BC Environment

BIOPHYSICAL SOIL LANDSCAPES INVENTORY OF THE STIKINE–ISKUT AREA

(Mapsheets 104F, 104G, and Parts of 104B and 104H)

Victoria, British Columbia
1992

Province of British Columbia
Ministry of Environment, Lands and Parks

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Abstract

The purpose of the survey was to produce biophysical soil landscape unit maps to be used as a base for describing vegetation successional trends and rating land according to its capability to support wild ungulates.

The report has three parts. The physiography, bedrock geology, climate, vegetation zones, and terrain are described briefly in Part 1. The study area, which covers approximately 26 500 km^2, is located within the drainages of the Stikine and Iskut Rivers in northwestern British Columbia. The area is diverse and consists of rugged, mountainous terrain influenced by a moist, marine climate in the southwest which changes to gently rolling plateaus dominated by a continental climate in the northeast.

Part 2 describes the method used to produce the biophysical soil landscape unit maps and legend. Travel throughout the area was primarily by helicopter and by truck on the few roads. One hundred and eighty-nine sites were described and some soil profiles partially sampled. The soils were classified according to the Canadian System of Soil Classification.

Part 3 describes some of the physical and chemical characteristics of the biophysical soil landscape units. Cross-sectional diagrams illustrate the relationships between the biophysical soil landscape units.

Three 1:250 000 biophysical soil landscape unit maps with legends accompany this report; one for N.T.S. 104F and 104G, a second for a portion of 104B, and a third for part of 104H.

Preface

This survey is part of a continuing program to map, at a broad reconnaissance level, the soil resources in the Province of British Columbia. Its purpose is to provide land planners and land managers with a reconnaissance inventory of physical and biological features.

The Terrestrial Studies Section (now known as the Habitat Inventory Section in the Wildlife Branch) conducted the survey at the request of the British Columbia Hydro and Power Authority, the Regional Fish and Wildlife Branch, and the former Planning and Assessment Branch of the British Columbia Ministry of Environment. The purpose was to provide information, firstly, on the terrain (surficial materials and features), geological hazards, and ungulate capability, and secondly, on the soil, vegetation, and wildlife capability of the area.

Acknowledgements

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PART 1

GENERAL DESCRIPTION OF THE AREA

1.1 Location

The Stikine-Iskut study area is located adjacent to Alaska in northwestern British Columbia between 56° 30′ and 58° 00′ north latitude and 130° 00′ and 133° 00′ west longitude (Figure 1). It includes all of mapsheets NTS 104F and 104G, portions of 104B and 104H, and covers about 26 500 km^2.

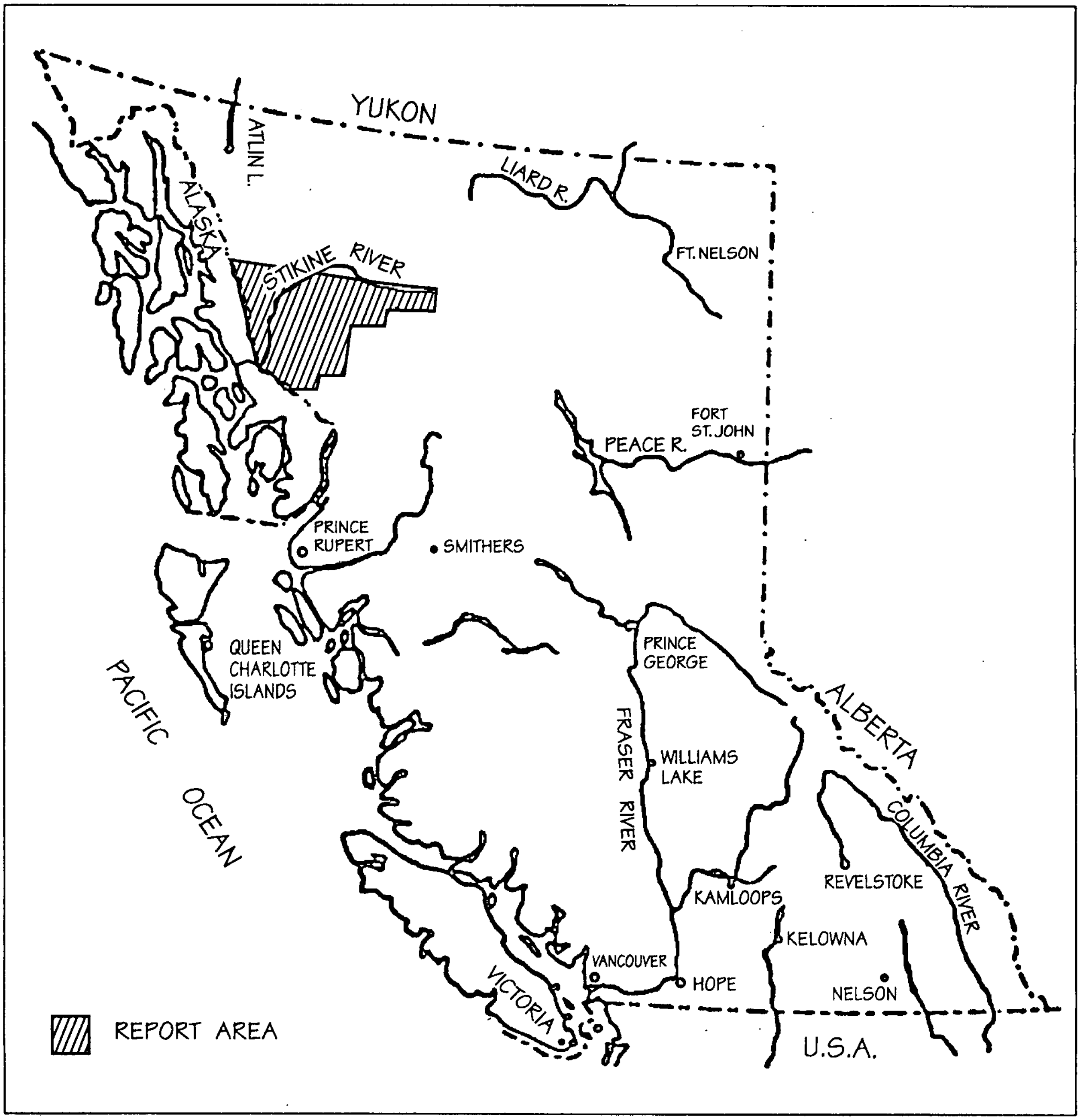


Figure 1. Outline map of British Columbia showing the location of the Stikine-Iskut study area.

1.2 Access, Population Centres, and History

The Stewart-Cassiar Highway, a well maintained gravel surface highway, provides access to the eastern part of the study area and links the communities of Smithers and Terrace to the Alaska Highway in the Yukon. Located along the highway within the study area are the small settlements of Bob Quinn Lake, Tatogga Lake, Iskut Village, and Forty Mile. Telegraph Creek, the largest and oldest settlement, is linked to the Stewart-Cassiar highway by a 130 km secondary road from Dease Lake.

Another secondary road links the Klappan River valley to the Stewart-Cassiar highway near Tatogga Lake. A road to the high elevation, alpine areas of Tsaybahe Mountain starts just north of the Iskut Village. The unfinished railbed of the B.C. Railway was inaccessible by vehicle as bridges over the Stikine and Klappan rivers were impassable at the time of the survey in 1982. The Stikine River is navigable by barges from tidewater in Alaska to Telegraph Creek and river boats can be used above the Grand Canyon of the Stikine River.

Telegraph Creek, Iskut, and Bob Quinn Lake have well maintained airstrips. Other landing strips are at Schaft Creek, Morchua Lake, and Burrage Creek, and emergency strips are at Galore and Snippaker Creeks and at the mouth of the Scud River (Kitimat-Stikine Regional District, 1981).

Travel on foot and by horseback is possible along some of the older established routes such as the Telegraph Trail which traverses the study area from Burrage Creek in the Iskut drainage through Raspberry Pass and along Mess Creek to Telegraph Creek on the Stikine River. Another major pack trail provides access from the Klappan River east to the Spatsizi Plateau, Cold Fish Lake, and Highland Post.

The Tlingits and Tahltans are the two aboriginal groups living in the area. The Tlingit are coastal people and restrict their travels to the lower Stikine River, while the Tahltans occupy the inland portions (Duff, 1964). The types of cultures and the prehistoric settlements which predate the fur trade are only now becoming known (Smith, 1970).

The Tlingit first began trading furs with the Russians in the late 1700's. Captain Vancouver charted the shoals at the mouth of the Stikine River in 1793 (Patterson, 1966). R. Campbell established the first fur trading post for the Hudson's Bay Company at Dease Lake in 1838. Dease Lake was named by John McLeod in 1834 (Morice, 1971).

The Western Union (Collin's) Telegraph began to survey a line for an overland telegraph route to Siberia in 1865 but prior to completion, the project was abandoned when the first trans-atlantic cable was laid (Burton, 1972). Gold was discovered on the Stikine River in 1861. A second minor gold strike on Thibert Creek sent more prospectors into the Stikine and led to the start of the town of Glenora and construction of a trail to Dease Lake.

A good account of the geography and geology is contained in Dawson (1887-88). Other insights into the history and early development can be obtained by consulting the records of the early land surveyors. Kerr (1948) contains a detailed account of geography in his report on bedrock geology.

The Klondike gold rush of 1898 saw renewed construction and use of the Telegraph Trail and the abandoning of Glenora in favour of Telegraph Creek, (Elliott, 1960). River boat traffic became common along the Stikine River at this time and a good summary of river travel is described in the Alaska Geographic (1979).

A history of the route from Telegraph Creek to Dease Lake is contained in Patterson (1966). The Stewart-Cassiar highway was completed in 1972 and the village of Iskut was established on this route at this time.

1.3 Economic Activity and Development Potential

Guiding, outfitting, mining exploration, trapping, sport fishing, and tourism are the major industries of the local economy. Highway traffic is increasing and as the quality of the Stewart-Cassiar highway improves, it will become the alternate route to the Alaska Highway.

Five hydro-electric dams have been proposed for the Stikine-Iskut River system. The three dams on the Iskut system would form pondages at More Creek, in the Iskut Canyon, and a diversion dam on Forrest-Kerr Creek. Two dams have also been proposed for the Grand Canyon of the Stikine River with pondages extending along the Klappan River valley to north of McEwan Creek and along the Stikine valley to Cullivan Creek (Alaska Geographic, 1979; Kelly, 1983).

Several potential copper mines exist on Schaft and Mess Creeks and the Scud River. Placer gold is also present on the Barrington River. There are gold, silver, lead, and zinc deposits in the Tom Mackay Lake area, and reserves of nickel, copper, and gold on Snippaker Creek. None of these deposits have been developed but access proposals and future townsite locations have been studied (Ministry of Environment, and Ministry of Energy, Mines and Petroleum Resources, 1983; Faustman, 1982).

1.4 Physiographic Regions and Bedrock Geology

The area is one of mountains and high plateaus dissected by major rivers and their tributaries (Holland, 1964). It contains three physiographic regions consisting of the Coast Mountains (Boundary Ranges), the Stikine Plateau (Tahltan Highland, Klastline Plateau, and Spatsizi Plateau), and the Skeena Mountains (Figure 2).

The following is a brief description of these physiographic regions. A more detailed description can be found in Ryder (1984). The bedrock geology information has been obtained from Souther *et al.* (1979), Kerr (1948), Souther (1972), and Officers of the Geological Survey of Canada (1956) and is generalized in Figure 3.

1.4.1 Coast Mountains (Boundary Ranges)

The Boundary Ranges are the northern subdivision of the Coast Mountains and form a 50- to 80-km wide band in the west. These ranges have steep, rugged, mountainous topography in which the elevations range from 3136 m at Mount Rutz and 2937 m at Mount Ambition to 10 m on the Stikine River at the Alaska boundary.

Bedrock consists of intrusive, igneous, acidic rocks such as granodiorite, quartz monzonite, and quartz diorite and basic metamorphic or volcanic rocks such as schist, gneiss, and andesite. Mount Hoodoo is a recent volcano. The Stikine and Iskut River valleys are the only major breaks in the Boundary Ranges.

The biophysical soil landscape map units for this physiographic region are shown in Table 1 on page 28.

1.4.2 Stikine Plateau (Tahltan Highland)

The Tahltan Highland, a part of the Stikine Plateau, forms a transitional band 40- to 50-km wide separating the rugged Boundary Ranges from the more subdued topography of the Klastline and Spatsizi plateaus to the east. The Iskut River forms the eastern boundary between the Highland and the Skeena Mountains. The eastern edge is dominated by a

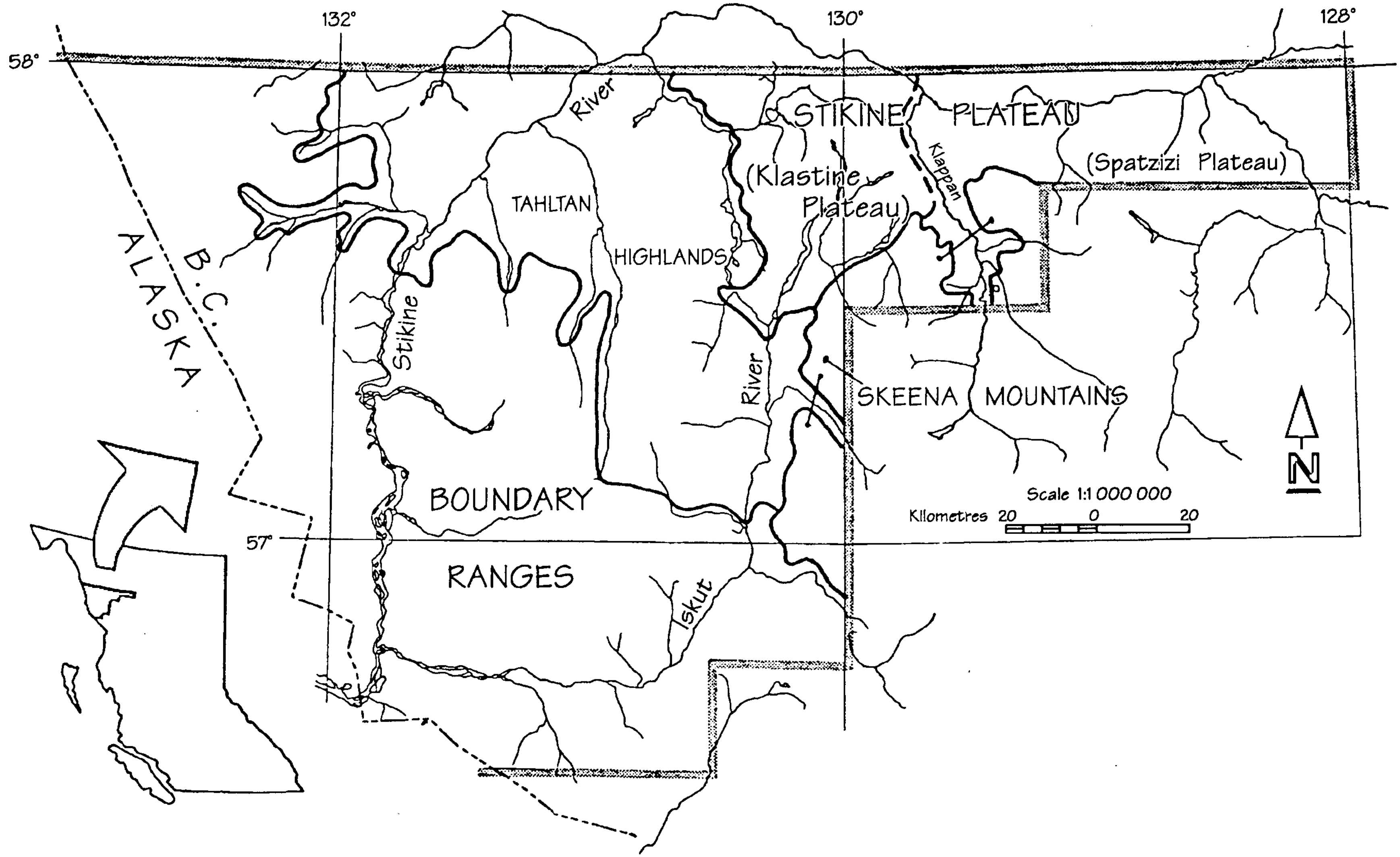
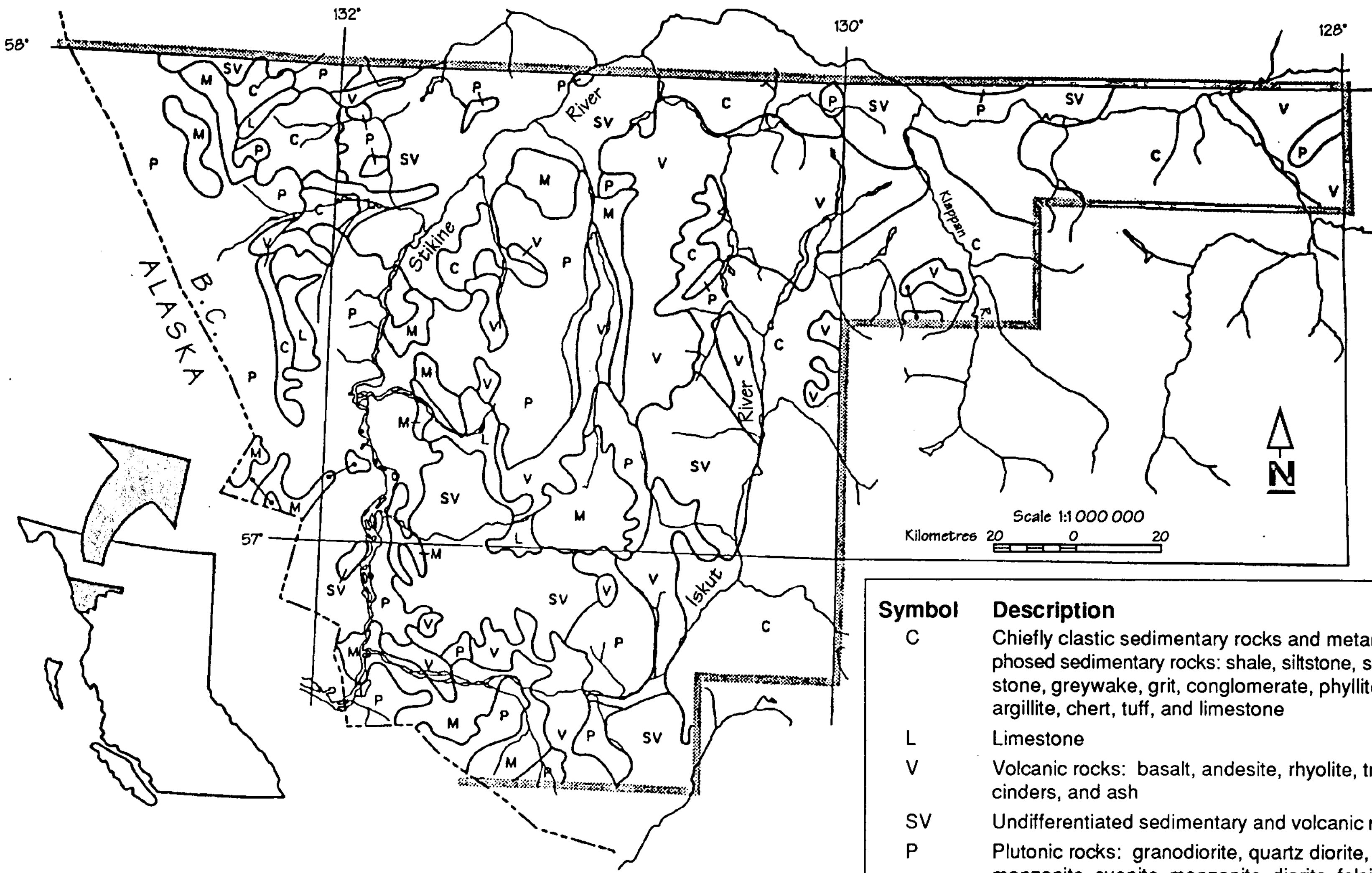


Figure 2. Physiographic regions of the Stikine-Iskut study area (modified after Holland, 1964).



Symbol	Description
C	Chiefly clastic sedimentary rocks and metamorphosed sedimentary rocks: shale, siltstone, sandstone, greywake, grit, conglomerate, phyllite, argillite, chert, tuff, and limestone
L	Limestone
V	Volcanic rocks: basalt, andesite, rhyolite, trachyte, cinders, and ash
SV	Undifferentiated sedimentary and volcanic rocks
P	Plutonic rocks: granodiorite, quartz diorite, quartz monzonite, syenite, monzonite, diorite, felsite, and feldspar porphyry
M	Metamorphic rocks: schist and gneiss

Figure 3. Generalized bedrock geology (after Souther, Brew, and Okulitch, 1979, and Ryder, 1983c).

large shield volcano capped by glacier-clad Edziza Peak (Holland, 1964). The Spectrum Range consists of brightly coloured, altered lavas which extend southward from the 2786 m peak of Mount Edziza.

The highlands are dissected by the Stikine River and Mess Creek. The highlands area north to the Stikine River consist of volcanic and sedimentary rocks. West of Mess Creek is an area of granitic rock, schist, and gneiss.

The biophysical soil landscape map units for this area are shown in Table 2 on page 29.

1.4.3 Stikine Plateau (Klastline and Spatsizi Plateaus)

These plateaus occur mainly to the north and east of the study area. Their upper elevations lie above 1500 m, but they have been dissected by the Stikine, Klappan, and Klastline Rivers to below 900 m. Kinaskan and Eddontenajon lakes are at 800 m elevation. The Stikine River valley is the largest in the area.

Bedrock consists predominantly of fine grained sedimentary and volcanic rocks. The higher elevations of the Spatsizi Plateau consist of flat lying conglomerates.

The biophysical soil landscape map units for this physiographic region are shown in Table 3 on page 30.

1.4.4 Skeena Mountains

The Skeena Mountains are a distinctive unit of largely folded sedimentary and volcanic rocks. The principal rocks are black, fine-grained argillite, shale, and dark graywacke. Igneous intrusions and limestone are absent in this region.

The Eaglenest Range, rising to 2175 m on Cartmel Mountain, lies in the northeast. The Klappan and Little Klappan rivers separate the Eaglenest Range from the Klappan Range. Todagin Lake and Tsatia Mountain, peaking at 2234 m, lie to the northwest. The biophysical soil landscape map units for this physiographic region are shown in Table 3 on page 30.

1.5 Climate

Telegraph Creek and Todagin Ranch have the only Atmospheric and Environmental Services (AES) weather stations in the area. The Telegraph Creek climate data are atypical for most of the area since the station is at a low elevation near the Stikine River on a steep south-facing slope. Dease Lake has the only other nearby long term AES station and more accurately characterizes the regional, continental climate. More climatic information is described in Atmospheric and Environmental Services (1951 & 1980), and by Kermode (1982) for the above mentioned stations.

A short-term, low density climate network was established in June 1979 within the study area and was operational until 1985. The station names, coordinates, and starting dates are described in Appendix I. The data from these short-term stations can be normalized by tying them to representative long-term stations (B. Marsh, personal communication).

The climate of the Stikine-Iskut study area varies from marine in the southwest to continental in the northeast. The Lower Stikine valley, near the Alaska border, is influenced by a coastal climate (more moderate temperatures, wetter and more intense precipitation). There is a coastal-interior transition zone from the confluence of the Stikine and Iskut

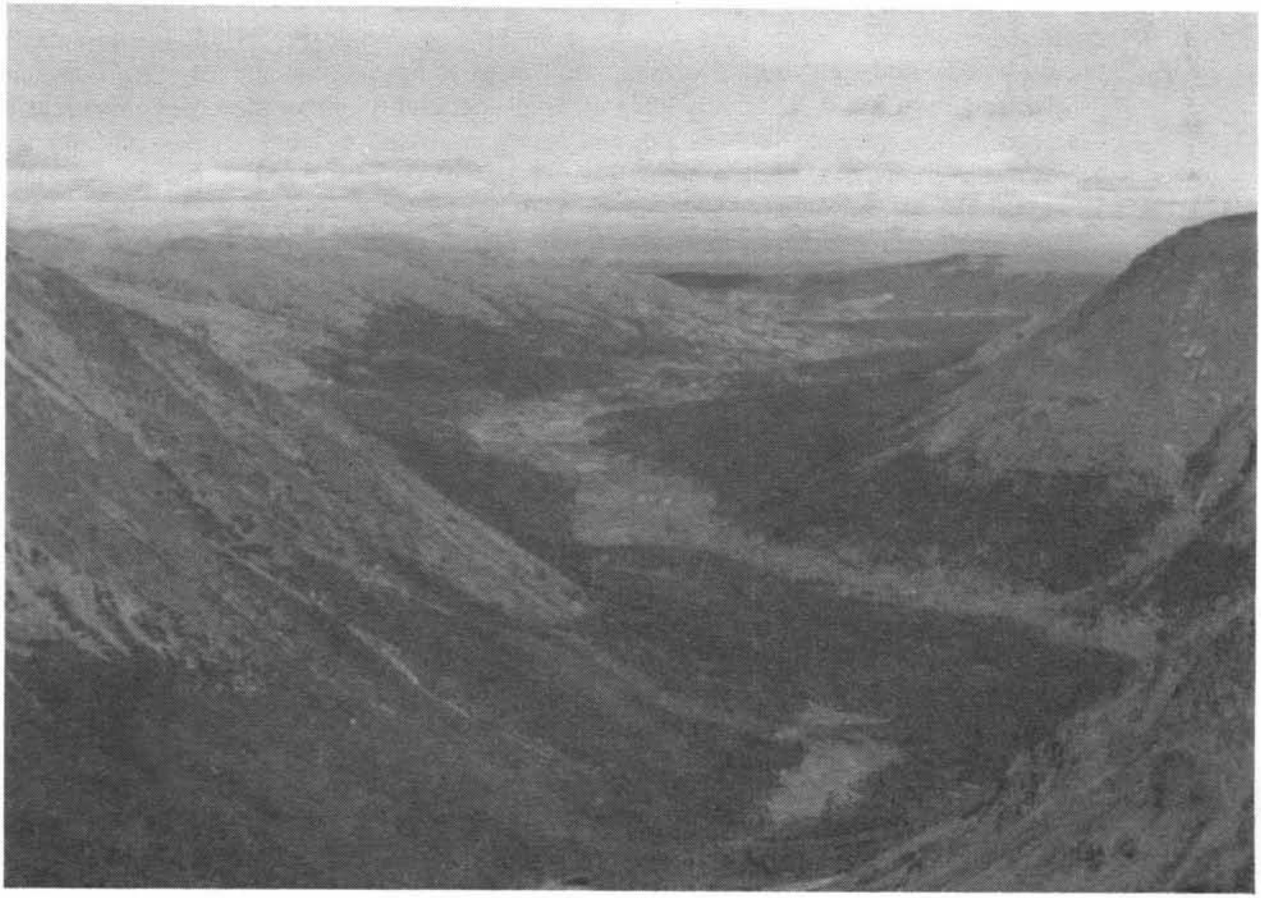


Plate 1. The Eaglenest Range

View of Cullivan Creek east from Mount Cartmel. The valley bottoms along the creek have shrubby vegetation believed to have developed due to cold air pooling, and are generally mapped as STU1. The darker, forested areas are composed of morainal materials (STM3b). The steeper slopes are composed of colluvial soils mapped as STC2ks.

rivers to a line from Devil's Elbow on the Stikine River to the central part of the upper Iskut drainage (south of Barrage Creek). Continental climate covers the remainder of the area.

Most of the region is in a rain shadow in the lee of the Coast Mountains. The Stikine and Iskut river valleys channel coastal air. The greatest precipitation is south and southwest of the upper reaches of Mess Creek, although some carry-over of the coastal precipitation occurs west of the Stikine River on the mid-and-upper elevations in the upper Chutine River valley. Precipitation (as rain or snow) increases with increasing elevation. The increase is greatest in the west and least in the east. Snow depths are greatest in the southwest at mid- and high elevations and least at low elevations between Telegraph Creek and Tuya River. Relatively light snowfalls occur throughout the lower elevations of the continental interior. Snow is wet and heavy in coastal-influenced areas and dry and light in the central and eastern areas. The see-saw battle of spring time air masses along the coastal-interior transition is apparent from the loose, icy texture of the snowpack at lower elevations near Telegraph Creek and Glenora. Such transitional areas may be influenced by coastal or interior air masses anytime during the year.

The driest area is between Telegraph Creek and the Stikine-Tanzilla confluence in the Stikine valley. To the north and east, precipitation increases again. Generally, the entire Stikine Basin upstream of Telegraph Creek recieves relatively little precipitation.

Temperatures vary more throughout the year at any one place, than they do from place to place any one time. Cold winters and short, warm summers are typical. Arctic air can dominate the winter months and early spring in the interior zone and the mid-to-lower elevations of the transitional zone. Arctic air frequently surges down the Stikine bringing bitter winter temperatures and heavy snowfall from lower Iskut valley to Wrangell, Alaska.

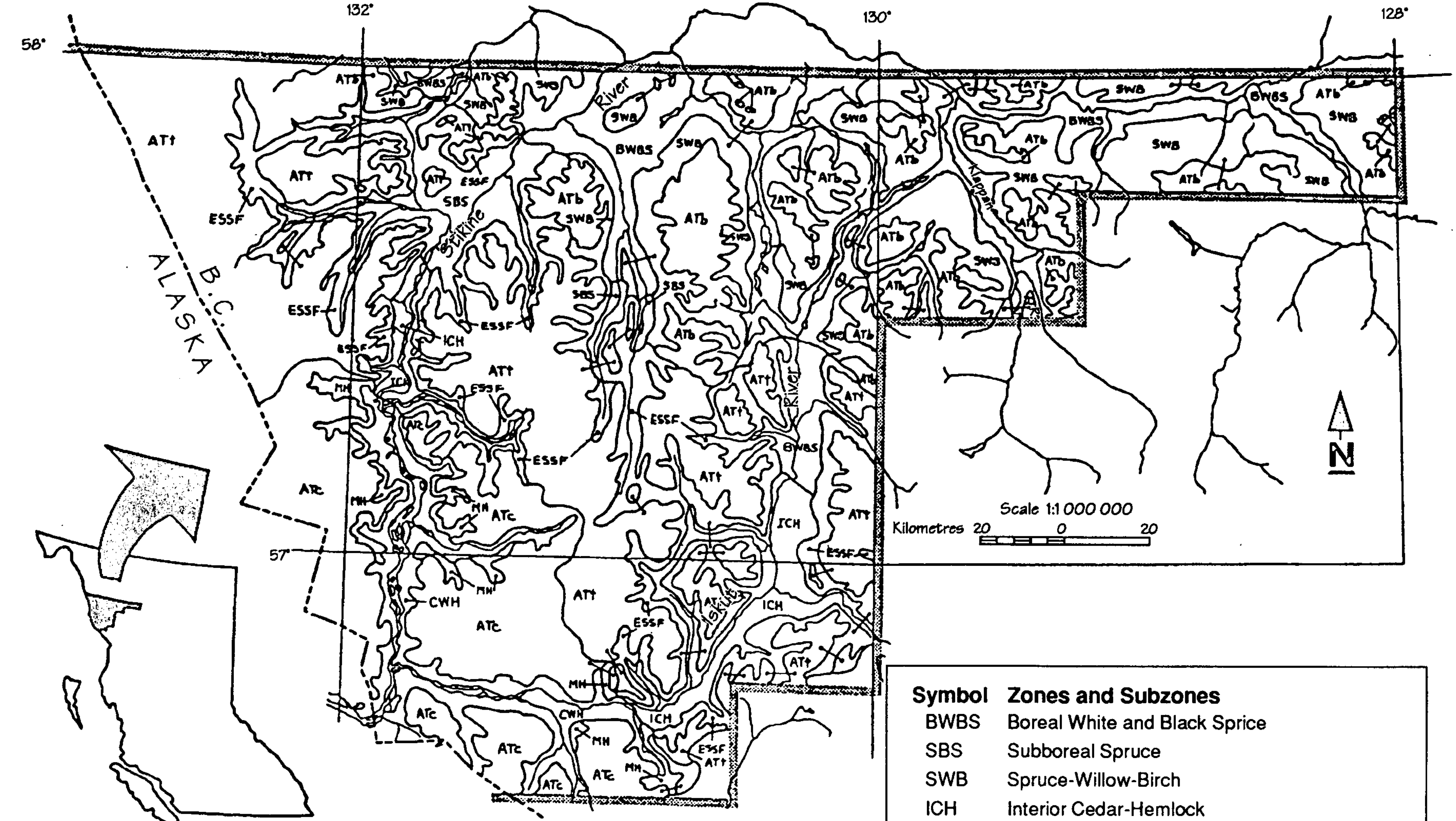
There is generally a short freeze-free period throughout the region. Longest periods are on well air drained slopes of the Stikine River downstream from the Tanzilla river confluence (Epp and Fenger, 1978). Freezing temperatures can occur anytime during the year, especially in mid-elevation, depressional sites subject to cold air pooling.

Thermal inversions are common within the mid-elevations of the interior plateaus. Cold air frequently pools in valley bottoms and other low lying depressions. The period subject to intense solar radiation is brief and the growing season is accordingly short and cool. As a result, annual potential evapotranspiration totals are relatively low except on the steeper south- and southwest-facing slopes where topographic shading is not a factor (Fenger, 1982).

1.6 Vegetation

The Biogeoclimatic Zones of the Stikine-Iskut area are mapped by Utzig *et al.* (1982) at a scale of 1:250 000. A simplified version is presented in Figure 4. More detailed information is presented by Pojar *et al.* (1982).

Successional trends and influence of fire are summarized by Parminter (1984). A vegetation survey emphasizing the possible successional trends within the study area has been compiled by Lea (1984a). A set of broad vegetation cover types for the Stikine-Iskut study area have also been produced (Lea, 1984b). The 45 vegetation landscape cover types arranged by biogeoclimatic zone, are listed in Appendix II and have been described based on physiognomic stand composition obtained from forest cover maps, aerial photograph interpretation, and field observations.



Symbol	Zones and Subzones
BWBS	Boreal White and Black Sprice
SBS	Subboreal Spruce
SWB	Spruce-Willow-Birch
ICH	Interior Cedar-Hemlock
ESSF	Engelmann Spruce-Subalpine Fir
CWH	Coastal Western Hemlock
MH	Mountain Hemlock*
ATb	Alpine Tundra (Northern Continental) (boreal)
ATc	Alpine Tundra (Northern Coastal) (coastal)
ATt	Alpine Tundra (Northern Coastal) (transitional)

*The Mountain Hemlock Zone usually occurs as a narrow belt above the Coastal Western Hemlock zone.

**Adapted from Utzig *et al.* (1982).

Figure 4. Biogeoclimatic zones** of the Stikine-Iskut study area.

Plate 2. The Great Glacier from Katete Mountain

A view north up the Stikine River with the Great Glacier protruding into the valley from the left. The Great Glacier has left a series of terminal moraines (BM4) as a result of periodic advances and recessions which have forced the Stikine River to move to the east side of the floodplain where it is now located. Rugged, alpine soil landscapes, located in the photo foreground, are symbolled BC1. These soils are associated with granitic bedrock, and have a high coarse fragment content as depicted in the photo.

1.7 Terrain (Surficial Materials and Landforms)

All of the Iskut-Stikine study area has been glaciated. Glacial erosion was most intense in the southern and western mountains where heavy snowfall produced extensive icefields and large valley glaciers. Permanent snow and ice still occupy large areas of the Boundary Ranges today but become rarer northeastward, even at similar elevations, in response to the climatic changes between the coast and interior (Ryder, 1984).

The terrain mapping of the Stikine-Iskut area was carried out simultaneously with the biophysical soil landscapes, vegetation, and ungulate capability inventories. A more detailed description of the terrain and surficial material characteristics, geologic hazards, and glacial features is contained in the summary report by Ryder (1984) and on the maps by Ryder (1983a, 1983b) and Lacelle (1983a, 1983b, 1983c). Figure 5 shows the general distribution of the major types of surficial materials.

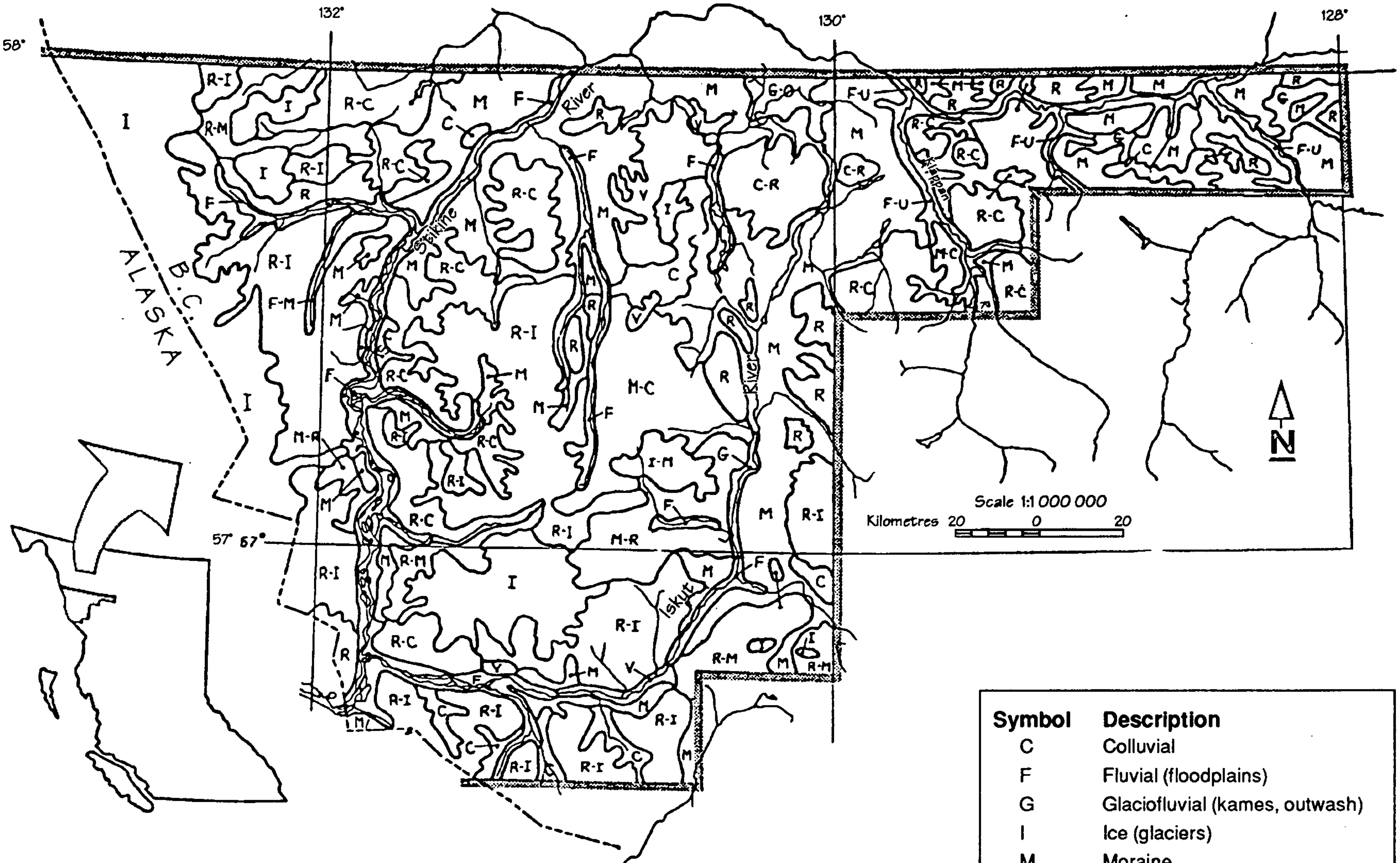
1.8 Soils

Climate changes dramatically across the area from southwest to northeast. Rainfall, freeze-free period, and snow pack all decrease from the coastal climate at the mouth of the Stikine River inland across the Boundary Ranges to the continental climate of the interior plateaus. Along this gradient soil characteristics also change. Shown in Figure 6 is the general distribution of the soils as expressed by Great Groups and Subgroups of the Canadian soil classification (Canada Soil Survey Committee, 1978). This pattern reflects the climatic and vegetational trends in the area. Four schematic cross sectional diagrams (Figures 7 to 10) show the soil development trends in the coastal area, the northern and southern transitional area, and the interior area.

1.8.1 Soils of the Boundary Ranges

The soils of the major valleys in the Boundary Ranges are the most deeply weathered of any in the area, due to high rainfall and cool temperatures (Figure 7). They are Podzols (Canada Soil Survey Committee, 1978). They have dark reddish brown upper mineral horizons resulting from the weathering of iron and aluminum. Such soils on the coast support western hemlock and mountain hemlock stands as climax plant communities. These forests produce large quantities of litter which form thick organic surface horizons above the mineral soil. Organic compounds are leached from this surface layer into the mineral layer. The amount of material leached increases with the amount of precipitation, so at higher elevations, the soils have a greater build-up of organic carbon (greater than 5%) in the B horizon and are classified as Ferro-Humic Podzols. Podzolic soils with less than 5% organic carbon in the B horizon are classified as Humo-Ferric Podzols and are more extensive at the lower elevations.

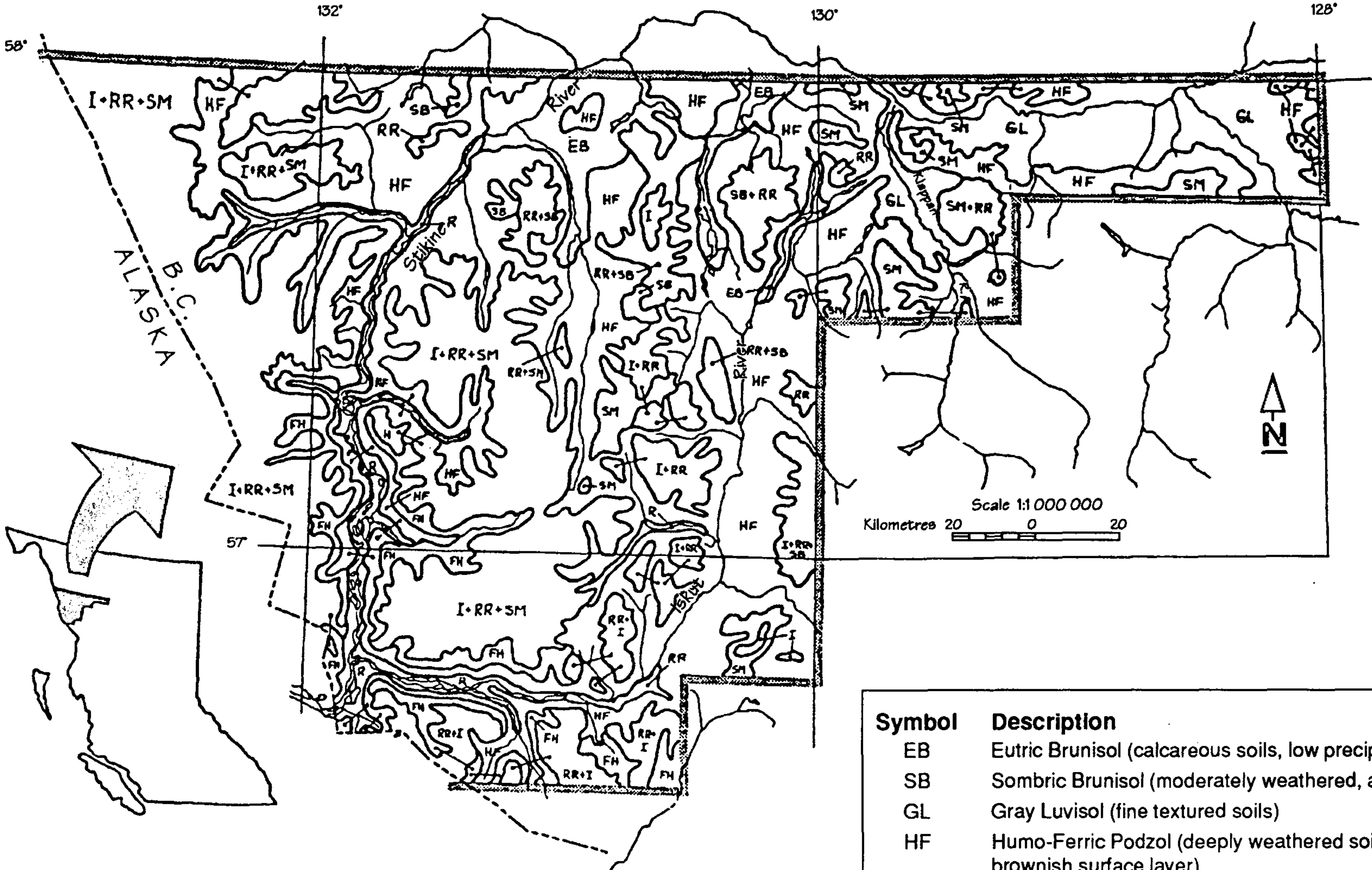
Podzolic soils also occur in the alpine areas and some snow avalanching areas, but differ in having the accumulation of organic matter in the A horizon. Alpine areas have soils with matted, turfy tops whereas the avalanche paths have loose, non-turfy surfaces. These soils are Sombric Humo-Ferric Podzols.



Symbol	Description
C	Colluvial
F	Fluvial (floodplains)
G	Glaciofluvial (kames, outwash)
I	Ice (glaciers)
M	Moraine
O	Organic
R	Rock
U	Undifferentiated
V	Volcanic

*Adapted from 1:250,000 scale surficial materials maps by Ryder (1983b) and Lacelle (1983c).

Figure 5. Distribution of surficial materials in the Stikine-Iskut study area*.



Symbol	Description
EB	Eutric Brunisol (calcareous soils, low precipitation areas)
SB	Sombric Brunisol (moderately weathered, alpine soils)
GL	Gray Luvisol (fine textured soils)
HF	Humo-Ferric Podzol (deeply weathered soils with brownish surface layer)
FH	Ferro-Humic Podzol (most deeply weathered soils with dark, organic enriched surface layer)
SM	Sombric Humo-Ferric Podzol (turfy, alpine soils)
R	Regosol (young soils, unweathered)
RR	Rock and Regosol
I	Ice

Figure 6. Distribution of soils within the Stikine-Iskut study area.

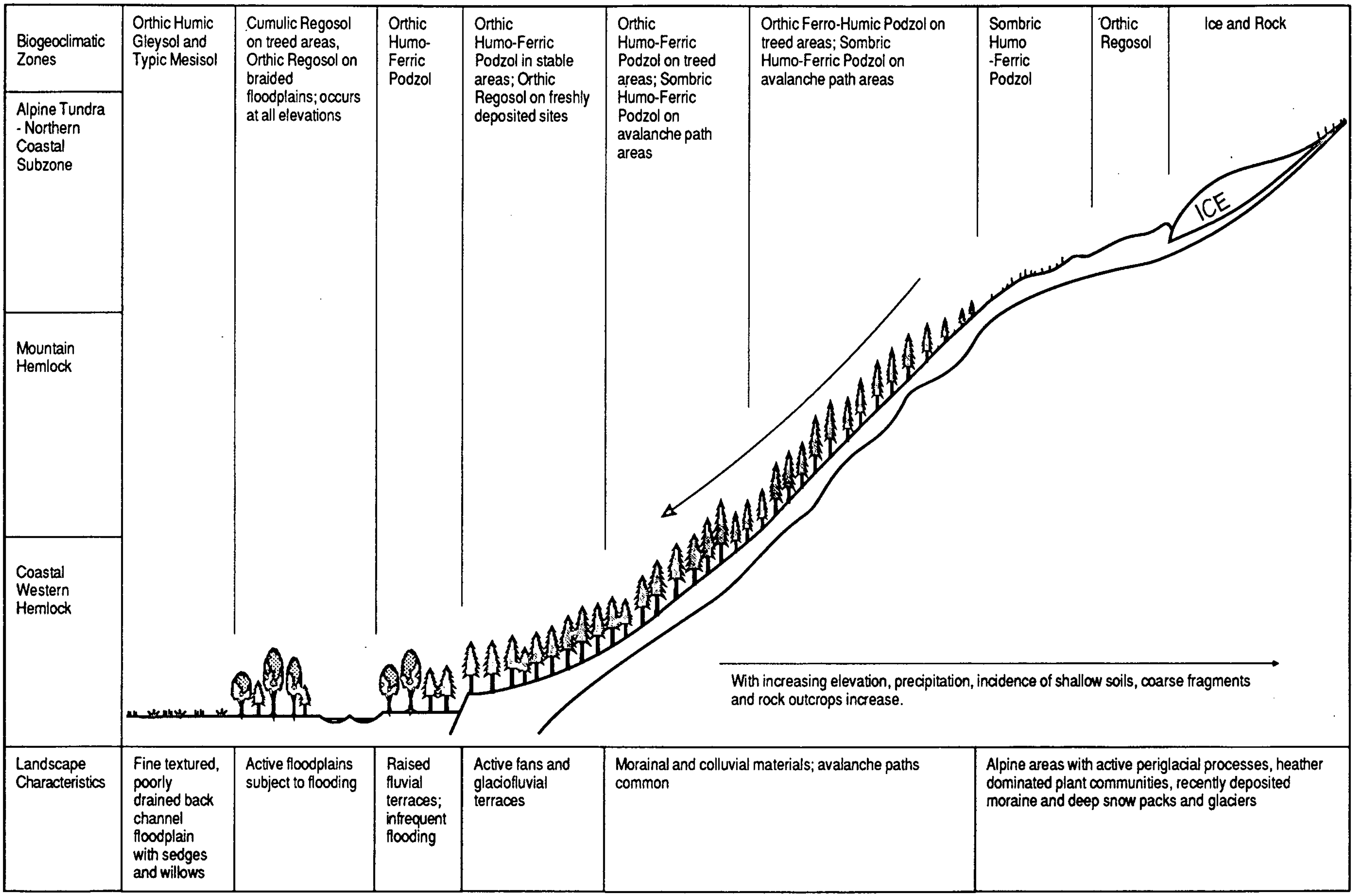


Figure 7. Soil development trends in the Boundary Ranges (Coastal Climate Area).

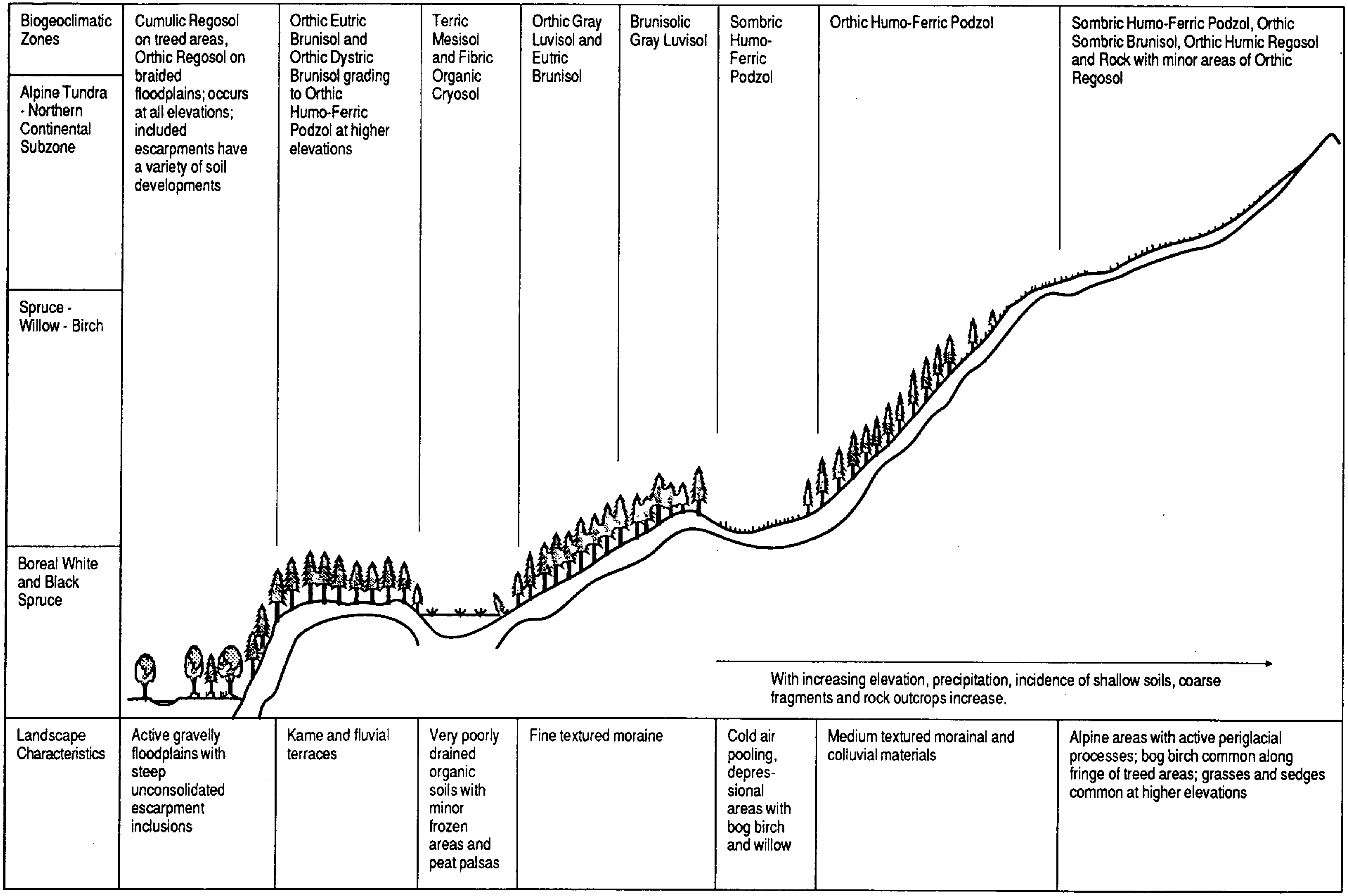


Figure 8. Soil development trends on the Stikine Plateau (Klastline and Spatsizi Plateaus).

Biogeoclimatic Zones	Cumulic Regosol on treed areas, Orthic Regosol on braided floodplains; occurs at all elevations	Ortho Humo-Ferric Podzol	Lava with minor areas of Orthic Regosol	Orthic Humo-Ferric Podzol	Orthic Humo-Ferric Podzol on treed areas, Sombric Humo-Ferric Podzol and Cumulic Regosols on avalanche path areas	Sombric Humo-Ferric Podzol and Rock with minor areas of Orthic Regosol
Alpine Tundra - Northern Coastal Subzone						
Engelmann Spruce - Subalpine Fir						
Interior Cedar - Hemlock						
Landscape Characteristics	Active, gravelly floodplains subject to flooding	Rapidly drained glaciofluvial materials, usually terraced	Recent lava flows with young seral plant communities	Morainal and colluvial materials	Morainal and colluvial materials, avalanche paths common	Alpine areas with active periglacial processes, some heather plant communities and deep snow packs

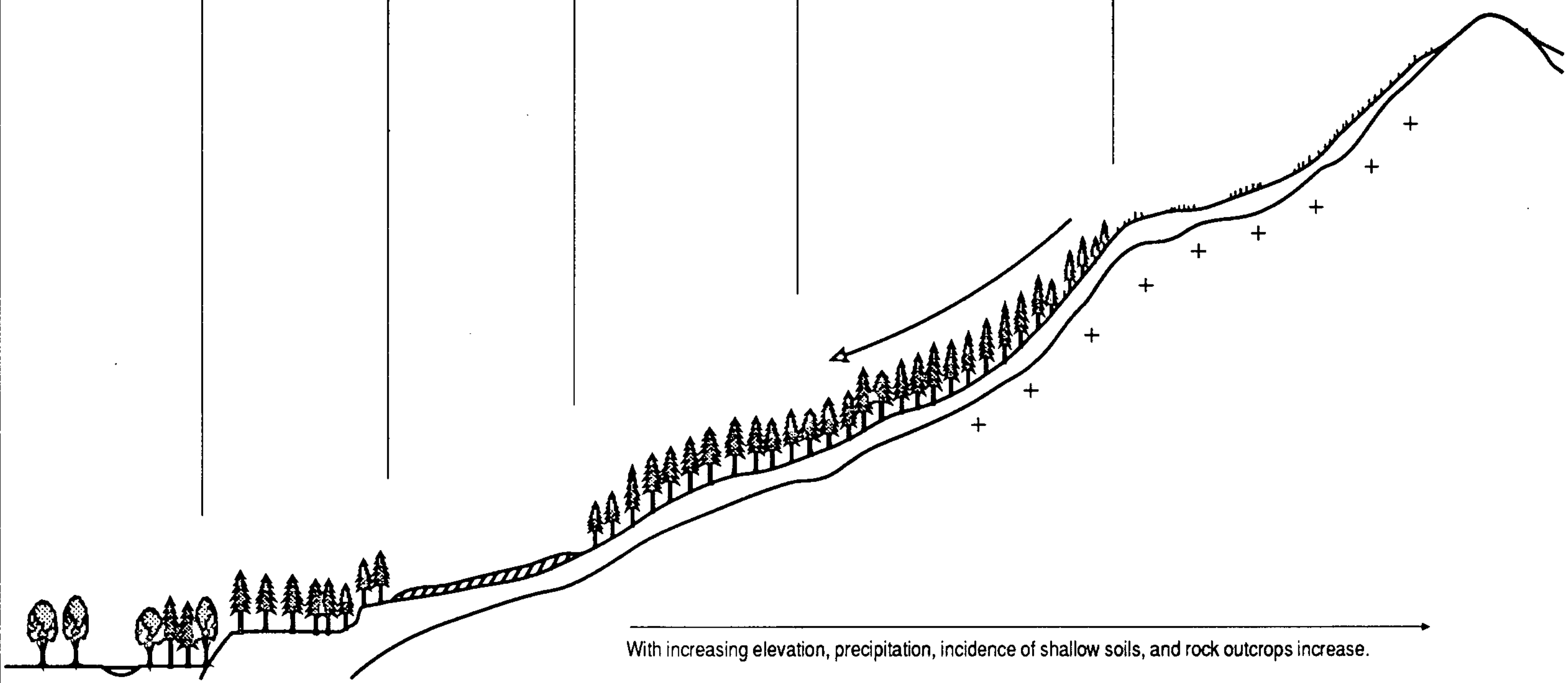


Figure 9. Soil development trends on the Boundary Ranges - Skeena Mountains transitional area.

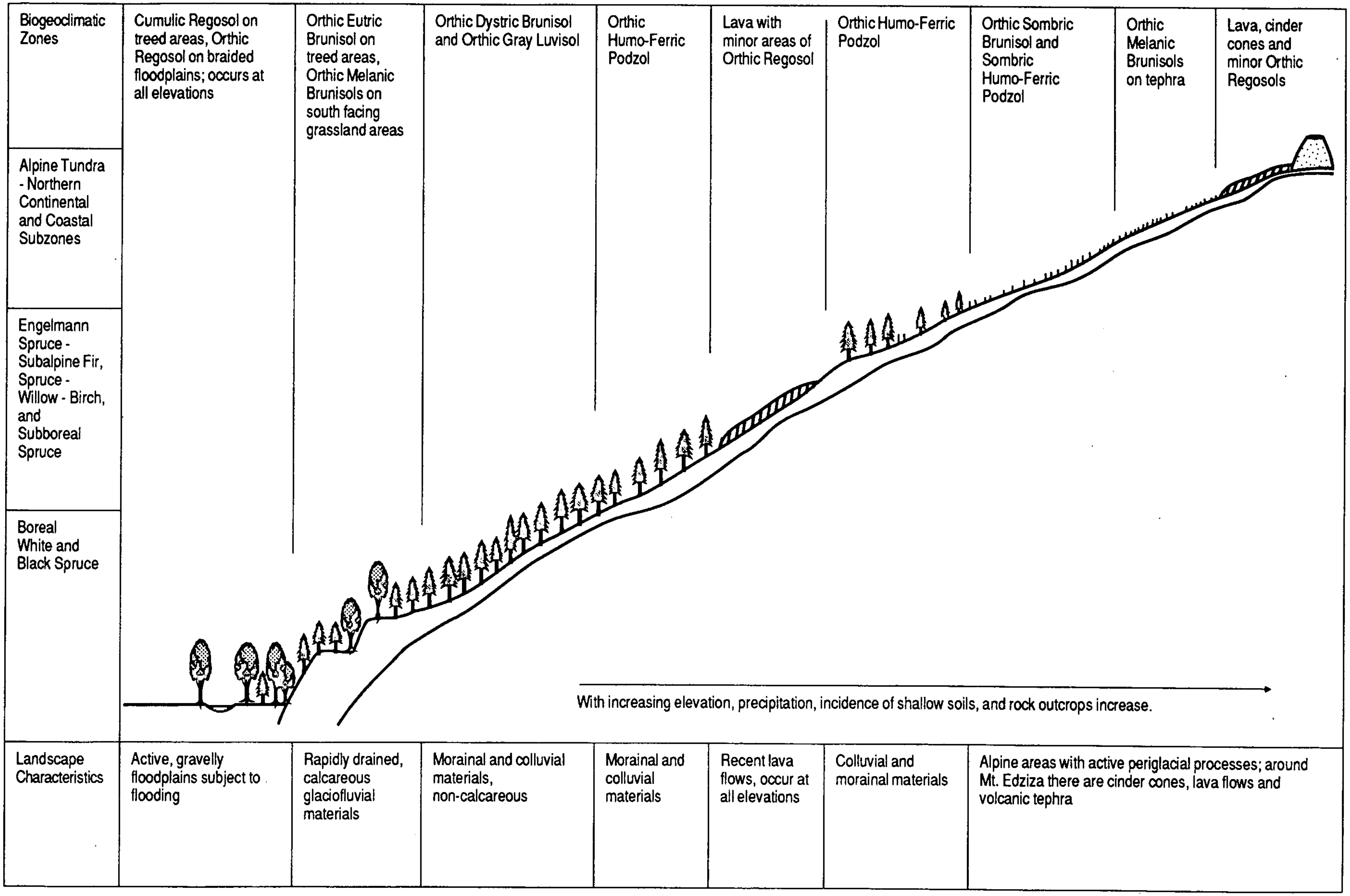


Figure 10. Soil development trends on the Tahltan Highlands Coast to Interior transition area.

The youngest soils, Cumulic and Orthic Regosols, are those derived from annual or periodic fluvial deposits. They occur along major rivers and on fans of the smaller, steeper tributaries. These soils regularly receive new surface deposits during the snowmelt. Regosolic soils show little weathering and soil horizons are poorly developed. Snow avalanche paths which receive regular depositions of new materials, also have some Regosolic soils. Although soils associated with floodplains and avalanche paths have little soil weathering, they often are densely vegetated and have aerated ground water. Poorly drained, fine textured floodplains along the lower Stikine River have Gleysolic soils. Recent morainal deposits, left by the receding glaciers, also have Regosolic soils.

The incidence of shallow soils and rock outcrops increases at higher elevations. Most of the morainal and colluvial soils between the river floodplains and the alpine areas have a large proportion of coarse fragments. The soil textures vary between medium (loam) and coarse (sandy loam).

1.8.2 Soils of the Stikine Plateau (Klastline and Spatsizi Plateaus)

The soils within the major valleys of the Klastline and Spatsizi Plateaus have developed predominantly from fine (clayey) textured morainal deposits (Figure 8). Clay minerals within these soils have been translocated from surface to subsurface layers. These soils, which are Luvisols, have good moisture holding capacities and are moderately to slowly pervious. The soil horizon in which clay has accumulated can restrict downward root growth and also can restrict the downward movement of water.

Medium to coarse textured materials on kame and fluvial terraces have Dystric and Eutric Brunisol at lower elevations grading to Humo-Ferric Podzols at mid-elevations. These soils are not as deeply weathered as the coastal Humo-Ferric Podzols or other soils at higher elevations with greater rainfall. In some closed depressions at mid-elevations, cold air pooling results in stunted or sparse trees. The soils of these depressions are Sombric Humo-Ferric Podzols. They have an accumulation of organic matter in their surface mineral horizons formed by the incorporation of the litter from shrubs and grasses. These depressions can be extensive and include gleyed, imperfectly drained mineral soils, or very poorly drained organic soils.

Organic soils can occur anywhere, but are most common at mid-elevations where the landscape is gently rolling and poorly drained depressions are most frequent. Organic soils also occur on flat or sloping land with poor drainage. To be called organic their organic surface layer must be more than 40 cm deep and contain at least 17% organic carbon. They consist primarily of moderately decomposed mosses and are classified as Typic Mesisols. Some organic soils at higher elevations have permafrost within 1 m of the surface and occur as small patches within larger organic areas. Identification of permafrost soils, Mesic Organic Cryosols, was by the presence of peat palsas. At some lower elevations fine textured soils overlain by 20 to 40 cm of organic material were also frozen, and are classified as Static Cryosols (Alley and Young, 1978 and Brown, 1967).

Alpine areas have Sombric Humo-Ferric Podzols with a dark, organic enriched surface mineral horizon. Having less protective snow cover, these soils are subject to more freezing and thawing cycles than coastal alpine areas. Patterned ground, solifluction lobes, nivation hollows, stone stripes, and sorted polygons are common features. As a result, soil horizons are commonly churned, irregular, or discontinuous. The plant communities at or near timberline become sparser with increasing elevation where Orthic Humic Regosols are common.

1.8.3 Soils of the Boundary Ranges - Skeena Mountains transition area

The Boundary Ranges - Skeena Mountains transition area is a zone of transition from marine to continental climate; consequently, there are large fluctuations in precipitation and temperature.

The prevailing climate is moist and cool with moisture deficits sometimes occurring in the growing season. As depicted in Figure 9, most materials have weathered to form Humo-Ferric Podzol soils. The depth of weathering is marginally less than along the coast but deeper than similar Podzolic soils further inland. Hemlock and spruce forests produce large volumes of litterfall and most soils have a moderately thick layer of decaying litter above the mineral horizons. This litter layer has abundant roots, and plants recycle nutrients directly from it.

The landscape is generally steep and soils are often high in coarse fragments with shallow soils and coarse fragments becoming increasingly more common at higher elevations.. A pan which has developed in some of the soils is most common at mid- or upper elevations; these soils are classified as Duric Humo-Ferric Podzols. These pans occur 40 to 80cm below the soil surface and are hardest at the top. Dried pans are extremely hard and will not slake in water. The pans act as an impermeable layer to soil water and have a high bulk density (weight per unit area) and few pores as these are usually filled by the cementing agent.

The fine to medium textured valley floor morainal materials near Bob Quinn Lake show evidence of clay movement from surface to subsurface soil layers and are classified as either Brunisolic Gray Luvisols or Humo-Ferric Podzols, depending on the amount of clay translocated.

Juvenile soils, Regosols, occur on floodplains of major rivers, in minor portions of recently deposited lava flows, in portions of avalanche paths, and in alpine and subalpine areas on recently exposed moraine. The Cumulic Regosols of the floodplains are high in coarse fragments as stream gradients are sufficiently steep to allow for gravel transport. The braided portions of the active floodplains are also fairly wide in relation to the overall floodplain width. Glacial meltwaters and snowmelt swell these rivers each spring and new material is deposited and older surfaces buried. The frequency of flooding does not allow sufficient time for weathering to alter the soil and evidence of older buried soil surfaces is often poor or lacking.

Steepness of the terrain and the high snowfall within this transitional area have created ideal conditions for the formation of avalanche paths which are common in some valleys. Slide alder dominates these avalanche path plant communities. The soils have a deep surface layer enriched with organic material intermixed with mineral material and are classified as Cumulic Regosols. Seepage is often associated with lower portions of avalanche paths where the slopes become more gentle. Rock outcrops and lithic soils (less than 100 cm deep) dominate the upper portions of most avalanche paths resulting in a vegetative cover that is less luxuriant than that on lower slopes.

1.8.4 Soils of the Tahltan Highland - Coast to Interior Plateaus transition area

The climate of the Tahltan Highland transition area is similar to the Boundary Ranges - Skeena Mountains transition zone where both marine and continental climates interact. As depicted in Figure10, most of the materials have weathered to form Humo-Ferric Podzols. The spruce forests associated with the podzolic soils produce a moderately thick layer of litter and mosses above the mineral soil creating a medium for root growth and nutrient cycling. The landscape is generally steep and the soils are often high in coarse fragments with shallow soils and coarse fragments becoming increasingly more common at higher elevations.

To the northwest, the valley floor soils show evidence of weaker soil development and have been classified as Eutric Brunisols. Some south- and west-facing slopes, because of fire history, have not regenerated to trees but to grasses and shrubs. As a result, an organic buildup has occurred in the surface mineral horizons with soils being classified as Melanic Brunisols.

Recent, or juvenile, Regosolic soils occur on floodplains of major rivers, on the occasional recently deposited lava flows, and in portions of avalanche paths. The floodplain Cumulic Regosol soils contain many coarse fragments as stream gradients are sufficiently steep for their transport.

Alpine soils on morainal or colluvial materials are Sombric Brunisols in areas of continental climate and Sombric Humo-Ferric Podzols in areas of marine climate. Soils formed on volcanic tephra from the eruptions around Mount Edziza are Melanic Brunisols.

1.9 Fisheries

The canyon of the Iskut River lies between the confluences of Snippaker and Forrest-Kerr creeks, and prevents the upstream movement of anadromous fish. This is also true of the Grand Canyon of the Stikine River. Below these canyons, the Iskut and Stikine rivers and their several tributaries contain chinook, chum, coho, pink, and sockeye salmon as well as cutthroat, steelhead, Dolly Varden trout, and whitefish. The only resident sport fish which appear to inhabit the main Iskut and Stikine Rivers upstream of their respective canyons are Dolly Varden and whitefish. Elsewhere in the Iskut drainage, rainbow trout are present but only in one or two small lakes in the Bob Quinn area. They are more prevalent in the lakes and streams of the Stikine River system. The most important habitat for anadromous fish are side channels, especially those with clear water such as along the mainstem Iskut and its main tributary, the Craig River.

Much of the above information was obtained by a survey of aquatic resources in parts of the area carried out by the Ministry of Environment in 1982 (Hawthorn *et al.*, 1984). A listing of fish species found in this study appears in Appendix III.

1.10 Wildlife

Caribou (*Rangifer tarandus*), Stone's sheep (*Ovis dalli stonei*), mountain goat (*Oreamnos americanus*), moose (*Alces alces*), and mule deer (*Odocoileus hemionus hemionus*) are all present in the area. Ungulate capability maps have been produced based on biophysical soil landscape information, successional trends in vegetation, and knowledge of habitat utilization (Stewart, 1983b and Blower, 1983b).

Plate 3. Yehinko Lake looking south

Yehiniko Lake lies on the boundary between the subdued Tahltan Highlands (foreground) and the rugged Boundary Ranges (background). The soil landscapes in the foreground are symbolled TAM5a with inclusions of TAG2 along Yehiniko Creek. A fluvial fan (TAF3) protrudes into the lake midway down on the right side.

Caribou are abundant on the Spatsizi Plateau, absent in the southwest and limited elsewhere. There are Stone's sheep on most mountains although they are absent in the southwest. Mountain goats are widely distributed, occurring wherever favourable escape terrain exists. Moose range throughout most of the area, although they are less numerous in the southwest. Mule deer are common only in the north-central part. They are absent from the southwest and occur in very limited numbers throughout the remainder of the area. Sitka black-tailed deer are occasionally found in the southwest near the Alaska boundary, but no established population exists in this area.

The depth, condition, and duration of winter snow cover is the most significant factor influencing the distribution and abundance of ungulates. Snowpacks are, as a rule, considerably deeper and have a greater density and moisture content but do not last as long in the southwest compared to other parts of the area. Snow is generally deeper at higher elevations, although the influence of topography on windspeed and solar radiation has an important local effect on snow cover. Increased insolation on steep, south-facing slopes is especially important in reducing the depth and duration of snowpacks for ungulate populations at low and intermediate elevations. On exposed high elevation sites, strong winds reduce the depth and duration of snowpacks and thus provide high-level winter ranges for ungulates.

Grizzly bears *(Ursus arctos),* black bears *(U. americanus),* wolves *(Canis lupus),* wolverines *(Gulo gulo),* and other fur bearers are also present. Land capability for these species has not been mapped. Large populations of Willow, Rock, and White-tailed Ptarmigan *(Lagopus lagopus, L. mutus, L. leucurus)* also occur.

1.11 Recreation

Hunting is a major recreation, and there are several guide/outfitters operating within the area. Extensive stretches of moderately sloping alpine land provide good access for hikers, hunters, and horses from July to October. Several large lakes are accessible from the Stewart-Cassiar highway and provide angling opportunities. There are recreation reserves on Natadesleen, Kinaskan, Tatogga, Morchuea, and Ealue Lakes. Campsites and boat launches have also been established on some of them.

The lower Stikine River is navigable, and river raft expeditions leave from Telegraph Creek for Alaska. The upper Stikine River above the Stewart-Cassiar highway bridge is also navigable for small craft such as canoe and rubber raft. However, much of the area is not easily accessible and provides opportunities for a more remote "wilderness" type recreation. There is spectacular scenery. Mount Edziza Provincial Park and surrounding recreation reserves offer a great variety of scenery, with recent volcanic and glacial landforms and are home to important large game animals including caribou, sheep, moose, grizzly and black bear.

The northern and eastern portions of the Spatsizi Wilderness Park are also in the area. Mountains, plateaus, lakes, rivers, vegetation types, fish, and wildlife offer many opportunities for wilderness recreation. Extreme cold, strong winds, and deep wet snow limit winter recreation.

Plate 4. Taweh Creek, Mount Edziza

The area shown looks eastward up Taweh Creek culminating at Mount Edziza. Mount Edziza is a shield volcano with a glacial ice cap. The sparsely vegetated alpine area below the icefield is a combination of exposed bedrock and colluvium symbolled as 7TAR1r-TAC1. The plateau area is composed of volcanic materials (TAV2).

PART 2

METHODS

2.1 Field Methods

Aerial photographs were studied to familiarize the surveyors with the area, to observe the drainage conditions, and to note all possible access. The general tone, patterns, and texture of the aerial photographs indicated landscape characteristics that were verified by on-site field inspections. The biophysical soil landscape inventory used the boundaries delineated by the terrain inventory wherever appropriate. However, some additional boundaries were added to account for some important vegetation-soils changes. For example, the alpine-subalpine boundary was not separated on the terrain maps, but this boundary is shown on the soil landscape maps.

Fieldwork was carried out by two multidisciplinary teams during July and September, 1982. Each team consisted of a geomorphologist, a pedologist, an ecologist, and a wildlife biologist. Each team mapped a different area and used the helicopter on alternate days. Non-flying days were spent examining areas accessible by road or traversing the land on foot once dropped off by helicopter. A total of 17 days were spent traversing the area by helicopter, 8 days were spent along roads and 4 days walking transects (Figure 11).

One hundred and eighty-nine site and soil description forms were completed according to Ministry of Environment procedures (Walmsley *et al.*, 1980). The information is stored in the B.C. Soil Information System (Sondheim and Suttie, 1983). Additional information collected in the field was recorded on aerial photographs and incorporated into the biophysical soil landscape maps.

2.2 Previous Soil Work

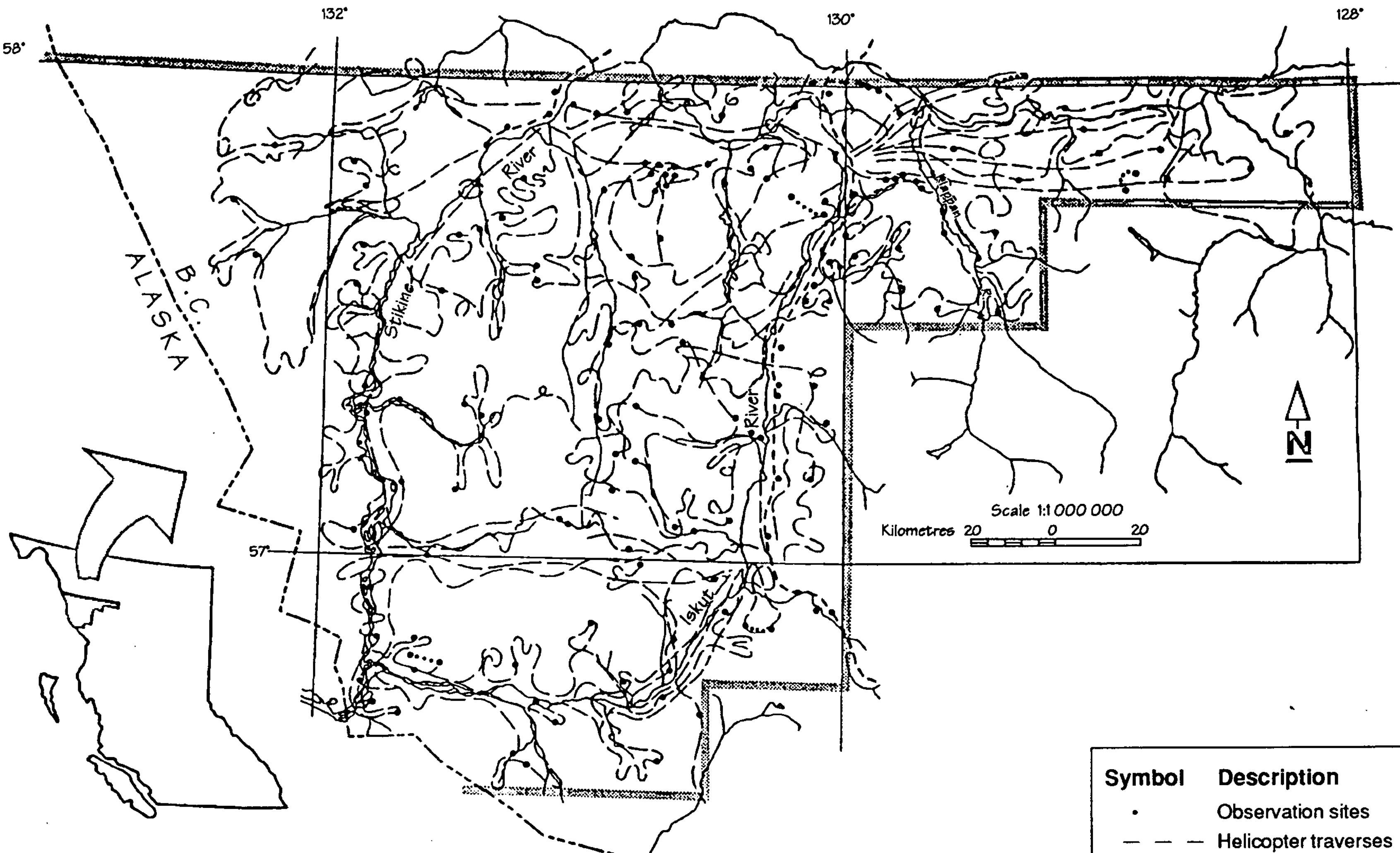
Site, soil, and vegetation plots were described for a vegetation zone map (Utzig *et. al.*, 1982). Additional ground observations were available from studies of biogeoclimatic zones (Pojar *et al.*, 1982) and fire ecology (Parminter, 1983). Soil and terrain mapping near proposed hydro-electric developments also provided soil information (Walmsley and Maynard, 1983). Altogether, approximately 330 sites were used to describe the biophysical soil landscapes. An agriculturally oriented soil survey at a scale of 1:50 000 described soils in more detail between the Chutine River and Nine Mile Creek along the Stikine River, near Telegraph Creek (Epp and Fenger, 1978).

An interdisciplinary survey of the Dease Lake map area (104J) to the north, provides maps of terrain features, biophysical soil landscapes, and ungulate capability (Ryder, 1984; Fenger, 1984c; Stewart, 1983a)

Also available, adjoining the area along its northern boundary are a biophysical map (Fenger, 1982) and an ungulate capability map (Fuhr and Demarchi, 1982) for the Cry Lake area (104-I). Adjacent and partially overlapping to the east is a map and report on the geomorphic processes along the Klappan River (Alley and Young, 1978). Soils along the Stikine River within Alaska have also been inventoried by the United States Department of Agriculture (E. Kissinger, personal communication).

2.3 Mapping Methods

Upon completion of the fieldwork, which included describing 189 site and soil forms and sampling the soils for laboratory analyses, the biophysical soil landscape unit (BSLU) legend was developed. A BSLU is a group of soils that have developed on similar parent



Symbol	Description
•	Observation sites
— — —	Helicopter traverses
------	Road traverses
....	Foot traverses

Figure 11. Field work: locations of observation sites and traverses.

materials and under similar climatic conditions (in this case expressed by vegetation zones). When interpreted as an expression of climate, the vegetation zone becomes a useful mapping tool that provides boundary limits for some BSLU's. In areas of limited or no access, the BSLU delineation is determined by photographic interpretation of the vegetation and terrain patterns extrapolated from whatever point data sources that are available. This linkage between vegetation zone, inferred climate, and BSLU's provides a sound ecological basis for land use planning (Kowall, 1980).

The first level or broadest stratification of the landscape was derived from the physiographic regions and associated bedrock geology. The boundaries on the terrain map were used as the basic delineations for the BSLU map. Terrain units were adjusted to indicate major changes in soils and vegetation not related to material changes.

Biophysical soil landscape units were also stratified along biogeoclimatic (vegetation) zonation changes. Vegetation landscapes are tied to the BSLU's on the 1:250 000 scale maps as noted on the map legends (Kowall 1984; Fenger 1984a, 1984b). The vegetation landscapes indicate successional pathways which can occur on various landscapes (Lea, 1984b). Appendix II lists the abbreviations and names of the vegetation landscapes on the BSLU maps and groups them by biogeoclimatic zones.

A further level of detail was added to the BSLU's by using extra symbol characters as modifiers (Kowall, 1984; Fenger, 1984a, 1984b; map legend box 5). For example, a map unit symbolized as STM1 indicates that the majority of the area is composed of soils deeper than 1 m to bedrock. Other areas symbolled STM1c have all the characteristics of the BSLU STM1 except that a small portion of the map unit has soils less than 1 m in depth to bedrock. Some map units, which are defined as having shallow soils predominantly, are symbolized with a "d" modifier. The descriptions of map units in the legend apply to the majority of the areas. Modifiers are used only to indicate exceptions.

2.4 Biophysical Soil Landscape Unit Legend

The biophysical soil landscape unit legend is printed on the maps and describes the map units. To make the legend, the area was divided into physiographic regions, major bedrock types, and vegetation zones. Mapping determined the predominant soil types and drainage classes on different parent materials within each physiographic region, bedrock type, and vegetation zone. Each one constitutes a BSLU and their distribution within the matrix of physiographic region, bedrock type, vegetation zone, and parent material is shown in Tables 1, 2, and 3. The individual symbol characters are explained on the maps.

Table 1 Biophysical soil landscape units for the Boundary Ranges physiographic region.

PHYSIOGRAPHIC REGION	BOUNDARY RANGES (B)														
Bedrock Groupings[2]	Acidic, coarse grained plutonic						Basic, fine grained sedimentary and volcanic						Fine grained, dark coloured sedimentary		+
Vegetation Zones[1]	AC	MH	CWH	AI	ESSF	ICH	AC	MH	CWH	AI	ESSF	ICH	AC	ESSF	ICH
Materials															
Colluvium (C)	BC1	BC2	BC3	BC4	BC5	BC6	BC7	BC8	BC9	BC10	BC11	BC12	BC13	BC14	BC15
Fluvial (F)[3]		BF8	BF1, BF2, BF3, BF4		BF7	BF5 BF6			BF1, BF2, BF3, BF4		BF7	BF5 BF6			BF5 BF6
Glaciofluvial (G)[3]			BG1			BG2			BG1			BG2			
Ice (Glaciers) (I)	I			I			I			I			I		
Moraine (M)[3]	BM1 BM2	BM2 BM3	BM4, BM5	BM2 BM6	BM7	BM8	BM1 BM2	BM3	BM4, BM5	BM1 BM2	BM7	BM8	BM1 BM2	BM7	BM8
Organic (O)					BO1						BO1				
Bedrock (R)	BR1	BR2	BR3	BR4	BR5	BR6	BR7	BR8	BR9	BR10	BR11	BR12	BR13	BR14	
Marine (W)[3]			BW1						BW1						

1. AC - Alpine Coastal (Alpine Tundra - Northern Coastal); AI - Alpine Interior (Alpine Tundra - Northern Continental); MH - Mountain Hemlock; ESSF - Engelmann Spruce - Subalpine Fir; CWH - Coastal Western Hemlock; ICH - Interior Cedar - Hemlock. Lea (1984a, 1984b) and Pojar *et al.* (1982)
2. Adapted from Souther *et al.* (1979)
3. The fluvial, glaciofluvial, moraine, and marine materials could not be successfully distinguished based on bedrock grouping and therefore the map units are not restricted to one bedrock group for these materials.

Table 2 Biophysical soil landscape units for the Tahltan Highland physiographic region.

PHYSIOGRAPHIC REGION	TAHLTAN HIGHLAND (TA)								
Bedrock Groupings[2]	**Basic, fine grained sedimentary and volcanic (including calcareous rock)**					**Acidic, coarse grained plutonic**			
Vegetation Zones[1]	AI	SWB	ESSF	SBS	BWBS	AI	SWB	ESSF	SBS
Materials									
Colluvium (C)	TAC1	TAC2	TAC4	TAC5	TAC3	TAC6	TAC7	TAC9	TAC10
Fluvial (F)[3]		TAF2	TAF4, TAF5	TAF3	TAF1				
Glaciofluvial (G)[3]		TAG2		TAG2	TAG1				
Ice (Glaciers) (I)	I					I			
Moraine (M)[3]	TAM3, TAM6	TAM2	TAM4	TAM5	TAM1	TAM3, TAM6	TAM2		TAM5
Organic (O)			TA03	TAO2	TAO1				TAO2
Bedrock (R)	TAR1	TAR2	TAR4	TAR5	TAR3	TAR6			
Undifferentiated (U)[3]					TAU1				
Volcanic (V)	TAV2	TAV1							

1. AI - Alpine Interior (Alpine Tundra - Northern Continental); ESSF - Engelmann Spruce - Subalpine Fir; SWB - Spruce - Willow - Birch; SBS - Subboreal Spruce; BWBS - Boreal White And Black Spruce. Lea (1984a, 1984b) and Pojar *et al.* (1982)
2. Adapted from Souther *et al.* (1979)
3. The fluvial, glaciofluvial, moraine, and undifferentiated materials could not be successfully distinguished based on the bedrock groupings and therefore the map units are not restricted to one bedrock group for these materials.

Table 3 Biophysical soil landscape units for the Skeena Mountains and the Stikine Plateau physiographic regions.

PHYSIOGRAPHIC REGION	SKEENA MOUNTAINS (SM)			STIKINE PLATEAU (ST)					
Bedrock Groupings[2]	Fine grained, dark coloured sedimentary			Basic, fine grained sedimentary and volcanic (including calcareous rock)			Acidic, coarse grained intrusive and sedimentary		
Vegetation Zones[1]	AI	SWB	ESSF	AI	SWB	BWBS	AI	SWB	BWBS
Materials									
Colluvium (C)	SMC1	SMC2	SMC3	STC1	STC2	STC3	STC5		
Fluvial (F)[3]			SMF1		STF1, STF6	STF2, STF3, STF5,		STF1, STF6	STF2, STF3, STF5
Glaciofluvial (G)[3]					STG2, STG3	STG1, STG4		STF2, STG3	STG1, STG4
Ice (Glaciers) (I)	I								
Moraine (M)[3]	SMM1, SMM2	SMM3	SMM4	STM5, STM6	STM1, STM2, STM3	STM4, STM9	STM5, STM6, STM11	STM10	STM4
Organic (O)					STO1	STO2		STO1	ST02
Bedrock (R)	SMR1	SMR2	SMR3	STR1	STR2	STR3	STR5		
Undifferentiated (U)[3]						STU1			STU1

1. AI - Alpine Interior (Alpine Tundra - Northern Continental); ESSF - Englemann Spruce - Subalpine Fir; SWB - Spruce - Willow - Birch; BWBS - Boreal White and Black Spruce. Lea (1984a, 1984b) and Pojar *et al.* (1982)
2. Adapted from Souther *et al.* (1979)
3. The fluvial, glaciofluvial, moraine, and undiffentiated materials could not be successfully dustinguished based on bedrock groupings and therefore the map units are not restricted to one bedrock group for these materials.

PART 3

BIOPHYSICAL SOIL LANDSCAPE UNIT OVERVIEW

3.1 Introduction

Broad regional soil characteristics have been described in Part 1.8. This part illustrates and describes some of the important characteristics of the different biophysical soil landscape units (BSLU's). The relationship between the various BSLU's for each biogeoclimatic zone within a physiographic region is shown in a series of cross sections. It is intended that these diagrams be used as a guide to the BSLU maps and legends. Soil classification is given under each BSLU symbol on these diagrams.

Descriptions of BSLU's that were field visited have been compiled from field observations. The BSLU's that were mapped by air photograph interpretation but not visited have been described by extrapolation. Site, soil, and vegetation description form numbers that represent each BSLU are recorded in Appendix IV. The BSLU descriptions summarize the site, soil, and laboratory analyses, which include soil reaction (pH), percent organic carbon, total nitrogen, cation exchange capacity, exchangeable cations, and extractable iron and aluminum for selected mineral horizons. Some physical analyses were carried out to determine the percentage of sand, silt, and clay. Organic horizons were analysed for reaction, rubbed fibre content, and pyrophosphate index.

3.2 The Boundary Ranges

Forty-nine BSLU's were delineated within the Boundary Ranges. Figures 12 to 18 schematically illustrate the relationship between these BSLU's. Within the Boundary Ranges, 120 site, soil, and vegetation description forms were completed to describe representative BSLU's.

3.2.1 Colluvial map units

The colluvial soils were separated into 15 different BSLU's. The separations were made according to three bedrock groupings and six biogeoclimatic vegetation units. In this area, 20 different colluvial sites were inspected with 10 BSLU's having at least one recorded site inspection.

The colluvial soils are fairly extensive within this rugged, mountainous area and are found in all vegetation zones. They are most common on the steeper slopes and their coarse fragment content varies, but is generally high. Textures are coarse. Most sites are well to rapidly drained with the exception of some lower slope areas where seepage occurs resulting in soils that are imperfectly to poorly drained. These are designated using BSLU modifiers "a" and/or "b".

The soil reaction is strongly acid in the surface mineral horizons of both alpine and forested sites. The fertility of these moderately to rapidly pervious soils is generally high with the nutrients mainly derived from the abundant litter layer.

Usually, with increasing elevation, soils are shallower with more soil creep and churning. Snow avalanche paths are prevalent on many of the steep slopes. Alpine areas are affected by periglacial processes. Soils vary from Sombric Humo-Ferric Podzols in the alpine areas and on avalanche paths through Orthic Ferro-Humic Podzols in the Mountain Hemlock forest to Orthic Humo-Ferric Podzols in the remainder of the forested areas. Orthic and Cumulic Regosols also occur in avalanche paths that are subject to frequent erosion and/or deposition.

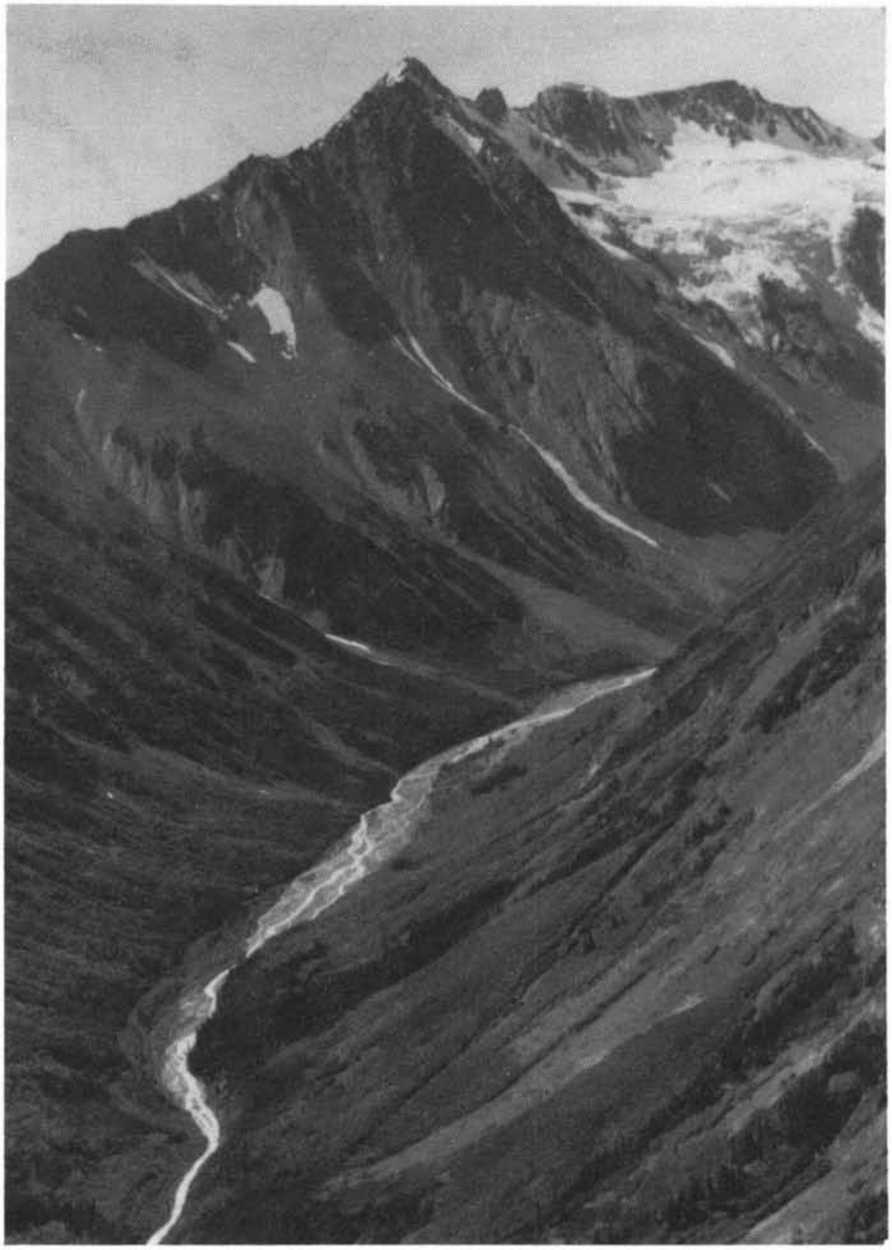


Plate 5. Barrington River, Boundary Ranges

Throughout the Boundary Ranges, avalanching is common due to the rugged topography and deep snow conditions. U-shaped valleys are typical of this glaciated terrain and have shallow soils and exposed bedrock on the upper slopes and accumulations of deep colluvium on the lower slopes. Map units depicted from mountain top to valley bottom are symbolled as I (glaciers), BR7 (bedrock), and BC7 (colluvium) at high elevations in the Alpine Tundra biogeoclimatic zone, BC11ck (shallow colluvium subject to avalanching) at mid elevations in the Engelmann Spruce - Subalpine Fir zone, and BC12s (deep colluvium with exposed bedrock) on the lower slopes, and BF5 (floodplain) on the valley bottom in the Interior Cedar - Hemlock zone.

Biogeoclimatic Zones	BC3 0.HFP (SM.HFP)	BF4 0.HFP 0.R	BF1 O.R	BF2 CU.R	BF3 0.HG	BW1 0.HFP	BG1 0.HFP	BM5 0.HFP	BM4 0.HFP	BR9 (0.R)
Alpine Tundra - Northern Coastal Subzone	Occasional avalanche paths									
Mountain Hemlock										
Coastal Western Hemlock										
Landscape Characteristics	Colluvium predominantly derived from the weathered underlying bedrock; seepage common at base of slope	Active fans; also terraced	Active, braided flood- plains subject to frequent flooding	Active, sandy floodplains subject to frequent flooding	Fine textured, poorly drained back channel floodplain with sedges and willows	Terraced marine remnants	Kame deposits; of limited extent	Terminal moraine of the Great Glacier	Moderately to steeply sloping, medium textured moraine	Basic, fine grained rock outcrops; includes patches of colluvial soils

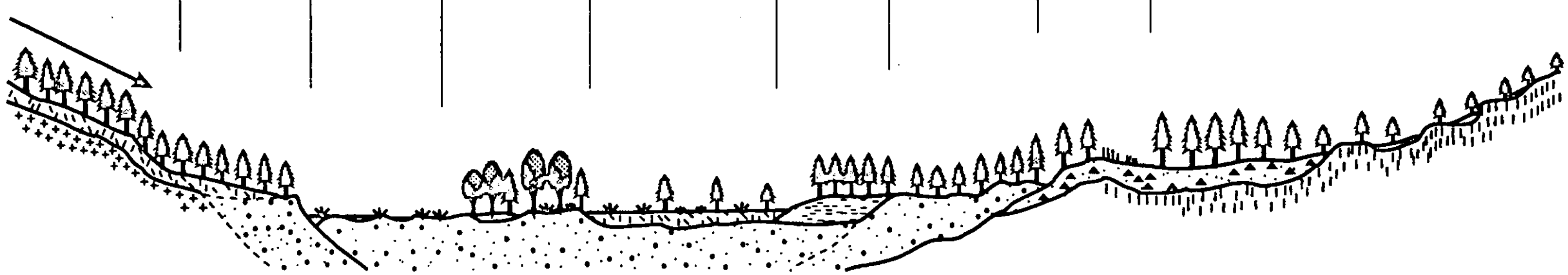


Figure 12. Schematic cross-section of the biophysical soil landscape units of the Boundary Ranges (1 of 7).

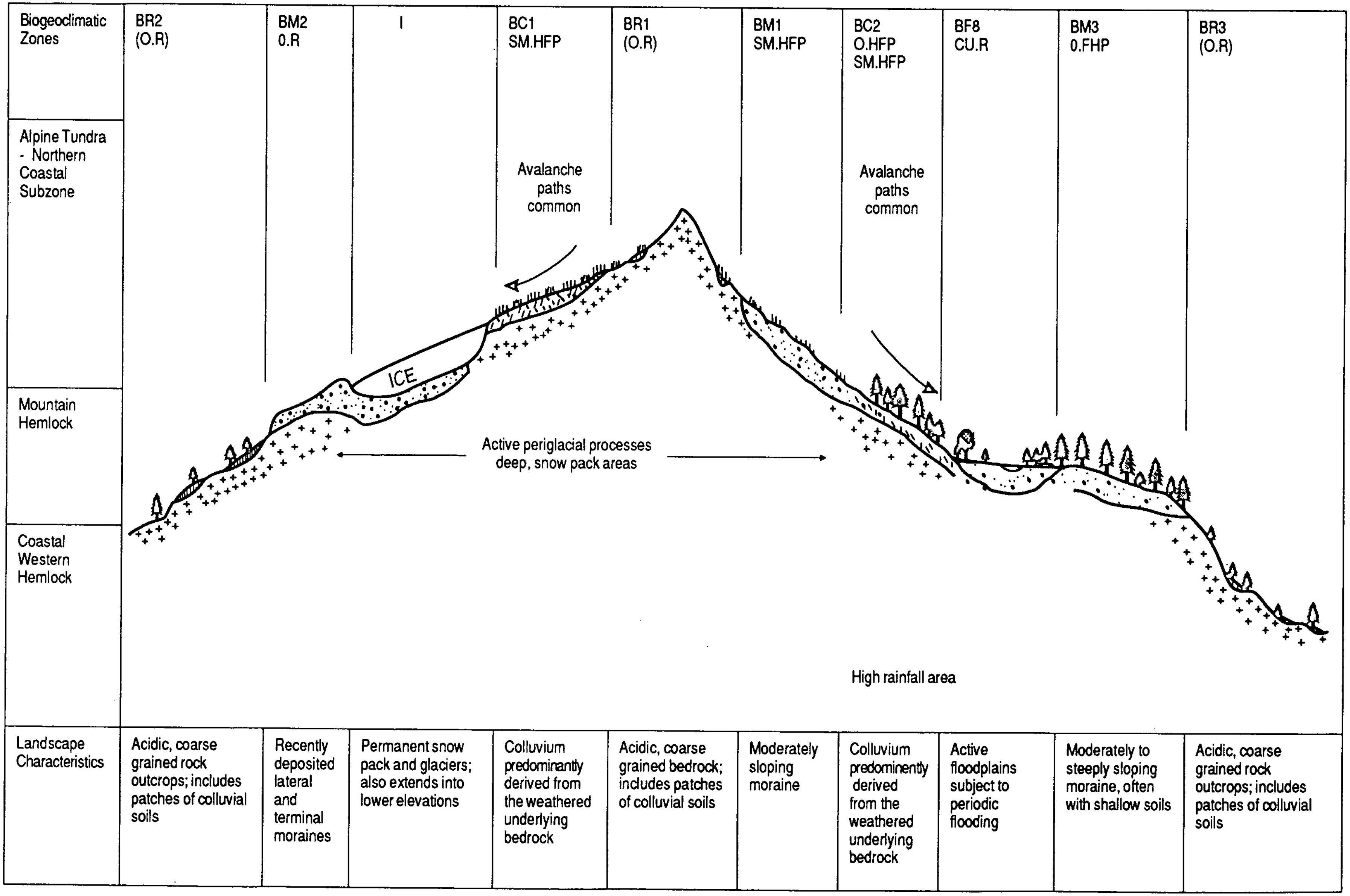


Figure 13. Schematic cross-section of the biophysical soil landscape units of the Boundary Ranges (2 of 7).

Biogeoclimatic Zones	BR7 (0.R)	BC7 SM.HFP	BM1 SM.HFP	BM3 0.FHP	BC8 0.FHP SM.HFP	BR8 (0.R)	BC9 0.HFP (SM.HFP)	BF4 0.HFP 0.R.	BF2 CU.R	BM4 0.HFP
Landscape Characteristics	Basic, fine grained bedrock includes patches of colluvial soils	Colluvium predominantly derived from the weathered underlying bedrock	Moderately sloping moraine	Moderately to steeply sloping moraine, often with shallow soils	Colluvium predominantly derived from the weathered underlying bedrock	Basic, fine grained rock outcrops; includes patches of colluvial soils	Colluvium predominently derived from the weathered underlying bedrock	Active fans	Active floodplains subject to periodic flooding	Moderately to steeply sloping moraine

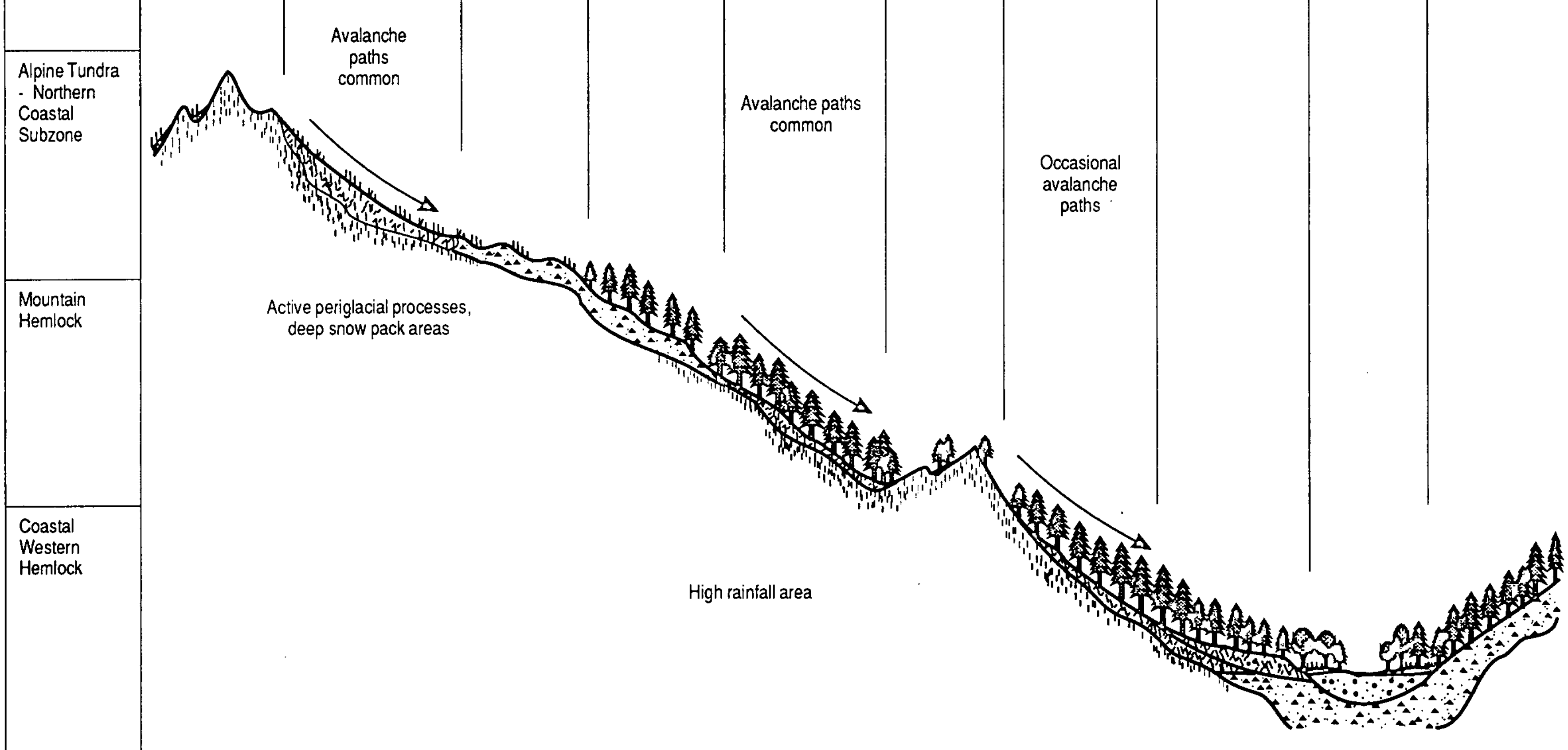


Figure 14. Schematic cross-section of the biophysical soil landscape units of the Boundary Ranges (3 of 7).

Biogeoclimatic Zones	BC6 0.HFP (SM.HFP)	BF6 0.HFP 0. R	BF5 CU.R	BG2 0.HFP	BM8 0.HFP	BC12 0.HFP (SM.HFP)	BR12 (0.R)	BM7 0.HFP	BF7 CU.R	B01 TY.M
Engelmann Spruce - Subalpine Fir										
Interior Cedar Hemlock										
Landscape Characteristics	Colluvium predominantly derived from the weathered underlying bedrock	Active fans, also terraces	Active floodplains subject to periodic flooding	Terraces and undulating kames; of limited extent	Moderately to steeply sloping moraine	Colluvium predominantly derived from the weathered underlying bedrock	Basic, fine grained rock outcrops and recent lava flows; includes patches of colluvial soils	Steeply to moderately sloping moraine	Active floodplains subject to periodic flooding	Very poorly drained organic soils

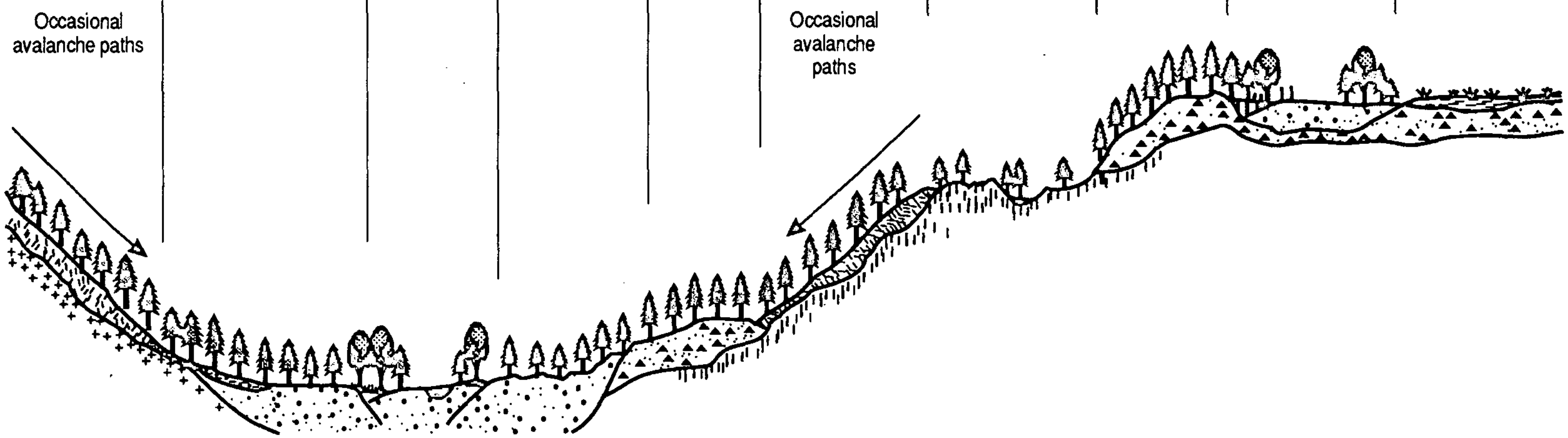


Figure 15. Schematic cross-section of the biophysical soil landscape units of the Boundary Ranges (4 of 7).

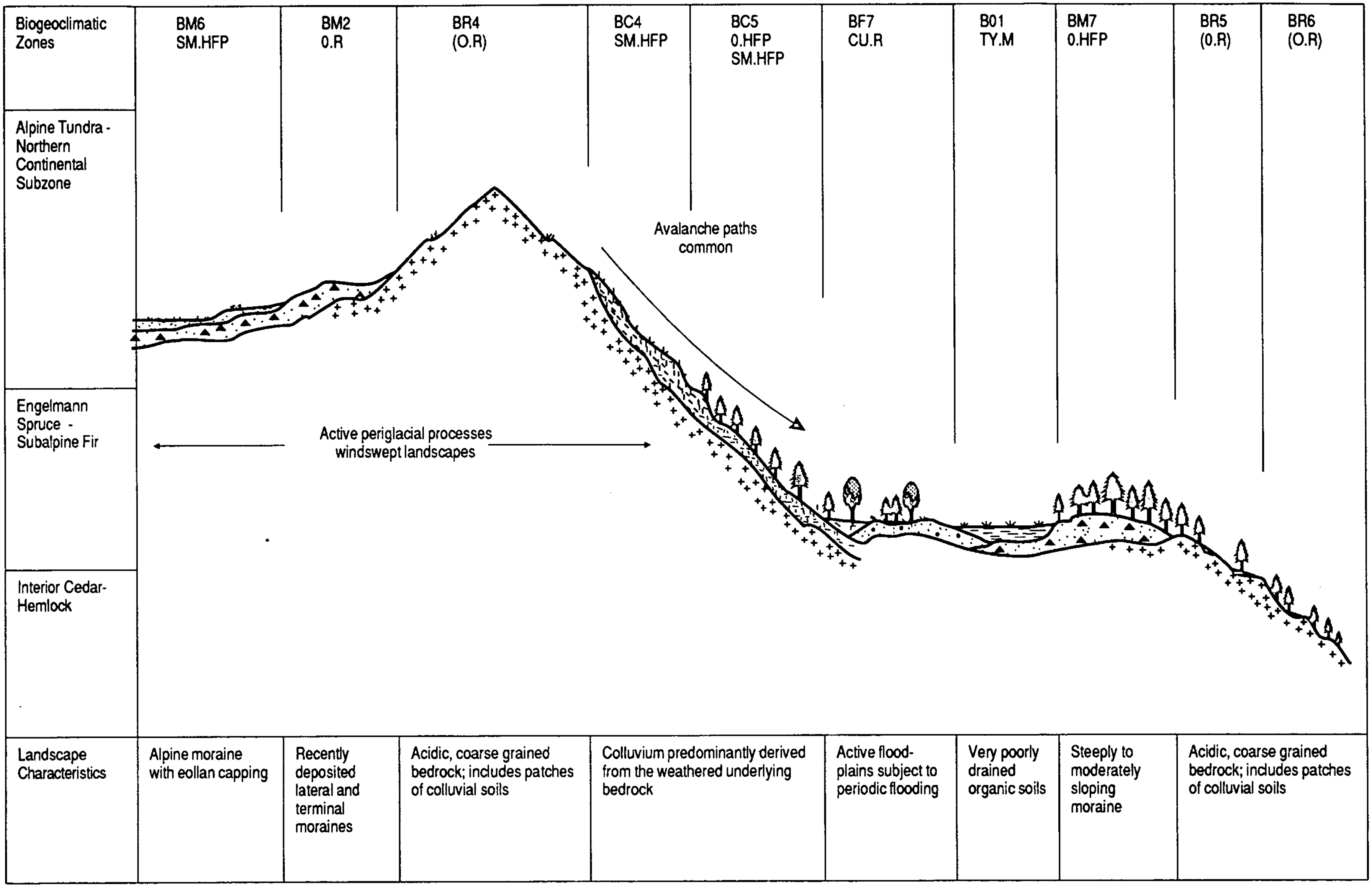


Figure 16. Schematic cross-section of the biophysical soil landscape units of the Boundary Ranges (5 of 7).

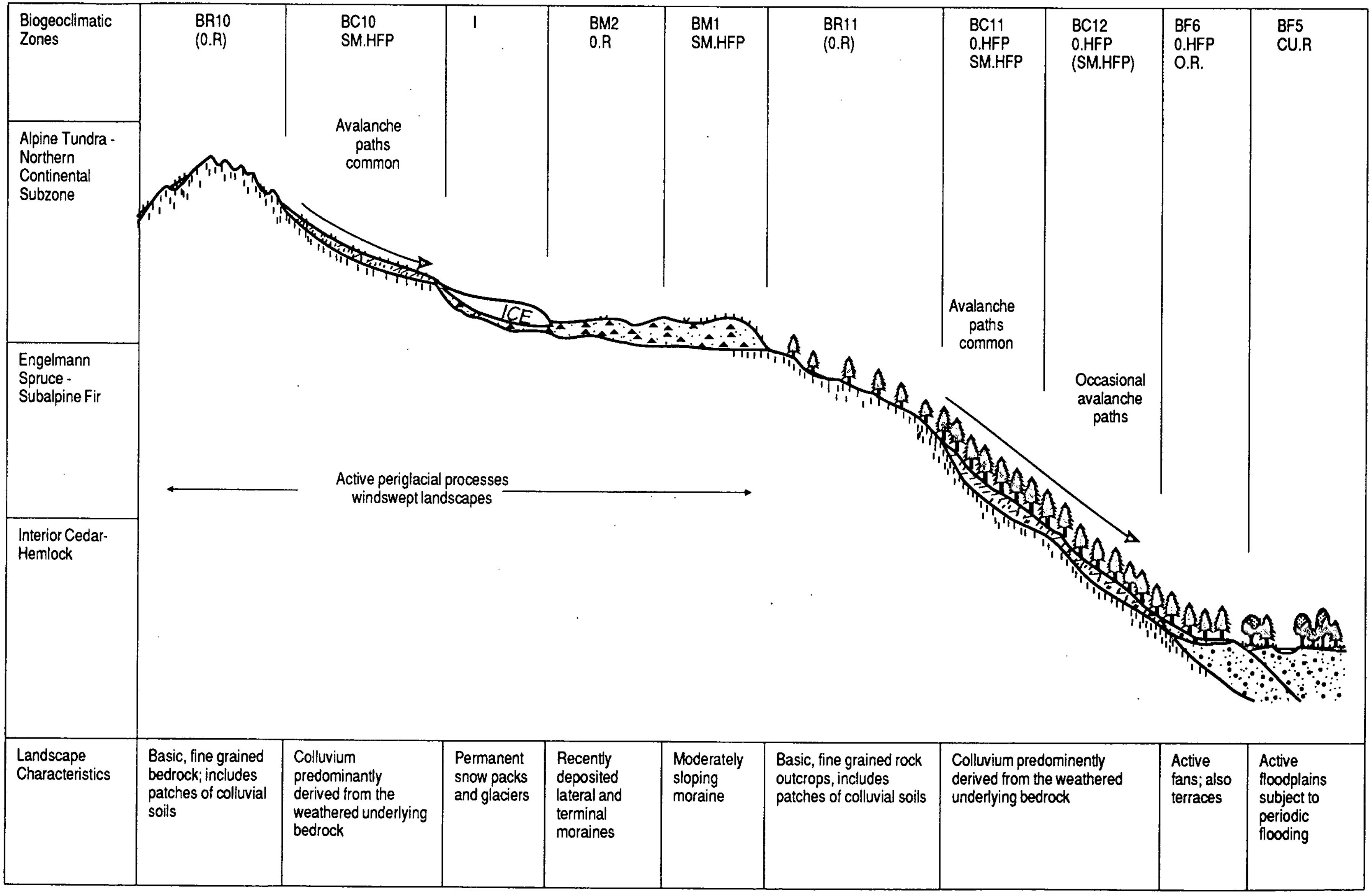


Figure 17. Schematic cross-section of the biophysical soil landscape units of the Boundary Ranges (6 of 7).

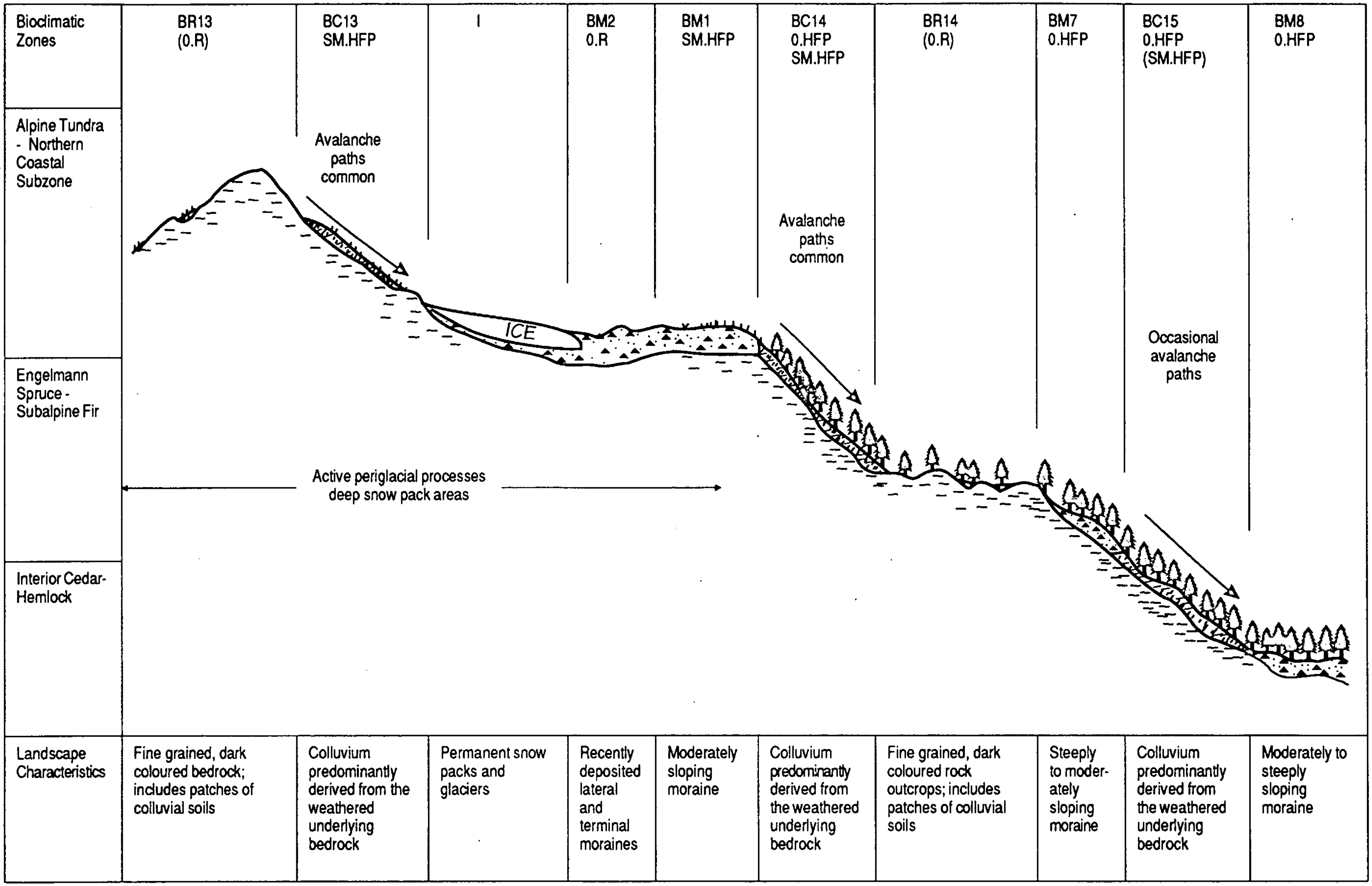


Figure 18. Schematic cross-section of the biophysical soil landscape units of the Boundary Ranges (7 of 7).

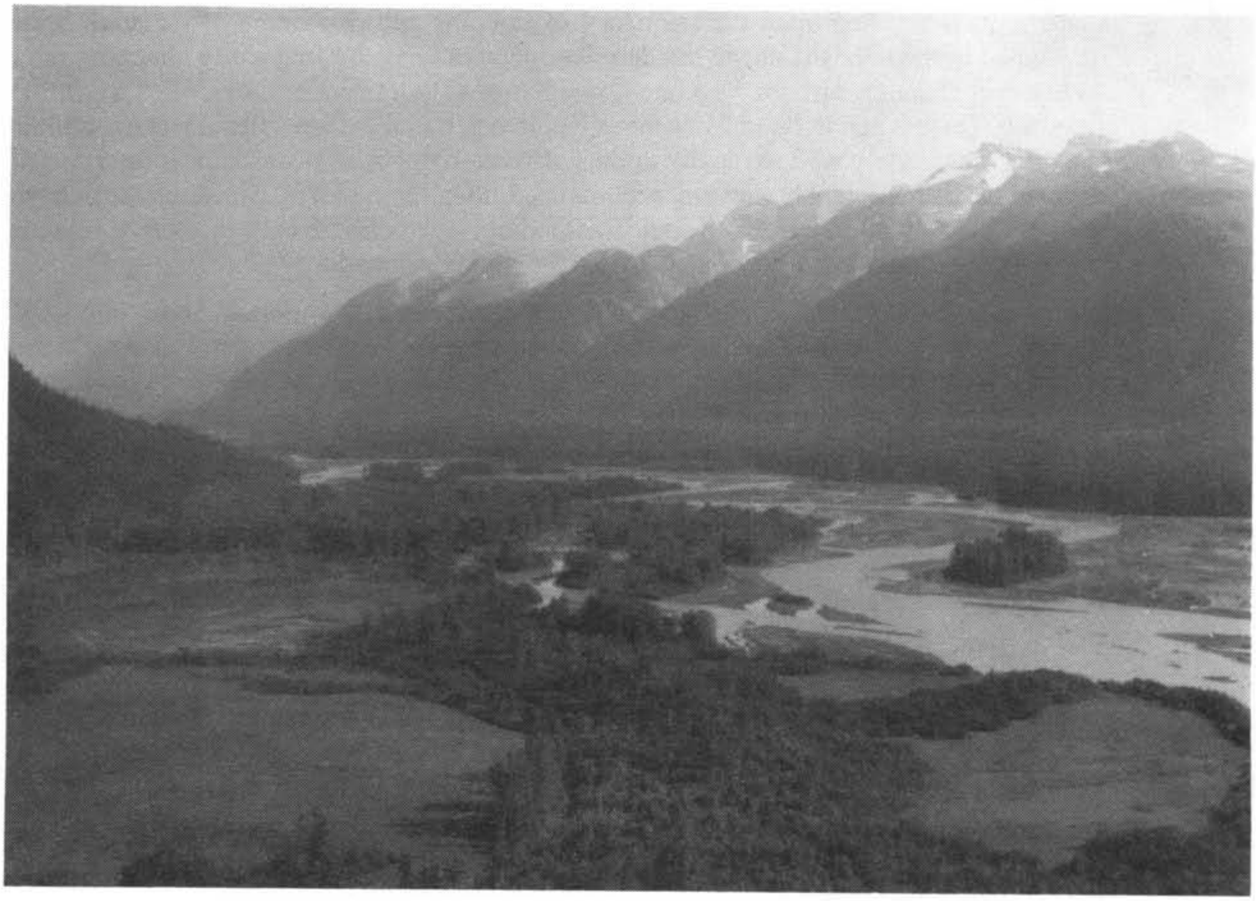


Plate 6. Lower Iskut Valley

The Iskut River is one of the many glacially fed rivers and streams that have wide, active, braided, gravelly floodplains symbolled as BF1. The adjacent treeless, sedge meadows, which are symbolled BF3, are composed of finer textured soils deposited from overbank flooding during freshet. The treed floodplain areas subject to frequent flooding usually support black cottonwood. These soils, which are gravelly with occasional sandy cappings, are symbolled as BF2.

3.2.2 Fluvial map units

The eight fluvial BSLU's had 26 site inspections with six having at least one recorded site description. These BSLU's are mainly restricted to the Coastal Western Hemlock and Interior Cedar - Hemlock biogeoclimatic zones but range into the Engelmann Spruce - Subalpine Fir and Mountain Hemlock zones.

The coarse-textured (sandy and gravelly) floodplains are separated into three soil landscape units depending upon the frequency of flooding and deposition of material. Soils developed in the deposits of the braided floodplains caused by frequently changing river and stream channels are non-vegetated, rapidly to well-drained, and classified as Orthic Regosols. On less active floodplains that support vegetation but are still subject to periodic flooding, moderately well to rapidly drained, Cumulic Regosols occur indicating repeated depositions of material burying any accumulated litter. On rapidly drained terraces above the floodplains that are rarely affected by flooding, weathering has been more continous resulting in Orthic Humo-Ferric Podzols under climax vegetation.

The finer textured floodplains are generally moderately well or well drained, support good stands of cottonwood and spruce and the soils are Cumulic Regosols. These soils are pervious, have generally gently sloping topography, and coarse fragment contents from 0 to over 50%. Some floodplain areas have high water tables and sedge meadows and alder-willow vegetation. Here the soils are poorly drained and are classified as Orthic Humic Gleysols.

The fluvial fan deposits located on moderate slopes are coarse textured, rapidly drained, and rapidly pervious with a high coarse fragment content. They are Orthic Regosols where periodic stream depositions occur and Orthic Humo-Ferric Podzols on stable areas.

The soil reaction of these soils is variable. The Regosolic soils, subject to periodic flooding, are generally neutral to moderately acid, whereas the older soils are strongly acid in the upper horizons. Fertility of these rapidly pervious soils is generally moderate to low.

3.2.3 Glaciofluvial map units

The two glaciofluvial BSLU's described have 12 recorded site inspections. These soils are generally on gentle slopes in the valleys at lower elevations in the Coastal Western Hemlock and Interior Cedar - Hemlock biogeoclimatic zones. The coarse fragment content of these soils is variable, ranging from 0 to over 50%, and textures are usually sandy. Most sites are rapidly to well drained and rapidly pervious. The surface mineral horizons are strongly acid, and of moderate to low fertility. The soils are generally Orthic Humo-Ferric Podzols.

3.2.4 Morainal map units

Of the eight described BSLU's, seven had at least one recorded site inspection. Fifty-three site descriptions were recorded. These BSLU's, which range in elevation from the valley bottoms to alpine areas and include recently depositied terminal and lateral moraines, are found in all the vegetation zones.

The two alpine BCLU's had nine site inspections. The soils are generally on moderate to steep topography, and are moderately to well drained. The coarse fragment content of these medium textured soils is generally high, except where there is an overlay of up to 60 cm of volcanic tephra. The tephra is coarse fragment free, loamy, and has a low bulk density. These alpine soils have dark, humic surface layers (Ah) with turfy root mats. Plant communities, dominated by heathers, are associated with high snowpack areas. Periglacial processes, active in the alpine areas, result in slightly to extremely mounded topography. Surface mineral horizons are strongly acid. The fertility of these moderately pervious soils is generally high with the nutrients coming mainly from the organically rich, turfy surface layer. The soils are Sombric Humo-Ferric Podzols with some Sombric Ferro-Humic Podzols.

The two BSLU's on recently deposited terminal and lateral moraines had four site inspections and are found at all elevations in all vegetation zones. These recent morainal deposits are on moderate to steep slopes with ridged and hummocky local topography. The coarse fragment content of these medium textured soils is generally high. They are well drained, moderately pervious, with a variable soil reaction (depending on the bedrock from which the parent material was derived) and low fertility. The soils are Orthic Regosol. The terminal moraine of the Great Glacier in the Coastal Western Hemlock zone is of sufficient age to support trees and has Orthic Humo-Ferric Podzols.

The two morainal BCLU's on mid-elevation, subalpine landscapes of the Mountain Hemlock and Engelmann Spruce - Subalpine Fir zones had a total of 20 recorded site inspections. These soils are generally on steep to moderate topography and are well to moderately well drained. The coarse fragment content of these medium textured soils is moderate to high. The partly decomposed surface organic layer which can be as thick as 20 cm, consists of mosses, needles, and branches and is classified as a hemimor (Klinka *et al.*, 1981). Although ortstein pans and duripans are found in some soils, they are sporadic and discontinuous. Generally, the strongest pan development is at high elevations and becomes weaker, deeper, and more discontinuous with decreasing elevations. A general discussion of duric horizons in south coastal British Columbia is given by McKeague and Sprout (1975). The surface mineral horizons are strongly acid. The fertility of these moderately pervious soils is generally high with the nutrients mainly coming from the decomposition of the litter layer. The soils of the Mountain Hemlock zone are Orthic Ferro-Humic Podzols and those of the Engelmann Spruce - Subalpine Fir zone are Orthic Humo-Ferric Podzols.

The two morainal BSLU's in the Coastal Western Hemlock zone had a total of 17 recorded site inspections. The soils are generally on moderate to steep slopes and are moderately well to well drained. Their coarse fragment content is generally moderate and their texture medium. Where these soils are well drained, the surface organic matter, which consists of partially decomposed mosses, needles, and branches, is generally less than 6 cm thick and is a hemimor. The surface organic layer in imperfectly to poorly drained locations, is thicker (up to 30 cm), strongly decomposed in the lower portion, and is classified as a hemihumimor. Some of these morainal soils show some evidence of eluviation of clay from the surface to sub-surface, but the quantity of clay translocated is not sufficient to qualify as a Bt horizon diagnostic of Luvic or Luvisolic soils. The reaction of the surface mineral horizons is strongly acid. The fertility of these moderately pervious soils is generally high with most of the nutrients derived from the decomposition of the litter layer. The soils are generally Orthic Humo-Ferric Podzols.

3.2.5 Organic map units

Only one organic BSLU was delineated in the Boundary Ranges. It is located in the Englemann Spruce - Subalpine Fir zone and had two recorded soil inspections. The landscape is typically level or depressional, very poorly drained with a vegetation cover of sedges and lesser amounts of willow and glandular birch. These Typic Mesisol soils are moderately pervious and strongly acid.

3.2.6 Bedrock map units

Much of the Coast Mountains consist of exposed bedrock. Land with less than 10 cm of mineral or organic material was considered to be non-soil, and also mapped as bedrock. Small patches or thin layers of soil that support partial or continuous vegetative cover may be included. Generally, these very thin soils are weathered directly from the bedrock.

Although the bedrock is quite extensive, little time was spent examining these areas. Six sites were inspected in two of the 14 BSLU's delineated.

The bedrock in the Boundary Ranges is classified into three groups. The first is acidic, coarse-grained plutonic bedrock (BR1 to BR6) that includes grandiorite, quartz monzonite, tonalite, adamellite, diorite, schist, and gneiss. The second is basic, fine-grained sedimentary and volcanic bedrock (BR7 to BR12) that includes phyllite, argillite, siltstone, graywacke, limestone, dolomite, andesite, basalt, breccia, tuff, cinders, ash, and areas of undifferentiated andesitic volcanic and clastic sedimentary rocks. Fine-grained, dark coloured sedimentary rocks (BR13 and BR14) including siltstone, graywacke, conglomerate, and shale form the third group.

3.2.7 Marine map units

The one marine BSLU described had one recorded site inspection and consists of a remnant terrace above the present floodplain of the Stikine. The soils are fine textured, stone-free, moderately well-drained, and slowly pervious. The surface mineral horizons are strongly acid and generally have a high fertility level. The soils are Orthic Humo-Ferric Podzols.

3.3 The Skeena Mountains

Within the Skeena Mountains physiographic region, 11 BSLU's were delineated. Figures 19 and 20 schematically illustrate the relationships between the BSLU's. There is only a small portion of the Skeena Mountains physiographic region within the study area, and only 13 site, soil and vegetation description forms were completed. Although occupying only a small area, the Skeena Mountains were distinguished from the other physiographic regions due to the dark colour of the soils and because they cover a large area to the south and east.

3.3.1 Colluvial map units

Three BSLU's represent the colluvial areas in three biogeoclimatic zones and one bedrock grouping. A total of six recorded site inspections were made.

Colluvial soils are quite extensive, and occur in all three biogeoclimatic zones. They are restricted to the steeper slopes and are quite variable, usually inheriting the characteristics of the materials from which they were derived. Although the coarse fragment content is variable, it is generally high to moderate. Textures are generally medium (loamy). Most sites are well to rapidly drained.

Soils are strongly acid in the surface mineral horizons in both alpine and forested sites. The fertility of these moderately pervious soils is generally high with the nutrients mainly being derived from the abundant litter layer. The dark brown to dark gray color of the sedimentary and volcanic rocks is reflected in the dark colour of the soils.

Usually, at higher elevations, soils are shallower with soil creep and churning common. There are also occasional snow avalanche paths.

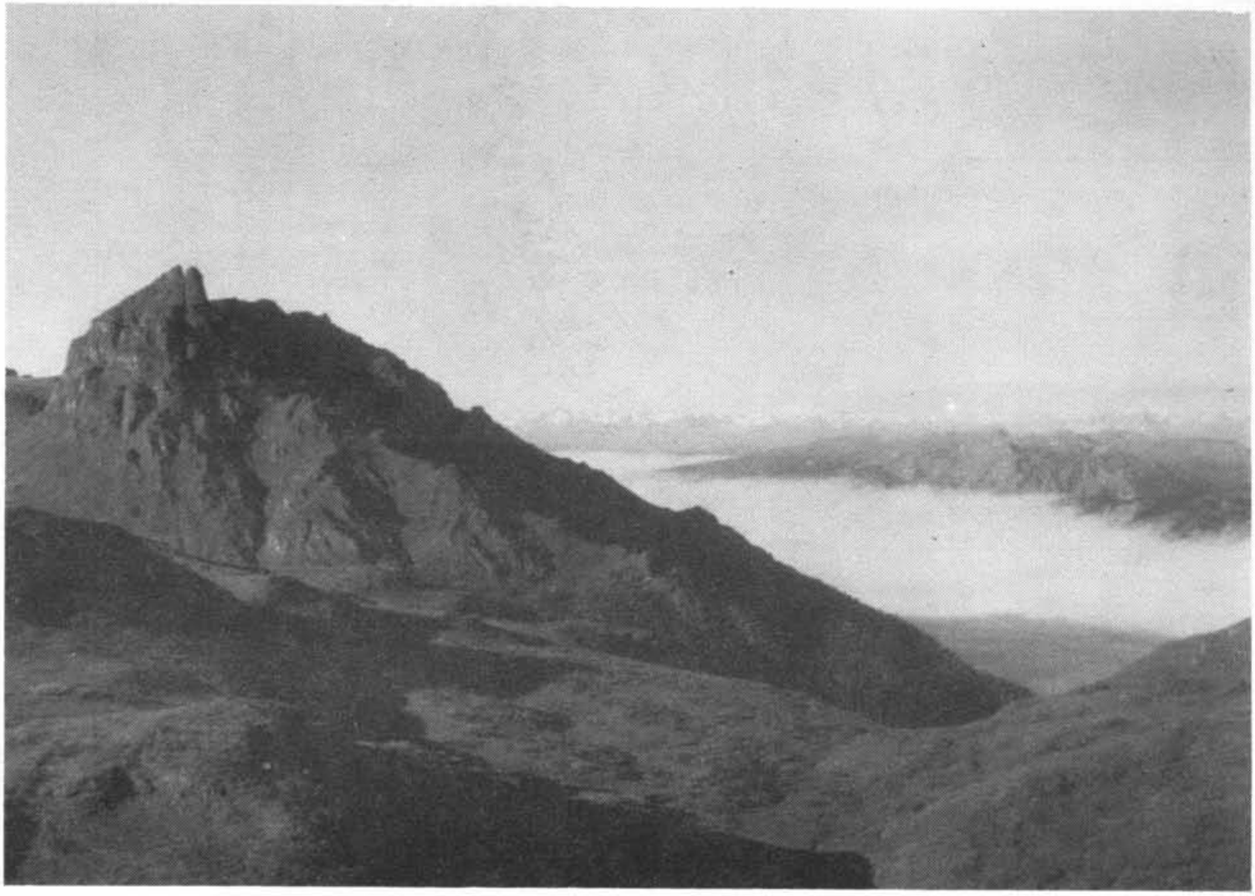


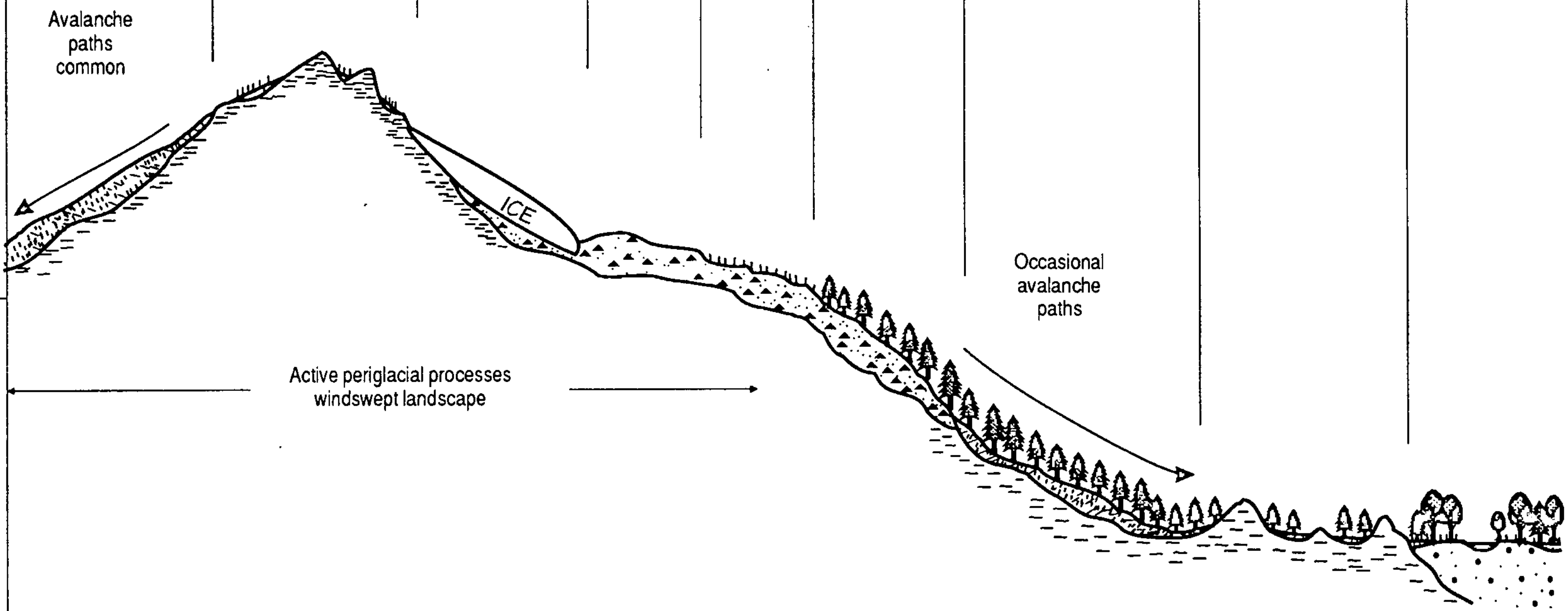
Plate 7. Todagin Mountain

Todagin Mountain forms the northernmost portion of the Skeena Mountains and is composed of dark, fine-grained sedimentary bedrock. The rugged peak on the left is symbolled SMR1. The area in the foreground has a mixture of morainal and colluvial materials mapped as 6SMM1d-4SMC1.

Biogeoclimatic Zones	SMC1 SM.HFP 0.SB	SMR1 (0.R)	I	SMM2 0.R	SMM1 SM.HFP 0.SB	SMM3 0.HFP	SMC2 0.HFP (SM.HFP)	SMR2 (0.R)	SMF1 CU.R

Alpine Tundra - Northern Continental Subzone

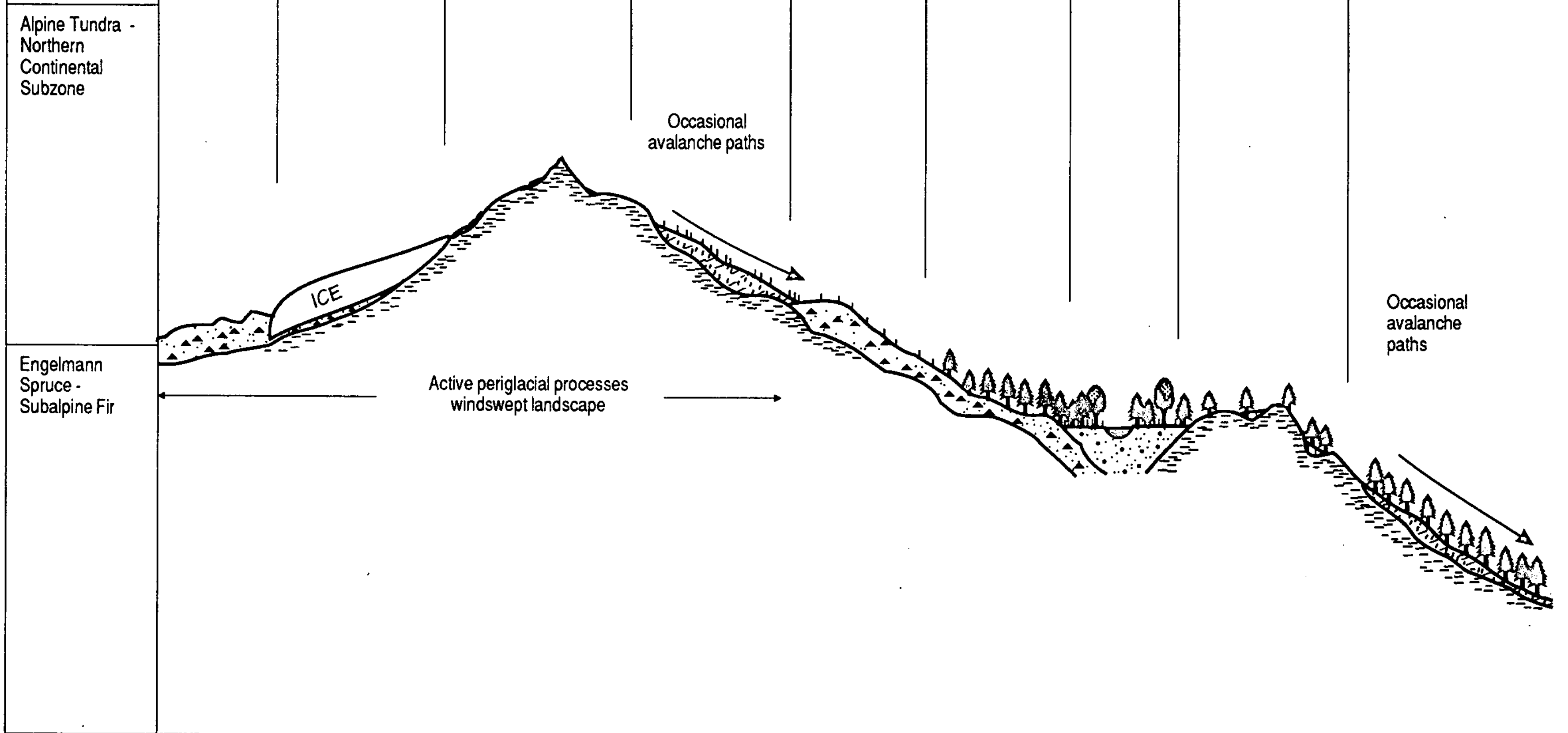
Spruce - Willow - Birch



Landscape Characteristics	Dark coloured colluvium predominantly derived from the weathered underlying rock	Fine grained, dark coloured bedrock; includes patches of shallow colluvial soils	Permanent snow packs and glaciers	Recently deposited lateral and terminal moraines	Moderately sloping moraine	Moderately to steeply sloping moraine	Dark coloured colluvium predominantly derived from the weathered underlying bedrock	Fine grained, dark coloured rock outcrops; includes patches of shallow colluvial soils	Active floodplains subject to periodic flooding

Figure 19. Schematic cross-section of the biophysical soil landscape units of the Skeena Mountains (1 of 2).

Biogeoclimatic Zones	SMM2 0.R	I	SMR1 (0.R)	SMC1 SM.HF 0S.B	SMM1 SM.HFP 0.SB	SMM4 0.HFP	SMF1 CU.R	SMR3 (0.R)	SMC3 O.H.FP (SM.HFP)



Landscape Characteristics	Recently deposited lateral and terminal moraines	Permanent snow packs and glaciers	Fine grained, dark coloured bedrock; includes patches of shallow colluvial soils	Colluvium predominantly derived from the weathered underlying bedrock	Moderately sloping moraine	Moderately to gently sloping moraine	Active floodplains subject to periodic flooding	Fine grained, dark coloured rock outcrops; includes patches of shallow colluvial soils	Colluvium predominatly derived from the weathered underlying bedrock

Figure 20. Schematic cross-section of the biophysical soil landscape units of the Skeena Mountains (2 of 2).

Alpine areas are subject to periglacial processes. The soils are Sombric Humo-Ferric Podzols in the alpine and avalanche paths, and Orthic Humo-Ferric Podzols in forested areas. Occasionally, Orthic Sombric Brunisols are found on the southerly aspects in the alpine.

3.3.2 Fluvial map units

The one BSLU delineated in the Engelmann Spruce - Subalpine Fir zone was not inspected on the ground. It is inferred to have coarse textured (generally sandy) floodplain soils on gentle slopes, subject to periodic flooding, and the deposition of new material. The coarse fragment content is variable, ranging from 0% to over 50%. Most of these soils are rapidly to well drained and rapidly pervious. The surface mineral horizons are strongly acid and are quite fertile. They are generally Cumulic Regosol.

3.3.3 Morainal map units

Of the four described BSLU's, two had at least one recorded site inspection. A total of seven site inspections were recorded. The soils, which range in elevation from lower mountain sides to alpine areas and include recently deposited terminal and lateral moraines, are found in three biogeoclimatic zones.

The one alpine morainal BSLU had a total of six recorded site inspections. The soils are generally on moderate to steep topography. The coarse fragment content of these medium textured, moderately well drained soils is generally moderate. Periglacial processes have produced stone stripes, solifluction lobes, and nivation hollows. Soil horizons are discontinuous due to frost churning. Surface mineral horizons are strongly acid. The fertility of these moderately pervious soils is generally high with the nutrients mainly being derived from the organically rich, turfy surface layer. The soils are Sombric Humo-Ferric Podzols.

The one BSLU on recently deposited terminal and lateral moraines had no site inspections. These morainal deposits have moderate to steep topography and are ridged and hummocky. The coarse fragment content of these medium textured soils is generally high. They are well drained, moderately pervious, have variable soil reaction, and at present are low in fertility. They are Orthic Regosols.

The two morainal BSLU's on mid-elevation subalpine landscapes of the Spruce - Willow - Birch and Engelmann Spruce - Subalpine Fir biogeoclimatic zones had one recorded site inspection. The soils occur on a variety of slopes, are well to moderately well drained, and moderately pervious. The coarse fragment content of these medium textured soils is moderate to high. Soil reaction in the surface mineral horizon is strongly acid and the fertility generally high. The soils are Orthic Humo-Ferric Podzols.

3.3.4 Bedrock map units

Exposed bedrock occurs throughout the Skeena Mountains. Included is bedrock covered with less than 10 cm of unconsolidated material that may support partial or continuous vegetative cover. Generally, these very thin soils were weathered directly from the bedrock.

There is only one bedrock grouping with three BSLU's based on differences in vegetation zones or elevation. No site inspections were made. The fine grained, dark coloured sedimentary bedrock consists of siltstone, graywacke, conglomerate, and shale with inclusions of volcanic basalt, pillow lava, rhyolite, and olivine basalt.

3.4 The Stikine Plateau (Klastline and Spatsizi plateaus)

Only the Klastline and Spatsizi Plateau portion of the Stikine Plateau is described here. The Tahltan Highland portion is described separately. There are 29 BSLU's; Figures 21-23 schematically illustrate the relationships between them. BSLU's mapped on the Stikine Plateau in both this area and in the Dease Lake area to the north were sequentially numbered. Since some BSLU's mapped in the Dease Lake area do not extend into this area, there are gaps in the sequence of numbers. One hundred and four site, soil and vegetation description forms were completed or were available to describe representative BSLU's.

3.4.1 Colluvial map units

The colluvial areas were separated into four different BSLU's, according to two bedrock groupings and three biogeoclimatic zones. Ten sites were inspected in the four BSLU's. These colluvial areas are quite extensive and are represented in all three biogeoclimatic zones. The soils have generally inherited the characteristics of the materials from which they are derived, and are restricted to steeper slopes. Although the coarse fragment content is variable, it is generally moderate to high. Textures are medium (loamy). Most sites are well to rapidly drained.

Soils are strongly acid in their upper mineral horizons in both the Alpine and Spruce - Willow - Birch zones, but are medium acid in the Boreal White and Black Spruce zone. The fertility of these moderately pervious soils is generally moderate to high with the nutrients mainly derived from the abundant litter layer. Usually, at higher elevations, soils are shallower with more soil creep and churning. There are occasional, snow avalanche paths. The alpine sites have weathered physically, by frost action, from the underlying bedrock and exhibit some of the characteristics of the bedrock. The broad alpine ridges of the Spatsizi Plateau have weathered from flat lying conglomerate bedrock and the resulting soils have high coarse fragment contents of rounded gravels and cobbles and loamy to sandy textures. Soils are Sombric Humo-Ferric Podzols and Orthic Sombric Brunisols in alpine areas (Knapik, 1976), Orthic Humo-Ferric Podzols in the Spruce - Willow - Birch area and Orthic Eutric Brunisols in the Boreal White and Black Spruce areas.

3.4.2 Fluvial map units

The five fluvial BSLU's had 17 site inspections with three of them having at least one recorded site description. They are found in the Spruce - Willow - Birch and Boreal White and Black Spruce biogeoclimatic zones. Three BSLU's are defined for floodplain areas and two for fluvial fans.

The floodplains are separated into three classes depending on the frequency of flooding and deposition of material. Medium textured, low-lying floodplains along the Stikine River subject to frequent flooding vary from imperfectly to well drained. Coarse textured (gravelly and sandy) floodplains associated with faster moving streams and subject to periodic flooding, are generally well to rapidly drained and commonly capped with a thin sandy layer. Higher lying, coarse textured fluvial terraces which are flooded less frequently than the lower floodplains, are well to rapidly drained and are also often capped with a sandy layer. These rapidly pervious soils generally support good stands of cottonwood and spruce, have a medium acid to neutral soil reaction, and are moderate to low in fertility. The floodplain soils are Gleyed Cumulic Regosols on poorer drained areas and Cumulic or Orthic Regosols on better drained sites. The terraces generally are Orthic Eutric Brunisols in the Boreal White and Black Spruce zone and Orthic Humo-Ferric

Biogeoclimatic Zones	STF6 CU.R 0.HFP	STF3 CU.R 0.EB	STF5 CU.R	ST02 T.M	STF2 CU.R	STG4 0.EB 0.DYB	STG1 0.EB 0.DYB	STU1 0.EB 0.R 0.GL (0.MB)	STM4 0.GL 0.EB	STM9 0.GL BR.GL
Alpine Tundra - Northern Continental Subzone										
Spruce - Willow - Birch										
Boreal White and Black Spruce										
Landscape Characteristics	Active fans	Active gravelly fans, also terraces	Active sandy floodplains subject to frequent flooding	Very poorly drained organic soils	Active gravelly floodplains subject to periodic flooding	Sandy kame deposits; includes silty glaciolacustrine sediments	Hummocky kame deposits	Steeply sloping escarpments with active failing and soil creep	Moderately sloping, fine textured moraine	Fine textured moraine with a low coarse fragment content

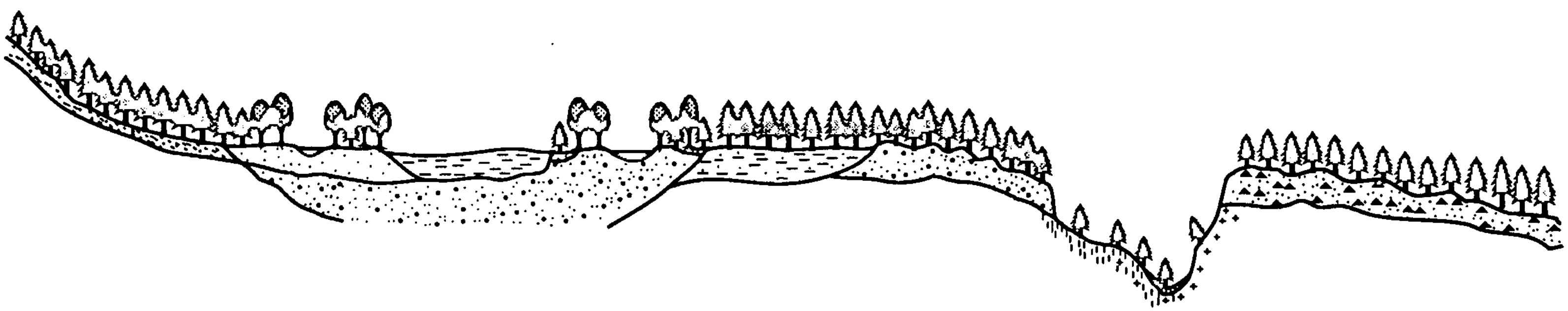


Figure 21. Schematic cross-section of the biophysical soil landscape units of the Stikine Plateau (1 of 3).

Biogeoclimatic Zones	STR2 (0.R)	STG2 SM.HFP	STG3 0.HFP	ST01 T.M	STF1 CU.R	STM1 0.HFP	STM10 SM.HFP (0.HFP)	STM11 SM.HFP	STC5 SM.HFP	STR5 (0.R)
Alpine Tundra - Northern Continental Subzone										
Spruce - Willow - Birch										
Landscape Characteristics	Basic, fine grained rock outcrops; includes patches of shallow colluvial soils	Non-treed depressional kame deposits subject to cold air pooling	Hummocky kame deposits	Very poorly drained organic soils with drunken forests and occasional peat palsas	Active floodplains subject to periodic flooding	Moderately to steeply sloping moraine, includes some shallow soils	Shrub dominated subalpine moraine	Gently to moderately sloping moraine	Colluvium predominantly derived from the weathered underlying bedrock	Acidic, coarse grained bedrock; includes patches of shallow colluvial soils

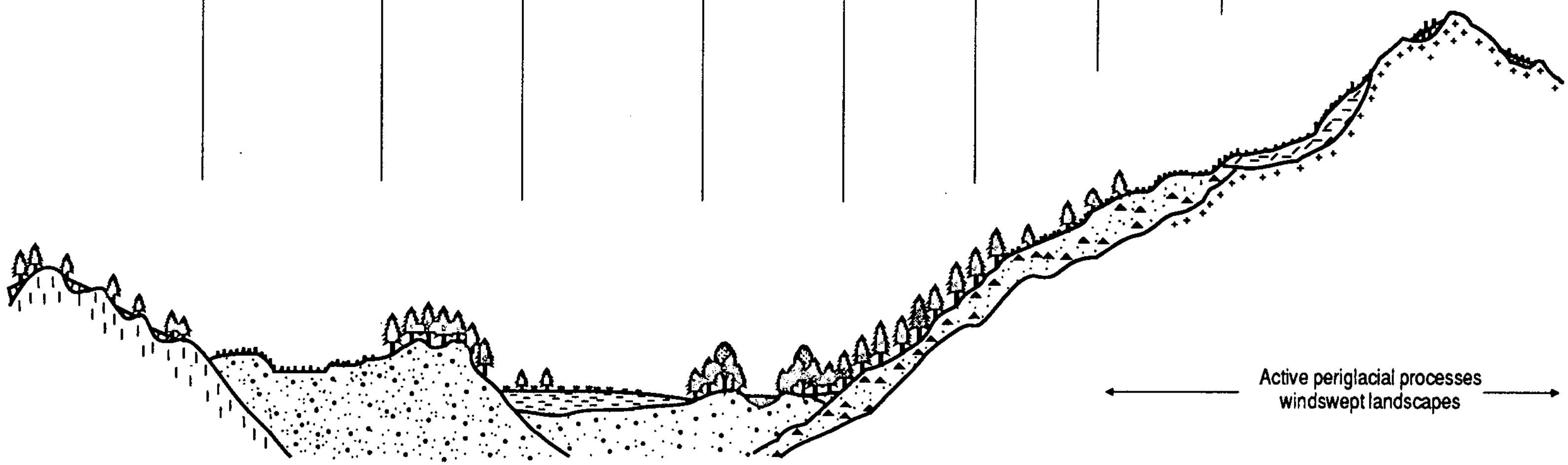


Figure 22. Schematic cross-section of the biophysical soil landscape units of the Stikine Plateau (2 of 3).

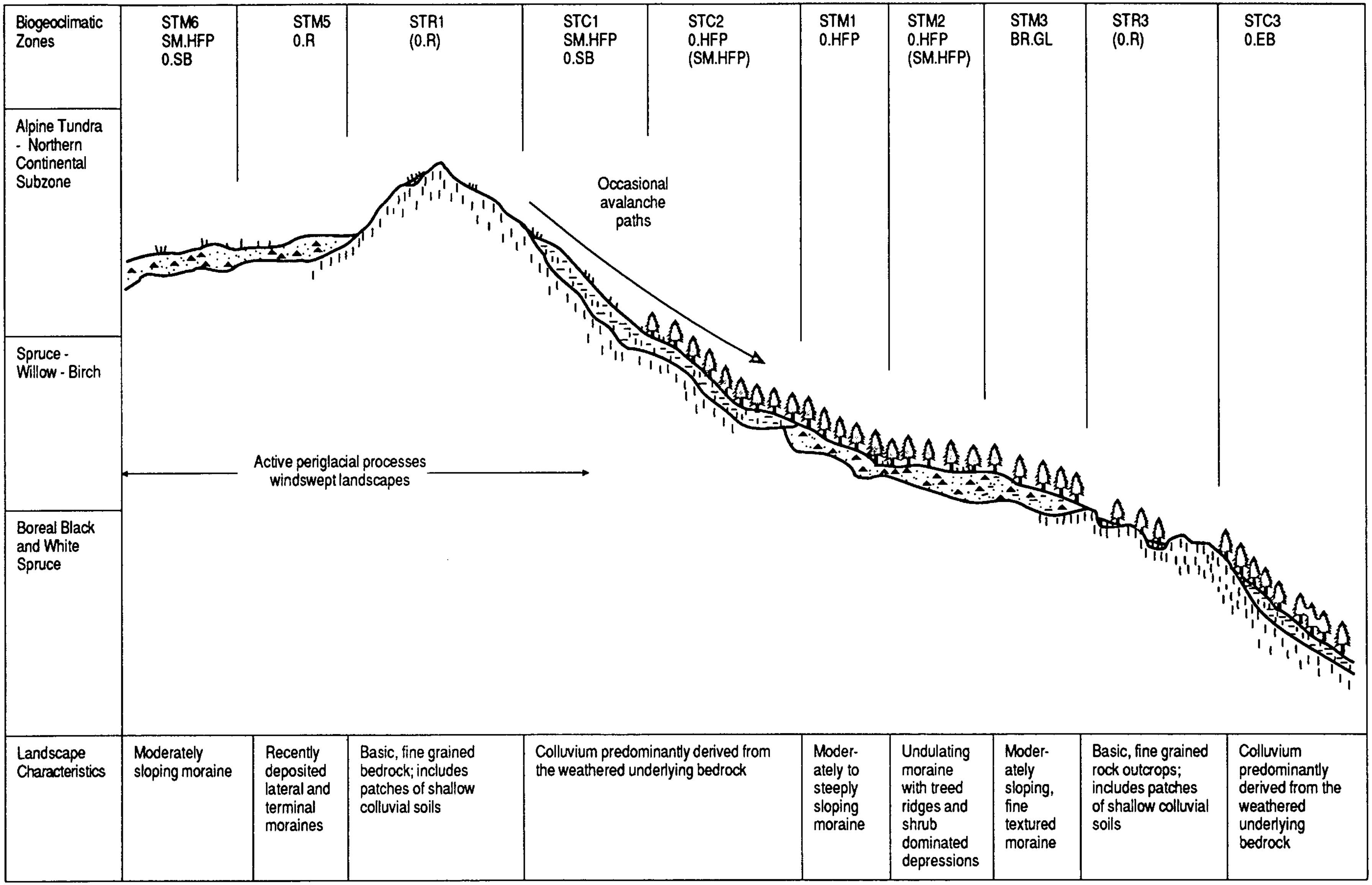


Figure 23. Schematic cross-section of the biophysical soil landscape units of the Stikine Plateau (3 of 3).

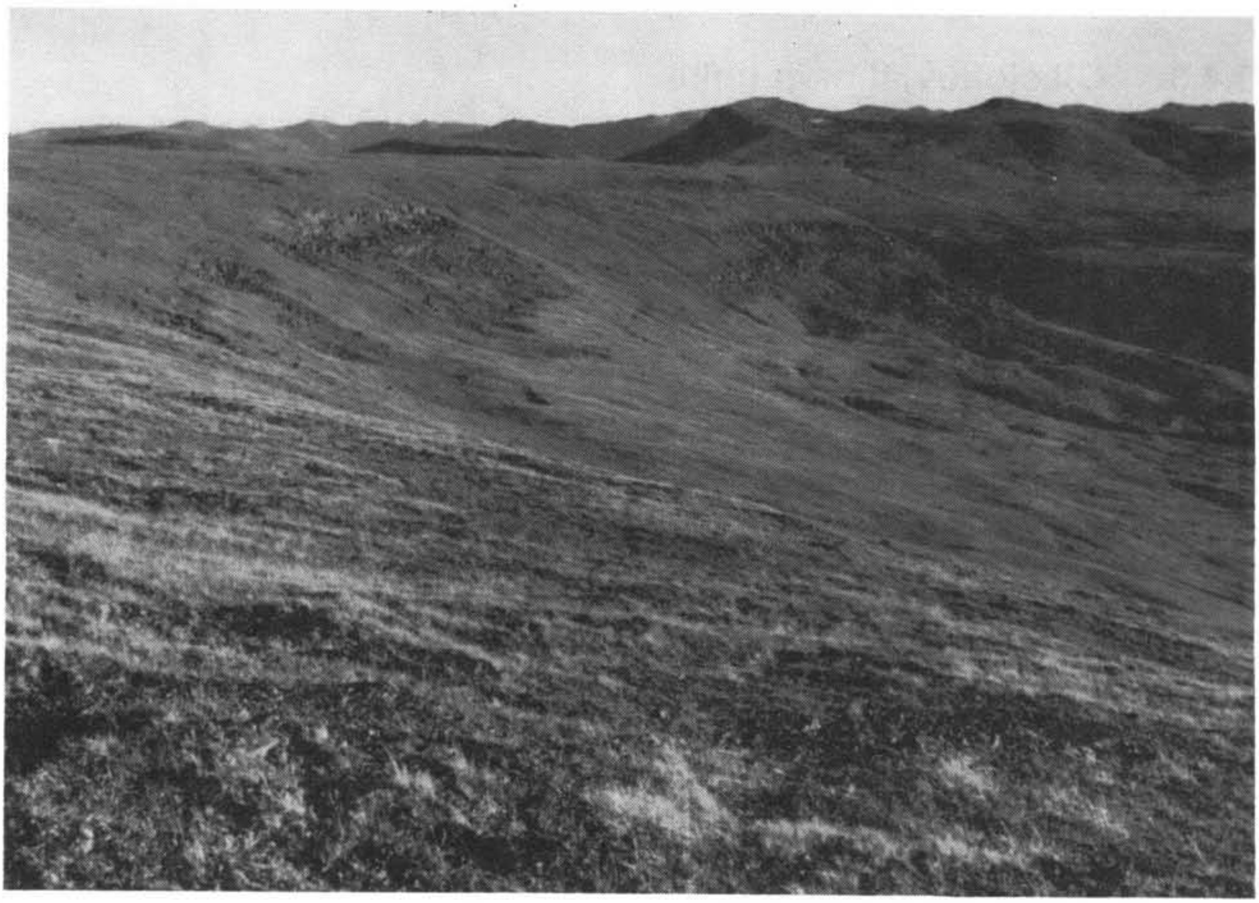


Plate 8. The Spatsizi Plateau

The Spatsizi Plateau is a small plateau within the much larger Stikine Plateau physiographic region. This alpine view typifies the gentle nature of the topography which is due to the flat-lying conglomerate bedrock. The surficial material is generally composed of morainal materials and is symbolled "STM11".

Podzols in the Spruce - Willow - Birch zone. These rapidly pervious fluvial soils, on gentle topography, have a coarse fragment content which varies from 0% to over 50%.

The coarse textured fluvial fans on moderate slopes are rapidly drained, rapidly pervious, have a medium acid soil reaction, moderate to low fertility, and high coarse fragment content. They are Cumulic Regosols where periodic stream deposition occurs. Orthic Eutric Brunisols and Orthic Humo-Ferric Podzols occur on stable fans in the Boreal White and Black Spruce zone and Spruce - Willow - Birch zone, respectively.

3.4.3 Glaciofluvial map units

The four glaciofluvial BSLU's had 18 site inspections and occur in both the Spruce - Willow - Birch and Boreal White and Black Spruce zones. Sporadic occurences of silty glaciolacustrine areas are included as they are not sufficiently extensive to warrant mapping separately. Their characteristics and distribution have been described in the maps and report for the Stikine River valley (Walmsley and Maynard, 1983). Permafrost is found in some of the fine textured glaciolacustrine materials of the Klappan River valley and can be expected further south too (Alley and Young, 1978).

The generally coarse-textured (sandy) soils have a variable coarse fragment content that ranges from 0% to over 50%. Most sites are rapidly to well drained, rapidly pervious, and are found on moderate to gentle slopes. The surface mineral horizons are medium acid in Orthic Dystric Brunisols and Orthic Humo-Ferric Podzols. Sites with no trees, possibly due to cold air pooling, have Sombric Humo-Ferric Podzols. Their fertility is generally moderate to low.

3.4.4 Morainal map units

Of the nine described BSLU's, six had at least one recorded site inspection. Forty-nine site descriptions were recorded in total. They range in elevation from the Boreal White and Black Spruce zone in the valley bottoms through the Spruce - Willow - Birch zone to the Alpine Tundra zone at high elevations.

The two alpine morainal BSLU's had a total of 10 recorded site inspections. They are generally on moderate to gently sloping topography. The coarse fragment content of the medium to fine textured, moderately well drained soils is generally moderate to high. Periglacial processes, active in these alpine areas, produce stone stripes, solifluction lobes, and nivation hollows. The surface mineral horizons are strongly to medium acid. The fertility of these moderately pervious soils is generally high with the nutrients mainly being derived from the organically rich, turfy surface layer. Soil types vary, being either Sombric Humo-Ferric Podzols or Orthic Sombric Brunisols. Some wet areas are Orthic Humic Regosol. The distinction between alpine morainal and colluvial soils was made on the depth of material. Frost action has churned the shallower colluvial soils to their full depth disrupting the characteristics which indicated the origin of their parent materials.

The one BSLU on recently deposited terminal and lateral moraines had no site inspections. These morainal deposits have moderate to steep topography and are ridged and hummocky. The coarse fragment content of the medium textured soils is generally high. They are well drained, moderately pervious, with a variable soil reaction and a low fertility. They are Orthic Regosols.

The four morainal BSLU's on mid-elevation landscapes of the Spruce - Willow - Birch zone had 20 recorded site inspections. The fine textured soils, which occur mainly at lower elevations, exhibit clay eluviation, are moderately pervious, occur on moderate to gentle slopes, and have a moderate coarse fragment content. Soils that are well to moderately well drained are Brunisolic Gray Luvisols or Orthic Gray Luvisols and those that are poorly drained are either Orthic Humic Gleysols or Humic Luvic Gleysols. Medium to coarse textured morainal soils in the Spruce - Willow - Birch zone have a discontinuous, 10 to 30 cm thick, stone-free, aeolian surface layer. These moderately pervious soils occur on moderate to steep slopes and have a moderate to high coarse fragment content below the surface layer. They are generally moderately well drained and, on forested sites, are Orthic Humo-Ferric Podzols. On shrub-dominated areas, Sombric Humo-Ferric Podzols occur. The morainal soils in this vegetation zone have a strongly acid reaction in the surface mineral horizons and a high fertility.

The two morainal BCLU's in valley bottom landscapes of the Boreal White and Black Spruce zone had 15 recorded site inspections. A majority of the soils are on well to moderately well drained, fine textured sites and show evidence of clay translocation from surface to lower horizons. They are moderately to slowly pervious, occur on moderate to gentle slopes, and have a moderate to small amount of coarse fragments. They have a medium acid reaction, moderate fertility and are generally Brunisolic or Orthic Gray Luvisols. Occasionally Orthic Eutric Brunisols are found.

Generally, the forest floor organic layer increases in depth from low to higher elevations. The litter layer changes from hemimors as the volume and depth of the humic layer increases and as the soil drainage class changes from well to imperfectly drained. Low elevation, southern aspects have developed xeromors (Klinka *et al.*, 1981). Vegetated alpine and shrub-dominated areas have mainly orthirhizomull humus forms.

3.4.5 Organic map units

There are two organic BSLU's mapped on the Stikine Plateau, one in the Spruce - Willow - Birch zone and one in the Boreal White and Black Spruce zone. Six recorded site inspections were made. Generally, the organic soils are located on level or depressional areas, but some organic veneers occur on moderate slopes in seepage areas. These soils are very poorly drained, moderately pervious, strongly acid, and have a high fertility level. Peat palsas with permafrost sometimes occur in these organic areas and here the soils are classified as Fibric Organic Cryosols. Most are Terric Mesisols, and as they grade to mineral soils, the transitional margins are Orthic Humic Gleysols.

3.4.6 Bedrock map units

Exposed bedrock occurs throughout the plateau but with greater frequency at higher elevations. Bedrock covered with less than 10 cm of unconsolidated material is included. Generally, these very thin soils are weathered from the underlying bedrock. There are four bedrock BSLU's in two bedrock groupings. No site inspections were recorded. The basic, fine grained sedimentary and volcanic bedrock grouping includes phyllite, argillite, siltstone, graywacke, limestone, shale, andesite, basalt, cinders, ash, and areas of undifferentiated sedimentary and volcanic rocks. The acidic, coarse grained, intrusive and sedimentary bedrock grouping includes granite porphyry, granophyre, syenite, felsite, sandstone, siltstone, and conglomerate.

3.4.7 Steep escarpments of undifferentiated material map units

In the Boreal White and Black Spruce zone, one BSLU was delineated with four recorded site inspections on steep escarpments along the major rivers. Some areas are composed of morainal and lacustrine materials and others of rock outcrops and colluvial veneers. Some escarpments are actively eroding with new material constantly being exposed. The soils developed in these fresh materials are Orthic Regosols and weather to mostly Orthic Eutric Brunisols after failure or soil erosion has ceased.

Different types of organic forest floor materials are associated with different aspects on these steep slopes. South-facing escarpments receiving high insolation develop xeromors, whereas north aspects, which have deeper forest floors composed of mosses, are hemihumimors. Grass or shrub-dominated, south-facing aspects with Melanic Brunisol soils have xerorhizomull humus forms.

3.5 The Stikine Plateau (Tahltan Highland)

There are 34 BSLU's in the Tahltan Highland and Figures 24 through 27 schematically illustrate the relationship between them. Ninety-two site, soil, and vegetation description forms were completed to describe representative BSLU's.

3.5.1 Colluvial map units

There are nine different colluvial BSLU's having nine site inspections in total. They are separated according to two bedrock groupings and five biogeoclimatic vegetation zones. Five BSLU's had at least one recorded site description.

Colluvial areas are quite extensive in this mountainous and plateau area and are found in all five biogeoclimatic zones. The soils have inherited the characteristics of the materials from which they are derived and are restricted to the steeper slopes. Their coarse fragment content is variable, ranging from moderate to high. Textures are generally medium (loamy) and most sites are well to rapidly drained.

Soils are strongly acid in the surface mineral horizons in both alpine and forested sites. The fertility of these moderately pervious soils is generally high with the nutrients mainly derived from the abundant litter layer.

Shallow soils, soil creep, and churning become more common at higher elevations. Snow avalanche paths occasionally occur on the steep slopes. Alpine areas are affected by periglacial processes. Alpine soils are Sombric Humo-Ferric Podzols and Orthic Sombric Brunisols, with the Podzol soils occurring toward the southwest and the Brunisolic soils toward the northeast. Most of the forests have Orthic Humo-Ferric Podzols except for Orthic Eutric Brunisols in the Boreal White and Black Spruce zone.

3.5.2 Fluvial map units

All five of the fluvial BSLU's had site inspections, with a total of 20 sites being recorded. They occur in the mid- to low elevation vegetation zones, on the gentle to moderate topography of floodplains subject to frequent flooding. One BSLU represents braided floodplain deposits in the Englemann Spruce - Subalpine Fir zone. The deposits are the result of frequent floodings that cause changing river and stream channels. The soils are non-vegetated, rapidly to well drained and Orthic Regosols. On the higher floodplain

Biogeoclimatic Zones	TAR6 (0.R)	TAC6 SM.HFP 0.SB	I	TAM6 0.R	TAM3 SM.HFP 0.SB	TAC7 0.HFP (SM.HFP)	TAM2 0.HFP	TAM1 0.EB 0.GL (0.HG)	TAU1 0.R 0.EB (0.MB)	TAG1 0.EB (0.MB)
Landscape Characteristics	Acidic, coarse grained bedrock; includes patches of shallow colluvial soil	Colluvium predominantly derived from the weathered underlying bedrock	Permanent snow pack and glaciers	Recently deposited lateral and terminal moraines	Moderately sloping moraine	Colluvium predominantly derived from the weathered underlying bedrock	Moderately to steeply sloping moraine	Moderately to gently sloping moraine; includes poorly drained areas	Steeply sloping escarpments with active failures and soil creep	Undulating and terraced kames

Alpine Tundra - Northern Continental Subzone

Spruce - Willow - Birch

Boreal Black and White Spruce

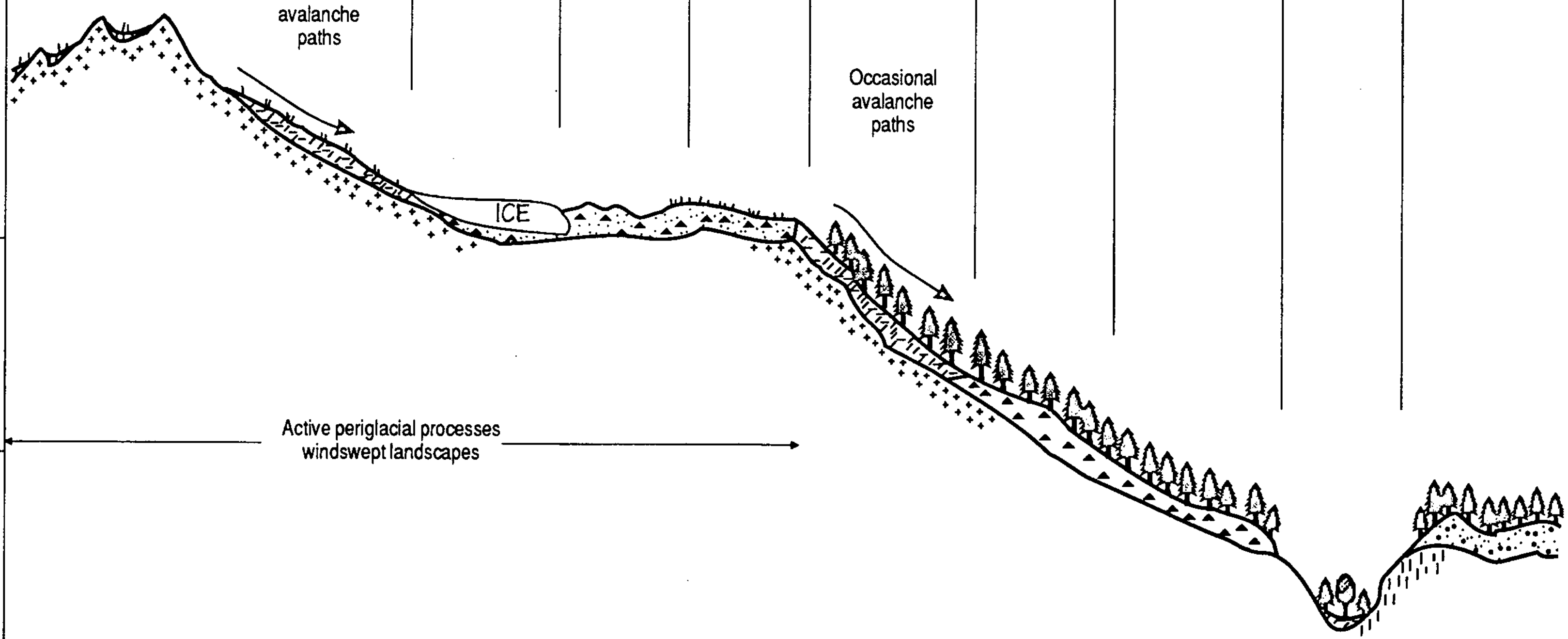


Figure 24. Schematic cross-section of the biophysical soil landscape units of the Tahltan Highland (1 of 4).

Biogeoclimatic Zones	TAR2 (0.R)	TAC2 0.HFP (SM.HFP)	TAV1 0.HFP	TAM2 0.HFP	TAF2 CU.R	TAG2 0.HFP	TAC3 0.EB	TAF1 CU.R	TA01 TY.M	TAR3 (0.R)
Alpine Tundra - Northern Continental Subzone		Occasional avalanche paths								
Spruce - Willow - Birch										
Boreal Black and White Spruce										
Landscape Characteristics	Basic, fine grained rock outcrops and recent lava flows; includes patches of shallow colluvial soils	Colluvium predominantly derived from the weathered underlying bedrock	Volcanic tephra with a low coarse fragment content	Moderately to steeply sloping moraine	Active floodplains subject to periodic flooding	Undulating and terraced kames	Colluvium predominantly derived from the weathered underlying bedrock	Active floodplains subject to periodic flooding	Very poorly drained organic soils with occasional peat palsas	Basic, fine grained rock outcrops and recent lava flows; includes patches of shallow colluvial soils

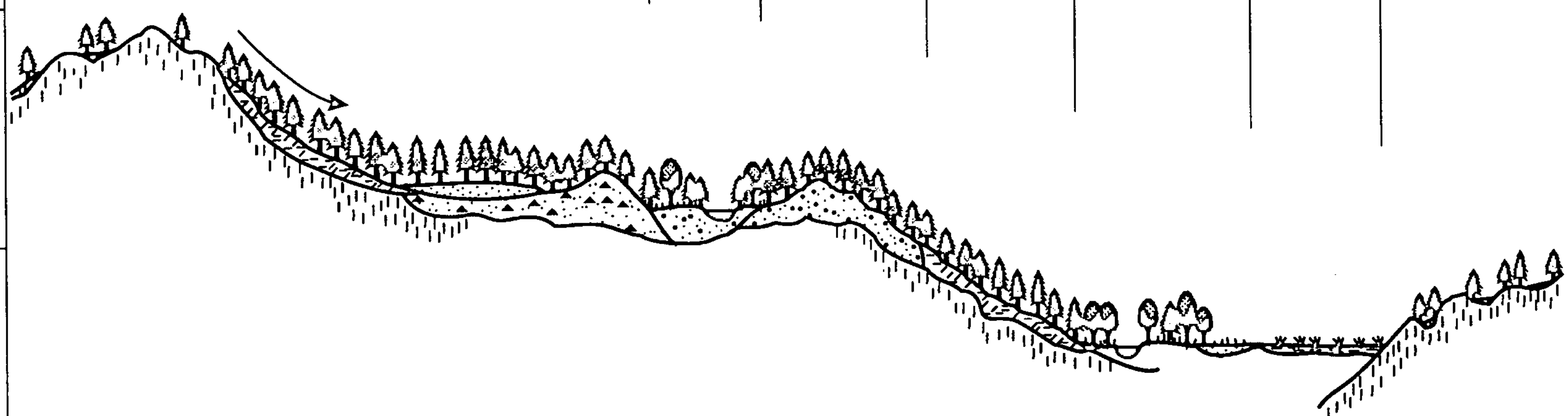


Figure 25. Schematic cross-section of the biophysical soil landscape units of the Tahltan Highland (2 of 4).

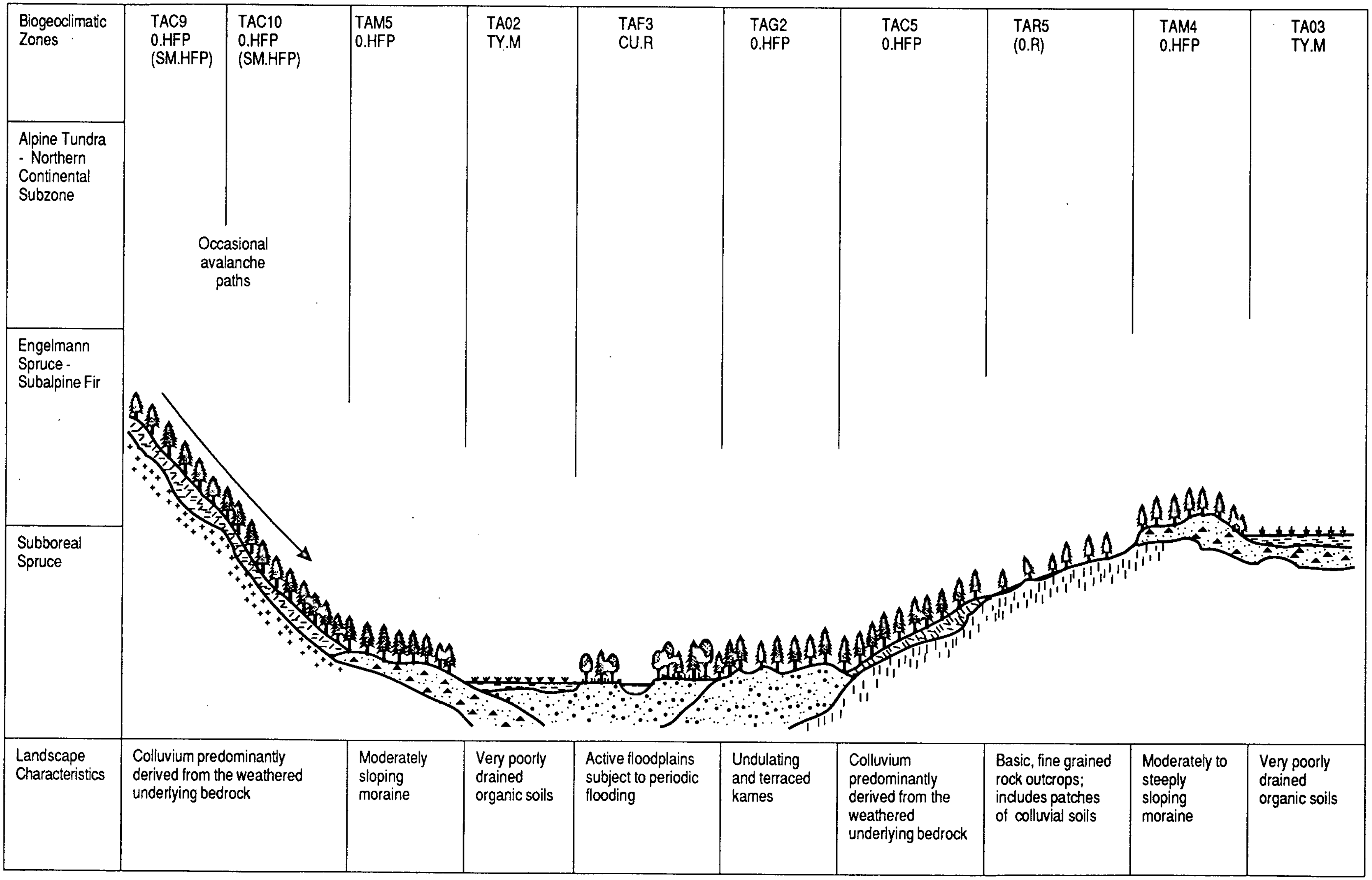


Figure 26. Schematic cross-section of the biophysical soil landscape units of the Tahltan Highland (3 of 4).

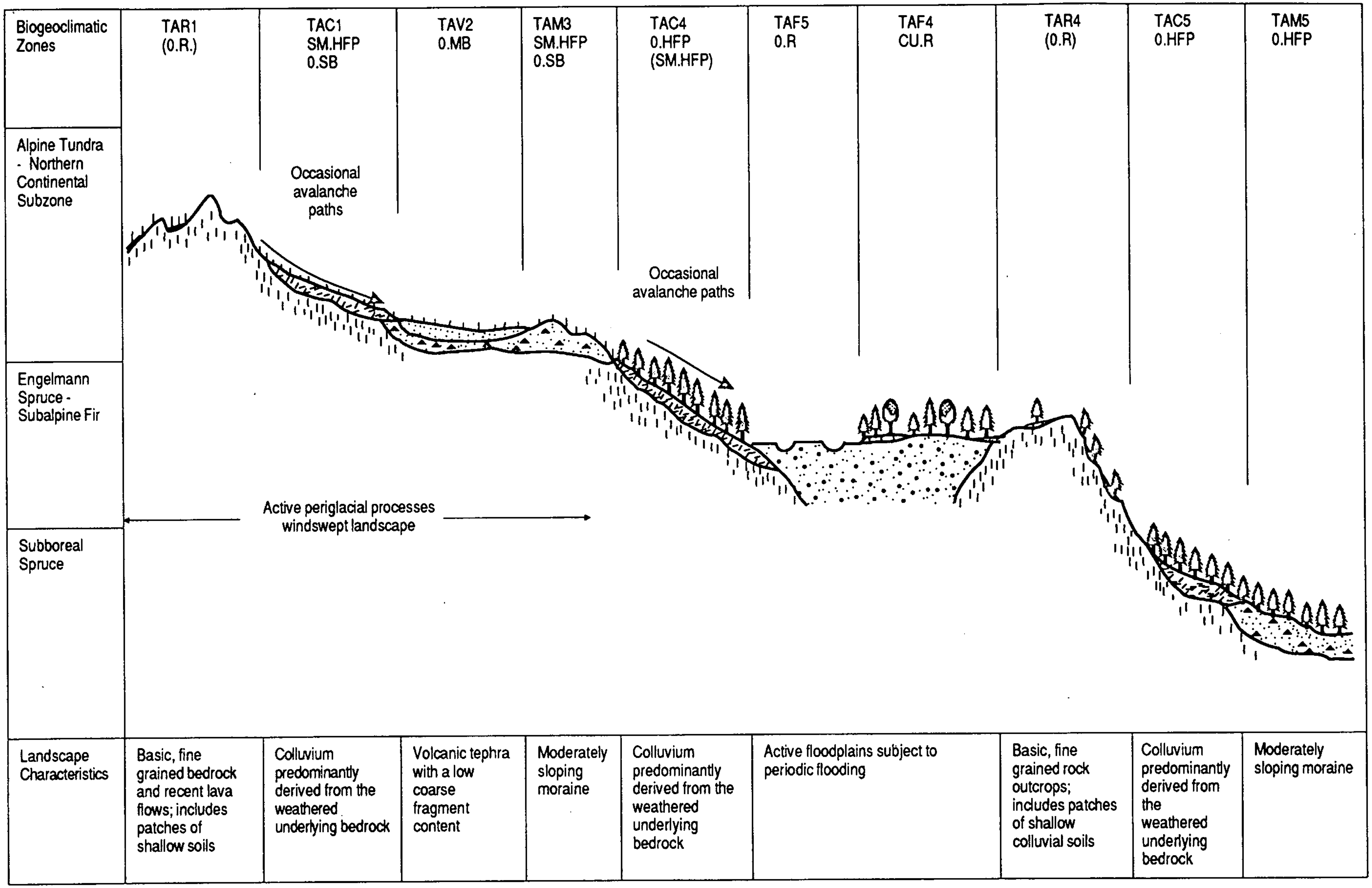


Figure 27. Schematic cross-section of the biophysical soil landscape units of the Tahltan Highland (4 of 4).

terraces that support vegetation but are still subject to periodic flooding, moderately well to rapidly drained Cumulic Regosol soils occur indicating repeated depositions of material burying any accumulated litter.

The floodplain soils have coarse fragment contents that vary from 0% to over 50%. They are rapidly pervious, medium to strongly acid, and are of moderate to low fertility.

3.5.3 Glaciofluvial map units

The two glaciofluvial BSLU's had 24 recorded site inspections. They are generally on moderate to gentle slopes in the valley bottoms of the Subboreal Spruce, Spruce - Willow - Birch, and Boreal White and Black Spruce biogeoclimatic zones. The soils have coarse fragment contents that vary from 0% to over 50%. Textures are usually coarse and generally sandy. Most sites are rapidly to well drained and rapidly pervious. The soils in the Subboreal Spruce and Spruce - Willow - Birch zones have surface mineral horizons that are strongly acid. They are Orthic Humo-Ferric Podzols. Soils in the Boreal White and Black Spruce zone are medium acid. Those developed under forest are Orthic Eutric Brunisols, whereas those on south facing grassy sites are Orthic Melanic Brunisols. The fertility of the glaciofluvial soils is generally moderate to low.

3.5.4 Morainal map units

Of the six morainal BSLU's, five had at least one recorded site inspection. Twenty-eight site descriptions were recorded. The BSLU's range in elevation from valley bottoms to alpine areas and include recently deposited terminal and lateral moraines, and are found in all vegetation zones.

One of the two alpine morainal units has nine recorded site inspections and is generally associated with moderately sloping topography. The coarse fragment content of these medium textured, moderately well drained soils is generally moderate. Periglacial processes, which are active in these alpine areas, have produced stone stripes, solifluction lobes, and nivation hollows. The surface mineral horizons are strongly to medium acid. The fertility of these moderately pervious soils is generally high with the nutrients mainly being derived from the organically rich, turfy surface layer. As was with the colluvial soils, there are Sombric Humo-Ferric Podzols nearer the coast and Orthic Sombric Brunisols towards the interior.

The one BSLU on recently deposited terminal and lateral moraines had no site inspections. These morainal deposits have steep topography and are ridged and hummocky. Their coarse fragment content is generally high, and their texture medium. The soils are well drained, moderately pervious, with a variable soil reaction and a very low fertility. They are Orthic Regosols.

The two morainal soils in the mid-elevation subalpine landscapes of the Spruce - Willow - Birch and Engelmann Spruce - Subalpine Fir zones had seven recorded site inspections. The soils occur on moderate to steep slopes, are well to moderately well drained and moderately pervious. The coarse fragment content of these medium textured soils is moderate to high. Their surface mineral horizons are strongly acid and have generally high fertility. They are Orthic Humo-Ferric Podzols.

The one morainal BSLU of the Subboreal Spruce zone has six recorded site inspections. The soils occur on moderately sloping topography, and are moderately well to well drained. Their coarse fragment content is generally moderate and their texture medium.

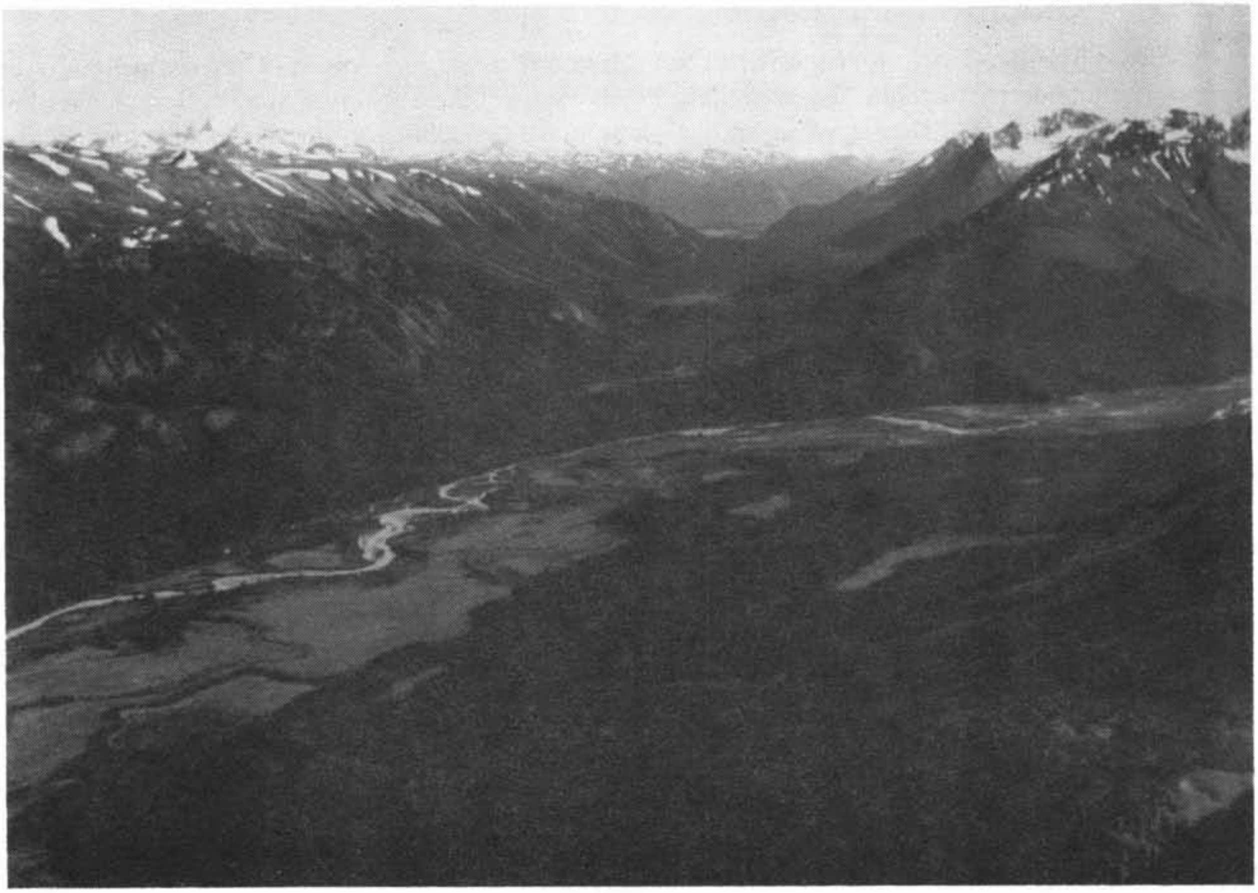


Plate 9. Schaft Creek in the Tahltan Highlands

The area shown is in the transition between the Boundary Ranges and the Tahltan Highlands. The view looks south across the Schaft Creek floodplain (7TAF3m-3TAO2) through a side valley connecting to the Mess Creek valley. The soil landscape to the right of Schaft Creek floodplain is composed of colluvial fan materials on the valley floor and deep colluvial materials on the lower valley slopes, and is symbolled as BC5dk.

The surface mineral horizons are strongly acid. The fertility of these moderately pervious soils is generally high with the nutrients being derived from the decomposition of the litter layer. They are Orthic Humo-Ferric Podzols.

The one morainal BSLU in the Boreal White and Black Spruce zone has a total of six recorded site inspections. The soils are generally on moderately to gently sloping topography and are moderately well drained. Their coarse fragment content is generally moderate and their texture medium. The surface mineral horizons are strongly acid. The fertility of these moderately pervious soils is moderate. Soils of coarser texture are Orthic Eutric Brunisols while those higher in clay are Orthic Gray Luvisols. Some soils on gently sloping topography are poorly to imperfectly drained and are Orthic Humic Gleysols.

3.5.5 Organic map units

The three organic BSLU's are in the Boreal White and Black Spruce, Subboreal Spruce, and Engelmann Spruce - Subalpine Fir biogeoclimatic zones. Five recorded site inspections were made. These soils are in level or depressional areas, are very poorly drained, and support sedges and lesser amounts of willow and glandular birch. They are moderately pervious, strongly acid, and have very high fertility. They are Typic Mesisols.

3.5.6 Bedrock map units

Exposed bedrock ocurs throughout the Tahltan Highlands. Areas mapped as bedrock include land covered with less than 10 cm of unconsolidated material. Generally, these very thin soils have weathered directly from the underlying bedrock.

Six bedrock BSLU's of two bedrock groupings are delineated, with no site inspections made. The basic, fine grained sedimentary and volcanic bedrock grouping included siltstone, graywacke, conglomerate, shale, limestone, andesite, basalt, rhyolite, pillow lava, tuff, and areas of undifferentiated sedimentary and volcanic rocks. The acidic, coarse grained plutonic bedrock grouping included tonalite, adamellite, diorite, quartz monzonite, granodiorite, schist, and gneiss.

3.5.7 Steep escarpments of undifferentiated material map units

In the Boreal White and Black Spruce zone, one BSLU was delineated though no recorded site inspections were made. These steep escarpments are common along the major rivers and are quite variable. Some are composed of morainal and glaciofluvial materials and others of rock outcrops and colluvial veneers. Some escarpments are actively eroding and the soils developed in these recently exposed materials are Orthic Regosols. Areas which had stabilized have Orthic Eutric Brunisols where forested, and Orthic Melanic Brunisols where grassy.

3.5.8 Volcanic material map units

The alpine, volcanic BSLU had six recorded site inspections, whereas the BSLU in the Spruce - Willow - Birch zone had no recorded site inspections. These volcanic soils are developed in volcanic ash, cinders, and pumice probably derived from the Mount Edziza volcanic eruptions. The tephra has very low bulk density, is stone-free, and has a loamy texture. The alpine soils have a dark, humic mineral surface layer (Ah) overlain by a turfy root mat. Plant communities in high snow pack areas are dominated by heathers. Periglacial processes, which are active in the moderately to gently sloping alpine areas, result in slightly to extremely mounded topography. The surface mineral horizons are medium acid. The fertility of these rapidly pervious soils is generally high. The soils are Orthic Melanic Brunisols.

The volcanic soils in the Spruce - Willow - Birch zone are associated with moderately sloping topography. Their surface mineral horizons are strongly acid. The fertility of these rapidly pervious soils is generally high. They are Orthic Humo-Ferric Podzols.

Plate 10. Eve Cone, Mount Edziza

A view northeast with Eve Cone in the foreground and other volcanic cones in the background. Recent, unvegetated lava flows, light in colour, in the alpine are mapped as TAR1v. The darker area behind Eve Cone are lava flows occurring in the Spruce - Willow - Birch zone, and are mapped as TAR2v.

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APPENDIX I List of short-term and long-term climate stations in the Stikine-Iskut area

Station Name	Latitude	Longitude	Elevation m	Slope at Site in Degrees	Aspect	NTS Mapsheet	Starting Date
Chuckachida	57°40′00"	127°36′00"	1083	1	90	94E12	79-06-23
Devils Elbow*	57°34′00"	131°44′00"	125	1	180	104G12	81-01-27
Darsmith Creek	56°45′ 00"	131°38′00"	27	2	90	104B12	81-03-30
Dawson	57°38′00"	128°12′00"	1037	1	280	104H9	79-06-23
Durham	57°10′00"	130°09′00"	1143	5	315	104G1	79-06-30
Didene*	57°17′00"	128°52′00"	1343	1	180	104H7	79-06-23
Eaglenest Creek	57°37′ 00"	129°00′00"	1525	10	270	104H10	79-06-28
Glenora 2	57°50′05"	131°23′30"	228	2	120	104G14	82-07-23
Glenora BCDA	57°49′50"	131°24′30"	229	1	100	104G14	81-06-19
Kehlechoa**	57°56′00"	128°50′00"	885	1	0	104G15	79-06-23
Kerr Glacier	56°55′00"	130°57′00"	1144	2	325	104B15	79-06-28
Kerr Low	56°57′00"	130°48′00"	595	4	110	104B15	79-06-23
Klappan	57°36′00"	129°26′00"	884	1	315	104H1	79-06-28
Lower Iskut	56°46′00"	131°37′00"	20	2	180	104B13	81-02-25
McBride River	57°58′00"	129°16′00"	74	1	180	104H14	79-06-28
McBride 5000	58°03′00"	129°09′00"	1499	15	40	104I3	79-06-28
Pitman	58°02′00"	127°52′00"	945	5	180	94L4	79-06-28
Pallen	58°12′00"	130°23′00"	1494	13	325	104J1	79-06-29
Stikine Canyon	58°08′00"	130°19′00"	936	10	180	104J1	79-06-29
Suite Z	58°07′00"	130°16′00"	542	30	200	104J1	80-10-29
Telegraph Crk***	57°54′00"	131°10′00"	183			104G14	1964
Todagin Ranch***	57°36′00"	130°04′00"	899			104G9	1972

Each station has measured daily precipitation and temperature.
* These stations have wind measurements as well.
** This station has only wind measurements.
*** AES stations.

APPENDIX II Vegetation Landscapes arranged by biogeoclimatic zone

SYMBOL	NAME*
Alpine Tundra Biogeoclimatic Zone - Northern Continental Subzone	
A1	Mesic Altai fescue
A2	Moist sedge alpine
A3	Dry, entire-leaved white mountain-avens
Boreal White and Black Spruce Biogeoclimatic Zone	
B1	Willow thickets
B2	Balsam poplar
B3	Black spruce bog
B4	Lodgepole pine terrace
B5	Moist, lodgepole pine - willow
B6	Mesic lodgepole pine - trembling aspen
B7	Dry shrub - grass
B8	Dry trembling aspen
B9	Moist, cool lodgepole pine - moss
Coastal Western Hemlock Biogeoclimatic Zone	
C1	Black cottonwood - red-osier dogwood floodplain
C2	Sedge meadow
C3	Moist western hemlock - devil's club
C4	Mesic western hemlock - Alaskan blueberry
C5	Sitka alder avalanche chute
Englemann Spruce - Subalpine Fir Biogeoclimatic Zone	
F1	Sedge - wetland
F2	Moist alpine fir - devil's club
F3	Mesic alpine fir - blueberry
F4	Sitka alder avalanche chute
F5	Krummholz alpine fir - heath
Interior Cedar - Hemlock Biogeoclimatic Zone	
H1	Black cottonwood - red alder floodplain
H2	Lodgepole pine - alpine fir terrace
H3	Moist devil's club - oak fern
H4	Mesic western hemlock - Canadian bunchberry
Mountain Hemlock Biogeoclimatic Zone	
M1	Mesic mountain hemlock - blueberry
M2	Sitka alder avalanche chute
M3	Parkland - krummholz mountain hemlock

continued . . .

APPENDIX II (cont'd)

SYMBOL	NAME*
Subboreal Spruce Biogeoclimatic Zone	
S1	Cottonwood - aspen floodplain
S2	Lodgepole pine - soopolallie terrace
S3	Moist lodgepole pine - oak fern
S4	Mesic lodgepole pine - Canadian bunchberry
Alpine Tundra Biogeoclimatic Zone - Northern Coastal Subzone	
T1	Heath
Spruce - Willow - Birch Biogeoclimatic Zone	
W1	Wetland
W2	Lodegpole pine - glandular birch terrace
W3	Moist white spruce
W4	Open white spruce - glandular birch
W5	Volcanic material
W6	Willow - birch valley bottom
W7	Trembling aspen
W8	Krummholz alpine fir
W9	Altai fescue shallow soil
W10	Moist cool alpine fir - moss
W11	Sitka alder avalanche chute

* From Lea, 1984a

APPENDIX III A list of fish species present in the Stikine-Iskut area*

COMMON NAME	GENUS SPECIES
chinook salmon	*Oncorhynchus tshawytscha*
chum salmon	*O. keta*
coho salmon	*O. kisutch*
pink salmon	*O. gorbuscha*
sockeye salmon	*O. nerka*
cutthroat trout	*Salmo clarki*
rainbow (steelhead) trout	*S. gairdneri*
Dolly Varden char	*Salvelinus malma*
mountain whitefish	*Prosopium williamsoni*
lampreys (general)	*fam. Petromyzonidae*
longnose sucker	*Catostomus catostomus*
sculpins (general)	*fam. Cottidae*
Sticklebacks (general)	*fam. Gasterosteidae*

*From Hawthorn *et al.*, 1984

APPENDIX IV Distribution of site, soil, and vegetation descriptions within the Biophysical Soil Landscape Unit legend of the Stikine-Iskut study area.

BSLU MAP SYMBOL	DESCRIPTION FORM NUMBER*
BC1	82-6028G, 82-6089G
BC2	82-7562B, 82-P22B, 82-P29G
BC3	82-7582B, 82-P30G
BC4	
BC5	82-6024G
BC6	82-6087G, 82-6088G
BC7	82-7569B
BC8	82-P7B
BC9	82-7571B, 82-7584B, 82-P25B, 82-P26B
BC10	
BC11	82-6014F, 82-6022G, 82-6083G
BC12	
BC13	82-7574B
BC14	
BC15	
BF1	
BF2	82-6091G, 82-6092G, 82-7559B
BF3	82-7560B, 82-7563B
BF4	82-7585B, 82-P27B
BF5	1093G-80, 82-6027G, 82-6099G, 82-7592B, 82-8939B, 82-P45G, 82-P47G, 82-P48G
BF6	1242B-80, 82-6086G, 82-7556B, 82-7579B, 82-8940B, 82-P46G
BF7	1088B-80, 82-6016F, 82-6023G, 82-6025G, 82-P33G
BF8	
BG1	1182G-80, 1185G-80, 1187B-80
BG2	1087B-80, 82-6072G, 82-6090G, 82-7555B, 82-7564B, 82-7580B, 82-7591B, 82-P41G, 82-P42G
BM1	82-7572B
BM2	82-6084G, 82-6093G, 82-7558B, 82-7568B
BM3	82-P9B, 82-P21B, 82-P28G, 82-P31G
BM4	82-6098G, 82-7583B, 82-P24B
BM5	
BM6	82-7561B, 82-7570B, 82-7581B, 82-P3B, 82-P4B, 82-P5B, 82-P6B, 82-P8B
BM7	82-6015F, 82-6017F, 82-6029G, 82-6030G, 82-6085G, 82-6094G, 82-7557B, 82-7566B, 82-7567B, 82-7575B, 82-7576B, 82-7578B, 82-7593B, 82-P36G, 82-P39G, 82-P40G

continued . . .

APPENDIX IV (cont'd.)

BSLU MAP SYMBOL	DESCRIPTION FORM NUMBER*
BM8	74-S1G, 1188G-80, 1189G-80, 82-6071G, 82-6073G, 82-7565B, 82-7573B, 82-7577B, 82-7589B, 82-7590B, 82-8908B, 82-8909B, 82-8914B, 82-8937B, 82-8938B, 82-P32G, 1175B-80
BO1	82-7588B, 82-P38G
BR1	
BR2	
BR3	
BR4	
BR5	
BR6	
BR7	
BR8	82-P23B
BR9	
BR10	
BR11	
BR12	1176B-80, 1178B-80, 1179B-80, 82-7554B, 82-8941B
BR13	
BR14	
BW1	82-7586B
SMC1	82-7531H, 82-7532H, 82-7535H
SMC2	82-6064G, 82-7533H
SMC3	1183G-80
SMF1	
SMM1	82-6074G, 82-6075G, 82-7528H, 82-7529H, 82-7530H, 82-7536H
SMM2	
SMM3	
SMM4	82-6095G
SMR1	
SMR2	
SMR3	
STC1	82-6061G, 82-7511H, 82-7512H, 82-7513H
STC2	82-6062G
STC3	82-7112H, 82-7508H
STC5	82-7525H, 82-7550H, 82-P68H
STF1	
STF2	82-6041G, 82-7523H, 82-7549H, 82-8895H
STF3	1063G-80, 1067H-80, 81-RLT8H, 81-RTP61H, 82-6003H, 82-7520H, 82-7522H

continued . . .

APPENDIX IV (cont'd.)

BSLU MAP SYMBOL	DESCRIPTION FORM NUMBER*
STF5	81-RLT6H, 81-RTP62H, 82-7541H, 82-7546H, 82-7547H, 82-7551H
STF6	
STG1	82-6036G, 82-7109H, 82-7537H, 82-7553H, 82-8898H, 82-8899H, 82-P69H, 82-P70H
STG2	82-8921H
STG3	82-6059G, 82-6060G, 82-6076G, 82-7502H, 82-7515H, 82-7516H, 82-7534H
STG4	82-8917H, RTL7H
STM1	82-6001G, 82-6050G, 82-6054G, 82-7501H, 82-7503H, 82-7504H, 82-7505H, 82-7509H, 82-P13G, 82-P14G
STM2	
STM3	81-RTP63H, 82-7113H, 82-7517H, 82-7518H, 82-7524H, 82-7543H, 82-7545H, 82-8896H
STM4	74-S19G, 1089H-80, 1184G-80, 81-R59G, 82-6004H, 82-6033G, 82-6034G, 82-6065G, 82-6081G, 82-6082G, 82-7114H, 82-7507H, 82-7510H, 82-7542H, 82-8897H, 82-8928G
STM5	
STM6	82-6002H, 82-6035G, 82-6049G, 82-6063G, 82-7506H, 82-7514H, 82-P11H, 82-P12H
STM9	
STM10	81-R60H, 82-7527H, 82-P65H, 82-P66H
STM11	82-7519H, 82-7526H, 82-P67H
STO1	82-7521H, 82-7540H, 82-7552H, 82-8929G
STO2	1092G-80, 82-7539H
STR1	
STR2	
STR3	
STR5	
STU1	82-7538H, 82-7544H, 82-7548H, 82-8900H
TAC1	82-6013G, 82-6097G
TAC2	
TAC3	82-6032G
TAC4	82-6012G, 82-6068G, 82-8907G, 82-P72G
TAC5	82-8903G
TAC6	82-6026G
TAC7	
TAC9	
TAC10	
TAF1	77-EMF11G, 77-EMF16G, 82-6006G, 82-6052G, 82-6057G
TAF2	82-6007G, 82-6051G

continued . . .

APPENDIX IV (cont'd.)

BSLU MAP SYMBOL	DESCRIPTION FORM NUMBER*
TAF3	77-EMF71G, 1090G-80, 81-TRP71G, 82-6008G, 82-6011G, 82-7123G, 82-8906G, 82-P35G, 82-P49G, 82-P51G, 82-P55G
TAF4	82-6010G
TAF5	77-EMF73G
TAG1	74-S16G, 77-EMF43G, 82-6058G, 82-7130G, 82-7131G, 82-7132G, 82-8933G
TAG2	74-S2G, 74-S6G, 82-6020G, 82-6055G, 82-6078G, 82-6080G, 82-6096G, 82-8905G, 82-8912G, 82-8913G, 82-P37G, 82-P50G, 82-P52G, 82-P53G, 82-P54G, 82-P56G, 82-P57G
TAM1	82-6031G, 82-6037G, 82-6045G, 82-6046G, 82-7122G, 82-7125G
TAM2	82-6038G, 82-6077G
TAM3	74-S3G, 82-6009G, 82-6018G, 82-6021G, 82-6040G, 82-6048G, 82-6066G, 82-6069G, 82-P44G
TAM4	74-S4G, 82-6070G, 82-6100G, 82-P73G, 82-P74G
TAM5	82-6005G, 82-6067G, 82-6079G, 72-7124G, 82-8910G, 82-P34G
TAM6	
TAO1	82-6053G
TAO2	82-6019G, 82-8904G, 82-8911G
TAO3	82-6039G
TAR1	
TAR2	
TAR3	
TAR4	
TAR5	
TAR6	
TAU1	
TAV1	
TAV2	74-S17G, 82-6047G, 82-6056G, 82-P43G, 82-P75G, 82-P76G

* The 2 digit portion of the number represents the year of sampling, the 3 or 4 digit portion represents the sample number, and the single letter at the end of the sample number represents the 104 series NTS map sheets.

Numbers 74-S1, 77EMF71, 82-6095 and 82-7556 were completed by the Terrestrial Studies Section, MOE; 1188-80, 81-R59, 81-RLT6, and 81RTP71 by the Research Branch, MOF; and 82-7131, 82-8907, and 82-P73 by Pedology Consultants.