common. The soils are moderately well drained, are moderately pervious, and have a humid to perhumid soil moisture regime.

The most common soils of the Archie Association are Podzolic Gray Luvisols. They have reddish brown Bf horizons overlying a sandy clay loam Bt horizon, which overlies the compact sandy loam yellowish brown parent material. A complete profile description, from Soil Survey Report No. 24 (Gough, in preparation), is given in the Appendix. These soils were first described in the Canim Lake area. The soils support good stands of merchantable timber.

Map units:

Two map units are recognized in the Horsefly survey area, AC and AC-MF.

AC Archie (2747 ha): A few small areas of this map unit occur on steeply sloping, high-elevation areas east of Murphy Lake. The deeper Podzolic Gray Luvisols are associated with Podzols, areas of lithic soils, and granitic bedrock outcrops.

AC-MF Archie - Moffat Lakes (11 064 ha): This map unit is on somewhat more subdued terrain near Murphy Lake, along the Quesnel Highland - Fraser Plateau boundary zone. Orthic Humo-Ferric Podzols of the Moffat Lakes Association are the main inclusions (20-40%) in the unit.

Art Association (AT)

The Art Association consists of loamy soils developed on morainal materials in the vicinity of Tisdall and Moffat lakes. The terrain is undulating or rolling on gentle to strong slopes. Elevations are above 1200 m. The association is dominant over 2.2% of the Horsefly map area.

The mean annual precipitation is greater than 566 mm, the freeze-free period is less than 50 days, and there are less than 1169 growing degree-days above 5°C.

The association occurs most frequently in the Engelmann spruce - subalpine fir zone. Subalpine fir and Engelmann spruce are the dominant and characteristic trees. The well-developed understory includes white-flowered rhododendron, blueberries, devil's-club, Sitka valerian, Canadian bunchberry, and mosses.

The parent materials of the Art Association are gravelly clay loam morainal materials that are slightly calcareous. Stones are moderately common. The soils are well drained, are moderately pervious, and have a humid soil moisture regime.

The most common soils of the Art Association are Brunisolic Gray Luvisols. They have a reddish brown loam and brownish clay loam subsoils overlying the yellowish brown parent material. A complete profile description, from Soil Survey Report No. 24 (Gough, in preparation), is given in the Appendix. These soils were first described in the Canim Lake area. Art soils support good stands of merchantable timber.

Map units

Two map units of the Art Association, AT and AT-LN, are identified in the Horsefly map area.

AT Art (6562 ha): This map unit occupies large areas of high-elevation basaltic flows. The terrain is rolling on the main areas north of Moffat Lakes.

AT-LN Art-Lynn (9751 ha): About 30% Podzols of the Lynn Association are associates of the Art soils in a map unit similar to the AT unit above.

Barkerville Association (BK)

The Barkerville Association consists of fine sandy, and sandy-skeletal soils developed on reworked, fluvial (anthropogenic) materials. The terrain is mainly level to gently sloping, but is extremely sloping where the materials overlie bedrock in the BK2 map unit. Elevations range from 900 to 1200 m. The association occupies only three small map delineations that lie immediately south of more extensive areas that adjoin the historic town of Barkerville.

The mean annual precipitation is about 1150 mm, the freeze-free period is 30-49 days, and there are about 780-1029 growing degree-days above 5°C.

The Barkerville soils occur in the interior cedar-hemlock zone. Western red cedar, white spruce, and Rocky Mountain Douglas fir are the main trees. Shrubs and herbs such as Rocky Mountain maple, Oregon boxwood, blueberries, Canadian bunchberry, and mosses are characteristic of the zone.

The parent materials of the Barkerville soils are fine sandy loam mine tailings or coarse, angular debris remaining after placer gold-mining operations. Bedrock outcrops are common in the steeply sloping terrain of the BK2 unit. The soils range from rapidly to poorly drained, are rapidly to slowly pervious, and have a subhumid to aquic soil moisture regime.

The most common soils of the Barkerville association are Orthic Regosols. They have quite uniform yellowish brown parent materials throughout. A complete description of a soil of the Barkerville Association is not given in this report.

The presence of Barkerville soils serves to indicate the sites of early gold-rush activity and of present-day mining operations. The soils were identified and mapped in the Barkerville area.

Map units

There are two single map units, BK1 and BK2, identified in the Barkerville Association.

BK1 Barkerville 1 (353 ha): Map delineations of this unit consist of fine sandy loam placer-mine tailings overlying Organic and Gleysolic soils in valley bottoms associated with Antler Creek.

BK2 Barkerville 2 (47 ha): This map unit consists of steep-sided, sluiced-out areas (Plate Ia) where the original fluvial material has been placer mined until only angular fragments or the bedrock floor remain.

Bearpaw Ridge Association (BR)

The Bearpaw Ridge Association consists of sandy-skeletal and loamy soils developed on colluvial deposits of the Quesnel Highland north of Quesnel Lake. The terrain is moderately to strongly rolling, with areas of steep to very steep slopes. Elevations range above 1400 m. This association is dominant over 5.4% of the map area.

The mean annual precipitation is greater than 1150 mm, the freeze-free period is less than 49 days, and there are less than 780 degree-days above 5°C.

The Bearpaw Ridge Association commonly occurs in the Engelmann spruce - subalpine fir zone. Subalpine fir and Engelmann spruce are the dominant and characteristic trees. The well-developed understory includes white-flowered rhododendron, blueberries, devil's-club, Sitka valerian, Canadian bunchberry, and mosses.

The parent materials are sandy-skeletal and loamy colluvial materials. Stones occur in varying amounts. The soils are moderately well drained, are moderately pervious, and occur under a humid soil moisture regime.

The most common soils of the association are Orthic Humo-Ferric Podzols. They have dark gray surface horizons, with a reddish brown subsoil that overlies the yellowish brown parent material. The description of an Eluviated Dystric Brunisol of the Bearpaw Ridge Association, from near the Barkerville historic site, is given in the Appendix. Some logging is carried out on these soils.

Bearpaw Ridge soils were first described in the Prince George area (Dawson, in preparation).

Map units

There are three compound map units of the Bearpaw Ridge association: BR-CP, BR-RO, and BR-TP.

BR-CP Bearpaw Ridge - Captain Creek (7598 ha): The delineations of this map unit contain 30 - 50% of the gravelly loamy Captain Creek soils.

BR-RO Bearpaw Ridge - Rockland (7514 ha): This map unit contains large amounts (30-50%) of bedrock (Rockland). The very steep to extreme slopes are frequently modified by avalanche tracks.

BR-TP Bearpaw Ridge - Torpy River (25 500 ha): Map delineations of this unit contain 20-40% of shallow, sandy, and loamy Torpy River soils.

Captain Creek Association (CP)

The Captain Creek Association consists of loamy-skeletal soils developed on morainal materials. The soils generally occupy lower slope positions above elevations of 1200 m. The association is dominant over 7.5% of the map area.

The mean annual precipitation is greater than 1150 mm, the freeze-free period is less than 49 days, and there are less than 780 growing degree-days above 5°C.

The Captain Creek Association occurs in both the interior cedar-hemlock and the Engelmann spruce - subalpine fir zones. Western red cedar, white spruce, and Rocky Mountain Douglas fir are the main trees of the cedar - hemlock zone. Shrubs and herbs such as Rocky Mountain maple, Oregon boxwood, blueberries, Canadian bunchberry, and mosses are characteristic of the zone. Subalpine fir and Engelmann spruce are the dominant and characteristic trees of the subalpine fir zone. The well-developed understory includes white-flowered rhododendron, blueberries, devil's-club, Sitka valerian, Canadian bunchberry, and mosses.

The parent materials of the Captain Creek soils are loamy-skeletal morainal deposits. Topography is generally moderately to strongly sloping with occasional areas that are extremely to very steeply sloping. The soils are moderately well drained, are moderately pervious, and have a perhumid soil moisture regime.

The most common soils of the association are Orthic Humo-Ferric Podzols, although Podzolic Gray Luvisols do occur. Podzolic soils have a grayish surface horizon with a yellowish brown subsoil that overlies the brown parent material. The description of an Orthic Humo-Ferric Podzol from near the mining community of Wells is given in the Appendix.

Soils of the Captain Creek Association provide much of the timber cut in the area.

These soils were first described in the Prince George area (Dawson, in preparation).

Map units

The four map units of the Captain Creek association include a single unit, CP, and three compound units, CP-BR, CP-SW, and CP-R.

CP Captain Creek (25 479 ha): In this unit, 20-40% of the soils may include lithic phases or gleyed subgroups of Podzolic soils.

CP-BR Captain Creek - Bearpaw Ridge (10 081 ha): The thicker morainal parent material of the Captain Creek soils is associated with 40 - 60% of shallow colluvial materials (Bearpaw Ridge) on moderate to steep slopes.

CP-SW Captain Creek - Spakwaniko (19 017 ha): Many of the areas of this map unit are confined to long, moderate slopes with northerly aspects. They exhibit a unique pattern of vegetation in which treeless communities of Sitka mountain alder, devil's-club, Sitka valerian, and other herbs and shrubs are interspersed among dense stands of Engelmann spruce and subalpine fir. The soils under these shrub communities are Gleysols or Sombric Brunisols (Spakwaniko) and occupy 30-40% of the map unit.

CP-R Captain Creek - Ramsey (1750 ha): The few delineations of this map unit occupy tributary valleys of the Swift River. About 20-30% of coarse textured soils on glaciofluvial materials (Ramsey) occur with Captain Creek soils on irregular hummocky terrain.

Catfish Creek Association (CC)

The Catfish Creek Association consists of soils developed on moderately decomposed peat in the eastern part of the Fraser Plateau and in the Quesnel Highland. The map unit is scattered in small to medium-sized areas. The topography is nearly level. Elevations range from 600 to 1500 m. The association predominates in less than 1% of the survey area.

The mean annual precipitation is from 620 to over 1150 mm. The freeze-free period is 50-89 days and there are 670-1169 growing degree-days above 5°C.

Catfish Creek soils occur most frequently in the interior cedar-hemlock zone. Vegetation on the organic terrain is restricted to a sparse tree cover of black spruce and lodgepole pine with common labrador tea (*Ledum groenlandicum*), other shrubs, herbs, sedges, and mosses.

The parent material of the soils is accumulated organic material, generally in a moderately decomposed state with inclusions of fibric materials. The soils are very poorly drained, are slowly pervious, and have a peraquic soil moisture regime.

The most common soils of the Catfish Creek Association are Typic Mesisols. They have fibric organic material in the surface horizons overlying mesic and humic organic horizons and mineral material at depth. A complete description of a Terric Fibric Mesisol of the Catfish Creek Association, from the Rocky Mountain Trench area (Maxwell, in preparation), is given in the Appendix.

Soils of the Catfish Creek Association are similar to Moxley soils in the Rocky Mountain Trench (Hortie et al. 1970).

Map units

One map unit, CC-SW, is identified in the survey area.

CC-SW Catfish Creek - Spakwaniko (1719 ha): Shallow terric Organic soils and Gleysols (Spakwaniko) occupy about 30% of the map unit in association with the deeper Catfish Creek soils.

Dezaiko Association (DZ)

The Dezaiko Association consists of loamy-skeletal and sandy soils developed on shallow colluvial or morainal deposits. The terrain is mainly moderately to strongly sloping with occasional areas that are gently or extremely sloping. This association generally occurs above 1500 m elevation throughout the survey area. It is dominant over 6.0% of the map area.

The mean annual precipitation is greater than 1150 mm, the freeze-free period is less than 49 days, and there are less than 780 growing degree-days above 5°C.

The vegetation is generally that of the Engelmann spruce - subalpine fir zone. Subalpine fir and Engelmann spruce are the dominant and characteristic trees. The well-developed understory includes white-flowered rhododendron, blueberries, devil's-club, Sitka valerian, Canadian bunchberry, and mosses.

The parent materials of the Dezaiko soils are loamy-skeletal and sandy colluvial veneers. Stones may occur in moderate amounts. These soils are well to moderately well drained, are moderately pervious, and have a subhumid to humid soil moisture regime.

The most common soils of the Dezaiko Association are Orthic Humo-Ferric Podzols, lithic phase. Dezaiko soils have a grayish surface horizon and a reddish brown subsoil which overlies the dark yellowish brown parent material. A complete description of an Orthic Humo-Ferric Podzol, lithic phase, from a site near Pinegrove in the Barkerville area, is given in the Appendix.

Dezaiko soils supply limited volumes of timber from logging operations in the Quesnel Highland area.

The Dezaiko Association was first named and described in the Prince George area (Dawson, in preparation).

Map units

There are two map units described for the Dezaiko Association, one single, DZ, and one compound, DZ-YP.

DZ Dezaiko (12 744 ha): Map delineations of this unit contain up to 40% bedrock outcrops in some areas.

DZ-YP Dezaiko - Yanks Peak (32 672 ha): This map unit contains 40-60% sandy soils of the Yanks Peak Association. The map unit occurs in the upper forested zone and often extends into the subalpine areas of shrubs and stunted trees.

Fontoniko Association (FN)

The Fontoniko Association consists of sandy soils developed on fluvial fan deposits throughout the highlands area. Elevations range from 1000 to 1500 m. The association predominates in less than 1% of the map area.

The mean annual precipitation is 830-1150 mm, the freeze-free period is 30-59 days, and there are 670-1029 growing degree-days above 5°C.

The soils commonly occur in the subboreal spruce and interior cedar-hemlock zones. In the subboreal spruce zone Engelmann spruce and subalpine fir with Rocky Mountain Douglas fir are common trees, with a ground cover of blueberries, Oregon boxwood, and mosses. Western red cedar, white spruce, and Rocky Mountain Douglas fir are the main trees of the cedar-hemlock zone. Rocky Mountain maple, Oregon boxwood, blueberries, Canadian bunchberry, and mosses are characteristic ground cover species.

Parent materials of the Fontoniko soils are loamy sand to sandy loam fluvial deposits. Stones or gravel may occur in moderate amounts. The soils have a light gray surface horizon and a reddish brown subsoil underlain by the yellowish brown parent material.

Fontoniko soils are mainly Eluviated Dystric Brunisols but Orthic Humo-Ferric Podzols are of frequent occurrence. Profile descriptions are similar to those described under Alix, Roaring, and Ramsey associations. A detailed profile description is not given in this report.

The soils were first described in the Bowron River area, east of Prince George.

Map units

A single unit, FN, with a number of small delineations was recognized in the Horsefly map area.

FN Fontoniko (1050 ha): About 20 small fan-shaped areas are mapped in the valleys of the Quesnel Highland; most of these occur on stream deltas along Cariboo Lake and the Cariboo River.

Guilford Association (GF)

The Guilford Association consists of sandy and loamy soils developed on recent fluvial deposits. The terrain is mainly level to undulating with some steep terrace escarpments. Elevations are generally below 1000 m, particularly along the Cariboo and Beaver rivers. This association predominates in less than 1% of the map area.

The mean annual precipitation is 800-1000 mm, the freeze-free period is 50-90 days, and there are 780-1169 growing degree-days above 5°C.

The Guilford Association occurs mainly in the interior cedar-hemlock zone. Western red cedar, white spruce, and Rocky Mountain Douglas fir are the main trees. Shrubs and herbs such as Rocky Mountain maple, Oregon boxwood, blueberries, Canadian bunchberry, and mosses are characteristic of the zone.

The fluvial parent materials of Guilford soils range in texture from silt loam to sandy loam. Stones and gravel may occur in moderate amounts. The soils are moderately well to imperfectly drained, are moderately to slowly pervious, and have a subaquic soil moisture regime.

The most common soils of the Guilford Association are Cumulic Regosols. Gleyed Cumulic Regosols occur throughout the association in imperfectly drained, slowly pervious sites. The soil profile generally contains bands of grayish brown material between the layers of yellowish brown soil parent material. A complete description of a Gleyed Cumulic Regosol is from the Rocky Mountain Trench area (Maxwell, in preparation), where the association was first described and named. This soil is described in the Appendix. Guilford soils are similar to the McGregor soils that occur in different biogeoclimatic zones on the floodplain of the Fraser River.

Guilford soils are valuable for agricultural crops in some areas but in many cases they are susceptible to flooding.

Map units

There are three map units identified in the Horsefly area: one single, GF, and two compound, GF-CC and GF-HF.

GF Guilford (3489 ha): These soils have formed mostly on the active portion of stream floodplains but may contain up to 40% of more stable areas of Luvisols or Gleysols.

GF-CC Guilford - Catfish Creek (1535 ha): A single large delineation of this map unit in the Black Creek area contains about 30% of the very poorly drained Typic Mesisol soils of the Catfish Creek Association and Gleysols.

GF-HF Guilford - Horsefly (1892 ha): This map unit in the Beaver Creek valley contains a complex pattern of sandy Guilford soils and eroded remnants (20-40%) of the silty Horsefly soils.

Heger Association (HR)

The Heger Association consists of sandy-skeletal and loamy-skeletal soils developed on colluvial materials. They occur mainly along the western boundary zone of the Quesnel Highland. The terrain consists of steep to very steep mountain slopes or valley sides. Elevations are generally above 900 m. This association is dominant over 1.3% of the map area.

The mean annual precipitation is above 724 mm, the freeze-free period is less than 60 days, and there are less than 1030 growing degree-days above 5°C.

The Heger Association occurs in both the subboreal spruce and Engelmann spruce - subalpine fir zones. The subboreal spruce zone contains Engelmann spruce, subalpine fir, and Rocky Mountain Douglas fir with a ground cover of blueberries, Oregon boxwood, and mosses. Subalpine fir and Engelmann spruce are the dominant and characteristic trees of the subalpine fir zone. The well-developed understory includes white-flowered rhododendron, blueberries, devil's-club, Sitka valerian, Canadian bunchberry, and mosses.

Parent materials of the Heger Association are sandy-skeletal and loamy-skeletal colluvial materials that are derived from upslope, unconsolidated, acidic materials. The soils are well drained, are moderately pervious, and have a subhumid to humid soil moisture regime.

The most common soils of the association are Eluviated Dystric Brunisols. They have a grayish surface horizon and a reddish brown subsoil underlain by the yellowish brown parent material. A complete profile description, from B.C. Soil Report No. 24 (Gough, in preparation), is given in the Appendix.

Soils of the Heger Association often provide valuable browse and escape terrain for deer.

The association was first identified in the Canim Lake area.

Map units

One map unit, HR, was identified in the Horsefly map area.

HR Heger (10 776 ha): The composition of this unit may be extremely variable, containing large amounts of eroded soils, Regosols, Gray Luvisols, and rock outcrop.

Helmcken Association (HN)

The Helmcken Association consists of sandy-skeletal and loamy-skeletal soils developed on colluvial veneers in the vicinity of Horsefly Mountain. Elevations are generally above 1200 m. The association predominates in less than 1% of the Horsefly map area.

The mean annual precipitation is greater than 566 mm, the freeze-free period is less than 60 days, and there are less than 1309 growing degree-days above 5°C. In the Engelmann spruce - subalpine fir zone subalpine fir and Engelmann spruce are the dominant and characteristic trees. The well-developed understory includes white-flowered rhododendron, blueberries, devil's-club, Sitka valerian, Canadian bunchberry, and mosses.

The Helmcken soils are Orthic Humo-Ferric Podzols developed on colluvium that is less than 150 cm thick overlying metamorphic and volcanic bedrock. The lithic phase predominates in association with rockland. The Helmcken soils are not described in this report but more detailed information is available in B.C. Soil Report No. 24 (Gough, in preparation). The soils are of greater extent in this adjoining report area where they were first named and described.

Map units

Two map units, HN and HN-RO, occur in the Horsefly map area.

HN Helmcken (4414 ha): This map unit is confined to the slopes of Horsefly Mountain, below the Alkali - Helmcken unit of the mountain crest.

HN-RO Helmcken - Rockland (1722 ha): Outcrops of volcanic rocks are significant components (30-40%) of this map unit, in association with lithic Helmcken soils.

Keithley Association (KY)

The Keithley Association consists of soils developed from moderately decomposed organic materials accumulated on gentle slopes and in depressions at high-elevation sites in the Quesnel Highland. Elevations are generally well above 1100 m. This association predominates in less than 1% of the Horsefly map area.

The mean annual precipitation is greater than 709 mm, the freeze-free period is less than 30 days, and there are less than 1030 growing degree-days above 5°C.

The Keithley Association occurs mainly in the Engelmann spruce - subalpine fir zone. Hydrophytic vegetation such as sedges, reeds, coarse grasses, and moss communities is characteristic.

Parent materials of the Keithley soils are moderately decomposed, strongly acid, organic material derived from sedges, mosses, and herbs. The soils are very poorly drained, are moderately pervious, and have an aquic moisture regime.

The most common soils of the associaton are Typic Mesisols. They have a mesic middle tier and are at least 160 cm thick.

The Keithley soils are not described in detail in this report. They were first identified in the Cariboo Lake area.

Map units

Two map units occur in the Horsefly map area: one single, KY, and one compound, KY-TC.

KY Keithley (2600 ha): This unit occurs primarily in high-elevation valleys and is strongly acid in reaction.

KY-TC Keithley-Tumuch (1176 ha): About 40-60% of this map unit consists of the strongly acid, gravelly, sandy, fluvial soils (Tumuch) derived from fluvial materials.

Lanezi Association (LZ)

The Lanezi Association consists of loamy soils developed on morainal materials deposited along the boundary zone of the Quesnel Highland. The topography is mainly gently to strongly rolling and occasionally extremely sloping. Elevations range from 1000 to 1800 m. This association is dominant over 5.9% of the map area.

The mean annual precipitation is 1150 mm or greater, the freeze-free period is 30-49 days, and there are less than 780 growing degree-days above 5°C.

Lanezi soils occur commonly in the interior cedar-hemlock zone. Western red cedar, white spruce, and Rocky Mountain Douglas fir are the main trees. Shrubs and herbs such as Rocky Mountain maple, Oregon boxwood, blueberries, Canadian bunchberry, and mosses are characteristic of the zone.

The parent material of the Lanezi soils ranges from loam to clay loam morainal material that is acid to neutral in reaction. Stones or gravel are present in moderate amounts. The soils are moderately well drained, are moderately pervious, and have a perhumid soil moisture regime.

The most common soils of the Lanezi Association are Luvisolic Humo-Ferric Podzols. They have a grayish surface horizon with a yellowish brown subsoil overlying the olive brown parent material. A complete description for a Podzolic Gray Luvisol of the Lanezi Association, from Soil Survey Report Area No. 41 (Maxwell, in preparation), is given in the Appendix.

Lanezi soils were first recognized near the community of Likely and are described by Dawson (in preparation).

The soils of the Lanezi Associaton provide a substantial percentage of the timber logged in the area.

Map units

There are four map units of the Lanezi Association: a single unit, LZ, and three compound units, LZ-D, LZ-DN, and LZ-PM.

LZ Lanezi (6608 ha): The soils of this map unit are quite similar to those of the Dominion Association but occur in the interior cedar-hemlock zone.

LZ-D Lanezi-Deserters (22 865 ha): Map delineations of this unit contain 20-40% inclusions of the gravelly loamy Brunisolic Gray Luvisol soils of the Deserters Association.

LZ-DN Lanezi-Dragon (13 386 ha): This unit contains 30-50% of the shallow sandy loam Podzolic soils of the Dragon Association.

LZ-PM Lanezi-Ptarmigan (1738 ha): The few map delineations of this unit contain about 30% of the gravelly, sandy, glaciofluvial soils of the Ptarmigan Assocation. The topography is gently to moderately sloping.

Larghetto Association (LG)

Two small areas of one map unit (LG), near Tisdall Lake, are correlated with extensive units to the southeast in Soil Report Area No. 24 (Gough, in preparation).

Larghetto soils are dominantly Eluviated Eutric Brunisols developed on gravelly, loamy, and sandy colluvial materials. In the Horsefly report area these soils occur above 1000 m on moderately sloping topography. The association predominates in less than 1% of the Horsefly map area.

Further details on the Larghetto Association may be obtained from Soil Report No. 24 (Gough, in preparation).

Map units

One map unit, LG, is recognized in the survey area.

LG Larghetto (775 ha): The two delineations of this map unit occur in the upper Quesnel River valley on the eastern boundary of the map area.

Lynn Association (LN)

The Lynn Association consists of sandy-skeletal and loamy-skeletal soils developed on shallow colluvial materials in the Moffat Lakes area. The terrain is rolling and steeply sloping. Elevations are generally above 1200 m. This association predominates in less than 1% of the Horsefly map area.

The mean annual precipitation is greater than 724 mm, the freeze-free period is less than 30 days, and there are less than 780 growing degree-days above 5°C.

The Lynn Association occurs in the Engelmann spruce - subalpine fir zone. Subalpine fir and Engelmann spruce are the dominant and characteristic trees. The well-developed understory includes white-flowered rhododendron, blueberries, devil's-club, Sitka valerian, Canadian bunchberry, and mosses.

The parent material of the Lynn soils is gravelly loamy and sandy colluvium that is strongly acid in reaction. Stones are moderately common. The soils are well drained, are moderately pervious, and have a subhumid soil moisture regime.

The most common soils are Orthic Humo-Ferric Podzols. They have a reddish brown subsoil overlying the yellowish brown parent material. A complete description of an Orthic Humo-Ferric Podzol, lithic phase, of the Lynn Association, from B.C. Soil Survey Report No. 24 (Gough, in preparation), is given in the Appendix. Lynn soils were first named and described in the Canim Lake area.

Map units

One map unit, LN-AC, is recognized in the survey area.

LN-AC Lynn-Archie (3302 ha): This map unit is of small extent in the area of granitic rock formations east of Murphy Lake.

Ptarmigan Association (PM)

The Ptarmigan Association consists of sandy-skeletal soils developed on glaciofluvial materials. The terrain is mainly very gently to moderately sloping with minor areas of nearly level or strong slopes. Elevations range from less than 900 to nearly 1200 m. This association predominates in less than 1% of the map area.

The mean annual precipitation ranges from 834 to 1051 mm, the freeze-free period is 50-59 days, and there are 670-1169 growing degree-days above 5°C.

The soils of the association occur principally in the interior cedar-hemlock zone. Western red cedar, white spruce, and Rocky Mountain Douglas fir are the main trees. Shrubs and herbs such as Rocky Mountain maple, Oregon boxwood, blueberries, Canadian bunchberry, and mosses are characteristic ground cover plants.

The parent material of the Ptarmigan soils is sandy-skeletal glaciofluvial material that is calcareous at depth. Stones and cobbles are common. The soils are well drained, are moderately pervious, and have a subhumid soil moisture regime.

The most common soils of the Ptarmigan Association are Orthic Humo-Ferric Podzols. They have a grayish surface horizon with a reddish brown subsoil underlain by the yellowish brown parent material. A complete description of an Orthic Humo-Ferric Podzol of the Ptarmigan Association, from Soil Report Area No. 41 (Maxwell, in preparation), is given in the Appendix.

The Ptarmigan soils were first described near McBride in the Rocky Mountain Trench (Maxwell, in preparation).

Map units

Two map units of the Ptarmigan Association occur in the Horsefly map area: one simple, PM, and one compound, PM-CC.

PM Ptarmigan (4442 ha): This map unit may include up to 20% of Typic Mesisol (Catfish Creek) and Gleysolic soils.

PM-CC Ptarmigan - Catfish Creek (1545 ha): Map delineations of this unit may contain 30-50% inclusions of very poorly drained Typic Mesisols (Catfish Creek).

Rockland (RO)

The Rockland land type (RO) refers to those areas where bedrock outcrops at the surface and dominates the map unit. Soil development is confined to minor areas having greater than 10 cm of soil material over consolidated rock. The terrain is usually steep and ridged and frequently includes precipitous cliffs. This unit is most common in the subalpine environment of the Quesnel Highland and Cariboo Mountains.

Map units

One map unit, RO, is recognized.

RO Rockland (6750 ha); Steep, often precipitous slopes characterize this landtype of mountain ridge crests and escarpments.

Spakwaniko Association (SW)

The Spakwaniko Association consists of loamy soils formed on colluvial and morainal materials in the Spanish Lake area. The soils generally occupy seepage sites on north-facing slopes. The terrain is moderately sloping. Elevations range above 1000 m. The association predominates in less than 1% of the map area.

The mean annual precipitation is greater than 1149 mm, the freeze-free period is 30-49 days, and there are less than 780 growing degree-days above 5°C.

Spakwaniko soils occur in the interior cedar-hemlock and Engelmann spruce - subalpine fir zones. Western red cedar, white spruce, and Rocky Mountain Douglas fir are the main trees of the cedar-hemlock zone. Shrubs and herbs such as Rocky Mountain maple, Oregon boxwood, blueberries, Canadian bunchberry, and mosses are characteristic of the zone. Subalpine fir and Engelmann spruce are the dominant and characteristic trees of the subalpine fir zone. The well-developed understory includes white-flowered rhododendron, blueberries, devil's-club, Sitka valerian, Canadian bunchberry, and mosses.

Parent materials of Spakwaniko soils are loamy, morainal, and colluvial deposits. Stones or gravel may be present in moderate amounts. The soils are imperfectly and poorly drained, are slowly pervious, and have a perhumid soil moisture regime. They commonly occupy seepage sites on north-facing slopes.

The most common soils of the Spakwaniko Association are Orthic Humic Gleysols and Gleyed Sombric Podzols. They have very dark brown or black surface horizons underlain by gleyed subsoils. The description of a Gleyed Humo-Ferric Podzol, from near the community of Stanley, is given in the Appendix.

The Spakwaniko soils were first described in the Barkerville area.

Map units

Although only one map unit, SW, is recognized in this report, Spakwaniko soils are important subdominant components of such units as SS-SW and CP-SW.

SW Spakwaniko (285 ha): Soils in the three map delineations of this unit consist of 20-40% of Organic soils such as Catfish Creek that are associated with Spanish Lake and Captain Creek soils.

Spanish Lake Association (SS)

The Spanish Lake Association consists of loamy soils developed on morainal materials. It is confined to black phyllite rock of the Midas formation near Spanish Lake. The terrain is generally undulating or rolling on moderate to strong slopes, or occasionally, extreme slopes. Elevations are above 900 m. This association is dominant over 2.0% of the Horsefly map area.

The mean annual precipitation is greater than 709 mm, the freeze-free period is 30-74 days, and there are less than 1169 growing degree-days above 5°C.

The association occurs in the Engelmann spruce - subalpine fir and interior cedar-hemlock zones. Subalpine fir and Engelmann spruce are the dominant and characteristic trees of the subalpine fir zone. The well-developed understory includes white-flowered rhododendron, blueberries, devil's-club, Sitka valerian, Canadian bunchberry, and mosses. Western red cedar, white spruce, and Douglas fir are the main trees of the cedar-hemlock zone. Shrubs and herbs such as Rocky Mountain maple, Oregon boxwood, blueberries, Canadian bunchberry, and mosses are characteristic of the zone.

The parent material of the Spanish Lake Association is loamy till derived mainly from phyllite bedrock. Stones are few. The soils are moderately well drained, are moderately pervious, and have a subhumid soil moisture regime.

The most common soils are Eluviated Eutric Brunisols. Much of the color resulting from soil development processes is generally masked by dark gray colors inherited from the weathered phyllite parent material. A complete description of a profile from near Spanish Lake is given in the Appendix.

The Spanish Lake soils were first recognized during the soil survey of the Horsefly area. Although of limited extent, some map units produce high volumes of commercial timber.

Map units

Four map units are recognized in the Horsefly map area: one single, SS, and three compound, SS-PM, SS-RO, and SS-SW.

SS Spanish Lake (2564 ha): This map unit may contain inclusions of up to 20% of the poorly drained Orthic Humic Gleysols of the Spakwaniko Association or the gravelly, sandy soils of the Ptarmigan Association, or both.

SS-RO Spanish Lake - Rockland (4838 ha): Soils of this unit are often eroded and include Humo-Ferric Podzols and significant amounts of bedrock outcrop (>40%) in a subalpine environment.

SS-PM Spanish Lake - Ptarmigan (1032 ha): The one map delineation of this unit occurs along Spanish Lake where Ptarmigan soils on glaciofluvial gravels are common and may comprise 20-40% of the map unit on hummocky, sloping terrain.

SS-SW Spanish Lake - Spakwaniko (6704 ha): This map unit is confined mainly to the lower sections of northerly slope aspects. Gleysols and Gleyed Sombric Brunisols of the Spakwaniko Association occupy 20-30% of the nonforested shrub-herb inclusions in the map unit.

Torpy River Association (TP)

The Torpy River Association consists of gravelly sandy and loamy soils developed on morainal materials. The terrain is strongly to steeply sloping on mid to lower mountain slopes. Elevations range from 900 to 1500 m. Torpy soils do not predominate in any map unit but occur as subdominant soils in the BR-TP map unit. Torpy soils occur mainly in the Engelmann spruce - subalpine fir zone. Subalpine fir and Engelmann spruce are the dominant and characteristic trees. The well-developed understory includes white- flowered rhododendron, blueberries, devil's-club, Sitka valerian, Canadian bunchberry, and mosses. Stunted and twisted trees in a rich herbaceous flora, typical of lower alpine tundra zones, are quite common.

The predominant Orthic Humo-Ferric Podzols of the association are well to moderately well drained and are associated with gleyed soils and Ferro-Humic Podzols.

Soils of the Torpy River Association are described more fully in soil reports of adjoining survey areas (Dawson, in preparation; Lord and Green, in preparation).

Tumuch Association (TC)

The Tumuch Association consists of sandy-skeletal soils developed on fluvial materials in high mountain valleys of the Quesnel Highland. The terrain is predominantly gently sloping with occasionally moderate and nearly level slopes. Elevations range upward from 1200 m. This association is dominant over 1.5% to the map area.

The mean annual precipitation is greater than 1149 mm, the freeze-free period is 30-49 days, and there are less than 780 growing degree-days above 5°C.

Tumuch soils occur in the interior cedar-hemlock and Engelmann spruce - subalpine fir zones. Western red cedar, white spruce, and Rocky Mountain Douglas fir are the main trees of the cedar-hemlock zone. Shrubs and herbs such as Rocky Mountain maple, Oregon boxwood, blueberries, Canadian bunchberry, and mosses are characteristic of the zone. Subalpine fir and Engelmann spruce are the dominant and characteristic trees of the subalpine fir zone. The well-developed understory includes white-flowered rhododendron, blueberries, devil's-club, Sitka valerian, Canadian bunchberry, and mosses.

The parent materials of the Tumuch soils are sandy-skeletal fluvial deposits, which are strongly acid. Stones and gravel may occur in moderate amounts. The soils are well to imperfectly drained, are moderately pervious, and have a humid to subhumid soil moisture regime.

The most common soils of the association are Orthic Humo-Ferric Podzols, although Gleyed Regosols and Rego Gleysols occur frequently. Tumuch soils have a grayish surface horizon with a reddish brown subsoil underlain by the yellowish brown parent material. Tumuch soils are not described in greater detail in this report.

Map units

Two map units, TC and TC-YP, are identified in the survey area.

TC Tumuch (5460 ha): A number of small narrow areas of this unit occur in the upper reaches of tributary stream valleys in the Quesnel Highland. A high variability is generally present in the form of soil drainage, texture range, and soil development.

TC-YP Tumuch - Yanks Peak (5907 ha); This map unit occupies subalpine plateau areas above 1400 m elevation, north of Quesnel Lake. Fluvial deposits of small streams occur with morainal materials (Yanks Peak) in complex patterns of vegetation and soils.

Yanks Peak Association (YP)

The Yanks Peak Association consists of gravelly loamy soils developed on morainal materials in subalpine areas of the mountains. The terrain is mainly moderately to steeply sloping. Elevations range from 1500 to greater than 2000 m. The association is dominant over 2.3% of the map area.

The mean annual precipitation is greater than 1149 mm, the freeze-free period is less than 30-49 days, and there are less than 780 growing degree-days above 5°C.

The soils of the association occur in the Engelmann spruce - subalpine fir zone and alpine tundra zone. Subalpine fir and Engelmann spruce are the dominant and characteristic trees of the subalpine fir zone. The well-developed understory includes white-flowered rhododendron, blueberries, devil's-club, Sitka valerian, Canadian bunchberry, and mosses. Trees such as subalpine fir, whitebark pine, and Engelmann spruce survive only at the lowest levels of the alpine tundra zone. They occur here only in a stunted form with willows and common juniper. The herbaceous flora of the alpine tundra zone is rich and varied, including many species of grasses, sedges, and small shrubs.

The parent materials of the Yanks Peak soils are gravelly loamy, morainal materials that include colluvium. Stones or gravel occur in moderate amounts. The soils are well drained, are moderately to rapidly pervious, and have a humid soil moisture regime.

The most common soils of the Yanks Peak Association are Orthic Humo-Ferric Podzols. However, Sombric Podzols (Plate IId) and Regosols occur in most areas and predominate in some delineations. Podzolic soils have a grayish surface horizon with a reddish brown subsoil and yellowish brown parent material. A complete description of an Orthic Humo-Ferric Podzol, from Yanks Peak in the Quesnel Highland (Sneddon 1969), is given in the Appendix. In addition, a lithic phase of a Sombric Humo-Ferric Podzol (from Sneddon 1969) is also described in the Appendix.

Yanks Peak soils are similar to some soils of the Paxton Mountain (or Paxton) Association mapped in the mountain areas southeast of Prince George and in the Rocky Mountains (Vold et al. 1977), but these latter soils are developed on more calcareous materials.

Most areas where these soils predominate have a high recreational value.

Map units

One compound map unit, YP-RO, occurs in the Horsefly map area.

YP-RO Yanks Peak - Rockland (17 193 ha): The highest elevations in the map area occur in this map unit. As much as 30-50% of the unit may be occupied by bedrock outcrop.

LAND USE

The maps comprising the Canada Land Inventory (CLI) (Canada Land Inventory 1973) show the land or soil capability for various purposes. Maps showing land capability for forestry are at a scale of 1:125 000, as are the maps showing the soil capability for agriculture. Land capability for recreation and wildlife (waterfowl and ungulates) are shown on maps at a scale of 1:250 000. At these scales the information is suitable for regional planning but is too generalized for more detailed site evaulation.

An additional study, Land Capability Analysis: Cariboo Area (Canada Land Inventory 1973), at a scale of 1:250 000 includes the Horsefly River area (93 A/SW). This publication considers the capability of the land to support agriculture, big game, forestry, recreation, and wildlife.

No attempt is made in the present report to provide maps showing soil interpretations for any sector of natural resources. However, derived and interpretive maps can be made available following the publication of this report. A wide range of such maps, including those showing texture groups, drainage, geologic materials, and wetlands, can be produced by Agriculture Canada from original soil information. The following sections on agriculture, forestry, wildlife (ungulates), wildlife (waterfowl) and recreation give brief supplementary information on land or land capability of the Horsefly Area.

Agriculture

Under the CLI system, climate provides the basic limitations for agriculture. Selected climatic data were collected over the area through a network of short-term stations and related to the few established stations in or near the map area (Table 1).

Table 2, from a report published by the Air Studies Branch 1981, defines climatic capability classes in interior British Columbia.

The narrative section of the publication Soil Capability for Agriculture - Horsefly River 93 A/SW (1975) states that 90% of the area has a favorable climate for agriculture. Class 1 climate is confined to the San Jose valley. Extensive areas of Class 2 climate occur in the southwest. Below 1150 m aridity reduces climate ratings from Class 2 to Class 3. Under irrigation, the limitation imposed on agriculture by aridity in these climates can be overcome sufficiently to grow a wide range of vegetables, small fruits, cereal grains, and forage crops. Frost is a hazard in most valleys and depressions. Under the more severe Class 4 climate, cereal crops are restricted mainly to oats and barley. The aridity limitation does not apply to Class 2 climate east of the Beaver Creek valley. Above an elevation of about 1300 m, Class 5 and 6 climates restrict agriculture to the growth of forage crops, improved pasture, and native range.

The most favorable soils for agriculture in the Horsefly area are limited to soil capability Class 3, unimproved rating. Limitations imposed by topography or climate, or both, on some areas of well-drained lacustrine and alluvial soils are the main restrictions for agriculture. Where topography and stoniness factors are not limiting, Gray Luvisols developed on till materials are generally rated Class 4, unimproved. Under limitations imposed by more severe topography and stoniness, these soils are suitable only for forage crops, pasture, or grazing.

Most Podzols and Brunisols are restricted by limitations imposed by severe topography and stoniness to Classes 5 and 7, with small areas of Classes 3 and 4 in more favorable sites. Shallow lithic soils in the mountainous areas of the Quesnel Highland are further limited by severe climate to Classes 6 and 7.

The soil capability classification for agriculture under the Canada Land Inventory does not include Organic soils. In many regions of the province, and particularly on the Cariboo-Chilcotin plateau, these soils are important components of the soil landscape. In the supplementary publication Land Capability for Agriculture, B.C. Land Inventory (Runka 1973), organic deposits are rated in a proposed capability classification that recognizes the properties peculiar to Organic soils. The agriculture of the area is based on the ranching industry, which is largely dependent on readily drained and cleared soils of meadow lands and valley bottoms.

Table 2. Climatic capability for agriculture classes in interior British Columbia

	Freeze-free period (base 0°C) (days)	Growing degree-days (above 5°C)	Climatic moisture deficit (mm)	Climatic moisture surplus ratio
Class 1	90 - 119	1310 - 1504	< 40	< 0.33
Class 2	75 - 89	1170 - 1309	40 - 115	0.34 - 0.55
Class 3	60 - 74	1030 - 1169	116 - 190	0.56 - 0.75
Class 4	50 - 59	1030 - 1169	191 - 265	0.76 - 1.00
Class 5	30 - 49	780 - 1029	266 - 340	> 1.00
Class 6	< 30	670 - 779	341 - 415	
Class 7	< 30	< 670	> 415	

Climatic moisture deficit: the negative difference between May-September precipitation and potential evapotranspiration.
Climatic moisture surplus: the positive difference between May-September precipitation and potential evapotranspiration expressed as a ratio.

Forestry

The published CLI map Land Capability for Forestry, Horsefly River 93 A/SW (1975), groups all soils of the area into one or more of six classes based on inherent ability to grow commercial timber. These maps show, for each map delineation, the land capability classes, the limiting factors, and the tree species indicators. The productivity range of each class is based on the mean annual increment of the best species adapted to the site at or near rotation age. Productivity classes are expressed as cubic metres per hectare per year as follows:

Class 1.....>7.8

Class 2.....6.4-7.7

Class 3.....5.0-6.3

Class 4.....3.6-4.9

Class 5.....2.2-3.5

Class 6.....0.8-2.1

Class 7.....<0.8

Class 3 is the dominant capability class in the area. This class occurs predominantly on Gray Luvisols and Podzols developed on till. It may be associated with Class 2 where the soil moisture regime is favorable. Capability Class 1 was not identified in the map area.

Classes 4 and 5 occur in either colder and wetter sites on Podzols or Gray Luvisols or on drier sites associated with Gray Luvisols or Brunisols. Classes 6 and 7 are of minor occurrence in the map area.

Wildlife

Ungulates

Land capability for wild ungulates in the Horsefly area is shown on part of the CLI publication Land Capability for Wildlife - Ungulates, Quesnel Lake 93A (1976). Steep mountainous and plateau lands are rated mainly Class 5 for moose and caribou, whereas high-elevation subalpine and alpine areas of Yanks Peak and Rockland map units are generally rated Class 4 for caribou and mountain goat. South of Horsefly Lake deer are included in the Class 5 mountainous land rating. The most common limitations are excessive snow depths and adverse climate.

Class 1, the highest land capability class, occurs only on the large floodplain upstream from Cariboo Lake. Here, soils of the Guilford map unit provide excellent winter range for moose. The Heger map unit,

occupying southerly exposures along Horsefly Lake and Horsefly Mountain, is rated Class 2 for moose or for moose and deer winter range. The only other area in this class is in the valley of the upper Horsefly River adjoining Black Creek, where a large area of the Guilford - Catfish Creek map unit occupies the bottomlands.

A large block of plateau lands, lying roughly south of Beaver Creek valley and extending eastward beyond the community of Horsefly, is rated separately as Class 3 for summer and wintering populations of moose and deer. Practically all the map units of Tyee, Williams Lake, Chimney, Helena, Cinema, and Ridge Road soil associations are in this class, as well as some of Moffat Lakes and Deserters map units.

Class 4 lands of the plateau are limited by excessive snow depth and support mainly summer populations of moose, as well as some deer and caribou. Map units of Dominion, Lanezi, Keno Lake, and Spout soil associations fall entirely within this class. Most of the map units associated with Moffat Lakes and Deserters soils are also rated Class 4.

Waterfowl

Limitations of topography, climate, and elevation severely restrict the capability of lands in the area to produce or sustain waterfowl. The CLI publication Land Capability for Wildlife - Waterfowl, Quesnel Lake 93 A (1974) rates practically all lands as Class 6, or at best as Class 5.

The largest areas of Class 3 lands are on Guilford soil map units on the upper Cariboo River and at the mouth of the Horsefly River. Very small scattered areas of Class 3 and 2 lands occur on Sugarcane soils and on water bodies associated with Spokin soils near 150 Mile House.

Recreation

Land capability for outdoor recreation within the survey area is shown in the CLI publication Land Capability for Recreation, Quesnel Lake 93 A (1976). Recreational activities of moderate or better capability are confined almost entirely to valley bottomlands, shorelines, and water bodies. Map units dominated by soil associations that are developed on coarse and medium textured fluvial materials are generally rated Class 4 or 5 - moderate to moderately low capability. Included here are most of the map units of Guilford, Hawks, Ptarmigan, and Ramsey soil associations.

Class 3 and 2 capabilities comprise most of the Fontoniko map units and lake shoreline strips included with Keno Lake soils.

With the exception of the Chimney map units of the grasslands (Class 4), the soil associations derived from morainal materials, such as Tyee, Keno Lake, Cinema, Deserters, Dominion, and Moffat Lakes, are rated Class 6 or 5.

The Yanks Peak Association includes mostly open, high-elevation lands near or above timberline. The Class 5 capability of this map unit reflects a moderately low rating associated with dispersed activities that include hiking, viewing, and mountaineering.

DERIVED AND INTERPRETIVE MAPS

Agriculture Canada is able to produce maps based on the soil information presented here. These maps may be either interpretive, like those indicating the soil capability for agriculture, or they may be derived from the original soil information, such as those displaying texture, slope, or drainage features. These maps can be made because the original boundaries and map unit symbols are stored in a computer as part of the Canada soil information system (CanSIS).

Soil maps are drafted by the Cartography Section in the Land Resource Research Institute of Agriculture Canada, Ottawa. As part of the procedure, map unit symbols and the location of map unit boundaries are recorded in a computer. The soil map is therefore stored in its color-printed form, or as a black-and-white printout from the computer. In conjunction with the computer map there is also a list of all the map unit symbols and the areas they cover. This list is called the map index linkage. Therefore, Agriculture Canada has the means to list, by these symbols, all the map units of a soil map, and to reproduce the map itself as lines and symbols on a plain transparent sheet of paper. This system provides the capability to produce additional types of derived or interpretive maps as the need arises.

It is possible that a map showing only the different types of geological materials is required. The procedure involves replacing the original map unit symbol by a new symbol that indicates the type of geological material. The same boundaries are retained, with the exception of those that have the same new symbols on either side. In this case the boundary is deleted. No new boundaries are added.

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APPENDIX. DESCRIPTIONS AND ANALYSIS OF THE SOILS

This appendix lists, in alphabetical order, profile descriptions of most of the soils in the Horsefly area. Some descriptions, with their accompanying chemical and physical data, were drawn from adjoining soil survey report areas, usually from where the soils were first named and described.

Standard methods of soil analyses (McKeague 1976) were followed in the respective federal or provincial laboratories concerned with the survey projects. Further details are in soil survey reports or may be ascertained by contacting the specific agency.

ALEZA SOIL

Location: 53°52'N 122°40'W NTS: 93G15 Surveyor: AD Agency: BCMA Kelowna, 1965

Identification: BC Soil Survey Report 23 Classification: Orthic Luvic Gleysol (1978) Landform and parent material: clayey glaciolacustrine blanket

Drainage: poorly drained Slope and aspect: 1% simple depressional to level Elevation: 675 m Additional notes: This soil is part of the Pineview association. Sulfur averages 10-15 ppm in subsoil horizons. Mottles are few, faint in Aeg horizon; distinct in Btg1, Btg2, Btg3 horizons; and common, distinct in Cgj horizon

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L	8-2					abundant
F-H	2-0					abundant
Ah	0-8	very dark gray (10YR 3/1 d)	silt loam	moderate, medium-coarse platy	friable	abundant
Aeg	8-18	dark gray (5Y 4/1 d)	clay	strong, medium-coarse angular blocky	firm	plentiful
Btg1	18-36	brown (10YR 4/3 d)	heavy clay	strong, coarse prismatic	very firm	plentiful
Btg2	36-56	brown (10YR 4/3 d)	heavy clay	strong, coarse prismatic	very firm	few
Btg3	56-76	brown (10YR 4/3 d)	heavy clay	strong, coarse prismatic	very firm	few
Cgj	76+	brown (10YR 4/3 d)	heavy clay		very firm	

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	Cation exchange (meq/100 g)					Particle Size Distribution (%)			Pl (ppm)
				CEC	Ca	Mg	K	Na	Sand	Silt	Total clay	
L	4.5	31.7	1.80									99
F-H	4.5	23.7	1.62									157
Ah	4.6	12.2	0.87	68.7	16.0	29.5	0.3	0.3				33
Aeg	4.9	1.7	0.14	42.7	18.3	11.9	0.2	0.3				7
Btg1	5.4	1.0	0.08	60.4	24.9	20.3	0.3	0.4				2
Btg2	5.9	0.6	0.06	48.3	22.1	16.6	0.3	0.4				1
Btg3	6.3	0.5	0.05	43.2	20.7	14.4	0.4	0.5	0	30	70	2
Cgj	6.5			36.8		11.7	0.4	0.4	1	24	75	1

ALIX SOIL

Location: 54°08'N 124°08'W NTS: 93K1 Surveyor: IC Agency: BCMA, Kelowna, 1974

Identification: BC Soil Survey Report 22 Classification: Orthic Dystric Brunisol (1978) Landform and parent material: glaciofluvial, sandy, gravelly

Drainage: rapidly drained Slope and aspect: level Elevation: 880 m

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence
L-H	5-0				
Bm	0-17	yellowish brown (10YR 5/4 d)	sandy loam	weak, fine - medium subangular blocky	very friable
BC	17-28	pale brown (10YR 6/3 d)	gravelly sandy loam	weak, fine subangular blocky	very friable
11C1	28-50	variegated	sandy fine gravel	single grain	loose
11C2	50+	variegated	sandy fine gravel	single grain	loose

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	C/N	Oxalate (%) Fe	Oxalate (%) Al	Cation exchange (meq/100 g) CEC	Ca	Mg	K	Na	P1 (ppm)	P2 (ppm)	S (ppm)	Cu (ppm)	Zn (ppm)
L-H	4.1	58.0	1.52	37.7			83.6	21.1	6.4	3.0	0.1	60	136			
Bm	4.9	1.0	0.10	10.6	0.7	0.7	9.2	1.5	0.2	0.1	0.0	115	277	4	14	79
BC	5.0				0.5	0.4	6.0	1.9	0.2	0.1	0.0	146	227	2	20	80
11C1	5.1				0.3	0.2	5.7	2.9	0.5	0.1	0.0	20	51	2	23	43
11C2	5.1						5.8	3.0	0.7	0.2	0.0	9	25	2	24	43

ALKALI SOIL

Location: 51°02'N 120°22'W NTS: 92P1 Surveyor: NG Agency: BCMA, Kelowna, 1971

Identification: BC Soil Survey Report 24 Classification: Podzolic Gray Luvisol (1978) Landform and parent material: morainal

Drainage: well drained Slope and aspect: 2% NE Elevation: 1780m Additional notes: Rooting depth 75 cm; permeability is moderately rapid; infiltration is medium

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-H	5-0					abundant
Ae1	0-2.5	white (2.5Y 8/0 d)	loamy sand	single grain	friable	abundant
Bf1	2.5-13	strong brown (7.5YR 5/6 d)	sandy loam	single grain	friable	abundant
Bf2	13-27	yellowish brown (10YR 5/8 d)	sandy loam	single grain	friable	abundant
Ae2	27-50	light brownish gray (2.7Y 6/2 d)	loam	platy	friable	abundant
Bt1	50-75	light brownish gray (2.5Y 6/2 d)	clay loam	angular blocky	firm	plentiful
Bt2	75-95	light brownish gray (2.5Y 6/2 d)	clay loam	angular blocky	firm	
C1	95-112	light brownish gray (2.5Y 6/2 d)	clay loam	pseudo-platy	firm	
C2	112+	light brownish gray (2.5Y 6/2 d)	clay loam	pseudo-platy		

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	Oxalate (%) Fe	Oxalate (%) Al	Pyrophos. (%) Fe	Pyrophos. (%) Al	Cation exchange (meq/100 g) CEC	Ca	Mg	K	Na	P1 (ppm)	P1 (ppm)	S (ppm)	Mn (ppm)
L-H	5.0	50.8	1.9										72	85	211	23
Ae1	4.5	1.4	0.1					6.6	2.2	0.3	0.2	0.1	18	19	10	2
Bf1	5.0	2.5	0.1	1.7	2.1	0.3	0.7	20.7	2.2	0.4	0.3	0.1	14	56	14	1
Bf2	5.5	1.3	0.1	1.4	3.5	0.1	0.5	19.6	2.1	0.7	0.5	0.1	2	19	20	0
Ae2	5.2	0.3	0.0					10.8	6.0	1.4	0.3	0.1	11	57	7	2
Bt1	5.3	0.3	0.0					11.7	7.4	1.6	0.3	0.1	8	59	9	2
Bt2	5.3							13.6	9.5	1.9	0.3	0.1	8	57	7	2
C1	5.9							15.8	13.2	2.3	0.3	0.1	3	87	6	1
C2	5.9							13.8	11.8	1.7	0.3	0.1	3	85		

ARCHIE SOIL

Location: 52°59'N 120°43'W NTS: 93A15 Surveyor: NG Agency: BCMA, Kelowna, 1974

Identification: BC Soil Survey Report 24 Classification: Podzolic Gray Luvisol (1978) Landform and parent material: morainal

Drainage: moderately well drained Slope and aspect: East Elevation: 1219 m Additional notes: rooting depth 46 cm

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-H	8-0					abundant
Ael	0-3	light gray (10YR 7/1 d)	sandy loam	granular	friable	abundant
Bfl	3-13	pale brown (10YR 6/3 d)	sandy loam	granular	friable	abundant
Bf2	13-28	light yellow. brown (2.5Y 6/4 d)	sandy loam	granular	friable	abundant
Ae2	28-46	pale olive (5Y 6/3 d)	loam	granular	friable	few
Bt	46-66	light olive gray (5Y 6/2 d)	loam	platy	firm	
BC	66-112	olive gray (5Y 5/2 d)	silt loam	platy	firm	
C	112+	olive gray (5Y 4/2 d)	loam	pseudo-platy	firm	

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	Pyrophos. (%)		Cation exchange (meq/100 g)					Particle Size Distribution (%)			Pl (ppm)	S (ppm)
				Fe	Al	CEC	Ca	Mg	K	Na	Sand	Silt	Total clay		
L-H	4.9	52.9	1.8			91.6	89.2	9.1	2.8	0.1					
Ael	3.6	0.7	0.1			5.1	1.3	0.4	0.1	0.2				8	3
Bfl	4.9	2.2	0.1	0.7	0.4	15.7	1.5	0.5	0.1	0.1				66	2
Bf2	4.5	1.2	0.1	0.6	0.4	10.8	1.9	0.6	0.1	0.1				83	0
Ae2	5.0	0.4	0.0			5.2	1.7	0.6	0.1	0.1	45	45	10	28	0
Bt	5.5	0.3	0.0			8.8	3.3	1.5	0.2	0.1	37	45	18	9	0
BC	6.1										39	57	4		

ART SOIL

Location: 51°57'N 120°47'W NTS: 92P15 Surveyor: NG Agency: BCMA, Kelowna, 1971

Identification: BC Soil Survey Report 24 Classification: Brunisolic Gray Luvisol (1978) Landform and parent material: morainal

Drainage: well drained Slope and aspect: .5% SW Elevation: 1130 m

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-F	2.5-0					abundant
Ael	0-5	white (10YR 8/1 m)	sandy loam	granular	friable	abundant
Bm	5-22	yellowish brown (10YR 5/4 m)	sandy loam	granular	friable	abundant
Ae2	22-35	grayish brown (10YR 5/2 m)	sandy loam	granular	friable	abundant
Bt	35-60	olive (5Y 4/4 m)	gravelly clay loam	subangular blocky	friable	plentiful
BC	60-90	olive (5Y 4/3 m)	gravelly sandy loam	platy	friable	few
C	90+	olive (5Y 4/3 m)	gravelly loam	pseudo-platy	friable	few

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	Oxalate (%)		Pyrophos. (%)		Cation exchange (meq/100 g)					P1	P2	Mn
				Fe	Al	Fe	Al	CEC	Ca	Mg	K	Na	(ppm)	(ppm)	(ppm)
L-F	4.5	45.6	1.3										42	53	88
Ael	4.1	1.2	0.0					6.4	1.7	0.4	0.1	0.1	18	37	4
Bm	5.5	0.7	0.0	1.0	0.8	0.1	0.2	8.7	3.0	0.3	0.3	0.0	97	669	1
Ae2	5.8	0.3	0.0			0.1	0.1	9.4	6.9	1.5	0.1	0.1	7	18	1
Bt	6.3	0.4	0.0					16.0	13.1	3.4	0.3	0.1	7	37	1
BC	6.4							13.6	10.9	2.6	0.2	0.1	5	87	1
C	6.4							13.3	10.9	2.3	0.2	0.1	4	823	0

BEARPAW RIDGE SOIL

Location: 53°05'N 121°43'W NTS: 93H4 Surveyor: TL Agency: AC, Vancouver, 1980
5 km N of Stanley on east slope of Mt. Nelson

Identification: BC Soil Survey Report 40 Classification: Eluviated Dystric Brunisol (1978) Landform and parent material: loamy colluvial

Drainage: moderately well drained Slope and aspect: 10% ENE Elevation: 1500 m Additional notes: Profile 9337-80; from 30 cm the content of shaly, weathered rock fragments increases sharply with depth

Vegetation: Picea engelmannii, Abies lasiocarpa, Alnus spp., Lonicera spp., Veratrum viride subsp. eschscholtzii

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence
Ae	0-5	gray (10YR 5/1 d)	loam	moderate-strong, medium-coarse subangular blocky	firm, sticky, plastic
Bm	5-20	light brownish gray (10YR 5/2 d)	silty loam	moderate, medium-coarse sub-angular blocky	slightly hard, sticky
BC	20-30	grayish brown (2.5Y 5/2 d)	shaly loam	moderate-strong, medium sub-angular blocky	slightly hard, sticky
R	at 100	dark grayish brown (2.5Y 4/2 d)	shaly rock		

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Pyrophos. (%)		Cation exchange (meq/100 g)					Particle Size Distribution (%)			P1	P2
		Fe	Al	CEC	Ca	Mg	K	Na	Sand	Silt	Total clay	(ppm)	(ppm)
Ae	4.4												
Bm	4.5	0.3	0.1	5.74	1.7	0.7	0.0	0.0	38	50	12	16	16
BC	4.3								35	49	16		
R	4.9												

BEDNESTI SOIL

Location: 54°01'N 122°54'W NTS: 93J2 Surveyor: AD Agency: BCMA, Kelowna, 1965

Identification: BC Soil Survey Report 23 Classification: Podzolic Gray Luvisol (1978) Landform and parent material: silty lacustrine blanket

Drainage: Moderately well drained Slope and aspect: 2% S Elevation: 760 m Additional notes: Sulfur ranges from 5 to 10 ppm below L-H horizon

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-H	5-0					abundant
Ae	0-5	light brown. gray (10YR 6/2 d)	silt loam	weak, fine subangular blocky	very friable	abundant
Bf	5-23	light yellow. brown (10YR 6/4 d)	silt loam	weak, fine subangular blocky	very friable	abundant
AB	23-41	light gray (10YR 7/2 d)	silt loam	moderate, medium-coarse sub-angular blocky	firm	plentiful
Bt	41-66	pale brown (10YR 6/3 d)	silt loam	moderate, medium-coarse sub-angular blocky	firm	few
BC	66-76	pale brown (10YR 6/3 d)	silt loam	moderate, medium-coarse sub-angular blocky	firm	few
C1	76-102	pale brown (10YR 6/3 d)	silt loam	coarse pseudo-blocky	friable	
C2	102+	pale brown (10YR 6/3 d)	silt loam		friable	

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	Oxalate % Fe	Oxalate % Al	Cation exchange (meq/100 g) CEC	Ca	Mg	K	Na	Pl (ppm)
L-H	4.2	34.5	0.83								57
Ae	4.1	1.9	0.09			16.8	2.7	0.4	0.4	0.1	94
Bf	4.7	1.2	0.06	1.0	0.6	13.2	2.5	0.2	0.1	0.1	148
AB	4.8	0.5	0.01			8.1	3.8	0.6	0.2	0.1	21
Bt	4.9	0.4	0.02			13.0	7.3	1.2	0.2	0.1	14
BC	4.9	0.4	0.02			13.2	8.0	1.2	0.1	0.1	13
C1	5.1			0.5	0.3	13.4	8.2	1.4	0.2	0.1	11
C2	5.2					12.2	7.8	1.5	0.2	0.2	10

CAPTAIN CREEK SOIL

Location: 53°06'N 121°35'W NTS: 93H4 Surveyor: TL Agency: AC, Vancouver, 1980

Identification: BC Soil Survey Report 40 Classification: Orthic Humo-Ferric Podzol (1978) Landform and parent material: loamy morainal and colluvial

Drainage: well drained Slope and aspect: 12% E Elevation; 1300 m Additional notes: Profile 9330-80; Mosquito Creek Mine road, above sewage lagoon

Vegetation: Abies lasiocarpa, Pinus contorta, Populus tremuloides, Vaccinium membranaceum, V. caespitosum, Salix spp., Cornus canadensis, Veratrum viride subsp. eschscholtzii, Valeriana sitchensis; mosses, lichens

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L	7-5	mosses, twigs, needles				
F	5-2	semi-decomposed, layered				
H	2-0	decomposed, yellow mycelia				
Ae	0-5		silt loam	weak, moderate subangular blocky	loose, slightly plastic	abundant
Bf	5-13	strong brown (7.5 YR 4/6 m)	silt loam	weak, coarse-medium sub-angular blocky	friable, plastic	abundant
Bm1	13-20	dark brown (7.5YR 4/4 m)	silt loam	weak, coarse-medium sub-angular blocky	friable, plastic	few
Bm2	20-30		silt loam	weak, coarse-medium sub-angular blocky	plastic	few
BC	30-50	dark brown (7.5YR 4/4 m)	sandy loam			

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	C/N	Pyrophos. (%)		Cation exchange (meq/100 g)					Particle Size Distribution (%)			P1	P2
					Fe	Al	CEC	Ca	Mg	K	Na	Sand	Silt	Total clay	(ppm)	(ppm)
Ae	3.6	2.1	0.1	19.4	0.2	0.1	13.6	1.1	0.2	0.1	0.0	37	58	5	3	8
Bm	4.8	2.2	0.1	20.3	0.3	0.2	7.9	0.3	0.1	0.1	0.0	43	49	8	4	8
BC	5.2	0.7	0.0	10.3	0.1	0.1	3.8	1.1	2.0	0.0	0.0	49	47	4	7	23

CATFISH CREEK SOIL

Location: 53°35'N 120°50'W NTS: 93H10 Surveyor: RM Agency: BCME, Kelowna, 1978

Identification: BC Soil Survey Report 41 Classification: Terric Fibric Mesisol (1978) Landform and parent material: organic blanket

Drainage: very poorly drained Slope and aspect: 0.5% level Elevation: 914 m Additional notes: Profile RM 78 P31; airphoto A 21589-121; between McBride and Penny 3.2 km W: off Yellowhead Hy.

Vegetation: dominantly sphagnum mosses with minor amounts of Ledum, Carex, and Picea mariana

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color*	Texture	Structure	Consistence	Roots
Of1	0-16	light yellowish brown (10YR 6/4)	(raw sphagnum)			plentiful
Of2	16-30	dark reddish brown (5YR 3/4)	(slightly decomposed)			plentiful
Om	30-60	dark reddish brown (5YR 3/3)				abundant
Oh	60-70	dark reddish brown (5YR 2.5/2)				abundant
11Cg	70+	dark greenish gray (5GY 5/1)	clay	massive	very sticky, very plastic	plentiful

* natural, wet colors

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	C/N	Cation exchange (meq/100 g)				
					CEC	Ca	Mg	K	Na
Of1	3.5	47.9	2.8	17.1		12.5	9.9	6.7	0.9
Of2	3.8	51.5	2.0	26.0	113.9	9.4	3.7	0.6	0.5
Om	4.4	49.0	2.1	23.7	25.4	3.6	1.6	0.0	0.1
Oh	4.7	40.3	0.6		24.1	4.3	1.7	0.0	0.1
11Cg	5.1	1.3	0.2		14.9	5.4	3.1	0.1	0.1

CHIMNEY SOIL

Location: 51°52'35"N 123°02'45"W NTS: 92014 Surveyor: WW Agency: AC, Vancouver, 1971

Identification: BC Soil Survey Report 36 Classification: Orthic Dark Gray (1978)

Landform and parent material: gravelly, loamy, morainal blanket

Drainage: well drained Slope and aspect: 5% NE Elevation: 990 m

Vegetation: Douglas fir - pine grass (grasslands subzone)

Additional notes: Stop No. 16; W. Watt M. Sc. thesis site 1; located on Chilco Lake Ranch; very stony; bedrock is andesite; gravel content: Ah=10%, Bm=30%, BC=74%, Ck=25%

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
Ah	0-13	dark grayish brown (10YR 4/2 d)	loam	weak, coarse prismatic	friable	abundant, fine
Bm	13-25	dark brown (10YR 4/3 d)	gravelly clay loam	weak, medium prismatic	friable	plentiful, fine
BC	25-35	grayish brown (10YR 5/2 d)	gravelly loam	moderate-strong, fine angular blocky	firm	few
Ck	35+	light brownish gray (10YR 6/2 d)	gravelly loam	moderate-strong, pseudo-blocky	firm	

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	Cation exchange (meq/100 g)					Particle Size Distribution (%)				P1 (ppm)
				CEC	Ca	Mg	K	Na	Sand	Silt	Total clay	Fine clay	
Ah	6.2	2.7	0.2	26.2	13.1	12.4	2.3	0.1	31	41	28	10	54.0
Bm	6.6	1.3	0.1	29.7	13.6	18.0	0.8	0.2	24	35	41	13	
Ck	7.8	1.0		19.4	23.9	16.4	0.4	1.0	30	44	26	4	

CINEMA SOIL

Location: 52°32'30"N 122°23'20"W NTS: 93B9 Surveyor: TL Agency: AC, Vancouver, 1979

Identification: BC Soil Survey Report 31 Classification: Orthic Gray Luvisol (1978) Landform and parent material: loamy morainal blanket

Drainage: well drained Slope and aspect: 10% W Elevation: 900 m Additional notes: Basalt bedrock; rooting depth to 72 cm; Alix is a commonly associated soil; many soils on slopes have overlays of gravel, silt, or clay

Vegetation: Pseudotsuga menziesii, Populus tremuloides, Amelanchier alnifolia, Salix spp., Calamagrostis rubescens

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-F-H	4-0	forest litter				
Ae	0-10	grayish brown (10YR 5/2 d)	silt loam	strong, medium platy	slightly hard, slightly sticky	plentiful, fine, random
AB	10-17	dark brown (10YR 3/3 d)	loam	strong, medium sub-angular blocky	hard, firm, sticky	few, fine, random
Bt1	17-32	dark yellowish brown (10YR 3/4 d)	loam	strong, medium-coarse subangular blocky	hard, very sticky	few, medium, random
Bt2	32-42	dark brown (10YR 4/3 d)	loam	moderate, fine-medium subangular blocky	slightly hard, firm, sticky	few, medium
BC	42-72	dark brown (10YR 4/3 d)	silt loam	strong, fine angular blocky	very firm, slightly sticky	few, medium, random
Cca	72+	brown (10YR 5/3 d)	loam	pseudo-blocky	very firm, slightly sticky	very few, fine, random

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Cation exchange (meq/100 g)					Particle Size Distribution (%)				Pl (ppm)
			CEC	Ca	Mg	K	Na	Sand	Silt	Total clay	Fine clay	
Ae	6.1	1.1	12.6	7.6	3.2	0.9	0.1	35	55	10	2	23
Bt1	6.0	0.6	32.2	15.3	11.1	1.0	0.0	30	43	27	15	46
Bt2	6.2	0.5	26.9	13.8	10.0	0.6	0.0	35	48	17	6	40
BC	6.4	0.5	27.0	13.3	9.3	0.5	0.0	35	52	13	3	32
Cca	7.7		26.1	44.3	8.6	0.3	0.1					

DESERTERS SOIL

Location: 53°55'N 126°25'W NTS: 93E16 Surveyor: IC Agency: BCMA, Kelowna, 1974

Identification: BC Soil Survey Report 22 Classification: Gleyed Brunisolic Gray Luvisol (1978) Landform and parent material: loamy morainal

Drainage: imperfectly drained Slope and aspect: 24% NW Elevation: 1100 m Additional notes: Mottles Bmgj: few, fine, faint; Aegj and Btgj 1: common, fine, distinct; Btgj 2 and BCgj: few, fine, distinct; clay skins are common in the Bt horizons

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-H	5-0	forest litter				abundant
Ae	0-2	light gray (10YR 7/2 d)	sandy loam	single grain	loose	abundant
Bml	2-15	pale brown (10YR 6/3 d)	sandy loam	moderate, fine-medium granular	very friable	abundant
Bmgj	15-30	pale brown (10YR 6/3 d)	loam	weak-moderate, fine granular	very friable	abundant
Aegj	30-49	light gray (10YR 7/2 d)	gravelly loam	weak, fine subangular blocky	very friable	common
ABg	49-60	light gray (10YR 7/3 d)	gravelly loam	weak-moderate, medium subangular blocky	friable	very few
Btgj1	60-74	light brownish gray (10YR 6/2 d)	gravelly loam	moderate, fine-medium subangular blocky	firm	nil
Btgj2	78-85	very pale brown (10YR 7/3 d)	gravelly loam	moderate, fine-medium subangular blocky	very firm	
BCgj	85-106	light gray (10YR 7/2 d)	gravelly loam	pseudo-blocky	very firm	
C	106+	light gray (10YR 7/2 d)	gravelly loam	pseudo-platy	very firm	

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	C/N	Cation exchange (meq/100 g)					Particle Size Distribution (%)				P1 (ppm)	P2 (ppm)	S (ppm)	Cu (ppm)	Zn (ppm)
					CEC	Ca	Mg	K	Na	Sand	Silt	Total clay	Fine clay					
L-H	4.3	46.3	1.3	36.5	72.8	26.9	3.7	1.4	0.2					36	51	2	8	63
Ae	4.0	1.6	0.1	19.2	11.1	1.7	0.4	0.2	0.1					55	84	2	7	37
Bml	4.5	1.2	0.1	13.9	12.3	2.0	0.6	0.2	0.1					47	75	5	11	60
Bmgj	4.6	0.5	0.0	16.7	8.9	2.4	0.7	0.2	0.1					15	52	2	12	53
Aegj	4.7	0.2	0.0	7.7	10.5	4.9	1.7	0.2	0.1	43	38	19	4	5	58	3	18	58
ABg	4.7	0.2	0.0	9.0	10.7	6.2	1.9	0.2	0.1					5	78	3	17	54
Btgj1	5.3													5	124	3	20	60
Btgj2	5.4									42	34	24	11	3	129	2	22	64
BCgj	5.9													2	180	2	23	72
C	6.0									42	36	22	11	1	214	2	24	73

DEZAIKO SOIL

Location: 53°05'N 121°54'W NTS: 93H4 Surveyor: TL Agency: AC, Vancouver, 1980

Identification: BC Soil Survey Report 40 Classification: Orthic Humo-Ferric Podzol, lithic phase (1978) Landform and parent material: loamy morainal and colluvial veneer

Drainage: well drained Slope and aspect: 15% N Elevation: 1500 m Additional notes: Profile 9336-80; 4 km NE of Pinegrove; airphoto BC9355-66; bedrock is basalt (at <50 cm)

Vegetation: Rhododendron albiflorum, Abies lasiocarpa, Picea engelmanni, Vaccinium membranaceum, Veratrum viride subsp. eschscholtzii, mosses, lichens

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L	4-3	fresh needles, twigs				abundant
F	3-0	semi-decomposed leaves, wood				
Ae	0-5	dark grayish brown (10YR 4/2 m)	sandy loam	moderate, medium-coarse subangular blocky	friable, slightly plastic	few
Bhf	5-8	dark brown (7.5YR 3/2 m)	loam	weak-moderate, fine-medium subangular blocky	very friable, plastic	few
Bf1	8-18	dark brown (7.5YR 3/4 m)	loam	moderate, fine-medium subangular blocky	friable, plastic	few
Bf2	18-31	dark yellowish brown (10YR 4/4 m)	loam	moderate, fine-medium subangular blocky	friable, slightly plastic	few
BC	31+	dark yellowish brown (10YR 4/4 m)	loam	weak, fine subangular blocky	very friable, plastic	few

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	C/N	Pyrophos. (%)		Cation exchange (meq/100 g)					Particle Size Distribution (%)		
					Fe	Al	CEC	Ca	Mg	K	Na	Sand	Silt	Total clay
L	4.0	61.7	0.6	59.3										
Ae	3.3													
Bhf	3.5				1.5	0.2	22.8	0.4	0.2	0.1	0.1	50	39	11
Bf1	3.8				1.3	0.3	12.8	0.3	0.1	0.1	0.0	48	41	11
Bf2	4.1				0.6	0.2	5.9	0.1	0.0	0.1	0.0			
BC	4.2											52	40	8

DOMINION SOIL

Location: 54°31'N 122°40'W NTS: 93J10 Surveyor: AD Agency: BCMA, Kelowna, 1967

Identification: BC Soil Survey Report 23 Classification: Luvisolic Humo-Ferric Podzol (1978) Landform and parent material: loamy morainal blanket

Drainage: well drained Slope and aspect: 10% W Elevation: 780 m Additional notes: clay films are few in the AB horizon and common in BA and Bt horizons

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-H	5-0					abundant
Ae	0-7	light gray (10YR 7/2 d)	silt loam	single grain	loose	abundant
Bf1	7-25	pale brown (10YR 6/3.5 d)	silt loam	weak, fine subangular blocky	soft	abundant
Bf2	25-40	pale brown (10YR 6/3 d)	sandy loam	weak, fine-medium subangular blocky	soft	abundant
AB	40-65	grayish brown (2.5Y 4.5/2 d)	gravelly sandy loam	moderate, medium subangular blocky	slightly hard	plentiful
BA	65-90	dark grayish brown (2.5Y 4.5/2 d)	gravelly loam	moderate, coarse angular blocky	hard	plentiful
Bt	90-115	dark grayish brown (2.5Y 4.5/2 d)	gravelly loam	moderate, coarse angular blocky	hard	few
C	115+	grayish brown (2.5Y 5/2 d)	gravelly loam		hard	

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	Cation exchange (meq/100 g)					Particle Size Distribution (%)				P1	P2	S	Cu	Zn
				CEC	Ca	Mg	K	Na	Sand	Silt	Total clay	Fine clay	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
L-H	4.5	32.7	1.0	71.8	34.9	5.9	1.2	0.1					18	27		12	99
Ae	3.9	0.9	0.1	9.8	1.5	0.3	0.1	0.0	32	60	8		23	43	10	6	62
Bf1	4.6	0.6	0.1	7.6	1.5	0.2	0.1	0.0					18	74	8	10	58
Bf2	4.6	0.5	0.0	7.4	1.4	0.2	0.1	0.0					15	75	11	13	47
AB	4.6			6.3	1.7	0.4	0.1	0.1						69	8	16	45
BA	4.4			12.2	5.5	1.7	0.2	0.0	37	40	23	8		58	11	32	60
Bt	4.6			14.1	7.4	2.1	0.1	0.1						96	9	29	
C	5.7			13.8	10.0	0.2	0.1	0.1	35	41	24	6			6		59

DRAGON SOIL

Location: 54°00'N 124°50'W NTS: 93J15 Surveyor: IC Agency: BCMA, Kelowna, 1974

Identification: BC Soil Survey Report 22 Classification: Orthic Humo-Ferric Podzol (1978) Landform and parent material: shallow sandy colluvium; acidic bedrock

Drainage: rapidly drained Slope and aspect: 20% SE Elevation: 1230 m Additional notes: Many of the Dragon soils have less than 50 cm of colluvial or morainal material overlying bedrock and are classified as lithic phase

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-H	5-0					abundant
Ae	0-5	light gray (10YR 7/1 d)	sandy loam	weak, fine subangular blocky	loose	abundant
Bf1	5-7	yellowish brown (10YR 5/4 d)	sandy loam	moderate, fine-medium subangular blocky	very friable	abundant
Bf2	7-20	yellowish brown (10YR 5/4 d)	sandy loam	moderate, fine-medium subangular blocky	very friable	abundant
BC	20-45	brown (10YR 5/3 d)	gravelly sandy loam	moderate, fine-medium subangular blocky	very friable	common
C	45-55	light brown. gray (10YR 6/2 d)	gravelly sandy loam	pseudo-platy	friable	very few
R	55+					

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	C/N	Oxalate (%)		Cation exchange (meq/100 g)					P1 (ppm)	P2 (ppm)	S (ppm)	Cu (ppm)	Zn (ppm)
					Fe	Al	CEC	Ca	Mg	K	Na					
L-H	3.9	60.0	1.2	31.1			107.0	22.4	2.9	2.0	0.0	42	54		9	42
Ae	3.7	1.6	1.1	27.5			12.3	2.4	0.3	0.2	0.0	7	14	8	3	19
Bf1	5.5*	1.7			0.9	0.6	14.1	1.4	0.2	0.2	0.0	51	99	9	8	48
Bf2	6.0*	1.5	0.1	23.3	0.9	0.9	13.5	1.4	0.2	0.1	0.0	44	93	9	13	52
BC	6.0*				0.5	0.5	7.8	0.7	0.1	0.1	0.0	30	70	6	16	26
C	6.1*				0.4	0.3						28	62		17	25

* in water

GUILFORD SOIL

Location: 53°50'N 121°19'W NTS: 93H14 Surveyor: RM Agency: BCME, Kelowna, 1978

Identification: BC Soil Survey Report 41 Classification: Gleyed Cumulic Regosol (1978) Landform and parent material: silty fluvial terrace

Drainage: imperfectly drained Slope and aspect: 2% level Elevation: 655 m Additional notes: Profile RM 786P; airphoto A21590-76; 3 m above Fraser River, 30 m S of Penny Rd.; watertable 3 m; nonstony; mottles in Cgjl are many, coarse and faint

Vegetation: Picea glauca, Populus trichocarpa, Betula spp., Salix spp., Sambucus racemosa, Lonicera involucrata, Urtica dioica subsp. gracilis var. lyallii, mosses, ferns (including Matteuccia struthiopteris)

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L	1-0	mull humus				abundant
C1	0-1	light brownish gray (2.5Y 6/2 m)	sandy loam	single grain	loose	abundant
Ahb1	1-8	very dark gray (10YR 3/1 m)	sandy loam	weak, fine subangular blocky	very friable	abundant
C2	8-17	very dark grayish brown (10YR 3/2 m)	loam	weak, coarse pseudo-blocky	friable	abundant
C3	17-30	dark grayish brown (2.5Y 4/2 m)	silt loam	weak, coarse pseudo-platy	very friable	few
Ahb2	30-34	very dark gray (10YR 3/1 m)	silt loam	weak, fine pseudo-blocky	friable	abundant
Cgj1	34-44	brown (10YR 5/3 m)	silt	weak, fine pseudo-blocky	very friable	few
Cgj2	44-54	dark grayish brown (2.5Y 4/2 m)	silt	weak, coarse pseudo-blocky	friable	few
Cg	54-140	dark grayish brown (2.5Y 4/2 m)	silt	weak, coarse pseudo-platy	friable	very few

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	C/N	Cation exchange (meq/100 g)					Particle size distribution (%)			S (ppm)
					CEC	Ca	Mg	K	Na	Sand	Silt	Total clay	
L	6.4	41.0		33.1	108.9	59.6	11.5	4.2	0.1				
Ahb1	6.5	5.2	0.3	17.3	23.7	19.2	2.3	0.2	0.0				4.0
C2	6.1	2.3	0.1	18.9	13.3	10.4	1.7	0.1	0.0				1.8
C3	6.1	0.3	0.1	6.4	4.3	3.4	0.6	0.0	0.0	35	63	2	1.1
Ahb2	6.0	3.6	0.2	15.3	22.7	16.9	2.9	0.1	0.0				2.5
Cgj1	5.9	0.9	0.1	12.7	9.2	6.7	1.2	0.1	0.0	10	81	9	1.3
Cgj2	5.9	0.7	0.0	16.1	8.1	6.5	0.9	0.0	0.0	9	83	8	1.4
Cg	6.0	0.3	0.0	5.9	4.8	4.5	0.6	0.0	0.0	10	82	8	1.1

HAWKS SOIL

Location: 51°46'45"N 122°49'51"W NTS: 92015 Surveyor: AB Agency: AC, Vancouver, 1971

Identification: BC Soil Survey Report 36 Classification: Orthic Eutric Brunisol (1978) Landform and parent material: sandy glaciofluvial terrace

Drainage: rapidly drained Slope and aspect: level Elevation: 1150 m Additional notes: Stop No. 36; airphoto BC 5242-133

Vegetation: Douglas fir - pine grass (northern phase subzone)

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-F-H	2-0					
Ah	0-8	dark grayish brown(10YR 4.5/2 d)	fine sandy loam	weak, fine-medium subangular blocky	soft very friable	abundant
Bm	8-30	brown (10YR 5/3 d)	loamy sand	weak, medium subangular blocky	soft, very friable	plentiful
BC	30-60	brown (10YR 5/3 d)	loamy sand	weak, medium subangular blocky	soft, very friable	few
Ck	60+	light brownish gray (10YR 6/2.5 d)	loamy sand	weak, fine, pseudo-blocky	soft, very friable	few

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	Pyrophos. (%)		Cation exchange (meq/100 g)				
				Fe	Al	CEC	Ca	Mg	K	Na
Ah	6.4	2.2	0.1	0.4	0.1	19.0	11.6	5.7	2.9	0.0
Bm	6.3			0.6	0.1	14.5	7.5	7.3	0.7	0.0
BC	7.1			1.1	0.1	12.7	6.7	7.5	0.6	0.0
Ck	8.2			0.9	0.1	7.9	19.9	7.9	0.4	0.1

HEGER SOIL

Location: 51°54'N 120°47'W NTS: 92P15 Surveyor: NG Agency: BCMA, Kelowna, 1971

Identification: BC Soil Survey Report 24 Classification: Eluviated Dystric Brunisol (1978) Landform and parent material: colluvium

Drainage: rapidly drained Slope and aspect: 1.5% NW Elevation: 1000 m

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-F	2.5-0	forest litter				abundant
Ae	0-2.5	light gray (10YR 7/2 m)				abundant
Bm	2.5-42	yellowish brown (10YR 5/4 m)	gravelly sandy loam	single grain	loose	abundant
C	42+	olive (5Y 5/4 m)	gravelly loamy sand	single grain	loose	plentiful

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	Oxalate (%) Fe	Oxalate (%) Al	Pyrophos. (%) Fe	Pyrophos. (%) Al	Cation exchange (meq/100 g) CEC	Ca	Mg	K	Na	P1 (ppm)	P2 (ppm)	S (ppm)	Mn (ppm)
L-F	6.6	50.2	1.4										100	189	208	15
Bm	5.4	1.7	0.6	0.9	0.2	0.8	0.2	13.2	6.0	0.8	0.1	0.0	60	96	12	1
C	6.0	0.5	0.2					10.0	8.1	0.9	0.2	0.0	9	17	9	1

HELENA SOIL

Location: 51°46'27"N 121°40'16"W NTS: 92P13 Surveyor: KV Agency: AC, Vancouver, 1967

Identification: BC Soil Survey Report 25 Classification: Orthic Gray Luvisol (1978) Landform and parent material: morainal blanket

Drainage: well drained Slope and aspect: 5% S Elevation: 1150 m Additional Notes: Mature Douglas fir - pine grass zone with Douglas fir and lodgepole pine regeneration. Depth to bedrock = 5 m

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L	5-0					
Ael	0-5	light brownish gray (10YR 6/2 d)	silt loam	weak, very fine platy	loose	plentiful, fine, exped
Ae2	5-18	grayish brown (10YR 5/2.5 d)	silt loam	weak, very fine sub-angular blocky	slightly hard	plentiful, fine, exped
11Bt	18-36	dark yellowish brown (10YR 3/4 m)	gravelly clay loam	moderate-strong, very fine angular blocky	very firm	few, fine, exped
11BC	36-76	dark brown (10YR 4/3 m)	gravelly loam	weak-moderate, very fine subangular blocky	very firm	few, fine, exped
11C	76-100	dark grayish brown (10YR 4/2.5 m)	gravelly sandy loam	weak, very fine pseudo-blocky	firm	very few, fine, exped

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	Cation exchange (meq/100 g)					Particle Size Distribution (%)				Bulk Density
				CEC	Ca	Mg	K	Na	Sand	Silt	Total clay	Fine clay	
Ael	5.4	1.2	0.1	16.0	6.6	2.8	0.5	0.1	38	54	8	2	1.2
Ae2	5.1	0.7	0.1	18.9	8.3	4.8	0.4	0.1	37	52	11	2	1.4
11Bt	5.5	0.7	0.1	37.5	17.2	11.8	1.0	0.1	32	38	30	12	1.6
11BC	6.5	0.1		25.7	13.8	8.5	0.9	0.1	44	47	9	1	1.9
11C	7.4	0.0		16.1	10.9	4.9	0.5	0.1	49	47	4	0	2.1

HORSEFLY SOIL

Location: 52°19'15"N 121°28'50"W NTS: 93A6 Surveyor: TL Agency: AC, Vancouver, 1972

Identification: BC Soil Survey Report 32 Classification: Orthic Gray Luvisol (1978) Landform and parent material: silty lacustrine blanket

Drainage: well drained Slope and aspect: 3% N Elevation: 1000 m Additional notes: 2 km W of main road junction in Beaver valley; airphoto A22009-101

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L	6-5	litter of needles and leaves				
F-H	5-0	dark colored partially decomposed				
Ae	0-12	very pale brown (10YR 6/3-7/3 d)	silt loam	strong, medium platy	firm	plentiful
Bt	12-27	dark brown (10YR 3/3 d)	silt loam	moderate-strong, medium-coarse subangular blocky	very firm	few
BtjC	27-47	dark brown (10YR 3/3 d)	silt loam	weak-moderate, medium angular blocky and platy	very firm	very few
C1	47+	olive (5Y 5/3 d)	silt	pseudo-platy	firm	nil

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Particle Size Distribution (%) Sand	Silt	Total clay	Fine clay
Ae	4.8	7	87	6	1
Bt	4.9	5	73	22	14
C1	6.1	18	80	2	

KENO LAKE SOIL

Location: 52°28'N 121°10'W NTS: 93A6 Surveyor: TL Agency: AC, Vancouver, 1980

Identification: BC Soil Survey Report 32 Classification: Orthic Humo-Ferric Podzol (1978) Landform and parent material: loamy morainal veneer

Drainage: well drained Slope and aspect: 15% S Elevation: 1000 m

Additional notes: Profile 8323-80; Quesnel lake road at W end of Jacques Lake. The IIC is an extremely firm pan-like horison underlying the friable solum

Vegetation: Populus tremuloides, P. trichocarpa, Thuja plicata, Salix spp., Shepherdia canadensis, Paxistima myrsenites, Juniperus communis, Aralia nudicaulis, Rosa spp., Cornus canadensis, Linnaea borealis, Clintonia uniflora, Calamagrostis canadensis, mosses

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L		leaf and twig litter				
F	10-0	semi-decomposed mor				
H		platy, decomposed				
Bf	0-13	dark red. brown (5YR 3/3 m)	sandy loam	weak, fine-medium sub-angular blocky	very friable, slightly plastic	abundant
Bm	13-40	dark brown (10YR 3/3 m)	sandy loam	moderate, medium sub-angular blocky	very friable, slightly plastic	plentiful
BC1	40-50	dark brown (10YR 3/3 m)	sandy loam	moderate, medium-coarse angular blocky	very firm	very few
BC2	50-80	dark brown (10YR 3/3 m)	sandy loam	moderate, medium-coarse angular blocky	very firm	very few
IIC	80+	dark brown (10YR 3/3 m)	sandy loam	strong, medium-coarse pseudo-blocky	very firm	

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	C/N	Pyrophos. (%)		Cation exchange (meq/100 g)					Particle size distribution (%)		
					Fe	Al	CEC	Ca	Mg	K	Na	Sand	Silt	Total clay
Bf	5.9	2.3	0.1	15.5	0.3	0.3	19.4	11.9	1.2	1.4	0.1	55	34	11
Bm	6.3	0.7	0.0	10.0			22.6	16.6	1.5	1.6	0.1			
BC1	6.3	1.3	0.0	19.5			28.1	17.1	2.2	2.1	0.1	65	27	8
IIC	6.3											64	31	5

LANEZI SOIL

Location: 53°48'N 121°19'W NTS: 93H14 Surveyor: RM Agency: BCME, Kelowna, 1978

Identification: BC Soil Survey Report 41 Classification: Podzolic Gray Luvisol (1978) Landform and parent material: loamy morainal blanket

Drainage: moderately well drained Slope and aspect: 13% NE Elevation: 850 m Additional notes: Profile RM 785P; airphoto A 21590-48; on Yellowhead Hy.; very stony; seepage present; rooting 60-100 cm

Vegetation: Thuja plicata, Tsuga heterophylla, Abies lasiocarpa, Oplopanax horridus, Aralia nudicaulis, Ribes spp., Cornus canadensis, Vaccinium spp.

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L	10-6	forest litter				abundant
F	6-0	dark reddish brown (5YR 3/2)				abundant
Ae	0-6	white (10YR 8/1 m)	silt loam	moderate, medium subangular blocky	friable	plentiful
Bf1	6-16	strong brown (7.5 YR 4/6 m)	silt loam	weak, fine subangular blocky	very friable	plentiful
Bf2	16-26	yellowish brown(10YR 5/8 m)	loam	very weak, fine subangular blocky	friable	plentiful
Bt	26-40	yellowish brown (10YR 5/4 m)	silt loam	moderate, coarse platy	friable	few
Btj	40-56	light olive brown (2.5Y 5/4 m)	loam	moderate, coarse subangular blocky	friable	very few
BC	56-140+	light olive brown (2.5Y 5/4 m)	loam	strong, coarse platy	firm	very few

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	C/N	Pyrophos. (%)		Cation exchange (meq/100 g)					Particle size distribution (%)				S (ppm)
					Fe	Al	CEC	Ca	Mg	K	Na	Sand	Silt	Total clay	Fine clay	
F	5.3	50.8	2.0	25.7			141.5	76.4	8.7	1.6	0.3					
Ae	3.8	0.6	0.1	11.5			8.8	0.8	0.5	0.1	0.0	35	57	8	3	1.1
Bf1	4.4	2.3	0.1	19.3	1.3	0.3	20.6	2.2	0.6	0.1	0.0	38	51	11	4	0.5
Bf2	4.5	1.3	0.1	18.6	0.9	0.4	14.8	0.5	0.4	0.1	0.0	45	41	14	4	
Bt	4.5	0.9	0.1	17.0			9.2	0.3	0.3	0.1	0.0	38	48	14	2	
Btj	4.5	0.9	0.1	12.0			6.9	0.4	0.2	0.1	0.0	42	46	12	2	
BC	5.1	0.1	0.0	2.3			66.8	2.2	0.6	0.1	0.0	42	46	12	3	

LYNN SOIL

Location: 51°49'N 120°30'W NTS: 92P15 Surveyor: NG Agency: BCMA, Kelowna, 1971

Identification: BC Soil Survey Report 24 Classification: lithic Orthic Humo-Ferric Podzol (1978) Landform and parent material: colluvial

Drainage: well drained Slope and aspect: 9% S Elevation: 1500 m Additional notes: bedrock @ 50 cm

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-H	2.5-0	forest litter				
Ae	0-10	gray (5YR 6/1 m)	gravelly loam sand	single grain	loose	abundant
Bf	10-27	yellowish red (5YR 4/6 m)	gravelly loam sand	single grain	friable	plentiful
C	27-50	yellowish brown (10YR 5/4 m)	gravelly loam sand	pseudo-platy	friable	
R	50+					

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	Oxalate (%)		Pyrophos. (%)		Cation exchange (meq/100 g)					P1 (ppm)	P2 (ppm)	S (ppm)	Mn (ppm)
				Fe	Al	Fe	Al	CEC	Ca	Mg	K	Na				
L-H	5.4	22.5	1.0										164.1	350.2	76.5	20.7
Ae	4.2	0.6	0.0					5.6	1.7	0.4	0.2	0.1	8.1	8.5	8.2	1.0
Bf	4.7	1.6	0.1	0.9	1.2	0.2	0.4	6.3	4.4	1.3	0.1	0.1	62.4	118.9	14.7	2.6
C	4.9	0.6	0.0					9.5	7.0	2.1	0.3	0.1	53.5	85.3	10.9	1.0

MOFFAT LAKES SOIL

Location: 52°07'40"N 121°16'30"W NTS: 93A3 Surveyor: TL Agency: AC, Vancouver, 1972

Identification: BC Soil Survey Report 24 Site Desc. No. 1560-79 Classification: Orthic Humo-Ferric Podzol (1978) Landform and parent material: hummocky; gravelly sandy loam; morainal

Drainage: well drained Slope and aspect: 10% SW Elevation: 1480 m Additional notes: AP A22033-1 on logging road near Moffat Lakes. The landform is dominated by many large granitic boulders

Vegetation: Pinus contorta, Picea glauca, Vaccinium membranaceum, mosses

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L	3-2.5					
F-H	2.5-0					
Ae	0-2.5	dark reddish brown (5YR 3/2 m)	fine sandy loam	moderate, medium granular	firm	plentiful, fine and medium
Bf1	2.5-12	dark yellowish brown (10YR 3/4 m)	fine sandy loam	weak, medium subangular blocky	firm	plentiful, fine and medium
Bf2	12-27	dark yellowish brown (10YR 4/4 m)	fine sandy loam	weak, fine subangular blocky		fine
Bm	27-40	olive (5Y 4/3 m)	gravelly sandy loam			fine
Btj	40-75	dark brown (10YR 4/3 m)	gravelly loam			fine
C1	75+		cobbly, gravelly sandy loam			very fine

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Oxalate (%) Fe	Al
Bf1	4.6	1.1	1.3
Btj	5.2	0.3	0.1
C1	5.1	0.2	0.1

PTARMIGAN SOIL

Location: 53°33'N 121°53'W NTS: 93H10 Surveyor: RM Agency: BCME, Kelowna, 1978

Identification: BC Soil Survey Report 41 Classification: Orthic Humo-Ferric Podzol (1978) Landform and parent material: glaciofluvial terrace

Drainage: well drained Slope and aspect: 4% NE Elevation: 940 m Additional notes: Profile RM 781 P; airphoto A21589-131; moderately pervious, very stony; rooting depth 2 m

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-F-H	1-0	forest litter				
Ae	0-8	light gray (5YR 7/1 m)	sandy loam	weak, medium platy	friable, slightly hard	plentiful
Bf1	8-25	strong brown (7.5YR 4/6 m)	sandy loam	weak, fine subangular blocky	friable, slightly hard	plentiful
Bf2	25-54	dark brown (7.5YR 3/4 m)	loamy sand	weak, fine subangular blocky	friable, soft	abundant
Bf3	54-91	dark yellow. brown (10YR 3/4 m)	gravelly loamy sand	single grain	friable, soft	few
Bm	91-130	dark brown (10YR 3/3 m)	gravelly loamy sand	single grain	friable, soft	few
BCk	130-150+	olive brown (2.5Y 4/4 m)	gravelly loamy sand	single grain	friable, soft	few

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	Pyrophos. (%)		Cation exchange (meq/100 g)				P2
				Fe	Al	CEC	Ca	Mg	Na	(ppm)
L-F-H	4.1	56.6	1.6			176.5	20.0	3.6	0.1	
Ae	3.5	0.4	0.1			11.0	1.5	0.1	0.0	0.5
Bf1	4.3	2.1	0.1	1.4	0.4	17.7	1.3	0.0	0.0	0.4
Bf2	4.7	2.3	0.1	0.9	0.7	19.0	1.4	0.0	0.0	0.3
Bf3	4.9	0.8	0.1	0.4	0.4	9.3	1.5	0.0	0.0	0.1
Bm	6.4		0.0	0.1	0.1	5.7	3.5	0.8	0.0	0.6
BCk	7.5					2.3	7.0	0.2	0.0	0.3

RAIL SOIL

Location: 51°58'22"N 121°27'06"W NTS: 92P14 Surveyor: KV Agency: AC, Vancouver, 1967

Identification: BC Soil Survey Report 25 Classification: Typic Mesisol (1978) Landform and parent material: organic blanket

Drainage: very poorly drained Slope and aspect: level Elevation: 1175 m

Vegetation: Carex spp., Salix spp., Betula glandulosa, mosses, reeds

Additional notes: ponded; seepage present; decomposition: OM1, OM2, OM3 slightly decomposed; OH moderately decomposed; woody material in OM3 horizon is 2 cm size and 20% of volume

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence
OM1	0-36	very dark grayish brown (10YR 3/2 m)			
OM2	36-61	very dark brown (10YR 2.5/4 m)			
volcanic ash	61-64	pale brown (10YR 6/3 m)	sandy loam	structureless	nonsticky
OM3	64-114	dark brown (10YR 4/3 m)			
OH	114-145	very dark gray (10YR 3/1.5 m)			
Cg	145-180	greenish gray (5BG 5/1 m)	silty clay loam	structureless	slightly sticky

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	Cation exchange (meq/100 g)					Particle Size Distribution (%)				Bulk density
				CEC	Ca	Mg	K	Na	Sand	Silt	Total clay	Fine clay	
OM1	6.3	43.0	3.0	133.9	63.1	22.2	1.1	2.5					0.15
OM2	5.8	44.4	3.1	141.3	73.6	22.5	0.1	1.1					0.15
volcanic ash	5.9	7.5	0.5	21.8	12.5	3.5	0.1	0.3	56	41	3	1	
OM3	5.7	41.5	2.7	153.2	80.7	24.1	0.2	1.1					0.14
OH	5.5	41.2	1.8	205.2	127.4	35.7	0.3	1.1					0.17
Cg	6.6	0.5	0.0	14.7	8.9	4.2	0.8	0.2	44	37	19	6	

RAMSEY SOIL

Location: 54°14'N 125°28'W NTS: 93K3 Surveyor: IC Agency: BCMA, Kelowna, 1974

Identification: BC Soil Survey Report 22 Classification: Orthic Humo-Ferric Podzol (1978) Landform and parent material: gravelly glaciofluvial

Drainage: rapidly drained Slope and aspect: 9% S Elevation: 1230 m

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-H	5-0					
Ae	0-10	light brown. gray (10YR 6/2 d)	gravelly loamy sand	moderate, medium granular	soft	abundant
Bhf	10-20	strong brown (7.5YR 5/6 d)	gravelly loamy sand	moderate, medium granular	soft	abundant
Bf	20-40	yellow. brown (10YR 5/6 d)	gravelly loam	weak, medium granular	loose	abundant
IIC	40+	variegated	sandy gravel	single grain	loose	common to few

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	C/N	Cation exchange (meq/100 g)					P1 (ppm)	P2 (ppm)	S (ppm)	Cu (ppm)	Zn (ppm)
					CEC	Ca	Mg	K	Na					
L-H	4.8	53.0	1.6	37.5	92.9	37.5	5.3	1.6	0.1	34	54	17	9	152
Ae	4.3	1.4	0.0	28.6	10.9	2.4	0.6	0.1	0.1	27	50	1	6	31
Bhf	4.4	2.8	0.0	61.4	24.8	0.3	0.2	0.2	0.1	158	230	12	16	60
Bf	4.8	0.8	0.0	23.0	8.4	0.5	0.1	0.1	0.1	64	139	3	15	55
IIC	5.2		0.0		3.8	0.7	0.1	0.1	0.0	21	388	1	14	38

RIDGE ROAD SOIL

Location: 52°27'45"N 121°58'00"W NTS: 93A5 Surveyor: TL Agency: AC, Vancouver, 1980

Identification: BC Soil Survey Report 32 Classification: Brunisolic Gray Luvisol (1978) Landform and parent material: loamy morainal

Drainage: moderately well drained Slope and aspect: 6% S Elevation: 1030 m Additional notes: Profile 9327-80; Lot 8290 on Ridge Road in Big Lake area. Clay films in Bt horizon are continuous, thin, and occur on ped faces, in pores, and channels

Vegetation: Pinus contorta, Pseudotsuga menziesii, Amelanchier spp., Salix spp., Rosa spp., Arnica cordifolia, Calamagrostis rubescens, Linnaea borealis, Cornus canadensis, Vaccinium myrtilloides

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence
L-F-H	5-0	forest litter			
Ael		discontinuous, incipient			
Bm	0-12	grayish brown (10YR 5/3 d)	loam	weak, medium subangular blocky	loose
Ae2	12-27	very pale brown (10YR 7/3 d)	loam	moderate-strong, coarse subang. blocky	hard
Bt	27-45	dark yellowish brown (10YR 4/4 d)	clay loam	strong, medium subangular blocky	hard
BC	45-67	dark yellowish brown (10YR 4/4 d)	clay loam	moderate, medium angular blocky	hard
Cca	67+	dark grayish brown (2.5Y 4/2 d)	clay	strong, pseudo-blocky	hard

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	C/N	Pyrophos. (%)		Cation exchange (meq/100 g)					Particle Size Distribution (%)		
					Fe	Al	CEC	Ca	Mg	K	Na	Sand	Silt	Total clay
Bm	5.2	3.3	0.1	15.3	0.2	0.1	9.3	4.8	1.7	0.3	0.1	43	43	14
Ae2	5.2	1.1	0.1	12.7			8.7	3.7	1.7	0.2	0.1	42	40	18
Bt	5.3	1.4	0.1	12.5			17.6	7.7	4.2	0.3	0.1	36	31	33
Cca	6.9						12.4	10.1	3.2	0.2	0.1	38	34	28

SAXTON SOIL

Location: 53°50'N 122°45'W NTS: 93G15 Surveyor: AD Agency: BCMA, Kelowna, 1965

Identification: BC Soil Survey Report 23 Classification: Eluviated Dystric Brunisol (1978) Landform and parent material: sandy fluvial terrace

Drainage: rapidly drained Slope and aspect: level Elevation: 600 m Additional notes: Sulfur averages 5-10 ppm in surface horizons and 5 ppm in subsoil

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-H	2-0					abundant
Ae	0-2	light brownish gray (10YR 6/2 m)	loamy sand	single grain	soft	abundant
Bm1	2-15	dark yellowish brown (10YR 3/4 m)	loamy sand	weak, fine subang. blocky	soft	abundant
Bm2	15-33	dark brown (10YR 3.5/3 m)	loamy sand	weak, fine subang. blocky	loose	plentiful
BC	33-46	brown (10YR 4/3 m)	sand	single grain	loose	few
C1	46-90		sand	single grain	loose	few
C2	90+		sand	single grain	loose	

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	Oxalate (%) Fe	Oxalate (%) Al	Cation exchange (meq/100 g) CEC	Ca	Mg	K	Na	Pl (ppm)
L-H	4.3	29.0	0.65								73
Ae											125
Bm1	5.1	1.1	0.03	0.9	0.8	8.5	1.9	0.2	0.3	0.1	99
Bm2	5.3	0.4	0.02	1.0	0.9	6.0	1.5	0.2	0.3	0.1	48
BC	5.4					5.6	1.8	0.4	0.2	0.1	17
C1	5.5			0.8	0.4	5.0	2.1	0.3	0.3	0.1	7
C2						5.1	2.7	0.4	0.3	0.1	8

SPAKWANIKO SOIL

Location: 52°59'N 121°50'W NTS: 93A13 Surveyor: TL Agency: AC, Vancouver, 1980

Identification: BC Soil Survey Report 32 Classification: Gleyed Sombric Humo-Ferric Podzol (1978) Landform and parent material: loamy morainal

Drainage: imperfectly drained Slope and aspect: 25% SE Elevation: 1435 m

Vegetation: Alnus viridis, Veratrum viride subsp. eschscholtzii, Athyrium filix-femina, Maianthemum unifolium, Clintonia uniflora

Additional notes: Profile 9332-80; on logging road on W side of Sovereign Creek. Mottles in BCg horizon are many, medium, distinct. The profile is common in this soil association; found in "alder patches" on seepage slopes

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence
L	5-4	twigs, sticks and leaves			
F	4-3	partially decomposed organic matter			
H	3-0	black, fluffy and friable			
Ah1	0-9	very dark brown (10YR 2/2 m)	loam	moderate, medium subangular blocky	friable, plastic
Ah2	9-16	dark brown (10YR 3/3 m)	silt loam	moderate, coarse subangular blocky	friable, plastic
Bf	16-28	dark yellowish brown (10YR 4/4 m)	silty clay loam	moderate, subangular blocky	friable, very plastic
BC	28-43	grayish brown (2.5Y 5/2 m)	silty clay loam	angular blocky	firm, plastic
BCg	43+	grayish brown (2.5Y 5/2 m)	clay loam	strong, very coarse angular blocky	firm, plastic
C1	@60	pale brown (10YR 6/3 m)	loam	strong, medium pseudo-angular blocky	hard, slightly plastic

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	C/N	Pyrophos. (%)		Cation exchange (meq/100 g)					Particle Size Distribution (%)			P1 (ppm)	P2 (ppm)
					Fe	Al	CEC	Ca	Mg	K	Na	Sand	Silt	Total clay		
Ah1	3.4	11.5	0.4	15.9			37.1	0.4	0.3	0.2	0.1	31	55	14	103	151
Ah2	3.5	6.8	0.2	17.4			22.7	0.3	0.4	0.2	0.1	31	52	17	93	168
Bf	3.6	2.8	0.1	14.2	0.9	0.2	15.8	0.3	0.1	0.1	0.1	34	51	15	76	129
BCg	4.4	0.5	0.0	10.0												
C1	4.7	0.5	0.0	12.3			8.8	2.4	2.3	0.1	0.1	33	50	17	16	31

SPANISH LAKE SOIL

Location: 52°35'N 121°26'W NTS: 93A11 Surveyor: TL Agency: AC, Vancouver, 1972

Identification: BC Soil Survey Report 32 Classification: Eluviated Eutric Brunisol (1978) Landform and parent material: loamy morainal blanket

Drainage: moderately well drained Slope and aspect: 35% N Elevation: 1050 m

Additional Notes: Stop No. 403 airphoto A22033-129; logging haul road along Spanish Lake. Black colors of the weathered phyllite bedrock (shales, slates, and argillite) mask pedogenic processes

Vegetation: Picea glauca, Abies lasiocarpa, Acer glabrum, Rubus parviflorus, Cornus sericea subsp. occidentalis, Alnus viridis subsp. sinuata, Veratrum viride subsp. eschscholtzii

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L	15-2.5					
H	2.5-0	forest litter				plentiful
Ae	0-7	brown (10YR 5/3 d)	loam	weak, fine granular	friable	plentiful
Bm	7-20	light yellow. brown (10YR 6/4 d)	silt loam	moderate, fine granular	firm	plentiful
BC	20-35		silt loam	moderate, fine subangular blocky	firm	few
C1	35-90	gray (5Y 5/1 d)	loam	strong, medium pseudo-blocky	very firm	very few
C2	90-150		loam	strong, medium pseudo-blocky	very firm	nil
C3	150+	gray (5Y 5/1 d)	loam	strong, medium pseudo-blocky	very firm	nil

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Oxalate (%) Fe	Oxalate (%) Al	Particle Size Distribution (%) Sand	Silt	Total clay
Ae	4.7					
Bm	5.9	0.7	0.3			
C1	6.5			35	47	18
C3	7.0	0.4	0.1	35	46	19

SPOUT SOIL

Location: 51°57'16"N 121°26'34"W NTS: 92P/4 Surveyor: KV Agency: AC, Vancouver, 1967

Identification: BC Soil Survey Report 25 Classification: Podzolic Gray Luvisol (1978) Landform and parent material: loamy morainal blanket

Drainage: well drained Slope and aspect: 14% S Elevation: 1150 m Additional notes: Slightly stony; depth to bedrock = 2.5 m. Clay films in Bt horizon are common, moderately thick in channels, pores, and on ped faces

Vegetation: Pinus contorta, Calamagrostis rubescens - seral community after burn in Douglas fir - pine grass zone

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-F-H	8-0	forest litter				
Ael	0-4	light gray (10YR 7/1 d)	sandy loam	weak, very fine platy	loose	plentiful
Bf	4-28	dark yellowish brown (10YR 4/6 m)	sandy loam	weak, very fine subangular blocky	firm	plentiful
Ae2	28-38	light brownish gray (10YR 6/2 m)	sandy loam	weak, very fine angular blocky	very firm	few
Bt	38-60	dark brown (10YR 4/3 m)	loam	weak, very fine angular blocky	very firm	
IIC	60-112	dark grayish brown (10YR 4/2 m)	gravelly loam	pseudo-blocky	very firm	

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	Oxalate (%) Fe	Oxalate (%) Al	Cation exchange (meq/100 g) CEC	Ca	Mg	K	Na	Particle Size Distribution (%) Sand	Silt	Total clay	Fine clay	Bulk Density
Ael	4.7	1.2	0.1	0.5	0.1	10.7	2.6	0.7	0.2	0.1	54	41	5	1	
Bf	5.7	0.9	0.1	1.0	0.5	16.8	5.6	1.9	0.4	0.1	53	35	12	5	1.3
Ae2	5.7	0.3		0.7	0.7	7.3	3.4	1.2	0.2	0.1	63	32	5	0	1.9
Bt	5.9	0.2		0.6	0.6	14.2	7.0	3.2	0.4	0.1	49	36	15	2	2.1
IIC	6.2	0.1		0.3	0.3	14.4	7.3	3.9	0.4	0.1	51	35	14	3	2.0

TYEE SOIL

Location: 52°13'20"N 122°03'24"W NTS: 93B1 Surveyor: WS Agency: AC, Vancouver, 1966

Identification: BC Soil Survey Report 25 Classification: Orthic Gray Luvisol (1978) Landform and parent material: morainal blanket

Drainage: moderately well drained Slope and aspect: 5% SE Elevation: 1000 m Additional notes: LFH horizons consist of slightly decomposed leaves (20%) and needles (80%). The Bt horizon has many, moderately thick clay films in pores, channels, and on ped faces

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-F-H	3-0	forest litter				
Ae	0-18	light gray (10YR 7/2 d)	sandy loam	weak, fine granular	very friable	plentiful, exped
AB	18-28	light brown. gray (10YR 6/2 d)	loam	moderate, fine subangular blocky	firm	plentiful, exped
Bt	28-50	yellowish brown (10YR 5/4 d)	loam	moderate-strong, fine subangular blocky	firm	plentiful, exped
IIBC	50-76	pale brown (10YR 6/3 d)	gravelly loam	moderate, medium subangular blocky	firm	plentiful, exped
IIC	76-100	pale brown (10YR 6/3 d)	gravelly loam	moderate, medium pseudo-blocky	friable	few, exped
IICk	100-120	grayish brown (2.5Y 5/2 d)	gravelly loam	moderate, medium pseudo-blocky	friable	very few, exped

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	Cation exchange (meq/100 g)					Particle Size Distribution (%)			
				CEC	Ca	Mg	K	Na	Sand	Silt	Total clay	Fine clay
L-F-H	4.7		0.4	48.0	23.9	5.0	1.4	0.2				
Ae	4.4	0.5	0.0	8.2	3.0	1.0	0.2	0.1	49	45	6	2
AB	4.9	0.6	0.0	15.0	8.1	3.6	0.4	0.1	43	39	18	8
Bt	5.6	0.4	0.0	24.0	14.2	7.8	0.6	0.1	38	46	16	13
IIBC	6.2	0.2	0.0	19.4	12.2	6.5	0.5	0.1	43	33	24	6
IIC	6.4	0.1	0.0	16.9	11.1	5.2	0.4	0.1	45	33	22	6
IICk	7.3	0.1	0.0	15.4	23.0	4.3	0.3	0.1	45	33	22	6

WILLIAMS LAKE SOIL

Location: 52°12'10"N 121°52'14"W NTS: 92P4 Surveyor: TL Agency: AC, Vancouver, 1972

Identification: BC Soil Survey Report 25 Classification: Orthic Gray Luvisol (1978) Landform and parent material: loamy morainal blanket

Drainage: moderately well drained Slope and aspect: 10% S Elevation: 1080 m Additional notes: Moderately stony; Bt horizons have many thick clay films in roots, pores, and on ped faces; gravel content increases from 10% in AB to 25% in C horizon

Vegetation: mature Douglas fir - pine grass community

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-F-H	3-0	leaves (20%) and needles (80%)				
Ae	0-5	grayish brown (10YR 5/2 m)	fine sandy loam	moderate, fine granular	loose	plentiful
AB	5-9	very dark grayish brown (10YR 3/2.5 m)	loam	moderate, medium subangular blocky	firm	
Bt1	9-28	very dark grayish brown (10YR 3/2 m)	clay loam	strong, coarse subangular blocky	firm	
Bt2	28-46	very dark grayish brown (10YR 3/2.5 m)	clay loam	strong, coarse subangular blocky	firm	very few
BC	47-76	very dark grayish brown (10YR 3/2.5 m)	clay loam	moderate, medium subangular blocky	firm	
IICk	76-102		gravelly clay loam	moderate, medium pseudo-blocky	firm	
IIC	102-183		gravelly clay loam			

YANKS PEAK SOIL (1)

Location: 52°53'N 121°26'W NTS: 93A4 Surveyor: JS Agency: AC, Vancouver, 1968

Identification: BC Soil Survey Report 32 Classification: Orthic Humo-Ferric Podzol (1978) Landform and parent material: sandy loam morainal

Drainage: well drained Slope and aspect: 10% NE Elevation: 1783 m Additional notes: Site 3 Yanks Peak profile from J.I. Sneddon M.Sc. thesis U.B.C. 1968. Located 3.2 km N of Yanks Peak, airphoto A22009-123; Midas formation

Vegetation: Caltha leptosepala, Carex spp., Hieracium spp., Juncus spp., Senecio triangularis, Sibbaldia procumbens, Valeriana sitchensis, Valerianella locusta, Veratrum viride subsp. eschscholtzii, Lycopodium alpinum, mosses

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-F	2-0	organic litter				
Ae	0-7.5	gray (10YR 6/1 d)	gravelly silt loam	moderate, medium subangular blocky	friable	abundant
Bf	7.5-18	dark yellow. brown (10YR 4/4 d)	gravelly silt loam	moderate, coarse, subangular blocky	friable	plentiful
BC	18-50	grayish brown (2.5Y 5.5/2 d)	gravelly silt loam	moderate, coarse-medium angular blocky	firm	few
C	50+	gray (5Y 5/1.5 d)	gravelly sandy loam			

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	C/N	Oxalate (%) Fe	Oxalate (%) Al	Pyrophos. (%) Fe	Pyrophos. (%) Al	Cation exchange (meq/100 g) CEC	Ca	Mg	K	Na	Particle Size Distribution (%) Sand	Silt	Total clay	Fine clay	Bulk density (g/cm)	S (ppm)
L-F	3.6	23.6	1.3	17.9					63.5	3.8	2.6	3.9	1.1						0.0
Ae	3.6	2.3	0.3	8.6	0.3	0.1			15.4	0.7	0.5	0.2	0.4	29	56	15	3	1.4	0.0
Bf	3.9	2.0	0.1	15.5	2.9	0.2	2.0	0.3	14.6	0.8	0.1	0.1	0.4	32	54	14	3		0.0
BC	4.2	0.3	0.1	6.2	2.2	0.2	1.0	0.1	4.3	0.9		0.1	0.1	33	51	16	4	1.7	0.0
C	4.4	0.3	0.1	2.7	1.7	0.1	0.4	0.1	4.3	1.9	1.2	0.1	0.1	58	35	7	2		0.0

YANKS PEAK SOIL (2)

Location: 52°53'N 121°26'W NTS: 93A4 Surveyor: JS Agency: AC, Vancouver, 1968

Identification: BC Soil Survey Report 32 Classification: Sombric Humo-Ferric Podzol, lithic phase (1978) Landform and parent material: loamy morainal veneer

Drainage: well drained Slope and aspect: 5% NE Elevation: 1783 m Additional notes: Site 2 Yanks Peak profile from J.I. Sneddon M.Sc. thesis U.B.C. 1968. Located 3.2 km N of Yanks Peak, airphoto A22009-123; Midas formation-phyllite and schist

Vegetation: Anemone occidentalis, Arenaria lateriflora, Festuca spp., Juncus parryi, Juncus spp., Muhlenbergia spp., Pedicularis bracteosa, Ranunculus verecundus, Sibbaldia procumbens, Trollius laxus subsp. albiflorus, mosses

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-F	4-0	litter of fresh and partly decomposed roots, leaves and stems				
Ah	0-15	very dark gray (N 4/0 d)	gravelly silt loam	weak, fine subangular blocky	friable	abundant
Bf	15-38	dark gray (10YR 4/1 d)	gravelly silt loam	moderate, fine subangular blocky	friable	plentiful
C	38+	very dark gray (5Y 3.5/1 d)	gravelly loam			very few

PHYSICAL AND CHEMICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	C/N	Oxalate (%) Fe	Oxalate (%) Al	Pyrophos. (%) Fe	Pyrophos. (%) Al	Cation exchange (meq/100 g) CEC	Ca	Mg	K	Na	Particle Size Distribution (%) Sand	Silt	Total clay	Fine clay	Bulk density (g/cm)	S (ppm)
L-F	4.4	26.4	1.9	13.7					61.0	14.3	6.3	3.0	1.9						
Ah	4.1	4.1	0.6	7.3	0.7	0.2			23.2	3.7	1.3	0.4	0.3	27	57	16	4	1.3	0.0
Bf	4.1	2.2	0.3	6.4	0.8	0.3	0.8	0.1	13.5	1.6	0.6	0.2	0.2	34	50	16	5		0.0
C	4.1	1.2	0.2	5.1	0.8	0.2	1.3	0.1	7.0	0.8	0.5	0.1	0.3	38	47	15	3	1.4	0.0