SOILS OF THE BONAPARTE RIVER -CANIM LAKE MAP AREA (92P EAST HALF)

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SOILS OF THE BONAPARTE RIVER – CANIM LAKE MAP AREA (92P EAST HALF)

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INTRODUCTION

Soils and their suitability for various purposes form an integral part of making decisions in land planning and management. Information on soils learned through experience and research provides society with new knowledge of our land resource. Planning must take into account the dynamic character of the natural environment to ensure that the works of man fit as harmoniously as possible into the environment with minimal disturbance to the biological equilibrium.

A reconnaissance soil survey of the Bonaparte River - Canim Lake map area in south-central British Columbia was undertaken during 1970 and 1971. While a primary purpose of the inventory was to provide the basic soils information required for the production of soil capability for agriculture and forestry maps under the Canada Land Inventory Program (The Canada Land Inventory, Reports No. 2 and 4, 1972) it was realized that several other needs could be fulfilled with the same inventory.

This report, together with the enclosed soil-landform maps (1:100 000 scale) provide information on soils, landforms, climate and vegetation of the map area. The physiographic settings of the soils and interpretations most useful to land managers and planners are emphasized.

The first part of this report summarizes the physiography, geology, soils, climate and vegetation of the map area. The second part describes in relative detail the individual soil associations, the environment in which they occur and how they relate to each other and to other components of the ecosystem. The third part provides interpretations of the soils information in terms of capabilty or suitabilty (or limitations) for agricultural, engineering, and forestry uses.

The Imperial system of measurement is used throughout this report since the report was essentially written before the metric system was officially adopted for use in Canada.

SUMMARY

One hundred and twenty-one soil associations were described within the Bonaparte River - Canim Lake map area (N.T.S. 92P/E1/2). All the soil orders excepting the Solonetzic and Cryosolic occur in the map area. The presence of so many soil orders indicates the great variation in climate and parent material that exists.

Land suited for arable agriculture comprises a small percentage of the map area and is usually confined to the major valley bottoms and some of the flat to gently undulating upper tills.

Forestry is the most important industry with logging activity occurring to over 4500 ft. in elevation. Forestry productivity is moderate up to an elevation of 4500 ft.

A total of 1,909,140 acres are contained in the map area. Exposed bedrock occupies 14,080 acres, water accounts for 93,180 acres, and 1,801,880 acres comprises mapped soils.

Interpretations based on soil and vegetation survey information are included for some agricultural, engineering and forestry uses.

HOW TO USE THE SOIL MAPS AND REPORT

The descriptions of the soils, their environments and their suitabilities or potentials for specific uses are presented in the report. Soil maps which indicate the location and extent of the various soils are enclosed at the back of this report and should be used in combination with this report.

The mapping is of a reconnaissance nature and is intended to be used for overview planning purposes and for general management decisions. Detailed application will require further on-site inspection to confirm the exact soil association component present.

General information about the map area is contained in the section entitled "General Description of the Area". For more detailed soil information the reader is referred to the section entitled "Description of Soil Associations, and their Environment." Information on the suitability (or limitation) of the soils for specific uses is presented in the section "Soil Interpretations and Land Use".

Detailed soil profile descriptions and laboratory data are not included in this report. Not all the described soil profiles were sampled. Information on those that were sampled is available from The British Columbia Soil Information System (BCSIS), Ministry of Environment and Parks, Surveys and Resource Mapping Branch, Parliament Buildings, Victoria, British Columbia, V8V 1X4.

PART I - GENERAL DESCRIPTION OF THE AREA

1.1 LOCATION

The map area is located in south-central British Columbia between north latitudes 51°00' and 52°00' and west longitudes 120°00' and 121°00' (Figure 1.1).

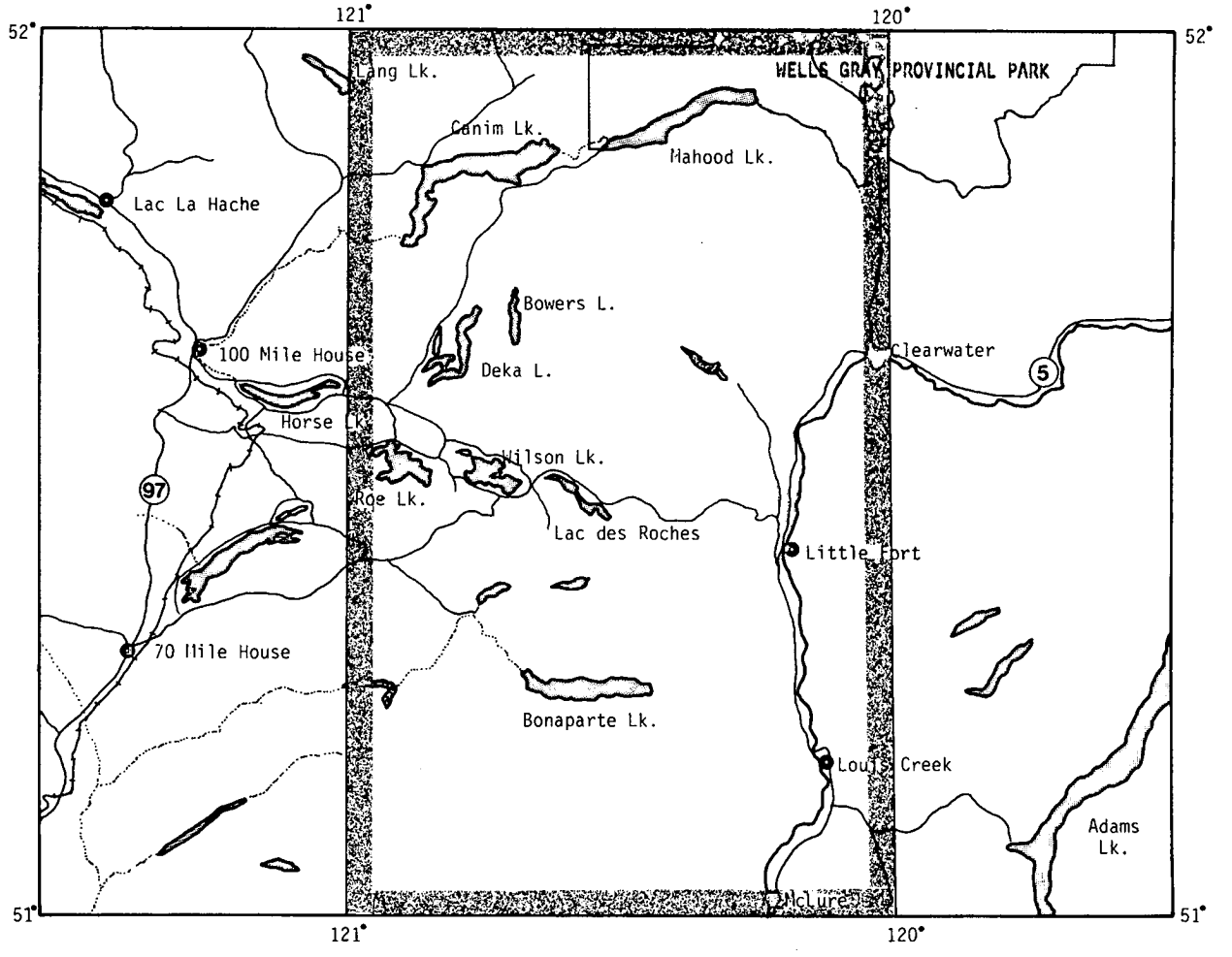


Figure 1.1 General location of the study area.

1.2 HISTORY AND DEVELOPMENT

The Central Interior Region was first inhabited by native Indians who mainly lived in small settlements along the shores of the major lakes. Their livelihood came from fishing, hunting and picking native fruits. As far as it is known, no cultivated crops were grown at this time.

The first fur trader appeared in the area around 1812. By 1863 the fur trade, carried out first by the Astor Company, then the North West Company and subsequently The Hudson's Bay Company, had drastically changed the character of the map area. The apparent reason for this was the influx of miners and the opening of new mines. Cattle were driven in to provide food for the miners who during and at the end of the gold boom pre-empted farms. The gold boom only lasted from 1860 to 1865 but in the short time of five years the Cariboo had been opened for exploration and development.

In 1915, the Pacific Great Eastern Railway's (P.G.E.) arrival at Lone Butte heralded a new way of life for the people around Sheridan, Roe and Bridge Lake. Regular trips to Ashcroft for supplies and frequent cattle drives to 59 Mile House were discontinued. People could finally market their products in Vancouver via the P.G.E. and buy goods at Lone Butte. To this day the railway has continued to be an important asset in the development of the region. The Canadian National Railway (C.N.R.) is as important to the development of the eastern half of the study region as the P.G.E. is to the western half. The general economy of the map area is presently based on forestry, mining, ranching and a fast growing recreation industry.

1.3 PHYSICAL FEATURES

1.3.1 PHYSIOGRAPHY

The study area lies within the Interior Plateau system (Holland, 1964), which is generally an area of low to moderate relief comprised of plateaus and uplands that are almost entirely drained by the North Thompson and Fraser drainage systems. The Interior Plateau is subdivided into the Fraser Basin, Nechako, Fraser and Thompson plateaus, and Quesnel, Shuswap and Okanagan highlands. Four of these areas occur within this particular study area. Approximately 60% of the map area lies within the Fraser Plateau, 20% within the Shuswap Highland, 15% within the Thompson Plateau and 5% representing the Quesnel Highland (Figure 1.2).

Fraser Plateau

In the Bonaparte River - Canim Lake map area, the Fraser Plateau is mainly flat to gently rolling country (Plate 1) with lesser areas that are steeper sloping. The plateau ranges in elevation from 3000 to 6000 ft. with large areas of upland lying between 4000 and 5000 ft. A large part of the plateau is underlain by flat or gently dipping late Miocene or Pliocene olivine basalt flows. Most of the plateau is covered by glacial drift.

Shuswap Highland

The Shuswap Highland (Plate 2) which is the most easterly of the physiographic subdivisions within the study area, extends southward from just north of Mahood Lake (Holland, 1964) to the Coldstream Valley east of Vernon and lies between the Thompson Plateau on the west and the Monashee Mountains on the east. The Shuswap Highland consists of gently or moderately sloping large upland areas that lie between 4500 and 7000 ft. and which are dissected by the Clearwater, Adams and Shuswap rivers and their tributaries. The deep valleys resulting from the dissections are as low as 2000 ft. in elevation. The glacial drift which covers most of the area is underlain by folded and metamorphosed Paleozoic rocks with lesser amounts of Mesozoic rocks.

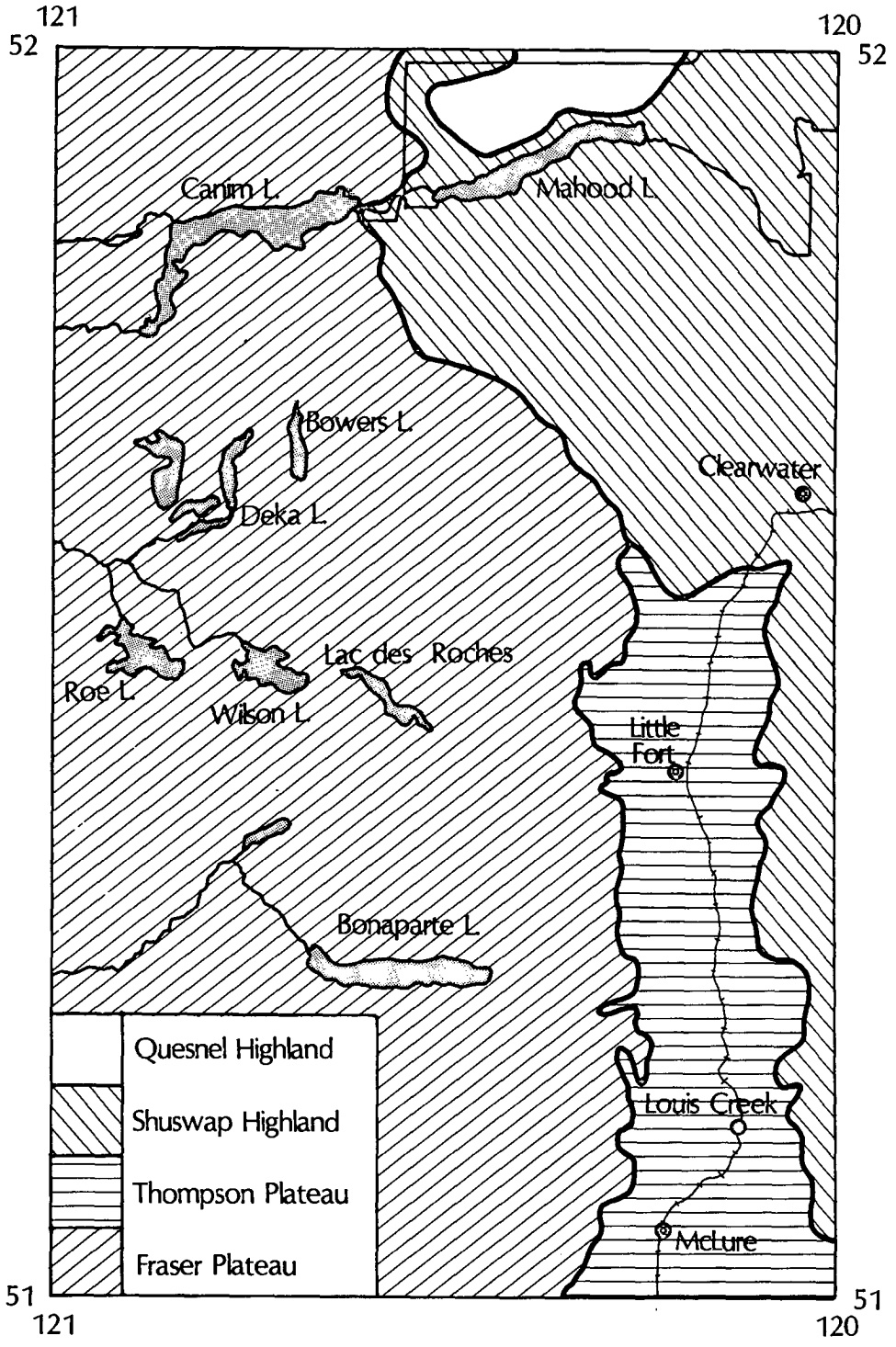


Figure 1.2 Physiographic subdivisions of the Bonaparte River - Canim Lake Map Area (After Holland, 1964).

Plate 1. Relatively flat area of the Fraser Plateau in the background.

Plate 2. Typical moderately to steeply sloping uplands of the Shuswap Highland.

Thompson Plateau

The Thompson Plateau lies west of the Shuswap Highland and forms a common boundary with the Fraser Plateau which is north and west of it. It is bounded on the west and south by the Clear Range and the Cascade Mountains. The Thompson Plateau has a gently rolling upland of low relief, for the most part lying between 4000 and 5000 ft. The section of the plateau which lies within the study area has elevations ranging from 1500 to 4000 ft. The wide elevational range is the result of the North Thompson River's incision into the plateau (Plate 3). The plateau contains a great diversity of rocks which include stocks of granitic that have intruded sedimentary and volcanic formations. A thick mantle of glacial drift covers bedrock over a large part of the plateau.

Plate 3. Incision of the Thompson Plateau by the North Thompson River.

Quesnel Highland

The Quesnel Highland lies on the eastern side of the Fraser Plateau and extends from Bowron Lake on the north to Mahood Lake on the south. It consists of a highly dissected plateau of moderate relief ranging from 2500 ft. in the valley to greater than 8000 ft. on the mountains. The area is predominantly underlain by closely folded schistose sedimentary rocks. Quartzite formations form many high peaks. Most of the summits are rounded due to Pleistocene ice and valley glaciers have deposited glacial material over much of the area.

1.3.2 BEDROCK GEOLOGY

The study region is underlain by rocks ranging in age from late Precambrian to recent (Campbell and Tipper, 1971). The map area straddles the Quesnel Trough, a basin of early Mesozoic eugeo-synclinal deposition situated between the Omineca Geanticline in the Columbia Mountains to the east and the Pinchi Geanticline to the west. A generalized map of the bedrock distribution is illustrated in Figure 1.3.

A great variety of bedrocks occur in the map area and were grouped based on similarities in origin, mineralogical composition, texture or size of grain. The following map unit numbers are those used by Campbell and Tipper (1971):

Volcanic	-	Map units 22, 25, 26 and 29 consist of mostly olivine basalt lava and andesite.
Granitic	-	Map unit 20 consists of mostly biotite, quartz monzonite and granodiorite and is generally coarser grained than rocks of map unit 14.
Granitic	-	Map unit 14 consists of mainly hornblende-biotite, granodiorite and quartz diorite and are generally finer grained than rocks of map unit 20. The rocks of map unit 14 are also greyer in colour.
Sedimentary	-	Map unit 10 consists of mainly black shale.
Metamorphic	-	Map units 1 and 12 consist of mainly quartz-mica schist and grey siliceous phyllite respectively.
Volcanic and Metamorphic	-	Map units 2, 3, 11, 15, 16 consist of mainly greenstone, volcanic arenite, aphanitic greenstone, andesitic arenite and augite porphyry beccia respectively.

In most regions of the map area it appears that the tills are derived from their underlying bedrocks. A good example of bedrock - till relationship is seen in the Pendleton Lakes area where black tills overlie black shale. The tills overlying some bedrock groups consistently display a certain colour or narrow range of colours. Except for the coarse texture of the tills derived from bedrocks in map unit 20, the textures of the tills overlying the other bedrock groups cannot always be predicted.

1.3.3 GLACIAL HISTORY

According to Tipper (1971) the Fraser Glaciation was responsible for the majority of glacial features seen in the map area. The Fraser ice sheet, covering the entire region, moved into the area from the Coast Mountains to the west and presumably from the Cariboo Mountains to the east. These two sections probably coalesced in the Bonaparte River - Canim Lake map area and then veered southeastward. The direction of ice movement during the advance is illustrated in Figure 1.4.

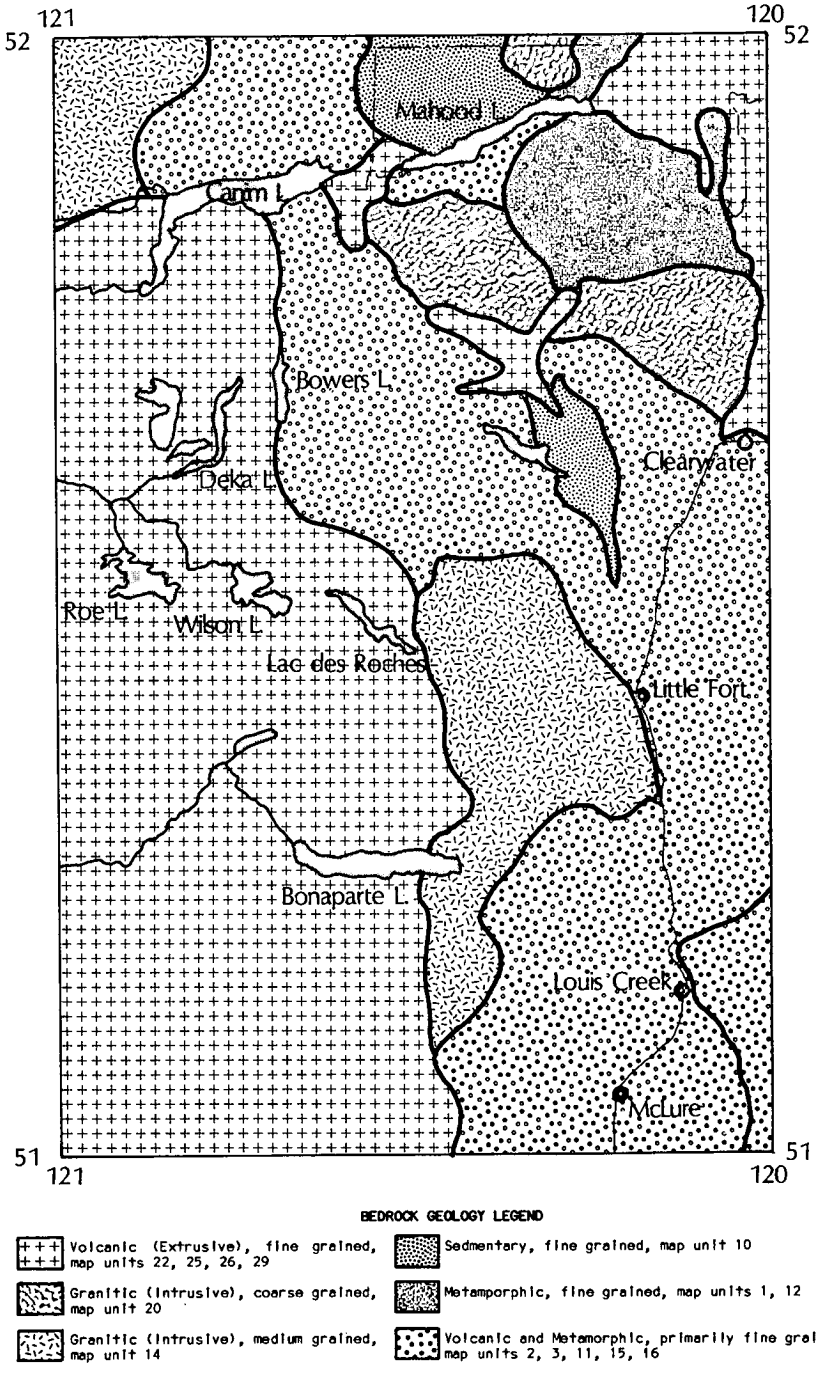


Figure 1.3 Generalized bedrock of the Bonaparte River - Canim Lake Map Area (GSC Memoir 363, 1971).

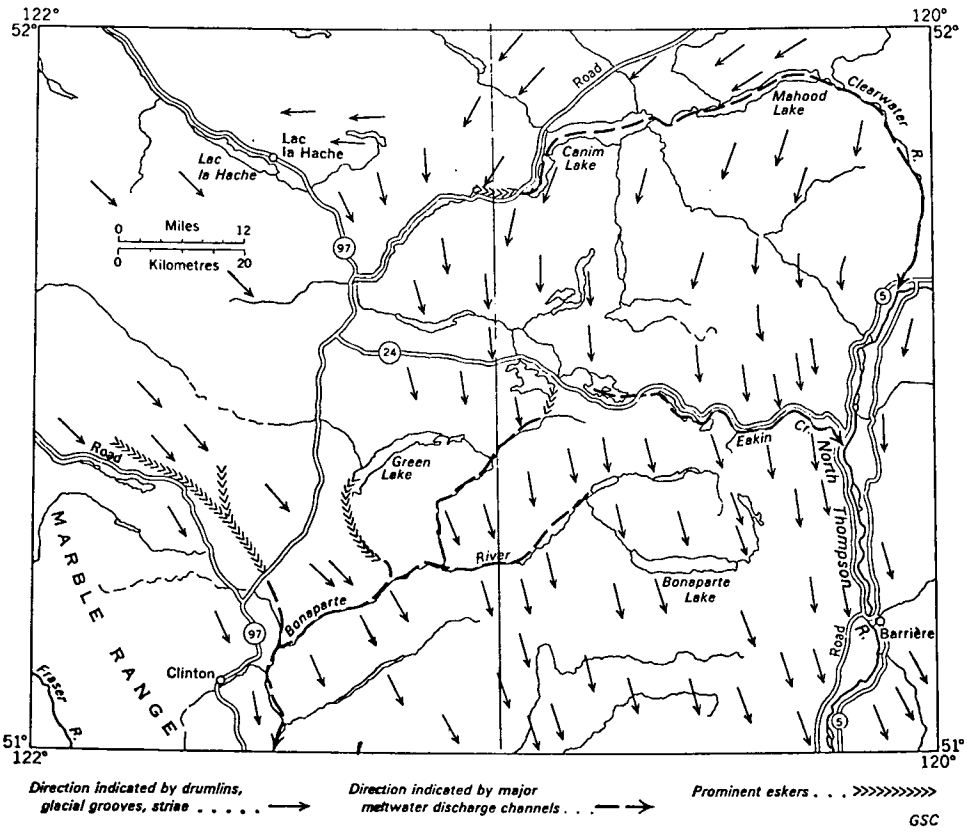


Figure 1.4 Direction of glacier flow in Bonaparte River - Canim Lake Map Area (GSC 363, 1971).

Armstrong (1981) estimates that the Fraser Glaciation occurred approximately over the period 19,000 to 10,000 years BP. Tipper (1971) believes that after the Fraser Glaciation, the ice re-advanced into the area from the Cariboo-Mahood Lake Valley, fanned out northwesterly and southerly, and flowed westerly beyond the area.

Tipper (1971) believes a complex deglaciation resulted from a complex topography of high, moderate and low relief. Fulton (1967) suggests the occurrence of downwasting which meant the ice front was affected by topography and did not retreat in an orderly manner.

1.3.4 LANDFORMS AND SURFICIAL MATERIALS*

Natural agencies, mainly ice, water, wind and gravity produce distinctive three dimensional topographical units that may be recognized wherever they occur. These are called landforms. The unconsolidated materials contained in these landforms vary in physical composition according to the agency (or agencies) which deposited them. The various deposits have properties peculiar to the agency which eroded, transported and deposited them.

* See appendix for complete landform symbology and descriptions as used in this report.

It is a geological axiom that ice does not sort the debris which it carries and deposits, but that wind and water do. Material deposited by glacial ice is known as glacial till (Plate 4). It consists of an unsorted and heterogeneous mixture containing a variety of fine and coarse fragments ranging from clays to boulders.

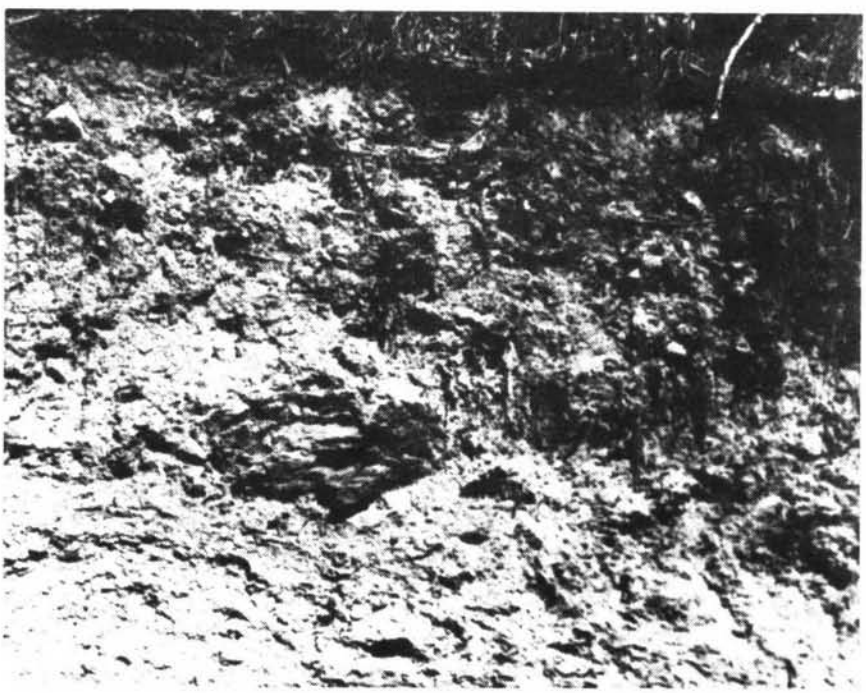


Plate 4. The strongly compacted glacial till deposit displays fragments of schistose metamorphic bedrock that is also the underlying bedrock. The structure of the till is coarse platy.

Water action tends to sort geologic materials, segregating gravels from sands, the sands from the silts, and so on. Segregation is dependent primarily on the speed (velocity) at which the water travels. The faster water flows, the more material it can carry and, as the velocity of the water decreases, the particles deposited will become progressively finer. Swiftly flowing streams can carry gravels, sands, silts and clays. As the velocity decreases, gravels and coarse sands settle to the streambed. Further decreases in velocity result in the deposition of medium and fine sands (Plate 5). Finally, when the water becomes quiet and still, such as in a lake, the silts and then the clays settle to the bottom and form lacustrine deposits (Plate 6). This entire process is most evident where swiftly flowing streams enter a lake.

Wind can also carry soil particles, with the size and amount transported dependent on the wind's velocity. The particle sizes are usually confined to sand and finer sizes.

Plate 5. Glaciofluvial deposit near Bridge Lake. Note the stratified nature of the deposit. Parent material's textures range from loamy sand to gravelly sand.

Plate 6. Glaciolacustrine deposit near Barriere. The parent material's textures range from loam to silt loam and is usually calcareous.

The force of gravity continually affects all materials and plays a predominant role on steep landscapes. All materials that have moved to their present position by direct gravity induced movement are called colluvium. Colluvial materials may either accumulate as deep deposits at the bottom of steep slopes, (Plate 7) or they may be actively eroding, thereby maintaining a shallow depth on the slopes. Both types of colluvial deposits are very common in the Bonaparte River - Canim Lake map area.

Plate 7. Deep colluvial deposit (greater than 5 feet deep) derived from shattered bedrock.

The percentage of the map area covered by the various deposits are as follows: basal till 58%, colluvium 22%, ablation till 5%, glaciofluvial 3.2%, fluvial 3.2%, organic 2% and glaciolacustrine 0.75%. A general description of the deposits and the soil associations occurring on them follows:

Glacial Till (Morainal) Deposits

Two types of glacial till, basal and ablation, were recognized in the map area.

1. The basal tills, compact heterogeneous materials composed of stones, gravels, sand, silt and clay display in many areas lithologies and mineralogies that are related to the

underlying or nearby bedrock. The majority of tills vary in texture throughout the profile. An exception is a till that was derived from a granitic bedrock that is in the Shuswap Highland. The texture is loamy sand throughout the profile. The tills also vary in thickness from many tens of feet to less than 20 in. Shallow tills, less than 3 ft., occur over all bedrock types but are predominant on the comparatively flat lying basaltic bedrocks.

Soil Associations: Able Mountain (AB), Allamore (AA), Allentown (AW), Allie (AL), Alans (AS), Alkali (AK), Ambush (AH), Aqualine (AQ), Archie (AC), Armour (AM), Art (AT), Artisan (AN), Astoria (AO), August (AG), Aurora (AR), Beaverhut (BT), Danger (DN), Deka (DE), Doreen (DO), Dragonfly (DA), Ejecta (EJ), English Lake (EN), Eugene (EE), Flourmill (FM), Garter (GA), Greenlee (GR), Hawkley (HY), McLure (MC), Monticola (MI), Mulholland (MO), Murtle (ME), Raspberry (RY), Roseflower (RW), Roserim (RM), Round (RD), Timber (TM), Tsinisunko (TO), Tunkwa (TW), Tyee (TE), Vidette Creek (VI), Wavey Lake (WA).

2. Abalation till consists of material deposited by ice, which in part, has been modified and transported by glacial meltwater. It is usually loose, stony and gravelly.

Soil Associations: Ta Holla (TA), Taggart (TG), Teather (TT), Thuya (TY), Tisdall (TD), Tole (TL), Tubbs (TU), Tuleric (TC), Whitely Lake (WT).

Glaciofluvial Deposits

Relatively well sorted, rounded, mostly level stratified sands and gravels deposited by glacial streams.

Soil Associations: Frog (FG), Holden (HD), Laurel (LL), Spanish (SP), Spooney (SN), Stolle (SL), Struthers (SE), Succour (SR), Ternan (TR), Wyllie (WY).

Fluvial (alluvial) Deposits

Well to moderately well sorted materials of various textures that are often stratified on flat to gently undulating floodplains (Plate 8) and are moderately well to poorly sorted coarse textured material on gently sloping fans.

Soil Associations: Barriere (BA), Beaver (BV), Bester (BR), Bethel (BE), Blackpool (BL), Bottrel (BO), Boxer Creek (BX), Byrd Creek (BD), Crater (CR), Danskin (DK), Darling (DG), Deadman (DD), Dorrell (DL), Drewry (DY), Duckling (DI), Duncan Creek (DU), Dunleavy (D) Dunsapie (DP), Elliot (EL), Gilead (GI), Rennie (RE).

Colluvial Deposits

These are unsorted loose materials of coarse textures, usually less than 5 ft. deep, often on steep slopes and overlying bedrock and accumulated through transport by gravity. The lithology and mineralogy of the deposits are similar to the underlying bedrocks.

Soil Associations: Chasm (CM), Hallamore (HA), Heathrow (HT), Heger (HR), Helmcken (HN), Hemp (H), Higgins (HG), Hooligan (HO), Hotfish (HH), Lacovia (LV), Ladder (LD), Larghetto (LG), Lastcourse (LE), Laxity (LX), League (LA), Lindquist (LI), Lizard (LR), Lobster (LB), Lolo (LO), Lost (LT), Louise Mountain (LS), Loveway (LW), Lupine (LP), Lonely (LY),

Lynn (LN), Ordschig (OD), Pendleton (PT), Placid (PD), Poison (PN), Pootyl (PL), Price (PC), Prince (PE), Whitewood Creek (WH), Willow Creek (WI), Windy Mountain (WM).

Plate 8. Flat to gently undulating alluvial deposits along the North Thompson River at Little Fort.

Glaciolacustrine Deposits

Well sorted, stratified silts and clays on level to strongly rolling topography. Topography can be steeply sloping because of erosion.

Soil Associations: Buffalo (BF), Exeter (EX), Exlou (E).

Organic Deposits

Generally wet, unstratified, partially to well decomposed organic materials accumulated in and at the margins of closed basins and in other moisture accumulation positions in the landscape (Plate 9). Also present in the study area are a few small areas of shallow organic material (less than 3 ft. deep) overlying bedrock. These areas were not mapped.

Soil Associations: Rail (RL), Rayonier (RA).

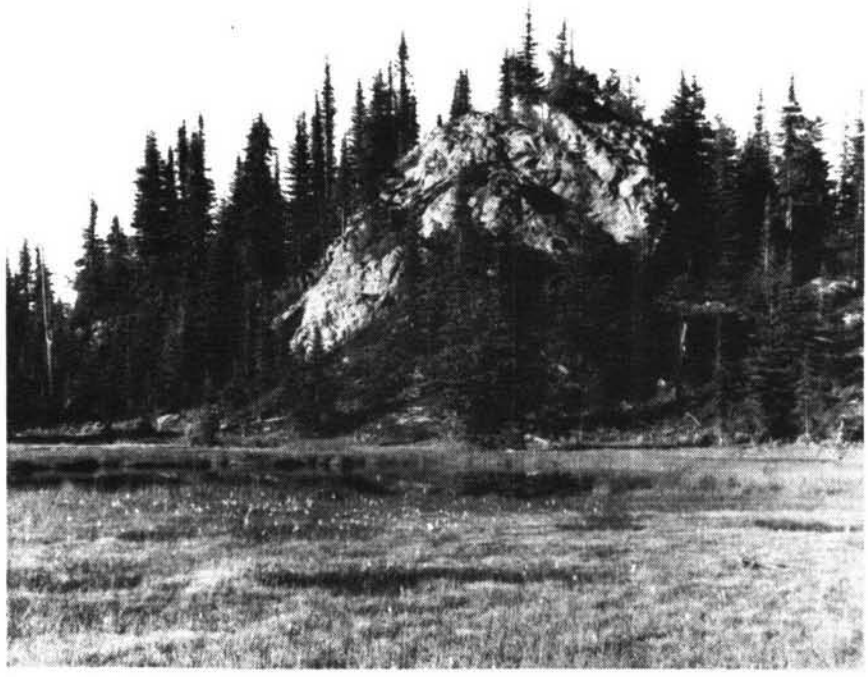


Plate 9. Deep organic deposits in the foreground occurring at approximately 4500 ft. elevation in the Clearwater Peak area.

1.4 ENVIRONMENTAL FEATURES

1.4.1 CLIMATE

Climate data comes from two sources; the Atmospheric Environment Service (A.E.S.), Environment Canada and the Air Resources Section, British Columbia Ministry of Environment. Only one longterm A.E.S. station (greater than 30 years) exists in the study area. See Appendix B for tabular data on Growing Degree Days, Free Periods, precipitation and temperature.

Regional and local climatic patterns in the study area are strongly influenced by three major physiographic subdivisions. These are: the Shuswap Highland, the Thompson Plateau and the Fraser Plateau. East of the North Thompson River Valley lies the Shuswap Highland which is generally characterized by warm, dry summers and cool, dry winters at low elevations, and by a cool, moderately wet climate at high elevations. West of the North Thompson Valley, and generally east of 120°28' longitude is situated the Thompson Plateau. Here the warm, dry climate of the North Thompson Valley grades quickly into cool, damp conditions at the upper elevations. All locations west of the Thompson Plateau fall within the Fraser Plateau. Because of the high elevation of this latter physiographic subdivision, the climate is one of cool, damp summers and cold, moderately wet winters.

Regional precipitation patterns indicate increasing precipitation south to north, generally west to east, and with increasing elevation. In low valley areas such as the Thompson and Deadman, annual precipitation ranges from 15.8 in. to 19.4 in. Because of the generally low relief and high elevation of the Fraser Plateau, precipitation patterns are much less pronounced than those in the more mountainous areas. In general on the Fraser Plateau, the decrease in annual precipitation north to south is about 1.1 in. for each 15 minutes of decreasing latitude at any particular longitude and elevation.

Snowfall accounts for 25% of the annual precipitation at lower elevations.

Regional temperatures decrease east to west, south to north, and with increasing elevation. Minimum temperatures throughout the region are comparable at any particular elevation, but are greatly affected by local topography. Depressional areas and valley bottoms exhibit lower minimum temperatures than areas that are characterized by good air drainage such as knolls and mountain slopes. Barriere, in the North Thompson Valley, normally records mean July maximum, minimum and mean temperatures of 82.6°F, 49.7°F and 66.2°F respectively.

The frost free season varies from less than 30 days in high mountain valleys to over 140 days in the North Thompson Valley.

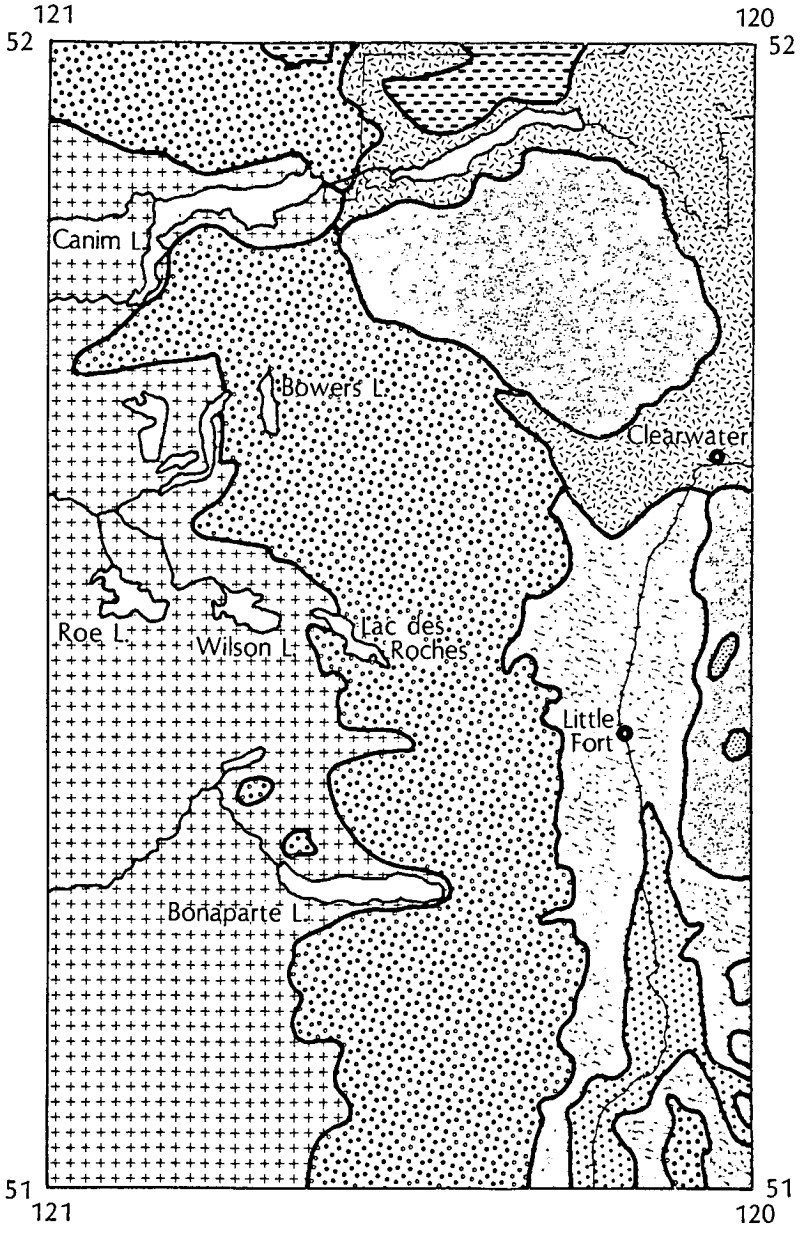
The growing degree day totals increase north to south, west to east and with decreasing elevation. Growing degree totals range from 3073 in the lower North Thompson River Valley to 770 at some of the highest elevations. For detailed information on climatic parameters, refer to Appendix B.

1.4.2 VEGETATION AND FOREST ZONATION

The study area is located within the Interior Wet Belt and the Dry Interior Regions. A 1971 survey of the map area (J. van Barneveld, unpublished) revealed that it is comprised of the following forest zones: Interior Douglas-fir, Interior western hemlock - western red cedar, Interior White spruce, and the Subalpine Engelmann spruce - alpine fir zones (Table 1 and Figure 1.5).

TABLE 1. VEGETATION REGIONS, ZONES AND SUBZONES OF THE STUDY AREA

1. DRY INTERIOR REGION
   - Interior Douglas-fir Zone
     - Ponderosa pine subzone
     - Lodgepole pine subzone
   - Interior White Spruce Zone
     - Lodgepole pine subzone
   - Subalpine Engelmann spruce - Alpine fir Zone
     - Subalpine Forested subzone
     - Subalpine Krummholz subzone
2. INTERIOR WET BELT REGION
   - Interior Western Hemlock - Western Red Cedar Zone
   - Subalpine Engelmann spruce - Alpine fir Zone



VEGETATION AND FOREST ZONATION LEGEND

FOREST REGION	FOREST ZONE	SUBZONE	PHYSIOGRAPHIC REGION
Dry Interior (DI)	SAeS-alF	SAeS-alF:a	Shuswap Highland
Dry Interior (DI)	SAeS-alF	SAeS-alF:a	Fraser Plateau
Dry Interior (DI)	IwS	IwS:a	Fraser Plateau
Dry Interior (DI)	ID	ID:a	Thompson Plateau
Dry Interior (DI)	ID	ID:b	Thompson Plateau
Dry Interior (DI)	SAeS-alF	SAeS-alF:b	Shuswap Highland
Interior Wet Belt (IWB)	SAeS-alF	SAeS-alF:a	Quesnel Highland
Interior Wet Belt (IWB)	IwH-wC	IwH-wC:a	Shuswap Highland

SAeS-alF:a = Forested subzone
IwH-wC:a = Douglas-fir ~ lodgepole pine subzone
SAeS-alF:b = Krummholz subzone
IwS:a = Lodgepole pine subzone
ID:a = Lodgepole pine subzone
ID:b = Ponderosa pine subzone

Figure 1.5 Vegetation regions, zones and subzones of the Study Area.

Some zones are subdivided into subzones on the basis of gross differences in forest growth, form and type, and which also reflect a difference in climate. Such a subdivision occurs in the Subalpine Engelmann spruce - alpine fir zone which is subdivided into the forested subzone and Krummholz subzone.

The Interior Douglas-fir zone occurs on the Thompson Plateau and extends from approximately 1100 ft. to 3500 ft. elevation depending on latitude and aspect. This zone is characterized by the occurrence of Douglas-fir in self perpetuating climatic climax forests. Seral species found in this zone are ponderosa pine, lodgepole pine, western paper birch and trembling aspen. Seral white spruce, western red cedar and black cottonwood occur in moist locations.

The Interior western hemlock - western red cedar zone occurs in the north-eastern section of the study area. The elevational range is approximately 1500 ft. to 4500 ft. The precipitation in this zone is comparatively high. The climatic climax forest is western red cedar and/or western hemlock. Seral species generally found in the complex are lodgepole pine, Douglas-fir, white spruce and western white pine.

The White spruce zone might be considered as a transitional zone between the Subalpine Engelmann spruce - alpine fir zone in the mid-region of the study area and the Interior Douglas-fir zone west of the map area. It occurs at elevations between 3500 ft. and 4000 ft. The climatic climax forest is white spruce and seral species include lodgepole pine and Douglas-fir.

The Subalpine Engelmann spruce - alpine fir zone occurs throughout the map area at higher elevations, usually above 4000 ft. The zone reflects a climate that has low minimum temperatures and moderate to high precipitation. The growing season is short. The climatic climax stands of the zone are composed of a variable mixture of Engelmann spruce and alpine fir. The dominant seral species is lodgepole pine. The Krummholz subzone occurs at the upper end of this zone and is characterized by stunted and layered tree form, usually grouped in islands and separated by treeless plant communities.

1.4.3 SOIL DEVELOPMENT AND CLASSIFICATION

Soil is that part of unconsolidated material at the surface of the earth which has been altered through the effect of climate (moisture and temperature), macro and micro-organisms, vegetation, topography and man all acting over a period of time. The resultant soil differs from the original geologic material from which it was derived in various physical, chemical, mineralogical, biological and morphological properties (Jungen, 1980).

Soil mapping and classification involves the identification and grouping of soils with similar characteristics and delineating areas of similar soils on maps. The Soil Order is the highest level of generalization. All of the soils within one Soil Order have one or more basic profile characteristics in common. There are eight Soil Orders in the 1973 edition of the System of Soil Classification for Canada (Provisional). These are:

1) soils with darkened surface horizons due to organic matter accumulation, usually found in grassland areas (Chernozemic Order);
2) soils of poor structure and tilth and often affected by salinity (Solonetzic Order);
3) soils of dry forested regions that have movement and accumulation of clay within the soil (Luvisolic Order);

4) Soils of the humid forested regions containing high amounts of amorphous aluminum, iron and/or organic matter (Podzolic Order);
5) Soils with weakly developed B horizons (Brunisolic Order);
6) Young soils with little or no horizon differentiation and development (Regosolic Order);
7) Soils with features indicative of periodic or prolonged saturation with water and reducing conditions (Gleysolic Order); and,
8) Soils composed primarily of decomposed to raw plant residues (Organic Order).

Each Soil Order is subdivided into two to four Soil Great Groups having certain morphological features in common which reflect a similar environment for soil development (pedogenic environment). Each Soil Great Group can be further subdivided into several Soil Subgroups which are based on the arrangement of horizons in the soil profile. For a more detailed description on the technical classification of soils see The System of Soil Classification for Canada, 1973.

The Soil Orders represented in the Bonaparte River - Canim Lake map area are: Chernozemic, Luvisolic, Podzolic, Brunisolic, Regosolic, Gleysolic and Organic. The Great Groups and Subgroups and the Soil Associations found on each parent material are described.

Chernozemic Soils:

Chernozemic soils have deep, dark surface horizons developed and maintained from the accumulation and decomposition of a cycic growth of xero- or meso-phytic grasses and forbs. The Orthic Dark Gray Chernozem subgroup is represented within the Bonaparte River - Canim Lake map areas (Plate 10).

Chernozemic soils occurs mainly on south facing slopes at mid and lower elevations. There is some question as to whether these soils are truly Chernozemic. The grasses responsible for the A horizon are seral and the climax vegetation will be trees. The dominant soils of the Buffalo (BF), Roseflower (RW), Poison (PN) and Deadman (DD) soil associations are Chernozemic. The parent materials of these soils are lacustrine, till, colluvium and alluvial fan deposits respectively. They are slightly to very calcareous.

Luvisolic Soils

Luvisolic soils have light coloured eluvial (leached) surface horizons overlying illuvial (accumulation) horizons in which silicate clay is the main accumulation product.

The Orthic Gray Luvisol, Brunisolic Gray Luvisol and Podzolic Gray Luvisol subgroups are represented within the map area. See Figure 1.6 for a diagrammatic horizon pattern of a typical luvisol in the area.

The Orthic Gray Luvisol soils occur primarily on tills and to a lesser degree on lacustrine parent materials. On tills these soils have AB horizons. The exceptions to this are the Orthic Gray Luvisols of the Tyee and Tunkwa soil associations. All AB horizons are quite similar to Bm horizons except that the chroma does not quite meet the classification requirement for a Bm. The AB horizon appears to have a chroma of 3 and greater when moist but less than 3 when dry. The AB horizon occurs where a Bm would in the Brunisolic Gray Luvisol. The Orthic Gray Luvisol soil of the Exlou soil association that is developed on lacustrine has an AB horizon. The parent mater-

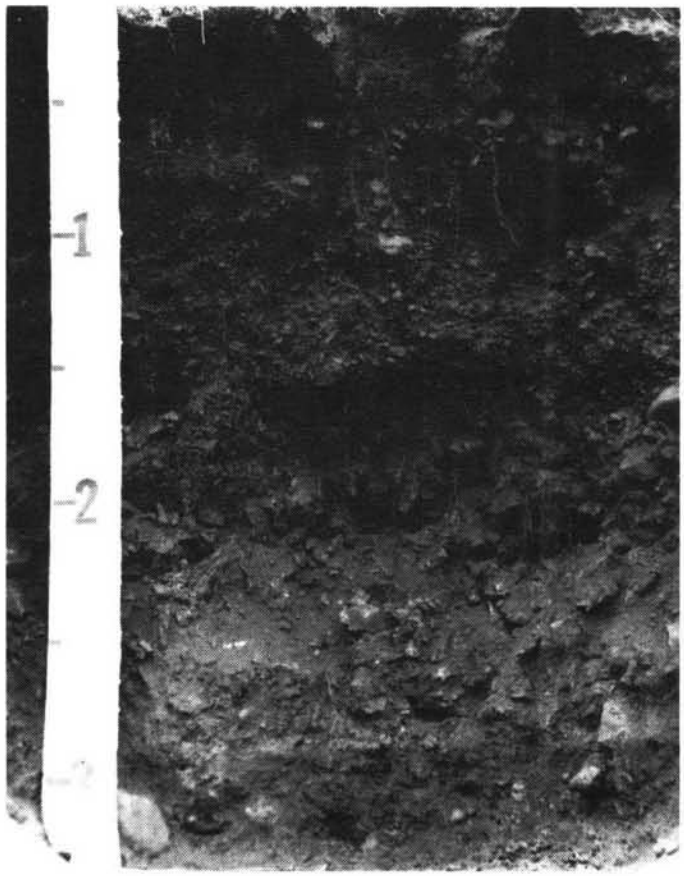


Plate 10. Orthic Dark Gray profile of the Hotfish Soil Association. The parent material is colluvium and the location is Deadman Falls.

ials of the lacustrine soils are calcareous. The upper elevational limit of the Orthic Gray Luvisol subgroup is approximately 4000 ft. The soil associations classified as Orthic Gray Luvisol are: Alans, Eugene, Exeter, Exlou, Tunkwa and Tyee.

The Brunisolic Gray Luvisol soils occur on till (morainal) parent materials. The pH (0.01M Ca Cl_2) values of the Bm horizons that occur below eluvial A horizons, are greater than 5.4 and the illuvial B horizons occur less than 30 in. below the soil surface. On the Thompson Plateau, Brunisolic Gray Luvisol soils having calcareous C horizons usually occur at lower elevations than those with non-calcareous C horizons. The soil associations classified as dominantly Brunisolic Gray Luvisol are: Allentown (AW), Allie (AL), Ambush (AH), Aqualine (AQ), Art (AT), Artisan (AN), Greenlee (GR), McLure (MC), Murtle (ME), Raspberry (RY), Vidette Creek (VI) and Wavey Lake (WA).

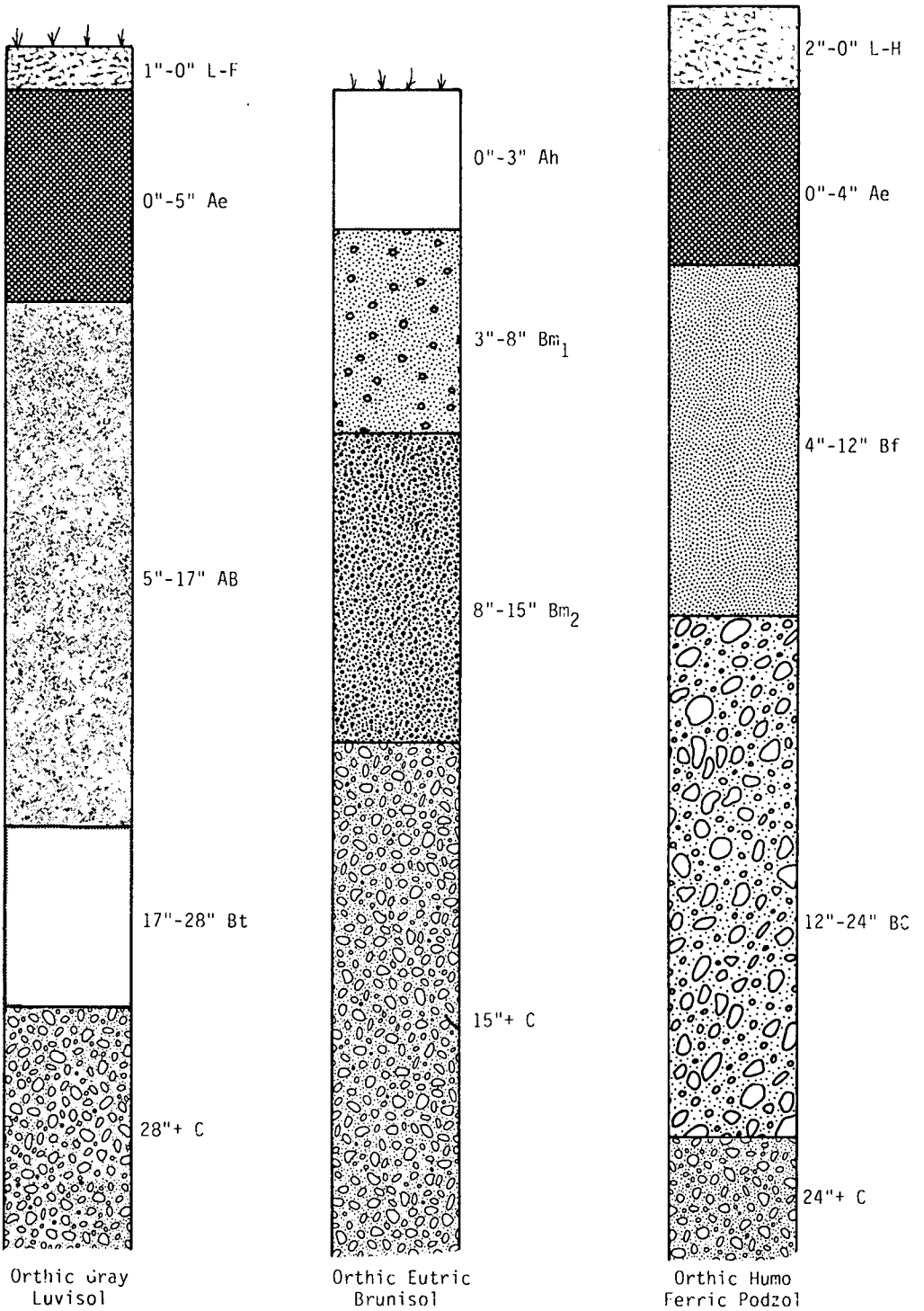


Figure 1.6 Diagrammatic horizon relationships of the some of the more common soil developments in the Bonaparte River - Canim Lake map area.

The Podzolic Gray Luvisol soils are found throughout the map area mainly between the 3500 ft. and 5000 ft. elevations. The parent materials are tills and range in texture from gravelly sandy loam to gravelly clay loam. The Bf horizons that lie below eluvial A horizons, have pH (0.01M Ca Cl_2) values less than 5.5. Illuvial B horizons occur less than 30 in. below the soil surfaces. The majority of the tills are non-calcareous. The soil associations identified are: Able Mountain (AB), Allamore (AA), Alkali (AK), Archie (AC), Beaverhut (BT), Doreen (DO), Ejecta (EJ), Garter (GA) and Round (RD).

Podzolic Soils

Podzolic soils are characterized by acidic, illuvial B horizon(s) in which amorphous aluminum, iron and organic matter have accumulated. Development of Podzolic soils is favoured by cool temperatures, high precipitation and vegetation that produces accumulations of acidic organic matter on the mineral surface. See Figure 1.6 for a diagrammatic horizon pattern of a typical podzol in the map area. The Humo-Ferric Podzol Great Group development occurs on a wide range of landforms and parent materials in the Subalpine Engelmann spruce - alpine fir and Interior western hemlock - western red cedar forest zones.

Colluvial deposits, particularly those which are shallow over bedrock, are very common soil parent materials for the Humo-Ferric Podzolic soils in the map area. The podzolic Bf horizons of these soils have pH values less than 5.5 (0.01M $CaCl_2$). The Bf horizons of those soils developed on granitic rocks have hues that are redder and chromas that are stronger than those developed on metamorphic rocks. Podzolic soils developed from colluvium are usually well drained, loose and friable, have very weak structure and have abundant roots in the upper soil horizons. Orthic Humo-Ferric Podzol is the dominant soil subgroup mapped. Some of the soils identified are: Hallamore (HA), Helmcken (HN), and Lacovia (LV).

Also developed on colluvial deposits are Ferro-Humic Podzols that are characterized by Bhf horizons that have pH (0.01M $CaCl_2$) values less than 5.5 and contain more than 5% organic carbon. The Higgins soil association is an example of a Ferro-Humic Podzol. It has a Bhf horizon with a pH (0.01M $CaCl_2$) value of approximately 4.9 and contains about 5.5% organic carbon. Other Ferro-Humic Podzol soils developed on colluvium are Lost (LT) and Lupine (LP) associations.

Some of the soils of the upper subalpine Engelmann spruce - alpine fir forest zone (mainly the Krummholz subzone) have a black, very dark gray or dusky red Ah horizon overlying a Bfh horizon that is bright red to reddish-black (Plate 11). These soils are generally found above 5500 ft. and are classified as Sombric Ferro-Humic Podzol. They are mapped as minor components in the Lost (LT) soil association. They are rubbly and very shallow over bedrock.

Glacial till deposits are also common parent materials of podzolic soils in the map area. A typical Luvisolic Humo-Ferric Podzol soil profile has a thin organic (L-F) horizon which is less than 3 in. thick over mineral soils. The Bf horizon is from 10 to 18 in. thick, has pH values less than 5.4 and a Bt horizon about 50 in. below the mineral surface. Podzolic soils with substantial organic matter enrichment (Bhf and Ah horizon) occur in edaphically wet sites where seepage persists for long periods during the growing season. Base saturation percentages are lower in the Bf and Bhf horizons than in the C horizons. Orthic Humo-Ferric Podzol soil development is rarely dominant on basal till parent materials. The only basal till on which it is believed to be dominant is the one on which the Aurora Association is mapped (Plate 12). The soil

Plate 11. Lithic Sombric Ferro-Humic Podzol soil developed on colluvial parent material.

associations classified as being dominantly Orthic Ferro-Humic Podzols are: Armour (AM), Hawkley (HY), Mulholland (MO), Tsintsunko (TO) and Tisdall (TD). Some of the soil associations that are dominantly Humo-Ferric Podzols are: August (AG), Aurora (AR), English Lake (EN), Tole (TL) and Whitely Lake (WT).

Some fluvial and glaciofluvial deposits also have Podzolic soil profiles. These profiles are characterized by thin L-H and Ae horizons that are both generally less than one inch thick, and brown or yellowish-brown C horizons. The 0.01M $CaCl_2$ pH values of the Bf horizons are less than 5.5 and their percentage base saturations are much lower than their related C horizons. The C horizons are non-calcareous. The soil associations dominated by Humo-Ferric Podzols are: Laurel (LL), Spanish (SP), Spooney (SN) and Wyllie (W).

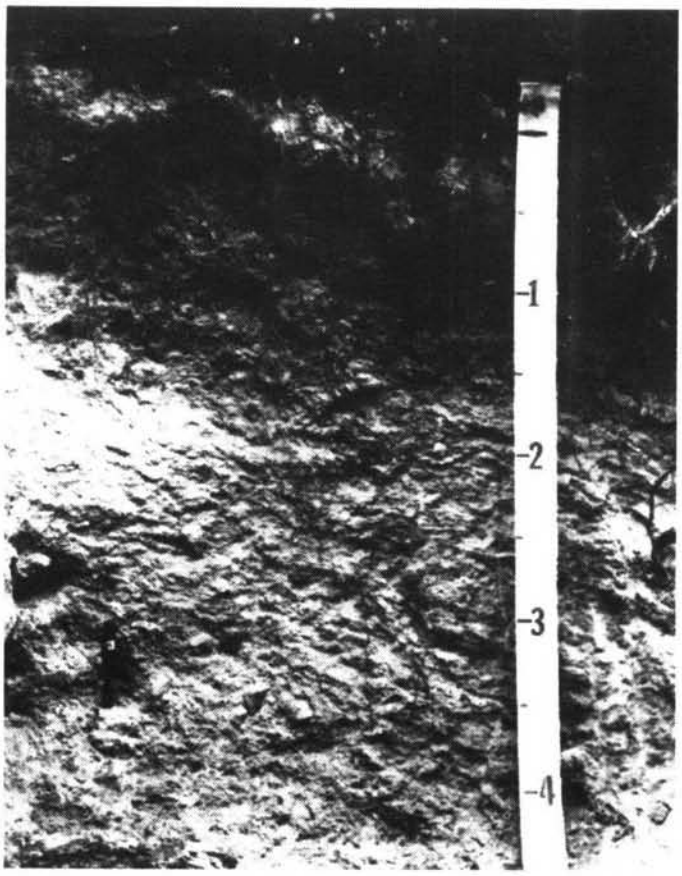


Plate 12. An Orthic Humo-Ferric Podzol of the Aurora Association. Soil is developed on glacial till derived from granitic bedrock. The Ae horizon is quite distinct.

Brunisolic Soils

Brunisolic soils occur under a wide variety of climatic and vegetative conditions and have Bm or Btj horizons. See Figure 1.6 for a diagrammatic horizon pattern of a commonly occurring Brunisol. Within the map area Brunisolic soils occur generally below 4000 ft. elevation and are usually found on coarse textured parent materials in all forest subzones except the Krummholz.

Parent materials on which Brunisolic soils occur are glaciofluvial (Plate 13), fluvial (alluvial), colluvium and glacial till deposits. Colluvium and glaciofluvial deposits are by far the most widespread surficial deposits on which Brunisolic soils have developed.

Plate 13. Sandy loam alluvial parent material with Degraded Eutric Brunisol soil development. The Ae horizon near the surface is easily discerned.

The glaciofluvial deposits have Dystric and Eutric Brunisols as the most common Great Groups. The Dystric Brunisol soils, although generally found between the 3500' and 4000' elevation, do occur at lower elevations in the high precipitation zones such as the Interior western hemlock - western red cedar forest zone. These soils have pH (0.01M $CaCl_2$) values less than 5.5. A typical Orthic Dystric Brunisol profile examined near Clearwater had an upper Bm horizon with a pH (0.01M $CaCl_2$) value of 5.4 and pyrophosphate extracted iron and aluminum of 0.23%.

Eutric Brunisol soils are usually found below the 3500' elevation. These soils have pH (0.01M $CaCl_2$) values greater than 5.5. In many areas, especially in the drier Interior Douglas-fir Zone, lodgepole pine subzone, the soils have slightly calcareous C horizons. The depth to lime in

the various areas is dependent on the precipitation received and the texture of the parent material.

Most Brunisolic soils mapped on glaciofluvial deposits occur in the Interior Douglas-fir Zone and include Holden (HD), Stolle (SL), Struthers, (SE) Succour (SR) and Ternan (TR) soil associations. Eutric Brunisols can also occur in the Interior Wet Belt Zone. For example, the Frog Association, a Eutric Brunisol, has been mapped in the Clearwater area.

Alluvial (fluvial) parent materials that are adjacent, or in close proximity to glaciofluvial deposits that have developed Eutric and Dystric Brunisol soils, are likely to develop similar soils if their parent materials are coarse (see Plate 13). The exceptions are where the fluvial material is subjected to regular floodings and high water tables. Brunisolic soil associations mapped on fluvial parent materials are Blackpool (BL), Crater (CR), Darling (DG), Dorrell (DL), Duckling (DI), Duncan Creek (DU), Dunleavy (D), Dunsapie (DP) and Gilead (GI).

Brunisolic soils, mostly Dystric and Eutric subgroups, commonly develop on colluvial parent material. Both subgroups have Bm horizons that occur as deep as 16.5 in. below the mineral surfaces and the pH (0.01M $CaCl_2$) values of the Bm horizons of the Dystrics are less than 5.5. A pH of 5.4 is a very common value. The pH (0.01M $CaCl_2$) values of the Bm horizons of the Eutric Brunisols are wider ranging than those of the Dystrics. A range of 5.5 to 6.9 was observed. There is no consistent trend of Mg:K ratio with soil depth but percentage base saturation increases with depth of soil. The soils are well to rapidly drained, are loose and friable and have weak structure. The Heger (HR), Hooligan (HO), Lolo (LO), Prince (PC), Whitewood (WH) and Willow Creek (WI) soil associations are classified as Dystric Brunisols while Chasm (CM), Heathrow (HT), Hemp (H) and nine others (see soils legend) are classified as Eutric Brunisols.

Coarse textured till (morainal) deposits will generally develop Brunisols rather than Luvisols in a climate that is conducive to the development of both types of soil. The Brunisols lack an illuvial Bt horizon. Both Dystric and Eutric subgroups are found in the map area. Bm horizons range from 3 in. to greater than 7 in. in thickness. The percentage base saturation increases with depth for both subgroups. The soil associations mapped as Eutric Brunisols on these parent materials are: Roserim (RM), Dragonfly (DA), Monticola (MI), Taggart (TG), Timber (TM), Tubbs (TU) and Tuleric (TC). The Dystric Brunisolic soil associations are: Thuya (TY) and Teather (TT).

Regosolic Soils

Regosolic soils are relatively young soils which have little or no soil development and are often restricted to recent deposits. Active talus, colluvial and fluvial deposits are the main parent materials of Regosolic soils. Regosolic soils developed on talus are indicated on the soils maps by the symbol WB.

On active fluvial floodplains and fans, Regosolic soils are the result of periodic flooding. Soil associations with predominantly Regosolic soils on fluvial deposits are Barriere (BA), Beaver (BV), Bethel (BE), Bottrel (BO), Boxer Creek (BX), Byrd Creek (BD), Danskin (DK), Drewry (DY) and Rennie (RE).

Gleysolic Soils

Gleysolic Soils develop under the presence of excessive moisture that results in permanent or periodic reducing conditions. They are bluish-gray in colour and usually display reddish-brown mottles. Gleysolic soils occur in depressional locations and on poorly to very poorly drained alluvial floodplains. Many poorly drained areas are found along the North Thompson River, along Bridge Creek, and on the western shores of Canim Lake. Soils of the Humic Gleysol Great Group are the only ones that were sampled and classified, however minor areas belonging to the Orthic and Eluviated Gleysol Great Group were observed in the area. The Humic Gleysols have Ah horizons that are greater than 3 in. in thickness and are calcareous in some areas. A soil association which represents such an area is the Elliot (EL) association.

Organic Soils

Organic soils are found in low depressional areas which are water saturated for most of the year. Two Great Soil Groups appear to be dominant in the map area. The Mesisol Great Group which is represented by the map symbol RL (Rail) occurs below the 5500 ft. elevation and the Fibrisol Great Group represented by the map symbol RA (Rayonier) occurs above 5500 ft. A representative Mesisol soil has an upper 13 in. of fibric organic material, underlain by 30 in. or more of mesic material. Thin mineral bands (about 1 in. thick) sometimes occur in the mesic material. A typical Fibrisol soil consists of uniform fibric organic material throughout the control section of the soil profile.

PART II - DESCRIPTION OF SOIL ASSOCIATIONS AND THEIR ENVIRONMENT

2.1 MAPPING METHODOLOGY

The first step that was required in the mapping and classification of soils in the Bonaparte River - Camin Lake area was the interpretation of aerial photographs. Identifiable landforms and areas of similar surficial appearance were delineated and mapped on the photographs. Existing information on bedrock geology, geomorphology, soils, vegetation, climate and land capability from similar areas were used to develop a mapping framework.

The next step involved verification of the initial mapping through field investigations. The soils and landforms were examined and described, as were the topography, surficial materials, vegetation, land use and other related characteristics. New information obtained in the field was used to modify the original mapping wherever needed. Representative soil profiles were described in detail. Approximately 40% of these were sampled and analyzed. The soils were classified according to the 1973 edition of the System of Soil Classification for Canada (Provisional).

The mapping was carried out on 1:63 360 scale air photographs flown prior to 1958. The information was then transferred to 1:50 000 maps and final manuscripts prepared. These maps were subsequently reduced in scale to two 1:100 000 maps and are part of this report.

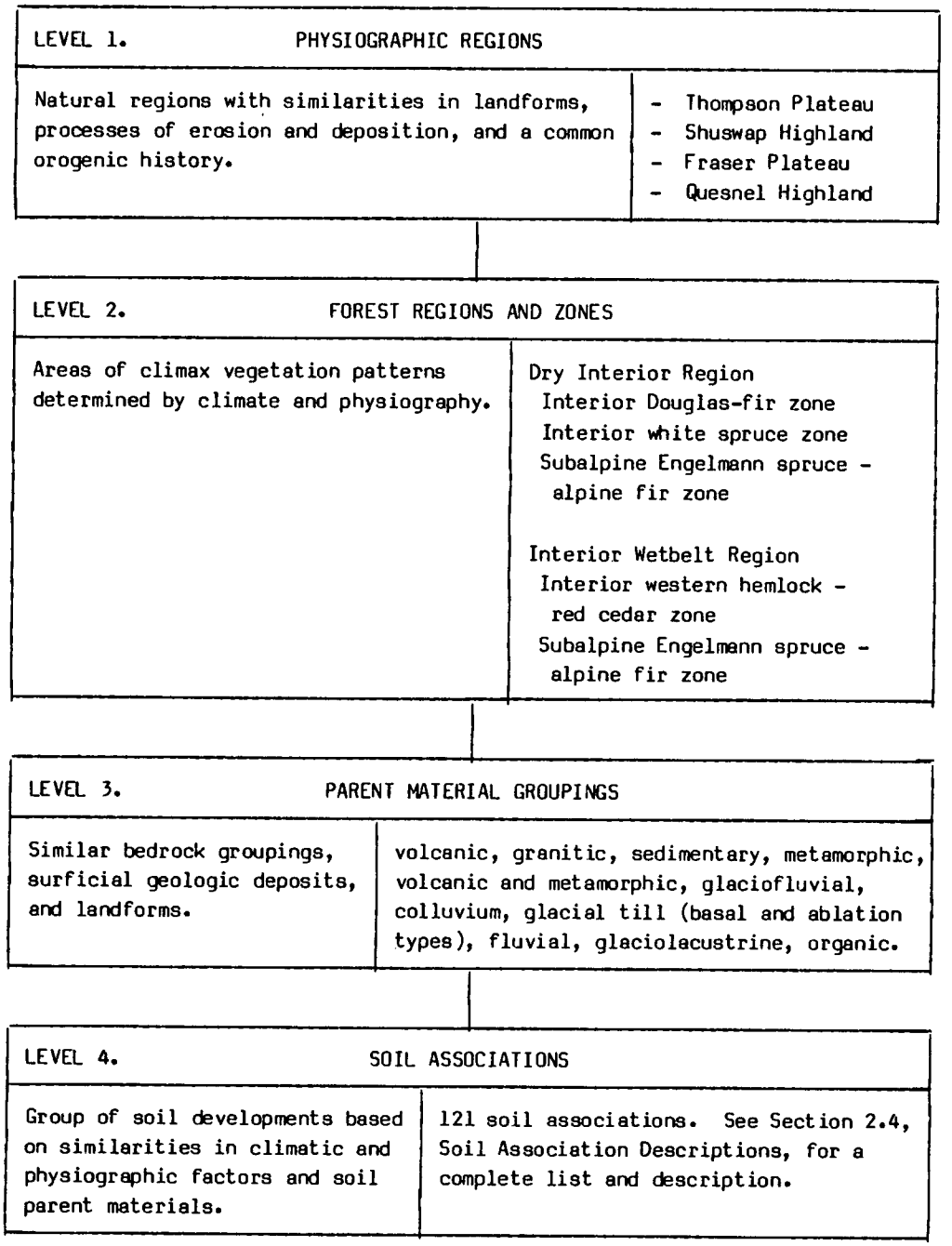
Map accuracy is dependent on ease and availability of access for field checking. Portions of the map area considered to have the highest relative accuracy and dependability are those where adequate ground access was possible. In other areas the map was compiled primarily by extrapolation and air photo interpretation. Mapping reliability depends partially on accessibility and to some extent on landscape complexity.

2.2 ESTABLISHMENT OF THE SOIL ASSOCIATION

Physiographic regions (Holland, 1964) of the province are used to provide the first and broadest stratification of the soil association. These physiographic delineations are natural regions in which there are similarities in the landforms, resulting from similar processes of erosion and deposition, a common orogenic history, and similarities of bedrock response to erosion. In the Bonaparte River - Canim Lake map area these physiographic units play a particularly significant role in the establishment of the Soil Association. Four physiographic regions, the Fraser and Thompson Plateaus, and the Quesnel and Shuswap Highlands, converge within the map area complicating the mapping of the soil associations considerably (Figure 2.1).

The second level of stratification are forest zones as reflected by dominant climatic climax vegetation. The third level of stratification are bedrock groupings (eg., groupings which, from the point of soil development, produce soil parent materials similar in characteristics such as texture and chemical properties).

At the fourth or local level the soil parent materials formed the basic framework of the soil association. A soil association is defined as a sequence of soils of about the same age, derived from similar parent materials, and occurring under similar climatic conditions, but having unlike



eg.: Able Mountain Soil Association - Found in the Quesnel Higland, Interior Wet Belt Forest Region, Subalpine Engelmann spruce - alpine fir Zone, on a glacial till derived from metamorphic and volcanic rocks.

Figure 2.1 Development of the Soil Association.

characteristics because of variations in topographic position and drainage. For example, the Doreen soil association represents a group of soils developed from glacial till derived from black phyllite and shale. Under normal environmental conditions the Doreen soils have Podzolic Gray Luvisol soil development, but within this soil association, variations in depth, climate, and/or moisture regime results in variations in profile development. When these variations become significant (about 20% of the delineated area) they are recognized and mapped as a separate component of the Doreen association.

The dominant soil(s) of a soil association are usually related subgroups of one soil great group. There are exceptions, however, as in the case of the Beaver Association where soil subgroups of different great groups occur as dominant in the soil association. Significant soils in a soil association include soil subgroups of other soil great groups.

The soil associations and land types are indicated on the map by a two letter symbol, for example, AB, and the association components constituting the delineated area are indicated by subscripts, AB_1, AB_3. The dominant soil subgroup(s) occupy 40 to 100% of the delineated area, with the combined significant soil subgroup(s) occupying 20 to 60%. Soil subgroup(s) occupying less than 20% of a delineated area are normally not recognized. Component numbers change when the significant soil subgroup inclusions change. Components (mapping units) were not numbered in a systematic manner, but in some soil associations the number 1 usually was assigned to the component that had a single soil profile develoment.

Combinations of two or more soil associations are mapped when they occur in a pattern too intermixed to delineate at the scale of mapping. Most combinations used in this survey consist of two separate soil association components, for example, GA_6^7-OD_3^3. The percentage of the delineated area occupied by each soil association is indicated by superscripts. The previous symbol contains about 70% of the Garter soil association (component 6) and about 30% of the Ordschig soil association (component 3). Three-way combinations of soil association components also occur.

2.3 SOIL ASSOCIATION DESCRIPTIONS

The individual soil associations of the Bonaparte River - Canim Lake map area are described below. This section also serves as map legends by providing information on genesis, texture, drainage, surface expression, elevational range, forest zonation and physiographic regions. The schematic cross-sectional diagrams (Figures 2.2, 2.3, 2.4 and 2.5) were prepared to show the relationships between elevations and some of the soil associations in each of the four physiographic regions. Depicted on each diagram is the genetic material, approximate elevational range and forest zone or subzone that each soil association occurs in, as well as the physiographic region and underlying bedrock. The soil profile development indicated represents the most common subgroup of the soil association.

Soil profile developments are indicated on the diagrams in the standard abbreviated form (Table 2). Table 3 defines the abbreviations and the pictorial symbols on the cross-sectional diagrams.

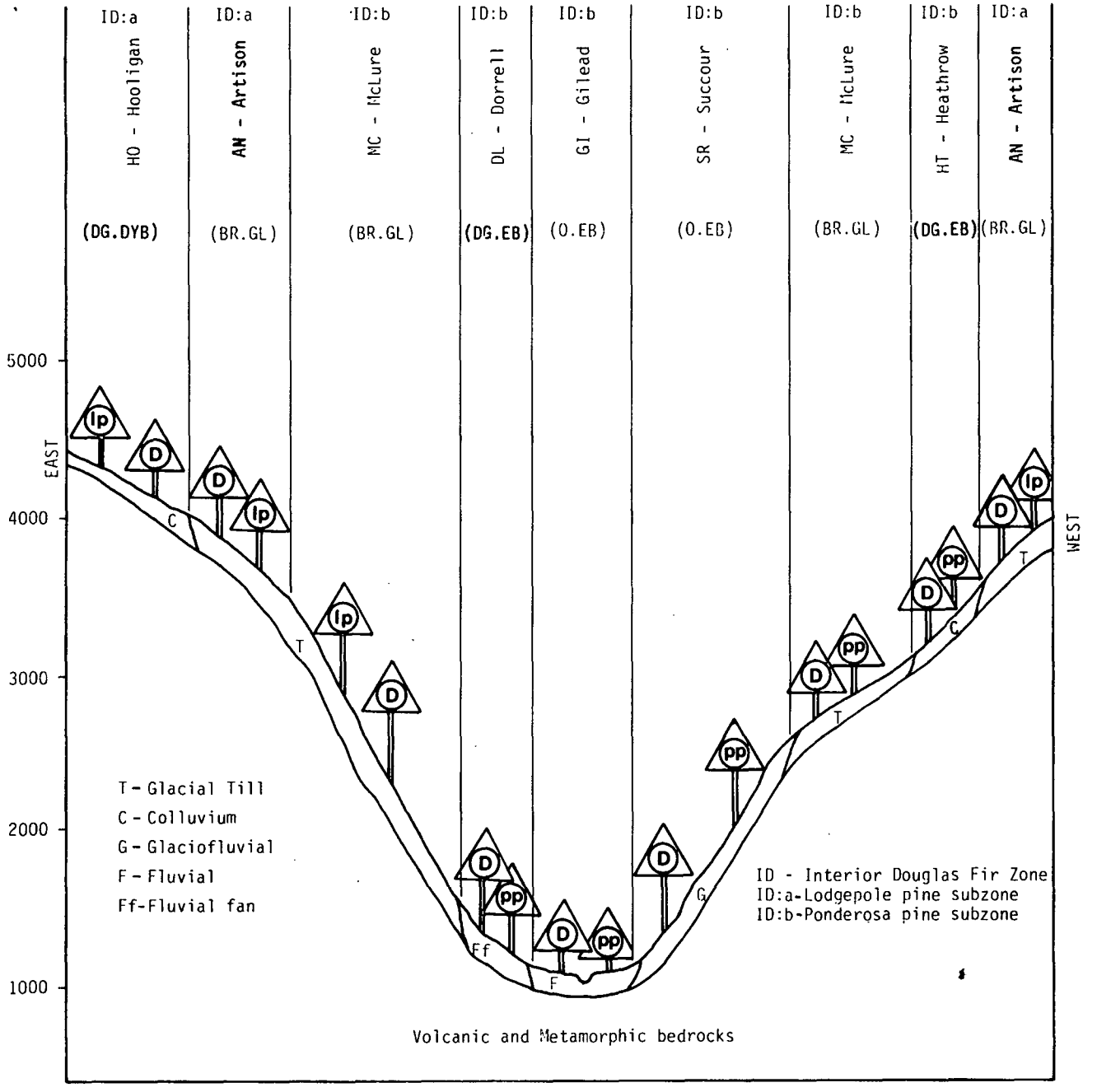


Figure 2.2 A cross-sectional diagram of a portion of the Thompson Valley at McLure showing the relationships of forest zones and dominant soil developments with elevations.

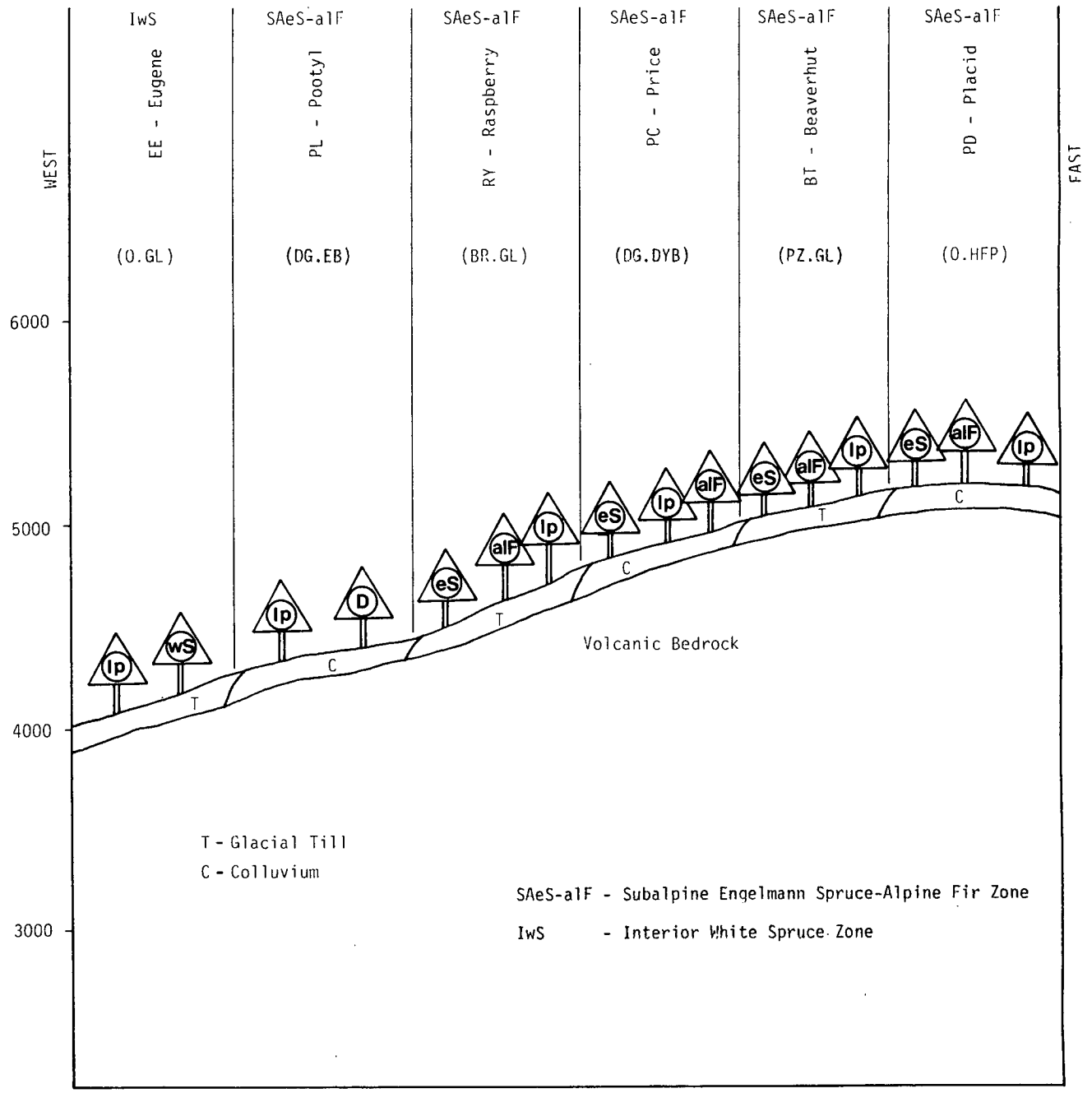


Figure 2.3 A cross-sectional diagram of a portion of the Fraser Plateau just south of Machete Lake showing the relationships of forest zones and dominant soil developments with elevations.

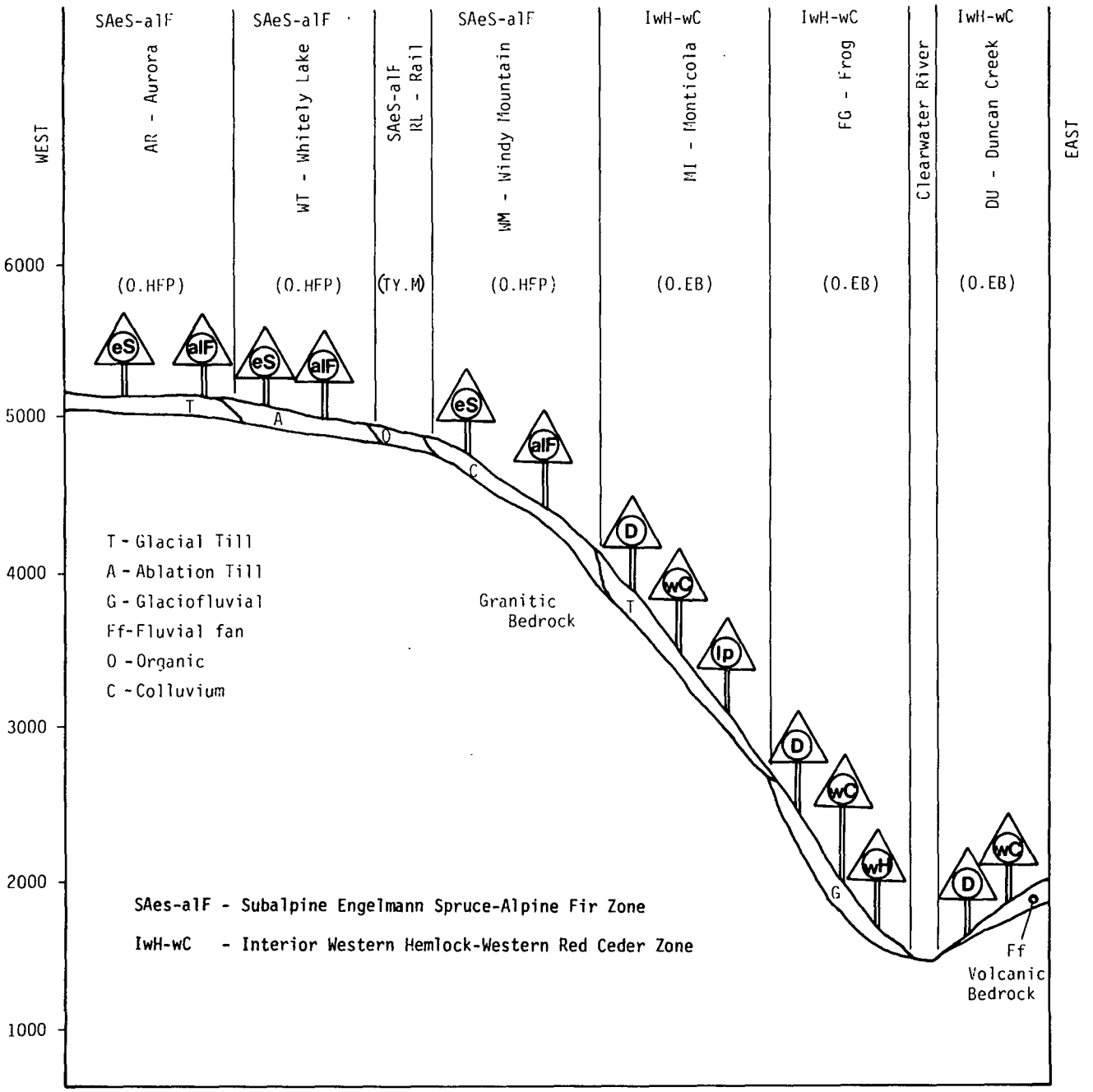


Figure 2.4 A cross-sectional diagram of a portion of the Shuswap Highland near Clearwater town showing the relationships of forest zones and dominant soil developments with elevations.

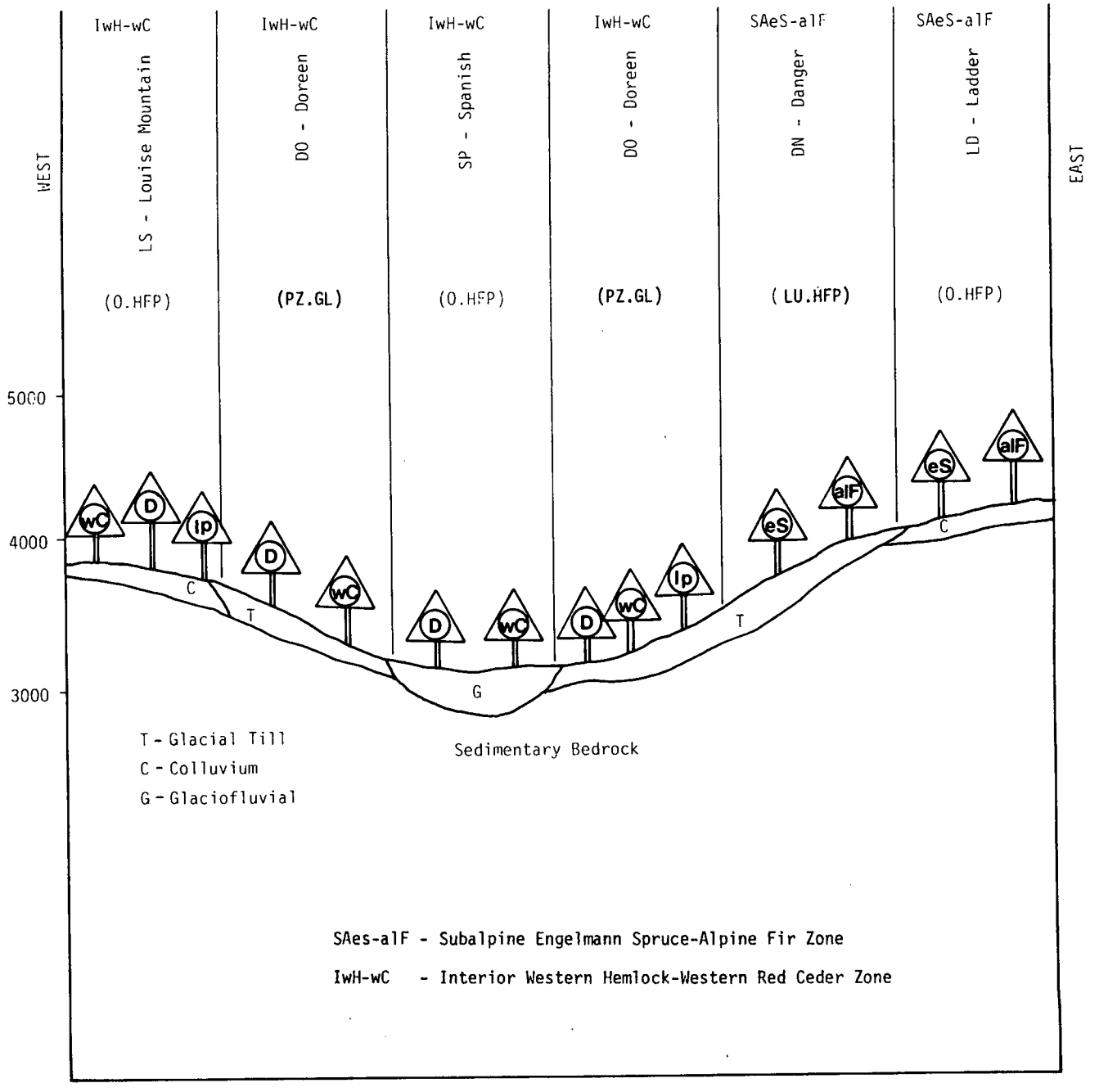


Figure 2.5 A cross-sectional diagram of a part of the Quesnel Highland west of Pendleton Lakes and northwest of Mahood Lake showing the relationships of forest zones and dominant soil developments with elevations.

TABLE 2. KEY TO SOIL CLASSIFICATION SYMBOLS USED ON THE SOIL ASSOCIATION DIAGRAMS

Soil Subgroup		Soil Great Group	
BR	Brunisolic	.DYB	Dystric Brunisol
DG	Degraded	.EB	Eutric Brunisol
LU	Luvisolic	.GL	Gray Luvisol
O	Orthic	.HFP	Humo-Ferric Podzol
PZ	Podzolic	.M	Mesisol
TY	Typic		

TABLE 3. KEY TO VEGETATION SYMBOLS USED ON THE SOIL ASSOCIATION DIAGRAMS

alF	alpine fir
D	Douglas-fir
eS	Engelmann spruce
lP	lodgepole pine
pP	ponderosa pine
wC	western red cedar
wH	western hemlock
wS	white spruce
bCo	black cottonwood

ALLAMORE Soil Association - AA

Location. Allamore soils occur mainly east of the North Thompson River in the Shuswap Highland physiographic region. Their elevational range is 3000' to 5500' and they cover 1.37 percent (26,270 acres) of the map area.

Forest Zonation. These soils occur in the Subalpine Engelmann spruce - alpine fir zone in the Dry Interior region.

Soils and Parent Material. Allamore soils have developed in gravelly loam to gravelly clay loam glacial till >5' deep which is derived mainly from metamorphic and volcanic rocks. Minor areas of till veneer <5' are also included in this association. The surface textures of these soils are sandy loam and gravelly sandy loam. Allamore soils occur on gently undulating to extremely sloping terrain. Soil development is predominantly Podzolic Gray Luvisol.

Drainage. Drainage ranges from well to imperfect with some slopes having seepage moisture.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
AA1	Podzolic Gray Luvisol	---	well	gently undulating to strongly rolling
AA2	Podzolic Gray Luvisol	Brunisolic Gray Luvisol	well	steeply to extremely sloping; usually south facing
AA3	Podzolic Gray Luvisol	Gleyed Podzolic Gray Luvisol	well to imperfect	gently undulating to strongly rolling; depressional areas; steep, moisture receiving positions
AA4	Gleyed Podzolic Gray Luvisol	Podzolic Gray Luvisol	imperfect to well	depressional areas
AA5	Podzolic Gray Luvisol	Orthic Humo-Ferric Podzol	moderately well, seepage	steeply to extremely sloping
AA6	Podzolic Gray Luvisol	Lithic Orthic Humo-Ferric Podzol	well	gently undulating to strongly rolling
AA7	Podzolic Gray Luvisol	Orthic Ferro-Humic Podzol, Lithic Orthic Ferro-Humic Podzol	moderately well, seepage	steeply to extremely sloping
AA8	Podzolic Gray Luvisol	Degraded Dystric Brunisol	moderately well, seepage	steeply to extremely sloping

ABLE MOUNTAIN Soil Association - AB

Location. Able Mountain soils are found north of Canim Lake in the Quesnel Highland and cover 0.26 percent (5,010 acres) of the map area. The elevational range of these soils is 3500' to 5000'.

Forest Zonation. These soils are found in the Subalpine Engelmann spruce - alpine fir zone of the Interior Wet Belt region.

Soils and Parent Material. Able Mountain soils have developed on gravelly loam to gravelly clay loam glacial till >5' deep and on a veneer <5' thick of similar till derived mainly from metamorphic and volcanic rocks. The surface textures of these soils are sandy loam and gravelly sandy loam. Able Mountain soils are found on terrain which varies from gently undulating to extremely sloping. The modal profile classification is Podzolic Gray Luvisol.

Drainage. Able Mountain soils are well to imperfectly drained with some slopes affected by seepage.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
AB1	Podzolic Gray Luvisol	---	well	gently undulating to strongly rolling or strongly sloping
AB3	Podzolic Gray Luvisol	Gleyed Podzolic Gray Luvisol	well to imperfect	gently undulating to strongly rolling; depressional areas; steep, moisture receiving positions
AB4	Gleyed Podzolic Gray Luvisol	Podzolic Gray Luvisol	imperfect to well	depressional areas
AB5	Podzolic Gray Luvisol	Orthic Humo-Ferric Podzol	moderately well, seepage	steeply to extremely sloping
AB6	Podzolic Gray Luvisol	Lithic Orthic Humo-Ferric Podzol	well	gently undulating to strongly rolling

ARCHIE Soil Association - AC

Location. Archie soils occur on the Fraser Plateau, very often in association with the Lynn soils. Specific areas of occurrence are: south of Bonaparte Lake in the Estelle and Adler lakes area and along the northwest boundary of the map area. Their elevational range is 4000' to 5500' and they represent 1.94 percent (37,200 acres) of the map area.

Forest Zonation. These soils are found in the Subalpine Engelmann spruce - alpine fir zone in the Dry Interior region.

Soils and Parent Material. Archie soils have developed on gravelly sandy loam to gravelly loamy sand glacial till >5' deep and on a veneer <5' thick of similar till that is derived mainly from plutonic rocks. The surface textures vary from sandy loam to gravelly loamy sand. The topographies are mainly gently undulating to strongly rolling. There are relatively small areas of steeply sloping to extemely sloping terrain. The representative soil profile is Podzolic Gray Luvisol.

Drainage. Archie soils are well, moderately well and imperfectly drained with some slopes having seepage moisture.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
AC1	Podzolic Gray Luvisol	Orthic Humo-Ferric Podzol	well to moderately well, seepage	steeply to extremely sloping
AC2	Podzolic Gray Luvisol	Gleyed Podzolic Gray Luvisol	well to imperfect	gently undulating to strongly rolling; depressional areas; steep, moisture receiving positions
AC3	Podzolic Gray Luvisol	Degraded Dystric Brunisol, Brunisolic Gray Luvisol	moderately well, seepage	steeply to extremely sloping
AC4	Gleyed Podzolic Gray Luvisol	Podzolic Gray Luvisol	imperfect to well	depressional areas
AC5	Podzolic Gray Luvisol	Orthic Ferro-Humic Podzol	moderately well, seepage	steeply to extremely sloping
AC6	Podzolic Gray Luvisol		well	gently undulating to strongly rolling
AC7	Podzolic Gray Luvisol	Lithic Orthic Humo-Ferric Podzol	well	gently undulating to strongly rolling

ARCHIE Soil Association - AC (CONTINUED)

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
AC8	Lithic Orthic Humo-Ferric Podzol	Podzolic Gray Luvisol	well	gently undulating to strongly rolling

AUGUST Soil Association - AG

Location. August soils are located north of Mahood Lake in the Quesnel Highland at an elevational range of 4500' to 5500' and they occupy 0.05 percent (970 acres) of the map area.

Forest Zonation. These soils occur in the Subalpine Engelmann spruce - alpine fir zone in the Interior Wet Belt region.

Soils and Parent Material. These soils have developed on gravelly sandy loam to gravelly loamy sand glacial till >5' deep and on a veneer <5' thick of similar till that is derived mainly from plutonic rocks. Surface textures vary from sandy loam to gravelly loamy sand, and topographies range from level to extremely sloping. The modal soil profile classification is Luvisolic Humo-Ferric Podzol.

Drainage. August soils are mostly moderately well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
AG1	Luvisolic Humo-Ferric Podzol	Orthic Humo-Ferric Podzol	moderately well, seepage	steeply to extremely sloping
AG7	Luvisolic Humo-Ferric Podzol	Lithic Orthic Humo-Ferric Podzol	moderately well to well	level areas; gently undulating to strongly rolling

AMBUSH Soil Association - AH

Location. Ambush soils occur from south of Bonaparte Lake on the Fraser Plateau to Eakin Creek in the north. They occupy 2.14 percent (40,960 acres) of the map area.

Forest Zonation. These soils occur in the Subalpine Engelmann spruce - alpine fir zone in the Dry Interior region.

Soils and Parent Material. These soils have developed on gravelly sandy loam to gravelly loamy sand glacial till >5' deep and on a veneer <5' thick of similar till that is derived mainly from plutonic rocks. Surface textures vary from sandy loam to gravelly loamy sand and topographies range from undulating to extremely sloping. Brunisolic Gray Luvisol is the modal profile classification.

Drainage. Ambush soils are well to imperfectly drained with seepage moisture existing on some sites.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
AH1	Brunisolic Gray Luvisol		well	undulating to strongly rolling
AH2	Brunisolic Gray Luvisol	Gleyed Brunisolic Gray Luvisol	well to imperfect	undulating to strongly rolling; depressional areas; steep, moisture receiving positions
AH3	Brunisolic Gray Luvisol	Degraded Eutric Brunisol	well	steeply to extremely sloping; usually south facing
AH4	Brunisolic Gray Luvisol	Orthic Humo-Ferric Podzol	moderately well, seepage	steeply to extremely sloping
AH5	Gleyed Brunisolic Gray Luvisol	Brunisolic Gray Luvisol	imperfect to well	depressional areas
AH6	Brunisolic Gray Luvisol	Degraded Dystric Brunisol	well to moderately well, seepage	steeply to extremely sloping
AH10	Brunisolic Gray Luvisol	Lithic Degraded Dystric Brunisol	well	undulating to strongly rolling
AH11	Lithic Degraded Dystric Brunisol	Brunisol Gray Luvisol	well	undulating to strongly rolling

ALKALI Soil Association - AK

Location. Alkali soils occur on the Fraser Plateau and range from the southern boundary of the map area near Bob Creek to as far north as Boss Creek. Their elevational range is 4500' to 5500' and they occupy 4.94 percent ((94,470 acres) of the map area.

Forest Zonation. These soils are found in the Subalpine Engelmann spruce - alpine fir zone of the Dry Interior region.

Soils and Parent Material. Alkali soils have developed on gravelly loam to gravelly clay loam glacial till >5' deep and on a veneer <5' thick of similar till that is derived mainly from metamorphic and volcanic rocks. Their surface textures are sandy loam and gravelly sandy loam. The soils occur on gently undulating to extremely sloping terrain. The modal soil is classified as Podzolic Gray Luvisol.

Drainage. These soils are well to imperfectly drained with seepage moisture occuring on some sites.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
AK1	Podzolic Gray Luvisol		well	gently undulating to strongly rolling
AK2	Podzolic Gray Luvisol	Brunisolic Gray Luvisol	well	steeply to extremely sloping; usually south facing
AK3	Podzolic Gray Luvisol	Gleyed Brunisolic Gray Luvisol	well to imperfect	gently undulating to strongly rolling; depressional areas; steep, moisture receiving positions
AK4	Gleyed Podzolic Gray Luvisol	Podzolic Gray Luvisol	imperfect to well	depressional areas; moisture receiving positions
AK5	Podzolic Gray Luvisol	Orthic Humo-Ferric Podzol	moderately well	steeply to extremely sloping
AK6	Podzolic Gray Luvisol	Lithic Orthic Humo-Ferric Podzol	well	gently undulating to strongly rolling
AK7	Podzolic Gray Luvisol	Orthic Ferro-Humic Podzol, Lithic Orthic Ferric-Humic Podzol	moderately well, seepage	steeply to extremely sloping
AK8	Podzolic Gray Luvisol	Degraded Dystric Brunisol	moderately well, seepage	steeply to extremely sloping

ALLIE Soil Association - AL

Location. Allie soils occur on the Thompson Plateau and are located south of Little Fort on the slopes above the North Thompson River. They range in elevation from 1100' to 3500' and cover 1.99 percent (38,100 acres) of the map area.

Forest Zonation. These soils are found in the Interior Douglas fir zone; Lodgepole pine subzone in the Dry Interior region.

Soils and Parent Material. These soils have developed on gravelly loam to gravelly clay loam, calcareous glacial till >5' deep and on a veneer <5' thick of similar till that is derived mainly of metamorphic and volcanic rocks. Surface textures are sandy loam and gravelly sandy loam, and topographies range from gently undulating to steeply sloping. Brunisolic Gray Luvisol is the predominant soil development.

Drainage. Drainage ranges from well to imperfect with some slopes displaying seepage moisture.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
AL1	Brunisolic Gray Luvisol		well	gently undulating to strongly rolling
AL2	Brunisolic Gray Luvisol	Degraded Eutric Brunisol	well	steeply to extremely sloping; usually not north facing
AL3	Brunisolic Gray Luvisol	Gleyed Brunisolic Gray Luvisol	well to imperfect	gently undulating to strongly rolling; depressional areas; steep, moisture receiving positions
AL4	Brunisolic Gray Luvisol	Lithic Degraded Eutric Brunisol	well	gently undulating to strongly rolling
AL5	Gleyed Brunisolic Gray Luvisol	Brunisolic Gray Luvisol	imperfect to well	depressional areas
AL7	Brunisolic Gray Luvisol	Degraded Eutric Brunisol	moderately well	steeply to extremely sloping

ARMOUR Soil Association - AM

Location. Armour soils occur east of Little Fort at 5500' and higher elevations in the Shuswap Highland, and cover 0.16 percent (3,060 acres) of the map area.

Forest Zonation. Armour soils are found in the Subalpine Engelmann spruce - alpine fir zone; Krummholz subzone in the Dry Interior region.

Soils and Parent Material. These soils have developed on gravelly sandy loam to gravelly loamy sand glacial till >5' deep and on a veneer <5' thick of similar till which is derived from plutonic bedrocks. Soil surface textures range from loamy sand to gravelly loamy sand, and topographies are level to extremely sloping. Orthic Ferro-Humic Podzol is the predominant soil development.

Drainage. Drainage ranges from well to moderately well with seepage moisture occurring on some moderately well drained sites.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
AM3	Orthic Ferro-Humic Podzol		moderately well	level to strongly rolling
AM4	Orthic Ferro-Humic Podzol	Sombric Ferro-Humic Podzol	moderately well, seepage	strongly sloping, to moderately rolling
AM5	Orthic Ferro-Humic Podzol		moderately well	steeply to extremely sloping

ARTISON Soil Association - AN

Location. Artison soils occur on the Thompson Plateau and are found between 3500' and 4500' elevations on both sides of the North Thompson River south of Blackpool and on the slopes above Louis Creek. They occupy 1.91 percent (36,580 acres) of the map area.

Forest Zonation. Artison soils are found in the Interior Douglas-fir zone; Lodgepole pine subzone in the Dry Interior region.

Soils and Parent Material. Artison soils have developed on gravelly loam to gravelly clay loam glacial till >5' deep and on a veneer <5' thick of similar till that is derived mainly from metamorphic and volcanic rocks. The textures of the soil surfaces are sandy loam and gravelly sandy loam. The topographies vary from undulating to extremely sloping. The predominant soil development is Brunisolic Gray Luvisol.

Drainage. These soils are well to imperfectly drained with some slopes displaying seepage moisture.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
AN1	Brunisolic Gray Luvisol		well	gently undulating to strongly rolling
AN3	Brunisolic Gray Luvisol	Degraded Eutric Brunisol	well	steeply to extremely sloping; usually south facing
AN4	Brunisolic Gray Luvisol	Podzolic Gray Luvisol	moderately well, seepage	steeply to extremely sloping
AN5	Brunisolic Gray Luvisol	Gleyed Brunisolic Gray Luvisol	well to imperfect	gently undulating to strongly rolling; depressional areas; steep, moisture receiving positions
AN6	Brunisolic Gray Luvisol	Degraded Dystric Brunisol	moderately well, seepage	steeply to extremely sloping
AN8	Gleyed Brunisolic Gray Luvisol	Brunisolic Gray Luvisol	imperfect to well	depressional areas
AN9	Brunisolic Gray Luvisol	Lithic Degraded Dystric Brunisol	well	gently undulating to strongly rolling
AN10	Brunisolic Gray Luvisol	Orthic Humo-Ferric Podzol	moderately well, seepage	steeply to extremely sloping

ASTORIA Soil Association - AO

Location. Astoria soils occur east of the North Thompson River and south of Clearwater in the Shuswap Highland at elevations between 4000' and 5000', and they cover 0.09 percent (1,900 acres) of the map area.

Forest Zonation. These soils occur in Subalpine Engelmann spruce - alpine fir zone in the Dry Interior region.

Soils and Parent Material. Astoria soils have developed on gravelly sandy loam to gravelly loamy sand glacial till >5' deep and on a veneer <5' thick of similar till that is derived largely from plutonic rocks. The surface textures vary from sandy loam to gravelly loamy sand. The topographies of the soils are strongly sloping to steeply sloping. Soil development is predominantly Podzolic Gray Luvisol.

Drainage. Astoria soils are moderately well drained with seepage moisture on some sites.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
AO1	Podzolic Gray Luvisol	Orthic Humo-Ferric Podzol	moderately well, seepage	strongly to steeply sloping

AQUALINE Soil Association - AQ

Location. Aqualine soils are situated on the Thompson Plateau west of the North Thompson River, east of Darlington Creek, and south of Little Fort. Their elevational range is from 1100' to 3000' and they occupy 0.42 percent (8,080 acres) of the map area.

Forest Zonation. Aqualine soils are located in the Interior Douglas-fir zone; Lodgepole pine subzone in the Dry Interior region.

Soils and Parent Material. These soils have developed on gravelly sandy loam to gravelly loamy sand glacial till >5' deep and on a veneer <5' thick of similar till that is derived largely from plutonic rocks. Surface textures of the soils vary from sandy loam to gravelly loamy sand, and topographies range from level to extremely sloping. The predominant soil development is Brunisolic Gray Luvisol.

Drainage. Drainage ranges from well to moderately well with seepage moisture occurring on some sites.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
AQ5	Brunisolic Gray Luvisol	Degraded Eutric Brunisol	well	steeply to extremely sloping; usually not north facing
AQ7	Lithic Degraded Eutric Brunisol	Brunisolic Gray Luvisol	well	level and gently undulating to strongly rolling
AQ8	Brunisolic Gray Luvisol	Orthic Gray Luvisol	well	moderately rolling
AQ10	Brunisolic Gray Luvisol		well	undulating to strongly sloping
AQ11	Brunisolic Gray Luvisol		moderately well, seepage	steeply to extremely sloping

AURORA Soil Association - AR

Location. Aurora soils occur on the uplands of the Shuswap Highland west of the Clearwater River and north of Mann Creek. Their elevational range is from 4000' to 5500' and they cover 2.95 percent (56,470 acres) of the map area.

Forest Zonation. These soils occur in the Subalpine Engelmann spruce - alpine fir zone in the Dry Interior region.

Soils and Parent Material. Aurora soils have developed on gravelly sandy loam to gravelly loamy sand glacial till >5' deep and on a veneer <5' thick of similar till which is derived from plutonic bedrocks. The soil surfaces have loamy sand to gravelly loamy sand textures, and topographies vary from undulating to extremely sloping. The predominant soil development is Orthic Humo-Ferric Podzol.

Drainage. Drainage ranges from well to imperfect.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
AR1	Orthic Humo-Ferric Podzol		well	gently undulating to level
AR2	Orthic Humo-Ferric Podzol	Gleyed Orthic Humo-Ferric Podzol	well to imperfect	gently undulating to strongly rolling; depressional areas
AR3	Gleyed Orthic Humo-Ferric Podzol	Orthic Humo-Ferric Podzol	well	depressional areas
AR4	Orthic Humo-Ferric Podzol	Lithic Orthic Humo-Ferric Podzol	well	gently undulating
AR5	Lithic Orthic Humo-Ferric Podzol	Orthic Humo-Ferric Podzol	well	gently undulating
AR6	Orthic Humo-Ferric Podzol		moderately well, seepage	steeply to extremely sloping

ALANS Soil Association - AS

Location. Alans soils are located on the Fraser Plateau from 3500' to 4000' elevation, mainly between the Deadman and Bonaparte rivers. They represent 2.47 percent (47,320 acres) of the map area.

Forest Zonation. Alans soils are found in the White spruce zone in the Dry Interior region.

Soils and Parent Material. These soils have developed on gravelly sandy loam to gravelly loamy sand glacial till >5' deep and on a veneer <5' thick of similar till which is derived largely from plutonic rocks. The surface textures of the soils range from sandy loam to gravelly loamy sand. The topographies range from gently rolling to very steeply sloping. Soil development is predominantly Orthic Gray Luvisol.

Drainage. Drainage ranges from well to imperfect with some slopes displaying seepage moisture.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
AS5	Orthic Gray Luvisol	Degraded Eutric Brunisol	well	steeply to extremely sloping
AS6	Orthic Gray Luvisol	Degraded Dystric Brunisol	moderately well, seepage	gently to steeply sloping
AS7	Lithic Degraded Eutric Brunisol	Orthic Gray Luvisol	well	level to gently undulating or strongly rolling
AS8	Orthic Gray Luvisol	Brunisolic Gray Luvisol	well	gently undulating to strongly rolling
AS10	Orthic Gray Luvisol		well	gently undulating to strongly rolling
AS11	Orthic Gray Luvisol	Gleyed Orthic Gray Luvisol	well to imperfect	undulating to strongly rolling

ART Soil Association - AT

Location. Art soils occur on the Fraser Plateau. They lie in an area extending from Mayson and Allan Lakes to Powder Lake in the north, and from Latremouille Lake to the Canimred River. Their elevational range is from 3500' to 4500' and they cover 5.27 percent (100,630 acres) of the map area.

Forest Zonation. These soils are located in the Subalpine Engelmann spruce - alpine fir zone of the Dry Interior Forest region.

Soils and Parent Material. Art soils have developed on gravelly loam to gravelly clay loam glacial till >5' deep and on a veneer <5' thick of similar till that is derived mainly from metamorphic and volcanic rocks. The textures of the soil surfaces are sandy loam or gravelly sandy loam. The topographies of the soils vary from undulating to extremely sloping. The modal soil is classified as Brunisolic Gray Luvisol.

Drainage. These soils are well to imperfectly drained with seepage moisture on some sites.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
AT1	Brunisolic Gray Luvisol		well	gently undulating to strongly rolling
AT3	Brunisolic Gray Luvisol	Degraded Eutric Brunisol	well	steeply to extremely sloping; usually south facing
AT4	Brunisolic Gray Luvisol	Podzolic Gray Luvisol	moderately well, seepage	steeply to extremely sloping
AT5	Brunisolic Gray Luvisol	Gleyed Brunisolic Gray Luvisol	well to imperfect	gently undulating, depressional areas and steep receiving positions
AT6	Brunisolic Gray Luvisol	Degraded Dystric Brunisol	moderately well, seepage	steeply to extremely sloping
AT8	Gleyed Brunisolic Gray Luvisol	Brunisolic Gray Luvisol	imperfect	depressional areas
AT9	Brunisolic Gray Luvisol	Lithic Degraded Dystric Brunisol	well	gently undulating to strongly rolling
AT10	Brunisolic Gray Luvisol	Orthic Humo-Ferric Podzol	moderately well, seepage	steeply to extremely sloping

ALLENTOWN Soil Association - AW

Location. Allentown soils occur at elevations from 3500' to 4500' on an area of the Thompson Plateau that is west of the North Thompson River, east of Darlington Creek and south of Little Fort. They occupy 0.42 percent (7,680 acres) of the map area.

Forest Zonation. These soils are found in the Interior Douglas-fir zone; Lodgepole pine subzone of the Dry Interior Forest region.

Soils and Parent Material. Allentown soils have developed on gravelly sandy loam to gravelly loamy sand glacial till >5' deep and on a veneer <5' thick of similar till that is derived largely from plutonic rocks. Their surface textures range from sandy loam to gravelly loamy sand and their topographies vary from gently undulating to extremely sloping. The representative soil profile is Brunisolic Gray Luvisol.

Drainage. These soils are well to moderately well drained with seepage moisture occurring on some slopes.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
AW6	Brunisolic Gray Luvisol	Degraded Dystric Brunisol	moderately well, seepage	steeply to extremely sloping
AW10	Brunisolic Gray Luvisol	Lithic Degraded Dystric Brunisol	well	gently undulating to strongly rolling
AW11	Lithic Degraded Dystric Brunisol	Brunisolic Gray Luvisol	well	gently undulating to strongly rolling

BARRIERE Soil Association - BA

Location. Barriere soils occur on the floodplain of the North Thompson River north of Little Fort. The physiographic region is the Thompson Plateau. Their elevational range is 1100' to 1500' and they occupy 0.16 percent (3,190 acres) of the map area.

Forest Zonation. These soils occur in the Interior Douglas fir zone; Lodgepole pine subzone of the Dry Interior region.

Soils and Parent Material. Barriere soils have developed on recent alluvial deposits. Textures grade from silt loam or silty clay loam in the surface through fine sandy loam or silt loam to loamy sand or sand in the subsoil. The soils have topographies that vary from level to depressional. Orthic Regosol is the predominant soil development.

Drainage. Drainage ranges from moderately well to poor.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
BA1	Orthic Regosol		moderately well	level
BA2	Orthic Regosol	Gleyed Cumulic Regosol, Gleyed Orthic Regosol	moderately well to imperfect	level with depressional areas
BA3	Gleyed Orthic Regosol, Gleyed Cumulic Regosol	Rego Humic Gleysol	imperfect to poor	depressional locations in level areas
BA4	Rego Humic Gleysol	Gleyed Orthic Regosol	poor to imperfect	depressional locations in level areas

BYRD CREEK Soil Association - BD

Location. Byrd Creek soils occur in the Shuswap Highland physiographic region north of Blackpool along the North Thompson River, in Wells Gray Park along Hemp and Trout creeks, and on the floodplain of Deception Creek. They range in elevation from 1100' to 3000' and cover 0.24 percent (4,590 acres) of the map area.

Forest Zonation. These soils are located in the Interior western hemlock - western red cedar zone of the Interior Wet Belt region.

Soils and Parent Material. These soils have developed on recent alluvial deposits. Textures grade from silt loam or fine sandy loam in the surface to loamy sand or sand in the subsoil. The topographies range from level to depressional. The predominant soil development is Orthic Regosol.

Drainage. Drainage ranges from moderately well to poor.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
BD1	Orthic Regosol		moderately well	level
BD2	Orthic Regosol	Gleyed Orthic Regosol	moderately well to imperfect	level with minor depressional areas
BD3	Gleyed Orthic Regosol	Rego Humic Gleysol	imperfect to poor	depressional sites in level areas

Plate 14: Byrd Creek Soil Association landscape in the middle-ground. The parent material is a fine sandy loam recent alluvial deposit.

BETHEL Soil Association - BE

Location. Bethel soils are located between 3500' and 5500' elevation in the Quesnel Highland. They occupy less than 0.01 percent (200 acres) of the map area.

Forest Zonation. These soils occur in the Subalpine Engelmann spruce - alpine fir zone of the Interior Wet Belt region.

Soils and Parent Material. These soils have developed on recent alluvial deposits. Textures grade from silt loam or fine sandy loam in the surface to loamy sand or sand in the subsoil. Topographies vary from undulating to level. The predominant soil development is Orthic Regosol.

Drainage. Drainage is mainly moderately well.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
BE1	Orthic Regosol		moderately well	level
BE2	Orthic Regosol	Gleyed Orthic Regosol	moderately well to imperfect	level areas with depressions; gently undulating to undulating

BUFFALO Soil Association - BF

Location. Buffalo soils are found between 2500' and 3500' elevation in an area of the Fraser Plateau that is north of Bridge Creek and west of Canim Lake. They occupy 0.03 percent (760 acres) of the map area.

Forest Zonation. Buffalo soils are found in the White spruce zone of the Dry Interior region.

Soils and Parent Material. These soils have developed on silt loam to silty clay loam glaciolacustrine deposits. Their surface texture is silt loam and they occur mainly on steeply sloping south facing slopes and some strongly rolling topographies. Orthic Dark Gray is the dominant soil development. Although these soils are perhaps not true grassland soils, they express grasslands-type conditions because of repeated burnings and southerly exposure.

Drainage. The soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
BF3	Orthic Dark Gray	Dark Gray Luvisol	well	strongly rolling to steeply sloping, south facing slopes

BLACKPOOL Soil Association - BL

Location. Blackpool soils occur in the Thompson Plateau physiographic region and are located at elevations ranging from 1100' to 1500' on that part of the North Thompson River floodplain north of Chu Chua. They cover 0.09 percent (1,850 acres) of the map area.

Forest Zonation. These soils are found in the Interior Douglas-fir zone; Lodgepole pine subzone of the Dry Interior region.

Soils and Parent Material. Blackpool soils have developed on recent alluvial deposits. Textures grade from silt loam or fine sandy loam in the surface to loamy sand or sand in the subsoil. Topographies range from depressional positions in level areas to gently undulating. The chief soil development is Degraded Eutric Brunisol.

Drainage. These soils are predominantly well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
BL1	Degraded Eutric Brunisol		well	level
BL2	Degraded Eutric Brunisol	Cumulic Regosol	well to moderately well	level to gently undulating
BL3	Degraded Eutric Brunisol	Gleyed Degraded Eutric Brunisol	well to imperfect	level with minor depressional areas
BL5	Degraded Eutric Brunisol	Rego Humic Gleysol	well to poor	level with minor depressional areas

BOTTREL Soil Association - BO

Location. Bottrel soils occupy less than 0.01 percent (370 acres) of the map area. They are located in the Shuswap Highland and their elevational range is from 3800' to 5500'.

Forest Zonation. These soils are found in the Subalpine Engelmann spruce - alpine fir zone in the Dry Interior region.

Soils and Parent Material. Bottrel soils have developed on recent alluvial deposits. Textures vary from silt loam to fine sandy loam and topographies are level with depressional areas. The major soil development is Orthic Regosol.

Drainage. Bottrel soils are predominantly moderately well drained with minor poorly drained areas.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
BO2	Orthic Regosol	Gleyed Orthic Regosol	moderately well to imperfect	level areas with depressions
BO3	Rego Humic Gleysol	Gleyed Orthic Regosol	poor to imperfect	level areas with depressions

BESTER Soil Association - BR

Location. Bester soils occur in the Thompson Plateau physiographic region north of Chu Chua in the North Thompson River Valley at elevations between 1100' and 1500'. They occupy 0.16 percent (3,180 acres) of the map area.

Forest Zonation. Bester soils occur in the Interior Douglas-fir zone; Lodgepole pine subzone in the Dry Interior region.

Soils and Parent Material. These soils have developed on recent alluvial deposits. Textures grade from silt loam or silty clay loam in the surface to sand or loamy sand in the subsoil. Topographies vary from level areas with depressions to gently undulating. The main soil development is Rego Humic Gleysol.

Drainage. These soils are poorly to imperfectly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
BR1	Rego Humic Gleysol	Gleyed Orthic Regosol	poor to imperfect	depressional sites in level and undulating areas
BR2	Rego Humic Gleysol	Degraded Eutric Brunisol	poor to well	gently undulating
BR3	Gleyed Orthic Regosol	Rego Humic Gleysol	imperfect to poor	depressional sites in level and undulating areas

BEAVERHUT Soil Association - BT

Location. Beaverhut soils occur in the Fraser Plateau physiographic region and extend from the southern boundary of the map area to south of Bonaparte Lake. They range from 5000' to 5500' in elevation and cover 1.27 percent (24,260 acres) of the map area.

Forest Zonation. Beaverhut soils occur in the Subalpine Engelmann spruce - alpine fir zone of the Dry Interior region.

Soils and Parent Material. The Beaverhut soils have developed on gravelly sandy loam to gravelly loam glacial till >5' deep and on a veneer <5' thick of similar till that is derived from volcanic bedrocks. The surface textures of these soils are sandy loam and gravelly sandy loam. The soils occur mainly on gently undulating to strongly rolling terrain. The modal profile classification is Podzolic Gray Luvisol.

Drainage. These soils are moderately well to imperfectly drained with some slopes displaying seepage moisture.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
BT1	Podzolic Gray Luvisol		moderately well	gently undulating to strongly rolling
BT2	Podzolic Gray Luvisol		moderately well, seepage moisture	gently sloping
BT3	Podzolic Gray Luvisol	Gleyed Podzolic Gray Luvisol	moderately well to imperfect	gently undulating to strongly rolling; some depressional areas and moisture receiving positions
BT4	Gleyed Podzolic Gray Luvisol	Podzolic Gray Luvisol	imperfect to moderately well	gently undulating to strongly rolling; common depressional areas and moisture receiving positions
BT6	Podzolic Gray Luvisol	Lithic Orthic Humo-Ferric Podzol	moderately well to well	gently undulating to strongly rolling
BT7	Lithic Orthic Humo-Ferric Podzol	Podzolic Gray Luvisol	well to moderately well	gently undulating to strongly rolling

BEAVER Soil Association - BV

Location. Beaver soils occur in the Fraser Plateau physiographic region and are located mainly along the Deadman and Bonaparte rivers and Criss Creek. They range in altitude from 1100' to 3500' and occupy 0.55 percent (10,570 acres) of the map area.

Forest Zonation. Beaver soils occur in the White spruce zone of the Dry Interior region.

Soils and Parent Material. These soils have developed on recent alluvial deposits. Textures vary from fine sandy loam to sand; the finer textures are usually near the surface. Topographies range from level to depressional locations in level areas. The predominant soil development is Orthic Regosol.

Drainage. These soils are well to poorly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
BV1	Orthic Regosol		well	level
BV2	Orthic Regosol	Gleyed Cumulic Regosol	well to imperfect	level with depressional areas
BV3	Gleyed Orthic Regosol	Rego Humic Gleysol	imperfect to poor	depressional sites in level areas
BV4	Rego Humic Gleysol	Gleyed Orthic Regosol	poor to imperfect	depressional sites in level areas

BOXER CREEK Soil Association - BX

Location. Boxer Creek soils occur on the Fraser Plateau near the southern and northern boundaries of the map area. The elevation of the soils ranges from 3500' to 5500' and they occupy 0.13 percent (2,520 acres) of the map area.

Forest Zonation. These soils occur in the Subalpine Engelmann spruce - alpine fir zone in the Dry Interior region.

Soils and Parent Material. Boxer Creek soils have developed on recent alluvial deposits. Textures vary from fne sandy loam to sand; the finer textures are usually near the surface. The topography is level but there are also depressional areas within the level areas. The chief soil development is Gleyed Orthic Regosol.

Drainage. Boxer Creek soils are imperfectly to poorly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
BX3	Gleyed Orthic Regosol	Rego Humic Gleysol	imperfect to poor	some depressional sites in level areas
BX4	Rego Humic Gleysol	Gleyed Orthic Regosol	poor to imperfect	level areas with some slight ridges

CHASM Soil Association - CM

Location. Chasm soils are found along the western boundary of the map area. They occur on the Fraser Plateau at elevations from 3100' to 3700' on south facing slopes north of Hamilton Creek. They represent 0.07 percent (1,470 acres) of the map area.

Forest Zonation. These soils occur in the White spruce zone in the Dry Interior region.

Soils and Parent Material. Chasm soils have developed on angular, gravelly loamy sand colluvium usually <5' deep, which is derived from volcanic rocks. Their surface textures are gravelly loamy sand or loamy sand and their topographies vary from strongly rolling to extremely sloping. The modal profile is classified as Degraded Eutric Brunisol.

Drainage. Chasm soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
CM1	Degraded Eutric Brunisol	Lithic Degraded Eutric Brunisol	well	strongly rolling to very hilly, and steeply to extremely sloping

CRATER Soil Association - CR

Location. Crater soils occur in the Shuswap Highland, on the floor of the North Thompson Valley between Blackpool and Clearwater. They range from 1100' to 1500' in elevation, and occupy 0.06 percent (1,160 acres) of the map area.

Forest Zonation. These soils are found in the Interior western hemlock - western red cedar zone of the Interior Wet Belt region.

Soils and Parent Material. Crater soils have developed on loamy sand to gravelly sand alluvial deposits. Surface textures range from loamy sand to gravelly sand, and topographies vary from level to very gently sloping. The modal soil is classified as Orthic Eutric Brunisol.

Drainage. Crater soils are rapidly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
CR1	Orthic Eutric Brunisol	Degraded Dystric Brunisol	rapid	level to very gently sloping

DUNLEAVY Soil Association - D

Location. Dunleavy soils occur in the Thompson Plateau physiographic region and are located at elevations from 1100' to 3500' in the valleys of Louis Creek and the North Thompson River, mainly between Chu Chua and Blackpool. They cover 0.18 percent (3,565 acres) of the map area.

Forest Zonation. Dunleavy soils are found in the Interior Douglas-fir zone; Lodgepole pine subzone in the Dry Interior region.

Soils and Parent Material. These soils have developed on loamy sand to gravelly sand alluvial fan deposits. Their surface textures vary from loamy sand to gravelly sand. The Dunleavy soils occur on fan shaped terrain which is very gently sloping to strongly sloping. The dominant soil development is Degraded Eutric Brunisol.

Drainage. These soils are well to imperfectly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
D1	Degraded Eutric Brunisol		well	very gently to strongly sloping
D3	Degraded Eutric Brunisol	Gleyed Degraded Eutric Brunisol, Orthic Regosol	well to imperfect	very gently to strongly sloping
D4	Degraded Eutric Brunisol	Orthic Gray Luvisol	well	very gently to strongly sloping
D5	Gleyed Degraded Eutric Brunisol	Degraded Eutric Brunisol	imperfect to well	very gently to strongly sloping

DRAGONFLY Soil Association - DA

Location. Dragonfly soils occur in the Shuswap Highland and are located in Wells Gray Park northeast of Clearwater. Their elevational range is 2500' to 3500' and they occupy 0.19 percent (3,820 acres) of the map area.

Forest Zonation. Dragonfly soils occur in the Interior western hemlock - western red cedar zone of the Interior Wet Belt region.

Soils and Parent Material. Dragonfly soils have developed on gravelly loamy sand to gravelly sand glacial till >5' deep and on a veneer <5' thick of similar till that is derived from volcanic bedrocks. Their surface textures vary from loamy sand to gravelly sand. The topographies are nearly level to extremely sloping. The modal profile classification is Degraded Eutric Brunisol.

Drainage. These soils are predominantly well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
DA2	Degraded Eutric Brunisol	Lithic Degraded Eutric Brunisol	well	nearly level to gently undulating
DA3	Degraded Eutric Brunisol		well	steeply to extremely sloping
DA4	Degraded Eutric Brunsiol	Gleyed Degraded Eutric Brunisol	well to imperfect	nearly level to gently undulating

DEADMAN Soil Association - DD

Location. Deadman soils occur on the Fraser Plateau between 2500' and 3000' elevations. They are found in a minor area north of Bridge Creek. They cover less than 0.01 percent (120 acres) of the map area.

Forest Zonation. These soils occur in the White spruce zone of the Dry Interior region.

Soils and Parent Material. Deadman soils have developed on loamy sand to gravelly sand alluvial-colluvial fan deposits. Their surface textures range from loamy sand to gravelly sand and they occur on fan shaped landforms which are moderately sloping. The predominant soil development is Orthic Dark Gray.

Drainage. Deadman soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
DD1	Orthic Dark Gray		rapid	moderately sloping

DEKA Soil Association - DE

Location. Deka soils are located at elevations ranging from 2500' to 3500' in the Shuswap Highland. They occur west of Deception Creek and north of the western end of Mahood Lake. They represent 0.06 percent (1,270 acres) of the map area.

Forest Zonation. These soils are found in the Interior western hemlock - western red cedar zone in the Interior Wet Belt region.

Soils and Parent Material. Deka soils have developed on gravelly loam to gravelly clay loam glacial till >5' deep and on a veneer <5' thick of similar till that is derived from black phyllite and shale. Their surface textures are sandy loam or gravelly sandy loam and their topographies vary from strongly rolling to very steeply sloping. The representative soil profile is Orthic Eutric Brunisol.

Drainage. Deka soils are mainly well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
DE2	Orthic Eutric Brunisol	Brunisolic Gray Luvisol	well to moderately well	strongly rolling to very steeply sloping

DARLING Soil Association - DG

Location. Darling soils occur on the Fraser Plateau along the north-eastern shore of Drewy Lake. Their elevational range is 3500' to 4500' and they represent 0.16 percent (3,010 acres) of the map area.

Forest Zonation. Darling soils occur in the Subalpine Engelmann spruce - alpine fir zone of the Dry Interior region.

Soils and Parent Material. Darling soils have developed on loamy sand to gravelly sand alluvial fan deposits. Their surface textures vary from loamy sand or sandy loam to gravelly sand, and they are located on fan shaped landforms where topographies range from very gently to strongly sloping. The principal soil is classified as Orthic Dystric Brunisol.

Drainage. These soils range from mostly well through imperfectly to poorly drained with some slopes displaying seepage moisture.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
DG1	Orthic Dystric Brunisol		well	very gently to strongly sloping
DG2	Orthic Dystric Brunisol	Degraded Dystric Brunisol	well to moderately well, seepage	very gently to strongly sloping
DG4	Rego Humic Gleysol	Gleyed Degraded Dystric Brunisol	poor to imperfect	very gently to strongly sloping
DG5	Orthic Dystric Brunisol	Orthic Regosol, Gleyed Degraded Dystric Brunisol	well to imperfect	very gently to strongly sloping
DG7	Gleyed Orthic Dystric Brunisol	Rego Humic Gleysol, Orthic Dystric Brunisol	well to poor	very gently to strongly sloping

DUCKLING Soil Association - DI

Location. Duckling soils occur on the Fraser Plateau west of the North Thompson River Valley at elevations ranging from 2500' to 3500'. They cover 0.08 percent (1,700 acres) of the map area.

Forest Zonation. These soils are located in the White spruce zone of the Dry Interior region.

Soils and Parent Material. Duckling soils have developed on loamy sand to gravelly sand alluvial fan deposits. Their surface textures vary from loamy sand or sandy loam to gravelly sand. The soils occur on fan shaped terrain which is very gently sloping to strongly sloping. The principal soil development is Degraded Eutric Brunisol.

Drainage. Duckling soils are from well to imperfectly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
DI1	Degraded Eutric Brunisol		well	very gently to strongly sloping
DI3	Degraded Eutric Brunisol	Orthic Regosol	well to moderately well	very gently to strongly sloping
DI4	Degraded Eutric Brunisol	Gleyed Degraded Eutric Brunisol	well to imperfect	very gently to strongly sloping
DI5	Gleyed Degraded Eutric Brunisol	Degraded Eutric Brunisol	imperfect to well	very gently to strongly sloping

DANSKIN Soil Association - DK

Location. Danskin soils occur in the Thompson Plateau physiographic region and are located in the North Thompson River Valley south of Blackpool. The elevational range is 1100' to 2500'. They represent 0.04 percent (850 acres) of the map area.

Forest Zonation. Danskin soils occur in the Interior Douglas-fir zone; Ponderosa pine subzone of the Dry Interior region.

Soils and Parent Material. Danskin soils have developed on loamy sand to gravelly sand alluvial fan deposits. Their surface textures vary from loamy sand or sandy loam to gravelly sand and their topographies are very gently sloping to strongly sloping. The modal soil profile is Orthic Regosol.

Drainage. These soils are predominantly well drained with minor areas of poor drainage primarily along the toe of the fans.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
DK1	Orthic Regosol		well	very gently to strongly sloping
DK2	Orthic Regosol	Gleyed Orthic Regosol	well to imperfect	very gently to strongly sloping
DK3	Gleyed Orthic Regosol	Rego Humic Gleysol	imperfect to poor	very gently to moderately sloping

DORRELL Soil Association - DL

Location. Dorrell soils occur in the Thompson Plateau physiographic region and are located between 1100' and 2500' elevation on the side slopes above the North Thompson River and Louis Creek valleys. They occupy approximately 0.22 percent (4,210 acres) of the map area.

Forest Zonation. These soils are found in the Interior Douglas-fir zone; Ponderosa pine subzone of the Dry Interior region.

Soils and Parent Material. Dorrell soils have developed on loamy sand to gravelly sand alluvial fan deposits. Their surface textures range from loamy sand or sandy loam to gravelly sand and they occur on very gently sloping to strongly sloping terrain. Degraded Eutric Brunisol is the main soil development.

Drainage. Dorrell soils are predominantly well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
DL1	Degraded Eutric Brunisol		well	very gently to strongly sloping
DL3	Degraded Eutric Brunisol	Orthic Regosol	well to moderately well	very gently to strongly sloping
DL5	Degraded Eutric Brunisol	Orthic Dark Gray	well	very gently to strongly sloping

DANGER Soil Association - DN

Location. Danger soils occur north of Mahood Lake in the Quesnel Highland at elevations ranging from 3500' to 5000'. They cover 0.27 percent (5,260 acres) of the map area.

Forest Zonation. These soils are found in the Subalpine Engelmann spruce - alpine fir zone of the Interior Wet Belt region.

Soils and Parent Material. Danger soils have developed on gravelly loam to gravelly clay loam glacial till >5' deep and on a veneer <5' thick of similar till that is derived from black phyllite and shale. The surface textures are sandy loam or gravelly sandy loam. The topographies vary from gently undulating to extremely sloping. The predominant soil development is Luvisolic Humo-Ferric Podzol.

Drainage. These soils are well to imperfectly drained with seepage moisture on some sites.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
DN1	Luvisolic Humo-Ferric Podzol		moderately well	gently undulating to strongly rolling
DN2	Luvisolic Humo-Ferric Podzol	Gleyed Luvisolic Humo-Ferric Podzol	moderately well to imperfect	gently undulating to strongly rolling,
DN7	Luvisolic Humo-Ferric Podzol	Lithic Orthic Humo-Ferric Podzol	moderately well to well	gently undulating to strongly rolling
DN8	Lithic Orthic Humo-Ferric Podzol	Luvisolic Humo-Ferric Podzol	well to moderately well	gently undulating to strongly rolling
DN9	Luvisolic Humo-Ferric Podzol	Orthic Humo-Ferric Podzol	moderately well	steeply to extremely sloping

DOREEN Soil Association - DO

Location. Doreen soils are located in the Shuswap Highland between Mahood and Pendleton lakes and on either side of Deception Creek. They range in elevation from 3000' to 4500' and cover 0.87 percent (16,710 acres) of the map area.

Forest Zonation. These soils are found in the Interior western hemlock - western red cedar zone of the Interior Wet Belt region.

Soils and Parent Material. Doreen soils have developed on gravelly loam to gravelly clay loam glacial till >5' deep and on a veneer <5' thick of similar till that is derived from black phyllite and shale. The surface textures are sandy loam or gravelly sandy loam. The topographies are gently undulating to strongly rolling, or steeply to extremely sloping. The representative soil profile is Podzolic Gray Luvisol.

Drainage. These soils are well to imperfectly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
DO1	Podzolic Gray Luvisol		moderately well	gently undulating to strongly rolling
DO3	Podzolic Gray Luvisol	Gleyed Podzolic Gray Luvisol	moderately well to imperfect	mostly gently undulating to strongly rolling; some depressional and steep moisture receiving positions
DO5	Gleyed Podzolic Gray Luvisol	Podzolic Gray Luvisol	imperfect to moderately well	depressional positions in undulating areas, steep moisture receiving positions
DO6	Podzolic Gray Luvisol	Degraded Dystric Brunisol	moderately well	steeply to extremely sloping, usually south facing
DO7	Podzolic Gray Luvisol	Lithic Orthic Humo-Ferric Podzol	moderately well to well	gently undulating to strongly rolling
DO8	Lithic Orthic Humo-Ferric Podzol	Podzolic Gray Luvisol	well to moderately well	gently undulating to strongly rolling

DUNSAPIE Soil Association - DP

Location. Dunsapie soils are located in the Thompson Plateau physiograhic region but occur only northeast of the town of Barriere. The elevational range is 3500' to 4500'. They occupy 0.03 percent (580 acres) of the map area.

Forest Zonation. These soils occur in the Interior Douglas-fir zone; Lodgepole pine subzone in the Dry Interior region.

Soils and Parent Material. These soils have developed on loamy sand to gravelly sand alluvial fan deposits. Their surface textures vary from loamy sand to gravelly sand. The Dunsapie soils occur on fan shaped landforms whose topographies are very gently to strongly sloping. The representative soil profile is Orthic Dystric Brunisol.

Drainage. Drainage ranges from mostly well to imperfect and poor in areas of sepage.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
DP1	Orthic Dystric Brunisol		well	very gently to strongly sloping
DP4	Rego Humic Gleysol	Gleyed Orthic Dystric Brunisol	poor to imperfect	very gently to strongly sloping
DP5	Orthic Dystric Brunisol	Orthic Regosol, Gleyed Orthic Dystric Brunisol	well to imperfect	very gently to strongly sloping

DUNCAN CREEK Soil Association - DU

Location. Duncan Creek soils occur between 1500' and 4500' elevation in the Shuswap Highland, mainly in association with a number of the small streams entering Clearwater River and Hemp Creek. They also occur along the southern shore of Mahood Lake. They represent 0.39 percent (7,600 acres) of the map area.

Forest Zonation. These soils are located in the Interior western hemlock - western red cedar zone of the Interior Wet Belt region.

Soils and Parent Material. Duncan Creek soils have developed on loamy sand to gravelly sand alluvial fan deposits. Their surface textures vary from loamy sand or sandy loam to gravelly sand. The Duncan Creek soils occur on fan shaped landforms with topographies that vary from very gently to steeply sloping. Orthic Eutric Brunisol is the modal profile classification.

Drainage. These soils are mostly well drained with some variation to imperfect or poor drainage on some seepage slopes.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
DU1	Orthic Eutric Brunisol		well	very gently to steeply sloping
DU4	Rego Humic Gleysol	Gleyed Orthic Eutric Brunisol	poor to imperfect	very gently to steeply sloping
DU5	Orthic Eutric Brunisol	Orthic Regosol, Gleyed Orthic Eutric Brunisol	well to imperfect	very gently to steeply sloping
DU6	Orthic Eutric Brunisol	Degraded Dystric Brunisol	well to moderately well	very gently to steeply sloping

DREWRY Soil Association - DY

Location. Drewry soils occur at elevations ranging from 1100' to 3500' on the Fraser Plateau, mainly along the north shore of Canim Lake. They cover 0.02 percent (530 acres) of the map area.

Forest Zonation. Drewry soils are found in the White spruce zone of the Dry Interior region.

Soils and Parent Material. Drewry soils have developed on loamy sand to gravelly sand alluvial fan deposits. Surface textures range from sandy loam or loamy sand to gravelly sand. These soils occur on fan shaped landforms that have topographies varying from very gently to strongly sloping. The modal soil is classified as Orthic Regosol.

Drainage. These soils are mostly well drained with some imperfectly and poorly drained inclusions.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
DY1	Orthic Regosol		well	very gently to strongly sloping
DY2	Orthic Regosol	Gleyed Orthic Regosol	well to imperfect	very gently to strongly sloping
DY3	Gleyed Degraded Eutric Brunisol	Rego Humic Gleysol	imperfect to poor	very gently to strongly sloping

EXLOU Soil Association - E

Location. Exlou soils occur in the Thompson Plateau physiographic region and are located along the valleys of the North Thompson River and Louis Creek. They range from 1100' to 2000' in elevation and represent 0.18 percent (3,580 acres) of the map area.

Forest Zonation. These soils are located in the Interior Douglas-fir zone; Ponderosa pine subzone of the Dry Interior region.

Soils and Parent Material. Exlou soils have developed on silt loam to silty clay loam glaciolacustrine deposits. The surface textures are loam or silt loam and the topographies vary from level to extremely steeply sloping. Orthic Gray Luvisol is the major soil development.

Drainage. Drainage is predominantly well.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
E1	Orthic Gray Luvisol		well	very gently to strongly sloping or undulating to strong rolling
E2	Orthic Gray Luvisol	Degraded Eutric Brunisol	well	steeply to extremely sloping
E3	Orthic Gray Luvisol	Orthic Regosol, Gleyed Orthic Gray Luvisol	well to imperfect	level or very gently sloping
E4	Lithic Orthic Gray Luvisol	Orthic Gray Luvisol	well	steeply to extremely steeply sloping

Plate 15. Exlou Soil Association landscape in the foreground. The parent material is silt loam glaciolacustrine deposit.

EUGENE Soil Association - EE

Location. Eugene soils are common on the Fraser Plateau at elevations between 3500' and 4000'. They occur from the southern border of the map area to Canim Lake in the northwest and occupy 13.76 percent (262,850 acres) of the map area.

Forest Zonation. These soils are located in the White spruce zone in the Dry Interior region.

Soils and Parent Material. Eugene soils have developed on gravelly sandy loam to gravelly loam glacial till >5' deep and on a veneer <5' thick of similar till that is derived from volcanic bedrocks. Their surface textures are sandy loam or gravelly sandy loam and topographies vary from gently undulating to extremely sloping. The major soil development is Orthic Gray Luvisol.

Drainage. Drainage ranges from mostly well to imperfect on seepage sites.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
EE1	Orthic Gray Luvisol		well	gently undulating to strongly rolling
EE2	Orthic Gray Luvisol	Gleyed Orthic Gray Luvisol	well to imperfect	gently undulating to strongly rolling
EE3	Orthic Gray Luvisol	Brunisolic Gray Luvisol	well	gently undulating to strongly rolling
EE4	Orthic Gray Luvisol	Degraded Dystric Brunisol	moderately well	gently to steeply sloping
EE5	Gleyed Orthic Gray Luvisol	Orthic Gray Luvisol	imperfect to well	depressional locations in undulating areas
EE7	Orthic Gray Luvisol	Dark Gray Luvisol	well	steeply to extremely sloping; south facing
EE8	Orthic Gray Luvisol	Orthic Eutric Brunisol	well	steeply to extremely sloping
EE9	Orthic Gray Luvisol	Lithic Orthic Eutric Brunisol	well	gently undulating to strongly rolling
EE10	Lithic Orthic Eutric Brunisol	Orthic Gray Luvisol	well	gently undulating to strongly rolling

Plate 16. Eugene Soil Assocation landscape in the middle-ground. Parent material is glacial till which overlies plateau lavas.

EJECTA Soil Association - EJ

Location. Ejecta soils occur on the Shuswap Highland in an area south of Mahood Lake and west of the Clearwater River. They range from 4500' to 5500' in elevation and cover 1.49 percent (28,510 acres) of the map area.

Forest Zonation. These soils are found in the Subalpine Engelmann spruce - alpine fir zone in the Dry Interior region.

Soils and Parent Material. Ejecta soils have developed on gravelly loam to gravelly clay loam glacial till >5' deep and on a veneer <5' thick of similar till that is derived mainly from quartz-mica and hornblende-mica schists. These soils have surface textures that are sandy loam or gravelly sandy loam, and their topographies vary from gently undulating to extremely sloping. The modal profile classification is Podzolic Gray Luvisol.

Drainage. Ejecta soils are well to imperfectly drained with seepage moisture on some sites.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
EJ1	Podzolic Gray Luvisol		well	gently undulating to strongly rolling
EJ2	Podzolic Gray Luvisol	Brunisolic Gray Luvisol	well	steeply to extremely sloping; usually south facing
EJ3	Podzolic Gray Luvisol	Gleyed Podzolic Gray Luvisol	well to imperfect	gently undulating to strongly rolling; depressional locations in undulating areas; steep, moisture receiving locations
EJ5	Podzolic Gray Luvisol	Orthic Humo-Ferric Podzol	moderately well to well, seepage	steeply to extremely sloping
EJ6	Podzolic Gray Luvisol	Lithic Orthic Humo-Ferric Podzol	well	gently undulating to strongly rolling
EJ7	Lithic Orthic Humo-Ferric Podzol	Podzolic Gray Luvisol	well	gently undulating to strongly rolling

ELLIOT Soil Association - EL

Location. Elliot soils are located on the Fraser Plateau, between 3000' and 4000' elevation and (represent 0.14 percent (2.780 acres) of the map area.) A significant acreage occurs at the western end of Canim Lake.

Forest Zonation. These soils are found in the White spruce zone of the Dry Interior region.

Soils and Parent Material. Elliot soils have developed on silt loam to silty clay loam, calcareous alluvial deposits. Their surface textures are sandy loam to silt loam and they occur on level to very gently sloping terrain. The predominant soil development is Carbonated Rego Humic Gleysol.

Drainage. Elliot soils are mostly poorly drained with some imperfectly drained inclusions.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
EL1	Carbonated Rego Humic Gleysol	Rego Humic Gleysol	poor	nearly level to very gently sloping
EL2	Carbonated Rego Gleysol	Gleyed Orthic Regosol	poor to imperfect	nearly level to very gently sloping

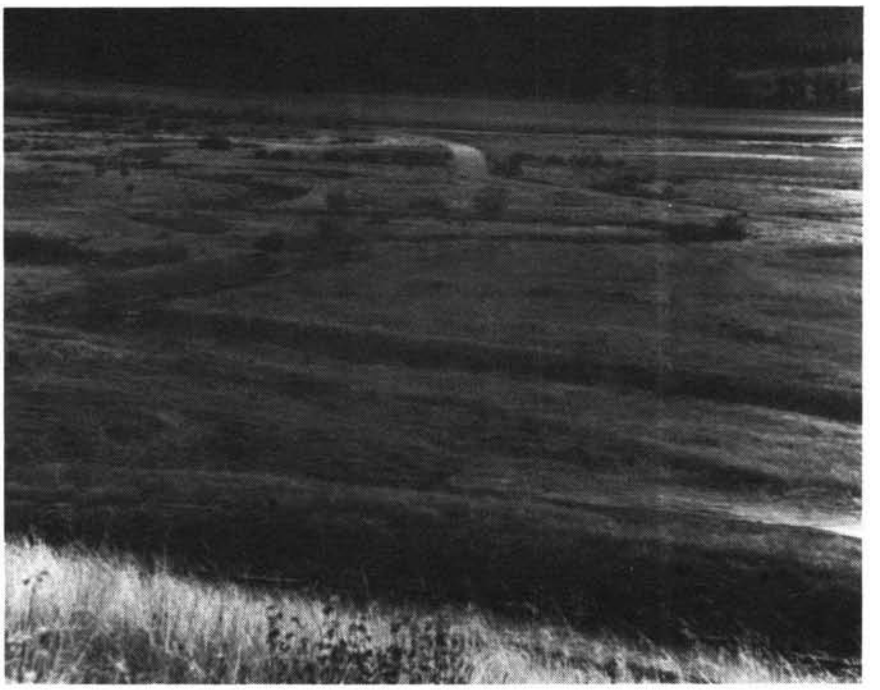


Plate 17. Elliot Soil Association landscape in the fore and middle-ground. The landform is a recent alluvial deposit west of Canim Lake.

ENGLISH LAKE Soil Association - EN

Location. English Lake soils occur north of Mahood Lake in the Quesnel Highland. They range in elevation from 3500' to 5500' and cover 0.12 percent (2,450 acres) of the map area.

Forest Zonation. English Lake soils are found in the Subalpine Engelmann spruce - alpine zone in the Interior Wet Belt region.

Soils and Parent Material. These soils have developed on gravelly loam to gravelly clay loam glacial till >5' deep and on a veneer <5' thick of similar till that is derived mainly from quartz-mica and hornblende-mica schists. The surface textures of the English Lake soils are sandy loam or gravelly sandy loam. The topographies are level to extremely sloping. The representative soil profile is Luvisolic Humo-Ferric Podzol.

Drainage. These soils are well to imperfectly drained with seepage on some sites.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
EN1	Luvisolic Humo-Ferric Podzol		moderately well	gently undulating to strongly rolling
EN3	Luvisolic Humo-Ferric Podzol	Gleyed Luvisolic Humo-Ferric Podzol	moderately well to imperfect	gently undulating to strongly rolling
EN6	Luvisolic Humo-Ferric Podzol	Lithic Orthic Humo-Ferric Podzol	moderately well to well	gently undulating to strongly rolling
EN9	Luvisolic Humo-Ferric Podzol	Orthic Humo-Ferric Podzol	moderately well	steeply to extremely sloping

EXETER Soil Association - EX

Location. Exeter soils are found on the Fraser Plateau, specifically on lands adjacent to Bridge Creek, Bridge and Sheridan lakes, along the western edge of the map area just south of Bridge Creek, and to a lesser extent, along Eagle Creek. Their elevational range is from 3500' to 4000' and they cover 0.44 percent (8,420 acres) of the map area.

Forest Zonation. These soils occur in the White spruce zone in the Dry Interior region.

Soils and Parent Material. Exeter soils have developed on silty glaciolacustrine deposits. Their surface texture is silt loam or loam and their topographies vary from level to steeply sloping. The major soil development is Orthic Gray Luvisol.

Drainage. Drainage ranges from well to imperfect.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
EX1	Orthic Gray Luvisol		well	level to gently and steeply sloping and undulating
EX2	Orthic Gray Luvisol	Orthic Regosol	moderately well to well	undulating and gently rolling
EX3	Orthic Gray Luvisol	Gleyed Orthic Gray Luvisol	moderately well to imperfect	level areas containing slight depressions

FROG Soil Association - FG

Location. Frog soils occur on the Shuswap Highland between 1500' and 2500' elevations in the North Thompson and Clearwater river valleys, near the town of Clearwater, and along the Canim River between Canim and Mahood lakes. They occupy 0.62 percent (11,940 acres) of the map area.

Forest Zonation. Frog soils occur in the Interior western hemlock-western red cedar zone of the Interior Wet Belt region.

Soils and Parent Material. Frog soils have developed on loamy sand to gravelly sand glaciofluvial deposits >5' deep and occasionally on a veneer <5' thick of similar materials over bedrock. The surface texture soils range from sandy loam to gravelly sand. The topography varies from level to gently undulating. The major soil development is Orthic Eutric Brunisol.

Drainage. These soils are predominantly rapidly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
FG1	Orthic Eutric Brunisol		rapid	level to gently undulating
FG2	Orthic Eutric Brunisol	Degraded Eutric Brunisol, Orthic Dystric Brunisol	rapid	level to gently undulating
FG3	Orthic Eutric Brunisol	Gleyed Orthic Eutric Brunisol	rapid to imperfect	level areas with slight depressions
FG6	Orthic Eutric Brunisol	Lithic Orthic Eutric Brunisol	rapid	level to gently undulating
FG7	Lithic Orthic Eutric Brunisol	Orthic Eutric Brunisol	rapid	level to gently undulating

FLOURMILL Soil Association - FM

Location. Flourmill soils occur in a small area of the Quesnel Highland north of Mahood Lake. They have an elevational range of 3400' to 3500' and cover 0.04 percent (800 acres) of the map area.

Forest Zonation. These soils are found in the Interior western hemlock - western red cedar zone of the Interior Wet Belt region.

Soils and Parent Material. Flourmill soils have developed on gravelly sandy loam to gravelly loam glacial till >5' deep and on veneer <5' thick of similar till that is derived from volcanic bedrocks. Their surface textures are sandy loam or gravelly sandy loam and their topographies vary from moderately to strongly rolling. Soil development is dominantly Podzolic Gray Luvisol.

Drainage. Flourmill soils are predominantly moderately well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
FM7	Podzolic Gray Luvisol	Lithic Orthic Humo-Ferric Podzol	moderately well to well	moderately to strongly rolling

GARTER Soil Association - GA

Location. Garter soils are found in the Shuswap Highland at elevations between 3500' and 4500'. They mostly occur north of Pendleton Lake, in the Spanish Creek area, and on the upper slopes west of Clearwater River between Brookfield Creek and Sylvia Falls. They occupy 0.46 percent (8,960 acres) of the map area.

Forest Zonation. Garter soils occur in the Interior western hemlock - western red cedar zone of the Interior Wet Belt region.

Soils and Parent Material. Garter soils have developed on gravelly sandy loam to gravelly loamy sand glacial till >5' deep and on a veneer <5' thick of similar till that is derived largely from plutonic rocks. The surface textures vary from sandy loam to gravelly loamy sand. Topography mainly varies from undulating to strongly rolling. Less significant topographies are level areas with depressions and steeply to extremely sloping terrain. The modal soil is classified as Podzolic Gray Luvisol.

Drainage. These soils are well to imperfectly drained with some slopes affected by seepage.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
GA1	Podzolic Gray Luvisol		moderately well	gently undulating to strongly rolling
GA3	Podzolic Gray Luvisol	Gleyed Podzolic Gray Luvisol	moderately well to imperfect	gently undulating to strongly rolling; depressional areas and steep, seepage receiving positions
GA5	Gleyed Podzolic Gray Luvisol	Podzolic Gray Luvisol	imperfect to moderately well	depressional areas
GA6	Podzolic Gray Luvisol	Degraded Dystric Brunisol	moderately well, seepage	steeply to extremely sloping
GA7	Podzolic Gray Luvisol	Lithic Orthic Humo-Ferric Podzol	moderately well to well	gently undulating to strongly rolling
GA9	Podzolic Gray Luvisol	Orthic Humo-Ferric Podzol	moderately well	steeply to extremely sloping

GILEAD Soil Association - GI

Location. Gilead soils occur in the Thompson Plateau physiographic region and are mainly located south of Chu Chua in the North Thompson River valley at elevations between 1100' and 1500'. They occupy 0.30 percent (5,280 acres) of the map area.

Forest Zonation. These soils are located in the Interior Douglas-fir zone; Ponderosa pine subzone of the Dry Interior region.

Soils and Parent Material. Gileadsoils have developed on recent alluvial deposits. Surface textures vary from sandy loam to fine sandy loam and grade to sand or loamy sand in the subsoil. Topographies range from level areas with depressions to undulating. The representative profile is Orthic Eutric Brunisol.

Drainage. Gilead soils are mostly well drained with some imperfectly and poorly drained inclusions.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
GI1	Orthic Eutric Brunisol		well to rapid	gently undulating to undulating; some level areas
GI3	Orthic Eutric Brunisol	Gleyed Orthic Eutric Brunisol	well to imperfect	gently undulating to undulating; some level areas with depressions
GI5	Orthic Eutric Brunisol	Rego Humic Gleysol	well to rapid and poor	gently undulating to undulating; some level areas with depressions

Plate 18. Landscape of the Gilead Soil Association near McLure. The parent material is sandy alluvium.

GREENLEE Soil Association - GR

Location. Greenlee soils are located on the Fraser Plateau between elevations of 2500' and 4000'; mainly on the upper slopes of Deadman River Valley and in the vicinity of Canim Lake. They cover 2.46 percent (47,080 acres) of the map area.

Forest Zonation. These soils occur in the White spruce zone of the Dry Interior region.

Soils and Parent Material. Greenlee soils have developed on gravelly loam to gravelly clay loam glacial till >5' deep and on a veneer <5' thick of similar till that is derived mainly from metamorphic and volcanic rocks. Their surface textures are sandy loam or gravelly sandy loam and their topographies range from gently undulating to extremely sloping. The dominant soil development is Brunisolic Gray Luvisol.

Drainage. Drainage ranges from well to imperfect with some slopes affected by seepage.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
GR1	Brunisolic Gray Luvisol		well	gently undulating to strongly rolling
GR2	Brunisolic Gray Luvisol	Degraded Eutric Brunisol	well	steeply to extremely sloping
GR3	Brunisolic Gray Luvisol	Gleyed Brunisolic Gray Luvisol	well to imperfect	gently undulating to strongly rolling containing depressional areas
GR4	Brunisolic Gray Luvisol	Lithic Degraded Eutric Brunisol	well	gently undulating to strongly rolling
GR5	Gleyed Brunisolic Gray Luvisol	Brunisolic Gray Luvisol	imperfect to well	depressional areas
GR6	Degraded Eutric Brunisol	Orthic Dark Gray, Lithic Orthic Dark Gray	well	steeply to extremely sloping, south facing slopes
GR7	Brunisolic Gray Luvisol		moderately well	steeply to extremely sloping

HEMP Soil Association - H

Location. Hemp soils occur in the Thompson Plateau physiographic region and are located south of Little Fort on the slopes above the North Thompson River. Their elevational range is 1100' to 3500' and they represent 1.14 percent (21,840 acres) of the map area.

Forest Zonation. Hemp soils are located in the Interior Douglas-fir zone; Lodgepole pine subzone of the Dry Interior region.

Soils and Parent Material. Hemp soils have developed on gravelly sandy loam to gravelly sand colluvium <5'deep that is mainly derived from metamorphic and volcanic rocks. Their surface textures range from gravelly sandy loam to gravelly loamy sand and their topographies vary from strongly rolling to extremely sloping. The modal profile classification is Degraded Eutric Brunisol.

Drainage. These soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
H1	Degraded Eutric Brunisol	Lithic Degraded Eutric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
H2	Lithic Degraded Eutric Brunisol	Degraded Eutric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
H5	Degraded Eutric Brunisol	Orthic Dark Gray	well	strongly rolling to very hilly; steeply to extremely sloping

HALLAMORE Soil Association - HA

Location. Hallamore soils are found in the Shuswap Highland between 4500' and 5500' elevation east of the North Thompson River. They cover 1.32 percent (25,310 acres) of the map area.

Forest Zonation. Hallamore soils occur in the Subalpine Engelmann spruce - alpine fir zone of the Dry Interior region.

Soils and Parent Material. Hallamore soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is mainly derived from metamorphic and volcanic rocks. Surface textures vary from gravelly loamy sand to gravelly sandy loam and topographies are strongly rolling to extremely sloping. The representative soil profile is Orthic Humo-Ferric Podzol.

Drainage. These soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
HA1	Orthic Humo-Ferric Podzol	Lithic Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping
HA2	Orthic Humo-Ferric Podzol	Degraded Dystric Brunisol, Lithic Degraded Dystric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
HA3	Orthic Humo-Ferric Podzol	Orthic Ferro-Humic Podzol, Lithic Orthic Ferro-Humic Podzol	well to moderately well	strongly rolling to very hilly; steeply to extremely sloping
HA4	Lithic Orthic Humo-Ferric Podzol	Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping
HA5	Lithic Orthic Humo-Ferric Podzol	Orthic Ferro-Humic Podzol	well to moderately well	strongly rolling to very hilly; steeply to extremely sloping

HOLDEN Soil Association - HD

Location. Holden soils occupy minor areas on the Fraser Plateau between 2500' and 4000' elevation, near the southwestern border of the map area. They occupy 0.02 percent (530 acres) of the map area.

Forest Zonation. These soils occur in the White spruce zone of the Dry Interior region.

Soils and Parent Material. Holden soils have developed on gravelly glacio-fluvial outwash >5' deep. Underlying may be glacial till derived from basalt bedrock. Surface textures vary from gravelly sandy loam to loamy sand and topographies range from undulating at gently rolling. The principal soil development is Degraded Eutric Brunisol.

Drainage. Holden soils are rapidly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
HD1	Degraded Eutric Brunisol	Orthic Gray Luvisol	rapid	undulating to gently rolling

HIGGINS Soil Association - HG

Location. Higgins soils occur on the Fraser Plateau east of Bowers Lake at elevations above 5500'. They represent 0.08 percent (1,640 acres) of the map area.

Forest Zonation. These soils are located in the Subalpine Engelmann spruce - alpine fir zone of the Dry Interior region.

Soils and Parent Material. Higgins soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is derived from metamorphic and volcanic rocks. The surface textures vary from gravelly loamy sand to gravelly sandy loam and topographies are moderately rolling to very hilly. Orthic Ferro-Humic Podzol is the representative soil classification.

Drainage. These soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
HG3	Orthic Ferro-Humic Podzol	Lithic Orthic Ferro-Humic Podzol, Orthic Regosol	well	moderately rolling to very hilly

HOTFISH Soil Association - HH

Location. Hotfish soils occur on the Fraser Plateau north of the Deadman River, and in the vicinity of Canim Lake. They range in elevation from 2500' to 3500' and represent 0.83 percent (15,900 acres) of the map area.

Forest Zonation. These soils occur in the White spruce zone of the Dry Interior region.

Soils and Parent Material. Hotfish soils are developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is mainly derived from metamorphic and volcanic rocks. The surface textures of these soils vary from gravelly loamy sand to gravelly sandy loam and topographies are strongly rolling to extremely sloping. Degraded Eutric Brunisol is the chief soil development.

Drainage. These soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
HH1	Degraded Eutric Brunisol	Lithic Degraded Eutric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
HH2	Lithic Degraded Eutric Brunisol	Degraded Eutric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
HH5	Degraded Eutric Brunisol	Orthic Dark Gray	well	strongly rolling to very hilly; steeply to extremely sloping, usually on south or southwest facing slopes

HELMCKEN Soil Association - HN

Location. Helmcken soils are dispersed throughout the Fraser Plateau. They mainly occur in the southern part of the map area near Bob Creek, and north of Canim Lake. They range in elevation from 4500' to 5500' and represent 1.52 percent (29,020 acres) of the map area.

Forest Zonation. These soils occur in the Subalpine Engelmann spruce - alpine fir zone in the Dry Interior region.

Soils and Parent Material. Helmcken soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is mainly derived from metamorphic and volcanic rocks. Their surface textures vary from gravelly loamy sand to gravelly sandy loam and their topographies are strongly rolling to extremely sloping. The chief soil development is Orthic Humo-Ferric Podzol.

Drainage. Helmcken soils are mainly well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
HN1	Orthic Humo-Ferric Podzol	Lithic Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping
HN2	Orthic Humo-Ferric Podzol	Degraded Dystric Brunisol, Lithic Degraded Dystric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
HN3	Orthic Humo-Ferric Podzol	Orthic Ferro-Humic Podzol, Lithic Orthic Ferro-Humic Podzol	well	strongly rolling to very hilly; steeply to extremely sloping
HN4	Lithic Orthic Humo-Ferric Podzol	Orthic Ferro-Humic Podzol	well	strongly rolling to very hilly; steeply to extremely sloping
HN5	Lithic Orthic Humo-Ferric Podzol	Orthic Ferro-Humic Podzol, Sombric Ferro-Humic Podzol	well to moderately well	strongly rolling to very hilly; steeply to extremely sloping

HOOLIGAN Soil Association - HO

Location. Hooligan soils are situated on the Thompson Plateau south of Blackpool and near Louis Creek. They range in elevation from 3500' to 4500' and cover 0.47 percent (9,110 acres) of the study area.

Forest Zonation. These soils occur in the Interior Douglas-fir zone; Lodgepole pine subzone of the Dry Interior region.

Soils and Parent Material. Hooligan soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is mainly derived from metamorphic and volcanic rocks. Their surface textures vary from gravelly loamy sand to gravelly sandy loam and their topographies are strongly rolling to extremely sloping. Degraded Dystric Brunisol is the primary soil development.

Drainage. Hooligan soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
HO1	Degraded Dystric Brunisol	Lithic Degraded Dystric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
HO2	Lithic Degraded Dystric Brunisol	Degraded Dystric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
HO3	Degraded Dystric Brunisol	Orthic Humo-Ferric Podzol, Lithic Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping

HEGER Soil Association - HR

Location. Heger soils occur on the Fraser Plateau, mainly between Powder and Mayson lakes. Their elevational range is from 3500' to 4500' and they represent 1.33 percent (25,430 acres) of the map area.

Forest Zonation. Heger soils are found in the Subalpine Engelmann spruce - alpine fir zone of the Dry Interior region.

Soils and Parent Material. Heger soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is mainly derived from metamorphic and volcanic rocks. Their surface textures vary from gravelly sandy loam to gravelly loamy sand, and their topographies are strongly rolling to extremely sloping. The representative soil profile is Degraded Dystric Brunisol.

Drainage. These soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
HR1	Degraded Dystric Brunisol	Lithic Degraded Dystric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
HR2	Lithic Degraded Dystric Brunisol	Degraded Dystric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
HR3	Degraded Dystric Brunisol	Orthic Humo-Ferric Podzol, Lithic Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping

HEATHROW Soil Association - HT

Location. Heathrow soils are located on the Thompson Plateau and occupy the valley sides south of Little Fort at elevations between 1100' and 3500'. They occupy 0.70 percent (13,400 acres) of the map area.

Forest Zonation. These soils are found in the Interior Douglas-fir zone; Ponderosa pine subzone of the Dry Interior region.

Soils and Parent Material. Heather soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is mainly derived from metamorphic and volcanic rocks. Their surface textures vary from gravelly sandy loam to gravelly loamy sand and their topographies are strongly rolling to extremely sloping. The modal soil is classified as Degraded Eutric Brunisol.

Drainage. Heathrow soils are mostly well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
HT1	Degraded Eutric Brunisol	Lithic Degraded Eutric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
HT2	Lithic Degraded Eutric Brunisol	Degraded Eutric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
HT5	Degraded Eutric Brunisol	Orthic Dark Gray	rapid and well	strongly rolling to very hilly; steeply to extremely sloping; usually on south or southwest facing slopes

HAWKLEY Soil Association - HY

Location. Hawkley soils are located on the Fraser Plateau at elevations above 5500'. They occur in the southern part of the map area, and lie west of the North Thompson River and east of Criss Creek, and occupy 0.39 percent (7,600 acres) of the map area.

Forest Zonation. These soils occur in the Subalpine Engelmann spruce - alpine fir zone of the Dry Interior region.

Soils and Parent Material. Hawkley soils have developed on gravelly loam to gravelly clay loam glacial till >5' deep and a veneer <5' thick of similar till that is derived mainly from metamorphic and volcanic rocks. The surface textures are sandy loam or gravelly sandy loam and topographies range from nearly level to strongly rolling. The modal profile classification is Orthic Ferro-Humic Podzol.

Drainage. These soils are moderately well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
HY3	Orthic Ferro-Humic Podzol		moderately well	gently undulating to strongly rolling; some nearly level
HY4	Orthic Ferro-Humic Podzol	Lithic Orthic Ferro-Humic Podzol	moderately well	gently undulating to strongly rolling; some nearly level

LEAGUE Soil Association - LA

Location. League soils occur on the Shuswap Highland at elevations between 2500' and 4000'. They are mostly located southeast of Mahood Lake and occupy 0.53 percent (10,300 acres) of the study area.

Forest Zonation. These soils occur in the Interior western hemlock-western red cedar zone of the Interior Wet Belt region.

Soils and Parent Material. League soils have developed on gravelly sandy loam to gravelly loam colluvium <5' deep that is derived largely from quartz-mica and hornblende mica schists. Their surface textures vary from gravelly loam to gravelly sandy loam and their topographies range from rolling to extremely sloping. The principal soil development is Orthic Humo-Ferric Podzol.

Drainage. League soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
LA1	Orthic Humo-Ferric Podzol	Lithic Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping
LA2	Lithic Orthic Humo-Ferric Podzol	Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping

LOBSTER Soil Association - LB

Location. Lobster soils occur in the Shuswap Highland at elevations between 1500' and 3500'. They occupy east facing slopes along the Clearwater River and represent 0.08 percent (1,650 acres) of the map area.

Forest Zonation. Lobster soils occur in the Interior western hemlock - western red cedar zone of the Interior Wet Belt region.

Soils and Parent Material. Lobster soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is mostly derived from plutonic rocks. Their surface textures vary from gravelly loamy sand to gravelly sandy loam and their topographies are strongly rolling to extremely sloping. Soil development is primarily Degraded Eutric Brunisol.

Drainage. These soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
LB1	Degraded Eutric Brunisol	Lithic Degraded Eutric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
LB2	Lithic Degraded Eutric Brunisol	Degraded Eutric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping

LADDER Soil Association - LD

Location. Ladder soils are situated in the Quesnel Highland north of Mahood Lake at elevations between 3500' and 5500'. They occupy 0.26 percent (5,150 acres) of the study area.

Forest Zonation. Ladder soils are found in the Subalpine Engelmann spruce - alpine fir zone in the Interior Wet Belt region.

Soils and Parent Material. Ladder soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is derived from black phyllite and shale. Surface textures range from gravelly loamy sand to gravelly sandy loam and topographies vary from strongly rolling to extremely sloping. Orthic Humo-Ferric Podzol is the main soil development.

Drainage. These soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
LD1	Orthic Humo-Ferric Podzol	Lithic Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping
LD2	Lithic Orthic Humo-Ferric Podzol	Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping

LASTCOURSE Soil Association - LE

Location. Lastcourse soils are located in the Shuswap Highland, mainly along the north shore of Mahood Lake and between the northwestern end of Mahood Lake and Deception Creek. They range from 2500' to 3500' in elevation and occupy 0.19 percent (3,760 acres) of the study area.

Forest Zonation. Lastcourse soils occur in the Interior western hemlock - western red cedar zone of the Interior Wet Belt region.

Soils and Parent Material. Lastcourse soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is derived from black phyllite and shale. Their surface textures vary from gravelly loamy sand to gravelly sandy loam and their topographies are moderately rolling to very steeply sloping. The representative soil profile is Orthic Eutric Brunisol.

Drainage. These soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
LE1	Orthic Eutric Brunisol	Lithic Orthic Eutric Brunisol	well	moderately to strongly rolling; steeply to very steeply sloping
LE2	Lithic Orthic Eutric Brunisol	Orthic Eutric Brunisol	well	moderately to strongly rolling; steeply to very steeply sloping

LARGHETTO Soil Association - LG

Location. Larghetto soils are situated on the Fraser Plateau between the Deadman and Bonaparte rivers at 3500' to 4000' elevation. They occupy 0.66 percent (12,670 acres) of the map area.

Forest Zonation. These soils occur in the White spruce zone in the Dry Interior region.

Soils and Parent Material. Larghetto soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is derived from plutonic rocks. Their surface textures vary from gravelly loamy sand to gravelly sandy loam and their topographies range from strongly rolling to extremely sloping. The modal soil is classified as Degraded Eutric Brunisol.

Drainage. These soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
LG1	Degraded Eutric Brunisol	Lithic Degraded Eutric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
LG2	Lithic Degraded Eutric Brunisol	Degraded Eutric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping

LINDQUIST Soil Association - LI

Location. Lindquist soils are situated in the Shuswap Highland. They occur east of the North Thompson River between Chu Chua Creek and Dunn Lake at elevations ranging from 4000' to 5000'. They represent 0.07 percent (1,900 acres) of the map area.

Forest Zonation. Lindquist soils are found in the Subalpine Engelmann spruce - alpine fir zone of the Dry Interior region.

Soils and Parent Material. Lindquist soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is derived from plutonic rocks. Their surface textures range from gravelly loamy sand to gravelly sandy loam and their topographies vary from strongly to steeply sloping. Soil development is predominantly Orthic Humo-Ferric Podzol.

Drainage. These soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
LI1	Orthic Humo-Ferric Podzol	Lithic Orthic Humo-Ferric Podzol	well	strongly to steeply sloping

LAUREL Soil Association - LL

Location. Laurel soils occur on the Fraser Plateau adjacent to Boss Creek, south of Skull Creek and near Jamieson Creek. They range from 4000' to 5500' in elevation and cover 0.13 percent (2,640 acres) of the study area.

Forest Zonation. These soils are found in the Subalpine Engelmann spruce - alpine fir zone in the Dry Interior region.

Soils and Parent Material. Laurel soils have developed on loamy sand to gravelly sand glacio-fluvial deposits >5' deep. Their surface textures vary from sandy loam to gravelly loamy sand and their topographies are gently undulating to moderately sloping. The representative soil profile is Orthic Humo- Ferric Podzol.

Drainage. Laurel soils are predominantly well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
LL1	Orthic Humo-Ferric Podzol		well	gently undulating to gently rolling and moderately sloping
LL2	Orthic Humo-Ferric Podzol	Degraded Dystric Brunisol	well	gently undulating to gently rolling
LL3	Orthic Humo-Ferric Podzol	Gleyed Orthic Humo-Ferric Podzol	well to imperfect	gently undulating to gently rolling; some level areas with depressions and moderately sloping, seepage receiving positions

LYNN Soil Association - LN

Location. Lynn soils occur on the Fraser Plateau, specifically north and south of Eakin Creek, in the Estelle and Adler lakes area, and along the northwest boundary of the map area. Their elevational range is 4000' to 5500' and they represent 2.88 percent (54,990 acres) of the map area.

Forest Zonation. These soils occur in the Subalpine Engelmann spruce - alpine fir zone in the Dry Interior region.

Soils and Parent Material. Lynn soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is derived from plutonic rocks. Their surface textures vary from gravelly loamy sand to gravelly sandy loam and their topographies are strongly rolling to extremely sloping. Orthic Humo-Ferric Podzol is the principal soil development.

Drainage. These soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
LN1	Orthic Humo-Ferric Podzol	Lithic Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping
LN2	Orthic Humo-Ferric Podzol	Degraded Dystric Brunisol, Lithic Degraded Dystric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
LN4	Lithic Orthic Humo-Ferric Podzol	Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping

LOLO Soil Association - LO

Location. Lolo soils are located on the Fraser Plateau, specifically northeast from Bonaparte Lake to the vicinities of Eakin Creek and Birch Lake. They range from 3500' to 4500' in elevation and occupy 1.06 percent (20,350 acres) of the study area.

Forest Zonation. Lolo soils occur in the Subalpine Engelmann spruce - alpine fir zone in the Dry Interior region.

Soils and Parent Material. Lolo soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is derived from plutonic rocks. Their surface textures vary from gravelly loamy sand to gravelly sandy loam and their topographies are strongly rolling to extremely sloping. Their soil development is primarily Degraded Dystric Brunisol.

Drainage. These soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
LO1	Degraded Dystric Brunisol	Lithic Degraded Dystric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
LO2	Lithic Degraded Dystric Brunisol	Degraded Dystric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
LO3	Degraded Dystric Brunisol	Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping

LUPINE Soil Association - LP

Location. Lupine soils are located east of Dunn Lake on the Shuswap Highland. They occur at elevations above 5000' and represent 0.41 percent (7,980 acres) of the map area.

Forest Zonation. These soils are found in the Subalpine Engelmann spruce - alpine fir zone of the Dry Interior region.

Soils and Parent Material. Lupine soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is derived from mixed metamorphic and volcanic rocks. Their surface textures vary from gravelly loamy sand to gravelly sandy loam and their topographies range from moderately rolling to extremely sloping. The predominant soil development is Orthic Ferro-Humic Podzol.

Drainage. These soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
LP3	Orthic Ferro-Humic Podzol		well	moderately rolling to very hilly; strongly to extremely sloping
LP6	Orthic Ferro-Humic Podzol	Lithic Orthic Ferro-Humic Podzol	well	moderately rolling to very hilly; strongly to extremely sloping

LIZARD Soil Association - LR

Location. Lizard soils occur on the Thompson Plateau in an area bounded by Thuya Creek on the north and Peterson Creek on the south. Their elevational range is 1100' to 3000' and they represent 0.12 percent (2,380 acres) of the map area.

Forest Zonation. These soils are located in the Interior Douglas-fir zone; Lodgepole pine subzone of the Dry Interior region.

Soils and Parent Material. Lizard soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is derived from plutonic rocks. Their surface textures vary from gravelly loamy sand to gravelly sandy loam and their topographies range from strongly rolling to extremely sloping. The modal profile classification is Degraded Eutric Brunisol.

Drainage. Lizard soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
LR1	Degraded Eutric Brunisol	Lithic Degraded Eutric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
LR2	Lithic Degraded Eutric Brunisol	Degraded Eutric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping

LOUISE MOUNTAIN Soil Association - LS

Location. Louise Mountain soils occur on the Shuswap Highland between Mahood and Pendleton lakes, and on either side of Deception Creek. They range in elevation from 3000' to 4500' and occupy 0.19 percent (3,770 acres) of the study area.

Forest Zonation. Louise Mountain soils are found in the Interior western hemlock - western red cedar zone of the Interior Wet Belt region.

Soils and Parent Material. Louise Mountain soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is derived largely from black phyllite and shale. Their surface textures vary from gravelly sandy loam to gravelly loamy sand and their topographies range from strongly rolling to extremely sloping. Orthic Humo-Ferric Podzol is the major soil development.

Drainage. These soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
LS1	Orthic Humo-Ferric Podzol	Lithic Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping
LS2	Lithic Orthic Humo-Ferric Podzol	Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping

LOST Soil Association - LT

Location. Lost soils occur east of Dunn Lake on the Shuswap Highland at elevations above 5500'. They occupy 0.47 percent (9,010 acres) of the study area.

Forest Zonation. Lost soils occur in the Subalpine Engelmann spruce - alpine fir zone of the Dry Interior region.

Soils and Parent Material. Lost soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is derived from plutonic rocks. Their surface textures range from gravelly loamy sand to gravelly sandy loam and topographies vary from moderately rolling to extremely sloping. The principal soil development is Orthic Ferro-Humic Podzol.

Drainage. These soils are well to moderately well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
LT3	Orthic Ferro-Humic Podzol		moderately well	moderately rolling to very hilly; strongly to extremely sloping
LT4	Orthic Ferro-Humic Podzol	Sombric Ferro-Humic Podzol	moderately well	moderately rolling to very hilly; strongly to extremely sloping
LT5	Lithic Orthic Ferro-Humic Podzol	Orthic Ferro-Humic Podzol	moderately well	moderately rolling to very hilly; strongly to extremely sloping
LT6	Orthic Ferro-Humic Podzol	Lithic Orthic Ferro-Humic Podzol	moderately well	moderately rolling to very hilly; strongly to extremely sloping

LACOVIA Soil Association - LV

Location. Lacovia soils are found on the Quesnel Highland north of Canim Lake at elevations ranging from 3500' to 5000'. They occupy 0.13 percent (2,580 acres) of the study area.

Forest Zonation. Lacovia soils occur in the Subalpine Engelmann spruce - alpine fir zone in the Interior Wet Belt region.

Soils and Parent Material. Lacovia soils have developed on gravelly sandy loam to gravelly loam colluvium <5' deep that is derived largely from quartz-mica and hornblende mica schists. Their surface textures are mostly gravelly sandy loam and their topographies range from strongly rolling to extremely sloping. The modal soil is classified as Orthic Humo-Ferric Podzol.

Drainage. These soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
LV1	Orthic Humo-Ferric Podzol	Lithic Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping
LV2	Orthic Humo-Ferric Podzol	Lithic Degraded Dystric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping

LOVEWAY Soil Association - LW

Location. Loveway soils occur north of Mahood Lake on the Quesnel Highland, at elevations ranging from 4500' to 5500'. They occupy 0.42 percent (8,110 acres) of the study area.

Forest Zonation. Loveway soils occur in the Subalpine Engelmann spruce - alpine fir zone of the Interior Wet Belt region.

Soils and Parent Material. Loveway soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is derived from plutonic rocks. Surface textures range from gravelly loamy sand to gravelly sandy loam and topographies vary from strongly rolling to extremely sloping. Orthic Humo- Ferric Podzol is the predominant soil development.

Drainage. These soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
LW1	Orthic Humo-Ferric Podzol	Lithic Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping
LW2	Orthic Humo-Ferric Podzol	Degraded Dystric Brunisol, Lithic Degraded Dystric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
LW3	Lithic Orthic Humo-Ferric Podzol	Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping

LAXITY Soil Association - LX

Location. Laxity soils occur on the Shuswap Highland in the northeast section of the map area. More specifically, they occur south of Murtle River and east of Clearwater River, along Mann and Lemieux creeks, and along the North Thompson River valley south of Clearwater. Their elevational range is from 1500' to 3500' and they cover 0.62 percent (11,890 acres) of the study area.

Forest Zonation. Laxity soils occur in the Interior western hemlock - western red cedar zone of the Interior Wet Belt region.

Soils and Parent Material. These soils have developed on gravelly sandy loam to gravelly loam colluvium <5' deep that is derived largely from quartz-mica and hornblende-mica schists. Their surface textures are mostly gravelly sandy loam and their topographies vary from rolling to extremely sloping. The representative soil profile is Orthic Eutric Brunisol.

Drainage. These soils are from well to moderately well drained with seepage on some sites.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
LX1	Orthic Eutric Brunisol	Lithic Orthic Eutric Brunisol	well	strongly rolling to hilly; very steeply to extremely sloping
LX2	Orthic Eutric Brunisol	Degraded Eutric Brunisol	moderately well	strongly rolling to hilly; very steeply to extremely sloping
LX3	Lithic Orthic Eutric Brunisol	Orthic Eutric Brunisol	well	strongly rolling to hilly; very steeply to extremely sloping

LONELY Soil Association - LY

Location. Lonely soils are located on the Shuswap Highland, mainly southeast of Mahood Lake. Their elevational range is between 4500' and 5500' and they represent 0.24 percent (4,680 acres) of the study area.

Foreast Zonation. Lonely soils occur in the Subalpine Engelmann spruce - alpine fir zone in the Dry Interior region.

Soils and Parent Material. Lonely soils have developed on gravelly sandy loam to gravelly loam colluvium <5' deep that is derived largely from quartz-mica and hornblende-mica schists. Their surface textures are mainly gravelly sandy loam and their topographies are strongly rolling to extremely sloping. Soil development is primarily Orthic Humo-Ferric Podzol.

Drainage. These soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
LY1	Orthic Humo-Ferric Podzol	Lithic Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping
LY2	Orthic Humo-Ferric Podzol	Degraded Dystric Brunisol, Lithic Degraded Dystric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
LY3	Lithic Orthic Humo-Ferric Podzol	Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping

McLURE Soil Association - MC

Location. McLure soils occur in the Thompson Plateau physiographic region and occupy the slopes along the North Thompson River south of the village of Chu Chua. They range in elevation from 1100' to 3500' and occupy 0.80 percent (15,300 acres) of the map area.

Forest Zonation. These soils occur in the Interior Douglas-fir zone; Ponderosa pine subzone of the Dry Interior region.

Soils and Parent Material. McLure soils have developed on gravelly loam to gravelly clay loam calcareous glacial til >5' deep and on a veneer <5' thick of similar till that is derived mainly from metamorphic and volcanic rocks. Their surface textures are sandy loam, loam or gravelly sandy loam and they occur on topographies that range from depressional areas to extreme slopes. The modal soil is Brunisolic Gray Luvisol.

Drainage. Drainage ranges from well to imperfect with some slopes affected by seepage.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
MC1	Brunisolic Gray Luvisol	Degraded Eutric Brunisol	well	steeply to extremely sloping; usually south facing
MC2	Brunisolic Gray Luvisol	Orthic Dark Gray, Lithic Orthic Dark Gray	well	steeply to extremely sloping; usually south facing
MC3	Brunisolic Gray Luvisol	Gleyed Brunisolic Gray Luvisol	well to imperfect	gently undulating to strongly rolling, including depressional areas
MC4	Brunisolic Gray Luvisol		well	gently undulating to strongly rolling; some level areas
MC5	Gleyed Brunisolic Gray Luvisol	Brunisolic Gray Luvisol	imperfect to well	depressional landscape positions
MC6	Brunisolic Gray Luvisol	Lithic Degraded Eutric Brunisol	well	steeply sloping
MC7	Brunisolic Gray Luvisol	Degraded Eutric Brunisol	moderately well, some seepage areas	steeply to extremely sloping

MURTLE Soil Association - ME

Location. Murtle soils are found on the Shuswap Highland east of the Clearwater River. Elevations range from 1500' to 3500' and the soils occupy 1.20 percent (23,060 acres) of the map area.

Forest Zonation. Murtle soils are found in the Interior western hemlock - western red cedar zone of the Interior Wet Belt region.

Soils and Parent Material. Murtle soils have developed on gravelly sandy loam to gravelly loam glacial till >5' deep and on a veneer <5' thick of similar till that is derived from volcanic bedrocks. Surface texture is either sandy loam or gravelly sandy loam and topographies vary from depressional areas to extremely sloping. The modal soil is Brunisolic Gray Luvisol.

Drainage. The drainges vary from mostly well to imperfect. Seepage occurs on some sites.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
ME1	Brunisolic Gray Luvisol	Orthic Eutric Brunisol	well	gently undulating to strongly rolling; some level
ME2	Brunisolic Gray Luvisol	Lithic Orthic Eutric Brunisol	well	gently undulating to strongly rolling
ME3	Brunisolic Gray Luvisol		moderately well, seepage	steeply to extremely sloping
ME6	Brunisolic Gray Luvisol	Gleyed Brunisolic Gray Luvisol	well to imperfect	gently undulating to strongly rolling, includes some depressional areas

Plate 19. Murtle Soil Association landscape in the fore and middle-grounds. The parent material is <5' of glacial till which overlies plateau lavas.

MONTICOLA Soil Association - MI

Location. Monticola soils occupy minor areas between 2500' and 3500' elevation in the Shuswap Highland. They occur on the east facing slopes above the Clearwater River north of the town of Clearwater and represent 0.03 percent (610 acres) of the map area.

Forest Zonation. Monticola soils are located in the Interior western hemlock - western red cedar zone of the Interior Wet Belt region.

Soils and Parent Material. Monticola soils have developed on gravelly sandy loam to gravelly loamy sand glacial till >5' deep that is derived largely from plutonic rocks. Surface textures vary from gravelly loamy sand to gravelly sandy loam and topographies are moderately to very steeply sloping. Orthic Eutric Brunisol is the representative soil profile.

Drainage. These soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
MI1	Orthic Eutric Brunisol		well	moderately to very steeply sloping

MULHOLLAND Soil Association - MO

Location. Mulholland soils occur on the Shuswap Highland east of Little Fort at elevations above 5500'. They occupy 0.25 percent (4,900 acres) of the map area.

Forest Zonation. These soils occur in the Subalpine Engelmann spruce - alpine fir zone; Krummholz subzone of the Dry Interior region.

Soils and Parent Material. Muholland soils have developed in gravelly loam to gravelly clay loam glacial till. The glacial till is >5' deep and is associated with a veneer <5' thick of similar till that is derived mainly from metamorphic and volcanic rocks. Surface textures are sandy loam or gravelly sandy loam and topographies vary from gently undulating to extremely sloping. The modal profile classification is Orthic Ferro- Humic Podzol.

Drainage. Drainage ranges from moderately well to imperfect with some slopes affected by seepage.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
MO3	Orthic Ferro-Humic Podzol		moderately well	gently undulating to strongly rolling
MO4	Orthic Ferro-Humic Podzol	Sombric Ferro-Humic Podzol	moderately well, seepage	moderately rolling to strongly sloping
MO5	Orthic Ferro-Humic Podzol	Gleyed Orthic Ferro-Humic Podzol	moderately well to imperfect	gently undulating to strongly rolling some depressional areas
MO6	Orthic Ferro-Humic Podzol		moderately well, seepage	steeply to extremely sloping

ORDSCHIG Soil Association - OD

Location. Ordschig soils are situated on the Shuswap Highland mainly north of Pendleton Lake, in the Spanish Creek area, and on the upper slopes above the Clearwater River between Brooksfield Creek and Sylvia Falls. They range in elevation from 3500' to 4500' and cover 0.13 percent (2,610 acres) of the map area.

Forest Zonation. Soils in this association occur in the Interior western hemlock - western red cedar zone of the Interior Wet Belt region.

Soils and Parent Material. Ordschig soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep and derived mainly from plutonic rocks. Surface textures are mostly gravelly loamy sand or gravelly sandy loam and topographies range from strongly rolling to extremely sloping. The predominant soil development is Orthic Humo-Ferric Podzol.

Drainage. These soils are well drained..

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
OD1	Orthic Humo-Ferric Podzol	Lithic Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping
OD2	Lithic Orthic Humo-Ferric Podzol	Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping
OD3	Orthic Humo-Ferric Podzol	Degraded Dystric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping

PRICE Soil Association - PC

Location. Price soils are situated on the Fraser Plateau. They occur, among other places, south of Bonaparte Lake, in the Elbow Lake area, and more extensively, between Bonaparte Lake and Machete Lake. They range in elevation from 4000' to 5000' and cover 1.23 percent (23,620 acres) of the study area.

Forest Zonation. These soils are found in the Subalpine Engelmann spruce - alpine fir zone in the Dry Interior region.

Soils and Parent Material. Price soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is mainly derived from volcanic rocks. Their surface textures are mostly gravelly loamy sand or gravelly sandy loam and topographies are strongly rolling to extremely sloping. The modal profile is classified as Degraded Dystric Brunisol.

Drainage. Price soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
PC1	Degraded Dystric Brunisol		well	strongly rolling to very hilly; steeply to extremely sloping
PC2	Degraded Dystric Brunisol	Lithic Degraded Dystric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
PC3	Lithic Degraded Dystric Brunisol	Degraded Dystric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping

PLACID Soil Association - PD

Location. Placid soils occur on the Fraser Plateau near Tsintsunko Lake, and more extensively between Bonaparte Lake and Machete Lake. Their elevational range is from 5000' to 5500' and they cover 0.32 percent (6,140 acres) of the map area.

Forest Zonation. These soils are found in the Subalpine Engelmann spruce - alpine fir zone in the Dry Interior region.

Soils and Parent Material. Placid soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is mainly derived from volcanic rocks. Surface textures vary from gravelly loamy sand to gravelly sandy loam and topographies are strongly rolling to extremely sloping. The principal soil development is Orthic Humo-Ferric Podzol.

Drainage. Placid soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
PD1	Orthic Humo-Ferric Podzol	Lithic Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping
PD2	Lithic Orthic Humo-Ferric Podzol	Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping

PRINCE Soil Association - PE

Location. Prince soils occur on the Shuswap Highland at elevations ranging from 1500' to 3500', mostly north of Clearwater and near the northern shore of Mahood Lake. They represent 0.23 percent (4,540 acres) of the map area.

Forest Zonation. Prince soils occur in the interior western hemlock - western red cedar zone of the Interior Wet Belt region.

Soils and Parent Material. Prince soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is mainly derived from volcanic rocks. Surface textures range from gravelly loamy sand to gravelly sandy loam and topographies are strongly rolling to extremely sloping. The representative soil profile is Degraded Eutric Brunisol.

Drainage. These soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
PE1	Degraded Eutric Brunisol		well	strongly rolling to very hilly; steeply to extremely sloping
PE2	Degraded Eutric Brunisol	Lithic Degraded Eutric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
PE3	Lithic Degraded Eutric Brunisol	Degraded Eutric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping

POOTYL Soil Association - PL

Location. Pootyl soils occur on the Fraser Plateau at elevations between 3500' and 4000'. They mostly occur in the southwest corner of the map area, east of Bridge Lake, and west of Deka and Drewy lakes. They cover 1.42 percent (27,140 acres) of the map area.

Forest Zonation. These soils occur in the White spruce zone of the Dry Interior region.

Soils and Parent Material. Pootyl soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is mainly derived from volcanic rocks. Surface textures vary from gravelly loamy sand to gravelly sandy loam and topographies are strongly rolling to extremely sloping. Degraded Eutric Brunisol is the major soil development.

Drainage. Pootyl soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
PL1	Degraded Eutric Brunisol		well	strongly rolling to very hilly; steeply to extremely sloping
PL2	Lithic Degraded Eutric Brunisol	Degraded Eutric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
PL4	Degraded Eutric Brunisol	Lithic Degraded Eutric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
PL5	Degraded Eutric Brunisol	Degraded Dystric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping
PL6	Lithic Degraded Eutric Brunisol	Degraded Dystric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping

POISON Soil Association - PN

Location. Poison soils are located on the Fraser Plateau, mainly near where Bridge Creek enters Canim Lake. They range in elevation from 3500' to 4000' and cover 0.01 percent (320 acres) of the study area.

Forest Zonation. Poison soils occur in the White spruce zone of the Dry Interior region.

Soils and Parent Material. Poison soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is derived from volcanic rocks. Surface textures vary from gravelly loamy sand to gravelly sandy loam and topographies are steeply to very steeply sloping. The modal soil is classified as Lithic Orthic Dark Gray.

Drainage. These soils are well to rapidly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
PN2	Lithic Orthic Dark Gray	Orthic Dark Gray	rapid	steep to very steep, south facing slopes

PENDLETON Soil Association - PT

Location. Pendleton soils are located on the Thompson Plateau northwest of the village of McLure. Their elevational range is between 3000' and 3500' and they occupy 0.05 percent (1,090 acres) of the map area.

Forest Zonation. These soils are found in the Interior Douglas-fir zone; Lodgepole pine subzone of the Dry Interior region.

Soils and Parent Material. Pendleton soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is derived mainly from volcanic rocks. Surface textures vary from gravelly loamy sand to gravelly sand and topographies are strongly rolling to extremely sloping. The modal soil is classified as Lithic Degraded Eutric Brunisol.

Drainage. Pendleton soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
PT2	Lithic Degraded Eutric Brunisol	Degraded Eutric Brunisol	rapid	strongly rolling to very hilly; steeply to extremely sloping

Plate 20. Pendleton Soil Association landscape in the background. The parent material is shallow colluvium over volcanic bedrock.

RAYONIER Soil Association - RA

Location. Rayonier soils occur on the Fraser Plateau and the Shuswap Highland. They occur above 5000' elevation and represent 0.06 percent (1,310 acres) of the map area.

Forest Zonation. These soils occur in the Subalpine Engelmann spruce - alpine fir zone in the Dry Interior Region.

Soils and Parent Material. These soils have developed on mostly deep, poorly decomposed organic material. The topographies are nearly level to very gently sloping. The modal soil is classified as Mesic Fibrisol.

Drainage. The drainage is very poor.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
RA1	Mesic Fibrisol		very poor	nearly level to very gently sloping

ROUND Soil Association - RD

Location. Round soils occur in the Shuswap Highland, mainly south of Mahood Lake and near Mann Creek and Taweel Lake. The soils range in elevation from 3500' to 4000' and occupy 1.46 percent (28,020 acres) of the map area.

Forest Zonation. Round soils are located in the Interior western hemlock - western red cedar zone of the Interior Wet Belt forest region.

Soils and Parent Material. Round soils have developed on gravelly sandy loam to gravelly clay loam glacial till >5' deep and on a veneer <5' thick of similar till that is derived largely from quartz-mica and hornblende-mica schists. The surface textures are sandy loam, loam or gravelly sandy loam and the topographies range from gently undulating to extremely sloping. The predominant soil development is Podzolic Gray Luvisol.

Drainage. Drainage ranges from well to imperfect.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
RD1	Podzolic Gray Luvisol		moderately well	gently undulating to strongly rolling
RD3	Podzolic Gray Luvisol	Gleyed Podzolic Gray Luvisol	moderately well to imperfect	gently undulating to strongly rolling containing depressional areas
RD4	Podzolic Gray Luvisol	Luvisolic Humo-Ferric Podzol, Orthic Humo-Ferric Podzol	moderately well	steeply to extremely sloping
RD5	Gleyed Podzolic Gray Luvisol	Podzolic Gray Luvisol	imperfect to moderately well	depressional areas
RD6	Podzolic Gray Luvisol	Degraded Dystric Brunisol	moderately well	steeply to extremely sloping
RD7	Podzolic Gray Luvisol	Lithic Orthic Humo-Ferric Podzol	moderately well to well	gently undulating to strongly rolling
RD8	Lithic Orthic Humo-Ferric Podzol	Podzolic Gray Luvisol	well to moderately well	gently undulating to strongly rolling

RENNIE Soil Association - RE

Location. Rennie soils occur in the Thompson Plateau physiographic region on the floodplain of the North Thompson River south of Little Fort, at elevations between 1100' and 1500'. They occupy 0.18 percent (3,550 acres) of the map area.

Forest Zonation. These soils are found in the Interior Douglas-fir zone; Ponderosa pine subzone of the Dry Interior region.

Soils and Parent Material. Rennie soils have developed on recent alluvial deposits. Textures grade from silt loam, fine sandy loam or silty clay loam in the upper horizons to loamy sand or sand in the subsoil. Topographies range from undulating to depressional. Orthic Regosol is the dominant soil development.

Drainage. These soils range from mostly well to poorly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
RE1	Orthic Regosol		well	gently undulating to undulating
RE2	Orthic Regosol	Gleyed Orthic Regosol	well to imperfect	gently undulating to undulating; some depressional areas
RE3	Gleyed Orthic Regosol	Rego Humic Gleysol	well to poor	depressional areas
RE4	Rego Humic Gleysol	Gleyed Orthic Regosol	poor to imperfect	depressional areas
RE6	Orthic Regosol	Orthic Eutric Brunisol	well	gently undulating to undulating

RAIL Soil Association - RL

Location. Rail soils occur in all physiographic regions at elevations below 5000'. They represent 0.91 percent (17,390 acres) of the map area.

Forest Zonation. These soils occur in all forest regions, zones and subzones except Subalpine Engelmann spruce - alpine fir zone; Krummholz subzone.

Soils and Parent Material. Rail soils have developed in mostly deep, moderately decomposed organic deposits whose topography varies from nearly level to gently sloping. The modal profile is Typic Mesisol.

Drainage. The soils are poorly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
RL1	Typic Mesisol	Terric Typic Mesisol	very poor	nearly level to very gently sloping
RL2	Typic Mesisol	Cumulo Mesisol	very poor	nearly level to gently sloping

ROSERIM Soil Association - RM

Location. Roserim soils occur on the Shuswap Highland in the northeast section of the map area, mainly between Hemp Creek and Clearwater River, along Mann and Lemieux creeks, and in the North Thompson River valley south of Clearwater. They range in elevation from 1500' to 3500' and represent 0.37 percent (7,190 acres) of the map area.

Forest Zonation. These soils are found in the Interior western hemlock - western red cedar zone of the Interior Wet Belt region.

Soils and Parent Material. Roserim soils have developed on gravelly loam to gravelly clay loam calcareous glacial till >5' deep and on a veneer <5' thick of similar till that is derived largely from quartz-mica and hornblende-mica schists. Their surface textures are sandy loam, loam or and gravelly sandy loam and topographies range from gently rolling to extremely sloping. The modal profile is classified as Orthic Eutric Brunisol.

Drainage. Drainage varies from mostly well to imperfect with seepage occurring on some sites.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
RM1	Orthic Eutric Brunisol		well	moderately rolling to strongly sloping
RM2	Orthic Eutric Brunisol	Gleyed Orthic Eutric Brunisol	well to imperfect	gently rolling
RM3	Orthic Eutric Brunisol	Brunisolic Gray Luvisol	well to moderately well, seepage	strongly rolling to extremely sloping
RM4	Lithic Degraded Eutric Brunisol	Degraded Eutric Brunisol	well	strongly rolling to extremely sloping
RM5	Orthic Eutric Brunisol	Brunisolic Gray Luvisol	well	very steeply to extremely sloping

ROSEFLOWER Soil Association - RW

Location. Roseflower soils occur in minor areas on the Fraser Plateau, mainly north of the Rayfield River and on the northern shores of Machete and Lac de Roches lakes. They range in elevation from 2500' to 4000' and occupy 0.04 percent (760 acres) of the study.

Forest Zonation. Roseflower soils are located within the White spruce zone in the Dry Interior region.

Soils and Parent Material. Roseflower soils have developed on gravelly sandy loam to gravelly loam glacial till >5' deep that is derived from volcanic bedrocks. The surface textures are sandy loam on gravelly sandy loam and topographies are moderate to very steep, south facing slopes. The representative soils profile is Orthic Dark Gray.

Drainage. These soils are well to rapidly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
RW3	Orthic Dark Gray	Dark Gray Luvisol, Degraded Eutric Brunisol	well to rapid	moderate to very steep, south facing slopes

Plate 21. Roseflower Soil Association landscape. The parent material is glacial till.

RASPBERRY Soil Association - RY

Location. Raspberry soils occur on the Fraser Plateau, mainly between Bonaparte Lake and Machete Lake, and in the Elbow Lake area. They range from 4000' to 5000' in elevation and occupy 4.92 percent (94,070 acres) of the map area.

Forest Zonation. Raspberry soils are found in the Subalpine Engelmann spruce - alpine fir zone of the Dry Interior region.

Soils and Parent Material. Raspberry soils have developed on gravelly sandy loam to gravelly loam glacial till >5' deep and on a veneer <5' thick of similar till that is derived from volcanic bedrocks. Their surface textures are sandy loam or gravelly sandy loam and they occur on terrain which ranges from depressional to extremely sloping. The modal profile classification is Brunisolic Gray Luvisol.

Drainage. These soils are mostly well drained with imperfect drainage and/or seepage in localized areas.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
RY1	Brunisolic Gray Luvisol		well	gently undulating to strongly rolling
RY2	Brunisolic Gray Luvisol	Gleyed Brunisolic Gray Luvisol	well to imperfect	gently undulating to strongly rolling containing some depressional and seepage sites
RY3	Brunisolic Gray Luvisol	Orthic Gray Luvisol	well	strongly rolling to extremely sloping
RY4	Brunisolic Gray Luvisol		moderately well	steeply to extremely sloping
RY5	Brunisolic Gray Luvisol	Podzolic Gray Luvisol	well	gently undulating to strongly rolling
RY6	Gleyed Brunisolic Gray Luvisol	Brunisolic Gray Luvisol	imperfect to well	depressional areas
RY7	Brunisolic Gray Luvisol	Lithic Orthic Dystric Brunisol, Lithic Brunisolic Gray Luvisol	well	gently rolling to very steeply sloping

RASPBERRY Soil Association - RY (CONTINUED)

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
RY8	Lithic Orthic Dystric Brunisol, Lithic Brunisolic Gray Luvisol	Brunisolic Gray Luvisol	well	gently rolling to very steeply sloping
RY9	Brunisolic Gray Luvisol	Orthic Humo-Ferric Podzol	moderately well	steeply to extremely sloping
RY12	Brunisolic Gray Luvisol	Degraded Dystric Brunisol, Orthic Dystric Brunisol	well	steep to extreme, usually south facing slopes

STRUTHERS Soil Association - SE

Location. Struthers soils occur on the Thompson Plateau, mainly along Lemieux Creek and above the North Thompson River at Little Fort. They range in elevation from 1100' to 2000' and occupy 0.28 percent (5,370 acres) of the map area.

Forest Zonation. These soils occur in the Interior Douglas-fir zone; Lodgepole pine subzone of the Dry Interior region.

Soils and Parent Material. Struthers soils have developed on loamy sand to gravelly sand glaciofluvial deposits >5' deep. Surface textures vary from sandy loam to gravelly sand and topographies are gently undulating to strongly rolling with some very steeply sloping inclusions. The representative soils profile is Orthic Eutric Brunisol.

Drainage. Struthers soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
SE1	Orthic Eutric Brunisol		well	gently undulating to strongly rolling; some very steeply sloping

Plate 22. Struthers Soil Association landscape in the middle-ground. The parent material is sandy glaciofluvial deposits.

STOLLE Soil Association - SL

Location. Stolle soils are found on the Fraser Plateau over a wide geographic area, but mainly in the upper Deadman River area and along Bridge Creek near Canim Lake. Their elevational range is from 2500' to 4000' and they represent 0.95 percent (18,320 acres) of the map area.

Forest Zonation. Stolle soils are found in the White spruce zone of the Dry Interior region.

Soils and Parent Material. Stolle soils have developed on loamy sand to gravelly sand glaciofluvial deposits >5' deep and on a veneer <5' thick of similar materials over bedrock. Surface textures vary from sandy loam to gravelly sand and topographies are predominantly level to gently undulating. Orthic Eutric Brunisol is the dominant soil development.

Drainage. These soils are mainly rapidly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
SL1	Orthic Eutric Brunisol		rapid	level to gently undulating or very gently sloping
SL2	Orthic Eutric Brunisol	Gleyed Orthic Eutric Brunisol	rapid to imperfect	level to gently undulating containing depressional areas
SL3	Orthic Eutric Brunisol	Lithic Orthic Eutric Brunisol	rapid	level to gently undulating or very gently sloping
SL4	Lithic Degraded Eutric Brunisol	Orthic Eutric Brunisol	rapid	level to gently undulating or very gently sloping
SL5	Orthic Eutric Brunisol	Orthic Dark Gray	rapid	level to gently undulating or very gently sloping

Plate 23. Stolle Soil Association landscape. The parent materials are sandy glaciofluvial deposits.

SPOONEY Soil Association - SN

Location. Spooney soils occupy scattered areas on the Quesnel Highland, but mostly occur in the Spanish Creek area near the northern border of the map area. They range in elevation from 3500' to 5500' and represent 0.11 percent (2,280 acres) of the study area.

Forest Zonation. Spooney soils are located in the Subalpine Engelmann spruce - alpine fir zone of the Interior Wet Belt region.

Soils and Parent Material. Spooney soils have developed on loamy sand to gravelly sand glaciofluvial deposits >5' deep and on a veneer <5' thick of similar materials over bedrock. Surface textures vary from sandy loam to gravelly sand and topographies are gently to steeply rolling. The modal soil is classified as Orthic Humo-Ferric Podzol.

Drainage. These soils are primarily well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
SN1	Orthic Humo-Ferric Podzol		well	gently to strongly rolling; steeply sloping at higher elevations
SN3	Orthic Humo-Ferric Podzol	Gleyed Orthic Humo-Ferric Podzol	well to imperfect	gently to strongly rolling; depressional areas and steep moisture receiving positions

SPANISH Soil Association - SP

Location. Spanish soils occur on the Shuswap Highland, specifically along Spanish, Mann and Deception creeks. Their elevational range is 2500' to 4500' and they cover 0.62 percent (11,960 acres) of the map area.

Forest Zonation. These soils occur in the Interior western hemlock - western red cedar zone of the Interior Wet Belt region.

Soils and Parent Material. Spanish soils have developed on loamy sand to gravelly sand glaciofluvial deposits >5' deep and on a veneer <5' thick of similar materials over bedrock. Surface textures vary from sandy loam to gravelly sand and topographies range from undulating to strongly rolling. Orthic Humo- Ferric Podzol is the principal soil development.

Drainage. Spanish soils are generally well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
SP1	Orthic Humo-Ferric Podzol		well	undulating to strongly rolling
SP2	Orthic Humo-Ferric Podzol	Degraded Dystric Brunisol	well	undulating to strongly rolling
SP3	Orthic Humo-Ferric Podzol	Gleyed Orthic Humo-Ferric Podzol	well to imperfect	undulating to strongly rolling containing some depressional areas
SP4	Orthic Humo-Ferric Podzol	Lithic Orthic Humo-Ferric Podzol	well	undulating to strongly rolling
SP5	Lithic Orthic Humo-Ferric Podzol	Orthic Humo-Ferric Podzol	well	undulating to strongly rolling

SUCCOUR Soil Association - SR

Location. The Succour soils occur in the Thompson Plateau physiographic region, mainly along the valleys of the North Thompson and Barriere rivers and Louis Creek. In the North Thompson valley they are found between the southern boundary of the map area and the Barriere River. Their elevation- al range is 1500' to 2500' and they represent 0.68 percent (13,160 acres) of the study area.

Forest Zonation. Succour soils are found in the Interior Douglas-fir zone; Ponderosa pine subzone of the Dry Interior region.

Soils and Parent Material. Succour soils have developed on loamy sand to gravelly sand glacio-fluvial deposits >5' deep. Soil surface textures range from sandy loam to gravelly sand and topographies are mainly undulating to strongly rolling. The major soil development is Orthic Eutric Brunisol.

Drainage. These soils are mainly rapidly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
SR1	Orthic Eutric Brunisol		rapid	gently undulating to strongly rolling; some very steeply sloping areas
SR2	Orthic Eutric Brunisol	Gleyed Orthic Eutric Brunisol	rapid to imperfect	gently undulating to strongly rolling containing depressional areas
SR5	Orthic Eutric Brunisol	Orthic Dark Gray	rapid	gently undulating to strongly rolling; some very steeply sloping areas

TA HOOLA Soil Association - TA

Location. Ta Hoola soils occur in the Quesnel Highland between Hotfish and Canim lakes at elevations ranging from 3000' to 3500'. They represent 0.14 percent (2,792 acres) of the study area.

Forest Zonation. Ta Hoola soils are found in the Subalpine Engelmann spruce - alpine fir zone of the Interior Wet Belt region.

Soils and Parent Material. Ta Hoola soils have developed on gravelly sandy loam to gravelly sand ablation till. Their surface textures range from gravelly sandy loam or gravelly loamy sand to gravelly sand and topographies are gently to moderately rolling. The modal soil is classified Orthic Humo-Ferric Podzol.

Drainage. These soils are well to imperfectly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
TA3	Orthic Humo-Ferric Podzol	Gleyed Orthic Humo-Ferric Podzol	well to imperfect	gently to moderately rolling, containing some level and depressional areas

TULERIC Soil Association - TC

Location. Tuleric soils occur at various locations in the Shuswap Highland including areas northwest of Mahood Lake, north and east of Murtle River, and near the confluence of Hemp and Blackwater creeks. They range in elevation from 1500' to 2500' and cover 0.28 percent (5,390 acres) of the map area.

Forest Zonation. These soils are found in the Interior western hemlock - western red cedar zone of the Interior Wet Belt region.

Soils and Parent Material. Tuleric soils have developed on gravelly sandy loam to gravelly sand ablation till. Surface textures range from gravelly sandy loam or gravelly loamy sand to gravelly sand and topographies are gently to moderately rolling. The modal profile is classified as Degraded Eutric Brunisol.

Drainage. Tuleric soils are well to imperfectly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
TC1	Degraded Eutric Brunisol		well	undulating to rolling, some nearly level areas
TC2	Degraded Eutric Brunisol	Gleyed Degraded Eutric Brunisol	well to imperfect	undulating to rolling containing depressional areas
TC3	Gleyed Degraded Eutric Brunisol	Degraded Eutric Brunisol	imperfect to well	depressional areas

TISDALL Soil Association - TD

Location. Tisdall soils occupy minor areas on the Fraser Plateau south of Tsintsunko Lake. They occur at elevations above 5500' and occupy 0.03 percent (680 acres) of the study area.

Forest Zonation. These soils are found in the Subalpine Engelmann spruce - alpine fir zone of the Dry Interior region.

Soils and Parent Material. Tisdall soils have developed on gravelly sandy loam to gravelly sand ablation till. The surface textures vary from gravelly sandy loam to gravelly sand and topographies are gently rolling to undulating. The modal profile is classified as Orthic Ferro-Humic Podzol.

Drainage. Tisdall soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
TD3	Orthic Ferro-Humic Podzol		well	gently rolling to undulating

TYEE Soil Association - TE

Location. Tyee soils are found on the Fraser Plateau at elevations between 3000' to 4000' near the western boundary of the map area. They represent 0.23 percent (4,540 acres) of the map area.

Forest Zonation. These soils are found in the White spruce zone of the Dry Interior region.

Soils and Parent Material. Tyee soils have developed on gravelly sandy loam to gravelly loam calcareous glacial till >5' deep that is derived from volcanic bedrocks. Surface textures range from loam to sandy loam and topographies vary from undulating to moderately rolling. The major soil development is Orthic Gray Luvisol.

Drainage. These soils are from well to imperfectly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
TE1	Orthic Gray Luvisol	Gleyed Orthic Gray Luvisol	well to imperfect	undulating to moderately rolling containing depressional areas

TAGGART Soil Association - TG

Location. Taggart soils occupy a minor area on the Thompson Plateau northwest of Little Fort. They range from 1500' to 2500' in elevation and represent 0.01 percent (200 acres) of the study area.

Forest Zonation. Taggart soils occur in the Interior Douglas-fir zone; Lodgepole pine subzone of the Dry Interior region.

Soils and Parent Material. Taggart soils have developed on gravelly sandy loam to gravelly sand ablation till. Surface textures vary from gravelly sandy loam to gravelly sand, and topographies are gently to strongly rolling. The representative soil profile is Degraded Eutric Brunisol.

Drainage. These soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
TG1	Degraded Eutric Brunisol		well	gently to strongly rolling

TOLE Soil Association - TL

Location. Tole soils are located on the Fraser Plateau at elevations between 4000' and 5500'. They occur, in addition to other places, in the northwest corner of the map area, and near Adler and Dagger lakes. These soils represent 1.45 percent (27,820 acres) of the map area.

Forest Zonation. These soils occur in the Subalpine Engelmann spruce - alpine fir zone of the Dry Interior region.

Soils and Parent Material. Tole soils have developed on gravelly sandy loam to gravelly sand ablation till. Surface textures range from gravelly sandy loam or gravelly loamy sand to gravelly sand and topographies vary from gently to strongly rolling. The main soil development is Orthic Humo-Ferric Podzol.

Drainage. Tole soils are well to imperfectly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
TL1	Orthic Humo-Ferric Podzol		well	gently to strongly rolling, some nearly level areas
TL3	Orthic Humo-Ferric Podzol	Gleyed Orthic Humo-Ferric Podzol	well to imperfect	gently to strongly rolling containing depressional areas
TL4	Gleyed Orthic Humo-Ferric Podzol	Orthic Humo-Ferric Podzol	imperfect to well	depressional to nearly level

TIMBER Soil Association - TM

Location. Timber soils occur on the Thompson Plateau and occupy a minor area in the southwestern corner of the map area. Their elevational range is 3000' to 3500'. The area occupied by these soils is negligible, <0.01 percent (80 acres) in this map area, but significant averages of these soils occur in map sheet 92I, to the south.

Forest Zonation. These soils occur in the Interior Douglas-fir zone; Ponderosa pine subzone of the Dry Interior region.

Soils and Parent Material. Timber soils have developed on gravelly sandy loam to gravelly loam, calcareous glacial till derived from volcanic bedrocks. Their surface texture is loam and topographies vary from moderately rolling to steeply sloping. The most common classifiation is Degraded Eutric Brunisol.

Drainage. Timber soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
TM3	Degraded Eutric Brunisol	Orthic Gray Luvisol	well	moderately rolling to steeply sloping

TSINTSUNKO Soil Association - TO

Location. Tsintsunko soils occur on the Fraser Plateau above 5500'elevation near the southern boundary of the map area. They cover 0.35 percent (6,800 acres) of the map area.

Forest Zonation. Tsintsunko soils are found in the Subalpine Engelmann spruce - alpine fir zone of the Dry Interior region.

Soils and Parent Material. Tsintsunko soils have developed on gravelly sandy loam to gravelly loam glacial till >5' deep and on a veneer <5' thick of a similar till that is derived from volcanic bedrocks. Their surface textures are sandy loam or gravelly sandy loam and they occur on nearly level to strongly rolling terrain. The modal profile is classified as Orthic Ferro-Humic Podzol.

Drainage. These soils are well to moderately well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
TO3	Orthic Ferro-Humic Podzol	Lithic Ferro-Humic Podzol	moderately well	gently undulating to strongly rolling containing some nearly level areas
TO4	Orthic Ferro-Humic Podzol		moderately well	gently undulating to strongly rolling containing some nearly level areas

TERNAN Soil Association - TR

Location. Ternan soils occur on the Fraser Plateau. They are located, in addition to other places, southeast and north of Canim Lake, along Jim Creek, between Bowers and Neida lakes, adjacent to Phinetta Creek, and between Bonaparte and Allan lakes. Their elevational range is 3500' to 4500' and they cover 0.35 percent (6,690 acres) of the map area.

Forest Zonation. These soils occur in the Subalpine Engelmann spruce - alpine fir zone in the Dry Interior region.

Soils and Parent Material. Ternan soils have developed on sandy loam to gravelly sand glaciofluvial deposits >5' deep. Their surface textures range from sandy loam to gravelly sand and topographies vary from level to strongly rolling. The modal soil is classified as Degraded Dystric Brunisol.

Drainage. Ternan soils are mostly rapidly drained with some to imperfectly drained inclusions.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
TR1	Degraded Dystric Brunisol		rapid	level to gently undulating
TR2	Degraded Dystric Brunisol	Orthic Dystric Brunisol	rapid	gently undulating to strongly rolling
TR3	Degraded Dystric Brunisol	Gleyed Degraded Dystric Brunisol	rapid to imperfect	gently undulating containing depressional areas
TR4	Gleyed Degraded Dystric Brunisol	Degraded Dystric Brunisol	imperfect to rapid	depressional areas

TEATHER Soil Association - TT

Location. Teather soils occur on the Shuswap Highland east of Hallamore Lake at elevations ranging from 3500' to 4500'. They occupy 0.11 percent (2,280 acres) of the study area.

Forest Zonation. These soils occur in the Interior Douglas-fir zone; Lodgepole pine subzone of the Dry Interior region.

Soils and Parent Material. Teather soils have developed on gravelly sandy loam to gravelly sand ablation till. The surface textures vary from gravelly sandy loam or gravelly loamy sand to gravelly sand and topographies range from gently to moderately undulating. The representative soil profile is classified as Degraded Dystric Brunisol.

Drainage. Teather soils are mostly well drained with some imperfectly drained inclusions.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
TT1	Degraded Dystric Brunisol		well	gently to moderately undulating
TT2	Degraded Dystric Brunisol	Gleyed Degraded Dystric Brunisol	well to imperfect	gently to moderately undulating containing depressional areas

TUBBS Soil Association - TU

Location. Tubbs soils occur in a number of places on the Fraser Plateau. Among others, they occur west of the Hamilton Creek and Deadman Creek valleys, between Ross Creek and Boyer Lake, adjacent to the northern shore of Enright Lake, west of the southern tip of Young Lake, and adjacent to of Machete Lake. Their elevational range is from 2500' to 4000' and they occupy 0.90 percent (17,360 acres) of the map area.

Forest Zonation. These soils occur in the White spruce zone of the Dry Interior region.

Soils and Parent Material. Tubbs soils have developed on gravelly sandy loam to gravelly sand ablation till. Surface textures vary from gravelly sandy loam or gravelly loamy sand to gravelly sand and topographies range from undulating to strongly rolling. The predominant soil development is Degraded Eutric Brunisol.

Drainage. Tubbs soils are well to imperfectly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
TU1	Degraded Eutric Brunisol	Gleyed Degraded Eutric Brunisol, Orthic Gray Luvisol	well to imperfect	undulating to strongly rolling containing depressional areas
TU2	Gleyed Degraded Eutric Brunisol	Degraded Eutric Brunisol	imperfect to well	depressional areas

TUNKWA Soil Association - TW

Location. Tunkwa soils occur on the Thompson Plateau along the western boundary of the map area south of Young Lake, and near the southern border west of Criss Creek. They range in elevation from 3500' to 4000' and represent 1.16 percent (22,240 acres) of the study area.

Forest Zonation. These soils occur in the Interior Douglas-fir zone; Ponderosa pine subzone of the Dry Interior region.

Soils and Parent Material. Tunkwa soils have developed on gravelly loam to gravelly silt loam, calcareous glacial till derived from volcanic bedrocks. Surface textures range from loam to silt loam and topographies vary from gently rolling to steeply sloping. The usual soil classification is Orthic Gray Luvisol.

Drainage. These soils are well to rapidly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
TW1	Orthic Gray Luvisol		well	gently rolling
TW2	Orthic Gray Luvisol	Degraded Eutric Brunisol	well	moderately rolling to very steeply sloping
TW5	Lithic Orthic Gray Luvisol		well	moderately rolling to hilly and steeply sloping

THUYA Soil Association - TY

Location. Thuya soils occur on the Fraser Plateau and are located southeast of Canim Lake, adjacent to Kellington Lake, between Kellington and Christmas lakes, adjacent to Bowers Lake and northwest of Wavey Lake. They range in elevation from 3000' to 4500' and cover 1.53 percent (29,280 acres) of the map area.

Forest Zonation. Thuya soils are found in the Subalpine Engelmann spruce - alpine fir zone in the Dry Interior region.

Soils and Parent Material. Thuya soils have developed on gravelly sandy loam to gravelly sand ablation till. Surface textures range from gravelly sandy loam or gravelly loamy sand to gravelly sand and topographies vary from gently undulating to strongly sloping. The modal profile is classified as Degraded Dystric Brunisol.

Drainage. These soils are well to imperfectly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
TY1	Degraded Dystric Brunisol		well	gently undulating to strongly sloping
TY2	Degraded Dystric Brunisol	Gleyed Degraded Dystric Brunisol	well to imperfect	gently undulating to strongly sloping containing depressional areas
TY4	Gleyed Degraded Dystric Brunisol	Degraded Dystric Brunisol	imperfect to well	depressional areas with adjacent strong slopes

VIDETTE CREEK Soil Association - VI

Location. Vidette Creek soils occur on the Shuswap Highland in the northeast part of the map area. Their elevational range is 3500' to 4500' and they represent 0.55 percent (10,580 acres) of the map area.

Forest Zonation. These soils are located in the Subalpine Engelmann spruce - alpine fir zone of the Dry Interior forest region.

Soils and Parent Material. Vidette Creek soils have developed on gravelly loam to gravelly clay loam glacial till >5' deep that is derived mainly from metamorphic and volcanic rocks. The textures of the soil surfaces are sandy loam or gravelly sandy loam and topographies vary from undulating to extremely sloping. The modal soil is classified as Brunisolic Gray Luvisol.

Drainage. These soils are well to imperfectly drained with seepage on some sites.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
VI1	Brunisolic Gray Luvisol		well	gently rolling to strongly sloping; hilly areas
VI4	Brunisolic Gray Luvisol		well, seepage	steeply to extremely sloping, usually south facing slopes
VI5	Brunisolic Gray Luvisol	Gleyed Brunisolic Gray Luvisol	well to imperfect	gently to moderately rolling containing depressional areas
VI6	Brunisolic Gray Luvisol	Degraded Dystric Brunisol	moderately well, seepage	steeply to extremely sloping, usually south facing slopes
VI10	Brunisolic Gray Luvisol	Orthic Humo-Ferric Podzol	moderately well, seepage	steeply to extremely sloping, usually south facing slopes

WAVEY LAKE Soil Association - WA

Location. Wavey Lake soils occur on the Shuswap Highland in the northeast part of the map area. Their elevational range is 3500' to 4500' and they represent 0.18 percent (3,440 acres) of the map area.

Forest Zonation. Wavey Lake soils are found in the Interior Douglas-fir zone; Lodgepole pine subzone of the Dry Interior region.

Soils and Parent Material. Wavey Lake soils have developed on gravelly loam to gravelly clay loam glacial till >5' deep that is derived mainly from metamorphic and volcanic rocks. The textures of the soil surfaces are sandy loam or gravelly sandy loam and the topographies vary from moderately rolling to extremely sloping. The predominant soils development is Brunisolic Gray Luvisol.

Drainage. These soils are well to moderately well drained with some slopes displaying seepage.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
WA1	Brunisolic Gray Luvisol		well	moderately to strongly rolling
WA3	Brunisolic Gray Luvisol	Degraded Eutric Brunisol	well	strongly rolling to extremely sloping; usually south facing
WA6	Brunisolic Gray Luvisol	Degraded Dystric Brunisol	moderately well, seepage	strongly rolling to steeply and extremely sloping

WHITEWOOD CREEK Soil Association - WH

Location. Whitewood Creek soils are situated io the Shuswap Highland in the northeast part of the map area. They range in elevation from 3500' to 4500' and cover 0.34 percent (6,560 acres) of the study area.

Forest Zonation. These soils are found in the Interior Douglas-fir zone; Lodgepole pine subzone of the Dry Interior region.

Soils and Parent Material. Whitewood Creek soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is derived from metamorphic and volcanic rocks. Surface textures vary from gravelly sandy loam to gravelly sand and topographies are strongly rolling to extremely sloping. Degraded Dystric Brunisol is the primary soil development.

Drainage. Whitewood Creek soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
WH1	Degraded Dystric Brunisol	Lithic Degraded Dystric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping

WILLOW CREEK Soil Asssociation - WI

Location. Willow Creek soils occur on the Shuswap Highland in the northeast part of the map area. Their elevational range is 3500' to 4500' and they represent 0.11 percent (2,260 acres) of the map area.

Forest Zonation. Willow Creek soils are found in the Subalpine Engelmann spruce - alpine fir zone of the Dry Interior region.

Soils and Parent Material. Willow Creek soils have developed on gravelly sandy loam to gravelly sand colluvium <5' that is derived from metamorphic and volcanic rocks. Their surface textures vary from gravelly sandy loam to gravelly sand and topographies range from strongly rolling to extremely sloping. The representative soil profile is Degraded Dystric Brunisol.

Drainage. These soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
WI1	Degraded Dystric Brunisol	Lithic Degraded Dystric Brunisol	well	strongly rolling to very hilly; steeply to extremely sloping

WINDY MOUNTAIN Soil Association - WM

Location. Windy Mountain soils occur on the Shuswap Highland in an area west of Mann Creek and south of Mahood Lake. Their elevational range is 4000' to 5000' and they represent 0.37 percent (7,130 acres) of the map area.

Forest Zonation. These soils occur in the Subalpine Engelmann spruce - alpine fir zone in the Dry Interior Region.

Soils and Parent Material. Windy Mountain soils have developed on gravelly sandy loam to gravelly sand colluvium <5' deep that is derived from plutonic rocks. Their surface textures vary from gravelly sandy loam to gravelly sand and topographies range from strongly rolling to extemely sloping. Orthic Humo-Ferric Podzol is the principal soil development.

Drainage. These soils are well drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
WM1	Orthic Humo-Ferric Podzol	Lithic Orthic Humo-Ferric Podzol	well	strongly rolling to very hilly; steeply to extremely sloping

WHITELY LAKE Soil Association - WT

Location. Whitely Lake soils are located on the Shuswap Highland. They occur, in addition to other places, near Reflector and Italia lakes. Their elevational range is 4000' to 4500' and they represent 0.80 percent (15,340 acres) of the study area.

Forest Zonation. These soils occur in the Subalpine Engelmann spruce - alpine fir zone of the Dry Interior region.

Soils and Parent Material. Whitely Lake soils have developed on gravelly sand ablation till. Surface textures range from gravelly loamy sand to gravelly sand and topographies vary from strongly undulating to strongly rolling. The main soil development is Orthic Humo-Ferric Podzol.

Drainage. Whitely Lake soils are well to imperfectly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
WT1	Orthic Humo-Ferric Podzol		well	strongly undulating to strongly rolling
WT3	Orthic Humo-Ferric Podzol	Gleyed Orthic Humo-Ferric Podzol	well to imperfect	strongly undulating to strongly rolling

WYLLIE Soil Association - WY

Location. Wyllie soils occur on the Shuswap Highland in the vicinity of Grizzly, Reflector and Sicily lakes, and in the Upper Mann Creek area. They range from 4000' to 5500' in elevation and cover 0.43 percent (9,300 acres) of the map area.

Forest Zonation. These soils are found in the Subalpine Engelmann spruce - alpine fir zone in the Dry Interior region.

Soils and Parent Material. Wyllie soils have developed on sandy loam to gravelly sand glaciofluvial deposits >5' deep and a veneer <5' thick of similar materials overlying bedrock. Surface textures vary from sandy loam to gravelly sand and topographies are gently undulating to gently rolling. The representative soil profile is Orthic Humo-Ferric Podzol.

Drainage. Wyllie soils are well to imperfectly drained.

Soil Assoc. Component	Dominant Soil Subgroup(s)	Significant Soil Subgroup(s)	Drainage	Topography
WY1	Orthic Humo-Ferric Podzol		well	gently undulating to gently rolling
WY2	Orthic Humo-Ferric Podzol	Gleyed Orthic Humo-Ferric Podzol	well to imperfect	gently undulating to gently rolling containing depressional areas
WY4	Gleyed Orthic Humo-Ferric Podzol	Orthic Humo-Ferric Podzol	imperfect	depressional areas
WY5	Lithic Orthic Humo-Ferric Podzol	Orthic Humo-Ferric Podzol	well	gently undulating to gently rolling

MISCELLANEOUS LAND TYPES

Rock (RO) — Areas mapped as bedrock are those which have little or no surface mantle or debris (generally less than 4 inches) and the rock is exposed at the surface. The rough, mountainous terrain has ensured that a significant portion of the map area is of this land type.

Talus (WB) — Talus deposits are found in all physiographic regions of the map area at nearly all elevations and represent 0.29 percent of the study area. The deposits have steeply to extremely sloping topography and might be classified as a nonsoil because of their inability to support plant growth.

PART III - SOIL INTERPRETATIONS AND LAND USE

3.1 INTRODUCTION

Soil interpretations relate soil and its associated landscape, vegetation and climate characteristics to a specified use. The main purpose in compiling interpretative material is to present information in a form that is more easily understood than the basic soil or landscape data.

The generalized interpretative information in the following sections is based mainly on field observations and, to a limited degree, on laboratory data. The interpretations are mainly only estimates of how a particular soil is expected to perform for a particular use. Since the soil survey is of a reconnaissance nature (variations within soil associations are inherent in this type of survey) all interpretations should be viewed in general terms. The interpretations presented are not intended for detailed applications, but rather to assist in making general land use decisions related to planning and management. For more detailed application the user may have to supplement the reconnaissance data with information specifically collected to resolve the questions.

3.2 SOIL INTERPRETATIONS FOR AGRICULTURE

3.2.1 SOIL CAPABILITY FOR AGRICULTURE

Soil capability for agriculture ratings are an interpretation based on soil survey and climate information. The classification emphasizes the range of regionally adapted crops which can be grown and is applied to undeveloped as well as presently cultivated land. It groups soils into seven classes with Class 1 having no limitations for the production of regionally adapted crops and Class 7 having no capability for arable agriculture or natural grazing. The assumptions and methodology relevant to the classification are more adequately explained in "Soil Capability for Agriculture, Report Number 2, 1972" and "Methodology, Land Capability for Agriculture - British Columbia Land Inventory, 1973". The following is a brief description of the capability classes:

Class 1 - Soils in this class have no significant limitations for the production of regionally adapted crops.

Class 2 - Soils in this class have moderate limitations that restrict the range of crops or require moderate conservation practices.

Class 3 - Soils in this class have moderately severe limitations that restrict the range of crops or require special conservation practices.

Class 4 - Soils in this class have severe limitations that restrict the range of crops or require special conservation practices or both.

Class 5 - Soils in this class have very severe limitations that restrict their capability to producing perennial native forage crops, and improvement practices are feasible.

Class 6 - Soils in this class are capable only of producing perennial forage crops, and improvement practices are not feasible.

Class 7 - Soils in this class have no capability for arable culture or permanent pasture.

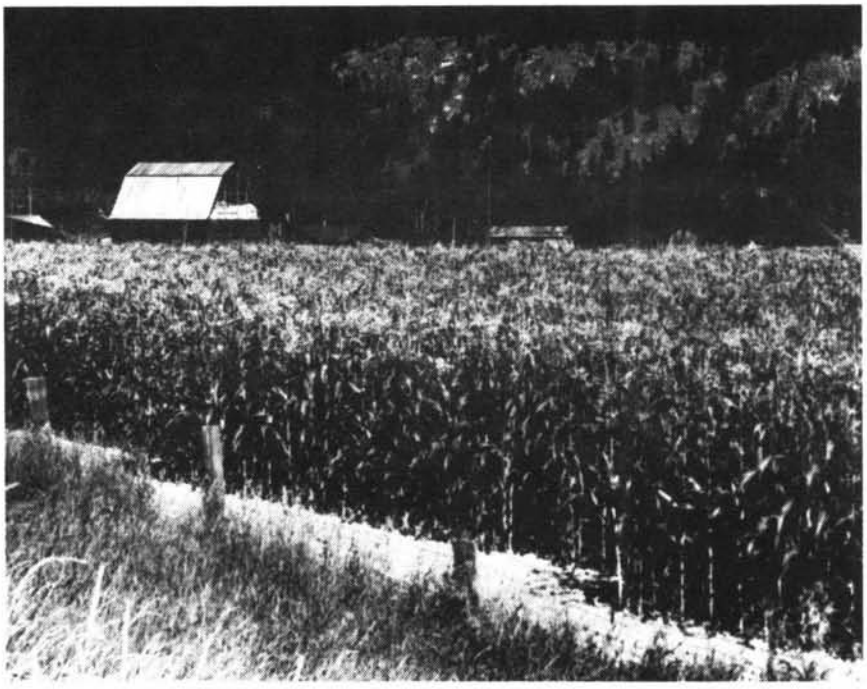


Plate 24. Silage corn grown on Class 1 soils (Gilead soil association) in the North Thompson River valley.

Plate 25. Typical Class 6 lands in the background. Perennial (natural) forage crops are produced in the open areas. The soils parent materials are glacial till of the McLure soil association and shallow colluvium of the Heathrow soil association.

The best soils for agriculture in the Bonaparte River - Canim Lake map area are located mainly on recent alluvial and glaciofluvial deposits. Other lands suitable for arable agriculture include some lacustrine and glacial till deposits. The medium to coarse-textured, low water holding soils usually improve significantly in their agricultural capability when irrigated. The following refers to improved (irrigated or drained) ratings where feasible.

Capability Class 1 soils occur predominantly on the better drained loam and silt loam alluvial soils of the North Thompson River valley. These soils have gentle topographies, are stone-free and have no climatic limitations.

Capability Class 2 soils are found on the recent alluvial, glaciofluvial and lacustrine soils in the North Thompson River valley and in the Dixon Creek valley. The fluvial soils have predominantly sandy loam surfaces and are well drained. The main limitation of the fluvial soils is a low moisture holding capacity. The main limitations of the lacustrine are poor soil structure and poor soil drainage.

Capability Class 3 soils occur on fine sandy loam, loam and silt loam surfaced recent alluvium, lacustrine, glacial till and glaciofluvial deposits. The main limitation associated with this class is a short freeze-free period of 60 to 75 days. Other limitations include low soil moisture holding capacity, moderately sloping topography or short periods of inundation. Class 3 soils are found in the following areas: Bridge Creek area west of Canim Lake, fans along the North Barriere River, and the North Thompson River valley east of Blackpool.

Capability Class 4 soils are found on moderately sloping glacial till, lacustrine, recent alluvium, and glaciofluvial deposits. Major limitations (which may occur individually or in combination) are adverse topography, low soil moisture holding capacity, stoniness, high water tables and a freeze-free period of 50 to 60 days. Class 4 soils are scattered throughout the region.

Capability Class 5 soils are scattered throughout the region on moderate to strongly sloping glacial till, coarse-textured fans, stony glaciofluvial terraces and poorly drained alluvium that is susceptible to flooding. Limitations, either singly or in combination, include adverse topography, stoniness, low soil moisture holding capacity, inundation and high water tables.

Capability Class 6 soils are found mainly on very steeply sloping colluvial and till soils. These soils are predominantly on west, south and east facing aspects in the North Thompson River valley. In narrower valleys such as the North Barriere River, Louis Creek, and Criss Creek, the soils occur mainly on southerly aspects. Class 6 soils are also found on nearly level shallow till over bedrock soils west of the Deadman River valley, and on the North Thompson River floodplain where frequent inundation occurs for the greater part of the growing season.

Capability Class 7 areas are severely limited by adverse topography, shallowness to bedrock, and harsh climate and do not produce natural forage.

The approximate arable area in the Bonaparte River - Canim Lake map area is 611,940 acres (Classes 1 to 5 inclusive) and this is 32% of the total map area. The acre distribution of agricultural capability classes by 1:50 000 map sheet is given in Table C.2 (p. 227).

All agricultural classes (except Class 1) have subclasses attached to the class number. They indicate the kind(s) of limitations that restrict the use of the land for agriculture. The class number indicates the degree of the limitation(s). For more information on the rating system, including subclasses, refer to Soil Capability for Agriculture, Report Number 2, 1972.

Soil capability for agriculture maps of the Bonaparte River - Canim Lake map area are available at the scale of 1:50 000 or 1:125 000 at the following address:

MAPS-B.C.ry,
Surveys and Resource Mapping Branch
British Columbia Ministry of Environment and Parks
Parliament Buildings,
Victoria, British Columbia.
V8V 1X5

3.2.2 CLIMATIC CAPABILITY FOR AGRICULTURE

The highest potential agricultural capability of a soil or area is determined by its climate characteristics that affect crop production. Climate classes form the base for agricultural capability classes. For example, soils having Class 1 capability for agriculture must be located in an area which has at least a Class 1 climate capability for agriculture rating. The soil capability for agriculture rating cannot be higher than the climate capability for agriculture rating for the area in which the soil is located.

The effects of changing management practices and land use on climate should be kept in mind. Industrial development, creation of man-made water bodies and changes in forest harvesting practices change the face of the land and also cause changes in the local climates.

Certain assumptions must be made in interpreting and applying the climate capability for agriculture classification. For a detailed description of these see the publication Climate Capability Classification for Agriculture (B. C. Land Inventory, 1975).

The following are brief definitions of the climatic classes present in the Bonaparte River - Canim Lake map area, together with associated key crops. More adequate definitions may be found in the publication referred to above.

CLIMATIC CLASS 1a

Characteristics

The freeze-free period is 120 to 150 days. Full capability can only be achieved when supplemental water is supplied. There are low minimum temperatures, occasionally below -45°F. Key crops are corn and hardy apples in select microclimates.

Location

Some areas of climatic Class 1a are the floodplain of the North Thompson River at Little Fort, and on the west facing valley slopes of the North Thompson River between Little Fort and Chu Chua. This climate class can also be found on both east and west facing slopes of the North Thompson valley between Chu Chua and Barriere. The elevational range of the climate Class 1a in the North Thompson River valley south of Chu Chua is 1600 to 2500 feet on east and west facing aspects. The elevational range of this class in the Lemieux Creek valley is 1600 to 2000 feet.

CLIMATIC CLASS 1

Characteristics

The freeze-free period is 90 to 129 days. Annual precipitation is more than 16 inches and the May-September precipitation is greater than 8.0 inches. There is no significant heat deficiency and no serious moisture deficiency. There is a climatic moisture deficit of <1.5 inches during the growing season in areas not irrigated. The key crop is corn.

Location

Climatic Class 1 areas are found between 1600 to 1900 feet elevations at McLure, Barriere, Chinook Cove, Little Fort and Clearwater.

CLIMATIC CLASS 2

Characteristics

The freeze-free period is 75 to 90 days. Annual precipitation is less than 22.0 inches. The May-September precipitation is less than 9.8 to 11.2 inches. There is a climatic moisture deficit of 1.5 to 4.5 inches during the growing season in areas not irrigated.

Location

Areas of climatic Class 2 are found between the following elevations: 2500 feet and 3500 feet elevation on east-facing aspects in the North Thompson River valley, 2000 feet and 3000 feet in Whitewood Creek valley, and 3000 feet and 3700 feet in the Mount Edwards area between the North Thompson River and Louis Creek.

CLIMATIC CLASS 3

Characteristics

The freeze-free period is 60 to 75 days. Annual precipitation is less than 25 inches. The May-September precipitation is less than 13 inches. A climatic moisture deficit of 4.6 to 7.5 inches occurs during the growing season in areas that are not irrigated.

Location

Areas of climatic Class 3 exist between the following elevations: 3500 feet and 4000 feet elevation on the east and west facing aspects in the North Thompson River valley, 3500 feet and 4200 feet in the vicinity of Mount Edwards which is between the North Thompson River and Louis Creek, and 2500 feet and 3500 feet elevation between Canim and McNeil lakes.

CLIMATIC CLASS 4

Characteristics

The freeze-free period is 50 to 60 days or a climatic moisture deficit of 7.5 to 10.4 inches occurs during the growing season in areas that are not irrigated.

Location

This climatic class occurs as frost pooling pockets within the climatic class 3 areas. These class 4 areas exist between 3400 feet and 3600 feet elevation adjacent to Bowers, Deka, Sheridan, Snohoss, Deadman, Young, Eagan and Machete lakes.

CLIMATIC CLASS 5

Characteristics

The freeze-free period is 30 to 50 days or climatic moisture deficit of 10.5 to 13.4 inches occurs during the growing season in areas not irrigated. This climatic class is only suitable for forage production.

Location

Climatic class 5 areas occur, in addition to other places, between 3500 feet and 4400 feet elevation on the Fraser Plateau, and between 4000 feet and 4900 feet elevation between the North Thompson River and Louis Creek.

CLIMATIC CLASS 6

Characteristics

The freeze-free period is less than 30 days. Growing degree-days above 42°F are between 400 and 650. A climatic moisture deficit of 13.4 to 16.3 inches occurs during the growing season in non-irrigated areas.

Location

Climatic class 6 areas are found between 4500 feet and 5500 feet elevation on the Fraser Plateau and between 4500 feet and 6500 feet elevation in the Shuswap Highland.

CLIMATIC CLASS 7

Characteristics

The freeze-free period is highly variable but it is usually less than 30 days.

Location

These areas occur above the 5500 feet elevation in the Shuswap Highland and above 5000 feet elevation on the Fraser Plateau.

3.2.3 CROP SUITABILITY

Table 4 indicates the type of crops which are suited to a particular soil association within a particular climate class. Parameters such as rooting depth, soil texture and structure, drainage, stoniness, topography and climate were considered in preparing the crop suitability table.

Management Problems

Some specific soil characeristics that should be considered in the management of the arable soils are presented in Table 5. The interpretations are estimates based on field experience and limited laboratory data. These estimates are general in nature and are only intended for broad evaluations.

3.3 SOIL INTERPRETATIONS FOR ENGINEERING

Among soil properties highly pertinent to engineering are soil strength, compaction characteristics, permeability, soil drainage, grain size distribution, shrink-swell potential, plasticity and soil reaction. Also important are depth to bedrock, depth to water table, and slope. These properties, in varying degrees and combinations, affect construction and maintenance of roads, pipelines, foundations for small buildings, irrigation systems, small dams and systems for disposal of refuse and sewage. Interpretations for some of these uses are presented in this report.

Such information, however, does not eliminate the need for further site-specific investigations and is not intended to take its place. For the engineer, knowledge of the general setting of an area is of primary importance before beginning detailed site investigations. This general approach is also important for a pedological survey, so that one may better understand the soil and the landscape and make better predictions about their response to various uses.

3.3.1 ENGINEERING PROPERTIES OF THE SOILS

Engineering test data is provided for some of the major surficial deposits of the map area. Theses are given in Table 6. The samples were taken at depths varying from two to fifteen feet and are representative of some of the dominant soil parent materials.

Liquid and plastic limits measure the effect of water on the consistence of a soil material. As the moisture content of a clayey soil increases from a dry state, the material changes from a semi-solid to a plastic state. If the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material changes from the semi-solid to the plastic state, and the liquid limit is the moisture content at which it changes from the plastic to the liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic. Some silty and sandy soils are non-plastic (NP).

The engineering classifications given (Unified and AASHO) are based on data obtained by mechanical analysis and by determination of the liquid and plastic limits.

TABLE 4. CROP SUITABILITY

CROP	SOIL ASSOCIATION (Map Symbols)	CLIMATE CAPABILITY CLASS
I Silage Corn - Best suited to deep soils with high fertility, level topography, medium texture, good aeration, good drainage and high moisture retention.	BL1; GI2, 3; E1, 3	1, 1a
II Cereal Grains - Crops with fine, fibrous roots, including wheat, oats and barley are best suited to well drained, medium or heavy textured soils.		
(a) wheat	E1; BL1,2; BA1; RE1,6	2 or better
(b) barley or oats	BF3; EX1, 2, 3; E1; BL1, 2; BA1; RE1, 6	3 or better
III Vegetables - Vegetable crops generally require soils that are well to imperfectly drained and naturally very fertile or respond easily to fertilization regardless of other soil characteristics that may be required by the individual crops.		
(a) tuberous crops	BF3; EX1, 2, 3; E1, 3; BL1, 2, 3; BA1, 2; RE1, 6; BD1, 2; GI1, 3; BV1, 2	3 or better
(b) non-tuberous crops	BF3; EX1, 2, 3; E1, 3; BL1, 2, 3; BA1, 3; RE1, 6; BD1, 2; GI1, 3; FG1, 2, 3; SR1, 2, 5; SE1; SL1, 2, 5	3 or better
IV Forage Crops - The relationship between species and varieties and soils is not specific because of climatic factors that may greatly vary the growth responses of plants to any set of soil conditions. Legumes prefer a mildly alkaline to neutral soil.		
(a) <u>grasses</u> - brome grass, timothy, ryegrass, reed canary grass	AA1, 3; AC1, 2; AH1; AK1, 3; AL1, 3; AN1, 5, 8; AB1; AS8, 10, 11; AT1, 5; BF3; BA1; BL1, 2, 3, 5; RE1, 2, 6; BV1, 2; CR1; BD1, 2; GI1, 3; FG1, 2, 3; SR1, 2, 5; SE1; SL1, 2, 5; SP1, 2, 3; D1, 3, 4, 5; DK1, 2; DL1, 3; DO1, 3; DU1, 5, 6; DY1, 2; DD1; DG1, 2, 5, 7; DI1, 3, 4, 5; E1, 3; MC3, 4, 5; ME1, 6; RD1, 3; RM1, 2; TA3; TC1; TE1; TT1,2; TU1,2; TG1; TW1; TY1,2; VI1,5; WT1, 3; WY1	5 or better
(b) <u>legumes</u> - alfalfa, red clover, alsike clover	AL1; AS8, 10; BA1; BL1, 2; RE1,6; CR1; BV2; BF3; DK1; DL1, 3; DU1; DI1, 3; EE1, 3; EX1, 2; E1; FG1; GI1; GR1, 2; MC4; ME1; RE1, 6; RM1; SL1, 5; SE1; SR1, 5; TG1; TU1, 2; TC1; TW1	5 or better

TABLE 5. MANAGEMENT CONSIDERATIONS OF ARABLE SOILS

Management Considerations	Soil Associations (Map Symbols)
Low soil moisture holding capacity (require supplemental irrigation)	BL1; DI1, 3, 5; DK1; DL1, 3, 5; DU1, 6; DY1; FG2, 3; GI1; LL1; SE1; SL1; SP1, 2; SR1, 5; TL1, TT1; TU1; TY1; WY1; CR1; D1, 3, 4; DG1, 2, 5.
High flooding hazard	BR3; BV2, 3; GI3, 5; RE3, 4, 6; BA1, 2, 3; BD2, 3; BL3, 5; BR1, 2, 3.
Soils requiring drainage	BV2, 3, 4; BA2, 3, 4; AH4; AC4; BR1, 2, 3; BL3, 5; BD2, 3; DK2, 3; DG4, 7; DY2, 3; DI4; DU4; D5; DP4; EL1, 2; EX3; GI3, 5; RE2, 3, 4; SL2; TY2; TL3; RM2; MC3.
Low organic matter content	All arable soils except BR3.
Soils with stoniness limitations	CR1; D1, 3, 4; DG1, 2, 5; DI1, 3, 5; DK1, 3; DL1, 3, 5; DU1, 5, 6; DY1, 2; FG1, 2, 3; TL1, 3, 4; TT1; TU1, 2; TY1, 2; LL3; SP1, 2, 3.
Soils subject to compaction, poor trafficability, surface puddling and crusting	BF; EX; E.

TABLE 6: ENGINEERING TEST DATA

Parent Material	Soil Name and Sampling Location	Sampling Depth	Mechanical Analysis Percentage Passing Sieve Number (All Passing 3" Sieve)								Plasticity Index	Liquid Limit	Coef. of Linear Expan.	Engineering Classification	
			3/8"	4	10	20	40	60	140	200				Unified	AASHO
Glacial Till	Ambush Lat. 51°-25' Long. 120°-25'	15'	81.51	75.21	64.54	58.57	53.20	48.98	41.41	39.25	6.74	22.17	0.013	SM-SC	A-4
Glacial Till	Archie Lat. 51°-27' Long. 120°-22'	6'-7'	96.21	90.04	73.25	34.60	21.04	18.96	15.87	15.31	8.44	21.88	N/D	SC	A-2-4
Glacial Till	Art Lat. 51°-27' Long. 120°-47'	7'-8'	93.70	87.40	77.14	70.19	65.55	62.16	55.54	53.37	5.70	24.78	0.035	ML-CL	A-4
Glacial Till	Aurora Lat. 51°-41' Long. 120°-05	5'-6'	83.93	76.20	64.50	55.54	43.53	34.61	21.89	9.37	non-plastic	non-plastic	N/D	SP-SM	A-1-b
Glacial Till	Dragonfly Lat. 51°-46' Long. 120°-01'	6'-7'	74.65	64.46	46.04	29.15	21.24	16.53	10.24	8.97	non-plastic	non-plastic	N/D	SW-SM	A-1-a
Glacial Till	Doreen Lat. 51°-58' Long. 120°-37'	3'-4'	93.75	89.15	73.65	66.17	61.12	57.62	50.32	47.75	7.20	25.73	0.086	SC	A-4
Glacial Till	Ejecta Lat. 51°-47' Long. 120°-13'	5'-6'	89.05	84.42	75.47	68.76	64.10	60.60	53.22	50.37	6.67	23.72	0.035	ML-CL	A-4
Glacial Till	Eugene Lat. 51°-28' Long. 120°-44'	4'	79.22	74.05	52.18	26.81	15.74	13.11	11.20	10.80	12.61	35.41	N/D	SP-SC	A-2-6
Glacial Till	Murtle Lat. 51°-57' Long. 120°-07'	4'	58.11	54.19	50.42	31.40	22.95	19.97	16.85	16.00	5.28	20.66	N/D	SM-SC	A-2-4
Glacial Till	Roserim Lat. 51°-56' Long. 120°-04'	4'	87.65	73.30	48.02	27.37	18.63	17.63	15.25	14.71	8.83	27.74	N/D	SC	A-2-4
Glacial Till	Round Lat. 51°-39' Long. 120°-09'	6'	92.73	87.85	81.00	71.52	63.99	59.18	50.66	47.95	7.24	25.01	N/D	SC	A-4
Glaciofluvial Deposits	Frog Lat. 51°-37' Long. 120°-04'	5'-6'		99.87	99.44	96.92	83.50	50.91	17.48	12.75	non-plastic	non-plastic	N/D	SM	A-2-4
Lacustrine	Exlou Lat. 51°-16' Long. 120°-11'	5'	100	99.95	99.82	99.82	99.82	99.82	99.78	99.77	17.67	41.21	N/D	CL	A-7-6
Alluvium	Blackpool Lat. 51°-14' Long. 120°-09'	2-2 1/2'	100.0	100.0	99.90	99.65	98.72	94.19	38.13	28.56	non-plastic	non-plastic	N/D	SM	A-2-4
Alluvium	Crater Lat. 51°-37' Long. 120°-07'	5'-6'	63.44	52.37	38.41	18.90	8.93	3.59	1.80	1.63	non-plastic	non-plastic	N/D	SP	A-1-a
Alluvium	Gilead Lat. 51°-02' Long. 120°-14'	3'	85.21	81.00	78.16	74.71	63.96	40.16	12.05	8.56	non-plastic	non-plastic	N/D	SP-SM	A-3
Colluvium	Laxity Lat. 51°-56' Long. 120°-03'	5'	79.44	62.93	41.17	22.95	14.73	11.62	8.70	8.16	7.37	21.74	N/D	SP-SC	A-2-4

N/D = Not determined.

Pedological textural classes are related to classes in both the Unified and AASHO systems. Although the relationships are not perfect, they are sufficient for predicting the likely engineering class, or classes, for each textural class. Table 7 provides a comparison of the three systems. This table may be used as a guide in classifying soils for which no engineering test data are available.

Table 8 indicates some of the properties of soil parent material that are significant for Engineering. The parameters considered are: depth to bedrock and seasonal high water table, C.S.S.C., Unified and AASHO textures, permeability, soil reaction and shrink-swell potential. The information is correlated with the individual soil association or with the soil association component where sufficient data is available. The data is generalized and is based on field observations and limited laboratory analyses.

The parameters considered are described in the following sections.

Depth to Bedrock and Depth to Seasonal High Water

The depths are presented as values which are excess of (>) or less than (<).

Texture Classification

Soil texture is concerned with the size of the mineral particles in the soil and with the relative proportion of each size-group present. Classifications are given for three classification systems:

i) Family level textural grouping, according to Canada Soil Survey Committee Soil Classification Manual (Canada Department of Agriculture, 1970).
   (a) Coarse-textured group
      (1) very coarse-textured: sands and loamy sands
      (2) moderately coarse-textured: sandy loams and fine sandy loams
   (b) Medium-textured group
      (1) medium-textured: loam, silt loam, and silt
      (2) moderately fine-textured: sandy clay loam, clay loam, and silty clay loam
   (c) Fine-textured group
      (1) fine-textured: sandy clay, clay, and silty clay
      (2) very fine-textured: heavy clay (more than 60% clay)

ii) The Unified System (U.S.D.A., 1971). In the Unified system, soils are classified according to particle size distribution, plasticity index, liquid limit, and organic matter content. Soils are grouped in 15 classes. There are eight classes of coarse-grained soils identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as PT.

iii) The A.A.S.H.O. System (U.S.D.A., 1971). The A.A.S.H.O. System, produced by the American Association of State Highway Officials is used in classifying soils according to those properties that affect use in highway construction and maintenance. In this system, a soil is placed in one of seven basic groups ranging from A-1 to A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A-1 are gravelly

soils of high bearing strength, the best soils for subgrade (foundations). At the other extreme, in group A-7, are clay soils that have low bearing strength when wet and are the poorest mineral soils for subgrade.

Permeability

Permeability is that quality of the soil which enables it to transmit water or air. Permeability classes are based on soil structure, soil texture, porosity, shrink-swell potential and other characteristics of the horizons in the soil profile. The entrance of water into surface horizons, or into the whole solum may be rapid but permeability may be slow because of a slowly permeable layer or compact, impermeable parent material directly beneath the solum. Permeability classes are as follows (U.S.D.A., 1971):

Class	Numerical Range (cm per hr)
Slow	<1.5
Moderate	1.5 - 5.1
Rapid	>5.1

Reaction

Reaction Description	pH Range (0.1M $CaCl_2$)
Extremely acid	<4.5
Very strongly acid	4.5 - 5.0
Strongly acid	5.1 - 5.5
Medium acid	5.6 - 6.0
Slightly acid	6.1 - 6.5
Neutral	6.6 - 7.3
Mildly alkaline	7.4 - 7.8
Moderately alkaline	7.9 - 8.4

Shrink-Swell Potential

Shrink-swell behaviour is that quality of the soil that determines its volume change with change in moisture content. Building foundations, roads, and other structures may be severely damaged by the shrinking and swelling of soil. The volume change of the soil is influenced by the amount of moisture change and by the amount and kind of clay present.

Three classes are given:

Low - Coefficient of linear expansion (COLE) is <0.03. Includes soils that are loamy sand and sand that contain any kind of clay mineral, and sandy loam to clay that contain low shrink-swell clay minerals.

Moderate - These soils have a COLE of 0.03 to 0.06. Generally includes soils that are silty clay loam, clay loam and sandy loam containing mixed clay minerals.

High - These soils have a COLE >0.06. Generally includes soils that are clay loam, silty clay loam, silty clay, and clay that have a high percentage of montmorillinite or other high shrink-swell clay minerals.

TABLE 7: GENERAL RELATIONSHIP OF SYSTEMS FOR CLASSIFYING SOILS (U.S.D.A. 1971)

U.S.D.A.* and C.S.S.C.+ Texture Class	Unified Symbol	AASHO** Symbol	Soil Properties Related to Classification
Clay; silty clay	CH	A-7	High shrink-swell clays
	MH	A-7	Mica, iron oxide, kaolinitic clays
	CL	A-7	Low Liquid Limit. Generally >40% pct clay
Silty clay loam	CL	A-7	Low Liquid Limit. Plastic (A-6 if clay <30 pct)
	ML-CL	A-7	Low Liquid Limit. Moderately plastic (A-6 if clay <30 pct)
	CH	A-7	High Liquid Limit. High shrink-swell clays
	MH	A-7	High Liquid Limit. Mica, iron oxide, kaolinitic
Clay loam	Cl	A-6 or A-7	Low Liquid Limit. Plastic
	ML-CL	A-6	Low Liquid Limit. Moderately plastic
	CH	A-7	High Liquid Limit. High shrink-swell clays
	MH	A-7	High Liquid Limit. Mica, iron oxide, kaolinitic
Loam	ML-CL	A-4	Moderately plastic (A-6 if clay >21 pct)
	CL	A-6	Plastic (A-4 if clay <22 pct)
	ML	A-4	Low plasticity (A-7 if clay >21 pct)
Silt loam	ML-CL	A-4	Moderately plastic (A-6 if clay >21 pct)
	ML	A-4	Low plasticity (A-7 if clay >21 pct)
	CL	A-6	Plastic
Silt	ML	A-4	Low Plasticity
Sandy clay	CL	A-7	Fines >50 pct
	SC	A-7	Fines 50 pct or less
Sandy clay loam	SC	A-6	Plastic. Fines 36-50 pct
	SC	A-2-6	Plastic. Fines 35 pct or less
	CL	A-6	Plastic. Fines >50 pct
Sandy loam	SM	A-2-4 or A-4	Low plasticity
	SC	A-2-4	Plastic
	SM-SC	A-2-4	Moderately plastic
Fine sandy loam	SM	A-4	Nonplastic. Fines 50 pct or less
	ML	A-4	Nonplastic. Fines >50 pct
	ML-CL	A-4	Moderately plastic. Fines 50 pct
	SM-SC	A-4	Moderately plastic. Fines 50 pct or less
Very fine sandy loam	ML-CL	A-4	Moderately plastic
	ML	A-4	Low plasticity
Loamy sand	SM	A-2-4	Nonplastic. Fines 35 pct or less
	SM-SC	A-2-4	Moderately plastic. Fines 35 pct or less
	SM	A-4	Low plasticity. Fines >35 pct
	ML	A-4	Little or no plasticity
Sand, fine sand	SP-SM	A-3	Fines approximately 5-10 pct
	SM	A-2-4	Fines approximately >10 pct
	SP	A-3	Fines <5 pct
Very fine sand	SM	A-4	Low plasticity
	ML	A-4	Little or no plasticity
Coarse sand	SP; GW	A-1	Fines <5 pct
	SP-SM	A-1	Fines 5-12 pct
	SM	A-1	Fines 13-25 pct
	SM.	A-2-4	Fines >25 pct
Gravel	GP; GW	A-1	Fines <5 pct
50 pct passes No. 200	GM or GC	A-1	Fines 5-25 pct
50 pct of coarse	GM or GC	A-2	Fines 26-35 pct
passes No. 4 sieve	GM	A-4	Fines >35 pct
	GC	A-5	Fines >35 pct

*United States Department of Agriculture.
+Canada Soil Survey Committee.
**American Association of State Highway Officials.

TABLE 8: ESTIMATED SOIL PROPERTIES SIGNIFICANT TO ENGINEERING

Soil Parent Material	Soil Association or Land Type Symbol	Depth to		Texture Classification			Permeability	pH (0.1M $CaCl_2$)	Shrink-swell Potential
		Bedrock	Seasonal High Water Table	C.S.S.C.	Unified	AASHO			
Glacial (basal) till, medium to fine texture	AA1,2,4,5,8; AB1,5; AK1,2,5,8; AT1,3,4,6,10; DE2; DN1,9; DO1,6; EJ1,2,5; EN1,9; GR1,2,7; MY3; MO3,4,6; VI1,4,6,10; WA1,3,6	>5'	>5'	Medium to Fine	ML-CL, SC	A-4, A-2-4	Slow to Moderate	6.0-6.6	Moderate to High
	AA3,4; AB3,4; AK3,4; AT5,8; DN2; DO3,5; EJ3; EN3; MO5; VI5	>5'	<5'	Medium to Fine	ML-CL, SC	A-4, A-2-4	Slow to Moderate	6.0-6.6	Moderate to High
	AA6,7; AB6; AT9; DN7,8; DO7; EJ6,7; EN6; GR4,6; HY4	<5'	>5'	Medium to Fine	ML-CL, SC	A-4, A-2-4	Slow to Moderate	6.0-6.6	Moderate to High
	AL1,2,7; AN1,3,4,6,10; MC1,2,4,7; RD1,4,6; RM1,3,5; TW1,2	>5'	>5'	Medium to Fine	ML-CL, SC	A-4 A-2-4	Slow to Moderate	7.0-7.7	Moderate to High
	AL3,5; AN5,8; MC3,5; RD3,5; RM2	>5'	>5'	Medium to Fine	ML-CL, SC	A-4 A-2-4	Slow to Moderate	7.0-7.7	Moderate to High
	AL4; AN9; MC6; RD7,8; RM4; TW5	<5'	>5'	Medium to Fine	ML-CL, SC	A-4 A-2-4	Slow to Moderate	7.0-7.7	Moderate to High
Glacial (basal) till, medium to coarse texture	AC1,3,5,6; AG1; AH1,3,4,6; AM3,4,5; AO1; AQ5,8,10,11; AS5,6,8,10; AW6; BT1,2; EE1,3,4,7,8; GA1,6,9; ME1,3; MI1; RW3; RY1,3,4,5,9; RY10; TE; TO4	>5'	>5'	Medium to Coarse	SP-SC, SM-SC	A-2-6 A-2-4	Moderate to Rapid	6.1-6.4	Moderate to Low
	AC2,4; AH2,5; AS11; BT3,4; GA3; EE2,5; ME6; RY2,6	>5'	<5'	Medium to Coarse	SP-SC, SM-SC	A-2-6 A-2-4	Moderate to Rapid	6.1-6.4	Moderate to Low
	AC7,8; AG7; AH10,11; AQ7; AS7; AW10,11; BT6,7; EE9,10; FM7; GA7; ME2; RY7,8; TO3	<5'	>5'	Medium to Coarse	SP-SC, SM-SC	A-2-6 A-2-4	Moderate to Rapid	6.1-6.4	Moderate to Low
	TM3	>5'	<5'	Medium to Coarse	SP-SC SM-SC	A-2-6 A-2-4	Moderate to Rapid	7.3-7.5	Moderate to Low
Glacial (basal) till, coarse texture	AR1,6; DA3	>5'	>5'	Coarse	SP-SM, SW-SM	A-1-b A-1-a	Rapid	5.8-6.3	Low
	AR2,3; DA4	>5'	<5'	Coarse	SP-SM, SW-SM	A-1-b A-1-a	Rapid	5.8-6.3	Low
	AR4,5; DA2	<5'	>5'	Coarse	SP-SM, SW-SM	A-1-b A-1-a	Rapid	5.8-6.3	Low
Alluvium	BD1; BE1; BV1; CR1; RE1,6	>5'	>3'	Coarse	SP-SM, SP-SM	A-1-a A-2-4 A3	Rapid to Moderate	5.7-6.2	Low
	BD2,3; BE1; BO2,3; BR1,2,3; BV2,3,4; BX3,4; RE2,3,4	>5'	<3'	Coarse	SP-SM, SP-SM	A-1-a A-2-4 A-3	Rapid to Moderate	5.7-6.2	Low

TABLE 8. ESTIMATED SOIL PROPERTIES SIGNIFICANT TO ENGINEERING (CONTINUED)

Soil Parent Material	Soil Association or Land Type Symbol	Depth to		Texture Classification			Permeability	pH (0.1M $CaCl_2$)	Shrink-swell Potential
		Bedrock	Seasonal High Water Table	C.S.S.C.	Unified	AASHO			
Alluvium	BA1; BL1,2; GI1	>5'	>3'	Coarse	SP-SM, SP-SM	A-1-a A-2-4 A3	Rapid to Moderate	6.6-7.7	Low
	BA2,3,4; BL3,5; GI3,5	>5'	<3'	Coarse	SP-SM, SP-SM	A-1-a A-2-4 A3	Rapid to Moderate	6.6-7.7	Low
	EL1,2,3	>5'	<3'	Fine to Medium	ML-CL	A-4	Moderate	7.7-7.9	Moderate
Fluvial Fans	D1,4; DD1; DG1,2; DI1,3; DK1; DL1,3,5; DP1; DU1,6; DY1	>5'	>5'	Coarse	SP, SM	A-1-a A-2-4	Rapid	6.0-6.8	Low
	D3,5; DG4,5,7; DI4,5; DK2,3; DP4,5; DU4,5	>5'	>5'	Coarse	SP, SM	A-1-a A-2-4	Rapid	6.0-6.8	Low
Glacial (ablation) till	TA3; TC1; TD3; TG1; TL1; TT1; TY1; WT1	>5'	>5'	Coarse	SP, SP-SM	A-1-a A-1-b	Rapid	5.8-6.3	Low
	TC2,3; TL3,4; TT2; TU1,2; TY2,4; WT3	>5'	<5'	Coarse	SP, SP-SM	A-1-a A-1-b	Rapid	5.8-6.3	Low
Colluvium	WB	>5'	>5'	Coarse	GP	A-1	Rapid		Low
Shallow colluvium over bedrock	HA, HG, HO, HR, HN, LB, LD, LE, LG, LI, LN, LO, LP, LR, LS, LT, LW, OD, PC, PD, PE, PL, PT, WH, WI, WM	<5'	>5'	Coarse	GP	A-1	Rapid	5.5-6.5	Low
	CM, H, HH, HT, PN	<5'	>5'	Coarse	GP	A-1	Rapid	7.5-7.7	Low
	LV, LY	<5'	>5'	Medium to Coarse	SP-SC	A-2-4	Rapid to Moderate	5.5-6.1	Low
	LA, LX	<5'	>5'	Medium to Coarse	SP-SC	A-2-4	Rapid to Moderate	6.6-7.5	Low
Glacio-fluvial	FG1,2; HD1; LL1,2; SE1; SL1,5; SN1; SP1,2; SR1,5; TR1,2; WY1	>5'	>5'	Coarse	SP, SM	A-2-4 A-1-a	Rapid	5.2-6.8	Low
	FG3, LL3, SL2, SN3, SP3, SR2, TR3,4	>5'	<5'	Coarse	SM, SP	A-2-4 A-1-a	Rapid	5.2-6.8	Low
	FG6,7; SL3,4; SP4,5; WY5	<5'	>5'	Coarse	SM, SP	A-2-4 A-1-a	Rapid	5.1-6.8	Low
Lacustrine	BA1,2; E1,2; EX1,2	>5'	>5'	Medium to Fine	ML-CL	A7	Slow	7.8-8.5	Moderate to High
	E3; EX3	>5'	<5'	Medium to Fine	ML-CL	A7	Slow	7.8-8.5	Moderate to High
	E4	<5'	>5'	Medium to Fine	ML-CL	A7	Slow	7.8-8.5	Moderate to High

3.3.2 ENGINEERING INTERPRETATIONS OF THE SOILS

Soil interpretations for engineering uses are given in Table 9. These ratings are based on soil properties given in Tables 6 and 8. The general guidelines used for the interpretations are contained in "Guide for Interpreting Engineering Uses of Soils, USDA 1971".

Soil Suitability as a Source of Topsoil

The ratings, good, fair and poor are based on soil characteristics. The ratings, in conjunction with the soil map, can indicate in general terms the advisability for using a specific soil as topsoil.

Good - These soils are medium to fine-textured, have low gravel content, are friable and easy to handle. Physical, chemical and biological characteristics are favourable for plant growth.

Fair - These soils have moderate limitations for use as topsoil.

Poor - These soils are not suitable as a source of topsoil because of severe limitations such as coarse texture, high gravel and stone content, toxic substances and poor structure.

Soil Suitability as a Source of Sand and Gravel

This interpretation indicates the suitability of each soil as a possible source of sand and/or gravel. It does not indicate the kind or quality of sand or gravel, nor does it refer to any specific use of the sand and/or gravel.

Suitable - This rating indicates that sand and/or gravel is present in sizeable quantities. The layer is at least 3 ft. thick and the entire 3 ft. need not be in the top 6 ft. of the overburden.

Not Suitable - This rating indicates that sand and/or gravel is generally not present in amounts which satisfy the requirements under "suitable".

Soil Suitability as a Source of Silt and/or Clay

This rating indicates the suitability of each soil as a possible source of silt and/or clay. It does not indicate the kind or quality of silt and/or clay nor does it refer to any specific uses.

Good - This rating indicates that the soil has good potential as a source of silt and/or clay. Gravel content is low.

Fair - This rating indicates that the soil has fair potential as a source of silt and/or clay. Soils are medium to fine-textured. Gravel and stone content is moderate.

Poor - This rating indicates that the soil is unsuitable as a silt and/or clay source. These soils are medium to coarse textured, gravelly and stony.

TABLE 9: ENGINEERING USES OF THE SOILS

Soil Parent Material	Soil Map Symbol	Top Soil	Sand and Gravel	Silt and Clay	Fill Material	Road Location	Shallow Excavations	Dwellings With Basements	Septic Tank Fields
Glacial (basal) till	AA1; AB1; AK1; AL1; AN1; AT1; DN1; DO1; EJ1; EN1; GR1; HY3; MC4; MO3,4; RD1; RM1; TW1; VI1	Fair to Good	Poor	Fair	Fair to Good	Slight	Slight	Slight	Severe to moderate: slow to moderate permeability
	AA3,4; AB3,4; AK3,4; AL3; AL5; AN5; AN8; AT5; AT8; DN2; DO3; DO5; EJ3; EN3; GR3; GR5; MC3; MC5; MO5; RD3; RD5; RM2; VI5	Fair to Good	Poor	Fair	Fair	Moderate: somewhat poorly drained	Moderate to Severe: somewhat poorly drained	Moderate to Severe: somewhat poorly drained	Severe: slow permeability, high water table
	AA2; AA5; AA7, 8; AB5; AK2,5, 8; AL2; AL7; AN3,4; AN6; AN10; AT3,4; AT6; AT10; DE2; DN9; DO6; EJ2; EJ5; EN9; GR1, GR6; GR7; MC1; MC2; MC7; MO6; RD4; RD6; RM3; RM5; TW2; VI4, VI6; VI10; WA1; WA3; WA6;	Poor: slope	Poor	Fair	Fair to Poor: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope, slow permeability
	AA6; AB6; AK6, 7; AL4; AN9; AT9; DN7,8; DO7,8; EJ6,7; EN6; GR4; HY4; MC6; RD7,8; RM4; TW5	Fair to Poor	Poor	Fair	Fair to Poor: shallowness over bedrock in places	Moderate to Severe: shallowness over bedrock	Moderate to Severe: shallowness over bedrock	Moderate to Severe	Moderate to Severe: shallowness over bedrock
	AC6; AH1; AM3; AQ8; AQ10; AS8; AS10; BT1; EE1; EE3; GA1; ME1; RY1; RY5; TE1; TO4	Fair to Good	Poor	Poor	Good to Fair	Slight	Slight	Slight	Slight to Moderate: moderate to rapid permeability
	AC2,4; AH2; AH5; AS11; BT3, 4; EE2; EE5; GA3; GA5; ME6; RY2; RY6	Fair to Good	Poor	Poor	Good to Fair: somewhat poorly drained	Moderate: somewhat poorly drained	Moderate to Severe: somewhat poorly drained	Moderate to Severe	Moderate to Severe: high water table, moderate permeability
	AC1; AC3; AC5; AG1; AH3,4; AH6; AM5; AO1; AQ5; AQ11; AS5, 6; AW6; BT2; EE4; EE7; EE8; GA6; ME3; MI; RW, RY3,4; RY9; RY12; TM3	Poor: slope	Poor	Poor	Fair to Poor: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
	AC7,8; AG7; AH10,11; AQ7; AS7; AW10,11; BT6,7; EE9,10; FM7; GA7; ME2; RY7,8; TO3	Fair to Poor	Poor	Poor	Good to Poor: shallowness over bedrock in places	Moderate to Severe: shallowness over bedrock	Moderate to Severe: shallowness over bedrock	Moderate to Severe	Moderate to Severe: shallowness over bedrock
	AM4	Fair to Good	Poor	Poor	Good to Fair	Moderate	Moderate	Moderate	Moderate: slope, moderate to rapid permeability
	AR1	Poor	Fair	Poor	Good	Slight	Slight	Slight	Slight: rapid permeability

TABLE 9: (CONTINUED)

Soil Parent Material	Soil Map Symbol	Top Soil	Sand and Gravel	Silt and Clay	Fill Material	Road Location	Shallow Excavations	Dwellings With Basements	Septic Tank Fields
Glacial (basal) till (Cont'd)	AR2,3; DA4	Poor	Fair	Poor	Good to Fair: somewhat poorly drained	Moderate: somewhat poorly drained	Moderate to Severe: somewhat poorly drained	Moderate to Severe	Moderate to Severe: high water table, rapid permeability
	AR6; DA3	Poor: slope	Poor	Poor	Fair to Poor: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
	AR4,5; DA2	Poor	Fair	Poor	Good to Poor: shallowness over bedrock	Severe to Moderate: shallowness over bedrock	Severe to Moderate: shallowness over bedrock	Severe to Moderate	Moderate to Severe: shallowness over bedrock
Ablation till	TC1; TD3; TG1; TL1; TT1; TY1; WT1	Good to Poor	Good	Poor	Good	Slight	Slight	Slight	Slight
	TA3, TC2,3; TL3,4; TT2, TY2; TY4; WT3	Good to Poor	Good	Poor	Good to Fair: somewhat poorly drained	Slight to Moderate: somewhat poorly drained	Moderate to Severe: somewhat poorly drained	Moderate to Severe	Moderate to Severe: high water table
Glacio-fluvial	FG1,2; HD; LL1, 2; SE; SL1; SL5; SN1; SP1, 2; TR1,2; WY1	Good to Poor	Good	Poor	Good	Slight	Severe: sidewall instability	Slight	Slight
	FG3; LL3; SL2; SN3; SP3; SR2; TR3,4; WY2	Good to Poor	Good	Poor	Good to Fair: somewhat poorly drained	Slight to Moderate	Severe: sidewall instability	Slight to Severe: somewhat poorly drained	Moderate to Severe: water table
	SR1; SR5	Good to Poor	Good to Poor: slope	Poor	Good to Poor: slope	Severe: sidewall instability	Slight to Severe: slope	Slight to Severe: slope	Slight to Severe: slope
	FG6,7; SL3,4; SP4,5; WY5	Good to Poor	Good to Poor: shallowness over bed-rock	Poor	Good to Poor: shallowness over bedrock	Slight to Severe: shallowness over bedrock	Slight to Severe: shallowness over bedrock	Slight to Severe: shallowness over bedrock	Slight to Severe: shallowness over bedrock
Lacustrine	BF	Fair to Poor	Poor	Good	Poor	Moderate to Severe: slope	Slight	Moderate: slope, moderate, shrink-swell potential	
	E1,2; EX1	Good	Poor	Good	Poor	Severe	Slight	Moderate: shrink-swell potential	Severe: slow permeability
	EX2	Good	Poor	Good	Poor	Severe	Moderate: rare flood-ing	Severe: rare flooding	Severe: slow permeability
	E3; EX3	Good	Poor	Good	Poor: shrink-swell potential	Severe	Moderate to Severe: somewhat poorly drained	Severe to Moderate: somewhat poorly drained	Severe: slow permeability
	E4	Poor	Poor	Poor	Poor	Severe: slope	Severe: slope, shallowness over bed-rock	Severe: slope, shallowness over bed-rock	Severe: shallowness over bedrock
Fluvial fans	D1; D4; DD; DG1; D11; DL1; DL5; DP1; DU1	Poor	Good	Poor	Good	Slight	Severe: sidewall instability	Slight	Slight
	D3; D5; DG5; DG1; D14,5; DP5; DU5	Poor	Good	Poor	Good to Fair: somewhat poorly drained	Slight to Moderate	Severe: sidewall instability	Slight to Severe: somewhat poorly drained	Moderate to Severe: water table

TABLE 9: (CONTINUED)

Soil Parent Material	Soil Map Symbol	Top Soil	Sand and Gravel	Silt and Clay	Fill Material	Road Location	Shallow Excavations	Dwellings With Basements	Septic Tank Fields
Fluvial fans (Cont'd)	DG2; DG4; DK2, 3; DP4; DU4; DU6; DY2,3	Poor	Good	Poor	Severe: poorly drained	Severe: poorly drained	Severe: poorly drained	Severe: poorly drained	Severe: high water table
	DI3; DL3	Poor	Good	Poor	Good	Moderate to Severe: rare flooding	Severe: sidewall instability	Slight to Severe: rare flooding	Slight to Moderate: rare flooding
	DK1; DY1	Poor	Good	Poor	Good	Moderate: rare flooding	Severe: sidewall instability	Severe: rare flooding	Moderate: rare flooding
Alluvium	BA1; BD1; BE1; BL2; BV1; RE1; RE6	Good to Fair	Fair	Fair	Fair: average of the horizons	Moderate: rare flooding	Moderate to Severe: rare flooding sidewall instability in lower horizons	Severe: rare flooding	Moderate: rare flooding
	BA2; BD2; BE2; BL3; BL5; BO2; BV2; GI3; GI5; RE2	Good	Fair	Fair	Fair: somewhat poorly drained	Moderately: somewhat poorly drained	Severe: somewhat poorly drained, sidewall instability in lower horizons	Severe: somewhat poorly drained, occasional flooding	Moderate to Severe: high water table
	BA3,4; BD3; BO3; BR; BV3,4; BX3,4; EL1,2; RE3,4	Poor: poorly drained	Fair	Fair	Poor: poorly drained	Severe: poorly drained	Severe: poorly drained	Severe: poorly drained	Severe: high water table
	BL1; GI1	Good to Fair	Fair	Fair	Fair: average of the horizons	Slight	Slight	Slight	Slight
	CR	Poor	Good	Poor	Good	Moderate: rare flooding	Severe: sidewall instability	Severe: rare flooding	Slight: rapid permeability
Shallow colluvium over bedrock	CM1; H1,2; HG; HA; HH1,2; HN; HO1,2; HR; HT1,2; LA; LB; LD; LE; LG; LI; LN; LO1,2; LP6; LR; LS; LT5,6; LV; LW, LX; LY; OD1,2; PC2,3; PD; PE2,3; PL2; PL4; PL6; PN; PT; WH; WI; WM	Poor: slope	Fair to Poor	Poor	Fair to Poor: slope, shallowness over bedrock	Severe: shallowness over bedrock, slope	Severe: shallowness over bedrock, slope	Severe: shallowness over bedrock, slope	Severe: shallowness over bedrock
	H5; HH5; HO3; HT5; LO3; LP3; LT3,4; OD3; PC1; PE1; PL1; PL5	Poor: slope	Fair to Good	Poor	Fair to Poor: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Deep colluvium	WB	Poor: slope	Poor	Poor	Poor	Severe: slope	Severe: slope	Severe: slope	Severe: slope

Soil Suitability as a Source of Fill Material

The ratings reflect how well a soil performs after it is removed from its original location and used as fill materials, as in making subgrades for roads.

Good - These soils are well suited for use as fill material. They have low shrink-swell potential and low suceptibility to frost action.

Fair - These materials are moderately suited for use as fill material. They have moderate shrink-swell potential and moderate susceptibility to frost action.

Poor - These soils are not suitable for use as fill material. They have high shrink-swell potential and are highly susceptible to frost action.

Other soil factors considered are: shear strength, compressibility, workability, compaction characteristics, stability, erodibility, depth to water table, moisture content and presence of stones and boulders.

The criteria for the ratings of slight, moderate, and severe in Table 9 for road location, excavations, foundations for low buildings and septic tank filter fields are those as defined in the appropriate tables given in "Guide for Interpreting Engineering Uses of Soils, U.S.D.A., 1971. In the ratings for road location, parameters identified in Swanston (1974) were also considered.

Soil Interpretation for Road Location

Soil properties that affect road construction include:
(a) Presence of organic material and thickness
(b) Depth to bedrock and presence of stones and boulders
(c) Depth to water table
(d) Stability of slopes
(e) Potential for frost heaving
(f) Erodibility
(g) Flooding hazard
(h) Topography
(i) Ease of hauling and excavation
(j) Plasticity of the material
(k) Presence of springs and seeps

Soil Interpretation Affecting Foundations for Low Buildings

Soil properties that affect foundations for low buildings include:
(a) Shear strength
(b) Shrink-swell potential
(c) Compressibility
(d) Consolidation characteristics
(e) Susceptibility to liquifaction and piping
(f) Soil texture
(g) Soil permeability

(h) Depth to bedrock
(i) Depth to water table
(j) Susceptibility to sliding

Soil Interpretation for Septic Tank Filter Fields

Features that affect the operation of a septic tank effluent filter field include:
(a) Soil permeability
(b) Depth to water table
(c) Flooding hazards
(d) Steepness of slope
(e) Depth to bedrock or other impervious materials
(f) Crevassed bedrock that may lead polluted water to other places

3.4 SOIL INTERPRETATIONS FOR FORESTRY

3.4.1 SOIL CAPABILITY FOR FORESTRY

The Soil Capability Classification for Forestry was the basis for determining the forest capability of the soils in the survey area (Canada Land Inventory, 1970). Each soil association component was rated according to its inherent ability to grow trees. Factors such as soil profile development, topography, climate, moisture regime, parent material, as well as tree species characteristics were all taken into account. The capability rating, therefore, is an expression of most of the important environmental factors as they apply to tree growth.

The capability of each soil association component to grow wood fibre was determined by locating and measuring representative forest productivity plots on the various soils. The methodology of locating and measuring forest productivity plots and assessing the capability of the soils is described by Kowall (1971). Productivity data, as well as information from air photo interpretation, field observation, British Columbia Forest Service inventory data and forest cover maps, soil, vegetation and climate maps were used to produce the forest capability maps. The mapping of the Land Capability for Forestry follows the Canada Land Inventory (1967) procedure.

Forest capability maps are available from the MAPS-B.C., Surveys and Resource Mapping Branch, British Columbia Ministry of Environment and Parks, Parliament Buildings, Victoria, British Columbia, V8V 1X5.

A summary of the productivity of each of the Soil Capability for Forestry classes is as follows:

Capability Classes	Mean Annual Increment (MAI) of Wood Growth Per Year cu.ft./ac./yr.
7	0 - 10
6	11 - 30
5	31 - 50
4	51 - 70
3	71 - 90
2	91 - 110
1	111 - 130
1a	131 - 150

Subclasses are attached capability to classes 2 to 7 indicating the nature of the soil (or climatic) limitations present. Class 1 (and its subdivision) is assumed to have no limitations to tree growth and therefore has no subclass designation. The subclasses used to indicate limitations for tree growth are:

A - drought or aridity caused by aspect or exposure
C - combination of climatic factors at high elevations
D - physical restriction to rooting by dense or consolidated layers, other than bedrock
E - actively eroding soils - avalanche paths
H - low temperatures - soil and air
I - inundation by streams or lakes
M - soil moisture deficiency at some time during the growing season
R - restriction to rooting by bedrock
S - a combination of soil factors which collectively lower the capability class
U - exposure - aspect and atmospheric
W - soil moisture excess

Table 10 relates the forest capability rating with the soil associations. The ratings are average and for some soil associations, are interpretative only. The ratings are not intended for site specific forest management but rather are general in nature and intended for broad scale evaluation and planning. Generally, for each soil association or group of soil associations, components are grouped into the following categories: deep soils, shallow soils overlying bedrock, soils affected by cold temperatures and soils subjected to high evapotranspiration due to southerly exposure.

The landform symbols used in Table 10 are listed in Table 12, Landform Symbolling System of Genetic and Surface Expressions. A description of these materials are given in Section 1.3.4.

The species listed in Table 10 represent those species which seem to be the best adapted to the site and are the most productive. They are obtained from productivity data derived from forest inventory and capability plots. For more precise information on species suitability, guidelines outlined by Utzig and McDonald (1977) should be consulted and used in conjunction with the soils and forest capability information. Symbols used for the various species are given in Table 13.

TABLE 10. THE RELATIONS BETWEEN SOIL ASSOCIATIONS AND FOREST CAPABILITY

Soil Association	Soil Association Component(s)	Landform(s)	Usual Forest Capability Ratings	Tree Species Suitable for Planting	Forest Zone: Subzone
Able Mountain	AB1, 3-5	T	3S, 4M	1P, wS, D	SAeS-alF: a
	AB6	T, T/R	4M, 5MR	1P, D	SAeS-alF:a
Alans	AS5, 6, 8, 10, 11	T	4M, 5M	1P, D	IwS: a
	AS7	T, T/R	4M, 5MR	1P, D	IwS: a
Alkali	AK1-5, 8	T	3S, 4M	1P, wS, D	SAeS-alF: a
	AK6	T, T/R	4M, 5MR	1P, eS, alF	SAeS-alF: a
	AK7	T, T/R	4M, 5HR	1P, eS, alF	SAeS-alF: a
Allamore	AA1-5, 8	T	3S, 4M	1P, wS, eS	SAeS-alF: a
	AA6	T, T/R	4M, 5MR	1P, eS, alF	SAeS-alF: a
	AA7	T, T/R	4M, 4MR	1P, eS, alF	SAeS-alF: a
Allentown	AW6	T	4M, 5M	1P, D	ID: a
	AW10, 11	T, T/R	4M, 5MR	1P, D	ID: a
Allie	AL1-3, 5, 7	T	4M, 5M	1P, D	ID: a
	AL4	T, T/R	4M, 5MR	1P, D	ID: a
Ambush	AH1-6	T	3S, 2S	1P, wS, D	SAeS-alF: a
	AH10, 11	T, T/R	3S, 4MR	1P, wS, D	SAeS-alF: a
Aqualine	AQ5, 8, 10, 11	T	4M, 5M	1P, D	ID: a
	AQ7	T, T/R	4M, 4MR	1P, D	ID: a
Archie	AC1-4, 6	T	3S, 4M	1P, wS, eS	SAeS-alF: a
	AC5	T	4M, 5H	1P, eS, alF	SAeS-alF: a
	AC7, 8	T, T/R	4M, 5MR	1P, eS, alF	SAeS-alF: a
Armour	AM3-5	T, T/R	5H	eS, alF	SAeS-alF: b
Artison	AN1, 3-6, 8	T	3S, 2S	1P, wS, D	SAeS-alF: a
	AN9,10	T, T/R	3S, 4MR	1P, wS, D	SAeS-alF: a
Art	AT1, 3-6, 8	T	3S, 2S	1P, wS, D	SAeS-alF: a
	AT9, 10	T, T/R	3S, 4MR	1P, wS, D	SAeS-alF: a
Astoria	AO1	T, T/R	3S, 4M	1P, eS	SAeS-alF: a
August	AG1	T	4M, 5H	1P, eS, alF	SAeS-alF: a
	AG7	T, T/R	5MR	1P, eS, alF	SAeS-alF: a
Aurora	AR1-3, 6	T	3S, 4M	1P, wS, D	SAeS-alF: a
	AR4, 5	T, T/R	4M, 5MR	1P, D, eS, alF	SAeS-alF: a
Barriere	BA1-4	F	3WI	bCo, wS	ID: a

TABLE 10. THE RELATIONS BETWEEN SOIL ASSOCIATIONS AND FOREST CAPABILITY (CONTINUED)

Soil Association	Soil Association Component(s)	Landform(s)	Usual Forest Capability Ratings	Tree Species Suitable for Planting	Forest Zone: Subzone
Beaverhut	BT1-4 BT6, 7	T T, T/R	3S, 4M 4M, 5MR	lP, eS lP, eS, alF	SAeS-alF: a SAeS-alF: a
Beaver	BV1-4	F	3S, 7W	lP, wS	IwS: a
Bester	BR1-3	F	3WI	bCo, wS	ID: a
Bethel	BE1, 2	F	3S	wS, lP, eS	SAeS-alF: a
Blackpool	BL1-3, 5	F	3S, 4M	bCo, D, wS	ID:a
Bottrel	BO2, 3	F	3S, 7W	wS, eS, lP	SAeS-alF: a
Boxer Creek	BX3, 4	F	3S, 7W	lP, wS, eS	SAeS-alF: a
Buffalo	BF3	L	6UM	D, tA	IwS: a
Byrd Creek	BD1-3	F	3S, 1	wS, bCo	IwH-wC: a
Chasm	CM1	C/R	6UR	lP, D	IwS: a
Crater	CR1	F	5M, 4M	lP, D, wC, wH	IwH-wC: a
Danger	DN1, 2, 9 DN7, 8	T T, T/R	3S, 4M 4M, 5MR	lP, wS, D lP, D, eS, alF	SAeS-alF: a SAeS-alF: a
Danskin	DK1-3	Ff	4M, 5M	lP, D	ID: b
Darling	DG1, 2, 4, 5, 7	Ff	4M, 3S	lP, D, wS	SAeS-alF: a
Deadman	DD1	Ff	5UM	tA, D	IwS: a
Deka	DE2	T, T/R	4M	lP, D, wC, wH	IwH-wC: a
Doreen	DO1, 3, 5, 6 DO7, 8	T T, T/R	3S, 4M 4M, 5MR	lP, wS, wC, D lP, wC, D	IwH-wC: a IwH-wC: a
Dorrell	DL1, 3, 5	Ff	5M, 4M	lP, D	ID: b
Dragonfly	DA3, 4 DA2	T T, T/R	4M 4M, 5MR	lP, D, wC, wH lP, D, wC, wH	IwH-wC: a IwH-wC: a
Drewry	DY1-3	Ff	4M, 3M	lP, D, wS	IwS: a
Duckling	DI1, 3-5	Ff	4M, 3M	lP, D, wS	IwS: a
Duncan Creek	DU1, 4-6	Ff	3S, 4M	lP, D, wC	IwH-wC: a

TABLE 10. THE RELATIONS BETWEEN SOIL ASSOCIATIONS AND FOREST CAPABILITY (CONTINUED)

Soil Association	Soil Association Component(s)	Landform(s)	Usual Forest Capability Ratings	Tree Species Suitable for Planting	Forest Zone: Subzone
Dunleavy	D1, 3-5	Ff	5M, 4M	D, lP, wS	ID: a
Dunsapie	DP1, 4, 5	Ff	3S, 4M	lP, D, wS	ID: a
Ejecta	EJ1-3, 5	T	3S, 4M	lP, wS, eS	SAeS-alF: a
	EJ6, 7	T, T/R	4M, 5MR	lP, eS, alF	SAeS-alF: a
Elliot	EL1, 2	F	5W, 6W	wS	IwS: a
English Lake	EN1, 3, 9	T	4M, 5H	lP, eS, alF	SAeS-alF: a
	EN6	T, T/R	5MR	lP, eS, alF	SAeS-alF: a
Eugene	EE1-5, 7, 8	T	4M, 5M	lP, D	IwS: a
	EE9, 10	T, T/R	4M, 5MR	lP, D	IwS: a
Exeter	EX1-3	L	4DM, 5DM	lP, D	IwS: a
Exlou	E1-4	L	5DM	D	ID: b
Flourmill	FM7	T, T/R	4M, 5MR	lP, D	IwH-wC: a
Frog	FG1-3, 6, 7	G	4M, 3S	lP, D, wC	IwH-wC: a
Garter	GA1, 3, 5, 6, 9	T	3S, 4M	lP, D, wS	IwH-wC: a
	GA7	T, T/R	4M, 5MR	lP, D	IwH-wC: a
Gilead	GI1, 3, 5	F	5M, 3WI	D, wS, bCo	ID: b
Greenlee	GR1-3, 5, 7	T	3S, 4M	lP, D, wS	IwS: a
	GR4	T, T/R	4M, 5MR	lP, D, wS	IwS: a
	GR6	T, T/R	6UM	lP, tA	IwS: a
Hallamore	HA1, 2, 4	C/R	4MR, 5RM	lP, eS, alF	SAeS-alF: a
	HA3, 5	C/R	5HR	lP, eS, alF	SAeS-alF: a
Hawkley	HY3	T	5H	eS, alF	SAeS-alF: a
	HY4	T, T/R	5HR	eS, alF	SAeS-alF: a
Heathrow	HT1, 2, 5	C/R	6RU, 5RA	D, pP	ID: b
Heger	HR1-3	C/R	4MR, 5RM	lP, D, eS	SAeS-alF: a
Helmcken	HN1, 2, 4	C/R	4MR, 5RM	lP, eS, alF	SAeS-alF: a
	HN3, 5	C/R	5HR	lP, eS, alF	SAeS-alF: a
Hemp	H1, 2, 5	C/R	5RM, 6UR	lP, D, pP	ID: a

TABLE 10. THE RELATIONS BETWEEN SOIL ASSOCIATIONS AND FOREST CAPABILITY (CONTINUED)

Soil Association	Soil Association Component(s)	Landform(s)	Usual Forest Capability Ratings	Tree Species Suitable for Planting	Forest Zone: Subzone
Higgins	HG3	C/R	6HR, 7CR	eS, alF	SAeS-alF: a
Holden	HD1	G	5M	lP, D	IwS: a
Hooligan	HO1-3	C/R	4MR, 5RM	lP, D	ID: a
Hotfish	HH1, 2 HH5	C/R C/R	4MR, 5RM 6UR	lP, D lP, D	IwS: a IwS: a
Lacovia	LV1, 2	C/R	4MR, 5HR	lP, eS, alF	SAeS-alF: a
Ladder	LD1, 2	C/R	4MR, 5RM	lP, eS, alF	SAeS-alF: a
Larghetto	LG1, 2	C/R	4MR, 5RM	lP, D	IwS: a
Lastcourse	LE1, 2	C/R	4MR, 5RM	lP, D	IwH-wC: a
Laurel	LL1-3	G	3S, 4M	lP, eS, alF	SAeS-alF: a
Laxity	LX1-3	C/R	4MR, 5RM	D, lP	IwH-wC: a
League	LA1, 2	C/R	4MR, 5RM	D, lP	IwH-wC: a
Lindquist	LI1	C/R	4MR, 5RM	lP, eS, alF	SAeS-alF: a
Lizard	LR1, 2	C/R	5RM	lP, D	ID: a
Lobster	LB1, 2	C/R	4MR, 5RM	D, lP	IwH-wC: a
Lolo	LO1-3	C/R	5RM, 4MR	lP, D	SAeS-alF: a
Lonely	LY1-3	C/R	4MR, 5RM	lP, eS, alF	SAeS-alF: a
Lost	LT3 LT4-6	C/R C/R	5H 5HR, 6HR	eS, alF eS, alF	SAeS-alF: a SAeS-alF: a
Louise Mountain	LS1, 2	C/R	4MR, 5RM	lP, D, wC	IwH-wC: a
Loveway	LW1-3	C/R	4MR, 5HR	lP, eS, alF	SAeS-alF: a
Lupine	LP3 LP6	C/R C/R	5H 5HR, 6HR	eS, alF eS, alF	SAeS-alF: a SAeS-alF: a
Lynn	LN1, 2, 4	C/R	4MR, 5RM	lP, eS, alF	SAeS-alF: a
McLure	MC1-5, 7 MC6	T T, T/R	5A, 4M 5A, 6MR	D, pP D, pP	ID: b ID: b

TABLE 10. THE RELATIONS BETWEEN SOIL ASSOCIATIONS AND FOREST CAPABILITY (CONTINUED)

Soil Association	Soil Association Component(s)	Landform(s)	Usual Forest Capability Ratings	Tree Species Suitable for Planting	Forest Zone: Subzone
Monticola	MI1	T	4M	lP, D, wC, wH	IwH-wC: a
Mulholland	MO3-6	T	5H	eS, alF	SAeS-alF: b
Murtle	ME1, 3, 6 ME2	T T, T/R	4M 4M, 5MR	lP, D, wC, wH lP, D, wC, wH	IwH-wC: a IwH-wC: a
Ordschig	OD1-3	C/R	4MR, 5RM	D, lP	IwH-wC: a
Pendleton	PT2	C/R	6RU	lP, D	ID: a
Placid	PD1, 2	C/R	4MR, 5HR	lP, eS, alF	SAeS-alF: a
Poison	PN2	C/R	6RU	lP, D	IwS: a
Pootyl	PL1, 2, 4-6	C/R	5RM	lP, D	IwS: a
Price	PC1-3	C/R	4MR, 5RM	lP, eS	SAeS-alF: a
Prince	PE1-3	C/R	5RM	lP, D	IwH-wC: a
Rail	RL1, 2	O	7W	-	various
Raspberry	RY1-6, 9, 12 RY7, 8	T T, T/R	3S, 2S 3S, 4MR	lP, eS lP, eS	SAeS-alF: a SAeS-alf: a
Rayonier	RA1	O	7W	-	SAeS-alF: a
Rennie	RE1, 6 RE2-4	F F	5M 3WI	D, wS D, wS, bCo	ID: b ID: b
Roseflower	RW3	T	6UM	tA, lP	IwS: a
Roserim	RM1-3, 5 RM4	T T, T/R	4M 4M, 5MR	lP, D, wC, wH lP, D, wC, wH	IwH-wC: a IwH-wC: a
Round	RD1, 3-6 RD7, 8	T T, T/R	3S, 4M 4M, 5MR	lP, D, wS lP, D	IwH-wC: a IwH-wC: a
Spanish	SP1-5	G	3S, 4M	lP, D, wS	IwH-wC: a
Spooney	SN1, 3	G	3S, 4M	lP, eS, alF	SAeS-alF: a
Stolle	SL1-5	G	4M, 5M	lP, D	IwS: a
Struthers	SE1	G	5M, 4M	lP, D	ID: a

TABLE 10. THE RELATIONS BETWEEN SOIL ASSOCIATIONS AND FOREST CAPABILITY (CONTINUED)

Soil Association	Soil Association Component(s)	Landform(s)	Usual Forest Capability Ratings	Tree Species Suitable for Planting	Forest Zone: Subzone
Succour	SR1, 2, 5	G	5M	lP, D, pP	ID: b
Ta Hoola	TA3	A	3S, 4M	lP, wS	SAeS-alF: a
Taggart	TG1	A	4M, 5M	lP, D	ID: a
Teather	TT1, 2	A	3M, 2S	lP, wS, D	ID: a
Ternan	TR1-4	G	3S, 4M	lP. wS, D, eS	SAeS-alF: a
Thuya	TY1, 2, 4	A	3M, 2S	lP, wS, D	SAeS-alF: a
Timber	TM3	T	6M, 5M	lP, D	ID: b
Tisdall	TD3	A	5H	eS, alF	SAeS-alF: a
Tole	TL1, 3, 4	A	3S, 4M	lP, eS	SAeS-alF: a
Tsintsunko	TO3 TO4	T, T/R T	5HR 5H	eS, alF eS, alF	SAeS-alF: a SAeS-alF: a
Tubbs	TU1, 2	A	4M, 5M	lP, D	IwS: a
Tuleric	TC1-3	A	4M	lP, D	IwH-wC: a
Tunkwa	TW1, 2 TW5	T T/R	5AM 6R	lP, D lP, D	ID: b ID: b
Tyee	TE1	T	5AM	lP, D	IwS: a
Vidette Creek	VI1, 4-6, 10	T	3S, 2S	lP, wS, D	SAeS-alF: a
Wavey Lake	WA1, 3, 6	T	3S, 2S, 4M	lP, wS, D	ID: a
Whitely Lake	WT1, 3	A	3S, 4M	lP, wS	SAeS-alF: a
Whitewood Creek	WH1	C/R	4MR, 5RM	lP, D	ID: a
Willow Creek	WI1	C/R	4MR, 5RM	lP, D, eS	SAeS-alF: a
Windy Mountain	WM1	C/R	4MR, 5RM	lP, eS, alF	SAeS-alF: a
Wyllie	WY1, 2, 4, 5	G	3S, 4M	lP, wS, D, eS	SAeS-alF: a

TABLE 11. THE RELATIONS BETWEEN LAND TYPES AND FOREST CAPABILITY

Land Types	Map Symbol	Average Forest Capability Ratings	Tree Species Suitable for Planting	Forest Zonation
Talus	WB	7R, 6HR, 6UR	variable	all
Rock Outcrop	RO	7R	variable	all

TABLE 12. LANDFORM SYMBOLLING SYSTEM FOR GENETIC MATERIALS AND SURFACE EXPRESSION

Genetic Materials	Surface Expression
A - ablation till	d - drumlinized
C - colluvium	f - fan
F - fluvial (alluvial)	h - hummocky
G - glaciofluvial	m - kame
L - lacustrine	k - kettled
O - organic	p - plain
R - bedrock	t - terrace
T - glacial till	

T/R - till <5' deep over bedrock
C/R - colluvium <5' deep over bedrock

TABLE 13. TREE SPECIES ABBREVIATION LIST

bCo - black cottonwood
wC - western red cedar
wH - western hemlock
wS - white spruce
lP - lodgepole pine
pP - ponderosa pine
D - Douglas-fir
eS - Engelmann spruce
alF - alpine fir
tA - trembling aspen

The forest zonation is that used by the Vegetation Unit of the Surveys and Resource Mapping Branch. A fuller explanation is given in Section 1.4.2. The symbols of the forest zonations are given in Table 14.

TABLE 14. FOREST ZONATION SYMBOLS

	Dry Interior Region
ID	Interior Douglas-Fir Zone
ID: a	Lodgepole pine subzone
ID: b	Ponderosa pine subzone
IwS	Interior White Spruce Zone
IwS: a	Lodgepole pine subzone
SAeS-alF	Subalpine Engelmann Spruce - Alpine Fir Zone
SAeS-alF: a	Forested subzone
SAeS-alF: b	Krummholz subzone
	Interior Wet Belt Region
IwH-wC	Interior Western Hemlock - Western Red Cedar Zone
IwH-wC: a	Douglas-fir - lodgepole pine subzone
SAeS-alF	Subalpine Engelmann Spruce - Alpine Fir Zone
SAeS-alF: a	Forested subzone

3.4.2 GENERALIZED INTERPRETATIONS OF THE SOIL ASSOCIATIONS AND LAND TYPES FOR FOREST MANAGEMENT

The information given in Table 15 is generalized and is applicable for broad planning and management purposes. It may not be suited for site specific application in the field. The reconnaissance nature of the survey prevented sufficient information to be gathered to adequately give interpretations at the soil association component level.

Limits to Regeneration

Forest regeneration, especially natural regeneration, is dependent upon a number of variables. One of the most important factors is an adequate seed source. Other variables include whether the seedbed has been scarified or compacted, cutting methods, distance of the seedbed from the seed source, prevailing wind direction, shade requirements of the various seedling species, soil characteristics, climate, aspect, elevation, frost potential and brush competition.

The following is a list of soil related conditions which may affect regeneration of trees:

(1) frost heaving - usually occurs on soils having a high clay or silt content.

(2) low fertility - usually occurs in coarse textured soils such as gravels, especially when the surface organic layer has been removed.

(3) high lime content - areas where carbonate levels are high in the soil and restrict the uptake by the plants of essential nutrients causing a fertility problem.

(4) soil moisture deficiency - usually occurs in coarser textured soils such as sandy loams, loamy sand and sand with or without a coarse fragment content. Extreme conditions occur in coarse textured soils such as gravels which have very low waterholding capacities and rapid percolation rates.

(5) soil moisture excess - occurs in areas having a high water table, causing the soil to be poorly or very poorly drained, which limits aeration on seedling establishment.

(6) climatic limitations at high elevations - areas that are subject to high snowfalls which effectively shorten the growing season and/or areas that have cold soil temperatures especially during the early part of the growing season or areas subject to wind exposure.

(7) climatic limitations at low elevations - areas that are subject to high evapotranspiration, low precipitation (aridity), and wind and aspect exposure.

(8) steep slopes - soil surface is unstable and subject to erosion which washes away the seedlings especially if the surface organic horizon is greatly disturbed. Usually occurs on slopes greater than 50% but may occur on less steep slopes on soils having a high clay or silt content.

(9) unstable soil surface - areas where avalanche paths are prevalent.

(10) shallow rooting medium - areas that have shallow soils overlying bedrock; these soils tend to drain rapidly and become droughty.

(11) rocky rooting medium - coarse, fragmental and rubbly areas and talus slopes where the volume of soil suitable for rooting is reduced.

(12) inundation - areas subject to periodic flooding.

Plant Competition

The ratings are based on soil characteristics, field observations, slope, aspect, climate and elevation, and indicate the susceptibility of the soil association components for revegetation by brush, shrubs and undesirable trees following harvesting. Generally, it is assumed that the more productive the site, the greater will be the problem with brush revegetation and competition. Better forest growing sites are usually areas with an adequate supply of soil moisture, which usually contains the necessary nutrients for good plant growth. In general, such sites revegetate to brush, grass and/or undesirable tree species in much less time than it takes to establish desirable tree species. Conversely, on dry sites that are rapidly or well drained, brush competition is low and generally not a problem.

Brush revegetation, including the seeding of domestic grass species, is not always detrimental and in many instances may be beneficial in stabilizing site disturbed by harvesting and thereby reducing soil erosion. It may also aid seedling establishment by curbing frost heaving and, with certain species, provide shade.

The ratings are as follows:

Low - revegetation of brush species is not a factor in the establishment of desirable tree crop.

Moderate - some revegetation of brush species will occur and compete with the desired species.

High - revegetation of brush species is severe and greatly restricts the establishment and growth of the desired species.

Windthrow Hazard

These ratings are based on such factors as soil texture, water table and effective rooting depth, and are considered individually or in combination. Other factors that should be considered are the rooting characteristics of the various tree species, age and density of stand, exposure to the prevailing winds, especially storm tracks, and extent of the exposed forest edge after harvesting.

It is assumed that the deeper the effective rooting medium, the more windfirm will be the tree. Therefore, on coarse-textured materials such as gravelly fluvioglacial materials lacking any root restricting layers (ortstein or duric horizons), root penetration is unrestricted, allowing for deep rooting and windfirmness. In contrast, fine-textured soils such as clayey glacial till or lacustrine sediments usually have a dense subsoil which restricts root penetration, causing a shallow rooting pattern and less windfirmness. Soils that have a high water table or are poorly drained also cause shallow rooting patterns and less windfirmness, as is the case in most instances of shallow soils overlying bedrock. Slope also has an adverse affect on tree stability. With increasing slope steepness, soil mass movement (soil creep) increases, thereby decreasing the tree roots' ability to become firmly anchored, resulting in more blowdown. For more information on wind damage see the publication by the Bureau of Land Management.

Low - No special problem exists. Effective rooting depth is deep with limited rooting restrictions, slopes are gentle.

Moderate - Some trees are expected to blow down during the periods of excessive soil wetness and high wind. Effective rooting depth may be restricted, slopes are more irregular and severe.

High - Many trees are expected to blow down during periods of soil wetness with moderate and high wind. Effective rooting depth is usually shallow, slopes are usually severe.

Potential Soil Damage from Disturbance

Potential soil damage from disturbance indicate the susceptibility of soils to incur damage during and subsequent to all phases of forest harvesting, mining exploration, recreational activity or any other activity which causes soil disturbance. Damage is caused to soils by creating soil disturbances which may destroy soil structure, cause compaction, increase erosion, and also by the removal of soil surface. They may affect other resources through decreased site productivity, lower water quality and yield or by damaged fish habitat in streams. Generally, alluvial sands and gravels have low to moderate susceptibility to damage while those that are silty or clayey have moderate to high susceptibility. Soils derived from lacustrine deposits and shallow soils overlying bedrock usually imply high degrees of damage.

Three categories of Physical Soil Damage, Surface Erosion Hazard and Mass Movement Hazards are rated low, moderate and high. These ratings are based on such factors as soil wetness, texture, coarse fragment percentage, slope, drainage, bulk density and Atterberg limits.

(1) Physical Soil Damage. This category considers the destruction of soil structure, soil compaction and/or puddling affecting plant growth and productivity. Damage usually occurs on soils with a high silt or clay content and when the soil is compacted or

churned when wet. Under these conditions, the soil pore space and pore size is so reduced that the soil becomes practically impervious to air and water. When this soil dries it usually becomes hard and dense.

(2) Surface Erosion Hazard. This category considers the loss of the solum and subsoil after the vegetation and litter has been disturbed or removed. Factors to be considered include the soil texture, depth of the soil to bedrock, seasonal rainfall intensities, aggregate stabilities and slope. Of particular concern are steeply sloping, shallow soils overlying bedrock and occurring in positions in which the soil moisture rapidly drains away. Another concern deals with roads where, without proper ditching and culverting, considerable amount of surface erosion can occur on the cut slopes, fill areas and also sidecast areas. Concurrent with surface erosion is stream sedimentation which is the sediment load added to streams in addition to that which occurs normally.

(3) Mass Movement Hazard. Individual factors affecting mass movement are relatively easy to identify, but it is difficult to determine the combination of factors resulting in mass movement of a landscape. Factors affecting mass movement are topography, soil physical characteristics, moisture status, climate and vegetation. These factors were subjectively assessed to estimate an overall rating.

The three ratings are as follows:

Low - This rating indicates that soils and other resources are likely to receive only minor damage.

Moderate - This rating indicates that soils and other resources are likely to incur moderate damage.

High - This rating indicates that soils and other resources are likely to incur major damage.

TABLE 15. GENERALIZED INTERPRETATIONS OF THE SOIL ASSOCIATIONS AND LAND TYPES FOR FOREST MANAGEMENT

SOIL ASSOCIATION AND SYMBOL	LANDFORM	LIMITS TO REGENERATION	PLANT COMPETITION	WINDTHROW HAZARD	POTENTIAL SOIL DAMAGE		
					Physical Soil Damage	Surface Erosion Hazard	Mass Movement Hazard
Allamore (AA)	T-T/R	frost heaving, shallow rooting medium, climatic limitations at high elevations	M	M	M-H	M-H	M
Able Mountain (AB)	T-T/R	soil moisture deficiency, shallow rooting medium	M	M	M-H	M	L
Archie (AC)	T-T/R	climatic limitations at high elevations, soil moisture deficiency	M	M	M	M-L	L-M
August (AG)	T-T/R	climatic limitations at high elevations, soil moisture deficiency	M	M	M	M-L	L-M
Ambush (AH)	T-T/R	soil moisture deficiency, shallow rooting medium	M	L	L	M-L	L
Alkali (AK)	T-T/R	soil moisture deficiency, shallow rooting medium	M	M	M	M-H	M
Allie (AL)	T-T/R	soil moisture deficiency	L	M	L	M	L-M
Armour (AM)	T-T/R	climatic limitations at high elevations, shallow rooting medium	M-L	M	M	M	L-M
Artison (AN)	T-T/R	soil moisture deficiency, shallow rooting medium	M	L-M	M	M-L	L-M
Astoria (AO)	T	climatic limitations at high elevations	M	L	L	L-M	L
Aqualine (AQ)	T-T/R	soil moisture deficiency	L	M	M	L-M	L
Aurora (AR)	T-T/R	climatic limitations at high elevations, soil moisture deficiency	M	L	L	L	L
Alans (AS)	T-T/R	soil moisture deficiency, shallow rooting medium	M-L	L	L	L	L
Art (AT)	T-T/R	soil moisture deficiency, shallow rooting medium	M	M	M	M	L-M

TABLE 15. GENERALIZED INTERPRETATIONS OF THE SOIL ASSOCIATIONS AND LAND TYPES FOR FOREST MANAGEMENT (CONTINUED)

SOIL ASSOCIATION AND SYMBOL	LANDFORM	LIMITS TO REGENERATION	PLANT COMPETITION	WINDTHROW HAZARD	POTENTIAL SOIL DAMAGE		
					Physical Soil Damage	Surface Erosion Hazard	Mass Movement Hazard
Allentown (AW)	T-T/R	soil moisture deficiency, shallow rooting medium	M	M	M	M	L-M
Barriere (BA)	F	periodic inundation	H	L	H	H	L
Byrd Creek (BD)	F	periodic inundation	H	L	H	H	L
Bethel (BE)	F	periodic inundation	H	L	H-M	H	L
Buffalo (BF)	L	climatic limitations at low elevations, soil moisture deficiency	L	M	H	H	M-L
Blackpool (BL)	F	soil moisture deficiency	M	L	H	H	L
Bottrel (BO)	F	periodic inundation	M-H	L	H-M	H	L
Bester (BR)	F	periodic inundation	H	L	H	H	L
Beaverhut (BT)	T-T/R	soil moisture deficiency shallow rooting medium	M	L	L	M-L	L
Beaver (BV)	F	periodic inundation	M	L	H-M	H-M	L
Boxer Creek (BX)	F	periodic inundation	M	L	H-M	M	L
Chasm (CM)	C/R	climatic limitations at very low elevations, soil moisture deficiency	L	M	M	M	M-L
Crater (CR)	F	low fertility - extreme soil moisture deficiency	L	L	L	L	L
Dunleavy (D)	Ff	low fertility - extreme soil moisture deficiency	L	L	L	L	L
Dragonfly (DA)	T-T/R	soil moisture deficiency, shallow rooting medium	M	L-M	L	L-M	L
Deadman (DD)	Ff	climatic limitations at low elevations	N/A	N/A	L	L	L
Deka (DE)	T	soil moisture deficiency	M-L	L	L	L-M	L
Darling (DG)	Ff	soil mositure deficiency	M	L	L	L-M	L

TABLE 15. GENERALIZED INTERPRETATIONS OF THE SOIL ASSOCIATIONS AND LAND TYPES FOR FOREST MANAGEMENT (CONTINUED)

SOIL ASSOCIATION AND SYMBOL	LANDFORM	LIMITS TO REGENERATION	PLANT COMPETITION	WINDTHROW HAZARD	POTENTIAL SOIL DAMAGE		
					Physical Soil Damage	Surface Erosion Hazard	Mass Movement Hazard
Duckling (DI)	Ff	soil moisture deficiency	M	L	L	L	L
Danskin (DK)	Ff	soil moisture deficiency	M-L	L	L	L	L
Dorrel (DL)	Ff	low fertility - extreme soil moisture deficiency	L	L	L	L	L
Danger (DN)	T-T/R	soil moisture deficiency, shallow rooting medium	M	M	M-H	M	L
Doreen (DO)	T-T/R	soil moisture deficiency	M	L	L	L-M	L
Dunsapie (DP)	Ff	soil moisture deficiency	M	L	L	L	L
Duncan Creek(DU)	Ff	soil moisture deficiency	M	L	L	L	L
Drewry (DY)	Ff	extreme soil moisture deficiency, low fertility	L	L	L	L	L
Exlou (E)	L	frost heaving, soil moisture deficiency	L	M-H	H	H	L-M
Eugene (EE)	T-T/R	soil moisture deficiency	M	M	M	M	M-L
Ejecta (EJ)	T-T/R	soil moisture deficiency, shallow rooting medium	M	M	M-H	M	L
Elliot (EL)	F	soil moisture excess, periodic inundation	L	M-H	M	L	L
English Lake(EN)	T-T/R	climatic limitations at high elevations, soil moisture deficiency	M	M	M	M-H	M
Exeter (EX)	L	frost heaving, climatic limitations at low elevations	L	M	H	M-H	L
Frog (FG)	G	extreme soil moisture deficiency, low fertility	L	L-M	L	L	L
Flourmill (FM)	T-T/R	soil moisture deficiency, shallow rooting medium	M	L	L	L-M	L
Garter (GA)	T-T/R	soil moisture deficiency, shallow rooting medium	M	L	L	M	L-M

TABLE 15. GENERALIZED INTERPRETATIONS OF THE SOIL ASSOCIATIONS AND LAND TYPES FOR FOREST MANAGEMENT (CONTINUED)

SOIL ASSOCIATION AND SYMBOL	LANDFORM	LIMITS TO REGENERATION	PLANT COMPETITION	WINDTHROW HAZARD	POTENTIAL SOIL DAMAGE		
					Physical Soil Damage	Surface Erosion Hazard	Mass Movement Hazard
Gilead (GI)	F	soil moisture deficiency, periodic inundation	L-M	L	H	H	L
Greenlee (GR)	T-T/R	soil moisture deficiency, shallow rooting medium	M	M-L	M	M	M-L
Hemp (H)	C/R	shallow rooting medium, climatic limitations at low elevations, soil moisture deficiency	L	H	H	M-H	M-H
Hallamore (HA)	C/R	shallow rooting medium, soil moisture deficiency, climatic limitations at high elevations	L-M	H	H	M-H	M-H
Holden (HD)	G	extreme soil moisture deficiency, climatic limitations at low elevations	L	L	L	L	L
Higgins (HG)	C/R	shallow rooting medium, soil moisture deficiency, climatic limitations at high elevations	L	H	H	M-H	H-H
Hotfish (HG)	C/R	shallow rooting medium, soil moisture deficiency	L	M	M	M	M
Helmcken (HN)	C/R	shallow rooting medium, soil moisture deficiency, climatic limitations at high elevations	L-M	H	H	M-H	M-H
Hooligan (HO)	C/R	shallow rooting medium, soil moisture deficiency	L-M	M	M	M	M
Heger (HR)	C/R	shallow rooting medium, soil moisture deficiency	M	H	H	M-H	M-H
Heathrow (HT)	C/R	shallow rooting medium, climatic limitations at low elevations	L	M	M	M	M-L

TABLE 15. GENERALIZED INTERPRETATIONS OF THE SOIL ASSOCIATIONS AND LAND TYPES FOR FOREST MANAGEMENT (CONTINUED)

SOIL ASSOCIATION AND SYMBOL	LANDFORM	LIMITS TO REGENERATION	PLANT COMPETITION	WINDTHROW HAZARD	POTENTIAL SOIL DAMAGE		
					Physical Soil Damage	Surface Erosion Hazard	Mass Movement Hazard
Hawkley (HY)	T-T/R	climatic limitations at high elevations, shallow rooting medium	L-M	M	M	M	L-M
League (LA)	C/R	shallow rooting medium, soil moisture deficiency	M	H	H	M	M-L
Lobster (LB)	C/R	shallow rooting medium, soil moisture deficiency	L	H	H	H	M-H
Ladder (LD)	C/R	shallow rooting medium, soil moisture deficiency	M	M	M	M	M
Lastcourse (LE)	C/R	shallow rooting medium, soil moisture deficiency, climatic limitations at low elevations	L	M-H	M	M	M
Larghetto (LG)	C/R	shallow rooting medium, soil moisture deficiency, climatic limitations at low elevations	L	M-H	M	M	M
Lindquist (LI)	C/R	shallow rooting medium, soil moisture deficiency	L-M	M-H	H	M-H	M
Laurel (LL)	G	soil moisture deficiency	M	L	L	L	L
Lynn (LN)	C/R	shallow rooting medium, soil moisture deficiency, climatic limitations at high elevations	M	M-H	M-H	M	M
Lolo (LO)	C/R	shallow rooting medium, soil moisture deficiency	M	M-H	M-H	M-H	M
Lupine (LP)	C/R	shallow rooting medium, soil moisture deficiency, climatic limitations at high elevations	M	M-H	M-H	M-H	M
Lizard (LR)	C/R	shallow rooting medium, soil moisture deficiency	L	M	M	M	M
Louise Mountain (LS)	C/R	shallow rooting medium, soil moisture deficiency	M	M	M-H	M-H	M

TABLE 15. GENERALIZED INTERPRETATIONS OF THE SOIL ASSOCIATIONS AND LAND TYPES FOR FOREST MANAGEMENT (CONTINUED)

SOIL ASSOCIATION AND SYMBOL	LANDFORM	LIMITS TO REGENERATION	PLANT COMPETITION	WINDTHROW HAZARD	POTENTIAL SOIL DAMAGE		
					Physical Soil Damage	Surface Erosion Hazard	Mass Movement Hazard
Lost (LT)	C/R	climatic limitations at high elevations, shallow rooting medium, soil moisture deficiency	L	L	M-H	M-H	M
Lacovia (LV)	C/R	climatic limitations at high elevations, shallow rooting medium	L-M	M-H	M-H	M-H	M
Loveway (LW)	C/R	climatic limitations at high elevations, shallow rooting medium	L-M	M-H	M-H	M-H	M
Laxity (LX)	C/R	shallow rooting medium, soil moisture deficiency	L	M	M	M	M
Lonely (LY)	C/R	shallow rooting medium, soil moisture deficiency	L	M	M	M	M
McLure (MC)	T	climatic limitations at low elevations, soil moisture deficiency	L	M	M	M	M
Murtle (ME)	T	soil moisture deficiency	M	L	L	L-M	L
Monticola (MI)	T	soil moisture deficiency	L	M	M	L-M	L-M
Mulholland (MO)	T	climatic limitations at high elevations	M	M	M	M	L-M
Ordschig (OD)	C/R	shallow rooting medium, soil moisture deficiency	M	M-H	M-H	M	M
Price (PC)	C/R	shallow rooting medium, soil moisture deficiency	M	M-H	M-H	M	M
Placid (PD)	C/R	climatic limitations at high elevations, shallow rooting medium	M	M-H	M-H	M	M
Prince (PE)	C/R	shallow rooting medium, soil moisture deficiency	L	M	M	M	L-M
Pootyl (PL)	C/R	shallow rooting medium, soil moisture deficiency	L	M	M	M	L-M

TABLE 15. GENERALIZED INTERPRETATIONS OF THE SOIL ASSOCIATIONS AND LAND TYPES FOR FOREST MANAGEMENT (CONTINUED)

SOIL ASSOCIATION AND SYMBOL	LANDFORM	LIMITS TO REGENERATION	PLANT COMPETITION	WINDTHROW HAZARD	POTENTIAL SOIL DAMAGE		
					Physical Soil Damage	Surface Erosion Hazard	Mass Movement Hazard
Poison (PN)	C/R	climatic limitations at low elevations, shallow rooting medium, soil moisture deficiency	L	M	M	M	L
Pendleton (PT)	C/R	climatic limitations at low elevations, shallow rooting medium, soil moisture deficiency	L	M	M	M	L
Rayonier (RA)	O	soil moisture excess	M	H	L	L	L
Round (RD)	T-T/R	soil moisture deficiency	M	M-L	M	M	M-L
Rennie (RE)	F	soil moisture deficiency, periodic inundation	L-M	L	H	H	L
Rail (RL)	O	soil moisture excess	M	H	L	L	L
Roserim (RM)	T-T/R	soil moisture deficiency	M	M-L	M	M	L-M
Roseflower (RW)	T	climatic limitations at low elevations, soil moisture deficiency	L	M	M	M	L-M
Raspberry (RY)	T-T/R	soil moisture deficiency	H	M	M	M	M-L
Struthers (SE)	G	extreme soil moisture deficiency, low fertility	L	L-M	L	L	L
Stolle (SL)	G	extreme soil moisture deficiency, low fertility	L	L-M	L	L	L
Spooney (SN)	G	soil moisture deficiency	M	L	L	L	L
Spanish (SP)		soil moisture deficiency	M	L	L	L	L
Succour (SR)	G	extreme soil moisture deficiency, low fertility	L	L	L	L	L
Ta Hoola (TA)	A	soil moisture deficiency	M	L	L	L-M	L
Tuleric (TC)	A	soil moisture deficiency	M	L	L	L-M	L
Tisdall (TD)	A	climatic limitations at high elevations	M	L-M	L	L-M	L

TABLE 15. GENERALIZED INTERPRETATIONS OF THE SOIL ASSOCIATIONS AND LAND TYPES FOR FOREST MANAGEMENT (CONTINUED)

SOIL ASSOCIATION AND SYMBOL	LANDFORM	LIMITS TO REGENERATION	PLANT COMPETITION	WINDTHROW HAZARD	POTENTIAL SOIL DAMAGE		
					Physical Soil Damage	Surface Erosion Hazard	Mass Movement Hazard
Tyee (TE)		climatic limitations at low elevations, soil moisture deficiency, frost heaving	L	M	M-H	M-H	M
Taggart (TG)	A	soil moisture deficiency	L	L	L	L	L
Tole (TL)	A	soil moisture deficiency	M	L	L	L-M	L
Timber (TM)	T	climatic limitations at low elevations, soil moisture deficiency	L	M	M	M	M
Tsintsunko (TO)	T	climatic limitations at high elevations	M	M	M	M	M-L
Ternan (TR)	G	soil moisture deficiency	M	L	L	L	L
Teather (TT)	A	soil moisture deficiency	M	L	L	L	L
Tubbs (TU)	A	soil moisture deficiency, some climatic limitations at low elevations	L	L	L	L	L
Tunkwa (TW)	T	climatic limitations at low elevations, soil moisture deficiency	L	M	H	H	M
Thuya (TY)	A	soil moisture deficiency	M	L	L	L-M	L
Vidette Creek (VI)	T	soil moisture deficiency	M	L	L	M-L	L
Wavey Lake (WA)	T	soil moisture deficiency	M	L	L	M-L	L
Whitewood Creek (WH)	C/R	shallow rooting medium, soil moisture deficiency	L-M	M	M	M	M
Willow Creek (WI)	C/R	shallow rooting medium, soil moisture deficiency	M	H	H	M-H	M-H
Windy Mountain (WM)	C/R	shallow rooting medium, soil moisture deficiency	M	M	M	M	M
Whitely Lake (WT)	A	soil moisture deficiency	M	L	L	L-M	L

TABLE 15. GENERALIZED INTERPRETATIONS OF THE SOIL ASSOCIATIONS AND LAND TYPES FOR FOREST MANAGEMENT (CONTINUED)

SOIL ASSOCIATION AND SYMBOL	LANDFORM	LIMITS TO REGENERATION	PLANT COMPETITION	WINDTHROW HAZARD	POTENTIAL SOIL DAMAGE		
					Physical Soil Damage	Surface Erosion Hazard	Mass Movement Hazard
Wyllie (WY)	A	soil moisture deficiency	M	L	L	L	L
LAND TYPES	MAP SYMBOL						
Talus	WB	shallow rooting medium, climatic limitations at low and high elevations	L	H	L	L	L

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GLOSSARY

aeolian - Material deposited by wind; includes loess and dune sand.

aggregate - A group of soil particles cohering, so as to behave mechanically as a unit.

alluvium - A general term for all deposits of rivers and streams.

association, soil - A sequence of soils of about the same age, derived from similar parent materials, and occurring under similar climatic conditions but having different characertistics due to variation in relief and in drainage.

available nutrient - That portion of any element or compound in the soil that can be readily absorbed and assimilated by growing plants.

available soil water - The portion of water in a soil that can be readily absorbed by plant roots; generally considered to be that water held in the soil up to approximately 15 atmospheres tension.

base saturation - The extent to which the adsorption complex of a soil is saturated with exchangeable cations other than hydrogen and aluminum. It is expressed as a percentage of the total cation exchange capacity.

beach - The gently sloping shore of a body of water which is washed by waves or tides, especially the parts covered by sand or pebbles.

bearing capacity - The average load per unit area that is required to rupture a supporting soil mass.

bedrock - The solid rock that underlies soil and the regolith or that is exposed at the surface.

boulders - Stones which are larger than 24 in. in diameter.

bulk density, soil - The weight of ovendry soil (105°C) divided by its volume at field moisture conditions, expressed in grams per cubic centimeter.

capabilty class - A rating that indicates the capability of land for some use such as agriculture, forestry, recreation, or wildlife. In the Canadian system, it is a grouping of lands that have the same relative degree of limitation or hazard. The degree of limitation is nil in Class 1 and becomes progressively greater to Class 7.

capability subclass - A grouping of soils that have similar kinds of limitations and hazards. It provides information on the kind of conservation problem or limitation. The class and subclass together provide information about the degree and kind of limitation for broad land-use planning and for the assessment of conservation needs.

carbon-nitrogen ratio (C/N ratio) - The ratio of the weight of organic carbon to the weight of total nitrogen in a soil or in an organic material.

GLOSSARY (CONTINUED)

category - Any one of the ranks of the system of soil classification in which soils are grouped on the basis of their characteristics.

cation exchange capacity (CEC) - The total amount of exchanageable cations that a soil can absorb. It is expressed in milliequivalents per 100 g of soil.

channelled (ridge and swale) - Characteristic ridge and swale topography (0-10% slopes common). Often a pattern or series of closely spaced curvilinear ridges and swales. A poorly integrated drainage pattern may be evident connecting swales.

cirque - An amphitheatre type valley carved out by glaciers.

classification, soil - The systematic arrangement of soils into categories and classes on the basis of their characteristics. Broad groupings are made on the basis of general characteristics and subdivisions on the basis of more detailed differences in specific properties.

clay - (i) As a particle-size term: a size fraction less than 0.002 mm in equivalent diameter, or some other limit (geologists and engineers). (ii) As a rock term: a natural, earthy, fine grained material that develops plasticity with a small amount of water. (iii) As a soil term: a textural class. See also texture, soil. (iv) As a soil separate: a material usually consisting largely of clay minerals but commonly also of amorphous free oxides and primary minerals.

climax - A plant community of the most advanced type capable of development under, and in dynamic equilibrium with, the prevailing climate.

cobbles - Rock fragments 3.0 to 10 in. in diameter.

colluvium - A deposit of rock fragments and soil material which has accumulated on or at the base of steep slopes as a result of gravitational action.

colour, soil - Soil colours are compared with a Munsell colour chart. The Munsell system specified the relative degrees of the three simple variables of colour; hue, value and chroma. For example: 10YR 6/4 means a hue 10YR, a value of 6, and a chroma of 4.

complex, soil - A mapping unit used in detailed and reconnaissance soil surveys where two or more defined soil units are so intimately intermixed geographically that it is impractical to separate them at the scale of mapping used.

compaction, soil - The packing together of soil particles by forces exerted at the soil surface resulting in increased soil density.

consistence, soil - The property of soil materials that relates to the degree and kind of cohesion and adhesion or to the resistance to deformation and rupture (soil strength). It is described in terms such as loose, soft, friable, firm, hard, sticky, plastic or cemented.

GLOSSARY (CONTINUED)

creep, soil - An imperfectly slow, more or less continuous downward and outward movement of slope-forming soil or rock. The movement is essentially viscous, under shear stress sufficient to produce permanent deformation but too small to produce shear failure, as in a landslide.

degradation, soil - The changing of soil to a more highly leached and more highly weathered condition, usually accompanied by morphological changes such as the development of an eluviated, light-coloured (Ae) horizon.

delta - A fluvial or glaciofluvial deposit which is relatively level usually triangular shaped form occurring at the mouth of a river as it enters a lake or ocean. May have numerous presently occupied or abandoned channels which appear as an integrated drainage pattern.

drainage, soil - (1) The rapidity and extent of the removal of water from the soil by runoff and flow through the soil to underground spaces. (2) As a condition of the soil, it refers to the frequency and duration of periods when the soil is free of saturation.

drumlins - An elongated or oval hill of glacial drift, commonly glacial till, deposited by glacial ice and having its long axis parallel to the direction of ice movement.

ecology - The study of the relationship between living organisms and their environment.

erosion - The wearing away of the land surface by running water, wind, ice or other agents such as gravity induced downslope movement of materials.

esker - A winding ridge of irregularly stratified sand, gravel, and cobbles deposited under the ice by a rapidly flowing glacial stream.

evapotranspiration - The combined loss of water from a given area, and during a specific period of time by evaporation from the soil surface and by transpiration from plants.

fan - A fan-shaped deposit of outwash at the toe of a slope where a tributary valley enters a main valley.

fertility, soil - The status of a soil with respect to the amount and availability of elements necessary for plant growth.

floodplain - The land bordering a stream built up of sediments from overflow of the stream and subject to inundation when the stream is a flood stage.

fluted - Level to gently irregular topography (0-25% slopes) marked by shallow, straight parallel troughs. Dendritic drainage pattern.

fluvial (alluvial) - Materials laid down by recent streams and rivers. Variable textures. Moderately well to well sorted and moderately well to well stratified.

GLOSSARY (CONTINUED)

friable - Soil aggregates that are soft and easily crushed between thumb and forefinger.

frost heave - The raising of a surface caused by ice in the underlying soil.

genetic - resulting or produced by soil forming processes.

geomorphology - The study of landforms as they relate to geologic composition and history.

glaciofluvial - Materials deposited by glacial meltwater-gravel and sand. Ranges from well sorted and well stratified to poorly sorted and poorly stratified.

glacial till (ablation) - Materials deposited directly by ice with some modification and transportation by glacial meltwater. Variable textures (often stony and bouldery). Poorly sorted and partially stratified.

glacial till (basal) - Materials deposited by ice directly without intervening transportation by water. Variable textures (most often heterogeneous mixture of sands, silts and clays - some often stony and bouldery). Unsorted and unstratified.

gleyed soil - An imperfectly or poorly drained soil in which the material has been modified by reduction or alternating reduction and oxidation. These soils have lower chromas or more prominent mottling or both in some horizons than the associated well-drained soils.

gravel - Rock fragments .08 inch to 3 inches in diameter.

groundwater - Water in the soil beneath the soil surface, usually under conditions where the pressure in the water is greater than the atmospheric pressure and the voids are completely filled with water. Also water that is passing through or standing in the soil and the underlying strata.

habitat - The natural environment of an organism.

horizon, soil - A layer in the soil profile approximately parallel to the land surface with more or less well-defined characteristics that have been produced through soil forming processes.

organic horizons - May be found at the surface of mineral soils or at any depth beneath the surface in buried soils or overlying geologic deposits. They contain more than 30% organic matter. Two groups of these layers are recognized:

O - An organic layer or layers developed under poorly drained conditions, or under conditions of being saturated most of the year or on wet soils that have been artificially drained.

Of - Fibric layer, an organic layer which is the least decomposed of all the organic soil materials. It has large amounts of well-preserved fiber that is readily identifiable as to botanical origin.

GLOSSARY (CONTINUED)

Om - Mesic layer, an organic layer which is intermediate in decomposition between the less decomposed fibric and the more decomposed humic materials. This material has intermediate values for fiber content, bulk density and water contents. The material is partly altered both physically and biochemically.

Oh - Humic layer, an organic layer which is the most decomposed of all the organic soil materials. It has least amount of plant fiber, the highest bulk density values and the lowest saturated water content. This material is relatively stable having undergone considerable change from the fibric state primarily because of oxidation and humification.

L-F-H - These are organic layers developed under imperfectly to well drained conditions.

L - An organic layer characterized by the accumulation of undecomposed organic matter.

F - An organic layer characterized by the accumulation of partly decomposed organic matter. The original structures are discernible with difficulty. Fungi mycelia are often present.

H - An organic layer characterized by an accumulation of decomposed matter in which the original structures are indiscernible.

master mineral horizons and layers - Mineral horizons are those that contain less organic matter than that specified for organic horizons.

A - A mineral horizon formed at or near the surface in the zone of removal of materials in solution and suspension and/or maximum accumulation of organic matter. Included are: (1) horizons in which organic matter has accumulated as a result of biologic activity (Ah); (2) horizons that have been eluviated of clay, iron, aluminum, and/or organic matter (Ae); (3) horizons having characteristics of (1) and (2) above but transitional to underlying B or C (AB or A and B); (4) horizons markedly disturbed by cultivation or pasture (Ap).

B - A mineral horizon or horizons characterized by one or more of the following: (1) an enrichment in silicate clay, iron, aluminum or humus, alone or in combination (Bt, Bf, Bfh and Bh); (2) an alteration by hydrolysis, reduction or oxidation to give a change in colour or structure from horizons above and/or below and does not meet the requirements of (1) and (2) above (bm, Bmg).

C - A mineral horizon or horizons comparatively unaffected by the pedogenic processes operative in A and B, excepting (1) the process of gleying, and (2) the accumulation of calcium and magnesium carbonates and more soluble salts (Cca, Csa, Cg and C).

R - Underlying unconsolidated bedrock, such as granite, sandstone, limestone, etc. The boundary between the R layer and any overlying unconsolidated material is called a lithic contact.

GLOSSARY (CONTINUED)

lower case suffixes

b - Buried soil horizon.

c - A cemented (irreversible) pedogenic horizon.

ca - A horizon with secondary carbonate enrichment where the concentration of lime exceeds that present in the unenriched parent material. It is more than four inches thick and if it has a $CaCO_3$ equivalent of less than 15%, it should have at least 5% more $CaCO_3$ equivalent than the parent material. If it has more than 15% $CaCO_3$ equivalent, it should have 1/3 more $CaCO_3$ equivalent than IC.

cc - Cemented (irreversible) pedogenic concretions.

e - A horizon characterized by the removal of clay, iron, aluminum, or organic matter alone or in combination. When dry, it is higher in color value by 1 or more units than an underlying B horizon. It is used with A (Ae).

f - A horizon enriched with hydrated iron. It usually has a chroma of 3 or more. It is used with B alone (Bf), and B and h (Bfh and Bhf), with B and g (Bfg), and with others.

The criteria for an f horizon (excepting Bgf) are that the oxalate-extractable Fe + Al exceed that of the IC horizon by 0.8% or more (FE + Al > 0.8%), and that the ratio of organic matter to oxalate-extractable Fe be less than 20.

These horizons are differentiated on the basis of organic matter content into:

Bf - less than 5% organic matter
Bfh - 5 to 10% organic matter
Bhf - more than 10% organic matter

g - A horizon characterized by gray colours and/or prominent mottling indicative of permanent or periodic intense reduction. Chromas of the matrix are generally one or less.

h - A horizon enriched with organic matter. When used with A alone, (Ah) it refers to the accumulation of organic matter and must contain less than 30% organic matter. It must show one Munsell unit of value darker than the horizon immediately below or have one percent more organic matter than the IC. When used with A and e (Ahe) it refers to an Ah horizon which has been degraded as evidenced, under natural conditions, by streaks and blotches and often by platy structure.

j - Used as a modifier of e, g, n and t to denote an expression of, but failure to meet the specified limits to the suffix it modifies.

k - Presence of carbonate as indicated by visible effervescence with dilute HCl.

GLOSSARY (CONTINUED)

m - A horizon slightly altered by hydrolysis, oxidation, or solution, or all three, to give a change in colour or structure, or both. It has:
1) Soil structure rather than rock structure comprising more than half the volume of all subhorizons.
2) Some weatherable minerals.
3) Evidence of alteration in one of the following forms:
a) Stronger chromas and redder hues than the underlying horizons.
b) Evidence of the removal of carbonates.
4) Illuviation, if evident, is too slight to meet the requirements of a textural B or a podzolic B.
5) No cementation or induration and lacks a brittle consistence when moist.

p - A layer disturbed by man's activities, i.e. by cultivation and/or pasturing. To be used only with A.

s - A horizon with salts including gypsum which may be detected as crystals or veins, or as surface crusts of salt crystals, or by distressed crop growth, or by the presence of salt tolerant plants.

sa - A horizon with secondary enrichment of salts more soluble than calcium and magnesium carbonates where the concentration of salts exceeds that present in the unenriched parent material. The horizon is four inches or more thick. The conductivity of the saturation extract must be at least 4 mS/cm and must exceed that of the C horizon by at least one-third.

t - A horizon enriched with silicate clay. It is used with B alone (Bt, Btg, etc.).

hummocky - Steep sided hillocks and hollows with multi-directional slopes dominantly between 10° and 35° and steeper and with local relief greater than 1 metre.

humus - That more or less stable fraction of the soil organic matter remaining after most of the added plant and animal residues have decomposed.

ice contact - Glaciofluvial deposits laid down along the margins of valley glaciers.

illuvial horizon - A soil layer or horizon in which material carried from an overlying layer has been precipitated from solution or deposited from suspension. The layer of accumulation includes silicate clay, hydrous oxides of iron and aluminum, and organic matter.

inclusion - Soil types found within a mapping unit which are not extensive enough to be mapped separately or as part of a soil complex.

infiltration, soil - The downward entry of water into the soil.

kame - An irregular ridge or hill of stratified glacial drift deposited by glacial meltwater.

GLOSSARY (CONTINUED)

kettle - Depression left after the melting of a detached mass of glacier ice buried in drift.

lacustrine deposits - Material deposited in lake water and later exposed either by lowering of the water level or by uplifting of the land.

landform - The various shapes of the land surface resulting from a variety of actions such as deposition or sedimentation (eskers, lacustrine basins), erosion (gullies, canyons), and earth crust movements (mountains).

leaching - The removal from the soil material in solution.

liquid limit (upper plastic limit) - The water content corresponding to an arbitrary limit between the liquid and plasitic states of consistence of a soil. The water content at which a pat of soil cut by a groove of standard dimensions will flow together for a distance of half inch under the impact of 25 blows in a standard liquid limit apparatus.

loess - Material transported and deposited by wind and consisting of predominantly silt-sized particles.

mapping unit, soil - Any delineated area shown on a soil map that is identified by a letter, symbol or number. A mapping unit may be a soil unit, a miscellaneous landtype, or a complex of soil units.

meltwater channel - An incised flat bottomed channel found by glacial meltwater. These channels often appearing oversized for the present stream which occupies it.

mottles - Spots or blotches of different color or shades of color interspersed with the dominant color. They are described in order of abundance (few, common, many), size (fine, medium, coarse), and contrast (faint, distinct, prominent). Mottling in soils indicates poor aeration and lack of good drainage.

order, soil - A category in the Canadian system of soil classification. All the soils of Canada have been divided into eight orders: Chernozemic, Solonetzic, Luvisolic, Podzolic, Brunisolic, Regosolic, Gleysolic, and Organic. All the soils within an order have one or more characteristics in common.

organic matter, soil - The organic fraction of the soil; includes plant and animal residues at various stages of decomposition, cells and tissues of soil organisms, and substances synthesized by the soil population. It is usually determined on soils that have been sieved through a 2.0 mm sieve.

outwash - Sediments washed out by flowing water beyond the glacier and laid down as stratified drift in thin forest beds. The particles may vary from silt to boulders.

parent material - The unconsolidated and more or less chemically weathered mineral or organic matter from which the solum of a soil has developed by pedogenic processes.

GLOSSARY (CONTINUED)

particle size - The effective diameter of a particle measured by sedimentation, sieving, or micrometric methods. Has been called grain size.

pedology - The aspects of soil science dealing with the origin, morphology, genesis, distribution, mapping, and taxonomy of soils, and classification in terms of their use.

percolation (of soil water) - The downward movement of water through soil.

permeability, soil - The ease with which water and air pass through the soil to all parts of the profile. It is described as rapid, moderate or slow.

pH, soil - The intensity of acidity or alkalinity, expressed as the logarithm of the reciprocal of the H+ ion concentration. pH 7 is neutral, lower values indicate acidity and higher values alkalinity.

plain - A region of general uniform slope, comparatively level, of considerable extent, and not broken by marked elevations and depressions; it may be an extensive valley floor or a plateau summit. Any extent of level or nearly level land.

plastic limit - (1) The water content corresponding to an arbitrary limit between the plastic and semi-solid states of consistency of a soil. (2) The water content at which a soil will just begin to crumble when rolled into a thread approximately 3 mm in diameter.

plasticity index - The numerical difference betwen the liquid and the plastic limits. The plasticity index gives the range of moisture contents within which a soil exhibits plastic properties.

profile, soil - A verticle section of the soil through all its horizons and extending into the parent material.

reaction, soil - The degree of acidity or alkalinity of a soil, usually expressed as a pH value. Descriptive terms commonly associated with certain ranges in pH are: extremely acid, <4.5; very strongly acid, 4.5 - 5.0; strongly acid, 5.1 - 5.5; moderately acid, 5.6 -6.0; slightly acid, 6.1 - 6.5; neutral 6.6 - 7.3; slightly alkaline, 7.4 - 7.8; moderately alkaline, 7.9 - 8.4; strongly alkaline, 8.5 - 9.0; and very strongly alkaline, >9.0.

sand - (1) A soil particle between 0.05 and 2.0 mm in diameter. (2) The textural class name for any soil containing 87% or more of sand and not more than 10% of clay.

scarp - An escarpment, cliff, or steep slope of some extent along the margin of a plateau, mesa, terrace, or bench.

seepage - (1) The escape of water downward through the soil. (2) The emergence of water from the soil along an extensive line of surface in contrast to a spring where the water emerges from a local spot.

GLOSSARY (CONTINUED)

series, soil - A category in the Canadian system of soil classification. This is the basic unit of soil classification consisting of soils which are essentially alike in all major profile characteristics except the texture of the surface.

silt - (1) Soil mineral particles ranging between 0.05 and 0.002 mm in equivalent diameter. (2) Soils of the silt textural class contain 80% silt and less than 12% clay.

site - (1) In ecology, an area described or defined by its biotic, climatic and soil conditions as related to its capacity to produce vegetation. (2) An area sufficiently uniform in biotic, climatic, and soil conditions to produce a particular kind of vegetation.

slump - The downward slipping of a mass of rock or unconsolidated material of any size, moving as a unit or as several subsidiary units, usually with backward rotation on a more or less horizontal axis parallel to the cliff or slope from which it descends.

soil - The unconsolidated mineral or organic material on the immediate surface of the earth that serves as a natural medium for the growth of land plants. Soil has been influenced by parent material, climate (including the effects of moisture and temperature), macro- and microorganisms, and relief, all acting over a period of time.

solum - The upper horizons of a soil in which the parent material has been modified and which most plant roots are contained. It usually consists of A and B horizons.

stones - Rock fragments 25 cm (10 inches) in diameter if rounded, and greater than 38 cm (15 inches) along the greater axis if flat.

stratified materials - Unconsolidated sand, silt and clay arranged in strata or layers.

structure, soil - The combination or arrangement of primary soil particles into secondary particles, units or peds. These peds may be, but usually are not, arranged in the profile in such a manner as to give a distinctive characteristic pattern. The peds are characterized and classified on the basis of size, shape, and degree of distinctness into classes, types, and grades.

survey, soil (Pedology) - The systematic examination, description, classification, and mapping of soils in an area. Soil surveys are classified according to the kind and intensity of the field examination.

talus - A sloping heep of loose rock fragments lying at the foot of a cliff or steep slope.

terrace - Relatively level (0-5% slopes) flat surface which is terminated by an abrupt change in slope on one or more sides. Often occurs in sequence on valley walls or paired on opposite sides of a valley.

texture, soil - The relative proportions of the various soil separates in a soil as described by the classes of soil texture.

GLOSSARY (CONTINUED)

till - See glacial till.

topography - (1) The physical features of a district or region, such as those represented on a map, taken collectively, especially, the relief and contours of the land. (2) The shape of the ground surface such as hills, mountains or plains. The soil slopes may be smooth or irregular. The slope classes used in this report are defined as follows:

	Percent slope
level or nearly level	0 to 0.5
very gently sloping or gently undulating	0.5 to 2
gently sloping or undulating	2+ to 5
moderately sloping or gently rolling	5+ to 9
strongly sloping or moderately rolling	9+ to 15
steeply sloping or strongly rolling	15+ to 30
very steeply sloping or hilly	30+ to 60
extremely sloping or very hilly	over 60

Unified soil classification system (engineering) - A classification system based on the identification of soils according to their particle size, gradation, plasticity index and liquid limit. It is employed in schemes to predict soil behavior as an engineering construction material.

varve - A distinct band representing the annual deposit in sedimentary materials regardless of origin. It usually consists of two layers, a thick light coloured layer of silt and fine sand laid down in spring and summmer, and a thin, dark coloured layer of clay laid down in the fall and winter.

water-holding capacity - The ability of a soil to hold water. The water-holding capacity of sandy soils is usually considered to be low, while that of clayey soils is high. It is often expressed in inches of water per foot depth of soil.

water table - Elevation at which the pressure in the water is zero with respect to the atmospheric pressure.

weathering - The physical and chemical disintegration, alteration and decomposition of rocks and minerals at or near the earth's surface by atmospheric agents.

APPENDIX A
SOIL PROFILE DESCRIPTIONS AND LABORATORY DATA ANALYTICAL METHODS

A.1 DETAILED SOIL PROFILE DESCRIPTIONS AND LABORATORY DATA

Descriptions of some soil profiles and accompanying laboratory data are not included in this report, but are available upon request from the B.C. Soil Information System. For copies please write to:

The Map Library,
Surveys and Resource Mapping Branch,
British Columbia Ministry of Environment,
Parliament Buildings,
Victoria, British Columbia.
V8V 1X5

A.2 ANALYTICAL METHODS

Reaction (pH) measurements were made on 1:1 soil:water suspensions for mineral soils, and 1:5 soil:water suspensions for organic soils (8). The pH was also determined using a 1:5 soil: 0.01M $CaCl_2$ solution (7) modified by shaking one half hour instead of 5 days. Soil organic matter was determined by the wet combustion method described by Grewelling and Peach (8).

Total nitrogen was determined using the method described by Bremner (5). Larverty's method (6), modified by John (6), was used to determine acid soluble (P_2) and available (P_1) phosphorus. Colour development was made following John's (6) procedure.

Exchange capacity was determined using the method described by Peach (12). The ammonium acetate extract was analyzed for exchangeable cations using a Techtron AA4 atomic absorption spectrophotometer. Oxalate-extractable iron and aluminum were determined using the method of McKeague and Day (9) and Pyrophosphate-extractable iron and aluminum were determined following procedures described by McKeague and Bascomb (9).

Sulphur analyses were made following the procedure of Bardsley and Lancaster (10). Manganese values were obtained by analyzing the extract from 1:5 soil: 0.01M $CaCl_2$ suspensions used for pH determination.

Boron analyses were made following the method of Grewelling and Peach (8).

The perchloric-nitric acid digestion for copper and zinc were made following the procedure of Lundblad (2) and analyses were made using a Techtron AA4 atomic absorption spectrophotometer.

A.3 REFERENCES FOR CHEMICAL ANALYSIS

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Peach, M., L. T. Alexander, L. A. Dean, and J. F. Reed. Methods of soil analysis for soil fertility investigation. U.S.D.A., Circular No. 757, Washington, D.C., 1957.

APPENDIX A (CONTINUED)

(2) Copper and Zinc

Lundblad, K. O., Svanberg, and P. Edman. Availability and Fixation of copper in Swedish Soils. Plant and Soil. Vol. 1, No. 4, April 1949.

(3) Iron and Aluminum

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(4) Nitrogen

Bremner, J. M. Determination of nitrogen in the soil by the Kjeldahl method. Journal of Agricultural Science, Vol. 55, No. 1, 1960.

(5) Phosphorus

John, M. K. Soil Analysis procedure in use in Kelowna for determination of available phosphorus, British Columbia Department of Agriculture, Kelowna, British Columbia, 1963.

(6) pH Soil: 0.01M $CaCl_2$ Ratio

Clark, J. S. The extraction of exchangeable cations from soils. Canadian Journal of Soil Science, Vol. 45, No. 3, pp. 322, 1965. Modified by shaking for one half hour.

(7) pH 1:1 and 1:5 Soil: Water Ratio, Organic Matter, Boron

Grewelling, Thomas and Michael Peach. Chemical soil tests.
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(8) Pyrophosphate Fe and Al

McKeague, J. A. An evaluation of 0.1 M pyrophosphate and pyrophosphate dithionite in comparison with oxalate as extractants of the accumulation products in Podzols and some other soil. Canadian Journal of Soil Science, Vol. 47, No. 1, pp. 95-99. Modified by analysing the extracts using a Techtron AA4 atomic absorption spectrophotometer.

Bascomb, C. L. Distribution of Pyrophosphate extractable iron and organic carbon in soils of various groups. J. Soil Science, Vol. 19, No. 2, pp. 251-268, 1958.

(9) Sulphur

Bardsley, C. L. and D. Lancaster. Determinations of reserve sulphur and soluble sulphates in soils. Soil Science Society of America Proceedings. Vol. 24, No. 4, 1960.

APPENDIX B
CLIMATE

TABLE B.1. APPROXIMATE GROWING DEGREE-DAYS AND FREEZE-FREE PERIOD FOR SELECTED STATIONS

Stations or Locations	Number of Years of Record	Growing[1] Degree-Days (41°F) 5°C	Freeze-Free[2] Period Days
Barriere	10-14	1903	109
Bridge Lake	3	1046	83
Chinook Cove	13	1943	124
Clearwater	34	1550	116
Hemp Creek	8	1305	80
Louis Creek	3	1587	106
McLure	3	1907	118

[1]Growing Degree-Days as defined by 41°F threshold.
[2]AES Frost Data 1941-1970 or CLI Data.

TABLE B.2. ANNUAL AND GROWING SEASON (MAY TO SEPTEMBER) PRECIPITATION FOR SELECTED STATIONS (From Atmospheric Environment Services AES 1941-1970)

LOCATION	MAY-SEPTEMBER	ANNUAL (in.)
Barriere	8.22	17.5 3
Chinook Cove	7.63	17.4 0
Darfield	8.21	16.8 3
Hemp Creek (Clearwater)	10.59	22.0 9
Lone Butte*	9.70	20.7 0
150 Mile House	8.74	16.7 5

*From Climatology Unit, Ministry of Environment.

TABLE B.3. MEAN DAILY AND ANNUAL TEMPERATURES (°F) FOR SELECTED STATIONS*

Stations	Elevation (ft.)	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Barriere	1280	17.7	27.7	35.4	46.1	55.2	61.6	66.2	64.2	55.8	44.6	32.3	24.0	44.2
Chinook Cove	1324	18.7	28.5	36.0	47.0	55.2	60.3	66.7	65.3	57.0	45.4	34.0	26.6	45.1
Darfield	1250	17.9	27.7	35.6	46.3	55.2	61.5	65.9	63.5	55.2	44.2	32.5	24.5	44.2
Hamp Creek (Clearwater)	2100	14.5	22.5	29.6	40.5	49.0	55.2	59.5	57.1	48.9	40.1	28.4	20.9	38.9
150 Mile House	2420	11.9	22.5	29.8	40.5	50.3	56.4	60.5	58.3	51.9	41.3	28.9	20.6	39.4

*From Atmospheric Environment Service 1941 to 1970.

APPENDIX C
AREA SUMMARIES

TABLE C.1. AREA SUMMARY OF THE SOIL ASSOCIATIONS AND LAND TYPES

SOIL ASSOCIATION	MAP SYMBOL	ACRES, PURE UNITS	ACRES, COMPLEX UNITS	TOTAL	APPROX. PERCENT OF AREA
Allamore	AA	17 444	8 828	26 272	1.37
Able	AB	2 402	2 608	5 010	0.26
Archie	AC	12 118	25 083	37 201	1.94
August	AG	508	464	972	0.05
Ambush	AH	17 181	23 775	40 956	2.14
Alkali	AK	63 400	31 067	94 467	4.94
Allie	AL	13 284	24 818	38 102	1.99
Armour	AM		3 060	3 060	0.16
Artison	AN	22 746	13 830	36 576	1.91
Astoria	AO		1 904	1 904	0.09
Aqualine	AQ	1 648	6 436	8 084	0.42
Aurora	AR	20 779	35 688	56 467	2.95
Alans	AS	38 527	8 788	47 315	2.47
Art	AT	41 142	59 491	100 633	5.27
Allentown	AW	7 676		7 676	0.42
Barriere	BA	3 186		3 186	0.16
Byrd Creek	BD	4 257	328	4 585	0.24
Bethel	BE		200	200	0.01
Buffalo	BF		760	760	0.03
Blackpool	BL	1 848		1 848	0.09
Bottrel	BO	252	120	372	0.01
Bester	BR	3 178		3 178	0.16
Beaverhut	BT	21 416	2 844	24 260	1.27
Beaver	BV	7 462	3 108	10 570	0.55
Boxer Creek	BX	1 596	920	2 516	0.13
Chasm	CM	1 472		1 472	0.07
Crater	CR	532	632	1 164	0.06
Dunleavy	D	3 563		3 563	0.18
Dragonfly	DA	2 316	1 500	3 816	0.19
Deadman	DD		116	116	<0.01
Deka	DE		1 268	1 268	0.06
Darling	DG	3 104		3 104	0.16
Duckling	DI	1 592	112	1 704	0.08
Danskin	DK	552	300	852	0.04
Dorrel	DL	3 819	386	4 205	0.22
Danger	DN	5 255		5 255	0.27
Doreen	DO	14 540	2 168	16 708	0.87
Dunsapie	DP	580		580	0.03
Duncan Creek	DU	6 308	1 292	7 600	0.39
Drewry	DY	428	100	528	0.02
Exlou	E	2 964	612	3 575	0.18
Eugene	EE	211 863	50 990	262 853	13.76
Ejecta	EJ	22 578	5 936	28 514	1.49
Elliot	EL	2 148	636	2 784	0.14

APPENDIX C (CONTINUED)

TABLE C.1. AREA SUMMARY OF THE SOIL ASSOCIATIONS AND LAND TYPES (CONTINUED)

SOIL ASSOCIATION	MAP SYMBOL	ACRES, PURE UNITS	ACRES, COMPLEX UNITS	TOTAL	APPROX. PERCENT OF AREA
English Lake	EN	2 447		2 447	0.12
Exeter	EX	6 952	1 476	8 428	0.44
Frog	FG	7 960	3 984	11 944	0.62
Flourmill	FM		804	804	0.04
Garter	GA	4 688	4 276	8 964	0.46
Gilead	GI	5 281		5 281	0.30
Greenlee	GR	30 974	16 110	47 084	2.46
Hemp	H	4 284	17 588	21 836	1.14
Hallamore	HA	4 172	21 134	25 306	1.32
Holden	HD	236	296	532	0.02
Higgins	HG		1 636	1 636	0.08
Hotfish	HH	1 908	13 988	15 896	0.83
Helmcken	HN	3 412	25 607	29 019	1.52
Hooligan	HO	2 036	7 074	9 110	0.47
Heger	HR	6 260	19 168	25 428	1.33
Heathrow	HT	6 684	6 716	13 400	0.70
Hawkley	HY	176	7 418	7 597	0.39
League	LA	5 396	4 903	10 299	0.53
Lobster	LB	1 048	604	1 652	0.08
Ladder	LD	1 284	3 864	5 148	0.26
Lastcourse	LE	1 696	2 068	3 764	0.19
Larghetto	LG	3 296	9 376	12 672	0.66
Lindquist	LI		1 904	1 904	0.09
Laurel	LL	2 190	454	2 644	0.13
Lynn	LN	16 990	37 998	54 988	2.88
Lolo	LO	10 232	10 116	20 348	1.06
Lupine	LP	2 004	5 972	7 976	0.41
Lizard	LR		2 384	2 384	0.12
Louise Mountain	LS	868	2 904	3 772	0.19
Lost	LT	332	8 676	9 008	0.47
Laeovia	LV	1 304	1 275	2 579	0.13
Loveway	LW	5 016	3 092	8 108	0.42
Laxity	LX	3 768	8 124	11 892	0.62
Lonely	LY	216	4 464	4 680	0.24
McLure	MC	11 956	3 340	15 296	0.80
Murtle	ME	16 630	6 430	23 060	1.20
Monticola	MI	668		668	0.03
Mulholland	MO	2 224	2 680	4 904	0.25
Ordschig	OD	232	2 376	2 608	0.13
Price	PC	4 672	18 944	23 616	1.23
Placid	PD	2 480	3 660	6 140	0.32
Prince	PE	3 464	1 072	4 536	0.23
Pootyl	PL	6 160	20 984	27 144	1.42
Poison	PN		320	320	0.01
Pendleton	PT	1 088		1 088	0.05

APPENDIX C (CONTINUED)

TABLE C.1. AREA SUMMARY OF THE SOIL ASSOCIATIONS AND LAND TYPES (CONTINUED)

SOIL ASSOCIATION	MAP SYMBOL	ACRES, PURE UNITS	ACRES, COMPLEX UNITS	TOTAL	APPROX. PERCENT OF AREA
Rayonier	RA	516	792	1 308	0.06
Round	RD	20 612	7 412	28 024	1.46
Rennie	RE	3 550		3 550	0.18
Rail	RL	14 557	2 828	17 385	0.91
Roserim	RM	4 792	2 399	7 191	0.37
Roseflower	RW	764		764	0.04
Raspberry	RY	73 439	20 634	94 073	4.92
Struthers	SE	2 483	2 688	5 171	0.28
Stolle	SL	8 947	9 370	18 317	0.95
Spooney	SN	532	1 752	2 284	0.11
Spanish	SP	8 570	3 388	11 958	0.62
Succour	SR	8 119	5 043	13 162	0.68
Ta Hoola	TA	2 704	88	2 792	0.14
Tuleric	TC	3 460	1 928	5 388	0.28
Tisdall	TD		684	684	0.03
Tyee	TE	4 536		4 536	0.23
Taggart	TG			200	0.01
Tole	TL	17 812	10 006	27 818	1.45
Timber	TM	76		76	0.01
Tsintsunko	TO	6 420	380	6 800	0.35
Ternan	TR	5 232	1 459	6 691	0.35
Teather	TT	1 396	880	2 276	0.11
Tubbs	TU	5 352	12 008	17 360	0.90
Tunkwa	TW	20 808	1 436	22 244	1.16
Thuya	TY	13 704	15 576	29 280	1.53
Vidette Creek	VI	3 996	6 584	10 580	0.55
Wavey Lake	WA		3 443	3 443	0.18
Whitewood Creek	WH	1 396	5 165	6 561	0.34
Willow Creek	WI		2 256	2 256	0.11
Windy Mountain	WM	2 118	5 010	7 128	0.37
Whitely Lake	WT	1 904	13 436	15 340	0.80
Wyllie	WY	964	8 332	9 296	0.48
MISCELLANEOUS LAND TYPES					
Rock Outcrop	RO	1 612	12 470	14 082	0.73
Talus	WB	1 968	3 636	5 604	0.29
Water				93 175	4.88
				1,814,971	99.53

APPENDIX C (CONTINUED)

TABLE C.1. AREA SUMMARY OF THE SOIL ASSOCIATIONS AND LAND TYPES (CONTINUED)

SOIL ASSOCIATION	MAP SYMBOL	ACRES, PURE UNITS	ACRES, COMPLEX UNITS	TOTAL	APPROX. PERCENT OF AREA
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Garter	GA	4 688	4 276	8 964	0.46
Gilead	GI	5 281		5 281	0.30
Greenlee	GR	30 974	16 110	47 084	2.46
Hemp	H	4 284	17 588	21 836	1.14
Hallamore	HA	4 172	21 134	25 306	1.32
Holden	HD	236	296	532	0.02
Higgins	HG		1 636	1 636	0.08
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Laxity	LX	3 768	8 124	11 892	0.62
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APPENDIX C (CONTINUED)

TABLE C.1. AREA SUMMARY OF THE SOIL ASSOCIATIONS AND LAND TYPES (CONTINUED)

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Roseflower	RW	764		764	0.04
Raspberry	RY	73 439	20 634	94 073	4.92
Struthers	SE	2 483	2 688	5 171	0.28
Stolle	SL	8 947	9 370	18 317	0.95
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Tyee	TE	4 536		4 536	0.23
Taggart	TG			200	0.01
Tole	TL	17 812	10 006	27 818	1.45
Timber	TM	76		76	0.01
Tsintsunko	TO	6 420	380	6 800	0.35
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Tunkwa	TW	20 808	1 436	22 244	1.16
Thuya	TY	13 704	15 576	29 280	1.53
Vidette Creek	VI	3 996	6 584	10 580	0.55
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Talus	WB	1 968	3 636	5 604	0.29
Water				93 175	4.88
				1,814,971	99.53

TABLE C.2. ACRE SUMMARY AND DISTRIBUTION OF SOIL CAPABILITY FOR AGRICULTURE CLASSES

MAP AREA	CLASS 1		CLASS 2		CLASS 3		CLASS 4		CLASS 5		CLASS 6		CLASS 7		TOTAL
	Pure*	Complex+	Pure*	Complex+	Pure*	Complex+	Pure*	Complex+	Pure*	Complex+	Pure*	Complex+	Pure*	Complex+	
92 P/1	204	1812	1424	4240	560	2364	3844	13366	21760	23262	40964	20376	59760	41784	235,720
92 P/2					8380	12266	328	4272	75337	22612	4008	10964	97439	1124	236,730
92 P/7					3572	2776	19276	4610	106580	18975	560	1260	57829	6184	221,622
92 P/8	672	1336	224	1384	716	1871	652	2864	7421	22318	176	7505	135498	46452	229,089
92 P/9	146	1544	476	56	1232	804	596	2815	13780	41064	1140	872	125241	42094	231,860
92 P/10					3348	696	25744	8677	60990	21530	1012	704	69974	28160	220,835
92 P/15					1298	4732	19250	9962	16067	51214	1222	2681	82524	25775	214,725
92 P/16						160		2592	17458	28788		1436	110428	63528	224,390
Total	1022	4692	2124	5680	19106	25669	69690	49158	319393	229763	49082	45798	738693	255101	1,814,971

*Map area which contain only the indicated class.

+Map areas dominantly the indicated class but contain inclusions of other classes.