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Soils of the Taseko Lakes area, British Columbia

Report No. 36 British Columbia Soil Survey 1987

Canada

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Report No. 36 of the
British Columbia Soil Survey

K.W.G. Valentine, W. Watt, and A.L. Bedwany

Soil mapping by
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PREFACE

This report and the soil maps it contains (map sheets 92 O, NE, NW, SE and SW in the National Topographic System) cover about 15 500 km^2 in the southwestern Cariboo and Chilcotin regions of British Columbia.

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.

This publication is one of a series (Lord and Mackintosh 1982; Lord 1984; Valentine and Schori 1980; Gough, in preparation), covering the Cariboo-Chilcotin region. These publications provide soils information of 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

This report describes the soils of part of the Interior Plateau and a small portion of the Coast Mountains in British Columbia. The four map sheets extend from 51° to 52° north and from 122° to 124° west. They are equivalent to the National Topographic Series 92 O map sheet, covering roughly 1 546 000 ha (Fig. 1).

Settlement and resources

The small and scattered settlements within the area include Riske Creek, Dog Creek, Big Creek, and Hanceville. In addition there are a number of Indian reserves. The nearest major town is Williams Lake, 15 km to the northeast. Although first developed by European and American immigrants for beef cattle (one of the largest ranches in British Columbia, the Gang Ranch, is near Dog Creek), the area has become important for forest products since World War II. Commercial tree species include Engelmann spruce, balsam fir, lodgepole pine, and Douglas fir. There is also excellent country for hikers, riders, campers, anglers, hunters, and nature lovers. Trapping and mining, two of the oldest industries which earlier attracted people to the area, are of minor importance.

Physiography

The physiographic regions of British Columbia have been described by Holland (1976). Parts of six of these regions occur in the survey area: the Pacific Range, the Chilcotin Range, the Camelsfoot Range, the Fraser Plateau, the Marble Range, and the Fraser Basin. In this report, the Pacific, Chilcotin, and Camelsfoot ranges have been grouped into one, called the Coast Mountains, which also includes a very small part of the Marble Range. The Fraser Plateau has been divided into two, reflecting differences in the soil, vegetation, and landforms. Part of the Fraser Basin becomes the Major River valleys. Physiographic regions used in this report are shown in Fig. 2.

Coast Mountains

Tectonic uplift and subsequent glacial and stream erosion have produced the mountainous terrain of the Pacific and Chilcotin ranges. Inthe extreme southwest, where the mountains reach elevations of 3000 m, there are active glaciers, jagged peaks, and considerable areas of bare rock and rubbly boulders. Eastward toward the Camelsfoot Range the mountains become more rounded. They are not as high, have few exposures of bare rock, and no glaciers. A sharp break in slope separates the Chilcotin, Pacific, and Camelsfoot ranges from the broad rolling Fraser Plateau.

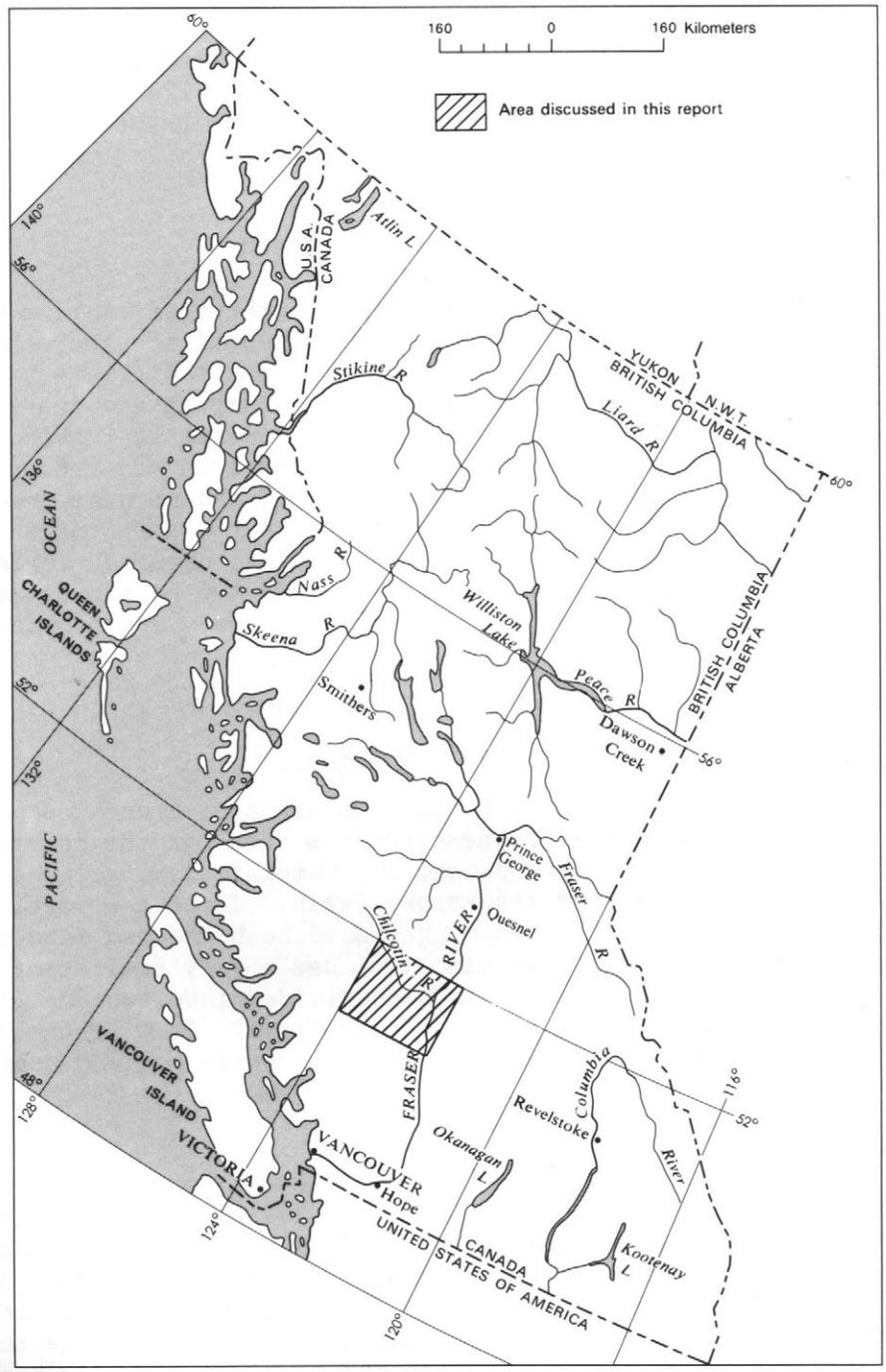
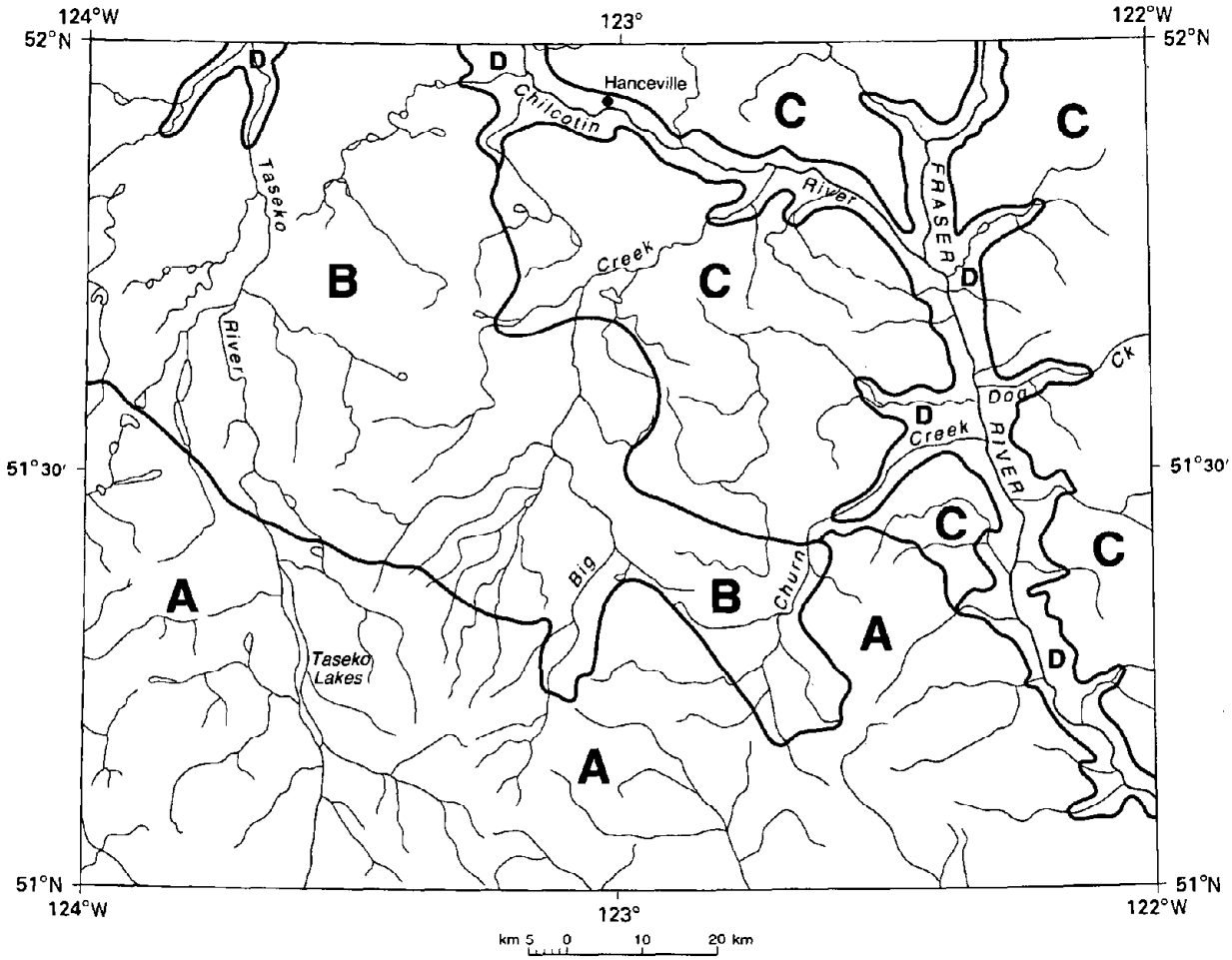


Fig. 1. Location of the Taseko Lakes map area in British Columbia



LEGEND

A - Coast Mountains
B - Fraser Plateau West
C - Fraser Plateau East
D - Major River Valleys

Fig. 2. Physiographic regions and drainage

Fraser Plateau

North and east of the Coast Mountains is the Fraser Plateau; a rolling drumlinized till plain dissected by deep valleys and containing some isolated hills. It slopes from the southwest to the northeast starting at about 1500 m above sea level (asl) and gradually falling to 1000 m asl. Most of the plateau is covered with moraine that reflects the mineralogy and surface configuration of the basalt flows underneath. There are many enclosed depressions with wet soils and organic deposits as well as glaciofluvial gravels in shallow valleys. In the west much of the moraine is coarse textured, having been water-washed by glacial meltwater from the Coast Mountains. This is the main difference between the Fraser Plateau West and the Fraser Plateau East.

The Major River valleys

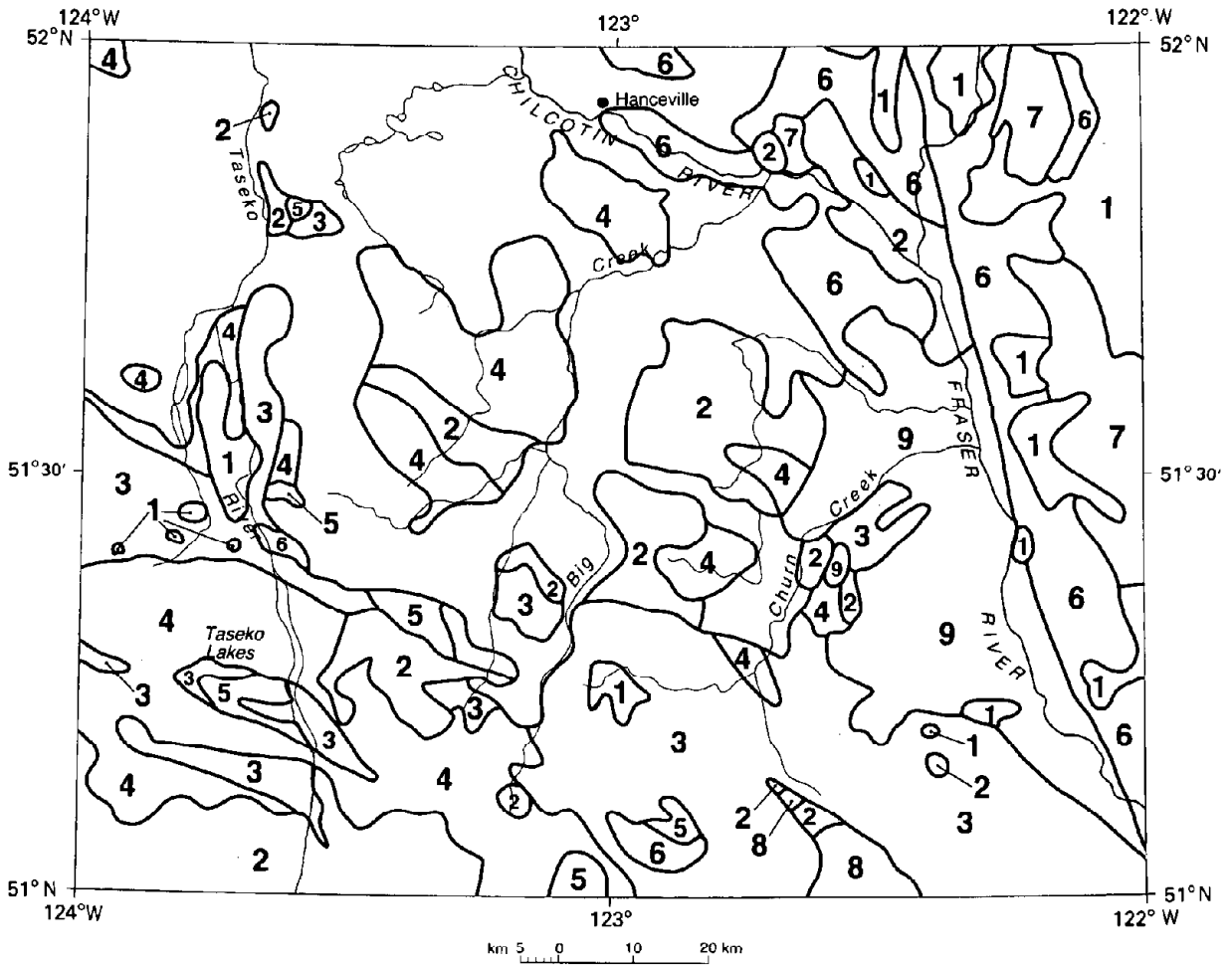
The Fraser and Chilcotin rivers dissect the Fraser Plateau and form the fourth physiographic subdivision. The upper slopes of their valleys have steep colluvial soils which are often thin with some bedrock exposures (for example, classic basalt columns above Dog Creek). Lower parts of the valleys are filled with a very complex mixture of materials deposited during and just after glaciation. The rivers are now cutting down through these deposits, forming steep gullies and intervening flat terraces. Many slopes in these unconsolidated deposits are unstable (for example, around the Gang Ranch).

Bedrock geology

Bedrock geology has been mapped and described by Tipper (1963). A generalized map of the various bedrock types is presented in Fig. 3. Bedrock determines many soil characteristics. For example, where the bedrock source of soil parent material is coarse textured acidic granite with few bases the soils which form on that material will be coarse and relatively infertile. Where the source is basalt, which is base rich and finer grained, the soils will be finer and more fertile.

Granodiorite is the most common type of rock in the Pacific Ranges. It is acidic, coarse grained, and has few minerals that weather to provide plant nutrients. The Pacific Ranges were the main source of glacier ice, and consequently adjacent morainal and fluvial deposits are also coarse textured and relatively infertile.

The bedrock of the Chilcotin Ranges varies from andesite, breccia, and basalt to sedimentary rocks with small granitic intrusions. The bedrock of the Camelsfoot Range is greywacke, shale, siltstone, and conglomerate in the south and rhyolitic and dacitic tuffs and breccias in the north. The latter rocks are fine grained, often with few potential soil nutrients, whereas the former are more variable in texture and nutrient content. Thus the soils of the Camelsfoot Range are generally finer textured than those of the Coast Mountains. Volcanic cinders and ash, common in their surface layers, also set them apart.



LEGEND

1	Volcanic deposits	plateau lava and basalt flows
2	Igneous intrusive rock	granodiorite
3	Sedimentary rocks	siltstones, shales, conglomerates, greywackes, grit, arkose and so forth
4	Extrusive igneous rocks	andesite, basalt, rhyolite and dacite
5	Dacitic feldspar porphry	
6	Mixed sedimentary and volcanics	andesites, basalt, limestone, argillite, and chert
7	Sedimentary rocks	mainly limestone
8	Ultramafic rocks	serpentine and peridotite
9	Extrusive igneous rocks	rhyolite and dacite

Fig. 3. Generalized geology

The large Fraser Plateau is underlain by basalt and andesite lava flows with a few intrusions of granodiorite. Such bedrock is base rich and fine grained. The soils are therefore more fertile and finer textured than those of the mountains. In parts of the eastern Fraser Plateau there are limestones and argillites. These rocks are very rich in bases. Throughout the Fraser Plateau the base rich rocks have produced alkaline soils, especially subsoils, with a high pH. In depressions the soils are sometimes alkaline and saline. They contain salts of sodium and magnesium as well as calcium.

Surficial geology and parent materials

The glacial geomorphology and Pleistocene history have been described by Tipper (1971) and the surficial geology by Heginbottom (1972). This section briefly describes the various types of surficial deposits from which the soils have been formed.

Morainal deposits

Morainal deposits (glacial till) are the most common surficial material within the map sheet. Their depth varies from a few centimeters to over 5 m. They consist of a heterogeneous mixture of boulders, cobbles, pebbles, sand, silt, and clay and their composition reflects the lithology of the bedrock from which they have been derived. In some places they may be very gravelly or sandy where running water has carried away the silt and clay. This is especially true in the western Fraser Plateau. Near Riske Creek, the morainal surface is covered with large boulders up to 2 m in diameter.

The undulating topography of morainal areas produces soils of different moisture regime, depending on slope position. Typically there are drier soils on crests and progressively moister soils downhill. In depressions there may be organic soils or lakes.

Fluvial deposits

Fluvial deposits are sediments that have been laid down by flowing water. They have a narrower range of particle size than moraine and are often bedded or layered. In the small meandering streams of the Fraser Plateau, the fluvial deposits are sandy to loamy with some silt loams. The fluvial deposits of the larger Fraser and Chilcotin rivers are coarser textured (sands and gravelly sands), whereas in the mountains they have variable textures (generally coarse due to the fast-flowing streams).

Glaciofluvial deposits (stream sediments deposited from glacial meltwater) are poorly sorted due to the large sediment content of the glacial meltwater and the inability of the streams to carry all the sediment. Generally glaciofluvial soils are coarse textured (sands and loamy sands) and contain large amounts of coarse fragments (gravels and cobbles). In some places this coarse textured material has been overlain by sandy eolian (windblown) deposits.

Fluvial soils are well drained if they are above the present river level on fans or terraces. In valley bottoms soil drainage varies, depending on susceptibility to flooding or seepage from the river. Fluvial soils have small to moderate water storage capacity and do not usually have impermeable layers.

Lacustrine deposits

Lacustrine deposits are sediments that were originally laid down in lakes. They are not very common in the survey area, being the parent materials of only three soils --- Churn Creek, Zenzaco, and Gay Lake. Textures range from loam to silt loam. These soils are moderately pervious and their finer textures give them a moderate to large water storage capacity. Lacustrine deposits usually now form flat to gently sloping terraces beside rivers.

Colluvial deposits

Colluvial deposits occur on steep slopes (for example, in the mountains or adjacent to the major rivers). These deposits are usually coarse textured with a loose consistence and contain a large proportion of angular coarse fragments. They are derived directly from bedrock or surficial deposits upslope. Downslope movement is active, although slow. They often have a dry moisture regime and are rapidly pervious.

Organic deposits

Organic deposits occur in poorly and very poorly drained depressions with high water tables throughout the growing season. They are relatively shallow, usually less than 2 m and often less than 1 m deep. They are usually neutral or slightly alkaline, rarely acidic, and occasionally contain free carbonates (marl deposits).

The vegetation associated with organic deposits is distinct from that of surrounding lands. Sedges, rushes, and reeds that can tolerate standing water during at least part of the year are characteristic of these wetlands. The excess water minimizes decomposition so that dead vegetation acccumulates. The water regime is the overriding factor in the development of organic deposits, which tend to be similar regardless of the broad vegetation or physiographic zone in which they occur. Organic deposits in this map area are generally fens composed of mesic (partially decomposed) or fibric (relatively undecomposed) peat. The deposits vary, depending on associated vegetation and water regime.

Climate

Most of the area has a moderate continental climate with cold winters and warm summers. Long-term Atmospheric Environment Service (A.E.S) climatic stations are located at Big Creek, Dog Creek, and Wineglass Ranch (shorter record). In addition there are three long-term A.E.S. stations just outside the map area. Table 1 shows selected climatic data from the relevant A.E.S. stations, and Fig. 4 shows the location of these stations. Wineglass Ranch and Dog Creek represent the Major River

Table 1. Climatic data for A.E.S. stations in or near the Taseko Lakes area

Station	Elevation (m)	Mean annual temperature (°C)	Mean annual total precipitation (cm)	May-Sept., precipitation (cm)	Mean snowfall (cm)	Frost-free period (days)** p(0.33)	p(0.25)	Years of record
Wineglass Ranch	488	5.9	31	17	70			8*
Dog Creek	1027	4.0	39	20	180	100	88	17*
Williams Lake	940	3.9	41	20	199	84	82	20*
Big Creek	1128	2.0	34	18	138	24	20	75
Alexis Creek-Tautri Creek	1219	0.4	46	20	195	6	2	18
Tatlayoko Lake	853	3.9	41	13	142	42	34	50

* Adjusted normals.

** p(0.33) - probability of frost within this period is one in three.

p(0.25) - probability of frost within this period is one in four.

Reference: Atmospheric Environment Service (no date) Canadian climatic normals 1951-1980.

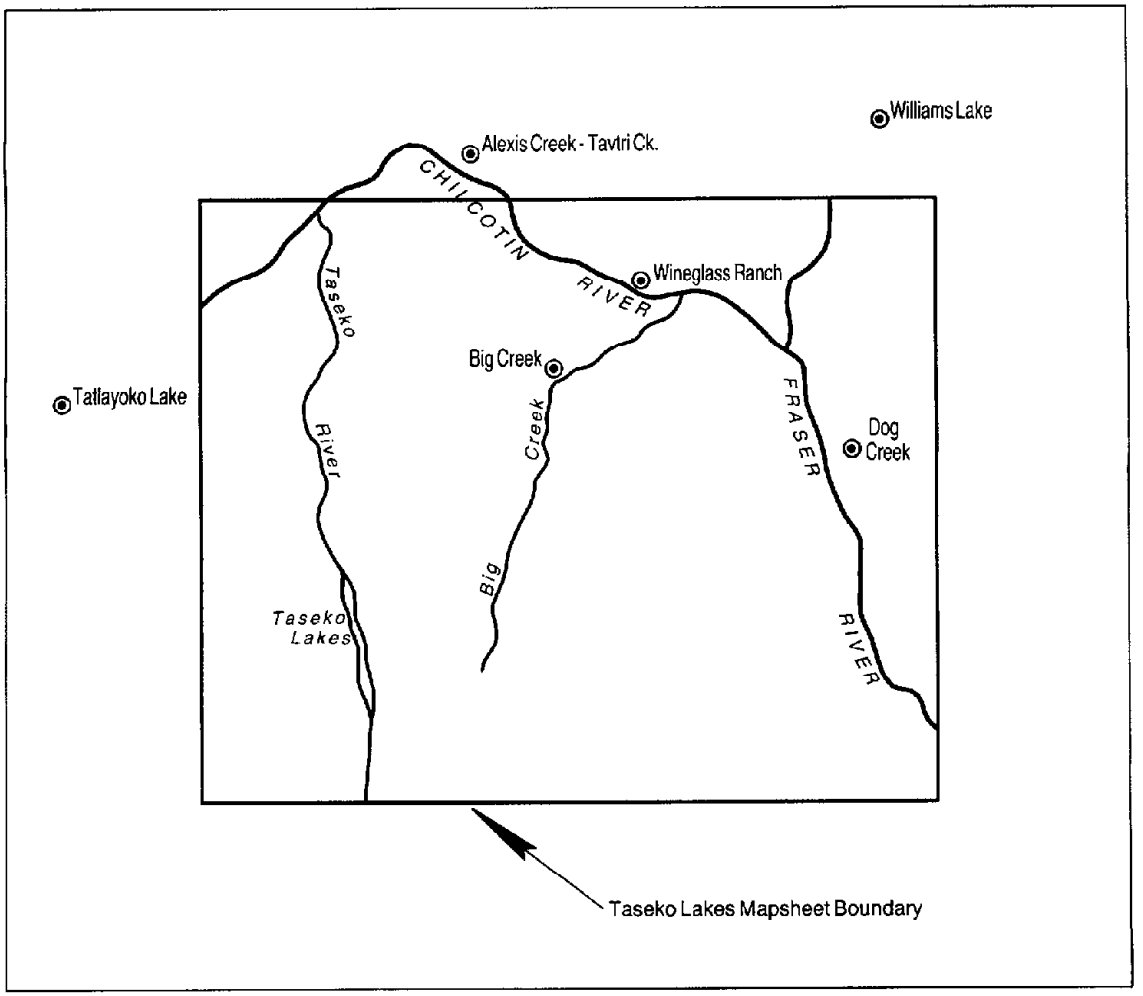


Fig. 4. Location of A.E.S. climate stations

valleys; Williams Lake and Big Creek represent the Fraser Plateau East, and Alexis Creek-Tautri Creek and Tatlayoko Lake represent the Fraser Plateau West. There are no A.E.S. stations in this part of the Coast Mountains.

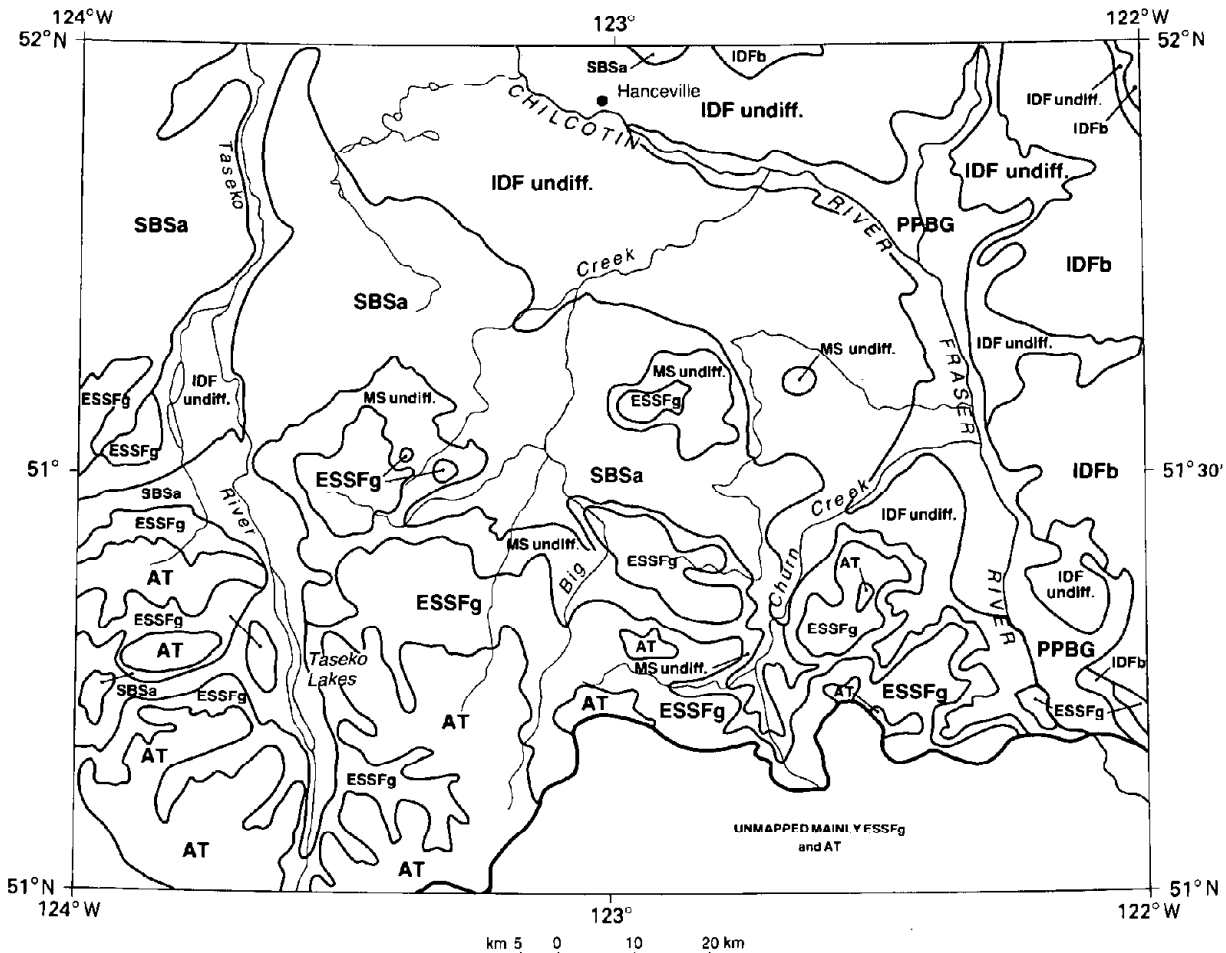
Local climatic conditions are governed largely by elevation, aspect, and physiographic setting, especially proximity to mountain ranges. In the lee of the Coast Mountains there is a rain shadow, giving less total precipitation and clearer skies, particularly in the Fraser Plateau West. In addition, being higher the Fraser Plateau West has a short frost-free period and consequently a short growing season. The mountains adjacent to it have even lower temperatures, a shorter growing season, and comparatively more precipitation. Aspect affects the local, or micro, climate on sloping lands. South- and southwest-facing slopes are considerably drier and warmer than adjacent north- or northeast-facing slopes. The warmest and driest lands are in and adjacent to the Major River valleys.

Different climates give different types of soil. For example, in the drylands next to the major rivers leaching is slight and grassland soils have developed organic rich surface horizons and calcium carbonate deposits in the subsoil (Chernozemic soils). The higher plateaus have more precipitation. Their soils are moister, and downward percolating water has enriched the subsoil with clay (Luvisolic soils). In the mountains there is even more precipitation and temperatures are lower, thereby increasing the effective precipitation. These soils are strongly leached. Downward percolating soil water has enriched the subsoil with organic matter, clay, iron, and aluminium (Podzolic soils).

Vegetation

The vegetation that grows on a soil affects its properties. All plants recycle nutrients and help to concentrate them near the soil surface. Grasses concentrate organic matter at the surface when their roots die. Trees shed their leaves, which accumulate as a litter layer at the bases of the trees and are slowly incorporated into the topsoil. Organic acids released from this litter percolate downward in the soil solution, translocating complexed clay, organic matter, and iron and weather the subsoil in the process. Trees mix soil mechanically when blown down by wind. Organic matter helps cement stable soil aggregates. It also enhances a soil's capability to store water, and is the principal source of important plant nutrients like nitrogen and phosphorus.

Annas and Coupé (1979) described five vegetation (or Biogeoclimatic) zones in the Taseko Lakes survey area. They define a Biogeoclimatic Zone as "a definite geographical area having basically similar patterns of energy flow, biochemical cycling, vegetation, and soils as a result of a broadly homogeneous macroclimate." Each Biogeoclimatic Zone is divided into subzones. Subsequent to the work of Annas and Coupé (1979) the Ministry of Forests in Williams Lake has revised the classification to include a sixth zone (the Mountain Spruce) and have revised some of the zone and subzone boundaries. A generalized description of each of the biogeoclimatic zones or subzones in the survey area follows. Fig. 5 shows their distribution. Appendix I gives a partial species list for the area.



LEGEND

AT	Alpine Tundra zone
SBSa	Subboreal Spruce, Chilcotin pine subzone
ESSFg	Engelmann Spruce-Subalpine Fir, dry subzone of ESSFg
MS undiff.	Montane Spruce
IDF undiff.	Interior Douglas Fir, undifferentiated subzone of forest-grassland
IDFb	Interior Douglas Fir, Douglas fir-pinegrass subzone (continuous forest)
PPBG	Ponderosa Pine-Bunchgrass zone
	Biogeoclimatic Unit Boundary
	Forest Region Boundary

Fig. 5. Biogeoclimatic zones and subzones (generalized from Annas and Coupé (1979) and Coupé, personal communication)

Alpine Tundra zone (AT)

Usually occurring above 2000 m, the AT has the most severe climate of all. Subalpine fir (Abies lasiocarpa), whitebark pine (Pinus albicaulis), lodgepole pine (Pinus contorta), and Engelmann spruce (Picea engelmannii) grow here as sparse, twisted, and flattened (Krummholz) forms. Similarly, shrubs are sparse and only the most hardy species persist, mainly low-growing willows (Salix spp.) and common juniper (Juniperus communis). The herb layer on drier sites is moderately sparse and contains alpine cushion plants such as moss companion (Silene acaulis), Lyall's lupine (Lupinus lyallii), mountain ameno (Dryas spp.), and various grasses and sedges. Wet sites often have a lush growth of herbaceous vegetation composed mostly of Indian paintbrush (Castilleja spp.), Sitka valerian (Valeriana sitchensis), elkslip marsh marigold (Caltha leptosepala), and various grasses and sedges.

Engelmann Spruce - Subalpine Fir, dry subzone (ESSFg)

The cold dry climate in this subzone results in low biological productivity. Typical overstory vegetation consists of lodgepole pine with sparse whitebark pine, subalpine fir, and Engelmann spruce. The shrub layer is sparse and consists of common juniper, white rhododendron (Rhododendron albiflorum), and soapberry (Shepherdia canadensis). Herbs are moderately abundant. They include grouseberry (Vaccinium scoparium), lupine (Lupinus sp.), crowberry (Empetrum nigrum), elephant's head (Pedicularis sp.), kinnikinnick (Arctostaphylos uva-ursi), heart-leaf arnica (Arnica cordifolia), and various grasses and lichens. South-facing slopes often have much less vegetation than north-facing slopes due to greater moisture stress.

Montane Spruce zone (MS)

This zone occurs at elevations intermediate between the SBSa and ESSF. Over most of the area the overstory consists of lodgepole pine and hybrid white spruce (Picea glauca x). Wet sites have an overstory of hybrid white spruce and occasionally subalpine fir. The shrub layer usually contains trappers tea (Ledum glandulosum), common juniper, and soapberry. The herb layer is moderately sparse and contains grouseberry, crowberry, and twinflower (Linnaea borealis). Mosses form a near-continuous ground cover. Wet forested sites often have well-developed shrub and herb layers with black twinberry (Lonicera involucrata), swamp gooseberry (Ribes lacustre), slender sedge (Carex disperina), and horsetail (Equisetum spp.).

Subboreal Spruce, Chilcotin Pine subzone (SBSa)

This subzone occurs below the MS and receives less precipitation because of the rainshadow region to the lee of the Coast Mountains. The most common vegetation is an overstory of lodgepole pine and a sparse understory of common juniper, prickly rose (Rosa acicularis), kinnickinnick, twinflower, and an abundance of lichen. Moister forested sites often have an overstory of white spruce and trembling aspen (Populus tremuloides). Shrubs on these sites include black twinberry, soapberry, and highbush cranberry (Viburnum edule). Common herbs on these sites are

colt's-foot (Petasites palmatus), horsetail, and stream violet (Viola glabella). Wetland communities are common in this subzone and are often sedge-dominated fens or shrub carrs dominated by willows and scrub birch (Betula glandulosa).

Interior Douglas Fir zone (IDF)

Within the IDF zone there are two distinct subzones. One subzone consists of lower elevation forest centered along some of the major drainages. In this subzone Douglas fir (Pseudotsuga menziesii) is the dominant tree and Rocky Mountain juniper (Juniperus scopulorum), Saskatoon (Amelanchier alnifolia), and snowberry (Symphoricarpos albus) are the common shrubs. The most frequently occurring herbs are bluebunch wheatgrass (Agropyron spicatum), pinegrass (Calamagrostis rubescens), kinnikinnick, and pussy-toes (Antennaria spp.).

In the other subzone of the IDF, Douglas fir and lodgepole pine are the most common trees. White spruce, aspen, and black cottonwood (Populus balsamifera ssp. trichacarpa) occur on moist to wet sites. The shrub layer is sparse and consists of prickly rose, soapberry, upland willow, common juniper, and birch-leaved spirea (Spiraea betulifolia). The dense herb layer is dominated by pinegrass, twinflower, and kinnikinnick with some Lindley aster (Aster ciliolatus) and blueleaf strawberry (Fragaria virginiana). Mosses are usually present and become abundant on cooler, moister sites.

Ponderosa Pine Bunchgrass zone (PPBG)

The PPBG is divided into subzones, but for the purposes of this report only the zone is described. It is a grassland. Trees are very sparse. Ponderosa pine occurs only in the south. Sites with moister conditions grow Douglas fir. Cottonwood occurs along creeks and rivers. Big sagebush (Artemisia tridentata) and rabbit brush (Chrysothamnus nauseosus) are the most common shrubs. The predominant grasses are bluebunch wheatgrass and needle grasses (Stipa spp.). Prickly pear cactus (Opuntia fragilis), pussy-toes, and sagebrush lily (Calochortus macrocarpus) are other common herbs. Big sagebrush becomes more abundant where cattle have overgrazed the land.

Plate 1

Indian families near Riske Creek traveling through the rolling morainal plateau of the Tyee and Williams Lake soils to the Williams Lake stampede.

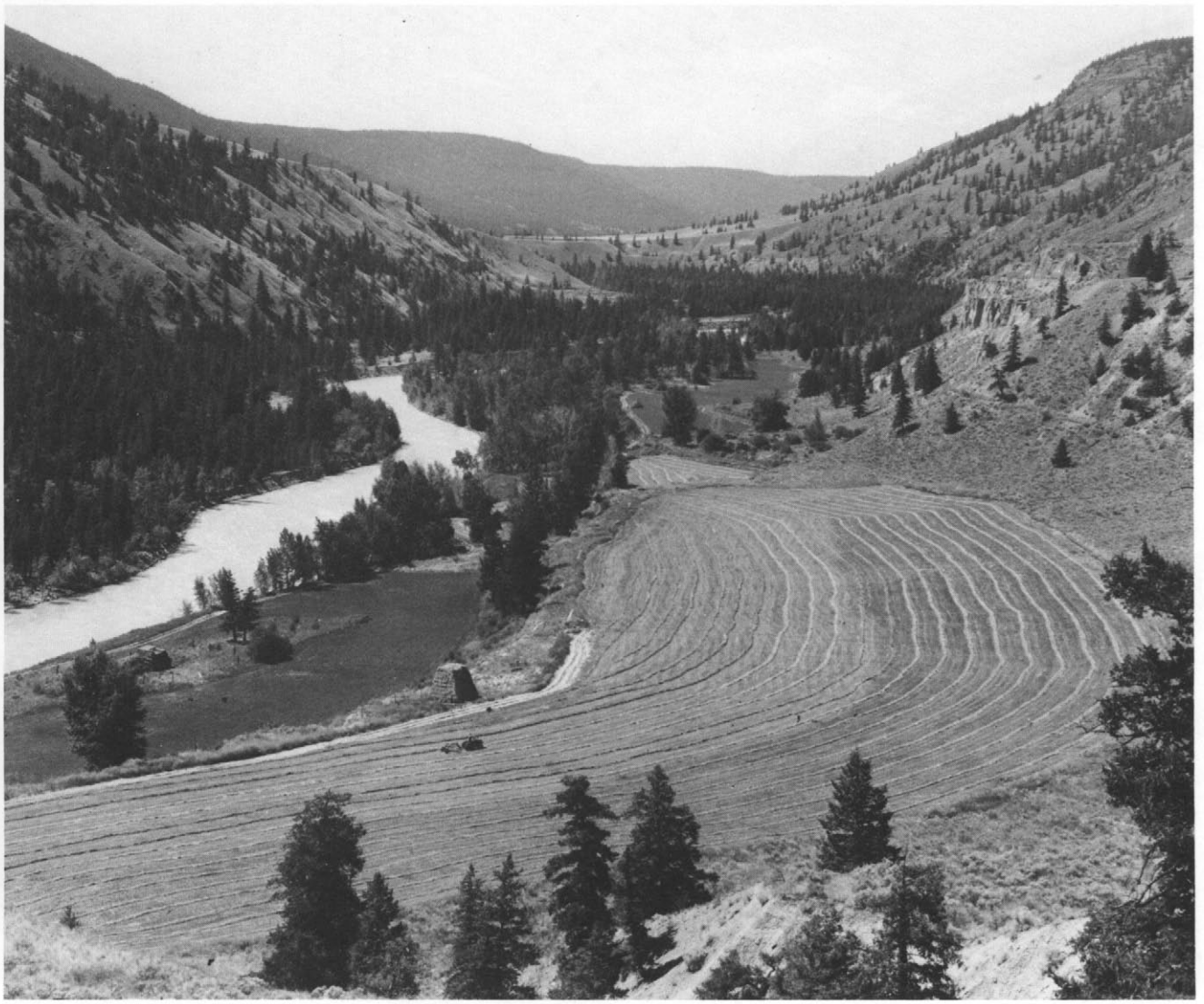


Plate 2

Fields of alfalfa on Chilcotin soils, Wineglass Ranch, in the Chilcotin River valley.

Plate 3

Alpine landscape of Redtop Mountain soils on Anvil Mountain.

Plate 4

Valley of the Fraser River looking north from Empire Valley. Steep eroded lands nearest the river have Dog Creek soils. Chilcotin soils lie on the grassed benches, with Whiskey Creek soils on the partially forested slopes above them. The rolling forested plateau of the skyline has Tyee and Williams Lake soils.

Plate 5

Rubbly alpine landscape of Mount Vic and Desperation soils and Rockland on Taseko Mountain.

SOIL SURVEY METHODS

Mapping procedures and survey intensity

Soil mapping in the 92 O map sheet took 3 years under the Canada Land Inventory (CLI) program. The procedures used have been described in Soil Survey Report No. 25 for Lac la Hache-Clinton (Valentine and Schori 1980). They correspond to procedures for broad reconnaissance (NE and NW map sheets) and exploratory (SE and SW map sheets) surveys, which are equivalent to survey intensity levels 4 and 5, respectively (Mapping Systems Working Group, 1981). These were very general surveys where large areas were mapped quickly with few ground checks and much reliance placed on information that could be gained from air photographs. Table 2 gives more details about the intensity of field survey for each quarter sheet, including methods of travel, number of soil observations, and the amount of land that each one of these observations represents.

Accuracy

A test of mapping accuracy carried out in the Lac la Hache-Clinton map sheet, just to the east, showed that 85% of the soil sites checked afterward in a map unit described as containing principally one type of soil matched that type (or were similar enough to be put to the same use). The intensity of survey procedures in the Lac la Hache-Clinton area matches those of the NE and NW map sheets (Chilcotin River and Hanceville) in Taseko Lakes.

A further check of accuracy was made of a map unit in the Taseko Lakes area described as principally containing two soils; CY1-WL, i.e., Chimney (55-75%) and Williams Lake (25-45%). Fifty sites were checked along transects through five different areas (delineations) of this map unit. The results were as follows:

Map unit CY1-WL	Accuracy check		Predicted on map
	Total	%	%
Soil sites that matched the principal soil of the map unit (Chimney)	35	70	55-75
Soil sites that matched the second soil of the map unit (Williams Lake)	11	22	25-45
Soil sites that did not match the soils of the map unit	4	8	-

This map unit is found in the northern half of the area, where more fieldwork was done. Moreover, it was relatively easy to predict from air photographs. Therefore, overall reliability or mapping accuracy would probably be as follows:

NE and NW map sheets (Chilcotin River and Hanceville), S1L4 - 75% to 85%
SE and SW map sheets (Churn Creek and Taseko Lakes), S1L5 - 65% to 75%

Table 2. Details of survey intensity for the four map sheets within 92 O map area

Survey intensity details	Map sheet			
	Chilcotin R.(NE)	Churn Ck.(SE)	Hanceville(NW)	Taseko Lakes(SW)
Scale of published map	1:100 000	1:100 000	1:100 000	1:100 000
Area on ground represented by average area drawn on map (ha)				
Area on ground represented by smallest area drawn on map (ha)	50	50	50	50
Area mapped (ha)	384 209	388 405	384 209	388 405
Field methods	Truck along roads, some foot traverses	Truck along roads, helicopter	Truck along roads, helicopter	Helicopter, truck, horse
Total number of field observations	600	200	560	240
Area represented by one field observation (ha)	640	1942	686	1618
Percentage of mapped areas in which soil was inspected at least once	40	25	30	7
Survey intensity level (SIL)[1]	4	5	4	5
Information available from other surveys	Soil Report 25 to East	Soil Report 25 to East	---	---

1. Reference: Mapping System Working Group (1981).

Soil associations and map units

At the scale used for the Taseko Lakes map (1:100 000) individual soils could not be shown; therefore groups of soils that consistently occur together are shown. Such a group of soils is called a SOIL ASSOCIATION.

A SOIL ASSOCIATION is a group of related soils developed on similar parent materials, which differ due to different soil water regimes or other characteristics such as depth to bedrock. The soils occur under similar climatic conditions and usually within one physiographic area or vegetation zone. A SOIL ASSOCIATION is named after its most common soil.

Areas containing predominantly one soil association were mapped wherever possible to give SIMPLE MAP UNITS. However, in many parts of the Taseko Lakes map different soil associations were too intimately mixed to be shown separately on the map. In other places it was impossible to map the exact boundaries between soil associations in the time allotted for the survey. Both these situations forced the grouping of soils from different associations within one area on the map. This produced COMPOUND MAP UNITS. All map units for every soil association are identified on the map by their soil symbols and a color that signifies their physiographic region, parent material, and, in some cases, vegetation (grassland or forest). They are also briefly described in the map legend. They are described more fully in the sections of the report that follow. Detailed descriptions of their dominant soils can be found in Appendix II. Some descriptions also contain results of laboratory analyses. The analytical methods used are the same as those reported in the Lac la Hache-Clinton report (Valentine and Schori 1980).

SOIL ASSOCIATIONS OF THE COAST MOUNTAINS

The Coast Mountains comprise the Pacific, Chilcotin, and Camelsfoot ranges, which vary in elevation from 1200 m to over 3000 m asl. In the west the mountains have steep jagged peaks with glaciers. Toward the east they become more subdued, their peaks are more rounded with no glaciers. Most of the land is steep and rugged. The few areas of flat land are restricted to valley bottom floodplains. Much of the area is in the cold forested Subboreal Spruce and Engelmann Spruce-Subalpine Fir biogeoclimatic zones. The sparsely treed Alpine Tundra zone occurs at the highest elevations.

Fig. 6 shows the distribution of soils according to parent materials, vegetation, and relative elevation. At higher elevations, rockland, glaciers, and colluvium (Mount Vic, Redtop Mountain, Yalakom, and Beehive soils) predominate. At middle and lower elevations, colluvium is common on steeper slopes (Tatlow and Cavanaugh soils), whereas morainal materials occur on gentler slopes (Yohetta, Borin, Granite Creek, and Konni Mountain soils). Fluvial (Purjue soils) and sometimes organic deposits (Chaunigan Lake) form the soil parent materials in valley bottoms. Areas of glaciofluvial deposits in this region (Dil Dil soils) occur mainly on the Dil Dil plateau. The Bowman soils formed in moraine over limestone bedrock are restricted to the extreme southeast.

Each soil association and its map units are described briefly in the section which follows. Some map units of the Tete Angela, New Meadow, and Hawks soils occur to a limited extent in this physiographic region, particularly in the lower valley areas. However, they have not been described in this section because they more closely resemble the soils of the Fraser Plateau.

Beehive Association (BH)

The Beehive Association consists of loamy-skeletal soils developed on shallow colluvial and sometimes morainal materials. Topography is strongly to very steeply sloping (16% to 100%) with an elevation range of 1400 m to 2600 m, although usually above 2000 m. These soils cover 2.6% of the map sheet mainly in the southwest. They are predominantly in the Alpine Tundra zone. Trees are sparse and stunted. Species include subalpine fir, whitebark pine, lodgepole pine, and Engelmann spruce. Shrubs are restricted to sparse willows and juniper. There is a dense herb layer.

These soils are well drained and rapidly pervious, with a subhumid moisture regime. Their colluvial and morainal parent materials are generally shallow over bedrock. Classified as Orthic Sombric Brunisols, lithic phase, the soils have a moderately weathered subsurface (B) horizon, sometimes have a thick, organic-enriched, acid surface (A) horizon, and have bedrock within 1 m of the surface. A profile description of a typical Beehive soil is included in Appendix II.

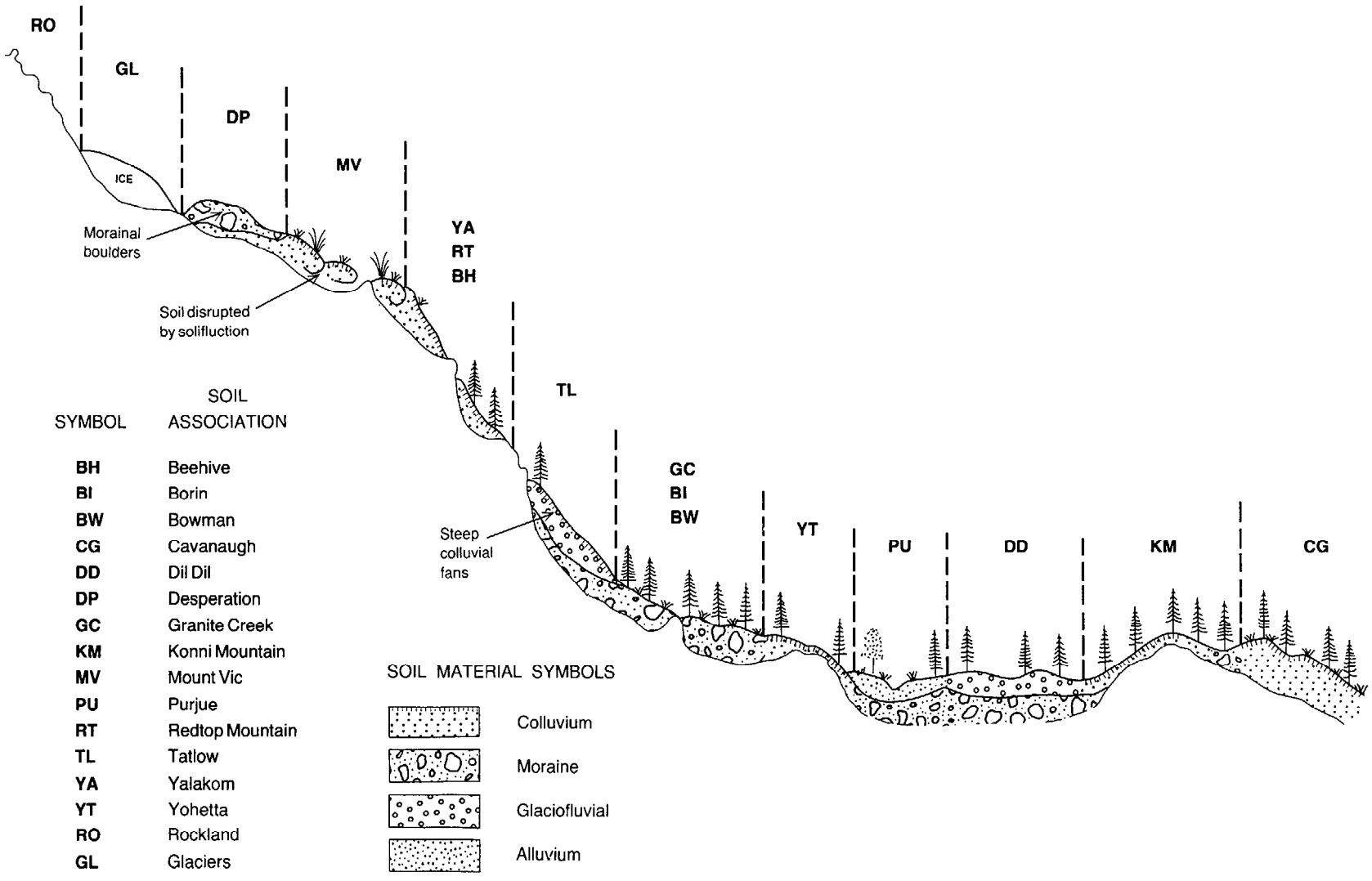


Fig. 6. Hypothetical cross section of the soil associations of the Coast Mountains

Situated in the alpine, these soils offer summer grazing for wildlife and considerable wildland recreation potential. They are, however, very sensitive to surface disturbance. Mining exploration roads and trenches have caused damage in some places.

Map units

Beehive soils have three map units: a simple map unit, BH, composed predominantly of Beehive soils, and two compound units, BH-MV and BH-RT.

BH Beehive (3637 ha): There are 11 delineations of this map unit; 10 of them occur in the southwest map sheet. All except three have complex topography. Slopes range from 10% to 70% and are more subdued than the slopes of the compound map units. They occur at the same elevation as BH-RT and lower than BH-MV. Many delineations contain significant areas of rock outcrops.

BH-MV Beehive-Mount Vic (4572 ha): Three delineations of BH-MV map units occur in the southwest map sheet. Two of these are near Mount Vic and the third is across the valley, east of Taseko Lake. They are at high elevations where the influence of solifluction has resulted in patterned ground forming Mount Vic soils. Mount Vic soils are deeper and wetter, and have less weathered B horizon than Beehive soils. They also lack the organic-enriched surface horizon. The BH-MV map unit has simple strong to very strong slopes (16% to 70%).

BH-RT Beehive-Redtop Mountain (18 296 ha): The 17 delineation of this map unit occur in the extreme southwest. Topography varies from simple to complex, moderate to very steep slopes (16% to 100%). Redtop Mountain soils are deeper and moister than Beehive soils and have no organic-enriched surface horizon. These soils occur mainly above 2000 m, although they are also found as low as 1500 m. Beehive soils are in upper drier sites and Redtop Mountain soils are in lower moister sites.

Borin Association (BI)

The parent material of Borin soils is gravelly loamy glacial till, usually over 1 m deep, which often contains volcanic cinders and ash near the surface. Topography is moderate to very strongly sloping (10% to 70%) and elevation ranges from 1500 m to over 2200 m. These soils are very common, covering more than 7.8% of the four map sheets. This is one of the main soils in the mountain regions.

Borin soils occur in the ESSFg subzone and the MS biogeoclimatic zone. Vegetation consists of an overstory of lodgepole pine and spruce with an understory of lupine, kinnikinnick, and aster. They are well drained, friable to firm, and rapidly pervious, and have a subhumid moisture regime. As Orthic Dystric Brunisols they have slightly weathered B horizons and acid surface horizons. In some there is a shallow organic-enriched surface horizon. Bedrock is usually deeper than

1 m. Appendix II contains a typical profile description of a Borin soil.

Borin soils offer potential for forestry in the lower elevations and are used as summer habitat by wildlife throughout their range.

Map units

Borin soils have two map units: one composed predominantly of Borin soils, and one composed of Borin soils with other shallower and rocky soils.

BI1 Borin 1 (76 104 ha): Here Borin soils predominate. There are 11 delineations, all but one of which have simple topography with slopes ranging from 10% to 70%. These areas are large, and six of them cover more than 73 000 ha in the southeast map sheet. A very small area (252 ha) has a significant amount of rock outcrop.

BI2 Borin 2 (45 408 ha): This map unit is similar to BI1 except that it contains inclusions (20%) of shallow soils and rock outcrops. There are 34 delineations, mainly in the southeast. Topography is usually simple with slopes ranging from 16% to 100%.

Bowman Association (BW)

Bowman soils are loamy-skeletal and have formed on highly calcareous morainal material. They contain limestone fragments derived from the Marble Range. Topography varies from 6% to 70% slopes. These soils occur between 1100 m to 1600 m. They are not very common, covering only 0.7% of the map sheet mostly in the extreme southeast.

In this part of the IDFb biogeoclimatic subzone the open forest has an overstory of mature Douglas fir with an understory of pinegrass and kinnikinnick.

These alkaline soils are well drained, friable, and rapidly pervious, and have a subhumid moisture regime. They are classified as Orthic Gray Luvisols with a leached surface horizon overlying a clay-enriched subsurface horizon and calcareous parent material. A typical profile description is contained in Appendix II.

Bowman soils offer moderate potential for grazing, depending on the amount of forest cover. The clay-enriched subsurface makes these soils subject to compaction if they are worked or driven upon when moist or wet.

Map units

One simple map unit, BW, is recognized in the survey area.

BW Bowman (1198 ha): This is a very localized map unit associated with the Marble Range in the extreme southeast. A small percentage of the area contains shallow soils with many limestone fragments.

Cavanaugh Association (CG)

Developed on gravelly sandy colluvial deposits, these soils are found principally on north slopes and ridge crests. Topography is moderately to very steeply sloping (10% to 100%), with an elevation range of 800 m to 1800 m. These soils cover approximately 1% of the map sheet.

Cavanaugh soils occur in the IDFb biogeoclimatic zone. They are deep, rapidly drained, and rapidly pervious, have a loose consistence, and have a subhumid moisture regime. Classified as Eluviated Eutric Brunisols, they have a slightly weathered subsurface horizon, leached surface, and calcium carbonate rich parent material. A complete profile description is given in Appendix II.

They offer moderate potential for grazing, depending on forest cover and range condition. Potential for forest growth is limited due to the low available water storage capacity of the coarse soil textures.

Map units

Two simple map units of Cavanaugh soils, CG1 and CG2, occur.

CG1 Cavanaugh 1 (9817 ha): This map unit includes north-facing slopes and ridge crests. The forest canopy is usually closed except on the crests. Slopes range from 10% to 100%. Irregular rock outcrops are common.

CG2 Cavanaugh 2 (4614 ha): This map unit covers south-facing slopes. The forest cover is open. The soils are drier, sometimes with high elevation grasslands and fewer rock outcrops than in the previous map unit.

Dil Dil Association (DD)

The Dil Dil Association consists of sandy-skeletal soils developed on glaciofluvial parent materials. Topography is very gentle to moderately sloping (2% to 15%). These soils occur between 1700 m and 2000 m elevation and cover about 0.7% of the map sheet.

They are found in both the ESSFg and the SBSa biogeoclimatic subzones. Their coarse textures give a drier moisture regime than other soils in these subzones. Characteristic vegetation is lodgepole pine with an understory of kinnikinnick, fireweed, yarrow, and grasses.

They are acid, are rapidly drained, have a very friable to loose consistence, are rapidly pervious, and have a subhumid moisture regime.

They are Orthic Dystric Brunisols with a slightly weathered subsurface (B) horizon and a thin (5 cm) organic-enriched surface horizon. Much of the fertility of these soils is concentrated in the surface horizon. A profile description is provided in Appendix II.

Dil Dil soils offer limited potential for grazing but very little for forestry because of their coarse soil textures, climate, and elevation.

Map units

There are two map units: one simple, DD, and one compound, DD-GC.

DD Dil Dil (681 ha): There are seven delineations of this map unit. All are at the foot of Mount Vic. They are long, thin valley train deposits associated with meltwater channels from Mount Vic. Topography is complex with many ridges and channel scars, and slopes range from 2% to 30%.

DD-GC Dil Dil-Granite Creek (10 621 ha): The two delineations of this map unit are in a broad outwash plain that extends from the meltwater channels associated with DD map units. Topography is complex and slopes range from 9% to 16%. Locations of the morainal Granite Creek soils are difficult to predict but they tend to occur on slightly higher ground.

Desperation Association (DP)

These soils have developed on fragmental sandy colluvial and morainal deposits from recent glacial activity in alpine areas above 1900 m. Topography is strongly to very steeply sloping (10% to |70%). The soils cover 0.8% of the map sheet, mainly in the southwest.

Their rubbly surface is often almost devoid of plants in this Alpine Tundra zone. What vegetation there is consists of grasses, forbs, and shrubs on the sandy patches between the rubble. Species include sedges, fescue, phlox, willow, and mountain avens.

They are Orthic Regosols, lithic phase, and consist of unweathered recent deposits with little or no soil development. They have a loose consistence, are rapidly drained, are rapidly pervious, and have a subhumid moisture regime. The depth to solid bedrock varies, but it is often less than 1 m. A profile description of Desperation soils can be found in Appendix II.

Desperation soils themselves have limited use, but they contribute to the wildland recreation or wildlife potential of the whole alpine country.

Map units

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

DP Desperation (3246 ha): The many small delineations of this map unit are dispersed throughout the highest elevations of the mountains in the south and southwest. They are often adjacent to glaciers and comprise complex exposures of recent glacial rubble, bedrock, talus slopes, and colluvium.

Granite Creek Association (GC)

Granite Creek soils have formed on sandy-skeletal morainal deposits. Topography is quite variable, ranging from very gentle to very strong slopes (2% to 70%). Usually above 2000 m, these soils can be found from 1400 m to 2400 m. They cover about 6.3% of the four map sheets, and are one of the main morainal soils of the southwest.

These soils occur in both the SBSa and the ESSFg subzones. Vegetation consists of an overstory of lodgepole pine and whitebark pine with an understory of common juniper, soapberry, kinnikinnick, and lichens.

They are rapidly drained and rapidly pervious, with a subhumid moisture regime. Classified as Orthic Dystric Brunisols, they have slightly weathered subsurface (B) horizons, thin (less than 5 cm thick) acid-leached surface horizons, and thin (less than 2 cm) litter layers consisting of partially decomposed needles. A complete profile description is found in Appendix II.

Granite Creek soils offer moderate potential for forest growth, although their subhumid moisture regime limits growth somewhat, as does the high elevation. The limited understory offers little forage for wildlife, although valley bottoms have some winter range.

Map units

Granite Creek soils have seven map units: one simple, GC, and six compound, GC-BH, GC-NW, GC-RT, GC-TL, GC-WN, and GC-YT.

GC Granite Creek (73 121 ha): This is a very common map unit containing predominately Granite Creek soils on the lower mountain slopes in the southwest. Topography is mainly simple slopes ranging from 6% to 70%.

GC-BH Granite Creek-Beehive (3573 ha): This map unit occurs at higher elevations than the Granite Creek map unit. It covers the transition into the alpine. As such it includes some exposures of the shallow colluvial Beehive soils.

GC-NW Granite Creek-New Meadow (3024 ha). In some narrow valleys there are small linear occurrences of the poorly drained fluvial New Meadow soils with Granite Creek soils on the adjacent valley slopes. The New Meadow soils are very gently to gently sloping. The Granite Creek soils are steeper, up to 15%.

GC-RT Granite Creek-Redtop Mountain (2606 ha). This map unit, like that of GC-BH, covers the forest-alpine transition zone. But here the alpine soils (Redtop Mountain) are Podzolic, with turfy surface horizons and deep (more than 1 m) reddish subsoils.

GC-TL Granite Creek-Tatlow (14 787 ha). Some mountain slopes have predominantly Granite Creek soils interspersed with fragmental talus slopes (rubbly linear features aligned downhill), which have sparse vegetation (Tatlow soils).

GC-WN Granite Creek-Willan Lake (997 ha). This map unit is not very common. It covers the few mountain slopes where Granite Creek soils occur with others that are shallow (less than 1 m deep) and have clay-enriched subsoils over sedimentary bedrock (Willan Lake soils).

GC-YT Granite Creek-Yohetta (369 ha). Here the Granite Creek soils occur with small exposures of others that have a higher pH, having been formed from basic rocks (Yohetta soils).

Konni Mountain Association (KM)

Konni Mountain soils are loamy-skeletal colluvial and morainal deposits on mountain ridges and crests. Topography is moderately to steeply sloping (10% to 70%) and elevations range from 1400 m to 2200 m. These soils are not very common, covering only about 0.2% of the map sheet. They are concentrated on the western border.

They occur in the AT zone and the ESSFg subzone. Vegetation consists of an overstory of subalpine fir and pine with an understory that includes common juniper, prickly rose, and yarrow.

Konni Mountain soils are commonly shallow (less than 1 m deep), well drained, rapidly pervious, and friable, and have a subhumid moisture regime. They are Orthic Eutric Brunisols with a slightly weathered subsurface horizon, and an organic-enriched surface horizon. A profile description is included in Appendix II.

The main potential for these soils is for wildlife and wildland recreation. Bands of bighorn sheep frequent some areas.

Map units

Konni Mountain soils have one simple map unit, KM.

KM Konni Mountain (3167 ha): Most delineations of this map unit occur around the upper slopes of Konni Mountain, where morainal and colluvial deposits are inseparable at this scale of mapping. Topography varies from 6% to 70% slopes.

Mount Vic Association (MV)

Mount Vic soils have variable texture but are generally coarse loamy colluvial deposits. They have patterned ground where solifluction processes are active. Topography is gentle to very strongly sloping (5% to 70%) and elevation is usually greater than 2000 m. These soils cover about 1% of the map sheet.

They are alpine soils, occurring in the AT biogeoclimatic zone where trees are very sparse and stunted. Pioneering plants that grow on these soils are mountain avens, willow, phlox, and elephant's head.

Mount Vic soils are moderately well drained and moderately pervious, with a perhumid moisture regime. They are classified as Orthic Regosols and have no soil horizons other than a shallow turfy organic surface. Solifluction (downslope movement of saturated soil) prevents the development of stable soil horizons. These soils often have a surface of cobbles and gravel with a loamy and sandy subsurface. A typical profile description of a Mount Vic soil is contained in Appendix II.

They provide winter range for wildlife in open windswept areas and summer range generally. They are also interesting for wildland recreation.

Map units

Mount Vic soils have two map units: a simple map unit, MV, and a compound unit with Redtop Mountain soils, MV-RT.

MV Mount Vic (6930 ha): This map unit occurs in the highest part of the alpine in the extreme southwest. Slopes range from gentle to strong (6% to 30%) and topography is usually complex. Rock outcrops are common and the unit as a whole shows the complicated soil landscape typical of the alpine.

MV-RT Mount Vic-Redtop Mountain (9404 ha): At lower elevations Mount Vic soils are mixed with deep stable soils, which have reddish subsoils (Redtop Mountain).

Purjue Association (PU)

These are deep sandy-skeletal fluvial deposits with variable textures. The landforms on which they occur are nearly level to moderately sloping (0.5% to 10%) terraces and fans at elevations ranging from 1200 m to 2000 m. They cover about 0.5% of the map sheet.

Purjue soils occur in valley bottoms throughout in SBSa and the ESSFg biogeoclimatic subzones. On the drier fans the trees are lodgepole pines with an understory of pinegrass, forbs, and shrubs including common junipier, yellow vetch, soapberry, and cow parsnip. On lower terraces and

floodplains the soils are wetter with a meadow-like vegetation of grasses and sedges.

These soils are rapidly drained and rapidly pervious, with predominantly a subhumid moisture regime, but some can be as wet as subaquic. They are classified as Orthic Regosols. There are no clear soil horizons, apart from a shallow (less than 10 cm deep) organic-enriched surface. Some soils have buried organic layers due to their fluvial mode of deposition. A complete description of a typical Purjue soil profile is contained in Appendix II.

Purjue soils offer some grazing for domestic or wild animals.

Map units

Purjue soils have two map units: a simple unit, PU, and a compound unit with Tete Angela Soils, PU-TG.

PU Purjue (5638 ha): This is a common unit in the valleys of the western half of the area. Topography ranges from very gentle to moderate slopes (2% to 15%). The unit often includes narrow stream deposits and wet marshes.

PU-TG Purjue-Tete Angela (2531 ha): Here are considerable areas of lower and wetter floodplain soils (Tete Angela). This compound unit combines them with the higher fans and terraces (Purjue). The topography varies from nearly level to gentle slopes (0.5%-9%).

Redtop Mountain Association (RT)

The Redtop Mountain Association consists of loamy-skeletal soils developed on deep colluvial materials. Their slopes vary from moderate to very steep (10% to 100%) at elevations ranging from 1700 m to 2800 m, although they usually occur above 2000 m. They are mainly in the southwest where they are one of the most common soils. They cover about 4.4% of the total area.

These are alpine soils in the AT biogeoclimatic zone. Vegetation consists of sparse trees with Krummholz form and a ground cover of common juniper, kinnikinnick, sedges, and grasses. The herb layer is very dense on moister sites. Classified as Sombric Humo-Ferric Podzols these soils are friable, well drained, and rapidly pervious, with a humid moisture regime. They have a reddish B horizon enriched with iron, aluminum, and organic matter, and a thick organic surface horizon. A typical profile is described in Appendix II.

There is some potential for winter range for wildlife in more exposed sites. Deep snow is limiting elsewhere. The surface horizons are susceptible to excessive physical disturbance.

Map units

Redtop Mountain soils have two map units: a simple unit, RT, and a compound unit with Beehive soils, RT-BH.

RT Redtop Mountain (32 774 ha): This is very common on the mountains of the southwest, where slopes range from 10% to 100%. Many delineations contain considerable proportions of bedrock.

RT-BH Redtop Mountain-Beehive (35 103 ha): Delineations of this map unit occur solely in the southwest. Slopes range from 10% to 100%. Beehive soils are shallower than Redtop Mountain soils. There are also inclusions of rock outcrops (less than 20%).

Tatlow Association (TL)

Tatlow soils have developed on sandy-skeletal colluvial talus slopes, which are usually very steep (16% to 100%). They occur between 1400 m and 2800 m. They cover about 1.2% of the map sheet and occur principally in the south.

They can be found throughout the SBSa, ESSFg and AT biogeoclimatic zones. Their vegetation is very sparse due to active colluviation. Trees such as whitebark pine often have stunted forms. Other plants sporadically present include fescue, mountain avens, and saxifrage.

Tatlow soils are rapidly drained, are rapidly pervious, have a loose consistence, and have a subhumid moisture regime. Their parent materials are deep and often rubbly. Classified as Orthic Regosols, they have no soil horizons and are relatively unweathered. A profile description of a typical soil is included in Appendix II.

Tatlow soils are unstable and offer little land use potential apart from escape terrain for big game.

Map units

Tatlow soils have a simple, TL, and a compound map unit, TL-GC.

TL Tatlow (18 027 ha): Covering the talus slopes on the highest mountains this map unit includes a considerable proportion of rock outcrops and shallow soils.

TL-GC Tatlow-Granite Creek (3648 ha): Here the Tatlow soils are interspersed with the morainal Granite Creek soils, usually at lower elevations. Slopes are simple and range from 15% to 70%.

Yalakom Association (YA)

These soils have formed in sandy-skeletal colluvium in the Camelsfoot Range in the southeast. There is often volcanic ash in the surface horizons. Slopes range from 16% to 100%, and elevations range from 1500 m to 2400 m. These soils cover about 2.5% of the map sheet. They are one of the most common soils of the southeast mountains.

Occurring at higher elevations they are restricted to the AT biogeoclimatic zone and the ESSFg subzone. Vegetation consists of sparse, stunted trees with a ground cover of mountain avens, sedges, fescue, willow, penstemon, arnica, mosses, and lichens.

They are well drained, are moderately pervious, have a loose consistence, and have a subhumid moisture regime. They are classified as Orthic Dystric Brunisols and have moderately weathered subsurface (B) horizons and a gritty surface of volcanic ash. A profile description is included in Appendix II.

Yalakom soils have value as range for wildlife.

Map units

There are two map units: one simple, YA, and one compound with Borin, YA-BI.

YA Yalakom (37 586 ha): Covering the higher elevations of the Camelsfoot Range, this map unit contains a considerable proportion of bedrock exposures in addition to Yalakom soils.

YA-BI Yalakom-Borin (1024 ha): Occasionally on lower slopes than the Yalakom map unit there are significant areas of morainal soils that also have volcanic ash at the surface (Borin). There are few rock outcrops in this map unit.

Yohetta Association (YT)

These soils have formed in gravelly coarse loamy moraine, derived from basic rocks. Usually on south-facing slopes, they have simple topography and moderate to very steep slopes (10% to 100%), with an elevation range of 1400 m to 1600 m. They are not very common, covering only 0.1% of the map sheet, exclusively in the west center.

Yohetta soils are in the ESSFg biogeoclimatic subzone and characteristic vegetation consists of an overstory of open aspen and lodgepole pine with an understory of cinquefoil, pasture wormwood, and needlegrass.

They are well drained, are moderately pervious, have a slightly hard consistence when dry, and have a semiarid moisture regime. They are

classified as Orthic Eutric Brunisols with only moderately acid subsoils, and thin surface horizons enriched with organic matter. A profile description is included in Appendix II.

They have some potential as summer grazing for cattle and big game.

Map units

There is only one simple map unit, YT.

YA Yohetta (2228 ha): This map unit occurs on dry south-facing slopes in a limited area on the western edge of the map sheet. Some areas have soils less than 1 m deep.

SOIL ASSOCIATIONS OF THE FRASER PLATEAU WEST

The western portion of the Fraser Plateau stretches across the northwest portion of the whole map sheet. It differs from the eastern portion by being higher and lying in the rain shadow of the Coast Mountains. It is, therefore, colder and drier. Its gently rolling surface is principally composed of glacial moraine (Tete Hill, Kloakut, and Cardiff soils) underlain by basalt lava bedrock. There are many small valleys and enclosed depressions containing wetter morainal soils (Cone Hill), fluvial deposits (New Meadow and Tete Angela soils), or organic meadows (Chaunigan Lake soils). Only occasionally are there colluvial deposits on some of the higher hills (Willan Lake soils). Considerable glacial meltwater flowed across the plateau from the Coast Mountains, leaving glaciofluvial gravels (Fletcher Lake soils) or gravelly water washed moraine (Shemwell soils). Most of the plateau is forested, although the cover is open on the dry or gravelly soils. In the driest areas trees give way to grass (Drummond soils). Fig. 7 shows in an idealized way how the soils are distributed.

Cardiff Association (CD)

Cardiff soils have formed in gravelly-loamy morainal materials derived from basaltic rocks. Topography is most often complex with gentle to strong slopes (2% to 30%). Elevation ranges from 1200 m to 1500 m. These soils cover about 0.8% of the map sheet principally in the west.

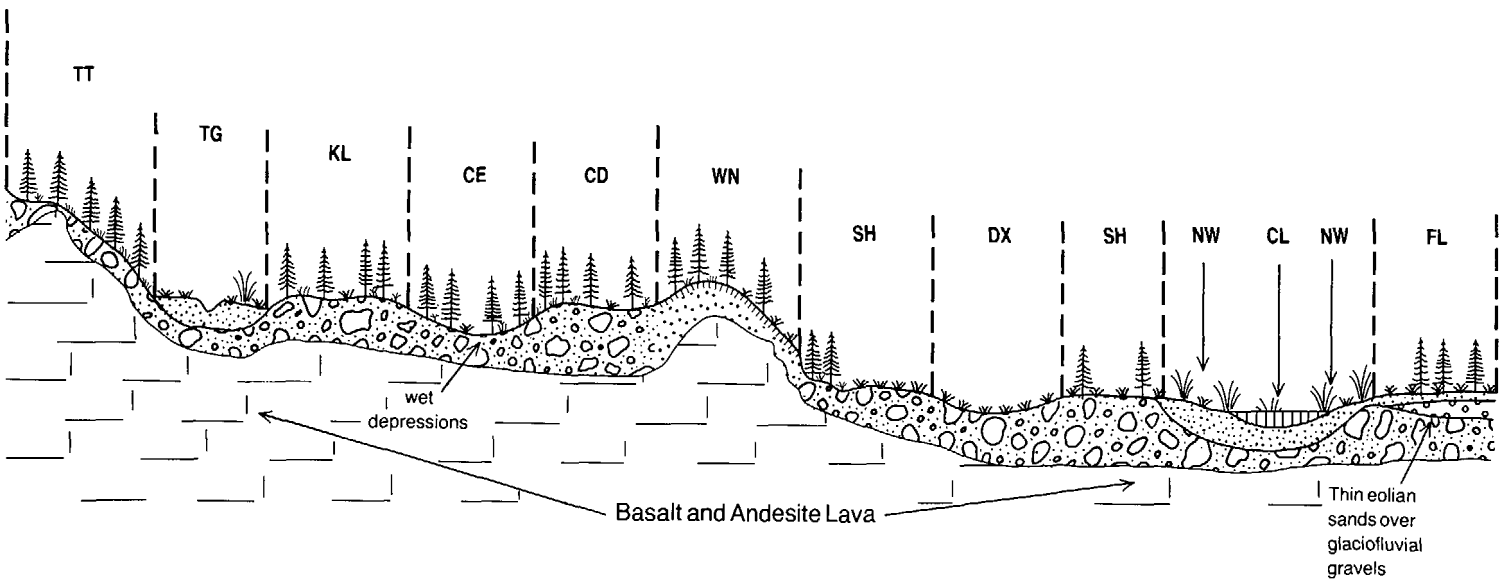
Vegetation on Cardiff soils is typical of the SBSa biogeoclimatic subzone. The trees are lodgepole pine and aspen with a sparse shrub layer of willow, and soapberry, and a continuous cover of pinegrass.

Cardiff soils are well drained, are moderately pervious, and have a subhumid moisture regime. They are classified as Orthic Gray Luvisols and have clay-enriched subsurface horizon and calcareous parent material. Bedrock is often close to the surface. A complete profile description is included in Appendix II.

Cardiff soils have moderate potential for forestry and offer some potential for use as summer range for domestic cattle and deer. Compaction problems may result if trees are harvested on these soils during wet periods when they are moldable or plastic.

Map units

Cardiff soils have two map units: a simple unit, CD, and a compound unit Cardiff-Shemwell, CD-SH.



SOIL MATERIAL SYMBOLS

- Colluvium
- Moraine
- Glaciofluvial
- Alluvium
- Organic

SYMBOL	SOIL ASSOCIATION
CE	Cone Hill
CD	Cardiff
CL	Chaunigan Lake
DX	Drummond
FL	Fletcher Lake
KL	Kloakut
NW	New Meadow
SH	Shemwell
TG	Tete Angela
TT	Tete Hill
WN	Willan Lake

Fig. 7. Hypothetical cross section of the soil associations of the Fraser Plateau West

CD Cardiff (3939 ha): Here Cardiff soils predominate. Slopes are complex, ranging from 2% to 15%. A considerable proportion (up to 35%) of this map unit has soils that are less than 1 m deep over bedrock.

CD-SH Cardiff-Shemwell (8888 ha): Most of the delineations of this map unit occur in the northwest of the map sheet. Slopes are very gentle to strong (2% to 30%) and are usually complex. Cardiff soils occur on the higher slopes, whereas Shemwell soils are lower.

Chaunigan Lake Association (CL)

These soils are organic. They have accumulated in depressions and valley bottoms across the plateau. Their surface is level to gently sloping. Their formation depends on local hydrology, not regional climate; therefore they can range from 1200 m to 2000 m and are widely distributed. However, in total area they cover less than 0.8% of the map sheet.

Chaunigan Lake soils are found throughout the ESSFg and the SBSa subzones, but their hydrophytic vegetation consists mainly of sedges, grasses, willow, and bog birch. A good description of their vegetation has been given by Runka and Lewis (1981).

These soils are very poorly drained, are moderately pervious, and have a peraquic moisture regime. They are classified as Terric Mesisols and consist of moderately decomposed organic material overlying loamy mineral material at a depth of less than 1.6 m. They often contain a layer of buried volcanic ash. A complete profile description is given in Appendix II.

They are important wildlife habitat, especially for moose and deer. They are also the most important native hay-producing lands for the cattle-ranching industry. Their wetness precludes tree growth.

Map units

Chaunigan Lake soils have five different map units: one simple unit, CL, and four compound units, CL-CE, CL-DX, CL-EL, and CL-NW.

CL Chaunigan Lake (1111 ha): Typical of the numerous small irregular depressions across the plateau. This map unit often surrounds small lakes. The topography is flat to gently sloping.

CL-CE Chaunigan Lake-Cone Hill (1421 ha): Here the organic Chaunigan Lake soils are bordered at a slightly higher level by imperfectly drained mineral soils (Cone Hill). Slopes are complex and range from 0.5% to 9%.

CL-DX Chaunigan Lake-Drummond (722 ha): The outer border of some large irregular depressions is composed of well drained, semiarid grassland soils (Drummond) with Chaunigan Lake soils in the center. Slopes vary from 0.5% to 9%.

CL-EL Chaunigan Lake-Elliot (571 ha): This map unit occurs where fluvial mineral sediments (Elliot soils) are mixed with the organic deposits. They have variable textures and accumulations of carbonates near the surface.

CL-NW Chaunigan Lake-New Meadow (6704 ha): This map unit is similar to the previous one (CL-EL), but here the fluvial soils are not carbonated. They have a lower pH (6.5 not 7.5 like the Elliot soils), and do not contain buried organic horizons.

Cone Hill Association (CE)

These soils have formed on gravelly-coarse-loamy morainal material at the base of slopes or in shallow depressions in the plateau surface. Their topography ranges from very gently to gently sloping (0.2% to 9%) and their elevation ranges from 1500 m to 1200 m. They are not very common, covering only about 0.06% of the map sheet, mostly in the west.

They are within the ESSFg and the SBSa biogeoclimatic subzones, but their vegetation reflects their wetter moisture regimes. The trees are usually lodgepole pine and hybrid white spruce, and there is an understory of equisetum and other herbs and shrubs, including red osier dogwood, willow, currant, high bush cranberry, black twinberry, and rose. The herb and shrub layer is relatively dense because of the moisture.

Cone Hill soils are imperfectly drained, are moderately pervious, and have a humid moisture regime. Classified as Gleyed Gray Luvisols, they have a mottled subsurface horizon with a thin litter layer overlying an acid leached surface horizon. A complete description is included in Appendix II.

Cone Hill soils offer considerable forage for wildlife due to their higher moisture status and resultant diversity of understory vegetation. Forest growth is restricted by the excess water.

Map units

There are three map units: a simple unit, CE, and two compound units, CE-CL and CE-NW.

CE Cone Hill (267 ha): There are only six small delineations of this map unit. All have simple topography with very gentle to moderate slopes (0.5% to 9%).

CE-CL Cone Hill-Chaunigan Lake (612 ha): This map unit represents small enclosed basins with nearly level to gently sloping (0.5% to 5%) topography, where the organic Chaunigan Lake soils occupy the lower slopes. These map units often have open water in the center.

CE-NW Cone Hill-New Meadow (32 ha): There is only one delineation of this map unit, where a narrow exposure of fluvial New Meadow soils runs through the morainal Cone Hill soils.

Drummond Association (DX)

Drummond are loamy-skeletal soils formed on moraine. Their topography is usually complex with slopes normally in the 2% to 15% range. Elevation varies from 990 m to 1500 m. Drummond soils cover 0.4% of the map sheet and occur throughout northwest in small, irregular delineations.

These grassland soils extend through the IDFb and SBSa zones. They occur in drier areas: south-facing slopes or lower terraces of drier valleys. Typical vegetation is grasses (bluegrass, needlegrass, and bluebunch wheatgrass) and forbs (rabbit brush and oyster plant), with scattered invading trees.

Drummond soils are deep, well drained, friable to loose, and rapidly pervious with a semiarid moisture regime. They are classified as Eluviated Dark Brown Chernozems and have surface horizons more than 10 cm deep,enriched with organic matter and calcareous parent material. Appendix II contains a profile description of a typical Drummond soil. Some Drummond soils farther north have been classified as Eluviated Dark Gray Chernozems.

They have a relatively low carrying capacity for cattle because they are dry. But they are usually near lower lying soils with potential for use as hay meadows.

Map units

Drummond soils have three map units: a simple unit, DX, and two compound map units, DX-EL and DX-YT.

DX Drummond (1777 ha): There are 18 delineations of this map unit, all relatively small. The undulating topography gives irregular, complex, but relatively gentle slopes, mostly ranging from 2% to 15%.

DX-EL Drummond-Elliot (3396 ha): There are many delineations of this map unit, although nearly all are small. Many of the linear or irregular depressions on the plateau have imperfectly drained fluvial soils bordered by the grassland Drummond soils. Slopes are complex and usually range from 0.5% to 9%.

DX-YT Drummond-Yohetta (948 ha): There is only one delineation of this map unit. It is on a south-facing slope adjacent to Konni Lake. Topography is simple and slopes range from 15% to 30%. The Yohetta soils are coarse textured morainal soils similar to Drummond, but they have an open forest not grassland.

Fletcher Lake Association (FL)

Fletcher Lake soils have formed in a veneer of eolian silt over deep loamy-skeletal glaciofluvial deposits. The undulating topography gives complex slopes that are very gentle to gentle (0.2% to 9%), whereas elevation ranges from 1150 m to 1200 m. These soils cover only 0.09% of

the map. They are concentrated near Fletcher Lake north of Big Creek.

They are in the Interior Douglas Fir Biogeoclimatic zone and have a tree cover of lodgepole pine, Douglas fir, and aspen with an understory of pinegrass, twinflower, kinnikinnick, rose, and vetch.

They are well drained, moderately pervious, and friable, with a subhumid moisture regime. Classified as Orthic Gray Luvisols, they have a clay-enriched subsurface horizon, a leached surface horizon, and a thin litter layer. They often have a very distinct calcium carbonate accumulation at the contact between the eolian silt and the glaciofluvial sands and gravels. Appendix II contains a typical profile description.

These soils have moderate potential as summer range for domestic cattle. Forest productivity is moderate to low.

Map units

There are two map units: a simple unit, FL, and a compound unit, FL-HS.

FL Fletcher Lake (76 ha): Adjacent to Fletcher Lake there are two delineations of this map unit. The topography is gently undulating, with slopes ranging from 0.5% to 9%.

FL-HS Fletcher Lake-Hawks (1452 ha): Where the silty eolian capping is thin or absent the Hawks soils have been mapped as this compound unit with Fletcher Lake. Together their topography ranges from 2.5% to 9%.

Kloakut Association (KL)

The parent material of Kloakut soils is loamy-skeletal moraine. Topography on this plateau surface is usually complex with very gentle to strong slopes (0.5% to 30%) and elevation ranges from 1400 m to 1900 m. These soils are common, covering over 6.5% of the survey area. They are one of the main soils of the southern portion of the Fraser Plateau West.

Their vegetation varies because of their extensive range, varying moisture regimes, slope position, and aspect. They extend across much of the SBS and MS zones and the ESSFg biogeoclimatic subzone. They are forested. The predominant trees vary from lodgepole pine and Douglas fir to Engelmann spruce.

Kloakut soils are moderately well drained, friable, and moderately pervious, and have a humid moisture regime. They are classified as Orthic Gray Luvisols and have a clay-enriched subsurface horizon, an acid-leached surface horizon, and a thin litter layer. A profile description is contained in Appendix II.

These soils have moderate forestry potential and some have potential range for domestic cattle. The morainal parent materials are often washed worked and consequently coarse textured and droughty.

Map units

Kloakut soils occur as six map units: a simple unit, KL, and five compound units, KL-CL, KL-DD, KL-GC, KL-NW, and KL-WN.

KL Kloakut (50 766 ha): There are 36 delineations of this map unit. Topography is complex, typical of a rolling till plain, and slopes vary considerably, with some delineations having very gentle slopes (2% to 5%) and others having strong slopes (16% to 30%). Some delineations are very large and six cover 21 000 ha in the northwest. Typically, the KL landscape contains numerous small unmapped bogs and ponds.

KL-CL Kloakut-Chaunigan Lake (35 522 ha): In some places organic bogs compose a considerable proportion of the depressions surrounded by the Kloakut soils. This map unit represents such places with Chaunigan Lake in the organic bogs. Slopes range from 0.5% to 9%. There is considerable potential as hay meadows.

KL-DD Kloakut-Dil Dil (680 ha): There is only one delineation of this map unit. Its topography is complex and slopes range from 6% to 15%. Dil Dil soils are dry, coarse textured, gravelly glaciofluvial outwash deposits.

KL-GC Kloakut-Granite Creek (5842 ha): One large delineation of KL-GC occurs in the southwest of the map sheet. The topography is complex with moderate to strong slopes (10% to 30%). Granite Creek soils are morainal and colluvial and usually occupy the higher elevations.

KL-NW Kloakut-New Meadow (267 ha): Some depressions on the plateau are not wet enough to have organic loamy deposits in the bottom, but they do contain poorly drained mineral soils (New Meadow). Slopes are nearly level to gentle (0.5% to 5%).

KL-WN Kloakut-Willan Lake (7494 ha): Topography of this map unit is complex and slopes range from 10% to 70%. Willan Lake soils are shallow, formed on morainal and colluvial veneers over rock. They occur at higher elevations than the Kloakut soils.

New Meadow Association (NW)

New Meadow soils are loamy fluvial deposits with a peaty surface. They are found in valley bottoms or depressions with nearly level to gentle slopes (0.5% to 5%) between 1200 m and 1500 m. These soils are the main mineral wetland of the Fraser Plateau, covering about 0.6% of the map sheet.

Their vegetation reflects the wetness of the soil, not regional climate. In fact the soils occur throughout the ESSFg, SBSa, and IDFb biogeoclimatic zones. They have no trees, only sedges, grasses, mosses, bog birch, and other wetland species.

They are poorly drained, very plastic when moist, and slowly pervious, and have a perhumid moisture regime. They are classified as Rego Humic Gleysols. They are mottled to the top of the mineral horizons and some soils have a thin surface of peat. Appendix II contains a profile description.

New Meadow soils furnish big game and domestic cattle with good grazing. Many are cut for winter hay supplies for beef cattle.

Map units

New Meadow soils have two map units: one simple unit, NW, and a compound unit with Chaunigan Lake, NW-CL.

NW New Meadow (3096 ha): There are numerous delineations of this unit, but they are all small. They occur in the irregular depressions and valleys across the plateau. There may be small proportions of organic soils at the lowest points and drier soils round the edges of these delineations. Topography is complex, with 0.5% to 11% slopes.

NW-CL New Meadow-Chaunigan Lake (5970 ha): Again represented by numerous but small delineations, this map unit covers those areas where the organic soils (Chaunigan Lake) cover a significant proportion (35% to 45%) of the land. Topography is complex and slopes are from 0.5% to 5%.

Shemwell Association (SH)

Shemwell soils have a loamy-skeletal texture. They have developed on water-washed moraine. They usually have complex topography and slopes range from very gentle to very strong (2% to 50%), although most of the area is gently to moderately rolling. Their elevation is between 900 m and 1250 m. They are very common, being dominant across the northwestern map sheet. They cover 12.9% of the total area.

Their vegetation is typical of dry sites within the SBSa subzone. It consists of an open forest of lodgepole pine with sparse shrubs such as willow and rose, and a ground cover of pinegrass and kinnikinnick.

Shemwell soils are well drained, loose to friable, and rapidly pervious, with a subhumid moisture regime. They are classified as Orthic Gray Luvisols and have clay-enriched subsurface (B) horizons, acid-leached surface horizons, and a very thin litter layer. A profile description is given in Appendix II.

These soils have moderate potential as range for domestic cattle and wildlife. They have some potential for forest, but they are droughty.

Map units

Shemwell soils have four map units: a simple map unit of Shemwell, SH, and three compound map units with Elliot, SH-EL, Hawks, SH-HA, and Willan Lake, SH-WN.

SH Shemwell (190 205 ha): This map unit covers a very large area of rolling till plain in the northwest. Its topography is usually complex, with slopes ranging from 2% to 30%. It also contains some exposures of slightly different soils, notably Hawks and Kloakut.

SH-EL Shemwell-Elliot (3408 ha): Where shallow valleys or depressions cross the plateau fluvial Elliot soils have been mapped with Shemwell. The undulating topography is complex, and slopes range from 0.5% to 5%. Although Shemwell soils are usually forested, Elliot soils have shrub, willow, and bog birch, with sedges, grasses, and no trees.

SH-HA Shemwell-Hawks (5254 ha): Restricted to the northwest this map unit borders steep-sided valleys. Shemwell soils are on the plateau and Hawks cover the slopes and upper terraces of the valleys. Slopes vary from very gentle to very strong (2% to 70%).

SH-WN Shemwell-Willan Lake (255 ha): Where small steep hills jut above the plateau surface Willan Lake soils have been mapped with Shemwell. Slopes vary from 10% to 70%.

Tete Angela Association (TG)

These are sandy-skeletal fluvial soils on the floodplains and terraces of small streams. Their topography ranges from nearly level to gentle slopes (0.5% to 9%) at elevations between 1200 m and 1500 m. They cover about 0.1% of the map sheet, mainly in the west.

Tete Angela soils are in the SBSa biogeoclimatic zone. Characteristic vegetation consists of sedges and grasses, with willow and bog birch in higher slopes. There are usually no trees.

They are imperfectly drained soils, friable to firm, and moderately pervious, with a subhumid moisture regime. Classified as Gleyed Cumulic Regosols, they have mottles to the surface, indicating saturated conditions during most of the year, and buried organic-enriched horizons in a stratifed profile due to alluvial deposition. A profile description is given in Appendix II.

These soils are often used for hay production and are cultivated where climate permits. They offer good wildlife habitat, although drainage is often disrupted by beavers.

Map units

Tete Angela soils have two map units: a simple unit, TG, and a compound unit, TG-CL, with Chaunigan Lake soils.

TG Tete Angela (1408 ha): Six small delineations of this map unit occur in the southwest. Topography is complex and slopes are very gentle to gentle (2% to 9%).

TG-CL Tete Angela-Chaunigan Lake (624 ha): Where organic deposits cover the lowest points of floodplains or depressions Chaunigan Lake soils have been mapped with Tete Angela. Some of the delineations of this map unit contain small lakes.

Tete Hill Association (TT)

The Tete Hill Association consists of loamy-skeletal soils formed on moraine that has been water washed. Their topography is very gently to sloping (2% to 30%) with some very strongly sloping (30 to 70% slopes) areas. Elevation ranges from 1500 m to 2000 m. These soils cover about 3.8% of the map sheet.

They are one of the main morainal soils of the subalpine area adjacent to the Coast Mountains on the west side of the Fraser Plateau. As such they are restricted to the ESSFg biogeoclimatic subzone. Tree cover is mainly lodgepole pine, with a sparse understory of kinnikinnick and pinegrass, and other species tolerant of dry conditions.

Tete Hill soils are well drained, loose to friable, and rapidly pervious, with a humid moisture regime. Classified as Eluviated Dystric Brunisols, they have slightly weathered subsurface (B) horizons and acid-leached surface horizons. Their surface litter layer is thin. A profile description is included in Appendix II.

The short growing season and dry climate give a sparse cover and thus low range capacity. Forest productivity is also low.

Map units

There are only two map units of Tete Hill: a simple unit, TT, and a compound unit, TT-CL, with Chaunigan Lake.

TT Tete Hill (12 056 ha): Restricted to the southwest much of this map unit has hummocky and ridged ground moraine with closed depressions. Its topography is usually complex and rolling, with many small unmapped depressions that surface water. Slopes range from 2% to 30%.

TT-CL Tete Hill-Chaunigan Lake (44 090 ha): Where depressions become numerous wet organic soils (Chaunigan Lake) form a considerable proportion

of area. Topography is complex, although slopes are more subdued than the simple TT map unit and range from 2% to 15%.

Willan Lake Association (WN)

Willan Lake are loamy soils developed on moraine and colluvium derived from granitic and sedimentary bedrock. Topography is complex and slopes range from moderate to very strong (10% to 70% slopes). These soils occur at elevations of 1300 m to 1700 m. They are not common, covering only 0.3% of the map sheet, exclusively in the west.

They are within the ESSFg and the SBSa biogeoclimatic subzones. Their vegetation is principally a tree cover of lodgepole pine and an understory of pinegrass. Other plants that occur are soapberry, rose, juniper, and grouseberry.

They are shallow (less than 1 m deep), well drained, friable, and moderately pervious, with a subhumid moisture regime. They are classified as Orthic Gray Luvisols, lithic phase, with a leached surface horizon, a clay-enriched subsurface horizon, and bedrock within 1 m of the surface. A profile description is included in Appendix II.

Being shallow and droughty, they have only moderate to poor forestry potential. They are subject to compaction if trees are harvested when the ground is moist or wet. Trafficability can be a problem. Windthrow may also be a hazard on some of these shallow soils.

Map units

Willan Lake soils have two map units: a simple unit, WN, and a complex unit, WN-HS.

WN Willan Lake (3714 ha): This map unit consists of small isolated hills rising above the plateau landscape. There are 16 delineations,all in the west. Topography is complex and ranges from 10% to 70%.

WN-HS Willan Lake-Hawks (1146 ha): On some lower slopes bordering hills of the Willan Lake soils there are gravelly glaciofluvial soils to various depths (Hawks). Topography is complex and slopes range from 15% to 30%.

SOIL ASSOCIATIONS OF THE FRASER PLATEAU EAST

The undulating topography of the eastern portion of the Fraser Plateau covers much of the northeastern part of the map sheet. However, it is not continuous, being dissected by steep-sided valleys of the Chilcotin and Fraser rivers. Most of the surface is composed of glacial moraine derived from the underlying basalt lava bedrock. The higher cooler parts are forested (Tyee, Williams Lake, and Helena soils). In places the moraine of these forested soils has been water washed (Tubbs). At lower elevations bordering the river valleys are morainal grassland soils (Chimney). There are numerous small valleys, hollows, and enclosed depressions; some contain glaciofluvial gravelly soils (Hawks, Vedan Meadow, and Trurans), others contain fluvial soils along streams (Big Creek and Elliot), and in the wettest spots there are organic soils (Rail). Steeper slopes covered with colluvium are rare (Tatton soils). Fig. 8 shows an idealized cross section of all these soils.

Each soil association is described in the following sections. Some of their map units may contain soils that are more typical of other Physiographic Regions (e.g., Chaunigan Lake). These soils are described in the sections for those regions.

Big Creek Association (BC)

The Big Creek Association consists of gravelly, sandy soils formed on fluvial sediments. Their topography is very gently sloping (2% to 5%) and their elevation range is limited (1050 m to 1200 m). They are not very common, being limited to the valleys of Big Creek and Gaspard Creek, and cover only 0.1% of the total area.

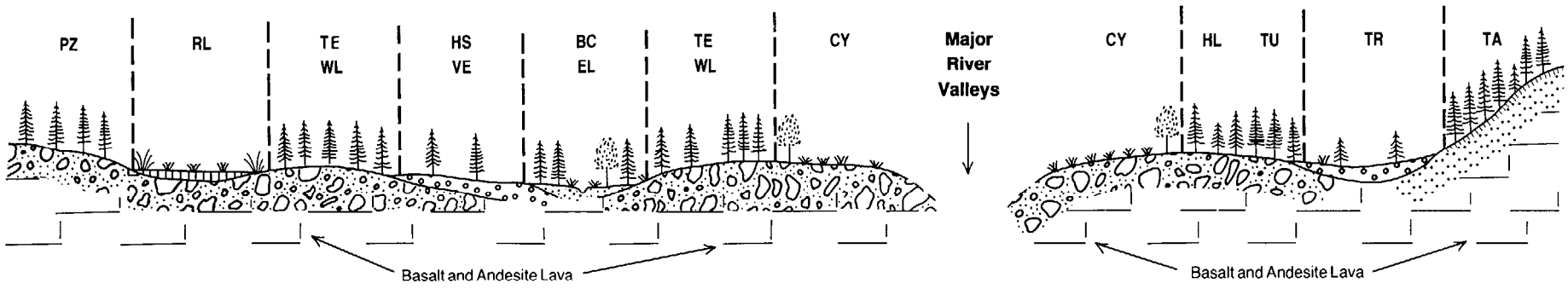
They are in the IDFb vegetation zone. The trees are mainly lodgepole pine and trembling aspen, with an understory of rose and pinegrass. Vegetation is, however, quite variable, as the soils have a range of textures and drainage.

Big Creek are usually deep (more than 1 m), well drained, loose, and rapidly pervious soils, with a semiarid moisture regime. They are classified as Orthic Eutric Brunisols and have slightly weathered subsurface (B) horizons and a thin surface litter layer. Along Gaspard Creek some soils are Regosols and Gleysols subject to flooding. A profile description is included in Appendix II.

These soils are on remnant terraces above the present river level. Their main potential is for forestry, if not too wet. They also offer some forage for domestic cattle and big game.

Map units

Big Creek soils have one simple map unit, BC.



SOIL MATERIAL SYMBOLS

- Colluvium
- Moraine
- Glaciofluvial
- Alluvium
- Organic

SOIL ASSOCIATION SYMBOL	SOIL ASSOCIATION
BC	Big Creek
CY	Chimney
EL	Elliot
HS	Hawks
HL	Helena
PZ	Piltz
RL	Rail
TA	Tatton
TR	Trurans
TU	Tubbs
TE	Tyee
VE	Vedan Meadow
WL	Williams Lake

Fig. 8. Hypothetical cross section of the soil associations of the Fraser Plateau East

BC Big Creek (1830 ha): This map unit represents the terraces and floodplain of Big Creek and Gaspard Creek. There are four delineations. Their topography is complex and has very gently rolling slopes (2% to 5%).

Chimney Association (CY)

These soils have formed on deep loamy-skeletal moraine. Topography on the undulating plateau is usually complex and slopes are very gently to strongly sloping (2% to 30%), with some very strong slopes (30% to 70%). Elevation ranges from 450 m to 800 m. These soils cover about 4.0% of the map sheet, and are the dominant grasslands of the Fraser Plateau in the northeast.

Although grasslands, they are within the IDFb biogeoclimatic zone. Characteristic vegetation is bluebunch wheatgrass, needlegrass, and sparse shrubs such as western snowberry and rose. The few trees are Douglas fir, lodgepole pine, or aspen. Without the periodic fires typical of grasslands many of these areas may eventually become forested. Signs of this are evident now.

These soils are well drained, moderately pervious, and friable to firm, and have a subhumid moisture regime. They are classified as Orthic Dark Brown Chernozems and have a deep (greater than 10 cm) organic-enriched surface horizon, a slightly weathered subsurface (B) horizon, and a calcareous parent material. A description is included in Appendix II.

Grazing potential of these soils is high and they provide the spring range of ranches in the Chilcotin and Fraser valleys.

Map units

Small expanses of grassland Chimney soils occur throughout the northeast where they are intermixed with many other soils. There are nine different map units: three simple units, CY1,CY2, CY3, and six compound units, CY1-DX, CY1-EL, CY1-TE, CY1-WL, CY2-WL, and CY3-WL.

CY1, CY2, and CY3, Chimney (22 544, 8380, and 2853 ha, respectively). The difference between these three simple units lies in the various minor soils that compose up to 15% of them. In CY1 the minor soils are saline, occupying hollows in the landscape, especially around Riske Creek. Here slopes range from 2% to 15%. In CY2 there are similar hollows but they contain moist Orthic Black Chernozems, which are not saline. Slopes again range from 2% to 15%. CY3 covers higher ground where bedrock can be within 1 m of the surface. In fact, occasionally rock is exposed at the surface. In these areas some slopes are as steep as 30%.

CY1-DX Chimney 1-Drummond (2095 ha). There is very little difference between these two soils apart from Drummond being drier (semiarid moisture regime) and rapidly pervious. Both are grasslands and both occur at about the same elevation. Slopes in this combined unit range from 2% to 15%.

CY1-EL Chimney 1-Elliot (510 ha). In four small delineations narrow strips of imperfectly drained fluvial soils (Elliot) occur with Chimney. At the lowest points Elliot soils are nearly level (0.5%). The Chimney soils can slope 9%.

CY1-TE Chimney 1-Tyee (1215 ha): This map unit is similar to CY1-WL, but the forested Tyee soils are slightly more moist than Williams Lake soils. The calcareous parent material of the Tyee soils lies 90 cm below the surface.

CY1-WL, CY2-WL, and CY3-WL Chimney-Williams Lake (14 725, 10 630, and 1074 ha, respectively). These are by far the largest map units of the Chimney soils. They represent the ecotone between grasslands and forest on the plateau. There are numerous irregular patches of the forested Williams Lake soils distributed throughout the large expanses of grassland. The difference between the three units is limited to the variations in the grassland Chimney soils previously discussed. Slopes range from 2% to 30%.

Elliot Association (EL)

The Elliot Association consists of fine-loamy soils formed on fluvial sediments. Their topography is subdued, with 0% to 5% complex slopes and an elevation range of 900 m to 1600 m. They cover only 0.5% of the map sheet but are widely distributed.

Concentrated in the IDFb and SBSa biogeoclimatic zones, their vegetation of willows, sedges, and grasses reflects local wetness, not regional climate. There are few trees, and shrubs (willow and bog birch) are restricted to higher slopes.

They are imperfectly drained, plastic when moist, and moderately pervious, with a perhumid moisture regime. They are classified as Carbonated Rego Humic Gleysols, with water near the surface for most of the year. They are carbonated to the surface and have a thick, organic-enriched, surface horizon. A profile is given in Appendix II.

These soils are very valuable as native hay meadows for cattle but have little value for forestry.

Map units

Elliot soils have four map units: a simple unit, EL, and three compound units, EL-CE, EL-CL, EL-CY.

EL Elliot (2968 ha): Restricted to narrow valleys and linear hollows the 40 delineations of this map unit are small, averaging 70 ha. Their topography is level to very gentle sloping (0% to 5%).

EL-CE Elliot-Cone Hill (614 ha): In some open depressions the Elliot soils are bordered by significant expanses of imperfectly drained morainal

soils (Cone Hill). The topography is complex and slopes range from 0.5% to 5%. Cone Hill soils are usually forested and occupy the upper slopes.

EL-CL Elliot-Chaunigan Lake (3655 ha): Many fluvial meadows have deep organic soils in the center (Chaunigan Lake). Slopes are quite gentle, ranging from 0.5% to 5%.

EL-CY Elliot-Chimney (523 ha): In these small delineations the Elliot soils are bordered by well drained morainal soils supporting grasslands (Chimney). Their topography is complex and slopes range from 0.5% to 5%.

Hawks Association (HS)

The Hawks Association consists of sandy-skeletal soils formed on glaciofluvial sediments, often along meltwater channels. Their topography is usually complex, with very gentle to gentle slopes (2% to 9%); however, the land is terraced and some terrace edges can slope as steeply as 70%. These soils range in elevations from 1200 m to 1500 m and cover about 1.9% of the map sheet throughout the Fraser Plateau and in some valleys of the Coast Mountains.

Hawks soils occur in the IDFb and the SBSa biogeoclimatic zones. Trees on these dry soils are usually lodgepole pine, with a sparse understory of pinegrass and kinnikinnik.

They are rapidly drained, friable to loose, and rapidly pervious, and have a humid to subhumid moisture regime. They are Eluviated Eutric Brunisols and have a slightly weathered subsurface (B) horizon, a thin litter layer, and calcareous parent material. A description is included in Appendix II.

These soils have low forest productivity and low forage production potential. They can be a source of gravel, although sometimes thin. They have good trafficability.

Map units

Hawks soils have five map units: one simple unit, HS, and three compound units, HS-DX, HS-SH, and HS-WC.

HS Hawks (16 076 ha): There are 57 delineations of this unit, mostly in the northwest. They occur as terraces adjacent to and above existing streams. Their topography is usually complex and slopes are quite variable, ranging from 0% to 70%.

HS-DX Hawks-Drummond (227 ha): The three occurrences of this map unit are in the northwest. The Drummond soils are grasslands, whereas Hawks soils are forested. Topography is complex and slopes range from 2% to 15%.

HS-SH Hawks-Shemwell (11 453 ha): This unit has been mapped in parts of the northwest where Shemwell morainal gravelly soils on the plateau border valley terrace slopes that have Hawks soils. Often the boundary between the two is arbitrary. Within the combined unit slopes range from 2% to 70%.

HS-WC Hawks-Whiskey (1456 ha): There is one large delineation of this map unit adjacent to the Taseko River. The Whiskey Creek soils are morainal soils on the upper slopes of the river valley. Hawks soils are on the lower terraces.

Helena Association (HL)

The Helena Association consists of gravelly-loamy soils developed on moraine. Topography is complex, with very gentle to moderate slopes (2% to 15%). Elevations range from 900 m to 1300 m. These soils cover about 0.5% of the map sheet.

Helena soils are in the IDFb biogeoclimatic zone and vegetation consists of a mature forest of Douglas fir and lodgepole pine, with an understory of pinegrass and scattered herbs and shrubs.

They are well drained, firm, and moderately pervious, with a subhumid moisture regime. They are classified as Orthic Gray Luvisols and have a clay-enriched subsurface (B) horizon that can hold water during wet periods, making traction difficult. A description is included in Appendix II.

These soils have moderate potential for domestic cattle and wildlife grazing if the canopy is not too dense. They also have moderate forest productivity, although in some places large surface boulders make harvesting difficult.

Map units

Helena soils occur as one simple map unit, HL.

HL Helena (7536 ha): There are five delineations, all in the east. The topography is complex and slopes range from 2% to 15%. Large boulders are commonly strewn across the surface, making the use of any machinery difficult.

Piltz Association (PZ)

Piltz are coarse-loamy soils formed on moraine. Slopes range from gentle to strong (5% to 30%) at elevations between 1200 m and 2000 m. These soils are common and cover about 5.7% of the map sheet. They form the main morainal soil of the higher parts of the Fraser Plateau East, extending into the Camelsfoot Range.

Piltz soils cross the IDFb, ESSFg, and SBSa biogeoclimatic zones. They are forested but the proportion of species can vary. Trees are lodgepole pine, Douglas fir, and spruce toward the alpine. The understory is sparse with pinegrass, kinnikinnick, and rose.

They are moderately well drained, slightly plastic, and moderately pervious, and have a subhumid moisture regime. They are Orthic Gray Luvisols, with a clay-enriched subsurface (B) horizon typical of this class. A profile description is given in Appendix II.

These soils have moderate forest productivity, and grazing potential is good where the canopy is more open. They cover one of the main summer range areas for the Gang Ranch.

Map units

Piltz have two simple map units, PZ1 and PZ2.

PZ1, PZ2 Piltz (64 453 and 24 027 ha, respectively): Both map units contain predominantly Piltz soils. PZ2 is usually on steeper land (5% to 30% slopes instead of 2% to 15% for PZ1) and contains up to 15% soils that are less than 1 m deep.

Rail Association (RL)

These are organic soils that have formed on sedge peat material. Their topography is complex and slopes are level to nearly level, undulating. Elevation ranges from 1150 m to 1800 m. The soils are not very common, covering only 0.1% of the map sheet.

They extend across the IDFb, SBSa, and ESSFg biogeoclimatic zones but their vegetation of sedges, grasses, scrub birch, willow, and mosses reflects wetness, not regional climate.

Rail soils are very poorly drained and moderately pervious, with a peraquic moisture regime. They are classified as Terric Mesisols and have a moderately decomposed organic layer overlying a mineral layer, which can occur at various depths within 160 cm of the surface. They often contain a thin (less than 5 cm) layer of volcanic ash. A profile is described in Appendix II.

The native hay is cut by ranchers as winter feed for cattle.

Map units

Rail soils have two map units: one simple unit, RL, and a compound unit with Chaunigan Lake, RL-CL.

RL Rail (1251 ha): There are five delineations of this map unit, representing small depressions with slopes ranging from 0.5% to 2.5%.

RL-CL Rail-Chaunigan Lake (956 ha): More common than the simple map unit, this unit has 11 delineations. Its topography is complex, with slopes varying from level to very gentle (0.5% to 2.5%). Chaunigan Lake soils border Rail soils in the depressions. They are shallower, their organic layers are less than 1 m deep.

Tatton Association (TA)

These are gravelly loamy soils formed on colluvial deposits, although their slopes are not very steep (5% to 30%). Elevation ranges from 1050 m to 1200 m. These soils are not very common, occurring only in the extreme northeast.

Vegetation consists of mature Douglas fir and and understory of pinegrass, typical of the IDFb biogeoclimatic zone.

Tatton soils are deep, rapidly drained, slightly hard, and moderately pervious, with a subhumid moisture regime. They are Orthic Gray Luvisols, and have clay-enriched subsurface (B) horizons with a leached surface horizon and calcareous parent material. Appendix II contains a profile description.

These soils have moderate forestry potential. They also have moderate range potential and are used as spring and fall range.

Map units

There is only one map unit, TA.

TA Tatton (289 ha): This map unit represents the forested sides of shallow valleys on the Fraser Plateau. There are two delineations in the northeast, slopes vary from 5% to 30% and some have shallow soils.

Trurans Association (TR)

Trurans are sandy-skeletal soils formed on glaciofluvial deposits. Their slopes are gentle (6% to 9%) and their elevation varies from 1000 m to 1200 m. They cover only 0.5% of the map sheet, exclusively in the northeast.

Occurring in the IDFb zone, the characteristic vegetation of these soils is an overstory of lodgepole pine and hybrid white spruce with pinegrass, sparse shrubs, and herbs.

Trurans soils are rapidly drained, loose, rapidly pervious, and deep with a subhumid moisture regime. Classified as Eluviated Dystric Brunisols, they have an acid-leached surface horizon, and a thin litter layer. A profile description is included in Appendix II.

These soils are droughty and consequently forest and range productivities are low. They can be good gravel sources, if deep enough.

Map units

There is one map unit, TR.

TR Trurans (904 ha): There are two delineations in shallow depressions in the northeast. They have moderate complex slopes (6% to 9%).

Tubbs Association (TU)

Tubbs soils have formed on sandy-skeletal, loose, water-washed moraine. Their topography is complex and slopes range from very gentle to moderate (2% to 15%). Elevation varies from 900 m to 1100 m. They are not very common, covering only 0.2% of the map sheet.

These soils are within the IDFb biogeoclimatic zone and characteristic vegetation consists of a mature Douglas fir overstory, with a pinegrass understory and scattered herbs and shrubs.

Tubbs are well drained, loose, and rapidly pervious soils, with a subhumid moisture regime. They are classified as Eluviated Eutric Brunisols and have an acid-leached surface horizon, calcareous parent material, and a thin surface litter layer. A profile description is given in Appendix II.

These soils have a low forest productivity due to their coarse soil texture and low water-holding capacity. They are used as spring range.

Map units

There is one map unit, TU.

TU Tubbs (3769 ha): There are seven delineations with slopes ranging from 2% to 15%. This map unit is similar to Shemwell, but the soils are slightly less weathered and climatically drier.

Tyee Association (TE)

Tyee are gravelly loamy soils formed on deep moraine. Their plateau topography has complex, very gentle to moderate slopes (2% to 15%), with some areas of strong to very strong slopes (up to 70%). Elevation varies from 1000 m to 1600 m. These soils cover about 10.5% of the map sheet. They form the main morainal soil of the Fraser Plateau East.

Tyee soils are in the IDFb biogeoclimatic zone. They have overstory vegetation of Douglas fir, with some lodgepole pine and trembling aspen and a ground cover of kinnikinnik, rose, showy aster, indian paintbrush, peavine, and pinegrass.

They are well drained, plastic, and slowly pervious, with a subhumid moisture regime. They are classified as Orthic Gray Luvisols and have a subsoil enriched with clay, an acid-leached surface horizon, calcareous parent material, and a thin litter layer. A description is included in Appendix II.

These soils offer good potential as summer range for domestic cattle, especially where the canopy is more open. They have moderate potential for forestry. They are also used as summer range by deer.

Map units

Tyee soils have three different simple map units, TE1, TE2, and TE3, that vary according to the small proportion of other soils with which Tyee are mapped.

TE1 Tyee 1 (97 394 ha): This is the most common unit, which has 48 delineations. It includes a small proportion of imperfectly drained soils in hollows. The topography is complex in most delineations and slopes generally range from 2% to 15%. Approximately 18% of this map unit has large boulders on the surface.

TE2 Tyee 2 (35 407 ha): This unit represents the transition from forest to grassland. Dominantly forest, it includes some grassland and saline soils in shallow depressions. Its complex slopes generally range from 2% to 15%.

TE3 Tyee 3 (29 484 ha): Usually restricted to higher ground this unit contains a proportion of soils that are thin over bedrock and others that have large boulders on the surface. Its slopes range from 2% to 30%, with a few as steep as 70%.

Vedan Meadow Association (VE)

These soils have a sandy eolian surface over glaciofluvial gravels and sands. Their slopes are very gentle to gentle (2% to 9%). Their one delineation occurs at an elevation of 1200 m in the northeast. They represent less than 0.2% of the whole map sheet.

Being in the IDFb biogeoclimatic zone, their vegetation consists of a tree cover of lodgepole pine and Douglas fir, with an understory of pinegrass and kinnikinnick.

These soils are rapidly drained, loose, and rapidly pervious, and have a semiarid moisture regime. They are classified as Orthic Gray Luvisols but only a little clay has accumulated in the subsoil. They have an acid-leached surface horizon and calcareous parent material. A profile description is included in Appendix II.

Grazing potential is moderate and forest productivity is low to moderate. This area is a source of sand, where the soils are deep.

Map units

There is only one compound map unit of Vedan Meadow soils, VE-TE2.

VE-TE2 Vedan Meadow-Tyee 2 (2434 ha): One delineation in the northeast contains a proportion of the forested Tyee soils with very small patches of grassland as well as the glaciofluvial gravels of Vedan Meadow.

Williams Lake Association (WL)

The Williams Lake Association consists of gravelly loamy soils that have formed on moraine. Their complex slopes range from very gentle to moderate (2% to 15%). They occur on the plateau just above the river valleys at elevations of 800 m to 1100 m. They cover about 6.6% of the map sheet, mainly in the northeast.

They are in the IDFb biogeoclimatic zone, with a forest of Douglas fir, lodgepole pine, and trembling aspen and an understory of pinegrass kinnikinnick, and other herbs and shrubs.

They are deep, are well drained, have very firm consistence, and are moderately pervious, with a subhumid moisture regime. They are classified as Orthic Gray Luvisols, with a subsoil enriched in clay, calcareous parent material, and a thin surface litter layer. A profile description is included in Appendix II.

These soils are used as spring or summer range for domestic cattle. They have moderate forest productivity.

Map units

There are four map units: three simple units, WL1, WL2, and WL3, and one compound unit, WL-HS.

WL1, WL2, WL3 Williams Lake (72 523, 20 352, and 8937 ha, respectively): These three map units have similar differences to those of Tyee. The first unit contains a small proportion of imperfectly drained soils in hollows plus some surface boulders. The second unit has small patches of grassland, some of which are saline. The third unit is on higher ground with thin soils over rock and large surface boulders.

WL1-HS Williams Lake 1 - Hawks (1166 ha): There are two delineations of this unit in the northeast. It has complex, very gentle to gentle slopes (2% to 9%). The coarse textured glaciofluvial Hawks soils are in shallow linear depressions that are bordered by Williams Lake.

SOIL ASSOCIATIONS OF THE MAJOR RIVER VALLEYS

The Fraser and Chilcotin rivers, with their tributaries such as Churn Creek and Big Creek, have cut deep valleys into the Fraser Plateau. The upper slopes of these valleys are covered with colluvium and glacial till. They drop steeply away from the plateau edge. Lower down are massive terraces cut into very complicated topography by innumerable deep gullies. The materials that compose these terraces are extremely variable and include eolian sands, lacustrine silts, fluvial gravels, and gravelly glacial till. Below the terraces are narrow active floodplains or rock gorges, like Farwell Canyon on the Chilcotin River. Somewhat protected, these valleys are warmer and drier than the plateau; there is more grassland and less forest.

The country offers spectacular scenery to tourists and winter range to domestic cattle. It is also excellent habitat for big game, combining grazing on the terraces with escape terrain in gullies. There is a protected band of Bighorn sheep on such land near Farwell Canyon.

The soils are more varied than in any other physiographic region. There are colluvial soils with an open forest on steeper slopes bordering the plateau (Chasm). Flatter slopes in the same position have lightly forested morainal soils (Withrow and Whiskey Creek). At lower elevations but still above the main terraces are rolling morainal grasslands (Big Bar). The glaciofluvial soils of the terraces can be forested (Hargreaves) or grassland (Chilcotin and Courtney), as can the lacustrine soils (Gay Lake-forested, Churn Creek, and Zenzaco-grassland). The gullies and steep terrace edges have thin, actively eroding soils (Dog Creek). Just above the present rivers are gravelly soils of alluvial fans and floodplains (Taseko and Toosey). Fig. 9 shows an idealized cross section of the soils of the Major River valleys.

Big Bar Association (BB)

The Big Bar Association consists of gravelly coarse-loamy morainal soils, with a thin veneer of eolian fine sand, and they have very gentle to gentle slopes (2% to 9%). Their elevation range is from 400 m to 1000 m. They cover only 0.2% of the map sheet. They are some of the highest grasslands in the PPBG biogeoclimatic zone and extend into the IDFb subzone. Species include bluebunch wheatgrass, and Sandberg's and Kentucky bluegrass. There are very few trees, mostly Douglas fir. Many places are heavily overgrazed.

Big Bar soils are well drained, very friable, and moderately pervious, with a semiarid moisture regime. They are classified as Orthic Dark Brown Chernozems and have considerable organic matter in the surface horizon and calcareous parent material. Volcanic ash is sometimes present in the upper horizons. A profile description is included in Appendix II. These soils provide good range for domestic cattle, although some have been overgrazed.

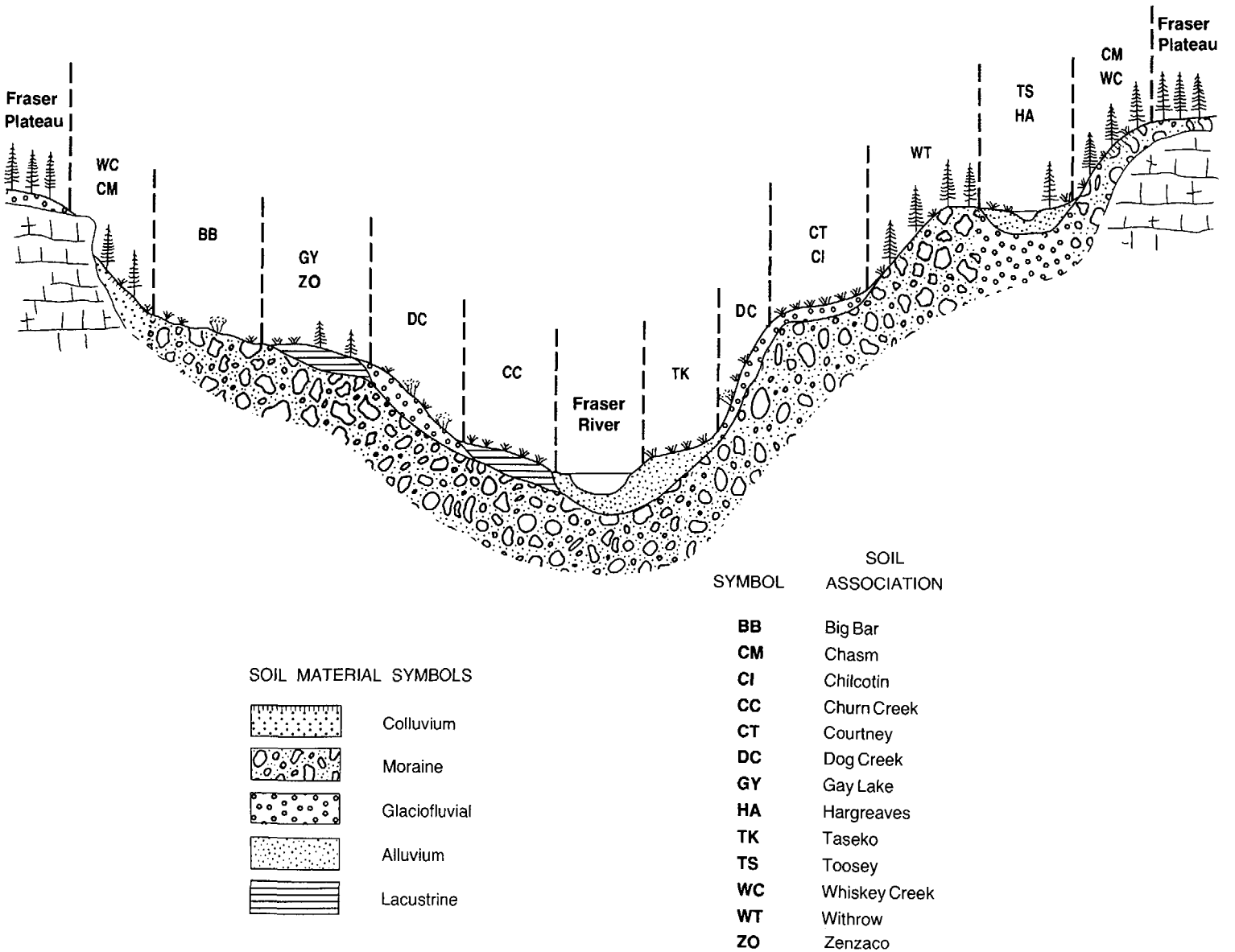


Fig. 9. Hypothetical cross section of the soil associations of the Major River valleys

Map units

Big Bar soils have two map units, BB1 and BB2, both of which are simple.

BB1 Big Bar 1 (1481 ha): Bordering the closed forest this unit contains small patches of forested soils (Helena). Its topography is very gently to gently rolling (2% to 9% slopes), with some moderate slopes.

BB2 Big Bar 2 (1820 ha): Here the Big Bar soils have a fine sandy eolian capping, varying in thickness between 20 cm and 50 cm. Slopes are complex and subdued, ranging from 2% to 9%.

Chasm Association (CM)

Chasm are gravelly loamy soils formed in colluvium on steep upper valley sides. Slopes range from moderate to very steep (10% to 100%). These soils cover about 1% of the map sheet.

They are in the IDFb biogeoclimatic zone bordering the PPBG zone. Their forest is open with Douglas fir and ponderosa pine, and a ground cover that includes bluebunch wheatgrass and spruce shrubs, willow, and roses.

They are moderately well drained, slightly hard, and moderately pervious, with semiarid moisture regime. They are classified as Eluviated Eutric Brunisols and have a thin litter layer, with a calcareous subsoil and parent material. In some of these soils there is a layer of volcanic ash in the upper horizons. A profile is described in Appendix II.

These soils have moderate potential as spring range for cattle and are winter habitat for wildlife (mule deer).

Map units

There is one map unit, CM.

CM Chasm (16 330 ha): On the upper valley sides this unit includes rock outcrops and thin soils. Slopes vary from moderate to very steep.

Chilcotin Association (CI)

These soils have formed on a veneer of coarse-loamy eolian fine sand overlying sandy skeletal glaciofluvial deposits. Their slopes are level to gently rolling (0% to 9%), with some moderately sloping areas (9% to 15%). They cover about 0.5% of the map sheet, and occur at elevations ranging from 400 m to 750 m.

Chilcotin soils are Orthic Dark Brown Chernozems of the grasslands in the PPBG biogeoclimatic zone. They have few or no trees. The main grass species is bluebunch wheatgrass. In areas that have been overgrazed, plants like big sage, rabbit brush, and oyster plant appear.

These soils are excellent spring and fall range for domestic cattle. They are used for irrigated forage production where water is available and where the surface eolian layer is deep enough to prevent stoniness from being a problem. Chilcotin soils can be susceptible to slumping.

Map units

There is one map unit, CI.

Cl Chilcotin (7242 ha): This unit represents the terrace remnants in the northern portion of the Major River valleys. Many delineations are isolated flats surrounded by the gullies of Dog Creek soils. The slopes of their undulating surfaces range from level to 9% slopes. Some small areas have 9% to 15% slopes.

Churn Creek Association (CC)

Churn Creek are loamy soils formed on lacustrine terraces with glacifluvial deposits at depth. Their topography is complex, with very gentle to gentle (2% to 9%) slopes, and their elevation range is 450 m to 750 m. These soils are not common, covering only 0.1% of the map sheet. They are within the PPBG biogeoclimatic zone, and have similar vegetation to the Chilcotin soils. They are deep, well drained, moderately pervious, and friable. Their moisture regime is subarid. Classified as Orthic Dark Brown Chernozems, they have a surface horizon enriched with organic matter and a calcareous parent material. Appendix II contains a profile description.

Churn soils are productive range for cattle. Some are used as irrigated forage meadows. However they are subject to slumping, the worst examples being near Gang Ranch, southwest of Dog Creek.

Map units

There is one map unit, CC.

CC Churn Creek (2187 ha): Represents high terraces in the southeast that have irregular hummocky topography due to recent or active slumping. The complex slopes range from 2% to 9%.

Courtney Association (CT)

Courtney are loamy-skeletal soils developed on eolian fine sand overlying sandy and gravelly deposits of a varied origin. They have very gently to gently sloping (2% to 9%) complex topography and occur at elevations between 450 m and 650 m. They cover only 0.2% of the map sheet.

Courtney soils are in the PPBG biogeoclimatic zone, and characteristic vegetation consists of bluebunch wheatgrass, needle grass, and big sage. In areas that have been overgrazed, big sage becomes more dominant.

These soils are deep, well drained, loose, and rapidly pervious, with subarid moisture regime. Classified as Orthic Brown Chernozems, they have a light brown surface horizon enriched with organic matter and calcareous parent material. A typical profile description is included in Appendix II.

These soils have moderate to high range potential for either domestic cattle or big game.

Map units

There is one simple map unit, CT.

CT Courtney (3613 ha): This map unit represents the flatter portions of eroded terraces at various levels in the southern portion of the Major River valleys. It is found predominantly in the southeast within the valley of the Fraser River. Like the map units of the slightly moister Chilcotin soils, individual areas are often surrounded by eroded gullies of Dog Creek soils. Complex slopes range from 2% to 9%.

Dog Creek Association (DC)

These are sandy-skeletal soils formed on mixed fluvial, glaciofluvial, and morainal material. Topography is usually simple, and slopes are strong to very steep on these valley sidewalls and eroded gullies along the Fraser and Chilcotin rivers. Dog Creek soils cover 4.1% of the map. They occur at elevations between 300 m and 1000 m.

Dog Creek soils are in the PPBG biogeoclimatic zone. They are sparse grasslands, predominantly bluebunch wheatgrass and big sage. As with the other grassland soils of this region, big sage becomes more dominant in areas that have been overgrazed. Clumps of Douglas fir grow in the bottoms of many gullies.

They are well drained, loose, and rapidly pervious, with a subarid moisture regime. They are classified as Orthic Dark Brown Chernozems. Many have been eroded on the steep slopes and have thin profiles over calcareous parent material. Appendix II includes a typical profile description.

They have moderate potential for domestic range production and may be used in the spring and fall. They also provide valuable escape terrain for big game adjacent to the better grazing areas of Courtney and Chilcotin soils. Some slopes are unstable and slump periodically.

Map units

Dog Creek soils have three simple map units, DC1, DC2, and DC3.

DC1 Dog Creek 1 (2454 ha): More than 40% of this map unit contains shallow soils and rock outcrops. Slopes are simple and very strong to very steep (30% to 100%). There are three delineations, all in the northeast.

DC2 Dog Creek 2 (3115 ha): This map unit contains small portions of forested soils, often in the bottoms or on the north-facing slopes of gullies. Its simple slopes are very strong to very steep (30% to 100%). It also contains some rock outcrops and shallow soils.

DC3 Dog Creek 3 (29 104 ha): This map unit contains less than 20% shallow soils and rock outcrops. Like the others, it has simple slopes from 30% to 100%.

Gay Lake Association (GY)

These are fine-silty soils that have formed on a blanket of lacustrine material on terraces adjacent to the Chilko River. Their topography is complex with mostly gentle to moderate slopes (6% to 15%), although some are strongly sloping, and an elevation range of 900 m to 1100 m. The soils cover only 0.04% of the map. They are within the IDFb Biogeoclimatic Zone. They have an overstory of Dogulas fir, with an understory of rose, kinnikinnick, and pinegrass. Lodgepole pine is also present.

Gay Lake soils are moderately well drained, deep, plastic when moist, and moderately pervious, with a subhumid moisture regime. They are classified as Orthic Eutric Brunisols as they have a slightly weathered subsurface horizon (B), surface horizon with a pH of over 5.5, and calcareous parent material. A typical profile description is given in Appendix II.

These soils have moderate to high potential as summer range for domestic cattle. Gentler slopes are occasionally irrigated for hay and alfalfa.

Map units

Gay Lake soils have only one simple map unit, GY.

GY Gay Lake (610 ha): There are only three delineations of this map unit, all in the northwest. The topography is complex and slopes range from 5%

to 30%. In some places low gravelly ridges (crevasse fillings) produce a hummocky surface.

Hargreaves Association (HA)

Hargreaves are coarse-loamy soils developed on terraced glacifluvial deposits adjacent to the Fraser and Chilcotin rivers. Topography is complex and slopes are very gentle to strong (2% to 30%), with some areas of very strong slopes (up to 70% slopes). Their elevation varies from 450 m to 1100 m. They cover about 0.2% of the map, mostly in the northeast and northwest.

These soils are just within the IDFb Biogeoclimatic zone bordering the PPBG grasslands. The main tree species is Douglas fir, with a groundcover of predominantly pinegrass and bluebunch wheatgrass.

Hargreaves soils are deep, well drained, friable, and rapidly pervious, with a semiarid moisture regime. They are Orthic Eutric Brunisols with a slightly weathered subsurface horizon, a surface pH above 5.5, and calcareous parent material.

These soils offer some grazing potential for domestic livestock and, if water can be pumped to them a few areas produce hay and alfalfa.

Map units

Hargreaves soils have one simple map unit, HA.

HA Hargreaves (3389 ha): This map unit is similar to the Chilcotin soils, occurring on flatter terrace remnants, but it is coarser textured and treed. Inclusions of Chilcotin soils may occur. Topography is complex and slopes range from 2% to 15% with some areas of strong to very strong slopes (up to 70%).

Taseko Association (TK)

Taseko are sandy and gravelly soils developed in fluvial sediments on the lowest terraces along river valleys. Their topography is mainly very gently to gently rolling (2% to 9%) with some areas of stronger slopes (up to 30%). They occur at elevations between 450 m and 750 m but cover only 0.1% of the map.

These soils occur in the IDFb biogeoclimatic zone. Their vegetation is typically balsam poplar (cottonwood), aspen, willow, horsetail, and grasses.

They are well drained, deep, friable, and rapidly pervious, with a semiarid moisture regime. They are Rego Dark Brown Chernozems. A profile

description is included in Appendix II.

At their lowest points they may be flooded in the spring. However they have good potential for agriculture and many of them are currently cultivated where stoniness is not too severe. They are good gravel sources. Gravel underlies the finer textured surface at varying depths.

Map units

Taseko soils have one simple map unit, TK.

TK Taseko (1620 ha): This map unit is found in the lowest terraces of river valleys in the northeast and northwest. Its topography is complex and slopes range from 2% to 9%. The soils can have variable textures typical of a recent floodplain deposit. The finer textured surface layer may vary from fine sand to silt loam and be from 25 cm to 100 cm deep, overlying gravels.

Toosey Association (TS)

Toosey are gravelly coarse-loamy soils formed on fluvial sediments. They have complex topography with very gentle to gentle slopes (2% to 9%), and occur at elevations between 450 m and 750 m. They cover about 0.2% of the map, mainly in the northeast and southeast.

These are grassland soils within the IDFb biogeoclimatic zone. Their vegetation is dominated by bluebunch wheatgrass and pasture wormwood.

They are deep, well drained, very friable, and rapidly pervious, with a subarid moisture regime. They are classified as Orthic Dark Brown Chernozems. A typical profile description is given in Appendix II.

These soils have moderate to high capability for irrigated agriculture. They also have good range potential for domestic livestock and big game. Much of the area is currently used for irrigated hay production.

Map units

Toosey soils have only one simple map unit, TS.

TS Toosey (3501 ha): Like the Taseko soils, this map unit is found along the lower terraces of river valleys, but its soils are finer textured. Its topography is very gently to gently rolling slopes (2% to 9%). There are inclusions of very calcareous soils.

Whiskey Creek Association (WC)

Whiskey Creek soils are gravelly coarse-loamy and have developed on morainal materials. Topography is usually simple and slopes are moderate to very steep (10% to 100%). Elevation ranges from 750 m to 1300 m. They are quite common, covering more than 2.3% of the map.

They are in the IDFb biogeoclimatic zone, between the grasslands of the lower river valley areas and the forested soils of the plateau. They have an overstory of Douglas fir, with a ground cover of pinegrass and sparse shrubs and herbs.

They are well drained, deep, and moderately pervious, with a semiarid moisture regime. They are classified as Orthic Eutric Brunisols and have slightly weathered subsurface horizons and a calcareous parent material. A profile description is given in Appendix II.

Steep terrain, tree cover, and good grass growth provide winter range for ungulates, mainly deer. They are also used as range for domestic cattle, lying between the spring and fall ranges near ranches in valleys, and the summer range of the plateau. Forest growth on these soils is sparse.

Map units

There is only one simple map unit, WC.

WC Whiskey Creek (35 560 ha): This map unit represents the upper forested slopes of the river valleys between the forested plateau and the lower grassland terraces. Topography is simple with strong to very steep slopes (15% to 100%). Between 10% and 30% of the area can be shallow soils or rock outcrops. The map unit may also contain some grassland Chimney soils.

Withrow Association (WT)

Withrow are gravelly loamy soils that have a silty eolian capping. They are found on higher terraces where the topography is complex and slopes are very gentle to moderate (2% to 15%). They occur between 750 m and 1100 m in elevation. They cover only 0.4% of the map, exclusively in the northeast.

These soils are within the IDFb biogeoclimatic zone. They are forested with Douglas fir and lodgepole pine. The groundcover is pinegrass and sparse willow, with other herbs and shrubs.

They are well drained, deep, friable, and moderately pervious, with a subhumid moisture regime. They are Eluviated Eutric Brunisols. A profile description is included in Appendix II.

Withrow soils have a moderate to high potential for grazing, mainly as summer range for domestic livestock. Their potential for forestry is moderate.

Map units

Withrow soils have one simple map unit, WT.

WT Withrow (5566 ha): There are six delineations of this map unit in the valley of the Chilcotin River and near Dog Creek. Topography is complex and slopes range from 2% to 15%.

Zenzaco Association (ZO)

These are loamy soils formed in lacustrine sediments on undulating terraces. Topography is quite variable and complex, ranging from nearly level to strongly sloping (0.5% to 30%). Elevation ranges from 650 m to 1050 m. Zenzaco soils cover only 0.2% of the map, exclusively in the northwest.

They are grasslands within the IDFb biogeoclimatic zone. Characteristic vegetation includes Kentucky bluegrass, wildflax, cinquefoil, thistle, oyster plant, and snowberry.

They are deep, moderately well drained, slightly hard, and moderately pervious, with a semiarid moisture regime. They are Orthic Brown Chernozems. A typical profile descriptions is included in Appendix II.

These soils have moderate productivity for range, although some contain soluble salts that restrict grass growth. Gentler slopes may be irrigated for forage crops where water is available.

Map units

Zenzaco soils have one simple map unit, ZO.

ZO Zenzaco (2678 ha): There are 10 delineations of the map unit, all in the northwest map sheet. Topography is complex and slopes range from 0.5% to 30%. This map unit is associated with the forested Gay Lake soils. It frequently contains gullies, and has some saline spots with stones and boulders on the surface.

LAND USE

Canada Land Inventory maps

Soil information can be used to estimate the capability of land to support various types of land use. As part of the Canada Land Inventory the soils of the Taseko Lakes area were assigned capability ratings for forestry, agriculture, recreation, and wildlife. The ratings were published in maps and short reports. The following maps are available:

Land Capability for Forestry (NE, NW, SE, and SW, 1:125 000)
Land Capability for Agriculture (920 NE, NW, SE, and SW, 1:125 000)
Land Capability for Wildlife (920 1:250 000)
Land Capability for Recreation (920 1:250 000)

A land capability analysis map (1:250 000) is also available for the Cariboo area, which includes the area covered by this report. It was made by comparing the capability maps for the individual types of land use.

All these maps are available from

The Map Librarian
Maps, B.C.
Ministry of Environment
Parliament Buildings
Victoria, B.C.
V8V 1X4

or

Canada Map Office
Surveys and Mapping Branch
Department of Energy, Mines and Resources
Ottawa, Ont.
K1A 0E9

The small scales at which these land capability maps have been published make them suitable for broad scale planning but not for assessing the best use for small pieces of land.

Soil interpretations for forestry

The Canada Land Inventory maps show general land capability for forestry. The following discussion presents more detailed interpretations of each soil association's potential for forestry. The interpetations themselves are given in Table 3 under headings of Physical limitations to forest management, Regeneration, and Species to regenerate. Some explanations of each interpretation follow.

Physical limitations to forest management (mainly logging). Six factors have been considered here: loss of organic matter, compaction, suitability of soil materials for road building, possible erosion or stream sedimentation, possible windthrow, and general environmental sensitivity.

Most forest soils have a thin organic surface of decaying leaves, needles, cones, roots, and so forth that should be preserved. Ground skidding can destroy this layer and cause erosion. Mention is made in Table 3 of soils that are particularly sensitive, but care will be required when harvesting any area.

Most soils are susceptible to compaction where heavy machinery is used repeatedly. Fine textured soils, or those with dense clayey subsoils (Luvisols), are most susceptible. Actual compaction depends on a number

Table 3. Forestry interpretations for each soil association

Soil association	Symbol	Physical limitations to forest management	Regeneration	Species to regenerate
Beehive	BH	Generally these soils are in environmentally sensitive (alpine) areas and trees have Krummholz forms.	N/A	N/A
Big Bar	BB	N/A - grassland.	Climatic limitation: aridity.	
Big Creek	BC	Good road building material where not subject to flooding. Some windthrow hazard where water tables are high and promote shallow rooting.	Brush species are common where water tables are high, but soils are arid where water tables are low (below rooting depth).	Lodgepole pine, spruce (wet sites)
Borin	BI	Fair road building material but may have steep slopes. Possible erosion and sedimentation from road construction.	Climatic limitation: short growing season.	Lodgepole pine, Engelmann spruce
Bowman	BW	Possible erosion and stream sedimentation from moderately steep slopes. Moderate windthrow hazard. Fair road building material.	Soil moisture deficiency and high calcium carbonate content of the A and B soil horizons. Thin litter layer - do not slash burn.	Lodgepole pine, Douglas fir
Cardiff	CD	Potential for soil compaction from skidding. Trafficability problems due to water retention. Possible erosion and stream sedimentation. Poor road building material.	Climatic limitation: aridity and short growing season, with some potential for frost heaving.	Lodgepole pine, Douglas fir

Table 3. Forestry interpretations for each soil association (continued)

Soil association	Symbol	Physical limitations to forest management	Regeneration	Species to regenerate
Cavanaugh	CG	Fair road building material but steep slopes. Potential erosion and stream sedimentation hazard if the surface is disturbed.	Soil moisture deficiency. Preserve the thin litter layer - no slash burning.	Lodgepole pine, Douglas fir, ponderosa pine
Chasm	CM	Some potential for soil compaction from skidding. Fair road building material but steep slopes. Possible erosion and sedimentation hazard if the surface is disturbed. Cut bank stability may be a problem.	Climatic limitation: aridity, especially on southern aspects. Shallow litter layer - no slash burning.	Lodgepole pine, Douglas fir
Chaunigan Lake	CL	Organic wetland.	High water table.	Sedge community
Chilcotin	CI	Grassland.	Climatic limitation: aridity.	Grasses
Chimney	CY	Grassland.	Climatic limitation: aridity.	Grasses
Churn Creek	CC	Grassland.	Climatic limitation: aridity.	Grasses
Cone Hill	CE	Trafficability problems and soil compaction potential due to high moisture content of soils. Road building problem due to high water table. Potential windthrow hazard.	Limitations due to high water table and potential brush competition. High water table would restrict site preparation.	White spruce, lodgepole pine
Courtney	CT	Grassland.	Climatic limitation: aridity.	Grasses
Desperation	DP	N/A - high elevation alpine soils.	N/A	N/A
Dil Dil	DD	Potential gravel source, very good road building materials. Loss of soil organic matter from skidding should be prevented.	Low available water storage capacity. Avoid slash burning - thin litter layer.	Lodgepole pine

Table 3. Forestry interpretations for each soil association (continued)

Soil association	Symbol	Physical limitations to forest management	Regeneration	Species to regenerate
Dog Creek	DC	Grassland.	Climatic limitation: aridity.	Grasses
Drummond	DX	Grassland.	Climatic limitation: aridity.	Grasses
Elliot	EL	Non-forested, high water table, poor trafficability. Poor road building area.	Periodic flooding and high carbonate content of soil.	Sedges
Fletcher Lake	FL	Surface has poor trafficability when moist. Subject to compaction when moist. Subsurface is good road building material.	Climatic limitation: aridity. Potential for frost heaving. Thin surface litter layer - no slash burning. Potential for aspen regeneration.	Lodgepole pine, Douglas fir
Gay Lake	GY	Subject to compaction. Poor road building material. May yield sediment following disturbance.	Frost heaving potential, potential for aspen regeneration.	Lodgepole pine, Douglas fir, white spruce
Granite Creek	GC	Moderate road building materials, sedimentation potential on steeper slopes.	Climatic limitation: growing season.	Lodgepole pine, Engelmann spruce
Hargreaves	HA	Fine sandy surface may have trafficability problems when moist or dry. Good road building materials at depth.	Climatic limitation: aridity due to soil moisture deficiency. Thin litter layer - no slash burning.	Below 750 m, Douglas fir. Above 750 m, Lodgepole pine
Hawks	HS	Very good road building material. Surface organic matter should not be disturbed too much.	Climatic limitation: aridity, low available water storage capacity. No slash burning - preserve litter layer.	Lodgepole pine, Douglas fir
Helena	HL	Potential compaction problems when the soil is moist. Fair road building material.	Climatic limitation: aridity, low available water storage capacity. No slash burning.	Lodgepole pine, Douglas fir

Table 3. Forestry interpretations for each soil association (continued)

Soil association	Symbol	Physical limitations to forest management	Regeneration	Species to regenerate
Kloakut	KL	Subject to compaction when moist. Fair road building material.	Climatic limitation: short growing season.	Lodgepole pine, Engelmann spruce
Konni Mountain	KM	Some windthrow potential on shallow soils. Rock at shallow depth. Moderate road building material.	Shallow soils may be droughty.	Lodgepole pine, Englemann spruce
Mount Vic	MV	Solifluction lobes, active colluviation. These soils are not forested.	N/A	N/A
New Meadow	NW	Sedge meadow, wetland.	N/A	N/A
Piltz	PZ	Trafficability and compaction problems when the soils are wet or moist.	Climatic limitation: short growing season.	Lodgepole pine, Engelmann spruce
Purjue	PU	Good road building material, gravel at depth. Some windthrow hazard where high water tables.	Climatic limitation: aridity, low available water storage capacity.	Lodgepole pine
Rail	RL	Organic wetland.	N/A	N/A
Redtop Mountain	RT	Generally these soils are in environmentally sensitive (alpine) areas, and trees have Krummholz forms.	N/A	N/A
Shemwell	SH	Minor trafficability and compaction problems may result when the soils are moist or wet. Moderate road building materials. May have inclusions of gravels in places.	Slight soil moisture deficiency, sandy soils. No slash burning.	Lodgepole pine
Taseko	TK	Grassland.	Climatic limitation: aridity.	Grasses
Tatlow	TL	Non-forested.	Active colluviation.	N/A
Tatton	TA	Potential loss of organic matter from skidding. Good road building material. Possible erosion hazard.	Climatic limitation: aridity, low available water storage capacity. No slash burning.	Lodgepole pine, Douglas fir

Table 3. Forestry interpretations for each soil association (continued)

Soil association	Symbol	Physical limitations to forest management	Regeneration	Species to regenerate
Tete Angela	TG	High water table, windthrow hazard. Poor road building material.	High water table, brush competition (including willow).	Spruce
Tete Hill	TT	Fair road building material.	Climatic limitation: short growing season, low available water storage capacity. No slash burning.	Lodgepole pine, Englemann spruce
Toosey	TS	Grassland.	Climatic limitation: aridity.	Grasses
Trurans	TR	Fair road building material. Good gravel source at depth. Disturbance of surface organic layer by skidding should be avoided.	Climatic limitation: aridity, low available water storage capacity. No slash burning.	Lodgepole pine, Douglas fir
Tubbs	TU	Fair to good road building material. Thin organic surface layer susceptible to disturbance from skidding.	Climatic limitation: aridity, low available water storage capacity. Thin litter layer.	Lodgepole pine, Douglas fir
Tyee	TE	Trafficability and compaction problems when moist or wet. Fair road building material.	Climatic limitation: aridity. Potential for frost heaving.	Lodgepole pine, Douglas fir
Vedan Meadow	VE	Moderate road building material. Gravel at depth. Some compaction and trafficability problems when moist or wet.	Climatic limitation: aridity, moderate available water storage capacity.	Lodgepole pine, Douglas fir
Whiskey Creek	WC	Good road building material. Gravels often at depth. Many areas with steep slopes subject to erosion.	Climatic limitation: aridity, heat, and dryness on south-facing slopes. Some very steep slopes.	Douglas fir
Willan Lake	WN	Shallow over bedrock, may require blasting for road building. Subject to compaction when moist. Possible windthrow hazard.	Climatic limitation: aridity, shallow soils with low available water storage capacity. No burning.	Lodgepole pine

Table 3. Forestry interpretations for each soil association (concluded)

Soil association	Symbol	Physical limitations to forest management	Regeneration	Species to regenerate
Williams Lake	WL	Subject to compaction when moist. Fair road building material.	Climatic limitation: aridity.	Douglas fir at lower elevation. Lodgepole pine at higher elevation.
Withrow	WT	Compaction and trafficability problems when moist. Poor road building material.	Climatic limitation: aridity, shallow calcium carbonate enriched horizon.	Lodgepole pine, Douglas fir
Yalakom	YA	Alpine tundra.	N/A	N/A
Yohetta	YT	Moderate road building material. Some sedimentation potential if the surface is disturbed. Some steep and very steep slopes.	South-facing slopes cause soil aridity. Thin litter layer - no slash burning.	Lodgepole pine, Douglas fir
Zenzako	ZO	Grassland.	Climatic limitation: aridity.	Grasses

of factors, including machine weight, number of passes, soil moisture content, and compressibility.

Suitability for road building covers two things: (1) the ease with which a logging road can be built across that soil, and (2) how suitable the soil material is for quarrying and use as road subgrade elsewhere. Comments about both are included in Table 3. Texture, drainage, and the likelihood of flooding govern soil performance as a roadbed in situ. General ratings have been devised as follows:

Texture	Drainage class	Rating
Coarse	Rapidly to well	Suitable
Medium	Well to moderately well	Moderately suitable
Fine	Imperfectly to very poorly	Poorly suited to unsuitable

Any steep land may erode after harvesting. Coarse textured soils with faster rates of infiltration are least susceptible. Greater problems may be encountered on some silty lacustrine soils in the Major River valleys. Many such soils show active slumps even now, and surface disturbance by logging could worsen the problem, in addition to adding fine sediments to fish streams.

There is potential for windthrow where soils are shallow, have water tables near the surface, or have any other subsoil characteristics that restrict the deep penetration of tree roots.

Regeneration. Any problems that may be encountered when trying to establish tree seedlings have been noted here. They may be climatic (moisture deficiency and short growing season), or inherent in the soil (alkalinity or excess soil water).

Species to regenerate. Suitable species to replant or reseed after harvesting are suggested according to biogeoclimatic zone and subzone, soil texture, and moisture regime. There is no attempt to project mill or market demand.

DERIVED AND INTERPRETIVE MAPS FROM THE CANSIS CARTOGRAPHIC FILE

The boundaries and symbols from all four soil maps from 92 O have been recorded in a computerized cartographic system---Canada Soil Information System (CanSIS). A complete map, parts of a map, selected information from a map, or modifications (for example, evaluations) of a map can be reproduced from such a record. The last two alternatives are the most useful. For example, selected information might be secondary maps showing those areas with organic or very gravelly soils. These are derived maps. They reprint information already embodied in the soil map. Modifications, or evaluations, might be maps showing those areas particularly suitable for grazing or recreational trail riding. These are interpretive maps. They require some manipulation or evaluation of the original soil information. They are similar to the Canada Land Inventory maps mentioned in the previous section.

The procedures for obtaining these maps are described in Section 4 of the Lac la Hache-Clinton Report (Valentine and Schori 1980). So far two derivative maps (gravel sources and moisture status) and two interpretive maps (suitability for spur and branch roads and suitability for grazing) have been created. They are reproduced on microfiche and included in the pocket attached to the inside back cover of that report.

If anyone needs other types of derivative or interpretive maps they should contact the senior author of this report at the following address:

Land Resource Research Centre
Research Branch
Agriculture Canada
Ottawa, Ont.
K1A 0C6
(613) 995-5011

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APPENDIX I. PLANT SPECIES MENTIONED IN THIS REPORT

TREES

Abies balsamea (L.) Mill.	balsam fir
A. lasiocarpa (Hook.) Nutt.	subalpine fir
Picea glauca (Moench) Voss	white spruce
P. glauca x	hydrid white spruce
P. engelmannii Parry ex Engelm.	Engelmann spruce
Pinus albicaulis Engelm.	whitebark pine
P. contorta var. latifolia Engelm. ex S.Wats.	lodgepole pine
P. ponderosa Dougl. ex P.Laws. & C.Laws	ponderosa pine
Populus balsamifera spp. trichocarpa Torr. & A.Gray	black cottonwood
P. tremuloides Michx.	trembling aspen
Pseudotsuga menziesii (Mirb.) Franco	Douglas fir

SHRUBS

Amelanchier alnifolia Nutt.	Saskatoon
Artemisia tridentata Nutt.	big sagebrush
Betula glandulosa Michx.	scrub birch
Chrysothamnus nauseosus (Pall.) Britt.	rabbit brush
Juniperus communis L.	common juniper
J. scopulorum Sarg.	Rocky Mountain juniper
Ledum glandulosum Nutt.	trappers tea
Rhododendron albiflorum Hook.	white rhodendron
Rosa acicularis Lindl.	prickly rose
Salix spp.	willow
Shepherdia canadensis (L.) Nutt.	soapberry
Spiraea betulifolia Pall.	birch-leaf spirea
Symphoricarpos albus (L.) S.F. Blake	snowberry
Vaccinium scoparium Leib.	grouseberry
Viburnum edule	highbush cranberry

HERBS

Achillea millefolium L.	yarrow
Agropyron sp.	wheatgrass
A. spicatum (Pursh) Scribn. & J.G. Sm.	bluebunch wheatgrass
Anemone occidentalis S. Wats.	mountain pasqueflower
Antennaria sp.	pussy-toes
Arctostaphylos uva-ursi (L.) K. Spreng.	kinnikinnick
Arnica cordifolia Hook.	heart-leaf arnica
Artemisia frigida Willd.	pasture wormwood
Aster ciliolatus Lindl.	Lindley aster
Bromus inermis Leyss.	smooth brome
Calamagrostis rubescens Buckl.	pinegrass
Calochortus macrocarpus Dougl.	sagebrush lily
C. rubescens Dougl.	sagebrush mariposa lily
Caltha leptosepala DC.	elkslip marsh marigold

Carduus sp.	thistle
Carex dispersina	slender sedge
Castilleja sp.	Indian paintbrush
Cicuta douglasii (D.C.) Coult. & Rose	water hemlock
Compositae sp.	composite
Dryas sp.	mountain avens
Empetrum nigrum L.	crowberry
Epilobium sp.	fireweed
Equisetuum sp.	horsetail
Festuca sp.	fescue
Fragaria virginiana Duchesne	blueleaf strawberry
Heracleum sp.	cow parsnip
Linnaea borealis L.	twinflower
Lonicera involucrata (Richardson) Banksblack	twinberry
Lupinus sp.	lupin
Opuntia fragilis (Nutt.) Haw.	prickly pear cactus
Parnassia fimbriata K. König.	fringed grass-of-Parnassus
Pedicularis sp.	elephant's head, or lousewort
Penstemon sp.	penstemon
Petasites palmatus	colt's-foot
Phlox diffusa Benth.	wild sweet William
Poa sp.	bluegrass
Potentilla sp.	cinquefoil
Ranunculus eschscholtzii Schlechtend.	subalpine buttercup
Ribes lacustre (Pers.) Poir.	swamp gooseberry
Saxifraga sp.	saxifrage
Silene acaulis (L.) Jacq.	moss campion
Smilacina stellata (L.) Desf.	starry false Solomon's seal
Solidago spathulata DC.	dune goldenrod
Stipa sp.	needlegrass
Triglochin sp.	arrow-grass
Valeriana sitchensis Bong.	Sitka valerian
Vicia sp.	vetch
Viola glabella Nutt.	stream violet

APPENDIX II. DESCRIPTIONS AND ANALYSES OF THE SOILS

This appendix lists, in alphabetical order, profile descriptions of all soils in the Taseko Lakes 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.

BEEHIVE SOIL

Location: 51°15'0"N, 123°25'0"W NTS: 920 Surveyor: KV Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Sombric Brunisol, lithic phase Landform and Parent Material: Colluvial, gravelly, veneer

Drainage: Rapidly drained, rapidly pervious, subhumid Slope and Aspect: 80%, SW Elevation: 2100 m Additional Notes: On upper slope of cirque basin 5 km east of Taseko Mt.

Vegetation: Juniperus communis, Arctostaphylos uva-ursi, Anemone species, Carex species Alpine tundra

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry(d) moist(m)	Texture	Structure	Consistence	Roots
LF						
Ah	0-12	very dark brown (7.5YR 2/2 m)	gravelly sandy loam	very weak, medium subangular blocky	loose, soft, nonplastic	abundant
Bm	12-30	strong brown (7.5YR 4/6 m)	gravelly sandy loam	very weak, medium subangular blocky	friable, loose, nonplastic	plentiful
BC	30-40	yellowish brown (10YR 5/6 m)	very gravelly sandy loam	moderate, medium, subangular blocky	firm,hard,slightly plastic	few
R	40+					

BIG BAR SOIL

Location: 51°17'29"N, 121°59'51"W NTS: 92O Surveyor: AS Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Dark Brown Landform and Parent Material: Eolian and morainal blanket

Drainage: Well drained, moderately pervious, semiarid Slope and Aspect: 18%, E Elevation: 1100 m Additional Notes: Some volcanic ash in A and B horizons. Grassland is overgrazed.

Vegetation: Grasses and forbs. Overgrazed, Sandberg Bluegrass, Wheatgrass, and Kentucky Bluegrass Interior Douglas fir, Douglas fir-pinegrass subzone and ponderosa pine-bunchgrass, plateau grassland subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
Ah1	0-4	very dark brown (10YR 2/2 m) dark grayish brown (10YR 4/2 d)	loam	weak, medium, platy	very friable	plentiful
Ah2	4-15	very dark brown (10YR 2/2 m) dark grayish brown (10YR 4/2 d)	sandy loam	weak, medium, subangular blocky	very friable	plentiful
IIBm	15-33	brown (10YR 4/3 d)	gravelly loam	moderate, medium, subangular blocky	slightly hard	plentiful
IICca	33-53	light brownish gray (10YR 6/2 d)	gravelly loam	weak, medium, platy	soft	few
IICk	53-110	grayish brown (10YR 5/2 d)	gravelly sandy loam	few, fine, distinct	firm	

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay	Ca Carb. Equiv %
Ah1	5.8	2.08	0.24	8.67					19.7	10.7	4.8	1.4	0.6	50	42	8	1	
Ah2	6.4	2.01	0.23	8.74					20.6	11.9	5.1	1.0	1.0	52	41	7	1	
IIBm	7.0	1.08	0.15	7.20					22.9	12.6	8.2	1.1	0.4	47	44	9	1	
IICca	8.6	0.89												41	45	14	1	
IICk	8.4	0.36												55	40	5		

BIG CREEK SOIL

Location: 51°43'30"N, 122°57'30"W NTS: 92O Surveyor: AB Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Eutric Brunisol Landform and Parent Material: Inactive, fluvial, gravelly, terraced

Drainage: Well drained, rapidly pervious, semiarid Slope and Aspect: Gently sloping Elevation: 1200 m Additional Notes: Variable soils developed on the alluvium of Big Creek.

Vegetation: Lodgepole pine, trembling aspen, rose, pinegrass Interior Douglas fir, Douglas fir-pinegrass subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
LFH	3-0			very weak, fine to medium, subangular blocky		
Bm1	0-10	very dark grayish brown (10YR 3/2 m)	sand	single grain	very friable	abundant
Bm2	10-30	brown (10YR 4/3 m)	sand	single grain	loose	abundant
IIC1	30-40	dark grayish brown (10YR 4/2 m)	gravelly sand	single grain	loose	plentiful
IIC2	40+	dark grayish brown (10YR 4/2 m)	gravelly sand		loose	few

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay	Ca Carb. Equiv %
LFH																		
Bm1	5.9		0.93	0.8	0.2													
Bm2	6.0			0.9	1.1													
IIC1	6.2			1.1	1.1													
IIC2																		

BORIN SOIL

Location: 51°16'0"N, 122°59'0"W NTS: 920 Surveyor: KV Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Dystric Brunisol Landform and Parent Material: Morainal, gravelly, blanket

Dainage: well drained, rapidly pervious, subhumid Slope and Aspect: 7%, NW,variable Elevation: 1800 m Additional Notes: Upper 10 cm of mineral soil low bulk density. Probably contain volcanic ash.

Vegetation: Pinus contorta, Picea engelmannii, Lupinus species, Arctostaphylos uva-ursi, Aster species Engelmann spruce-subalpine fir, dry subzone and subboreal spruce, Chilcotin subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry(d) moist(m)	Texture	Structure	Consistence	Roots
LF	3-0					
Ah	0-5	dark brown (10YR 3/3 m)	gravelly sandy loam	very weak, fine to medium	loose, loose	abundant
Bm	5-17	yellowish brown (10YR 5/6 m)	gravelly sandy loam	weak, coarse, subangular blocky	friable, loose	plentiful
BC	17-40	light olive brown (2.5Y 5/6 m)	gravelly sandy loam	moderate, medium, subangular blocky	friable, soft	few
C	40+	light olive brown (2.5Y 5/4 m)	gravelly sandy loam		firm, soft	few

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay
LF																	
Ah																	
Bm	4.7	1.41	0.08	17.63	0.2	0.2			16.6	2.5	0.1	0.1	0.1				
BC																	
C	4.8								17.2	10.9	1.8	0.1	0.2				

BOWMAN SOIL

Location: 51°19'39"N, 121°55'48"W NTS: 92P Surveyor: A.S. Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 25 Classification: Orthic Gray Luvisol Landform and Parent Material: Morainal, blanket

Drainage: Well drained, rapidly pervious, subhumid Slope and Aspect: 20%, SW Elevation: 1200 m Additional Notes: Highly calcareous soils derived from limestone.

Vegetation: Mature Douglas fir - pinegrass - kinnikinnick community. Interior Douglas fir zone, Douglas fir-pinegrass subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
LFH	3-0					
Ae	0-13	light brownish gray (10YR 6/2 d)	gravelly sandy loam	weak, medium, platy	soft	plentiful,fine
Bt	13-30	dark brown (10YR 4/3 d)	very gravelly loam		friable	plentiful,fine
BC	30-46	brown (10YR 5/3 d)	very gravelly sandy loam	weak, fine, subangular blocky	very friable	few, fine
Ck1	46-64	brown (10YR 4.5/3 d)	very gravelly sandy loam	weak, fine, subangular blocky	very friable	very few, fine
Ck2	64-115	grayish brown (10YR 5.5/2 d)	gravelly sandy loam	weak, fine, subangular blocky	friable	very few, fine

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate %		Pyrophos. %		Cation exchange meq/100g					Particle Size Distribution %				Ca. Carb. Equiv., %
					Fe	Al	Fe	Al	CEC	Ca	Mg	K	Na	Sand	Silt	Total Clay	Fine Clay	
Ae	6.5	0.98	0.04	22.5					8.9	4.7	1.2	1.9	0.1	63	33	4	-	
Bt	7.2	2.3	0.12	19.2					32.6	30.0	3.2	1.1	0.1	34	40	26	15	
BC	7.5	1.0												53	32	15	6	
Ck1	7.8	1.0												71	22	7	1	42.5
Ck2	8.0	0.3												62	30	8	-	

CARDIFF SOIL

Location: 51°31'0"N, 123°47'0"W NTS: 920 Surveyor: TL Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Gray Luvisol Landform and Parent Material: Morainal, blanket

Drainage: Well drained, moderately pervious, subhumid Slope and Aspect: 15%, SW Elevation: 1400 m Additional Notes:

Vegetation: Forest, softwood, Populus tremuloides, Pinus contorta, Salix species, Shepherdia canadensis, grasses Subboreal spruce, Chilcotin pine subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
H						
Ae	0-13	dark grayish brown (10YR 4/2 m) light brownish gray (10YR 6/2 d)	loam	weak, medium, platy	sticky, friable, slightly hard, plastic	plentiful
BA	13-28	dark grayish brown (10YR 4/2 m)	loam	moderate, medium subangular blocky	sticky, firm, plastic	few
Bt	28-40	dark brown (10YR 3/3 m)	clay loam	moderate, medium, angular blocky	very sticky, very firm, very plastic	few
BC	40-68	dark grayish brown (10YR 4/2 m)	loam	moderate, medium, angular blocky	sticky, firm, plastic	few
Cca	68-75	dark grayish brown (10YR 4/2 m)	loam	moderate, medium, angular blocky	sticky, firm, plastic	very few

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay	Ca Carb. Equiv %
H																		
Ae	6.3	1.16	0.07	16.57					16.6	9.1	4.6	0.7	0.2	47	44	9	4	
BA	6.2	0.60	0.07	8.57					23.0	11.4	7.5	0.8	0.4	38	40	22	10	
Bt	6.2								31.1	14.7	10.4	0.9	0.5	37	35	28	15	
BC																		
Cca	7.4								26.5	19.0	8.4	0.7	0.5	38	41	21	5	

CAVANAUGH SOIL

Location: 50°13'N, 121°05'W NTS: 92I Surveyor: GY Agency: BCME, Kelowna

Identification: B.C. Soil Survey Report 26 Classification: Eluviated Eutric Brunisol Landform and Parent Material: Gravelly, colluvial, fan

Drainage: Rapidly drained, rapidly pervious, subhumid Slope and Aspect: 15%, SW Elevation: 540 m Additional Notes: Moderate effervescence in Ck horizons.

Vegetation: Interior Douglas fir zone, Douglas fir-pinegrass subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
LF	2-0					
Ae	0-17	dark grayish brown (10YR 4/2 d)	loamy sand	structureless	loose	abundant fine
Bm	17-42	brown (10YR 5/3 d)	gravelly loamy sand	structureless	slightly hard	abundant fine
BCk	42-62	light brownish gray (2.5Y 6/2 d)	gravelly sand	structureless	loose	abundant fine
Ck1	62-80	light brownish gray (2.5Y 6/2 d)	gravelly sand	structureless	loose	abundant fine
Ck2	80-	light brownish gray (2.5Y 6/2 d)	gravelly sand	structureless	loose	

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay
LF	6.1	22.9	0.35	64													
Ae	6.5	1.5	0.06	25					19.0	14.4	4.6	0.7	0.1				
Bm	6.6	0.5	0.02	25					21.7	18.4	6.8	0.2	0.2				
BCk	7.1	0.3	0.04	7.5					13.5	10.4	2.3	0.2	0.3				
Ck1	7.8																
Ck2	7.9																

CHASM SOIL

Location: 51°04'21"N, 121°23'57"W NTS: 92P Surveyor: AS Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 25 Classification: Eluviated Eutric Brunisol Landform and Parent Material: Colluvial, veneer

Drainage: Moderately well drained, moderately pervious, semiarid Slope and Aspect: 35%, SE Elevation: 1050 m Additional Notes: Some volcanic ash in upper horizons. Moderate effervescence in IICk horizons.

Vegetation: Douglas fir-ponderosa pine-bluebunch wheatgrass regenerating seral community. Interior Douglas fir zone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
LFH	2-0					
Ae	0-5	grayish brown (10YR 5.5/2 d)	loam	weak, fine, platy	soft	plentiful fine
Btj	5-30	brown (10YR 4.5/3 d)	loam	moderate, medium, subangular blocky	slightly hard	plentiful fine
Bm	30-43	grayish brown (10YR 5/2.5 d)	loam	weak, fine, subangular blocky	slightly hard	plentiful fine
IICk	43-114	pale brown (10YR 6/2.5 d)	gravelly loam	weak, fine, subangular blocky	friable	very few fine

CHAUNIGAN LAKE SOIL

Location: 51°38'0"123°29'0"W NTS: 920 Surveyor: KV Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Terric Mesisol Landform and Parent Material: Organic, veneer

Drainage: Very poorly drained, moderately pervious peraquic Slope and Aspect: Level Elevation: 1470 m Additional Notes:

Vegetation: Grasses and forbs, sedge species, grasses provide 85% cover Engelmann spruce - subalpine Fir, dry subzone and Subboreal spruce, Chilcotin pine subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
Om1	0-15	natural wet/oxidized very dark grayish brown (10YR 3/2) rubbed wet/oxidized dark yellowish brown (10YR 4/4)	moderately decomposed organic material			
Om2	15-40	natural wet/oxidized very dark grayish brown (10YR 3/2) rubbed wet/oxidized dark yellowish brown (10YR 3/4)	moderately decomposed organic material			
Om3	40-68	natural wet/oxidized very dark grayish brown (10YR 3/2) rubbed wet/oxidized very dark brown (10YR 2/2)	moderately decomposed organic material			
Volcanic Ash	68-70	brown (10YR 5/3 m)	loamy sand	structureless single grain	nonsticky, nonplastic	
Oh	70-85	natural wet/oxidized very dark brown (10YR 2/2) rubbed wet/oxidized very dark brown (10YR 2/2)	well decomposed organic material			
Cg	85-120	natural wet/reduced olive (5Y 5/3)	loam	structureless	slightly sticky, plastic	

CHILCOTIN SOIL

Location: 51°49'30"N,122°33'30"W NTS: 92O Surveyor: AC, Vancouver Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Dark Brown Landform and Parent Material: Loamy eolian over sandy glaciofluvial blanket, gullied and terraced

Drainage: Well drained, moderately pervious, subarid Slope and Aspect: Gently sloping, NE Elevation: 820 m Additional Notes: On terraces above Fraser River near Gang Ranch. Subject to slumping and gullying.

Vegetation: Sagebrush, bluebunch, wheatgrass Ponderosa pine-bunchgrass, sagebrush subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
Ah	0-12	very dark grayish brown (10YR 3.0/2 m) grayish brown (10YR 4.5/2 d)	weak, coarse, angular blocky			plentiful
Bm	12-45	grayish brown (10YR 4.5/2 m) brown (10YR 4/2.5 d)	sandy loam	weak, coarse, angular blocky		few
Ck	45-112	brown (10YR 5/2.5 m) brown (10YR 5/2.5 d)	sandy loam	weak, medium, subangular blocky		few
IICk	112-150	brown (10YR 5/2.5 m) light brownish gray (10YR 6/2 d)	very gravelly sand	structureless, single grain		very few

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay
Ah	7.1	1.09	0.11	9.91										53	42	5	
Bm	5.8													55	42	3	
Ck	5.9													62	36	2	
IICk	5.7																

CHIMNEY SOIL

Location: 51°52'35"N, 123°02'45"W NTS: 920 Surveyor: WW Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Dark Brown Landform and Parent Material: Morainal, loamy skeletal, blanket

Drainage: Well drained, moderately pervious, subhumid Slope and Aspect: 5%, NE Elevation: 990 m Additional Notes: On range of Chilko Lake Ranch.

Vegetation: Grasses and forbs, grazed Interior Douglas fir zone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry(d) moist(m)	Texture	Structure	Consistence	Roots
Ah	0-13	very dark grayish brown (10 YR 2.5/2 m) dark grayish brown (10YR 4/2 d)	clay loam	weak, coarse, prismatic	friable	abundant
Bm	13-25	brown (10YR 4/3 d)	gravelly clay	weak, medium, prismatic	friable	plentiful
BC	25-35	grayish brown (10YR 5/2 d)	gravelly loam	moderate to strong, fine, angular blocky	firm	few
Ck	35+	light brownish gray (10YR 6/2) d)	gravelly loam	moderate to strong, fine to medium angular blocky	firm	

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay
Ah	6.2	2.70	0.24	11.25					26.2	13.1	12.4	2.3	0.1	31	41	28	10
Bm	6.6	1.30	0.11	11.82					30.0	13.6	18.0	0.9	0.3	24	35	41	13
Ck	7.8	1.00							19.4	23.8	16.5	0.4	0.1	30	44	26	4

CHURN CREEK SOIL

Location: 51°33'0"N, 122°19'0"W | NTS: 920 | Surveyor: AB | Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 | Classification: Orthic Dark Brown | Landform and Parent Material: Lacustrine, loamy, blanket, and terraced

Drainage: Well drained, moderately pervious, subarid | Slope and Aspect: 2%, W | Elevation: 650 m | Additional Notes: Site between Gang Ranch and Suspension Bridge. Lacustrine silts over 3 m thick.

Vegetation: Artemisia frigida, Stipa sp. | Ponderosa pine-brunchgrass zone, sagebrush subzones

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry(d) moist(m)	Texture	Structure	Consistence	Roots
Ah	0-13	very dark grayish brown (10 YR 3/2 m) dark grayish brown (10YR 4/2 d)	silt loam	weak, coarse, prismatic	nonsticky, very friable, soft	plentiful
Bm	13-45	brown (10YR 4/2.5 m) yellowish brown (10YR 4.5/3.5 d)	silt loam	weak, coarse, prismatic	nonsticky, very friable, soft	plentiful
Ck1	45-80	brown (10YR 5/2.5 m) pale brown (10YR 5.5/3 d)	silt loam	massive	nonsticky, friable soft	few
Ck2	80+		silt			

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay
Ah	7.8	1.38	0.15	9.20						20.8	4.7	1.0	0.2	39	53	8	
Bm	7.9									28.7	9.4	0.5	0.4	36	52	12	
Ck1	8.3									25.0	12.6	0.7	3.6	34	50	16	
Ck2	8.2									30.0	14.5	1.0	7.9	5	85	10	

CONE HILL SOIL

Location: 51°37'0"N, 123°26'30"W NTS: 920 Surveyor: TL Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Gleyed Gray Luvisol Landform and Parent Material: Morainal, blanket

Drainage: Imperfectly drained, moderately pervious, humid Slope and Aspect: 4%, SW Elevation: 1490 m Additional Notes: Few, fine distinct mottles in IIBCg, common, coarse, distinct mottles in IICg.

Vegetation: Lodgepole pine, black spruce, equisetum site Subboreal, Chilcoltine pine subzone, and Engelmann spruce - subalpine firm, dry subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
LFH	3-0					abundant
Ae	0-11	brown (7.5YR 4.5/2 m)	silt loam	moderate, coarse, subangular blocky	firm, slightly plastic	abundant
Btgj	11-34	grayish brown (10YR 5/2 m)	gravelly silty clay loam	moderate, coarse, subangular blocky	firm, plastic	few
IIBCg	34-58	reddish brown (2.5Y 5/3 m)	gravelly loamy sand	structureless	loose	few
IICg	58+	weak red (2.5Y 4.5/2 m)	gravelly sandy loam	structureless	loose	

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay	Ca Carb. Equiv %
LFH									28.9									
Ae	5.8	2.03	0.11	18.45					20.7	16.2	8.6	0.2	0.2	24	54	22	12	
Btgj	6.3								5.5	12.1	7.7	0.2	0.2					
IIBcg	6.5								6.7	3.7	1.6	0.1	0.1	75	23	2	0	
IICg	6.5									4.5	1.9	0.1	0.1					

COURTNEY SOIL

Location: 50°47'N, 121°05'W NTS: 92P Surveyor: GY Agency: BCME, Kelowna

Identification: B.C. Soil Survey Report 25 Classification: Orthic Brown Landform and Parent Material: Gravelly, colluvial, fan

Drainage: Well drained, rapidly pervious, subarid Slope and Aspect: 5%, S Elevation: 365 m Additional Notes:

Vegetation: Ponderosa pine-bunchgrass zone, sagebrush subzones Alpine tundra

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
Ah	0-10	grayish brown (10YR 5/2 d)	gravelly sandy loam	coarse platy	soft	abundant
Bm	10-30	dark brown (7.5YR 4/2 d)	gravelly sandy loam	weak, medium, subangular blocky	soft	plentiful
Cca	30-66	yellowish brown (10YR 5/5 d)	gravelly loamy sand	granular	loose	few
Ck	66+	yellowish brown (10YR 5/4 d)	gravelly loamy sand	granular	loose	few

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay
Ah	7.3	1.17	0.11	11					15.4	11.5	6.7	1.3	0.1				
Bm	7.3	0.94	0.17	6					17.6	13.6	6.5	1.2	0.1				
Cca	8.1	0.71	0.08	9					15.1	18.6	8.4	1.3	0.2				
Ck	8.4																

DESPERATION SOIL

Location: 51°15'0"N, 123°25'0"W NTS: 920 Surveyor: KV Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Regosol, lithic phase Landform and Parent Material: Morainal, fragmental

Drainage: Rapidly drained, rapidly pervious, subhumid Slope and Aspect: 58%, SE Elevation: 2036 m Additional Notes: In Cirque basin 5 km east of Taseko Mt. Generalized description from surface of alpine moraine. Rock types, felsite, diorite, and granite.

Vegetation: Grasses, forbs, and shrubs, undisturbed, dock, Carex species, Festuca species, Phlox diffusa, Salix species, Dryas species Alpine tundra zone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry(d) moist(m)	Texture	Structure	Consistence	Roots
C	0-10 (sand in rock rubble)		very gravelly sand	loose		

DIL DIL SOIL

Location: 51°16'0"N, 123°17'30"W NTS: 920 Surveyor: KV Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Dystric Brunisol Landform and Parent Material: Glaciofluvial, sandy skeletal, terraced

Drainage: Rapidly drained, rapidly pervious, subhumid Slope and Aspect: 14%, E Elevation: 1800 m Additional Notes: Site on eroded terraces of glaciofluvial grounds.

Vegetation: Pinus contorta, Arctostaphylus uva-ursi, Epilobium species Antennaria species, Achillea, Calamagrostis rubescens Engelmann spruce-subalpine fir, dry subzone and Subboreal spruce, Chilcotin pine subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry(d) moist(m)	Texture	Structure	Consistence	Roots
LF	1-0					abundant
Ah	0-6	dark brown (10YR 3/3 m)	very gravelly sandy loam	weak, granular	very friable, soft, nonplastic	abundant
Bm	6-20	yellowish brown (10YR 5/6 m)	very gravelly loamy sand	very weak, granular	very friable, loose, nonplastic	abundant
C	20-50	olive (5Y 5/4 m)	very gravelly sand	structureless	loose, loose, nonplastic	plentiful

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate %		Pyrophos. %		Cation exchange meq/100g					Particle Size Distribution %			
					Fe	Al	Fe	Al	CEC	Ca	Mg	K	Na	Sand	Silt	Total Clay	Fine Clay
LF																	
Ah	4.1	2.59	0.13	19.92					13.3	3.2	0.4	0.2	0.0				
Bm	4.1				0.1	0.3			9.4	1.6	0.2	0.1	0.1				
C	4.8								3.7	1.0	0.1	0.1	0.0				

DOG CREEK SOIL

Location: 51°33'0"N, 122°14'0"W NTS: 920 Surveyor: AB Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Dark Brown Landform and Parent Material: Sandy skeletal, mixed fluvial, glaciofluvial, morainal

Drainage: Rapidly drained, rapidly pervious, subarid Slope and Aspect: 28%, complex S Elevation: 800 m Additional Notes: Frequently gullied.

Vegetation: Agropyron spicatum, Artemisia frigida. Ponderosa pine - bunchgrass, sagebrush subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry(d) moist(m)	Texture	Structure	Consistence	Roots
Ah	0-13	dark grayish brown (10YR 4/2 d)	loamy sand	weak, fine to medium, subangular blocky	soft	plentiful
Bm	13-30	brown (10YR 5/2.5 d)	loamy sand	weak to moderate, medium, subangular blocky	slightly hard	plentiful
IICk	30+		very gravelly sand	weak, stratified	loose	few

DRUMMOND SOIL

Location: 51°57'30"N, 122°23'0"W NTS: 920 Surveyor: TL Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Eluviated Dark Brown Landform and Parent Material: Morainal, loamy skeletal, blanket

Drainage: Well drained, rapidly pervious, semiarid Slope and Aspect: 7%, SE Elevation: 1000 m Additional Notes:

Vegetation: Grasses and forbs, grassland herbs, and grasses with scattered invading conifers Interior Douglas fir zone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry(d) moist(m) (crushed)	Texture	Structure	Consistence	Roots
Ahe	0-13	very dark brown (10YR 2/2 m) dark grayish brown (10YR 4/2 d)	loam	moderate, medium, subangular blocky	slightly sticky, friable slightly hard, slightly plastic	abundant
Btj	13-25	very dark grayish brown (10 YR 3/2 m) grayish brown (10YR 5/2 d)	loam	weak, medium, prismatic	sticky, firm, hard, plastic	plentiful
Cca	25-38	dark grayish brown (2.5Y 3.5/2 m) dark grayish brown (2.5Y 3.5/2 d)	gravelly sandy loam	strong, fine, angular, blocky	slightly sticky, friable, slightly hard, slightly plastic	very few
IICk1	38-57	dark grayish brown (2.5Y 4/2 m) very dark grayish brown (2.5Y 3/2 d)	gravelly loamy sand	weak, fine, subangular blocky	nonsticky, loose, nonplastic	
IICk2	57+	very dark grayish brown (2.5Y 3/2 m) dark grayish brown (2.5Y 4/2 m)	gravelly loamy sand	single grain	nonsticky, loose, nonplastic	

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate %		Pyrophos. %		Cation exchange meq/100g					Particle Size Distribution %			
					Fe	Al	Fe	Al	CEC	Ca	Mg	K	Na	Sand	Silt	Total Clay	Fine Clay
Ahe	7.2	1.42	0.18	7.89					20.7	11.3	8.1	0.9	0.0				
Btj	7.5																
Cca	7.8																
IICk1																	
IICk2																	

ELLIOT SOIL

Location: 51°57'39"N, 121°47'53"W NTS: 92P Surveyor: KV Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 25 Classification: Carbonated Rego Humic Gleysol Landform and Parent Material: Fluvial, fine, loamy

Drainage: Imperfectly drained, moderately pervious, perhumid Slope and Aspect: Level Elevation: 850 m Additional Notes: Small amounts of marl in H horizon.

Vegetation: *Sedges, arrow grass, smooth brome, water hemlock* Interior Douglas fir, Douglas fir pinegrass subzone and Subboreal spruce, Chilcotin pine subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry(d) moist(m)	Texture	Structure	Consistence	Roots
LFH	5-0	black (2.5Y 2/0 m)		structureless		
Ahk1	0-8	black (2.5Y 2/0.5 m)	silt loam	structureless	slightly sticky, slightly plastic	abundant
H	8-13	black (2.5Y 2/0 m)		structureless	very sticky, plastic	abundant
Ahk2	13-33	very dark gray (2.5Y 3/0 m)	silty clay loam	structureless	very sticky, plastic	few
Ckg	33-75	dark gray (5Y 4/1 m)	silty clay loam	structureless	very sticky, plastic	few

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay	Ca Carb. Equiv %
LFH	6.9	35.6	2.92	12.19					118.1	119.15	50.92	1.98	4.68					
Ahk1	7.2	8.90	0.53	14.90					34.3	150.34	32.51	1.30	3.88					
H	7.0	26.9	2.10	12.80					117.8	208.26	47.88	1.38	5.17					
Ahk2	7.6	4.6	0.33	13.93					31.4	157.93	23.95	1.30	3.89					
Ckg	7.5	1.50	0.12	12.5					30.1	33.51	16.87	1.31	2.61					

FLETCHER LAKE SOIL

Location: 51°44'30"N, 123°03'0"W NTS: 92O Surveyor: KV Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Gray Luvisol Landform and Parent Material: Glaciofluvial, loamy skeletal, blanket

Drainage: Well drained, moderately pervious, subhumid Slope and Aspect: 9%, S Elevation: 1100 m Additional Notes:

Vegetation: Forest, softwood, Pinus contorta, Carex species, Calamagrostis rubescens, Linnaea borealis, vetch, lodgepole pine, pinegrass astragalus site Interior Douglas fir, Douglas fir-pinegrass subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
LF	2-0					
Ae	0-12	dark grayish brown (10YR 4/2 m) pale brown (10YR 6/3 d)	silt loam	very weak, coarse, platy	friable, soft	plentiful
Bt	12-20	dark yellowish brown (10YR 4/4 m) brown (10YR 4/3 d)	loam	strong, coarse, subangular blocky	sticky, firm plastic	abundant
IIBt1	20-35	dark yellowish brown (10YR 4/4 m) brown (10YR 5/3 d)	gravelly loam	moderate, medium, subangular blocky	sticky, firm, plastic	few
IIBt2	35-60	brown (10YR 4/3 m) dark grayish brown (10YR 4/2 d)	very gravelly sandy clay loam	moderate, fine, subangular blocky	sticky, friable, slightly plastic	few
IIC	60-90	light olive brown (2.5Y 5/4 m)	very gravelly loamy sand	structureless, single grain		

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay	Ca Carb. Equiv %
LF																		
Ae	5.7	0.65	0.04	16.25					11.0	6.1	2.1	0.4	0.1	42	54	4	0	
Bt	5.7	0.57	0.03	19.00					22.1	11.2	7.0	0.5	0.1	35	47	19	11	
IIBt1	5.9	0.54	0.03	18.00					19.7	10.2	5.9	0.0	0.1	50	36	15	9	
IIBt2	6.0																	
IIC	6.3																	

GAY LAKE SOIL

Location: 52°02'0"N, 123°14'30"W NTS: 920 Surveyor: TL Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Eutric Brunisol Landform and Parent Material: Lacustrine, fine, silty, terraced

Drainage: Moderately well drained, moderately pervious, subhumid Slope and Aspect: 3%, NE Elevation: 750 m Additional Notes:

Vegetation: Pseudotsuga menziesii, Rosa species, Arctostaphylos uva-ursi, Pinus contorta Interior Douglas fir, Douglas fir-pinegrass subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry(d) moist(m)	Texture	Structure	Consistence	Roots
LF	1-0					
Ahe	0-5	dark grayish brown (10YR 4/2 m) light brownish gray (10YR 5.5/2 d)	silty loam	weak, medium, subangular blocky	sticky, friable, slightly hard	abundant
Ae	5-10	grayish brown (10YR 5/2 m) light gray (10YR 6.5/2 d)	silty loam	strong, very coarse, subangular blocky	sticky, firm, hard, plastic	few
Bm	10-26	brown (10YR 4/3 m) crushed pale brown (10YR 5.5/3 d)	silty clay loam	weak, medium, columnar	sticky, firm, hard, plastic	few
BC	26-38	pale brown (10YR 5.5/3 m) very pale brown (10YR 6.5/3 d)	silty clay loam	moderate to strong, fine, angular blocky	very sticky, firm, hard, plastic	very few
Cca	38-61	pale brown (10YR 6/3 m) very pale brown (10YR 7/3 m)	silt	weak, medium, platy	sticky, firm, hard, plastic	-
Ck	61-80	pale brown (10YR 6/3 m) (10YR 7/2.5 d)	silt	weak, medium, platy	sticky, firm, hard, plastic	-

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay
LF																	
Ahe	6.3	2.06	0.17	12.12					26.3	13.2	7.1	0.8	0.1				
Ae	5.9	1.48	0.11	13.45					28.5	12.8	8.9	0.8	0.1	12	51	36	15
Bm	5.9	1.02							28.8	13.1	10.3	0.6	0.2	7	53	40	14
BC	6.5	0.72							22.4	11.5	7.7	0.3	0.2	2	61	36	8
Cca	7.5								15.3	28.5	6.8	0.2	0.3				
Ck																	

GRANITE CREEK SOIL

Location: 51°08'0"N, 123°36'0"W NTS: 920 Surveyor: TL Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Dystric Brunisol Landform and Parent Material: Morinal, sandy skeletal, blanket

Drainage: Rapidly drained, rapidly pervious, subhumid Slope and Aspect: 21%, S Elevation: 1600 m Additional Notes:

Vegetation: Forest, softwood, Pinus contorta, Pinus albicaulis, Juniperis communis, Shepherdia canadensis, lichen Engelmann spruce - subalpine firm, dry subzone and Subboreal spruce, Chilcotin pine subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
F	1-0					
Ahej	0-2	dark grayish brown (10YR 4/2 m)	gravelly loamy sand	very weak, medium, angular blocky		very few
Bm	2-14	dark yellowish brown (10YR 4/4 m)	gravelly loamy sand	very weak, medium, subangular blocky		abundant
BC	14-26	dark grayish brown (2.5Y 4/2 m)	gravelly sand	single grain		few
C	26+	grayish brown (2.5Y 5/2 m)	gravelly sand	single grain		few

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay	Ca Carb. Equiv %
F																		
Ahej	5.0																	
Bm	4.9		0.05		0.1	0.2												
BC	5.4																	
C	5.4																	

HARGREAVES SOIL

Location: 51°59'50"N, 122°16'30"W NTS: 920 Surveyor: AB Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Eutric Brunsiol Landform and Parent Material: Glaciofluvial, coarse, loamy, terraced

Drainage: Well drained, rapidly pervious, semiarid Slope and Aspect: Gently sloping, NE Elevation: 670 m Additional Notes: On Fraser river terraces.

Vegetation: Douglas fir, pinegrass, bunchgrass Ponderosa pine-brunchgrass, plateau subzone and Interior Douglas fir, Douglas fir-pinegrass subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
LFH	2-0					
Ahej	0-6	brown (10YR 4.5/3 d)	sandy loam	weak, fine to medium, subangular blocky	friable	abundant
Bm	6-41	yellowish brown (10YR 5/4 d)	sandy loam	weak, medium, subangular blocky	friable	plentiful
Cca	41-53	light gray (10YR 6.5/2 d)	loamy sand	weak, medium, subangular blocky		few
Ck	53+	light gray (10YR 6.5/2 d)	loamy sand	weak, medium, subangular blocky		very few

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay	Ca Carb. Equiv %
LFH																		
Ahej	6.7	1.07	0.09	11.89										65	28	7		
Bm	6.9	0.33												72	21	7		
Cca	7.9	0.08												80	17	3		
Ck	8.0	0.38												77	19	4		

HAWKS SOIL

Location: 51°57'0"N, 122°46'0"W NTS: 92O Surveyor: AB Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Eluviated Eutric Brunisol Landform and Parent Material: Glaciofluvial, sandy, skeletal

Drainage: Rapidly drained, rapidly pervious, humid to subhumid Slope and Aspect: Gently sloping Elevation: 1220 m Additional Notes:

Vegetation: Interior Douglas fir, Douglas fir-pinegrass subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
LH	5-0					
Aej	0-12	dark grayish brown (10YR 4/2 m) pale brown (10YR 5.5/2 d)	gravelly very fine sandy loam	subangular blocky	nonsticky, friable, soft	abundant
Bm	12-37	yellowish brown (10YR 5/4 m) light yellowish brown (10YR 5.5/4 d)	gravelly loamy sand	weak, subangular blocky	nonsticky, friable, soft	plentiful
Ck	37+	yellowish brown (10YR 5/4 m) dark gray (10YR 4/1 d)	gravelly sand	single grain	loose	few

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay	Ca Carb. Equiv %
LH																		
Aej	5.8				0.5	0.1												
Bm	6.6				0.5	0.1												
Ck	6.9				0.9	0.1												

HELENA SOIL

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

Identification: B.C. Soil Survey Report 25 Classification: Orthic Gray Luvisol Landform and Parent Material: Morainal, blanket, coarse, loamy

Drainage: Well drained, moderately pervious, subhumid Slope and Aspect: 5%, E Elevation: 1050 m Additional Notes:

Vegetation: Mature Douglas fir-pinegrass community with lodgepole pine. Interior Douglas fir zone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
L	5-0					
Ae1	0-5	light brownish gray (10YR 6/2 d)	silt loam	weak, very fine, platy	loose	plentiful fine
Ae2	5-18	grayish brown (10YR 5/2.5 d)	silt loam	weak, very fine, blocky	slightly hard	plentiful fine
IIBt	18-36	dark brown (10YR 3/4 d)	gravelly clay loam		very firm	few, fine
IIBC	36-76	dark brown (10YR 4/3 d)	gravelly loam	moderate, fine, blocky	very firm	few, fine
IIC	76-100	dark brown (10YR 4/2.5 d)	gravelly sandy loam	weak, very fine, blocky	firm	very few,fine

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate %		Pyrophos. %		Cation exchange meq/100g					Particle Size Distribution %			
					Fe	Al	Fe	Al	CEC	Ca	Mg	K	Na	Sand	Silt	Total Clay	Fine Clay
Ae1	5.4	1.2	0.7	17.1					16.0	6.6	2.8	0.5	0.1	38	54	8	2
Ae2	5.1	0.8	0.05	16.0					18.9	8.3	4.8	0.4	0.1	37	52	11	2
IIBt	5.5	0.8	0.6	13.3					37.5	17.2	11.8	1.0	0.1	33	38	29	12
IIBC	6.5	0.1							25.7	13.8	8.5	0.9	0.1	44	47	9	1
IIC	7.4								16.1	10.9	4.9	0.5	0.1	49	47	4	0

KLOAKUT SOIL

Location: 51°39'0"N, 123°28'0"W NTS: 920 Surveyor: WW Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Gray Luvisol Landform and Parent Material: Morainal, loamy, skeletal, hummocky

Drainage: Moderately well drained, moderately pervious, humid Slope and Aspect: 4%, S Elevation: 1490 m Additional Notes: Landscape contains numerous small bogs and ponds.

Vegetation: Subboreal Spruce, Chilcotin pine subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry(d) moist(m)	Texture	Structure	Consistence	Roots
LH	2-0					
Bm	0-5	brown (7.5YR 4/4 m)	gravelly loam	structureless	very friable	abundant
Ae	5-30	pale brown (10YR 6/3 m)	gravelly loam	very weak, medium, platy	very friable	abundant
BA	30-45	brown (10YR 4/3 m)	very gravelly sand loam	very weak, medium, platy	very friable	abundant
Btj	45-65	brown (10YR 4/3 m)	very gravelly loam	moderate, medium to coarse, angular blocky	friable	plentiful
Bt	65-86	brown (10YR 5/3 m)	gravelly loam	moderate, medium, angular blocky	friable	few
C	86+	dark grayish brown (10YR 4/2 m)	gravelly loam	moderate, medium, angular blocky	friable	-

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay
LH																	
Bm	5.3	1.95	0.08	24.38					13.0	1.2	0.7	0.3	0.1	50	41	9	
Ae	5.7	0.26	0.03	8.67					5.9	1.4	1.0	0.1	0.1	52	39	9	
BA	6.1	0.25	0.03	8.33					10.5	5.0	2.3	0.1	0.1	53	38	9	
Btj	6.3	0.18							12.0	6.8	3.2	0.1	0.2	53	39	8	
Bt	6.8	0.12							11.1	7.8	3.6	0.1	0.2	50	37	13	
C	7.2								14.1	9.8	4.8	0.2	0.2	49	38	13	

KONNI MOUNTAIN SOIL

Location: 51°27'30"N, 123°55'0"W NTS: 920 Surveyor: KV Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Eutric Brunisol Landform and Parent Material: Colluvial and morainal, loamy skeletal, blanket

Drainage: Well drained, rapidly pervious, subhumid Slope and Aspect: 10%, S Elevation: 1611 m Additional Notes:

Vegetation: Forest; Abies lasiocarpa, Pinus sp., Juniperus sp., Rosa sp., Achillea sp. Engelmann spruce-subalpine fir, dry subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry(d) moist(m)	Texture	Structure	Consistence	Roots
Ah	0-9	very dark grayish brown (10YR 3/2 m)	gravelly loam	weak, granular	friable, soft	abundant
Bm	9-22	dark yellowish brown (10YR 3/4 m)	gravelly sandy loam	weak, granular	friable, slightly hard	plentiful
C	22-42	brown (10YR 4/3 m)	very gravelly sandy loam	moderate, angular	friable, hard	few
R	42+					

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate %		Pyrophos. %		Cation exchange meq/100g					Particle Size Distribution %			
					Fe	Al	Fe	Al	CEC	Ca	Mg	K	Na	Sand	Silt	Total Clay	Fine Clay
Ah	6.3	6.7	0.64	10.4					30.6	23.7	3.7	0.6	0.0				
Bm	5.7	1.8	0.15	12.0					17.9	12.5	1.5	0.1	0.1				
C	5.9	1.2	0.10	11.9					17.2	13.8	1.2	0.1	0.2	53	32	16	5
R																	

MOUNT VIC SOIL

Location: 51°14'30"N, 123°16'0"W NTS: 92O Surveyor: TL Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Regosol Landform and Parent Material: Colluvial, coarse, loamy, soliflucted, blanket

Drainage: Moderately well drained, moderately pervious, perhumid Slope and Aspect: 17%, N Elevation: 2300 m Additional Notes: Site is part of a solifluction "Rock River," soil matrix is loamy and sandy under a gravel and cobble pavement.

Vegetation: Krummholz, Dryas species, Salix (alpine species) Phlox diffusa, Pedicularis species Alpine tundra zone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
Ahj	0-2	dark brown (10YR 3/3 m)	loam	weak, fine, granular	slightly sticky, friable, slightly plastic	abundant
C1	2-20	brown (10YR 4/3 m)	loam	structureless	slightly sticky, friable, slightly plastic	
C2	20-35	brown (10YR 4/3 m)	loam	structureless	slightly sticky, friable, plastic	
IIC	35+	brown (10YR 4/3 m)	very gravelly sand	structureless	slightly sticky, friable, slightly plastic	

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay	Ca Carb. Equiv %
Ahj																		
C1	4.6																	
C2	4.5																	

NEW MEADOW SOIL

Location: 51°47'0"N, 123°28'0"W NTS: 92O Surveyor: HCS Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Rego Humic Gleysol Landform and Parent Material: Fluvial, loamy, blanket

Drainage: Poorly drained, slowly pervious, perhumid Slope and Aspect: level Elevation: 1180 m Additional Notes:

Vegetation: Carex wetland meadow Subboreal spruce, Chilcotin pine subzone and Interior Douglas fir, Douglas fir-pinegrass subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
Ahg	0-19	very dark gray (5Y 3/1)	silty clay loam	moderate, very coarse, subangular blocky	very sticky, firm, extremely hard, very plastic	abundant
Cg	19-81	dark olive gray (5Y 3.5/2)	silty clay loam	moderate, very coarse, subangular blocky	very sticky, firm, extremely hard, very plastic	very few

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay	Ca Carb. Equiv %
Ahg	6.0	2.2	0.26	8.6					26.1	13.4	9.5	0.7	0.1					
Cg	6.5	0.9	0.10	8.9					23.8	12.0	9.1	0.7	0.2					

PILTZ SOIL

Location: 51°18'0"N, 123°01'30"W NTS: 92O Surveyor: KV Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Gray Luvisol Landform and Parent Material: Morainal, coarse, loamy, blanket

Drainage: Moderately well drained, moderately pervious, subhumid Slope and Aspect: 19%, N Elevation: 1825 m Additional Notes: Moist-receiving position on slope.

Vegetation: Pinus contorta, Picea engelmannii, Linnaea borealis, Carex concinnodes, grasses Interior Douglas fir zone, subboreal spruce and Montane spruce zones

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
LF	8-0					abundant
Bm	0-3	dark brown (10YR 3/3 m)	sandy loam	weak, fine, subangular blocky	nonsticky, friable, soft, nonplastic	abundant
Ae	3-24	grayish brown (10YR 5/2 m) light gray (10YR 7/1 d)	sandy loam	weak, fine, subangular blocky	slightly stick, friable, slightly hard, nonplastic	abundant
AB	24-38	brown (10YR 5/3 m) (common, distinct mottles)	loam	moderate, fine to medium, subangular blocky	slightly sticky, firm, slightly plastic	abundant
Bt	38-60	brown (10YR 4/3 m)	gravelly loam	strong, coarse, subangular blocky	very sticky, firm, hard, very plastic	few
BC	60-90	dark grayish brown (10YR 4/2)	gravelly clay loam	moderate to strong, medium to coarse, subangular blocky	firm, hard, plastic	few
C	90+		gravelly loam	moderate to strong, medium to coarse, subangular blocky		

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay	Ca Carb. Equiv %
LF																		
Bm	5.5	1.4	0.06	23.3	0.2	0.1			13.5	5.8	3.6	0.3	0.1	58	36	5		
Ae	5.2	0.3	0.02	16.0					7.7	3.4	2.1	0.2	0.1					
AB																		
Bt	5.9								23.1	10.2	8.8	0.4	0.2	44	32	24	12	
BC																		
C	6.4								19.4	9.3	8.0	0.4	0.2	43	37	20	8	

PURJUE SOIL

Location: 51°17'0"N, 123°03'30"W NTS: 920 Surveyor: TL Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Regosol Landform and Parent Material: Fluvial, sandy skeletal, terraces, and fans

Drainage: Rapidly drained, rapidly pervious, subhumid Slope and Aspect: Gently to moderately sloping Elevation: 1655 m Additional Notes: Open meadow

Vegetation: Grasses, forbs, and shrubs, Pinus contorta, Juniperus communis, yellow vetch, Shepherida canadensis, Heracleum Subboreal spruce zone, Chilcotin pine subzone and Engelmann spruce-subalpine fir zone, dry subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry(d) moist(m)	Texture	Structure	Consistence	Roots
Ah	0-4	very dark grayish brown (10YR 3/2 m)	loamy sand	very weak	nonsticky, very friable, nonplastic	plentiful
C	4-11	dark brown (10YR 3/3 m)	loamy sand	very weak, medium, subangular blocky	nonsticky, very friable, nonplastic	few
IIC	11-20	dark grayish brown (2.5Y 4/2 m)	very gravelly sand	structureless, single grain	nonsticky, loose, nonplastic	abundant
IIIC	20-28	dark brown (10YR 3/3 m)	sandy loam	weak, medium, angular blocky	nonsticky, loose, nonplastic	very few
IVC	28+	dark grayish brown (2.5YR 4/2 m)	very gravelly sand	structureless, single grain	nonsticky, loose, nonplastic	

RAIL SOIL

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

Identification: B.C. Soil Survey Report 25 Classification: Terric Mesisol Landform and Parent Material: Fen, Mesic organic blanket

Drainage: Very poorly drained, moderately pervious, peraquic Slope and Aspect: Level Elevation: 1100 m Additional Notes: Bm horizon is volcanic ash. Organic material is principally sedges.

Vegetation: Sedges, scrub birch, willows, and mosses. Interior Douglas fir zone

PROFILE DESCRIPTION

Horizon	Depth cm	Color wet (w) moist(m)	Texture	Structure	Consistence	Roots
Om1	0-36	very dark grayish brown (10YR 3/2 w)	moderately decomposed organic material			
Om2	36-61	very dark brown (10YR 2.5/4 w)	moderately decomposed organic material			
Bm	61-64	pale brown (10YR 6/3 m)	coarse sandy loam	structureless	nonsticky	
Om3	64-114	brown (10YR 4/3 m)	moderately decomposed organic material			
Oh	114-145	very dark gray (10YR 3/1.5 w)	well-decomposed organic material			
Cg	145-180	greenish gray (5BG 5/1 m)	silty clay loam	structureless	sticky and plastic	

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate %		Pyrophos. %		Cation exchange meq/100g					Particle Size Distribution %			
					Fe	Al	Fe	Al	CEC	Ca	Mg	K	Na	Sand	Silt	Total Clay	Fine Clay
Om1	6.3	43.0	3.05	14					133.9	63.1	22.2	1.1	2.5				
Om2	5.8	44.4	3.13	14					141.3	73.6	22.5	0.1	1.1				
Bm	5.9	7.5	0.49	15					21.8	12.5	3.5	0.1	0.3	56	41	3	1
Om3	5.7	41.5	2.66	16					153.2	80.7	24.1	0.2	1.1				
Oh	5.5	41.2	1.83	23					205.2	127.4	35.7	0.3	1.1				
Cg	6.6	0.5	0.5	1					14.7	8.9	4.2	0.8	0.2	44	37	19	6

REDTOP MOUNTAIN SOIL

Location: 51°14'0"N, 123°30'0"W NTS: 92O Surveyor: KV Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Sombric Humo-Ferric Podzol Landform and Parent Material: Colluvial, loamy skeletal, veneer

Drainage: Well drained, rapidly pervious, humid Slope and Aspect: 45%, SW Elevation: 2100 m Additional Notes:

Vegetation: Juniperus communis, Picea engelmannii, Anemone species, Carex species Alpine tundra zone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
LFH	6-0		lichens, mosses, roots, and woody material			abundant
Ah	0-21	very dark brown (7.5 YR 2/2 m)	sandy loam	very weak, medium, subangular blocky	loose, soft, nonplastic	abundant
Bf	21-50	strong brown (7.5YR 4/6 m)	sandy loam	very weak, medium, subangular blocky	friable, loose, nonplastic	abundant
Bm	50-70	yellowish brown (10YR 5/6 m)	loam	moderate, medium, subangular blocky	firm, hard, slightly plastic	abundant
R	70+					

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay	Ca Carb. Equiv %
LFH	5.0																	
Ah	5.0	3.9	0.96	4.1			0.4	0.4	21.5	9.1	1.6	0.2	0.1					
Bf	4.8	1.8	0.17	10.8			0.2	0.4	12.2	2.8	0.4	0.0	0.0					
Bm	4.9	0.6	0.05	12.0			0.1	0.3	8.2	1.4	0.3	0.0	0.1	53	41	6	2	
R																		

SHEMWELL SOIL

Location: 51°42'0"N, 123°38'0"W NTS: 920 Surveyor: WW Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Gray Luvisol Landform and Parent Material: Morainal, loamy skeletal, blanket

Drainage: Well drained, rapidly pervious, subhumid Slope and Aspect: 0%, level Elevation: 1275 m Additional Notes:

Vegetation: Lodgepole pine dominant with pine grass Subboreal spruce zone, Chilcotin pine subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry(d) moist(m)	Texture	Structure	Consistence	Roots
L	1-0					
Bm	0-3	brown (7.5YR 4/4 m)	gravelly sandy loam	structureless	loose	abundant
Ae	3-28	brown (10YR 5/3 d)	gravelly sandy loam	weak, fine, platy	loose	abundant
Bt	28-54	brown (10YR 4/3 m)	gravelly loam	strong, fine to medium, angular blocky	firm	abundant
BC	54-70	grayish brown (2.5Y 5/2 m)	gravelly sandy loam	weak, medium, angular blocky	very friable	plentiful
C1	70-95	dark grayish brown (10YR 4/2 m)	gravelly sandy loam	very weak, medium, angular blocky	loose	few
C2	95-130	dark grayish brown (10YR 4/2 m)	gravelly sandy loam	structureless	loose	

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate %		Pyrophos. %		Cation exchange meq/100g					Particle Size Distribution %			
					Fe	Al	Fe	Al	CEC	Ca	Mg	K	Na	Sand	Silt	Total Clay	Fine Clay
L																	
Bm									11.9	6.4	2.5	0.5	0.1	60	34	6	2
Ae	5.4	0.49							18.2	10.7	5.7	0.3	0.1	52	34	14	6
Bt	5.9													56	37	7	3
BC	6.2								8.8	5.0	2.6	0.1	0.1	60	37	3	0
C1	6.4													65	32	3	
C2	6.5																

TASEKO SOIL

Location: 51°51'0"N, 122°41'0"W NTS: 920 Surveyor: AB Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Rego Dark Brown Landform and Parent Material: Fluvial, sandy, terraced

Drainage: Well drained, rapidly pervious, semiarid Slope and Aspect: 8%, SE Elevation: 675 m Additional Notes: Floodplain deposits, variable surface textures and thickness.

Vegetation: Ponderosa pine - bunchgrass zone, plateau subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry(d) moist(m)	Texture	Structure	Consistence	Roots
Ah	0-15	dark grayish brown (10YR 3.5/1.5 m) grayish brown (10YR 4.5/2 d)	loamy fine sand	weak, fine, subangular blocky	friable, soft	abundant
Ck	15-35	light grayish brown (10YR 5.5/2 d)	loamy fine sand	weak, subangular blocky	friable, soft	few
IICk	35+		gravelly sand			

TATLOW SOIL

Location: 51°14'30"N, 123°26'0"W NTS: 920 Surveyor: TL Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Regosol Landform and Parent Material: Colluvial sandy skeletal, blanket

Drainage: Rapidly drained, rapidly pervious, subhumid Slope and Aspect: 36%, E Elevation: 2020 m Additional Notes:

Vegetation: Krummholz. Pinus albicaulis, and Carex, Festuca, Saxifraga, and Dryas spp. Subboreal spruce, dry subzone Engelmann spruce-subalpine fir dry subzone and Alpine tundra zone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry(d) moist(m)	Texture	Structure	Consistence	Roots
AC	0-8	brown (10YR 4.5/3 m)	very gravelly loamy sand	structureless, single grain	nonsticky, loose, loose, nonplastic	very few
C	8-50	brown (10YR 5/3 m)	very gravelly loamy sand	structureless, single grain	nonsticky, loose, loose, nonplastic	

TATTON SOIL

Location: 51°04'0"N, 121°23'0"W NTS: 920 Surveyor: KV Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 25 Classification: Orthic Gray Luvisol Landform and Parent Material: Colluvial, gravelly, loamy

Drainage: Rapidly drained, moderately pervious, subhumid Slope and Aspect: 20%, NE Elevation: 910 m Additional Notes:

Vegetation: Mature Douglas fir-pinegrass Interior Douglas fir, Douglas fir pinegrass subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry(d) moist(m)	Texture	Structure	Consistence	Roots
LH	25-0					
Ae	0-10	grayish brown (10YR 5.5/2 m)	gravelly sandy loam	weak, fine, platy	soft	plentiful
Bt	10-30	brown (10YR 4.5/3 m)	gravelly loam	moderate, medium subagnular blocky	slightly hard	plentiful
Btj	30-42	gray brown (10YR 5/2.5 m)	gravelly loam	weak, fine, subangular blocky		plentiful
Ck	42+	pale brown (10YR 6/2.5 m)	gravelly loam	weak, fine, subangular blocky	slightly hard	very few

TETE ANGELA SOIL

Location: 51°39'0"N, 123°48'30"W NTS: 920 Surveyor: KV Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Gleyed Cumulic Regosol Landform and Parent Material: Fluvial, sandy skeletal, fan

Drainage: Imperfectly drained, moderately pervious, subhumid Slope and Aspect: 5%, E Elevation: 1185 m Additional Notes:

Vegetation: Subboreal spruce, Chilcotin pine subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
LF	3-0					abundant
OH	0-3	black (10YR 2/1 m)	silt loam	weak, fine, granular	friable, soft	abundant
IICg	3-10	brown (10YR 5/3 m)	gravelly clay loam	structureless	firm, hard, plastic	plentiful
Ahb	10-14	black (10YR 2/1 m)	silt loam	moderate, fine, granular	friable, soft	plentiful
IICgb	14-24	brown (10YR 5/3 m)	gravelly clay loam	weak, medium, subangular blocky	firm, hard, plastic	plentiful
IIICgh	24-54	light olive brown (2.5Y 5/3 m)	very gravelly loamy sand	single grain	loose	plentiful

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay	Ca Carb. Equiv %
LF																		
OH	6.1	17.7	1.43	12.4					73.1	52.3	15.8	0.9	0.4					
IICg	6.1	1.4	0.11	12.8					27.1	15.0	7.0	0.4	0.1					
Ahb	6.0	5.7	0.48	11.8					44.0	29.7	10.5	0.5	0.1					
IICgb	6.1	0.7	0.08	8.4					29.4	16.0	8.5	0.4	0.1					
IIICgh	6.2																	

TETE HILL SOIL

Location: 51°24'0"N, 123°32'0"W NTS: 920 Surveyor: WW Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Eluviated Dystric Brunisol Landform and Parent Material: Morainal, loamy skeletal, hummocky

Drainage: Well drained, rapidly pervious, humid Slope and Aspect: 5%, complex Elevation: 1570 m Additional Notes: Hummocky and ridged ground moraine with small enclosed depressions.

Vegetation: Engelmann spruce-subalpine fir, dry subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
LFH	1-0					
Bm1	0-12	dark yellowish brown (10YR 4/4 m)	gravelly silt loam	structureless, single grain	loose	abundant
Ae	12-23	light brownish gray (10YR 6/2 m)	gravelly silt loam	strong, medium, platy	loose	abundant
AB	23-25	grayish brown (10YR 5/2 m)	gravelly loam	weak to moderate, coarse, platy	friable	plentiful
Bm2	25-35	brown (10YR 4/3 m)	gravelly sandy loam	moderate, medium, angular blocky		
Bm3	35-38	grayish brown (10YR 4.5/2 m)	gravelly sandy loam	weak, medium, angular blocky	friable	plentiful
BC	58-86	brown (10YR 4/2.5 m)	gravelly sandy loam	very weak, medium, angular blocky	friable	few
C	86+	dark grayish brown (2.5Y 4/2 m)	gravelly sandy loam	very weak, fine to medium, angular blocky	very friable	

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay	Ca Carb. Equiv %
LFH																		
Bm1	5.1	1.0	0.06	16.7	1.2	0.7			12.9	3.9	1.3	0.6	0.1	40	51	9	2	
Ae	5.1	0.17	0.03	5.7	0.6	0.3			13.3	6.3	2.5	0.4	0.1					
AB	5.7													48	43	9	2	
Bm2	5.9	0.08			0.6	0.4			25.8	17.1	6.8	0.3	0.2	53	41	6	2	
Bm3	6.2	0.34			0.6	0.3			24.6	16.5	6.8	0.4	0.2	64	33	3	1	
BC	6.2				0.6	0.3			19.8	13.4	5.7	0.6	0.2	61	36	3	0	
C					0.6	0.3												

TOOSEY SOIL

Location: 51°55'30"N, 122°29'0"W NTS: 920 Surveyor: AB Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Dark Brown Landform and Parent Material: Fluvial, gravelly, coarse loamy, fan

Drainage: Well drained, rapidly pervious, subarid Slope and Aspect: level to gently sloping Elevation: 910 m Additional Notes:

Vegetation: Artemisia frigida, Agropyron spicata, grassland Interior Douglas fir, Douglas fir-pinegrass subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry(d) moist(m)	Texture	Structure	Consistence	Roots
Ah	0-15	very dark grayish brown (10YR 3/2 m) brown (10YR 4/2.5 d)	gravelly very fine sandy loam	weak, coarse, columnar	nonsticky, very friable, soft	abundant
Bm	15-32	dark grayish brown (10YR 4/2 m) brown (10YR 3.5/3 d)	gravelly very fine sandy loam	weak to moderate, medium to coarse, subangular blocky	nonsticky, very friable, soft	plentiful
Ck	32+	grayish brown (10YR 5/2 m) gray (10YR 5/1 d)	gravelly very fine sandy loam	weak to moderate, medium to coarse, subangular blocky	nonsticky, very friable, soft	very few

TRURANS SOIL

Location: 51°57'02"N, 121°27'50"W NTS: 92P Surveyor: KV Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 25 Classification: Eluviated Dystric Brunisol Landform and Parent Material: Glaciofluvial blanket, gravelly, sandy

Drainage: Rapidly drained, rapidly pervious, subhumid Slope and Aspect: 3%, S Elevation: 1100 m Additional Notes:

Vegetation: Lodgepole pine, hybrid white spruce, pinegrass regenerating seral community, Interior Douglas fir zone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
LFH	2-0					
Ae	0-2	light gray (10YR 6.5/2 d)	sandy loam	weak, fine, subangular blocky	soft	plentiful, medium
IIBm	2-15	brown (10YR 5/3.5 d)	gravelly loamy coarse sand	weak, fine, subangular blocky	loose	plentiful, fine
IIBC	15-38	brown (10YR 5/3.5 d)	very gravelly loamy coarse sand	structureless	loose	plentiful, fine
IIC	38-102	dark yellowish brown (10YR 4/4 d)	very gravelly coarse sand	structureless	loose	very few, fine

TUBBS SOIL

Location: 51°45'21"N, 121°20'03"W NTS: 92P Surveyor: KV Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 25 Classification: Eluviated Eutric Brunisol Landform and Parent Material: Morainal, blanket, gravelly, sandy

Drainage: Well drained, rapidly pervious, subhumid Slope and Aspect: 12%, W Elevation: 900 m Additional Notes: Morainal parent material is water modified, producing slight bedding.

Vegetation: Mature Douglas fir-pinegrass community. Interior Douglas fir zone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
LFH	6-0					
Ae	0-15	grayish brown (10YR 5.5/2 d)	loam	weak, very fine, subangular blocky	slightly hard	plentiful fine
IIBtj	15-33	brown (10YR 4/3 m)	very gravelly sandy loam	weak, very fine, subangular blocky	very friable	plentiful fine
IIBC	33-53	olive gray (5Y 5/2 m)	very gravelly sandy loam	structureless	loose	few, fine
IICca	53-94	olive gray (5Y 4/1.5 m)	very gravelly sandy loam	weak, very fine, subangular blocky	very friable	plentiful fine
IICk	94-127	dark olive gray (5Y 3.5/2 m)	gravelly loamy sand	weak, fine, platy	very friable	few, fine

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay	Ca Carb. Equiv %
Ae	6.1	1.1	0.07	15.7					25.6	16.2	2.3	1.0	0.2	51	39	10	2	
IIBtj	6.2	0.6	0.07	8.6					29.4	20.0	3.3	0.4	0.2	67	25	8	3	
IIBC	7.2	0.3							17.4	16.6	2.0	0.1	0.7	71	26	3		
IICca	6.7	0.8												80	18	2		10.8
IICk	7.6	0.1												82	17	1		4.6

TYEE SOIL

Location: 51°47'30"N, 123°04'0"W NTS: 92O Surveyor: WW Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Gray Luvisol Landform and Parent Material: Morainal, loamy, blanket

Drainage: Well drained, slowly pervious, subhumid Slope and Aspect: 4%, S Elevation: 1140 m Additional Notes:

Vegetation: Douglas fir pinegrass, Interior Douglas fir zone, Douglas fir-pinegrass subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
LH	2-0					
Ae	0-13	brown (7.5YR 5/2 m) light brownish gray (10YR 6/2 d)	silt loam	weak to moderate, fine platy	very friable, soft	abundant
IIBt	13-43	brown (10YR 4/3 m) brown (10YR 5/3 d)	gravelly clay loam	moderate, coarse, angular blocky	firm, hard, very plastic	abundant
BC	43-90	brown (10YR 4/3 m) brown (10YR 5/3 d)	silt loam	moderate, cloddy	firm, hard, plastic	plentiful
Ck	90+	brown (10YR 4.5/3 m)	silt loam	massive	firm	

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay	Ca Carb. Equiv %
LH										6.1	2.5	0.3	0.1					
Ae	6.0	1.00	0.05	20.0					11.2	15.5	15.3	0.9	0.1	41	51	8	3	
IIBt	6.0	0.07	0.04	17.5					31.8	10.7	10.4	0.6	0.1	25	43	32	16	
BC	6.0	0.02	0.02	10.0					20.1	13.3	9.7	0.6	0.2	30	55	15	4	
Ck	7.3								19.2					34	58	8	2	

VEDAN MEADOW SOIL

Location: 51°43'30"N, 122°44'45"W NTS: 92O Surveyor: AB Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Gray Luvisol Landform and Parent Material: Eolian over loamy and coarse sandy glaciofluvial and morainal

Drainage: Rapidly drained, rapidly pervious, semiarid Slope and Aspect: Gently sloping Elevation: 1200 m Additional Notes: One large map unit at head of Vedan Creek.

Vegetation: Lodgepole pine, kinnikinick, pinegrass Interior Douglas fir zone, Douglas fir-pinegrass zone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
LFH	3-0					
Ae	0-8	grayish brown (10YR 4.5/2 m)	fine sandy loam	weak, medium, platy	nonsticky, loose, nonplastic	abundant
Bt	8-29	brown (10YR 5/3 m)	fine sandy loam	subangular blocky	nonsticky, loose, soft, nonplastic	plentiful
Ck	29-60	pale brown (10YR 6/2.5 m)	fine sandy loam	subangular blocky	nonsticky, very friable, soft, nonplastic	
IICk	60+		very gravelly sand	single grain	nonsticky, loose, nonplastic	

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay	Ca Carb. Equiv %
LFH																		
Ae	5.7	1.3	0.11	12.0	0.2	0.1			14.6	8.0	4.4	1.3	0.0	55	37	8		
Bt	6.5	0.4	0.04	10.0	0.7	0.2			18.5	9.9	7.7	1.2	0.0	64	23	13		
Ck	6.9	0.2	0.02	10.0	1.1	0.1			14.4	7.5	7.1	1.0	0.0	64	28	8		
IICk	8.4	0.2	0.03	6.7	0.9	0.1			12.4	18.8	13.7	0.2	0.2	67	31	2		

WHISKEY CREEK SOIL

Location: 51°48'0"N, 122°35'0"W NTS: 920 Surveyor: AB Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Eutric Brunisol Landform and Parent Material: Morainal, gravelly, coarse, loamy, blanket

Drainage: Well drained, moderately pervious, semiarid Slope and Aspect: Strongly sloping Elevation: 1000 m Additional Notes: On wooded slopes of major valleys tributary to Fraser River.

Vegetation: Ponderosa pine-bunchgrass zone, plateau subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry(d) moist(m)	Texture	Structure	Consistence	Roots
LH	3-0					
Ahe	0-5	dark grayish brown (10YR 4/2 m)	very fine sandy loam	weak, fine to medium, subangular blocky	nonsticky, friable, soft	abundant
Bm	5-27	brown (10YR 4/3 m)	very fine sandy loam	weak, fine to medium, platy	slightly sticky, firm, soft	plentiful
BC	27-47	brown (10YR 5/3 m)	gravelly fine sandy loam	moderate, medium, subangular blocky	slightly sticky, firm, hard	few
Ck	47-63	light brownish gray (10YR 5.5/2 m)	gravelly fine sandy loam	moderate, medium to coarse, subangular blocky	sticky, firm, hard	few
IICk	63+		very gravelly sand	single grain		

WILLAN LAKE SOIL

Location: 51°37'30"N, 123°23'0"W NTS: 920 Surveyor: TL Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Gray Luvisol, lithic phase Landform and Parent Material: Morainal and colluvial, loamy, veneer over rock

Drainage: Well drained, moderately pervious, subhumid Slope and Aspect: 5%, S Elevation: 1500 m Additional Notes:

Vegetation: Pinus contorta, Shepherdia canadiensis, Rosa acicularis, Juniperus species, Vaccinium species, Calamagrostis rubescens Engelmann spruce - subalpine firm, dry subzone and subboreal spruce, Chilcotin pine subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
LF	1-0					
Bm	0-4	light yellowish brown (10YR 6/4 m) dark brown (10YR 3/3 d)	sandy loam	very weak, medium, subangular blocky	nonsticky, loose, nonplastic	abundant
Ae	4-11	light gray (10YR 7/2 m) brown (10YR 4/3 d)	sandy loam	moderate to strong, fine to medium, platy	nonsticky, very friable, nonplastic	few
AB	11-26	light gray (10YR 7/2 m) brown (10YR 4/3 d)	loam	moderate, coarse, subangular blocky	nonsticky, very friable, nonplastic	few
Bt	26-39	brown (10YR 5/3 m)	clay loam	moderate to strong, coarse, angular blocky	sticky, firm, very plastic	few
R	39+	dark yellowish brown (10YR 3/6 d)				

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay	Ca Carb. Equiv %
LF																		
Bm																		
Ae	4.8	0.8	0.05	16.0					11.0	5.3	1.5	0.1	0.1	48	47	5	1	
AB	5.4	0.2	0.02	10.0					8.7	5.5	1.8	0.1	0.1	50	44	6	0	
Bt	5.6	0.5	0.04	12.5					25.8	14.6	6.6	0.3	0.4	36	35	28	4	
R																		

WILLIAMS LAKE SOIL

Location: 51°46'0"N, 122°39'0"W NTS: 920 Surveyor: AB Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Gray Luvisol Landform and Parent Material: Morainal, gravelly, loamy, blanket

Drainage: Well drained, moderately pervious, subhumid Slope and Aspect: 5% Elevation: 1040 m Additional Notes:

Vegetation: Douglas fir - pinegrass association, Interior Douglas fir zone, Douglas fir-pinegrass subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
LF	2-0					
Ae	0-12	brown (10YR 4/2.5)	weak, fine to medium, platy	weak, fine to medium, platy	nonsticky, friable, soft	abundant
Bt	12-27	yellowish brown (10YR 4.5/3.5)	loam	strong, medium to coarse, subangular blocky	very stick, very firm, very hard	plentiful
BC	27-60	pale brown (10YR 5.5/3)	gravelly sandy clay loam	moderate to strong, medium to coarse, subangular blocky	sticky, very firm, hard	few
Ck	60+	light brownish gray (10YR 5.5/2)	gravelly clay loam	weak to moderate, medium to coarse, subangular blocky	sticky, very firm, very hard	few

WITHROW SOIL

Location: 51°45'0"N, 122°29'0"W NTS: 920 Surveyor: AB Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Eluviated Eutric Brunisol Landform and Parent Material: Inactive morainal, gravelly, blanket

Drainage: Well drained, moderately pervious, subhumid Slope and Aspect: 10%, complex Elevation: 1000 m Additional Notes: The Ae and Bm horizons are an eolian capping on glacial moraine (IIBC and IICk horizons).

Vegetation: Interior Douglas fir zone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
LFH	3-0					
Ae	0-3	very dark grayish brown (10YR 3/2 m) brown (10YR 5/2.5 d)	very fine sandy loam	weak, medium, platy	nonsticky, loose	abundant
Bm	3-23	brown (10YR 4/3 m) dark yellowish brown (10YR 4/4 d)	silt loam	weak, medium, subangular blocky	nonsticky, very friable, soft	plentiful
IIBC	23-37	brown (10YR 5/3.5 m) light yellowish brown (10YR 5.5/4 d)	gravelly loam	subangular blocky	nonsticky, very friable, soft	plentiful
IICk	37+	pale brown (10YR 6/3 m) very pale brown (10YR 6.5/3 d)	gravelly loam	subangular blocky	nonsticky, very friable, slightly hard	few

YALAKOM SOIL

Location: 51°07'30"N, 122°37'0"W NTS: 920 Surveyor: KV Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Dystric Bunsiol Landform and Parent Material: Colluvial, sandy skeletal, veneer

Drainage: Well drained, moderately pervious, subhumid Slope and Aspect: 8%, E Elevation: 1975 m Additional Notes: Includes some exposures of Orthic Humo-Ferric Podzols in Camelsfoot Range. Surface horizons are principally volcanic ash.

Vegetation: Krummholz, wind exposure. Yellow dryas, Carex, Festuca, and Salix spp., Penstemon, Arnica, mosses, lichens Alpine tundra and Engelmann spruce - subalpine fir, dry subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
FH	4-0					
Bm	0-5	dark yellowish brown (10YR 3/4 m)	ashy sandy loam	structureless, single grain	loose	abundant
IIAhb	5-11	black (10YR 2/1 m)	gravelly silt loam	weak, very fine, granular	very friable, loose	abundant
IIBmb	11-52	dark yellowish brown (10YR 3/4 m)	very gravelly sandy loam	structureless	very friable, loose	abundant
IICb	52-70	olive brown (2.5Y 4/4 m)	very gravelly loamy sand	structureless	very friable, loose	abundant

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay	Ca Carb. Equiv %
FH																		
Bm	4.2	3.4	0.28	12.1	0.1	0.2			11.1	1.5	0.3	0.2	0.1					
IIAhb	3.9	11.7	0.66	17.7	0.5	1.0			47.5	2.5	0.3	0.1	0.1					
IIBmb	4.2	2.4	0.19	12.6	0.3	0.5			18.2	2.1	0.2	0.1	0.1					
IICb																		

YOHETTA SOIL

Location: 51°28'0"N, 123°59'0"W NTS: 920 Surveyor: TL Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Eutric Brunisol Landform and Parent Material: Morainal, gravelly, coarse, loamy, blanket

Drainage: Well drained, moderately pervious, semiarid Slope and Aspect: 14%, S Elevation: 1313 m Additional Notes:

Vegetation: Forested Populus tremoloides, Pinus contorta, Potentilla sp., Artemisia frigida, Stipa sp. Subboreal spruce dry subzone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
Ah	0-5	very dark brown (10YR 2/2 m)	sandy loam	weak, fine, granular	slightly, sticky, soft, nonplastic	abundant
Bm1	5-15	dark yellowish brown (10YR 3/4 m)	loam	moderate, medium to coarse, subangular blocky	slightly sticky, slightly hard, slightly plastic	plentiful
Bm2	15-30	dark yellowish brown (10YR 3/4 m) yellowish brown (10YR 5/4 d)	loam	moderate, medium, angular blocky	slightly sticky, slightly hard, slightly plastic	plentiful
BC	30-50	dark grayish brown (10YR 4/2 m) (10YR 4/3 d)	gravelly sandy loam	weak, fine, subangular blocky	slightly stick, hard, slightly plastic	few

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay	Ca Carb. Equiv %
Ah	5.9	3.9	0.38	10.2					23.3	15.9	1.6	0.9	0.0					
Bm1	5.8	1.3	0.14	9.3	0.1	0.1			13.5	8.3	1.3	0.8	0.1					
Bm2	6.0				0.1	0.1			11.8	7.5	1.2	0.6	0.0					
BC	6.3								10.7	7.3	1.1	0.4	0.1					

ZENZACO SOIL

Location: 51°58'0"N, 123°10'30"W NTS: 920 Surveyor: KV Agency: AC, Vancouver

Identification: B.C. Soil Survey Report 36 Classification: Orthic Brown Landform and Parent Material: Lacustrine loamy, terraced

Drainage: Moderately well drained, moderately pervious, semiarid Slope and Aspect: 30%, SE Elevation: 850 m Additional Notes: Map unit contains frequent gullies.

Vegetation: Grasses, forbs, shrubs; Potentialla species, wildflax, Poa pratensis, Symphorocarpus species, thistle, oyster plant Interior Douglas fir zone

PROFILE DESCRIPTION

Horizon	Depth cm	Color dry (d) moist(m)	Texture	Structure	Consistence	Roots
Ah1	0-5	brown (10YR 3.5/3 m) brown (10YR 5/3 d)	silt loam	very weak, fine, granular	loose	few
Ah2	5-12	brown (10YR 3.5/3 m) brown (10YR 4.5/3 d)	silt loam	moderate, fine, granular	slightly hard	few
Btj	12-25	brown (10YR 4/3 m)	silt loam	moderate, medium, subangular blocky	slightly hard	plentiful
BCca	25-50	light brownish gray (10YR 6/2 m)	silt loam	strong, medium, angular blocky	slightly hard	
Ck	50+	light gray (10YR 6/1 m)	silt loam	strong, coarse, platy	hard	

PHYSICAL AND CHEMICAL DATA

Horizon	pH	Organic C %	Total N %	C/N	Oxalate % Fe	Oxalate % Al	Pyrophos. % Fe	Pyrophos. % Al	Cation exchange meq/100g CEC	Ca	Mg	K	Na	Particle Size Distribution % Sand	Silt	Total Clay	Fine Clay	Ca Carb. Equiv %
Ah1	6.3	2.1	0.21	10.0					17.5	8.4	4.8	1.0	0.1					
Ah2	6.6	1.5	0.15	10.0					19.7	7.7	8.2	0.8	0.1					