

**FINAL REPORT**

**Tulsequah Chief Mine and Access Road  
Expanded Terrestrial Ecosystem  
Mapping**

for:  
B.C. Ministry of Water, Land  
and Air Protection  
Smithers, BC

by:  
Robert Fuller and  
Forest Information Systems

October, 2002

**TULSEQUAH CHIEF MINE and ACCESS ROAD  
EXPANDED TERRESTRIAL ECOSYSTEM MAPPING**

**Prepared for:**

**B.C. MINISTRY OF WATER, LAND  
and AIR PROTECTION  
SMITHERS, BC**

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## EXECUTIVE SUMMARY

The purpose of this project was to complete terrestrial ecosystem mapping of an expanded area around the Tulsequah Chief Mine and Access Road at 1:50,000 scale. The study area consists of approximately 8018.5 square kilometres and covers portions of 32 quad maps (each quad consists of four TRIM sheets) located in northwestern BC. Mapping was completed according to *Standards for Terrestrial Ecosystem Mapping in British Columbia* (RIC, 1998).

The ecosystem mapping is based on the three level ecosystem classification framework, which includes ecoregion units, biogeoclimatic units and ecosystem units. The study area occurs within three ecoregions: the Teslin Plateau (TEP), Tahltan Highlands (THH) and Boundary Ranges (BOR). Nine biogeoclimatic units occur within the map area. These are: Wet Maritime Coastal Western Hemlock Subzone (CWHwm); Moist Maritime Mountain Hemlock, Leeward Variant (MHmm2); Moist Very Cold Sub-Boreal Spruce Subzone (SBSmv); Moist Very, Very Cold Engelmann spruce – Subalpine Fir Subzone (ESSFmz); Moist Very, Very Cold Parkland Engelmann spruce – Subalpine Fir Subzone (ESSFmzp); Moist Cool Spruce – Willow – Birch Subzone (SWBmk); Moist Cool Scrub Spruce – Willow – Birch Subzone (SWBmks) and Alpine Tundra Zone (AT). Ecosystem unit labels consist of three components: site series, site modifier(s), and a structural stage. Site series are defined within the existing Ministry of Forests biogeoclimatic ecological classification system (Banner et al., 1993) and through classification developed during this project; 113 ecosystem units and twenty-two non-vegetated and/or anthropogenic units were mapped in the project area.

A description of the ecosystems mapped in each of the biogeoclimatic units is provided on separate tables. For each site series, these tables provide a summary of the environmental and physical site characteristics (site page); and a summary of the dominant and associate plant species for each potential structural stage (vegetation page).

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# **TULSEQUAH CHIEF MINE AND ACCESS ROAD EXPANDED TERRESTRIAL ECOSYSTEM MAPPING**

**for  
B.C. Ministry of Water, Land and Air Protection  
Smithers, BC**

## **1.0 INTRODUCTION**

### **1.1 BACKGROUND**

The Tulsequah Chief Mine and Access Road and expanded area was completed by Forest Information Systems Ltd. (FORMIS) during the period of September 1999 to October, 2001. This 1:50,000 scale Terrestrial Ecosystem Mapping (TEM) was completed for the Ministry of Water, Land and Air Protection as a component of wildlife studies for the proposed re-opening of the Tulsequah Chief Mine and associated access road and for other potential future development in the Taku River area.

This project completed TEM for an area of 8019.5 sq. km that includes an area of 1400 sq. km previously mapped in 1997. This previously mapped TEM was completed for the core area around the Tulsequah Chief mine site and along the proposed access road at a scale of 1:50,000 by JMJ Holdings Ltd. (1997) as a component of the Tulsequah Chief Environmental Impact Assessment completed by Rescan (1997) for Redfern Resources Ltd. The existing mapping covered an area of approximately 1,400 sq. km (Rescan, 1997).

### **1.2 OBJECTIVES**

The purpose of the project was to complete ecosystem mapping of the Tulsequah Chief Mine and Access Road and expanded area at 1:50,000 scale. Terrestrial ecosystem mapping was requested by the Ministry of Water, Land and Air Protection (WLAP) in order to assist with the development of wildlife interpretations. The objective of the project was to complete an up-to-date, accurate and precise Terrestrial Ecosystem Map (Level 4) and accompanying databases for the defined study area by:

- investigating and resolving the uncertainties in the Biogeoclimatic Ecosystem Classification at the zone, subzone, variant and site series level (in both classification and mapping);
- revising and updating the existing TEM map to correspond with these revisions in classification and mapping;
- mapping the expanded study area; and
- collect specific wildlife habitat information beyond the standard data collection for a level 4 TEM project (i.e. coarse woody debris, wildlife tress and forage information).

### **1.3 STUDY AREA**

The Tulsequah Chief Mine and Access Road Expanded Terrestrial Ecosystems Mapping area is located in northwestern BC. The TEM area covers approximately 8018.5 square kilometres on portions of 32 quad map sheets (Figure 1). A full quad map contains four TRIM map sheets as a base layer. The project area extends from the Alaska and British Columbia boundary at the Taku River, north to the Gladys Lake area. Major drainage's found in the southern part of the project area that are part of the Taku River system include all or portions of the Tulsequah, Inklin, Nakina, Silver Salmon, Sloko and Nakonake Rivers. The Juneau Icefield (Llewellyn Glacier) forms the southwestern boundary. The northern part of the project area drains to the Yukon River system. This includes the O'Donel, Pike and Gladys Rivers, Pine Creek as well as Surprise and Gladys Lakes. Atlin Lake forms much of the western boundary of the project area. The village of Atlin and the nearby Indian Reserve at Five Mile Point are the largest settlements in the project area.

The TRIM map sheets were combined to form a seamless map base for the project area.

INSERT FIGURE 1

## **1.4 PHYSIOGRAPHY AND SURFICIAL MATERIALS**

### **1.4.1 Physiography**

#### **1.4.1.1 *Topography***

The study area spans two major physiographic types: mountains and plateau. The former is represented by the Boundary Ranges of the Coast Mountains, and the latter by the Taku and Teslin plateaus, which are parts of the larger Stikine and Yukon plateaus respectively. Hence the topography varies greatly. The Boundary Ranges are rugged and mountainous with local relief typically <2000 m, and dominated by the classic landforms of alpine glaciation. The Tagish Highland, which is a region of transition between the coastal mountains and the inland plateaus, contains features characteristic of both areas, with rugged mountains grading into rolling hills and gently sloping uplands. Local relief is typically 1400 m in the Tagish Highland. The Taku Plateau is characterised by a low-relief undulating surface at approximately 1500 m. The Teslin Plateau, has a slightly higher average elevation than the Taku Plateau, and is characterised by a gently sloping, undulating upland surface, with a local relief of about 700 - 2000 m, that is separated into isolated blocks by wide glacial valleys (Holland, 1976).

#### **1.4.1.2 *Bedrock Geology***

The following section is based partly on materials published by Souther (1969) and Aitken (1959), and partly on field observations.

The Boundary Ranges are underlain by the Coast Plutonic Complex, which consists of numerous plutons that represent multiple phases of intrusion. The coarse-grained intrusive rocks of the plutons, including alaskite, granite, quartz monzonite, monzodiorite and granodiorite, are exposed along the axis of the ranges. The intrusives are by sedimentary, meta-sedimentary, and volcanic rocks, including greywacke, sandstone, limestone, shale and chert. The sedimentary rocks tend to form sharper and more irregular landforms than the intrusive rocks (Holland 1976) due to differing rates of erosion between the different rock types. In addition, sedimentary rocks commonly include -types that disintegrate into a fine-textured residue, giving rise to more silt- (and in some places clay-) rich till and colluvium. In contrast, intrusive rocks tend produce a sandy residue, resulting in materials with a dominantly sandy matrix.

In the Tagish Highland, the Inklin Formation and the Laberge Group consist of sedimentary rocks, including greywacke, siltstone, mudstone, sandy-siltstone, shale, limy sandstone and conglomerate. These sedimentary rocks are highly erodible and underlie hillsides where deep gullies are separated by sharp ridges.

On the Taku Plateau, the Atlin Intrusion is a highly metamorphosed ultramafic body that consists mainly of fractured and sheared serpentinite. Serpentinite-rich parent material gives rise to soils with high Ca:Mg ratios and high levels of basic elements, which can be toxic to plants. Also, these soils commonly have low levels of macronutrients (Balmer et al., 1992). Such conditions give rise to “serpentinite barrens” where vegetation is sparse, and where endemic and indicator species tolerant of these unusual soil conditions can be found. The Cache Creek Group, which also outcrops on the Taku Plateau, is composed of chert, chert conglomerate, chert breccia, limestone, limestone breccia, quartzite, volcanic greywacke, and schist. At the contact between the Atlin Intrusion and the Cache Creek Group, a narrow band of the latter has been metamorphosed to greenstone, and amphibolite (Aitkin, 1959).

Throughout the Taku Plateau and most of the Teslin Plateau, the lower valley sides are covered by thick surficial materials, while the hilltops and plateau are rocky, with outcrops of limestone and other Cache Creek rocks.

#### **1.4.1.3 *Landscape Evolutions and Deposition of Surficial Materials***

The mountainous and hilly topography of this area existed before the onset of the Pleistocene glaciations. Earlier periods of differential uplift had created the relief, while episodes of volcanism and erosion had given the landscape

a rugged topography, similar to that of today. The effects of glaciation, and postglacial erosion and deposition, shaped the landscape further, resulting in its present form.

### *Boundary Ranges*

Here the effects of glaciation dominate the landscape. The major river valleys, including that of the Taku River and the great range of relief are the only evident preglacial features. During the Pleistocene Epoch (2,000,000 to 10,000 years BP), this area was subject to multiple episodes of glaciation. Large erosional landforms, such as cirques and hanging valleys, reflect the combined effects of the glaciations. Smaller erosional features, depositional landforms and surficial materials are the result of the most recent (Fraser) glaciation and subsequent alpine glaciations.

During the climax of Fraser Glaciation, the Cordilleran Ice Sheet covered all but the highest peaks. Ice flowing eastward from the Boundary Ranges, diverged north along the trough of Atlin Lake and south through the Taku drainage system (Ryder and Maynard, 1991). The resulting landscape contains many of the classic glacial landforms, which at higher elevations include horns, arêtes, cirques, and hanging valleys. Rock, ice, and blocky colluvium are the dominant surface materials. At middle elevations, the landscape is characterised steep slopes and rounded hills. Steep valley sidewalls are rocky with a discontinuous cover of till and colluvium. At lower elevations, till is relatively thick, and glaciofluvial terraces and floodplains dominate the valley bottoms. Drumlins, elongate rocky knolls and fluted topography are common. Holland (1976) suggests that marine sediments are present below 325m, but none were noted in this study.

Postglacially, the activity of streams and mass movement (gravity) processes has further shaped the landscape. Flowing water has cut scarps and gullies and deposited gravels, forming plains and fans along valley bottoms. Mass movement processes ranging from debris flow to soil creep have formed fans and cones at breaks of slope, and blankets and veneers of debris on mountain sides. Ongoing glaciation continues to influence the landscape in the southwest portion of the study area where alpine glaciers, valley glaciers (e.g., the Tulsequah Glacier), and ice sheets (e.g., the Llewellyn Ice Sheet) persist.

Since the end of Fraser Glaciation, the persistence of ice has resulted in further shaping of the local topography. The southwest portion of the study area is dominated by ice.

Across much of this area, particularly the alpine regions and adjacent the ice fields, rugged topography and severe climate have resulted in widespread Lithic soils, and Regosols. Dystric Brunisols and Humo-Ferric Podisols have developed on mid and lower-slopes, while Organic soils are common in valley-floor depressions and in backwater channels on floodplains.

### *Tagish Highland*

The Tagish Highland has characteristics of both the mountain ranges to the southwest and the plateau regions to the northeast. The high elevation peaks and ridges resemble the rugged and glacially-sculpted mountains of the Boundary Ranges, while the landforms at lower and middle elevations are rounded and scoured, showing features more typical of the plateau. The Highland's glacial history is similar to that of the Boundary Ranges as described in the previous section, except that present-day glaciation is less widespread. Cirque erosion is currently active on the north and northeast sides of peaks and ridges. Glaciofluvial terraces are common and some pockets of thick surficial materials are present.

Soils in this region are very similar to those of the Boundary Ranges, although Dystric Brunisols dominates this slightly dryer transition zone.

### *Taku Plateau*

The Taku Plateau has changed relatively little from its preglacial form. Glaciers eroded and scoured the bedrock and blanketed the landscape with till of varying thickness. During deglaciation, glacial meltwater streams deposited gravel and sand in huge outwash plains, which were later dissected to form glaciofluvial terraces. Also during deglaciation, eskers, kames, kettles, and other features were formed when large masses of stagnant ice melted, and ablation till and ice-contact glaciofluvial materials were deposited. In addition, damming by ice resulted in the formation of glacial lakes in which silty glaciolacustrine sediments and gravelly sandy deltas were deposited.

Streams and rivers have been the dominant postglacial force in this area, depositing fluvial sediments and carving terraces in glacial drift. Small colluvial and fluvial fans are present at the mouths of some tributary streams. Low relief combined with poor drainage has resulted in the accumulation of organic materials in many depressions and flat areas on both uplands and valley floors.

Soils in this region are dominantly Brunisols, with Dystric Brunisols on materials derived from intrusive rocks and Eutric Brunisols on lime-rich parent materials. Minor pockets of Melanic and Sombric Brunisols were also identified. Organic soils are common in poorly drained sites and the cryoterbated phase of Brunisols and Regosols is abundant on hilltops where cryoturbation and solifluction are evident.

### *Teslin Plateau*

Similar to the Taku Plateau, the topography of the Teslin Plateau has been altered little from its character prior to glaciation. Here, the most obvious signs of glaciation are cirques on the north and east sides of ridges and peaks, glacial scour, wide flaring valleys, terraces, outwash plains, kame-esker complexes, and kettles. During the course of Fraser Glaciation, the ice flow direction in the major valleys of this low relief plateau, including the Taku and Teslin basins, reversed several times (Holland 1976). Since deglaciation, fluvial erosion and deposition have been active and mass movement processes have degraded the steeper slopes. The accumulation of organic materials is also wide spread. Soils in this region are similar to those described for the Taku Plateau.

## **1.4.2 Surficial Materials and Associated Landforms**

The major material types, described below, owe their distinctive characteristics to their mode of deposition and the material or rock type from which they were derived. Material characteristics such as texture (particle sizes), consolidation (bulk density), sorting, coarse fragment rock type and nutrient availability, coupled with other conditions, such as climate, moisture regime, aspect, elevation, material age and disturbance history, give rise to the different ecosystems present in the study area.

### **1.4.2.1 Till (M, M1)**

Till is material deposited directly by glacier ice. Typically, it consists of a fine-grained matrix (particles <2mm) surrounding and supporting clasts (particles > 2mm) of a variety of sizes, shapes and rock types. Characteristics such as texture and consolidation vary according to specific processes of deposition by glacier ice (e.g., subglacial vs. supraglacial tills).

Basal till (M) was deposited subglacially by melting at the sole of the glacier. Typically, it is a massive (non-stratified), poorly-sorted (well graded) material that is usually the most highly consolidated (densest) and strongest of all the surficial materials. Basal till can be highly cohesive, and it commonly has sufficiently low permeability to act as an effectively impermeable stratum to drainage.

Ablation (supraglacial) till (M1) consists of debris that melted out on top of a glacier when the ice surface melted downward during deglaciation. Ablation till is relatively coarse textured, with little silt or clay. Typically, it is non-consolidated, non-cohesive, and of rapid permeability. Ablation till commonly contains pockets of other types of drift, including till that flowed off the glacier when saturated (flow till), glaciofluvial sand and gravel, and fine textured (fine sand, silt, clay) glaciolacustrine sediments. Extensive deposits of ablation till often give rise to a variety of growing conditions because such areas are often hummocky, irregular and kettled in addition to the material variability noted above.

Little Ice Age moraines (M2) are composed of till that was deposited immediately downslope of the toe of present day glaciers and in cirques that were occupied by glacial ice during the Little Ice Age, the alpine glacier advance that culminated in the nineteenth century. These recent glacial deposits have ecological significance because they are non-vegetated or only sparsely vegetated due to the young age of the substrate (less than about 150 yr.), severe climate, and distance from seed sources. At higher elevations, ongoing glacial advances and retreats have formed morainal ridges and fluted till, such as those left behind from the Little Ice Age.

Veneers and blankets of Fraser Glaciation basal till are widespread throughout the study area. While steep hillsides and rugged alpine areas may be coated by a discontinuous veneer of till, the till thickens toward valley floors to form a continuous blanket over most of the gentler lower slopes. In areas where masses of stagnant ice melted, many of the ablation till deposits are kettled, undulating and include thick blankets and plains. Small lakes and bogs now occupy many of the kettles. In some areas of glacially-scoured bedrock, such as the high mountain passes and rocky tops, till is almost completely absent.

The uppermost 1-2m of the till (both basal and ablation) is modified by weathering and pedogenic (soil-forming) processes, giving rise to a much looser and more permeable soil. The looser consistency of this soil and of the ablation till is more conducive to burrowing and often provides a deep medium for unimpeded root growth. Compact and/or cemented basal till can restrict root growth and deter burrowing wildlife species.

Field work conducted by Deepa Spaeth Filatow in adjacent areas found the till to be a mixture of stones in a matrix of sand and/or silt. The dominant till texture is stony-silty sand; however, silty bouldery sands, stony silts, and sandy stony silt were also encountered. The till varies greatly in consolidation from highly consolidated to non-consolidated.

#### **1.4.2.2 Colluvium(C)**

Colluvium is material that accumulates as a result of gravitational slope processes (mass movements) such as rockfall, debris flows and slides, snow avalanches and rock creep. The physical characteristics of colluvium are closely related to its source material and mode of accumulation, and thus vary greatly.

Colluvial landforms vary depending on the process of accumulation. Veneers and blankets of colluvium derived from rock outcrops upslope are common on steep hillsides; while fans, cones, and talus slopes are located where rockfall, debris flow, and debris slide materials have accumulated below steep unstable slopes. Deposits of hummocky and undulating colluvium result from slides, flows, rock creep, rock glaciers, and slumps. Colluvium supports a wide variety of ecosystems, ranging from the lush, moist ecosystems found on colluvial fans, which provide good forage for bears, to the dry lichen dominated ecosystems that are found on blocky south facing talus slopes and may be significant for ground squirrels/ marmots.

#### **1.4.2.3 Bedrock(R)**

Bedrock was mapped where it outcrops or lies very close (less than two centimetres) to the land surface. As well, it is mapped as an underlying material where its form influences surface topography on a meso-scale. Bedrock outcrops are abundant throughout the more rugged and mountainous areas where it is exposed in peaks, ridges, cliff bands, bluffs, and on steep hill slopes. In the plateau regions, rock outcrops are present on hills, hummocks and mounds; along stream-cuts and gullies, and where glacial scour has left low angle undulating rock exposed.

Steep rocky cliffs and bluffs can provide escape terrain for goats and sheep. Steep rock can also contain small caverns and ledges that may be significant for other wildlife species.

Two rock types were distinguished in terrain symbols because of their influence on ecology. The first, limestone, gives rise to basic soil types and richer nutrient regimes. In addition, the caves and caverns present in limestone provide potentially good den or shelter sites for certain species. Limestone, which is relatively resistant to weathering other than dissolution, also gives rise to more large rock outcrops and cliffs than other types of sedimentary rock. The second significant rock type is serpentinite. The unique soil conditions (previously described

in the Bedrock Geology Section) that develop from these ultramafic parent materials results in adverse conditions for plant growth.

The symbol maRv over FGpj and maRv over ysLp was used to describe marl deposits over glaciofluvial deposits and lacustrine silts in the Atlin area (polygon 10086). (See Section 1.4.2.10 on lacustrine materials for further details).

#### **1.4.2.4      *Glaciofluvial Materials (FG)***

Glaciofluvial sediments were deposited by glacial meltwater streams during the final stages of Fraser Glaciation, and by present-day meltwater streams that drain from glaciers and icefields. Proglacial deposits formed downstream from glaciers, and include fans (FGf), outwash plains (FGp), and deltas (FGt) with foreset beds (inclined at about 20-35%) deposited on their frontal slopes. Postglacial streams have since cut down into some of these deposits to form terraces (FGt). Ice-contact deposits, such as kames and eskers (e.g., FGu, FGh, FGv) accumulated against or on top of melting ice, and commonly overlie till

Glaciofluvial sands and gravels are highly porous and permeable, thus forming relatively dry and well-drained sites. The materials are non-cohesive, and so tend to ravel when exposed in steep stream banks and roadcuts. Where lenses of finer materials (e.g., silt) are present, the resulting perched water tables may lead to seepage zones and ecologically richer sites.

Glaciofluvial deposits are common in the study area and are found along the most of the major valleys including Atlin Lake, Tulsequah River, Taku River, Wilson Creek, Spruce Creek, Slate Creek, Pike Creek, Nakonake River, and Pine Creek. The loose, unconsolidated and commonly thick deposits of glaciofluvial sediment provide a good medium for burrowing wildlife species.

#### **1.4.2.5      *Fluvial Materials (F, FA)***

Fluvial deposits have been transported and deposited by flowing water. They underlie floodplains (FAp, Fp), river (fluvial) terraces (Ft), alluvial (fluvial) fans (FAf, Ff) and deltas (FAp). Fluvial materials consist of loosely packed, non-cohesive gravels and sands. Minor silt is present in in-filled backchannels and in silty sandy overbank deposits on floodplains away from active channel zones and low terraces. Sands and gravels are porous and highly permeable. Typically, they provide sites that are dry and well-drained unless the watertable lies close to the ground surface, as in the case of floodplains and the lower parts of fans.

Fluvial materials are extensive along all of the major valley floors in the study area. Wide floodplains commonly have braided channels (e.g., the Taku River) and consist of well-sorted gravels with sub-rounded to rounded clasts. Along some reaches, floodplains are narrow with partly confined and irregularly sinuous channels (e.g., upper reaches of the Sloko and the Nakonake rivers). Rivers in the plateau regions tend to have meandering channels (e.g., the Silver Salmon River and the O'Donnel River).

#### **1.4.2.6      *Glaciolacustrine Sediment (L, LG)***

Glaciolacustrine deposits are present where sediments settled out of suspension in ice-dammed lakes. They typically consist of fine sand, silt and clay in layers that are internally well-sorted. Deposits range from massive to well-bedded and laminated (beds thinner than 1cm), depending on the mode of deposition and the action of turbidity currents and other processes that influence sedimentation on the lake floor. A small percentage of clasts may be present in glaciolacustrine materials where drop-stones were deposited from melting icebergs. Because of their fine texture and slow permeability, glaciolacustrine materials should be considered sensitive to disturbance: they are highly susceptible to surface erosion, gullyng, and slope failure.

#### **1.4.2.7      *Undifferentiated Materials (U)***

The material symbol “U” describes polygons where two or more different types of materials occur together within a small area. It is usually applied to scarps, gullies, and other steep erosional slopes formed where creeks have cut deeply into thick valley-fills of glaciofluvial gravels, till, and occasionally, glaciolacustrine sediments. Undifferentiated materials were often mapped as part of a complex with rock and colluvium where streams have cut deeply into both surficial materials and the underlying bedrock.

U1 was used to describe areas where drift from older glaciations has been overridden by glaciers during the Fraser Glaciation (e.g., Mb over U1tu). In these cases, the older materials and landforms have been truncated by glacial scour then blanketed by till. This is evident in the lower slopes adjacent to Gladys Lake (e.g., Mb over U1tu)

#### **1.4.2.8      *Organic Materials (O)***

Organic materials include peat and other organic soils thicker than 40cm. Most organic materials were found along valley floors and on lower slopes, such as gently sloping or undulating benches and imperfectly-drained terraces. Organic veneers were found overlying lacustrine and glaciolacustrine deposits, and active and inactive floodplains. In some situations, cumulic organic soils have developed where overbank sediments, commonly silty sand to sandy silt, are interbedded with thin organic layers. Organic plains (fens, bogs, marshes, etc.) have developed where moist depressions, including kettles, and lake have been filled-in, over time, with organic material. Organic wetlands provide a unique habitat used by a wide variety of wildlife; for example, the shrub dominated wetlands provide abundant forage for moose.

#### **1.4.2.9      *Weathered Bedrock (R)***

Weathered bedrock is disintegrated or decomposed rock that remains in its place of origin and has not moved downslope due to gravity. In the study area, this material consists predominantly of angular fragments with minor component of material finer than 2mm. Weathered bedrock is was mapped on gently undulating hill tops dominated by slopes <15% on the plateaus where some sedimentary and metamorphic rocks are prone to very rapid weathering. Many of these sites were subject to cryoturbation (e.g., Dv-C).

#### **1.4.2.10     *Lacustrine Materials (L)***

Lacustrine materials are present where sediments have accumulated in or at the margins of lakes. Sediments are carried into lakes as the suspended load of streams, and then settle to the lake floor. This results in the accumulation of moderately- to well-sorted, fine textured (i.e. fine sand, silt and clay) deposits that may be either stratified or massive.

Within the plateau regions where lakes are particularly abundant, near-shore lake deposits may be exposed for portions of the year due to seasonal decline in lake levels. In most cases, the exposed deposits are veneered by organics (e.g. Ov over Lp). Most of these lakes are fed by groundwater from relatively small, low-relief drainage basins, which makes them particularly susceptible to low water levels during dry weather. There are several such lakes adjacent the Atlin townsite and north toward Warm Bay where seasonally exposed lake sediments have high content of alkaline salts that accumulate as a result of evaporation, giving rise to solonchic soils.

The symbol maRv over Lp was used to describe marl deposits over lacustrine silts at polygon 10086 near Warm Bay. Marl is a calcium carbonate precipitate sometimes containing shells of gastropods and other invertebrates. This is an unusual use of the bedrock symbol as the marl deposit is not lithified but is soft and digable; however, no other symbol is suitable. Marl may be present in other shallow lakes and wetlands in the area but was only encountered and is only mapped at this site.

#### **1.4.2.11     *Eolian Materials (E)***

Eolian sediments are transported and deposited by wind. Fine particles are picked up from unvegetated surfaces, such as exposed floodplains at low water and steep bluffs of glacial sediments, and settle to the ground in adjacent areas. They typically form a thin (a few centimetres to about one metre) capping over other materials (Ev), but may locally thicken into a blanket (Eb) or dunes (Eu). Eolian veneers typically consist of a mixture of fine sand and coarse silt, with particle size decreasing away from the sediment source.

Soils on eolian veneers are stone-free; the silt component of the soil increases water retention compared to underlying fluvial gravels, and the ground is usually level to gently sloping. They provide a good rooting medium for plants and easy digging for animals. Eolian material is susceptible to remobilization by wind if vegetation cover is removed, and it is readily eroded by flowing water.

#### **1.4.2.12 Anthropogenic Materials (A)**

These are materials that have been sufficiently disturbed by human activity that their original properties have been altered substantially. Tailings from placer mining activities along Pine Creek are a good example of anthropogenic materials. The original glaciofluvial materials have been sufficiently reworked during the mining process to have lost their original bedding and sorting. In addition, the landforms that originally occupied this valley have been destroyed and replaced by landforms created by earth-moving equipment. In addition, the original soil profiles have been destroyed and replaced by pedologically young soils (Regosols).

### **1.4.3 Geomorphological Processes**

Active geomorphological processes are widespread in the study area. Terrain symbols indicate only the presence or absence of particular processes and give no indication of their frequency or magnitude. The following geomorphological processes have particular significance with regard to ecosystems.

#### **1.4.3.1 Debris Slides, Debris Flows and Rockslides (-R, -R'')**

Debris slides are a variety of landslides. They occur when a mass of glacial drift, colluvium, or weathered bedrock becomes detached from a hillside and moves rapidly downslope by sliding along a shear plane. The shear plane commonly coincides with the contact between weathered and unweathered material, or between surficial material and bedrock. If the debris is saturated, or if debris falls into a stream and becomes saturated, it is transformed into a debris flow. A debris flow is the rapid flow of a mass of viscous material consisting of mud, sand, stones, and vegetation debris. Rockslides result from the release of a mass of bedrock that slides downslope and disintegrates in the process; typically, failures occur on steep, weathered rock outcrops along ridge crests, on steep gully walls, and on cliff bands.

These processes are of ecological significance because all parts of the landslide - the failure plane (scar), track, and debris deposit - consists of young soils, and are covered by shrub or young forest stages of climax communities or disclimax vegetation communities.

#### **1.4.3.2 Rockfall (-Rd, -R''b)**

This process involves the release of relatively small masses of rock (e.g., a single block or a few cubic meters) and its movement downslope by freefall, rolling and bouncing. On the terrain map, the symbol  $R_s-R''b$  is used to indicate source areas for rockfall. Symbols such as  $aCk-R_b$  are used for downslope areas affected by rockfall, where rockfall is a potential hazard. Vegetation cover is generally sparse.

#### **1.4.3.3 Slow Mass Movement (-F, -F'')**

Slow mass movement is indicated where slow failure processes are occurring, for example, rock creep (e.g., polygon 004# 97,  $xCkm-F''gR_b$ ), soil creep ( $-F''c$ ) and earthflow ( $-F_e$ ), where tension cracks are evident ( $-F''k$ ), and where the displaced material from slumps and slides moves only a short distance. Like the rapid mass movement processes listed above, slow mass movement can result in young soils and young successional forest structure on freshly exposed scarp slopes. Tilted and recurved trees commonly indicate ongoing slow mass movement. The hummocky and ridged terrain of earthflows and slumps contains a variety of site conditions, ranging from small ponds and bogs to dry ridgecrests and patches of bare ground where soil disturbance is most severe.

#### **1.4.3.4 Gully Erosion (-V)**

Gullies are small ravines with V-shaped cross-sections formed in drift and bedrock. The symbol is usually applied to polygons where more than one gully is present. Gullies are formed by the erosive effects of debris flows, small streams, snow avalanches, and rockfall. Active gully erosion and related depositional zones (e.g., cones and fans) gives rise to areas where soil development may be weak or absent (Regosols), with associated sparse vegetation and/or young seral stages. A gullied mountainside includes a variety of aspects, resulting in drier habitats along the ridgetops and steep south-facing slopes, and moister sites along north-facing slopes and gully floors.

#### **1.4.3.5 Snow Avalanches (-A)**

Tracks and other evidence of avalanching (avalanche boulder tongues, avalanche cones, lingering snow deposits) are abundant and widely distributed throughout the mapped area. They are more common in the Boundary Ranges and in the Tagish Highlands than in the plateau area. This is due to heavy snowfall and the presence of steeper slopes in these more mountainous regions. Below tree line, tracks are clearly distinguished by linear vegetation patterns on steep hillsides. Zones affected by avalanching (both above and below treeline) are commonly moist, rich sites that are shrub - herb dominated. These lush meadows provide ample forage for black and grizzly bear.

On the terrain maps, avalanche tracks were subdivided according to their extent in a terrain polygon. "Major" avalanche tracks (-Af) are broader than the height of adjacent mature forest and occupy more than about 20% of the polygon area. "Minor" avalanche tracks (-Am) are narrow and occupy less than about 20% of a polygon. Where both major and minor tracks exist in the same polygon the symbol "-Aw" is used. "-Ao" is used to indicate old avalanche tracks sometimes evidenced by re-colonisation of coniferous trees.

#### **1.4.3.6 Periglacial and Permafrost Processes (-Z, -N, -S, -X)**

Periglacial processes (-Z) include solifluction (-S), cryoturbation (-C), and nivation (-N). Solifluction is the slow downslope movement of seasonally unfrozen regolith. Cryoturbation refers to heaving and churning of the ground due to freezing and thawing of the active (seasonally unfrozen) layer. Ground disturbance due to very active cryoturbation may prohibit plant growth. Nivation, sometimes termed "snow patch erosion", refers to the development of shallow depressions at sites occupied by long-lasting snow banks. Because snow may not melt from nivation hollows until well into the summer, plant growth here is delayed or suppressed. Permafrost processes (-X) were mapped where ground remains frozen throughout the year, as indicated by the presence of rock glaciers and some kinds of patterned ground. Permafrost indicators in the map area are confined to higher ground. The development of some types of patterned ground due to freezing and thawing results in a crude size sorting of the soil. Vegetation often reflects these textural differences because finer-textured zones retain moisture and support alpine plant communities, whilst adjacent stony ground remains bare or lichen-covered.

#### **1.4.3.7 Glacial Meltwater Channels and Kettles (-E, -H)**

Meltwater channels are relict channels created by streams draining from melting glacial ice. They are sinuous in plan, and typically flat-floored and steep-sided in cross-section. Floors are poorly-drained, and commonly covered by organic materials or occupied by small misfit streams. Glacial meltwater channels were mapped using the symbol -E where they are too small and/or too numerous to mark individually with on-site symbols. They are commonly associated with outwash (FG) deposits, but may also be cut into till, other thick surficial materials and bedrock. Kettles, another relict glacial feature, are depressions formed where large blocks of glacial ice were buried by glacial drift. When the ice melted, subsidence of the overlying ground resulted in depressions that filled with water or remained dry, depending on the depth of the water table. Kettles were mapped in glaciofluvial outwash areas. All of these features create a variety of moisture conditions and aspects within a polygon.

#### **1.4.3.8 Abundant Seepage (-L)**

This was mapped where seepage sites are widespread within a polygon. It is common where soil is permeable but surficial materials are slowly permeable (materials such as till and thin surficial materials over bedrock). Water seeps downslope near the base of the soil zone and is forced to the surface where soils are thin or where the watertable is high. It is also common where lower slopes receive shallow subsurface flow from a relatively large catchment area upslope. Abundant seepage was mapped on mid to lower slopes and is evidenced by changes in vegetation resulting from different plant species' affinity to the rich moisture and nutrient conditions found at these sites.

#### **1.4.3.9 Other Processes (-B, -B1, -J, -I, -M, -U1, -K)**

The morphology of alluvial stream channels provides information about stream behaviour and floodplain characteristics, such as the tendency for channel migration, overbank flooding, bank erosion, stream gradients and the texture of floodplain materials. In general, the sequence of channel types from braided (-B), through anastomosing (-J) and irregularly sinuous (-I) to meandering (-M), corresponds to declining stream gradient, fining of floodplain materials, and a decreasing tendency for abrupt shifts in channel position. For this project, an additional symbol, -B1, was used to indicate areas affected by outburst floods from the Tulsequah Glacier. These processes can cause disturbance of vegetation. Deposition of new parent material results in regosols or cumulic soils.

U1 was used to indicate inundation due to beaver dams. These may be recently flooded sites where there has been insufficient time for the accumulation of organic materials or the development of mature Gleysols.

The symbol -K is used to indicate karst terrain, i.e., limestone areas where dissolution has resulted in the formation of caves, underground passageways, and surface fretting. Soils are commonly thin or absent on limestone.

## 2.0 ECOSYSTEM UNIT CLASSIFICATION AND SYMBOLS

### 2.1 CLASSIFICATION SYSTEM

Three levels of classification are used in mapping habitats. These include Ecosections, Biogeoclimatic Units (zone, subzones, variants and phases) and Ecosystem Units.

**Ecoregion** classification system is used to stratify British Columbia's terrestrial and marine ecosystems into discrete geographical units at five different levels. The two highest levels, Ecodomains and Ecodivisions, are broad and place BC globally. The three lowest levels, Ecoprovinces, Ecoregions and Ecosections are progressively more detailed and narrow in scope, and relate segments of the province to one another. They describe areas of similar climate, physiography, oceanography, hydrology, vegetation and wildlife potential (Demarchi, 1993, 1996). Ecosection boundaries are delineated on 1:20,000 and 1:50,000 terrestrial ecosystem maps.

**Biogeoclimatic Subzones** are areas over which a distinct climatic climax community or zonal ecosystem occurs. A subzone consists of unique sequences of geographically related ecosystems.

**Biogeoclimatic Variants** are a subdivision of a subzone and represent a further reduction in the climatic and geographic variability with a subzone. These climatic differences result in corresponding differences in vegetation, soil and ecosystem productivity.

**Ecosystem Units** incorporate the site series of biogeoclimatic classification in addition to physical attributes and structural stages. Generally site series are relatively homogenous with regard to soils, surficial materials, topographic position, topoclimate and trends of secondary succession. Ecosystem units are composed of three components: site series, site modifiers, and structural stage. Ecosystem units have also been developed for non-forested ecosystems presently not included in the site series classification.

**Site Series** have been developed to describe variation at the site level within the biogeoclimatic unit. Site series codes (two letters) are unique within the biogeoclimatic subzone or variant [Resources Inventory Committee (RIC), 1998].

**Site Modifiers** are used to refine site series into more specific ecosystem units based on distinguishing site, soil and terrain characteristics. Typical environmental conditions have been defined for each site series defined within the Ministry of Forests biogeoclimatic classification system (RIC, 1998). Modifiers are used for sites that differ from the typical situation.

**Structural Stages** describe the dominant stand appearance for the ecosystem unit (RIC, 1995, 1998).

**Stand Composition Modifiers** are used to further differentiate between coniferous, broadleaf and mixed stands for structural stages 3 to 7 of forested ecosystems.

The ecosections, biogeoclimatic units, and ecosystem units present in the study area are described in the following sections.

### 2.2 ECOREGIONS AND BIOGEOCLIMATIC UNIT DESCRIPTION

#### 2.2.1 Ecosections

The study area occurs in three Ecosections that fall within three Ecoregions, namely the Northern Coastal Mountains Ecoregion, the Yukon-Stikine Highlands Ecoregion and the Boreal Mountains and Plateaus Ecoregion. The Boundary Ranges Ecosection is located in the Northern Coastal Mountains Ecoregion; the Tahltan Highlands Ecosection is situated in the Yukon-Stikine Highlands Ecoregion; and Teslin Plateau Ecosection is found in the

Boreal Mountains and Plateaus Ecoregion. A description of these ecoregions and ecosections can be found in Demarchi et al. (1996) and is summarized below.

### **2.2.1.1 Boundary Ranges Ecosection**

The Boundary Ranges Ecoregion (BOR) is one of three Ecosections located in the Northern Coastal Mountains Ecoregion, a rugged, largely ice-capped mountain range that rises abruptly from the coast. The Boundary Ranges Ecosection “is a large block of rugged, ice-capped, granitic mountains that are dissected by several major river valleys including the Taku River. It is the eastern or interior-most segment of the three major units in this Ecoregion. Most of this unit occurs in British Columbia.

The Wet Maritime Coastal Western Hemlock Variant (CWHwm), Leeward Moist Maritime Mountain Hemlock Variant (MHmm2) and Alpine Tundra Zone are found in the BOR Ecoregion within the project area.

### **2.2.1.2 Tahltan Highlands Ecosection**

The Tahltan Highland Ecosection (THH) is one of three Ecosections that lie within the Yukon-Stikine Highlands Ecoregion. This Ecoregion is a transitional mountain area lying between the rugged coastal mountains to the west and the subdued plateaus to the east (Teslin Plateau Ecosection, Boreal Mountains and Plateaus Ecoregion). The Tahltan Highland Ecosection is a transitional mountain area with several large valleys exposed to the coast that allow moist air to dominate the lower slopes. Within the project area, the upper part of the Taku River, the Inklin River, Sloko River and Nakonake River occur within the Tahltan Highland Ecosection.

Four biogeoclimatic zones occur within the THH within the project area. The Moist Very Cold Sub-Boreal Spruce subzone (SBSmv) lies within along the valley floors up to the mid-mountain slope position. The Moist Very Cold Engelmann Spruce – Subalpine Fir subzone (ESSFmz) occurs from mid slope to the tree line; the Moist Very Very Cold Parkland Engelmann Spruce – Subalpine Fir subzone (ESSFmzp) occurs on rolling, upper elevation plateaus at the treeline. The Alpine Tundra Zone occurs on upper slopes and mountain tops above the ESSFmz or ESSFmzp.

### **2.2.1.3 Teslin Plateau Ecosection**

The Teslin Plateau Ecosection is one of six Ecosections that occurs within the Boreal Mountains and Plateaus Ecoregion. The Boreal Mountains and Plateaus Ecoregion is a large area with a complex of lowlands, rolling and high plateaus and rugged mountains. It lies to the east of the Coast Mountains, south of the Yukon border and west of the Liard Basin and Northern Rocky Mountains. It has a dry sub-arctic climate. In British Columbia this Ecoregion contains six Ecosections, including The Teslin Plateau Ecosection, a rolling plateau area that lies in the rainshadow of the Coast Mountains. It contains several large lakes (Atlin Lake, Surprise Lake, Gladys Lake) situated in wide valleys.

Six biogeoclimatic units occur within the Teslin Plateau. The Moist Cold Boreal White and Black Spruce subzone (BWBSmc) occurs on plains (adjacent to Atlin Lake) and in lower valleys (i.e. Gladys River). The Moist Cool Spruce - Willow - Birch subzone occurs on mountain slopes and plateaus above 1050m. The Spruce – Willow – Birch scrub subzone occurs above the treeline on middle and upper slopes and is covered largely by low shrub ecosystems. A relatively small amount of the SBSmv occurs in the TEP along the north side of the Sloko and Nakina Rivers. An area of ESSFmz is also found in the TEP Ecosection on Mount O’Keefe and Focus Mountain. The Alpine Tundra Zone occurs on upper slopes and mountain tops above the SWBmks or ESSFmz/ESSFmzp subzones.

## **2.2.2 Biogeoclimatic Units**

Nine biogeoclimatic units occur within the study area. These are:

CWHwm	Wet Maritime Coastal Western Hemlock Subzone
MHmm2	Leeward Variant, Moist Maritime Mountain Hemlock

SBSmv	Moist Very Cold Sub-Boreal Spruce
ESSFmz	Moist Very, Very Cold Engelmann Spruce – Subalpine Fir Subzone
ESSFmzp	Moist Very Very Cold Parkland Engelmann Spruce – Subalpine Fir Subzone
BWBsmc	Moist Cold Boreal White and Black Spruce
SWBmk	Moist Cool Spruce – Willow – Birch Subzone
SWBmks	Moist Cool Scrub Spruce – Willow – Birch Subzone
AT	Alpine Tundra Zone

### 2.2.2.1 *CWHwm*

The CWHwm is the most northerly of the CWH subzones. In the northern portion of the Prince Rupert Forest Region the CWHwm subzone is found mainly to the west of the crest of the coast mountains along the major river drainages (Banner et al, 1993). In the project area, the CWHwm is found adjacent to the lower Taku River and its tributaries to an elevation of 600 m (up to 650m on warm aspects).

In the north, CWHwm is characterized by the presence of western hemlock in the tree canopy; Sitka spruce is also common, especially on fluvial materials. Black cottonwood is common on floodplains. Western redcedar and amabilis fir are both absent in this area of the CWH (Banner et al, 1993). The climate is wet and mild although the CWHwm likely has a heavier snowfall and shorter growing season than the other CWH subzones located to the south. Alaska blueberry, oval-leaved blueberry, false azalea, ferns and step moss are common species in the understorey.

### 2.2.2.2 *MHmm2*

The MHmm2 occurs above the CWH zone along the west slope of the Coast Mountains. It occurs at elevations above 600 m. The MHmm2 is mapped to an upper elevation of approximately 1200 - 1240m in the project area. The MHmm2 in the Taku River area is generally very rugged and steep and has not been differentiated into parkland. Very small, discontinuous areas of moderately steep parkland are present but these are more suitable for mapping at a 1:20,000 scale.

Mountain hemlock and subalpine fir are dominant in the tree canopy of climax stands on zonal sites; amabilis fir and yellow cedar are absent. Blueberries, pipecleaner, heron's-bill mosses, red-stemmed feathermoss and leafy liverworts dominate the understorey.

The MH that is found in the Tulsequah Chief project area might be a different variant, however it has been classified as the MHmm2 for the purposes of the study.

### 2.2.2.3 *SBSmv*

The previously unclassified SBS in the project and has been classified as the new Moist Very Cold Sub-Boreal Spruce Subzone. The SBSmv is a new subzone. It occurs in the river valleys and along lower mountain slopes to an elevation of 800 m (up to 840 m on strong warm aspects). It contains the most diverse number of tree species of the biogeoclimatic units found in the project area. Subalpine fir and hybrid spruce are common in the tree canopy of climax stands on near mesic sites away from the river bottoms. Black cottonwood, trembling aspen, lodgepole pine and paper birch are found on a variety of sites and are common seral species. Black cottonwood is common on fluvial sites while lodgepole pine is common on dry sites.

A diverse number of shrub species may be found in the subzone. These include oval-leaved blueberry, false azalea, devil's club, highbush-cranberry, red-osier dogwood, soopolallie, saskatoon, black gooseberry, prickly rose and alder species. Thimbleberry and Douglas maple are present on some sites. Bunchberry, prince's pine, bastard toad-flax, twinflower, heart-leaved arnica, five-leaved bramble, wintergreen's, and oak fern are common in the herb understorey. Red-stemmed feathermoss, step moss, knight's plume, dicranum mosses and leafy liverworts are common in the moss layer.

More than one subzone or variant may be present within the SBSmv subzone, although these have not been mapped. One subzone/variant appears to occur in the lower elevations of the Taku and Inklin Rivers and up to about the confluence of Sloko and Nakina Rivers. The BIEp – Highbush-cranberry – Bunchberry and BISw – Devil’s club – Oak fern are more common in these major river valleys. The other subzone/variant may occur at higher elevations in the SBS zone (perhaps above 450-500m) and/or in the parts of the zone that are less influenced by moist air that flows up the major drainages (i.e. in the Sloko River area and the upper part of the King Salmon Creek system). The BI – Bunchberry – Feathermoss is more common in these areas. These differences may be identified after further sampling in the area or after provincial correlation of the data.

#### **2.2.2.4      *ESSFmz***

The ESSF in the project area has now been classified as the new Moist Very, Very Cold Engelmann Spruce – Subalpine Fir Subzone. The area was previously mapped as the ESSFwv and ESSFwvp. It occurs above the SBSmv subzone. Subalpine fir and white spruce and/or hybrid spruce are found in the tree layer (subalpine fir is dominant on many sites). Lodgepole is a common seral species and is also common on dry sites. Mountain hemlock and western hemlock are uncommon and are generally only found near the CWH and MH zones (unlike the ESSFwv zone).

The shrub understorey on zonal sites consists of oval-leaved blueberry and false azalea (black huckleberry is not common). Devil’s club, currants and black gooseberry are found on seepage and richer sites. Mountain-heathers and crowberry are found in understorey in the upper part of the subzone near the transition to parkland. Bunchberry, five-leaved bramble, oak fern, clasping twistedstalk, foamflowers, oak fern and spiny wood fern are common understorey species. Sitka valerian, Sitka burnet, Indian hellebore, lady fern, and horsetails are found on wet sites. Common leafy liverworts, red-stemmed feathermoss, and dicranum mosses are common in the moss layer.

Avalanche tracks dominated by Sitka alder are common in the subzone. Non-forested ecosystems such as heather meadow, dwarf shrub-lichen (dry –lichen), krummholz and non-vegetated talus and rock are common in the upper part of the subzone were ESSFmzp has not been mapped (see ESSFmzp below).

#### **2.2.2.4      *ESSFmzp***

The ESSFmzp (parkland) subzone has been mapped on undulating plateaus and areas of moderately sloping terrain. Parkland occurs at elevations above elevations of approximately 1140 to 1200m. The elevations vary slightly with local terrain and with geographic location (increase slightly to the north). Parkland is characterized by a mosaic of tree patches, mountain-heather dominated meadows, wet herb meadows and grasslands. Subalpine fir is found in the tree islands; trees are often short and clumped in together. Oval-leaved blueberry, white mountain-heather, yellow mountain-heather, partridgefoot, five-leaved bramble and crowberry are typically found in the tree patches. Mountain-heathers, crowberry and partridge-foot are found in the heather meadows while herbs such as Sitka valerian, Indian hellebore, arrow-leaved groundsel, and Sitka burnet are found on moist and wet sites. Fescue dominated grasslands are also present in some locations.

Parkland has not been mapped as a continuous subzone in the project area due the steep terrain found on many of the upper mountain slopes. Project correlators agreed that it would be unnecessary to insert another subzone line in areas of steep terrain at the 1:50,000 mapping scale.

#### **2.2.2.6      *BWBSmc***

The Boreal White and Black Spruce zone in the project area was originally classified and mapped as the BWBSdk1 (Stikine Variant, Dry Cool). It has been re-classified as a new subzone, namely the Moist Cold Boreal White and Black Spruce Subzone. Zonal sites in the BWBSmc differ from the BWBSdk1 in that it has more subalpine fir and lodgepole pine in the tree canopy and less white spruce, trembling aspen and black spruce (generally absent). Zonal BWBSmc sites also appear to have less prickly rose, highbush-cranberry, soopolallie, twinflower, and fireweed, and more crowberry in the shrub and herb layers. The BWBSmc also has less step moss and knight’s plume and more red-stemmed feathermoss in the moss layer than the BWBSdk1.

The BWBSmc found in the project area generally occurs at elevations above 670m (the approximate elevation of Atlin Lake). A small area near the Silver Salmon River and Nakina River is lower in elevation. The BWBSmc has been mapped to elevations of 1050m (slightly higher on strong warm aspects).

A variety of successional stages are present on sites supporting forested units as a result of forest fires. Wet swamp forests and non-forested wetlands are also common in flat valley bottoms and along watercourses.

#### **2.2.2.7 SWBmk**

The previously unclassified SWB in the project area has been classified as the Moist Cool Spruce-Willow-Birch Subzone. It occurs above the BWBSmc subzone at elevations from 1050 to about 1340m. Subalpine fir is most common in the canopy; white spruce is found on moist and wet sites. Lodgepole is a common seral species and is also common on dry sites.

Zonal sites generally have a sparsely developed shrub (excluding subalpine fir regeneration) and herb layer consisting of crowberry, bunchberry, and twinflower. The bryophyte layer is typically well developed and consists of step moss, red-stemmed feathermoss, leafy liverworts and lichens. Two near zonal sites were identified (see descriptions of Bl-Feathermoss and Bl-Bunchberry-Leafy Liverworts in Section 4.8). Red-stemmed feathermoss and step moss are dominant in the bryophyte layer of the Bl - Feathermoss (FF) unit while liverworts are more common in the Bl - Bunchberry – Leafy liverwort unit. These units have been described separately but treated as FF for mapping purposes.

Trembling aspen (scrubby, dwarf forms) and common juniper are found on steep, warm aspects. Scrub birch, willows, crowberry, Altai fescue and a variety of lichens are species commonly found on non-zonal sites. Non-forested ecosystems (wetlands and scrub birch units) are common in valley bottoms that experience cold air accumulation. This sometimes results in a double tree line (i.e. trees grow on the slopes above the valley bottoms and below the SWBmks subzone).

#### **2.2.2.8 SWBmks**

The previously unclassified SWB scrub has been classified as the Moist Cool Scrub Spruce-Willow-Spruce subzone. It occurs above the SWBmk subzone and below the AT zone. Scrub forest (consisting of subalpine fir) are found in the lower part of the subzone but the majority of the SWBmks is covered by non-forested shrub, dwarf shrub, dwarf shrub-gramanoid, and grasslands ecosystems. Scrub birch – Altai fescue ecosystems cover extensive areas of gently to moderately sloping terrain on near mesic sites.

Scrub birch, willows, dwarf willows (net-veined, Arctic, Stoloniferous), crowberry, bog blueberry, dwarf blueberry, Altai fescue, mountain sagewort, red-stemmed feathermoss, dicranum mosses, haircap mosses, reindeer lichens, Cladonia lichens, ragged paperdoll and eye foam are species commonly found in the subzone.

#### **2.2.2.9 AT**

The AT zone is very extensive in the project area. The elevation at which AT occurs varies greatly across the project area (elevations increase from south to north). In the coast mountains (Boundary Ranges Ecoregion) the AT zone occurs above the MHmm2 subzone at elevations greater than 1200m. It is generally very rugged and steep; non-vegetated rock outcrop, talus and icefields are very common. The AT zone becomes less steep and rugged in the Tahltan Highlands Ecoregions, lying above the ESSFmz and ESSFmzp at elevations greater than 1400-1420m. In the Teslin Plateau Ecoregion the AT zone is much less rugged and consists of broad plateaus and rounded mountains. Much more of the AT zone is vegetated in the Teslin Plateau Ecoregions than in the other ecoregions and icefields are absent. It occurs at elevations above 1420 to 1620 m in the TEP.

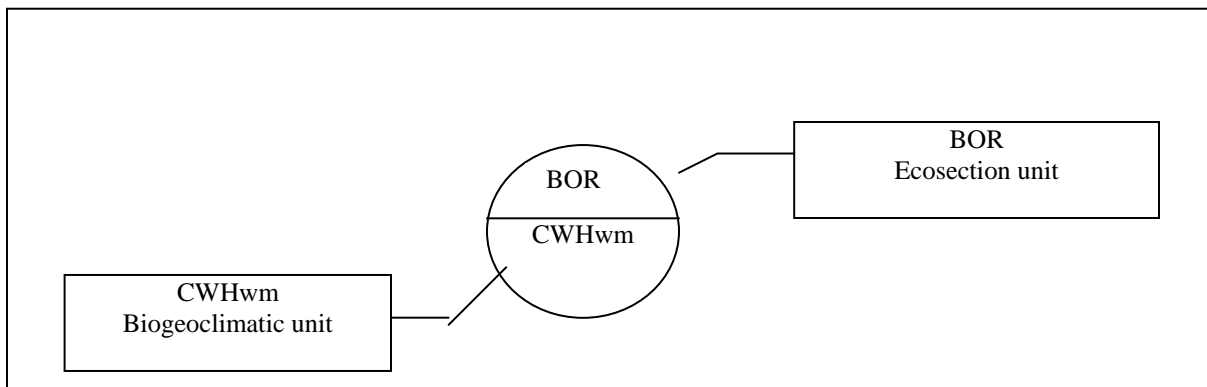
Krummholz (consisting of both mountain hemlock and subalpine fir), mountain avens - dwarf willow scrub, and mountain-heather ecosystems are most common in the coastal areas. Mountain avens – dwarf willow scrub, Altai fescue – dwarf willow units, Altai fescue – lichen grassland, and low scrub birch units are most common in the Teslin Plateau Ecoregion. Since the Tahltan Highlands is located between the coast and interior it contains a

mixture of ecosystem units. Wet seepage meadows, herbaceous meadows and alpine wetlands are localized in area (rare in the coastal alpine) and generally uncommon.

### 2.2.3 Ecoregion and Biogeoclimatic Map Labels

Figure 2 depicts the ecoregion and biogeoclimatic unit label as they appear on the ecosystem maps.

**Figure 2: Symbols for Ecoregion and Biogeoclimatic Units**

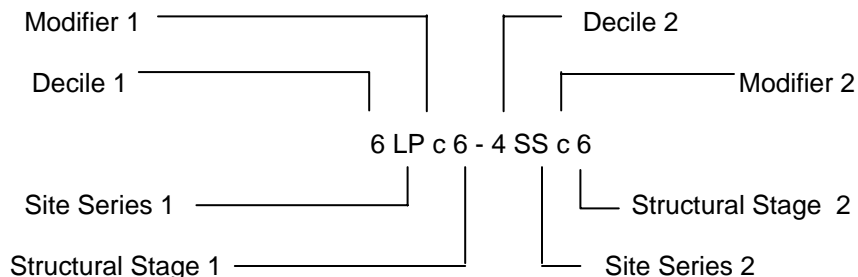


## 2.3 ECOSYSTEM UNIT METHODOLOGY

Mapping was completed according to the methodology outlined in *Standards for Terrestrial Ecosystem Mapping in British Columbia* (RIC, 1998).

The ecosystem mapping is based on the three level ecosystem classification framework, which includes ecoregion units, biogeoclimatic units and ecosystem units. Ecosystem unit labels consist of three components: site series, site modifier(s) and a structural stage. Site series are defined within the existing Ministry of Forests biogeoclimatic ecological classification system where possible (Banner et al., 1993). Classification was developed for the SBS and SWB zones as a component of the project as these zones were previously considered unclassified. The classification for the BWBS and ESSF zones was also altered as a result of sampling. Non-forested ecosystem units (i.e. avalanche units, parkland forest, heathland, dwarf shrub, grassland and wetlands) were also encountered that are presently not included in the MoF site series classification. Names, codes and typical descriptions for these units were selected from the Ministry of Sustainable Resource Management Provincial Site Series Code list where possible. When the data did not fit an existing unit a new unit was created for approval. A two-letter code has been assigned to each of the Ministry of Forests site series, to the newly classified units and to the non-forested ecosystems. The two-letter code is followed by site modifiers (if any are used) and then by the structural stage. Up to two site modifiers may be used in defining ecosystem units. The structural stage component of the label consists of a numeric character and in certain cases a structural stage modifier (a lower case alpha character). An example of an ecosystem unit map label is provided in Figure 3.

**Figure 3: Ecosystem Unit Label**



### 2.3.1 Site Series

Site series have been developed to describe variation at the site level within the biogeoclimatic units (RIC, 1995, 1998). The site series describe all land areas capable of supporting a specific climax plant association and reflecting a specified range of soil moisture and nutrient regimes within a subzone or variant (RIC, 1995, 1998). A two-letter symbol has been assigned to each site series; the codes are unique to each biogeoclimatic subzone and variant.

#### 2.3.1.1 Classification of Site Series

A significant component of this project included the completion of classification for the unclassified SBS and SWB zones and for the assessment of the existing classification for the BWBSdk1 and ESSFwv.

A total of 390 plots from three sources were used to develop and revise the classification for the project. Two hundred and fourteen (214) plots were completed during the 2000 field program, while 80 plots were completed by JMJ Holdings (1997) during the original 1996 Tulsequah Chief field program. In addition, 96 plots completed by the MoF during a trip down the Sheslay, Inklin and Taku Rivers in 1997 were used; some of these plots were located within the project area while others were completed in the project subzones outside the project boundaries. The MoF plots were largely from the BWBS, SBS, ESSF and CWHwm biogeoclimatic units. The MoF data were obtained in VPRO format.

Data from the 1996 and 2000 Tulsequah Chief project field programs were entered into VENUS. This data was then exported into VPRO format and combined with the MoF plot data. These data were then tabulated by biogeoclimatic unit, site series (for those units where classification existed) and by structural stage (to separate various non-forested from forested ecosystems). During the 2000 Tulsequah field program plots from forested sites were assigned a site series code based on the existing classification for the BWBSdk1, ESSFwv, and CWHwm. Plots from the MHun zone were assigned a site series from the MHmm2 classification. Data for non-classified ecosystems and from the unclassified SWB, SBS and AT zones were initially grouped into categories defined by soil moisture regime and/or plant associations (for example spruce – horsetail, spruce – devil’s club, pine – lichen). These site series or plant associations were used as site units in VPRO. Certain indicator plant genus and/or species were then assigned a specific colour code within VPRO. These data were then plotted in tabular format by biogeoclimatic zone. The tables included environmental and physical data as well as the percent cover by plant species. These data were analyzed for similarities in site characteristics and plant species. Plots were then re-assigned to more appropriate site units based on this analysis. Data (VPRO) format and output tables were then provided to Allen Banner, Regional Ecologist for the Prince Rupert Forest Region and Del Meidinger, MoF Research Branch for review and comment.

After the initial classification was developed based on the plot data, the ground inspection data from the 2000 field program were exported into the VPRO format with the plot data. The ground inspection data were used to enhance certain units that contained few plots and/or to develop new non-forested units.

A table of site units was developed for all the units identified in each biogeoclimatic zone. Codes and descriptions for existing site series and non-forested units were taken from the Provincial Site Series Mapping Codes List, when appropriate. Two letter codes and names were then created for the previously unclassified units. A list of all units for each biogeoclimatic zone, including suggested names and codes for new units were provided to Allen Banner for review along with data mentioned above. Some site units were lumped together for mapping purposes as a result of the review. For example two near-mesic forested site units (Bl – Feathermoss and Bl – Bunchberry – Leafy liverworts) that were identified were lumped under one code for mapping. In addition several adjustments to codes and names were made. Upon approval of the classification by the Regional Ecologist a table of two letter codes, unit names and typic descriptions was created and provided to MELP correlators. Adjustments to certain names and codes followed the MELP review.

Approval of the biogeoclimatic unit names followed the approval of the unit names. The BWBS found in the project area was previously included in the BWBSdk1 subzone. It was determined that it should be described as a newly established subzone, namely the BWBSmc. For the most part names and codes found in the BWBSdk1 have been used to describe the subzone. The SWB found in the project area was previously unclassified. The SWB was initially thought to be a new subzone, however MoF decided that the Tulsequah project data should be included in a formal classification process with all provincial SWB data before a new subzone is assigned. The SWB in the Tulsequah project area was therefore assigned to the SWBmk and SWBmks. This change required some further adjustments to the codes and names. The SBS located in the project areas was previously unclassified; it was assigned to the Moist Very Cold Sub-Boreal Spruce Subzone (SBSmv). The ESSF found in the project area was previously mapped as the ESSFwv and ESSFwvp subzones. It was determined that it should be described as the ESSFmz; existing codes and names from the ESSFwv were used for classification of the subzone. The CWH remained in the wet maritime subzone (CWHwm) and the MH was classified as the MHmm2. A description of each of the project biogeoclimatic subzones is given in Sections 2.2.2.1 to 2.2.2.9.

### 2.3.2 Site Modifiers

Typical environmental conditions, such as site, soil (depth, texture) and terrain features have been described for each sites series within the Ministry of Forests biogeoclimatic classification system. Site modifiers, if required, are used to further denote conditions that differ from the typical for the site series.

The following site modifiers have been used:

Symbol	Criteria
a	active floodplain
c	coarse-textured soils (includes sand and loamy sand; and sandy loam, loam and sandy clay loam with over 70% coarse fragment volume)
d	deep soils (> 1 metre)
f	fine-textured soils (includes silt and silt loam with less than 20% coarse fragment volume; heavy clay, silty clay, silty clay loam, clay loam, clay and sandy clay with less than 35% coarse fragment volume)
g	gullyng occurring
h	hummocky terrain
j	gentle to moderate slope (less than 35% slope)
k	cool, northerly or easterly aspect (285-135 degrees, slopes 35-100%)
m	medium-textured soils (includes sandy loam, loam, and sandy clay loam with less than 70% coarse fragment volume; silt loam and silt with greater than 20 % coarse fragment volume; and clay, silty clay, silty clay loam, clay loam, sandy clay and heavy clay with greater than 35% coarse fragment volume)

<b>Symbol</b>	<b>Criteria</b>
n	fan or cone
p	peaty material on surface
q	very steep cool aspect (slope greater than 100% on cool aspects, 285 – 135 degrees)
r	ridge top
s	shallow soils (20-100 cm to bedrock)
t	terrace
v	very shallow soil (less than 20 cm to bedrock)
w	warm, southerly or westerly aspect (135-285 degrees, slopes 35-100%)
z	very steep warm aspect (slope greater than 100% on warm aspects, 135-285 degrees)

### 2.3.3 Structural Stage

Structural stage describes the existing dominant stand appearance or physiognomy of the ecosystem unit. One of seven structural stage categories describing the current development stage is assigned to each ecosystem unit.

Symbol	Structural Stage	Age Criteria and Description
1	Sparse/Bryoid	Initial stages of primary and secondary succession; total shrub and herb cover is less than 20%.
1a	Sparse	Less than 10% vegetation cover. (Less than 20 years.)
1b	Bryoid	Bryophyte and lichen-dominated communities; >1/2 total vegetation cover (less than 20 years).
2	Herb	Early successional stages, and disclimax or climax sites, dominated by herbaceous vegetation (tree cover < 10%, shrub cover <= 20%, herb cover >20% or >= 33% of total cover) (less than 20 years for normal forest succession).
2a	Forb-dominated	Herbaceous communities dominated (>1/2 of total herb cover) by non-graminoid herbs, including ferns.
2b	Graminoid-dominated	Herbaceous communities dominated [>1/2 of total herb cover by graminoids (grasses, sedges, reeds, and rushes)].
3	Shrub/Herb	Early successional stages, and communities dominated by shrub vegetation < 10 m in height (tree cover < 10%, shrub cover > 20% or >= 33% of total cover). Used for communities that will be forested at climax (less than 20 years for normal forest succession).
3a	Low Shrub	Disclimax or climax communities dominated by shrub cover < 2 m in height.
3b	Tall Shrub	Disclimax or climax communities dominated by shrub cover 2-10 m in height.
4	Pole/Sapling	Trees > 10 m tall that have topped the shrub and herb layers. Stands are typically dense (generally < 20-40 years).
5	Young Forest	Self-thinning is usually evident and the forest canopy has begun differentiation into distinct layers (40-80 years).
6	Mature Forest	Trees established after the last disturbance have matured and a second cycle of shade tolerant trees may have established. (80-250 years for the CWHwm and MHmm2; 80 – 140 years for the BWBS).
7	Old Forest	Old structurally complex stands. (>250 years for the CWHwm, MHmm2; >140 years for the BWBS).

### 2.3.4 Stand Composition Modifiers

Stand composition modifiers are used to provide further definition to the structural stage. These modifiers differentiate between coniferous, broadleaf and mixed stands (RIC, 1998).

Modifier	Description
C	Coniferous – greater than ¾ of total tree layer cover is coniferous
B	Broadleaf – greater than ¾ of total tree layer cover is broadleaf
M	Mixed – neither coniferous or broadleaf account for > ¾ of total tree layer cover

## **2.4 ECOSYSTEM UNITS**

A summary of ecosystem units mapped in the project area is provided in Table 1. Map code, site series number, assumed site modifiers, typical situation, typical soil moisture regime and mapped site modifiers is provided for each ecosystem unit. Detailed descriptions of each ecosystem unit (summarized by biogeoclimatic unit) are provided in sections 4.2 through 4.6.

## **3.0 ECOSYSTEM MAPPING METHODOLOGY**

### **3.1 BACKGROUND**

Mapping was completed according to the methodology outlined in the Standard for Terrestrial Ecosystem Mapping in British Columbia (RIC, 1998).

### **3.2 PRETYPING ALPINE AND PARKLAND**

Alpine (AT) and subalpine (ESSFmzp, SWBmks) biogeoclimatic subzone lines were pre-typed on to the black and white 1:30,000 scale air photographs. Elevations for the subzone lines were selected based on previous mapping (JMJ Holdings, 1997), the October 1999 field reconnaissance, the Prince Rupert Regional Field Guide, information provided by the MoF Regional Ecologist and MELP Correlators, and information interpreted from the air photographs. Draft lines were typed on the photos following selected elevations (from plots of TRIM topography). Examples of the pre-typing were provided to MELP/MoF for review and comment. Final lines were typed on the boxed air photographs.

### **3.3 BIOTERRAIN**

Bioterrain pretyping was completed by Deepa Spaeth Filatow on 1:30 000-scale black and white air photos using a mirror stereoscope. 3X binoculars were used to inspect details and small features. Mapping was reviewed by J. M. Ryder Ph.D., P. Geo. and Larry Lacelle, P.Ag. During pretyping, areas of relatively uniform surficial material, landform, aspect, and drainage were delineated as polygons; polygon boundaries incorporated previously mapped biogeoclimatic lines. Each polygon was assigned a terrain symbol and drainage class. A detailed legend defining the terrain symbols is included in Appendix A.

There are several factors that influence the reliability of terrain mapping done largely by air photo interpretation, and hence the reliability of interpretations that are based on the terrain information. These include: the skill and experience of the mapper, the scale and quality of the air photographs, the density of the vegetation cover, the type of terrain and surficial materials present, and the terrain survey intensity level.

The mapper had prior first-hand knowledge of the study area, gained from mapping and field-checking for the terrain and soils portion of the terrestrial ecosystem mapping completed in 1996, and from mapping and field work for terrain stability field assessment, terrain stability mapping, and hazard mapping between 1997 and 1999; In addition, the terrain in the study area is not unusual to B.C. and similar to areas regularly encountered in terrain mapping projects.

The air photos used were of high quality and free of cloud cover. 1:30 000-scale air photos were used which is an appropriate scale for 1:50 000 final maps.

Bioterrain mapping was carried out following the Terrain Classification System for British Columbia (Howes and Kenk, 1997), the Guidelines and Standards to Terrain Geology Mapping in British Columbia (RIC, 1996) and ecosystem mapping standards (RIC, 1998).

Bioterrain mapping occurred over the fall of 1999 and winter of 2000. Pretyped aerial photographs from the north (Teslin Plateau), middle (transition from boreal to coastal), and southern (Boundary Ranges) portions of the project area were submitted to the Provincial Bioterrain Correlator for review. Comments received from the Correlator were incorporated into the mapping. Mapping on the air photographs was checked by staff from J.M. Ryder and Associates during the field work completed in the summer of 2001 (see Section 3.3). Following completion of the field work, the bioterrain polygon lines, terrain symbols and soil drainage classes were revised to take field data into account.

### **3.4 DIGITAL CAPTURE OF BIOTERRAIN LINEWORK**

All aerial photographs from the field program were orthorectified using softcopy methodologies from PCI Inc (Orthoengine AE). A value-added product of this technique is a full orthophoto image of the entire study area, which may be used for future enhancement of study area projects.

Air photos were digitally scanned at a resolution of 700dpi, which is sufficient to meet the ground control specification for TEM. All ground control points (GCP's) collected for each photo are listed in ASCII reports including X, Y, and Z coordinates, as well as GCP residual error values (X, Y, and Z) for each of the GCP's. Digital TRIM files were used in the collection of the georeferenced GCP's. All output is expressed in metres to three decimal places.

OrthoEngine automatically calculates the principal point of the photo using fiducial marks as input. The fiducial mark location will be accurate within plus or minus 4 m at ground scale.

Camera calibration report information is provided in an ASCII report format.

Polygon linework and field plot locations has been extracted from the orthorectified images and exported to Arc/Info using ImageWorks from PCI Inc. Topology corrections and edgematching existing polygon coverages were performed using Arc/Info. The submitted coverages will BUILD without errors or warnings. The Arc/Info commands LABELERRORS and NODEERRORS command will run with no errors, other than polygon 0 for the LABELERRORS command.

*FORMIS* has developed a custom data-entry program for spatial attribute information. This program was used initially to enter the attribute information. Data from this program was exported as a comma-separated value (CSV) file and imported into the DCTools package for attribute verification. Customized Microsoft Access queries were utilized to perform unique sorts on the ecology data, for verification of the expanded legend.

*FORMIS* utilized a customized automated ArcView procedure to feature code the polygons and arcs in TEM coverages based upon the attribute information for each polygon. ArcView Ver. 3.2 was used to produce the cartographic legend for the maps.

Spatial attribute links will be contained in the 'ecp' coverage as a foreign key field labelled as 'ECP\_TAG'. The field inspection sites 'eci' coverage will contain a foreign key field labelled as 'ECI\_TAG', which will link each sample site to its textual attributes in the non-spatial database.

Metadata files in Arc/Info format will be provided for field mapping information, GIS specifications and projection information.

### **3.5 FIELD WORK**

A sampling plan was submitted to MELP prior to the initiation of field work. These plans identified the biogeoclimatic units and potential ecosystem units expected in the area. Air photographs and topography maps were examined to identify access routes and potential sampling sites. These sampling sites were selected to provide a cross section of environmental and physical conditions in the project area. Potential sampling sites and traverses were marked on paper copies of 1:50,000 topography maps. These maps and the air photographs were used to plan field work as the sampling season progressed.

Field work was completed during three trips in the summer of 2000 at survey intensity level 4. The first trip covered the period June 18– July 3; the second trip occurred from July 16 to August 3 and the third trip ran from August 17 to September 4. Two field crews, consisting of three persons each, were deployed on each trip. Each field crew consisted of a plant ecologist, terrain/soil specialist and a second ecologist and/or wildlife technician. The scientists who participated in the field sampling program were as follows: vegetation, site, wildlife tree, coarse woody debris data and bear food plant phenology data were collected by Robert Fuller, Claudia Houwers and Harry Williams; terrain and soils data were collected by Deepa Spaeth Filatow, Claire Tweedale, and Jen Shypitka. Damian Power collected wildlife tree, coarse woody debris and wildlife data.

Two hundred and fourteen (214) full plots and 310 ground inspections and 996 visual inspections were completed in the project area. The locations of the plot and ground inspection sites were selectively chosen. An effort was made to ensure that the sample sites were homogeneous with respect to site, soil and vegetation characteristics. The Ecosystem Field Plot form (1998 version FS 882) was completed for full plots, while the Terrestrial Ecosystem Mapping Ground Inspection Form was used for ground inspections and those visuals that consisted of a ground (within polygon) visit; notes were collected on air call visuals. The Field Manual for Describing Terrestrial Ecosystems (Ministry of Forests and BC Environment, 1998) provided a detailed methodology for data collection at plot and ground inspections locations. Colour photographs were taken of the general plot area at the full plots and some ground and visual inspections.

Data on wildlife trees and coarse woody debris were collected at full plot inspections. Ecosystem Field Plot form FS 882 pages 6 and 7 were used to record wildlife tree and coarse woody debris data, respectively. Abbreviated data for wildlife tree and coarse woody debris were collected for ground inspections. Bear plant food phenology data were collected at full plot and ground inspections during the second and third field trips. The Field Manual for Describing Terrestrial Ecosystems (Ministry of Forests and BC Environment, 1998) provided a detailed methodology for data collection at plot and ground inspections locations. An attempt was made to collect information on ground lichen biomass for genera (i.e. *Cladina* spp., *Cetraria* spp.) that may be important forage for caribou. No formal methodology is available for collection of this information. Therefore notes were made in the comments section concerning vigour (e.g. height). This information can be used with the percent ground cover data to estimate biomass.

Completion of the wildlife data form and habitat assessment was not required, however Damian Power also made written notes regarding wildlife and wildlife habitat.

Access was largely achieved by the use of helicopter; with a lesser amount being completed via road access in the Atlin, Surprise Lake, Spruce Creek, O'Donnel River and Gladys Lake areas. The location of full plots, ground inspections and visual inspections were marked on the air photographs.

### **3.6 DATA REVIEW**

Upon completion of the field studies, the project specialists reviewed the field forms. Data from the inspections (i.e. full plots, grounds and visuals) were recorded in VENUS (VTEM). Data for wildlife trees, coarse woody debris and bear food plant phenology were also entered in VENUS for full plot inspections. Bear food plant phenology data collected for ground inspections has not been entered electronically since the GRAVITI portion of VENUS does not support entry of the information. Notes on wildlife habitat assessment are provided in the form of field notes. Project data was provided to the MoF Regional Ecologist for review of the classification.

The BGC lines were placed onto copies of approximately 1:100,000 scale maps for the Regional Ecologist to review. The biogeoclimatic lines were marked on 1:50,000 maps (containing contours and bioterrain polygon boundaries) by the ecosystem mappers as ecosystems were typed.

### **3.7 ECOSYSTEM MAPPING**

Following completion of the field program, review of the field data and revision of bioterrain polygons and symbols on the aerial photographs corrections to the bioterrain polygons were captured in the digital file. The polygons were then plotted on a base map that included topographic lines and hydrology features. Digital TRIM (1:20,000) files supplied by MELP were used to create the 1:50,000 quad base maps. Biogeoclimatic unit boundaries were drafted onto the bases for digitizing.

Ecosystem unit labels were created by project ecologists. Ecosystem unit labels include a site series, modifier(s) (where conditions differ from the typical situation described for a site series) and a structural stage. Map polygons were compared to forest cover maps to assist in determining structural stage for labels. Project ecologists examined the aerial photographs to determine the labels for each polygon. Ecosystem labels may consist of simple units (one ecosystem unit) or be complex and consist of up to three ecosystem units. Bioterrain polygons were frequently

subdivided due to the placement of biogeoclimatic lines, where ecological variability within a bioterrain polygon warranted creation of separate polygons, and to account for logging history. When the bioterrain polygons were split into additional polygons by the ecosystem mappers, lines were placed on the base map. Samples of the mapping were provided to the MELP Ecology Correlator for review and comment. Comments were incorporated into the final mapping.

The revisions provided on the base maps were incorporated into the digital polygon file (spatial coverage). Ecosystem unit and bioterrain labels were entered into the ecosystem polygon database provided by the Ministry of Environment, Resource Inventory Branch (Excel format). Mapping standards provide a list of the core polygon attribute data that are required. Some of the core data found in the ecosystem database for each polygon include ecosection, biogeoclimatic zone, subzone, variant and phase, ecosystem labels [decile, site series, modifier(s) and structural stage, recorded up to three times per polygon] and stand composition. Terrain attributes were also entered in the database. A description of the ecosystem polygon data attribute fields is contained in RIC, 1998a.

Ecosystem maps were created in ARC/Info format by combining the base map coverage, polygon digital files and the ecosystem databases. A map legend was created and incorporated into the maps to assist any map user. In addition to other information (see maps), the map legend lists all of the ecosystems mapped in the project area. The biogeoclimatic unit, ecosystem name, typical situation, assumed modifiers and mapped modifiers are provided for each ecosystem unit. Copies of the maps were provided to the MELP correlators for review and comment.

Descriptions of the ecosystem units are found in Section 4.0.

### **3.8 REVISION OF 1997 CORE AREA TEM**

As a requirement of the project, the TEM completed for the core area (JMJ Holdings, 1997) was to be incorporated into the “new” mapping. Digital files of the spatial and non-spatial (attribute) TEM data were supplied to FORMIS. The initial plan was to create digital coverages of the new TEM area and then join the two projects together. However, significant problems (geographic errors) were encountered when an attempt was made to join the two spatial coverages. As a result, the linework on the air photographs for the original (core) mapping was redigitized and incorporated into the seamless coverage for the entire project area.

The polygon attribute data for the core area was revised and updated to meet 1998 Standards for Terrestrial Ecosystem Mapping. Polygons numbers from the original (core) mapping area were then matched to the new polygon numbers found in the 2001 seamless coverage. In some cases polygons could not be matched between the original (core) and new mapping. In these cases the data were examined and the polygon re-attributed if necessary.

Biogeoclimatic linework in the original (core) area were updated to reflect geographic and elevational changes to the original biogeoclimatic models. In addition, the biogeoclimatic linework in the original mapping did not consistently follow the elevation models given in the 1997 report. As a result, new biogeoclimatic lines were incorporated over much of the original map area. Attribute data for polygons affected by the change in biogeoclimatic linework were examined and changed when necessary. It is estimated that data for approximately 1000 polygons in the original map area were re-attributed due to changes in linework associated with re-digitizing the linework and adjusting the biogeoclimatic linework.

The map codes for ecosystem units were not the same for the original (1997) and new mapping. Many new units were identified as a result of the classification developed for the 2001 project and in other cases codes for units identified during both projects were changed. A correlation table was then developed that matched 1997 ecosystems to the new ecosystem units (Appendix B). Codes found in the 1997 attribute data were changed to the new codes. In cases where site modifiers for the typical situation differed between the ecosystem units the appropriate changes were made to the 1997 data. The 1997 data was incorporated into the new attribute data file after the numbers were matched spatially, the ecosystem unit codes were updated and the data was cleaned.

### **3.9 NON-FORESTED UNITS**

Non-forested ecosystem units are common throughout all BEC units in the project area. These include avalanche tracks, wetlands, parkland forest, heathland, shrublands and grasslands.

One symbol (AC) was used to map all avalanche tracks in the project area; avalanche tracks were mapped in the CWHwm, MHmm2, SBSmv, ESSFmz and ESSFmzp. The species composition of these AC units is described for each biogeoclimatic unit in Section 4.

Wetlands were mapped within each of the biogeoclimatic units. All fens and marshes were generally mapped using two symbols for each subzone; one symbol is used for graminoid dominated systems while another symbol is used for shrubby wetlands. This approach is used to increase map reliability since it is very difficult to distinguish separate types of herb (graminoid) and shrub dominated wetlands on black and white 1:30,000 scale photographs.

All non-forested fens/marshes in the CWHwm are mapped as a sedge fen (SF), while Alder –Sitka sedge – Bluejoint (AS) is used for shrub swamps. Wetlands in the MHmm2 have been mapped as generic subalpine wetland (WL). Wetlands are generally small in the steep MH zone. Non-forest wetlands in the SWBmk and SWBmks include Sedge Fen (SF), Willow – Valerian (WV) and Willow –Sedge wetland (WS). Graminoid dominated wetlands found in the BWBSmc are mapped as Sedge – Fuzzy fen moss (SF) fen, while shrubby wetlands are mapped as Willow – Sedge (WS). Wetlands found in the SBSmv are mapped as Sedge - Fuzzy fen moss (SF) fens or as Willow – Sedge (WS) fens. Sedge dominated wetlands are mapped as Sedge Fen (SF) in the ESSFmz and ESSFmzp.

Non-forested subalpine and Alpine Tundra (AT) is very common throughout the project area. Separate units are used for grassland, shrubland, dwarf shrub - lichen, heathland, forb meadows and moist meadows in the various subzones. A description of the non-forest ecosystems is provided in Section 4.0.

### **3.10 APPLICATION OF MODIFIERS**

Terrain and soils data collected in the field indicate that coarse-textured soils are common throughout the area. These coarse-textured soils are generally found on morainal and colluvial parent materials. Fluvial and organic parent materials are also present. Soil texture modifiers were added to the ecosystem unit where field data and/or the terrain textures indicated non-typic textures for the site series. The definition used for soils textures is based on modifier definitions given in the mapping standards (RIC, 1998). These typic situations (i.e. slope position, soil depth, texture etc) are provide in the description of each unit and on the map legend. The coarse-textured modifier was assigned to appropriate ecosystem units in polygons where the terrain texture is mapped as being coarse-textured (i.e. used when the typic for the unit being mapped is other than coarse).

Soil depth modifiers were applied to situations where soil depth for a particular ecosystem did not meet the typic conditions. For example, in cases where deep soils are typic, the shallow soil modifier was used where the veneer surface expression was applied to a parent material (i.e. Mv or Cv) in the terrain label. The very shallow modifier was used where the surface expression “very thin veneer” (x) was applied to a parent material in the terrain label (i.e. Cx), where bedrock was significant component of the terrain label or where field data supported its use.

Other modifiers (such as h, j, k, n, p, and w) were used in situations that did not meet the typic situation. The gullyng modifier was applied when the bioterrain label included the gullyng geomorphological process (V) and the gullyng was thought to be a significant factor influencing ecosystem types in the polygon.

### **3.11 DISTURBANCE HISTORY**

The most significant disturbance of ecosystems in the project area is the result of fire. As a result of the fires, a moderate amount of structural stage three, four and five has been mapped in certain biogeoclimatic units (BWBSmc, SWBmk, SBSmv and to a lesser extent the ESSFmz). Recent large burns have occurred to the east of Sloko Lake (known as the “Sloko burn”) and on the Inklin River near its confluence with the Taku River

A minimal amount of logging has occurred in the vicinity of Atlin. Placer mining has disturbed the riparian areas in several watersheds in the Atlin area. Small rural residential holdings are scattered along the road south of Atlin and east to Surprise Lake.

### 3.12 LIMITATIONS

This mapping is based on 15% polygon inspection (i.e. Survey Intensity Level 4).

The project photographs were 1:34,000 scale flown in 1974 and were, therefore, several (26) years out of date at the time of the field work. This has some impact on map reliability as changes to fluvial units in the major river valleys, areas that experience infrequent avalanching and areas disturbed by wildfires (post 1974) are difficult to identify and/or interpret. In some cases, post 1974 burns may not have been identified through field work and may not be reflected in the mapping. The age of the photographs also posed a problem in determining structural stages, especially for forested units in stages 3 through 5. Ecosystem mappers had to determine which stage would be most appropriate for disturbed forested sites in these younger stages. For example, avalanche tracks often appeared to be a mix of conifers and broadleaf shrub; mappers had to determine whether disturbance occurs frequently enough to maintain the stage 3 structure. In other areas, newer avalanching may have removed mature or old forest.

Identification of some non-forested subalpine and alpine units was difficult at the 1:30,000 scale. Differences in tone and texture (photo signature) between certain units (i.e. heath, dwarf shrub, and dwarf shrub-grass units) are subtle. These photo signatures may change with aspect with respect to the camera and between individual photographs as a result of the printing process. However the scale of the aerial photographs was appropriate for the mapping scale and the quality of the photographs was good.

Due to the scale of mapping it was often not possible to include units that occupied around 10% of a polygon. These units may be readily identifiable on the photographs, however the complexity of the terrain and ecosystems found in polygons at 1:50,000 scale makes it difficult to include these small units.

Weather provided some challenges to the field sampling program. A late spring appeared to result in a heavier than “normal” snow cover in June of 2000. This reduced the area that was suitable for sampling during the first sampling trip. Snow also returned to the AT zone in the TEP Ecosection towards the end of August. Weather was also very poor (wet and cloudy) during the second trip when crews were stationed at the Tulsequah mine camp. Visibility was poor during much of this period; this prevented or made access difficult in many areas in the southern third of the project area. Poor visibility also reduced the number of visual inspections that could be made in this portion of the map area.

Terrain in the Boundary Ranges Ecosection is very steep and rugged; this made sampling in this portion of the project area difficult (i.e. difficult to access drop off and pick up sites and difficult to complete foot traverses). Very steep terrain and its associated ecosystems are under sampled in this area. The terrain in the Tahltan Highlands and Teslin Plateau Ecosections is much more accessible by both foot and helicopter. As a result sampling coverage in these areas is felt to be adequate.

One of the more significant challenges posed by this project was the lack of and/or uncertain classification that existed for many of the project biogeoclimatic zones (i.e. SWB, SBS, ESSF, BWBS). This made it difficult to complete visual inspections i.e. make ecosystem unit determinations within polygons. For instance, field crews had to use descriptive names (dominant plants etc) when completing visuals in the SBS or SWB as no codes for units were available. It was also difficult to determine the “finer” differences within a given zone in order to delineate subzone boundaries due to the geographic size of the project area (and due to time constraints). There may be subzone and/or variant differences within some of the project biogeoclimatic zones, however these may not be identified until the MoF completes classification with all Tulsequah project data and other provincial data.

The existing classification for the CWHwm and MHmm2 fit moderately well for the units identified, however certain site series were not found during sampling (CWHwm site series 8-10; MHmm2 sites series 4, 6, 8, 9). The units mapped in these Subzones were generally associated with appropriate site features, however in many cases key species were absent or lacking (i.e. western redcedar and amabilis fir). The BWBS did not fit the BWBSdk1 classification particularly well (more subalpine fir, little black spruce, less diverse or robust shrub and herb layer in the zonal site) and therefore the BWBSmc was established. However, other units had much in common with the BWBSdk1 site series and were identifiable in the field and on photographs (i.e. Pl – Lingonberry – Feathermoss, SwPl – Soopolallie – Twinflower and Sw – Currant – Horsetail).

However the project objectives were completed regardless of the limitations discussed above. Significant achievements include the sampling, creation and acceptance of several new ecosystem units; the refinement of biogeoclimatic lines and establishment of new biogeoclimatic units; and the updating of the previous (1997) mapping of the proposed Tulsequah Chief mine road corridor.

## 4.0 DESCRIPTION OF ECOSYSTEM UNITS

### 4.1 BACKGROUND

A description of the ecosystems mapped in each of the biogeoclimatic units is provided on separate tables. Each ecosystem unit is described on both a site and vegetation page. On the site page, the biogeoclimatic unit and site series number, two-letter ecosystem map symbol, ecosystem name and list of all modifiers used with the individual ecosystem symbol are listed in the boxes at the top of the page. A summary of the environmental and physical site characteristics, as determined from the plots, ground inspections and MoF regional field guide (when minimal field inspection data for a particular ecosystem unit are available) is provided in the site description box. Site data includes elevation, slope, aspect, soil moisture regime, soil nutrient regime and drainage class. Terrain and soil characteristics provided are the surficial material, soil development, coarse fragment content, humus depth and form, and soil texture encountered for that ecosystem unit at the inspection sites. Some boxes in the site description box remain blank where no field data is available. Information shown in brackets is subjective and is not derived from the plot cards.

The vegetation page provides a summary of the dominant and associate plant species for each potential structural stage of the ecosystem unit. Plant species were treated as dominants and associates based on the following criteria. Dominant species occur in 50% or greater of the plot and/or ground inspections with a cover  $\geq 10\%$ . Associate species occur in over 20% of the plots and ground inspections with a cover between 1 and 9%.

Five potential structural stages are listed for the forested ecosystem units. These include shrub, pole sapling, young forest, mature forest and old forest. For edaphic ecosystem units, only the herb and/or shrub structural stages are described. Notes that may provide further descriptions of the ecosystem unit are provided at the bottom of the vegetation table. The plot and ground inspection number(s) completed within each structural stage of the ecosystem unit are listed in the vegetation page of the tables. When no inspection numbers are provided for a particular structural stage, the dominant and associate species have been extrapolated from inspections completed in other structural stages, and from data contained in the MoF regional field guide.

During the 2000 field sampling program two hundred and fourteen (214) full plots were complete in the project area; these are numbered 98-04733; 99-02616 through 99-02700; 99-03301 through 99-03400; 00-02401 through 00-02427 and 00-02429. Ground inspections are indicated by the letter G followed by a number (G1-G134 and G1000-G1176). Visual inspections are indicated by the letter V followed by a number (V1-V486 and V1000-V1518). Three hundred and ten (310) ground inspections and 996 visual inspections were completed in 2000. The data from the full plots and ground inspections were used to develop the descriptions of the ecosystem units (visual inspections were used for mapping unless otherwise noted in the individual tables). Full plot data from the 1997 mapping (JMJ Holdings, 1997) and from Ministry of Forests plots located in the project area were also used to describe the units.

The following tables provide a description of the ecosystem units for each biogeoclimatic table. The biogeoclimatic units are ordered alphabetically. Within a biogeoclimatic unit, the tables are ordered alphabetically by the ecosystem unit symbol.

4.2 CWH<sub>wm</sub> – WET MARITIME COASTAL WESTERN HEMLOCK SUBZONE

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
CWH <sub>wm</sub>	AC	00	Avalanche Chute
<p><b>Assumed site modifiers for the typical situation:</b> d, steep – use aspect modifiers  <b>Mapped Modifiers:</b> gk, j, k, kn, ks, kv, n, nw, qs, sw, sz, vw, vz, w                      Typic AC occurs on steep slopes on deep soils on all slope positions. It is common on both warm and cool aspects on deep (typic), shallow, and very shallow soils. AC also commonly occurs on colluvial fans and cones on both cool and warm aspects. It also occurs on gently sloping runout areas at the toe of slopes (j modifier).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	320	
<b>Slope (%)</b>	60	
<b>Aspect (degrees)</b>	129	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic – hygric	(medium) - rich	
<b>Drainage</b>	moderately well	
<b>Surficial Material</b>		
organic veneer over colluvial veneer		
<b>Soil Development</b>		
Folisol		
<b>Humus Form</b>	-	
<b>Humus Depth (cm)</b>	60	
<b>Coarse Fragments (%)</b>	-	
<b>Soil Texture</b>	humic	

Photo: no photograph

**MAP**

Symbol/Site Series

**Name**

AC 00

**Avalanche Chute**

Map Symbol	AC2	AC3a	AC3b
<b>Plant Species</b>	Herb Climax	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	lady fern spiny wood fern bluejoint	alder (Sitka) devil's club salmonberry lady fern spiny wood fern	alder (Sitka) devil's club salmonberry lady fern spiny wood fern
<b>Associates</b>	salmonberry cow-parsnip Sitka burnet arrow-leaved groundsel Indian hellebore goatsbeard sedges Sitka valerian stinging nettle	Sitka spruce red elderberry clasping twistedstalk	Sitka spruce red elderberry clasping twistedstalk
<b>Plots</b>		964036	

**Comments:** This unit is very common on steeply sloping sites throughout the CHWwm.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
CWHwm	AD	00	Sitka alder – Devil’s club
<p><b>Assumed site modifiers for the typical situation:</b> d, steep – use aspect modifiers  <b>Mapped Modifiers:</b> h, j, k, ks, sw, w  Typic AD occurs on steep slopes on deep soils on all slope positions. It is common on both warm (w) and cool (k) aspects on deep (typic), and shallow (ks, sw) soils. AD also occurs on hummocks (h) and on gently sloping areas (j modifier). These sites are not necessarily subject to avalanching. This unit was mapped within the original map area and this description is taken from JMJ, 1997.</p>			

**SITE DESCRIPTION**

	Range	Mean
Elevation (m)		
Slope (%)		
Aspect (degrees)		
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
mesic – subhygric	(medium) - rich	
<b>Drainage</b>	moderately well	
<b>Surficial Material</b>		
colluvial materials		
<b>Soil Development</b>		
<b>Humus Form</b>		
<b>Humus Depth (cm)</b>		
<b>Coarse Fragments (%)</b>		
<b>Soil Texture</b>		

**Photo: no photograph**

**MAP**

Symbol/Site Series

Name

AD 00

Sitka alder – Devil's club

Map Symbol	AD2	AD3a	AD3b
<b>Plant Species</b>	Herb Climax	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	Sitka burnet Sitka valerian showy sedge	alder devil's club lady fern spiny wood fern	alder devil's club lady fern spiny wood fern
<b>Associates</b>	northern geranium lady fern	salmonberry red elderberry oak fern clasping twistedstalk	salmonberry red elderberry oak fern clasping twistedstalk
<b>Plots</b>			

**Comments:** This description is taken from MJJ, 1997.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
CWHwm	AS	00	Alder – Sitka sedge – Bluejoint
<p><b>Assumed site modifiers for the typical situation:</b> d, j, p  <b>Mapped Modifiers:</b> t  AS is a shrub swamp that typically occurs on level sites on organic soils. It is also mapped on fluvial terraces (t).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	80 - 100	90
<b>Slope (%)</b>	0	0
<b>Aspect (degrees)</b>	none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhydric – hydric	rich	
<b>Drainage</b>	very poor	
<b>Surficial Material</b>		
fibric organic veneer over fluvial plain; fibric organic veneer over fluvial blanket		
<b>Soil Development</b>		
Gleyed Regosol, Orthic Gleysol		
<b>Humus Form</b>	Hydromull, Fibrimor	
<b>Humus Depth (cm)</b>	15 – 20	
<b>Coarse Fragments (%)</b>	-	
<b>Soil Texture</b>	fibric, fibric/silty	

**Photo:** no photograph

**MAP**

Symbol/Site Series

Name

AS 00

Alder – Sitka sedge - Bluejoint

Map Symbol	AS3a	AS3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	alder (green, mountain) bluejoint Sitka sedge	alder (green, mountain) bluejoint Sitka sedge
<b>Associates</b>	Alaska willow Sitka willow mountain willow marsh horsetail; marsh cinquefoil small-flowered bulrush <i>Drepanocladus</i> sp.	Alaska willow Sitka willow mountain willow marsh horsetail; marsh cinquefoil small-flowered bulrush <i>Drepanocladus</i> sp.
<b>Plots</b>	961404, 9628597	

**Comments:** Both of these MoF plots are located in the 1997 map area; one in Flannigan Slough and the other on Shazah Creek near its confluence with the Tulsequah River. Other species that were present with less than 1% cover include red-osier dogwood, highbush-cranberry, great northern aster, lady fern, sweet-scented bedstraw, marsh violet and *Brachythecium* sp.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
CWHwm	CD	06	Act – Red-osier dogwood
<p><b>Assumed site modifiers for the typical situation:</b> a, c, d, j  <b>Mapped Modifiers:</b> n  Typic CD occurs on active floodplains on middle benches on deep, coarse-textured soils. It also occurs on fluvial fans (n).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	20 - 275	100
<b>Slope (%)</b>	0	0
<b>Aspect (degrees)</b>	none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
(mesic) subhygric	rich	
<b>Drainage</b>	well - imperfect	
<b>Surficial Material</b>		
sandy, active fluvial plains and terraces; gravelly, sandy active fluvial plain; sandy, gravelly fluvial fan; silty, sandy fluvial veneer over gravelly, sandy fluvial plain		
<b>Soil Development</b>		
Cumulic Regosol, Gleyed Regosol, Gleyed Cumulic Regosol, Orthic Regosol, Cumulic Humic Regosol, Gleyed Dystric Brunisol		
<b>Humus Form</b>	Leptomoder, Mormoder, Moders, Mors	
<b>Humus Depth (cm)</b>	0.5 – 9	
<b>Coarse Fragments (%)</b>	0 – 70	
<b>Soil Texture</b>	sandy – sandy loam	

Photo: B5-20, plot 9903326

**MAP**

**Symbol/Site Series**  
**CD 06**

**Name**  
**Act – Red-osier dogwood**

Map Symbol	CD3	CD4	CD5	CD6	CD7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	black cottonwood alders red-osier dogwood common horsetail	black cottonwood red-osier dogwood devil's club common horsetail pink wintergreen northern groundcone	black cottonwood red-osier dogwood devil's club common horsetail	black cottonwood red-osier dogwood devil's club lady fern common horsetail	black cottonwood red-osier dogwood devil's club lady fern common horsetail
<b>Associates</b>	willows highbush-cranberry meadow horsetail swamp horsetail lady fern sweet-scented bedstraw mountain sweet-cicely pink wintergreen bluejoint	Sitka spruce Douglas maple alder salmonberry western hemlock highbush-cranberry swamp horsetail meadow horsetail baneberry lady fern sweet-scented bedstraw mountain sweet-cicely clasping twistedstalk	Sitka alder/green alder Sitka spruce Bebb's willow highbush-cranberry lady fern great northern aster bluejoint oak fern pink wintergreen clasping twistedstalk	Sitka spruce red alder Sitka alder/green alder red elderberry highbush-cranberry clasping twistedstalk rosy twistedstalk one-flowered foamflower mountain sweet-cicely pink wintergreen	Sitka spruce red alder Sitka alder/green alder red elderberry Douglas maple highbush-cranberry clasping twistedstalk rosy twistedstalk one-flowered foamflower mountain sweet-cicely pink wintergreen
<b>Plots</b>		964045, 964027	964033, 9628598, 9628569	9628558, 9903326, G1034	

**Comments:** Salmonberry, stink fern and oak fern are listed as key indicators in the MoF Regional Field Guide; these species are largely absent in the inspections.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
CWHwm	CW	07	Act –Willow
<p><b>Assumed site modifiers for the typical situation:</b> a, c, d, j  <b>Mapped Modifiers:</b> n, p  Typic CW occurs on active floodplains on low benches on deep, coarse-textured soils. These ecosystems are generally located near the river and likely experience annual flooding. CW also occurs on fluvial fans (n) on sites with peaty veneers (p). These ecosystems are typically found in the shrub to young forest successional stages.</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	20 - 100	55
<b>Slope (%)</b>	0	0
<b>Aspect (degrees)</b>	none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric – hygric	rich – very rich	
<b>Drainage</b>	well - poor	
<b>Surficial Material</b>		
sandy active fluvial plain; silty, sandy active fluvial plain; silty, sandy active fluvial ridge; sandy fluvial terrace;		
<b>Soil Development</b>		
Gleyed Cumulic Regosol, Cumulic Regosol		
<b>Humus Form</b>	Hydromull, Mors, Moder	
<b>Humus Depth (cm)</b>	0 – 1	
<b>Coarse Fragments (%)</b>	0	
<b>Soil Texture</b>	sand – silt loam	

**Photo:** no photograph

**MAP**

Symbol/Site Series

**Name**

CW 07

Act - Willow

Map Symbol	CW3	CW4	CW5	CW6	CW7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	Sitka willow alders (Sitka) common horsetail	black cottonwood common horsetail	black cottonwood common horsetail	black cottonwood common horsetail	black cottonwood common horsetail
<b>Associates</b>	red-osier dogwood Alaska willow Scouler's willow highbush-cranberry great northern aster lady fern pink wintergreen <i>Brachythecium</i> sp.	Alaska willow Sitka willow shinning willow trembling aspen bluejoint pink wintergreen	alders Alaska willow Sitka willow shinning willow bluejoint pink wintergreen	alders willows bluejoint pink wintergreen purple sweet-cicely sweet-scented bedstraw	alders willows bluejoint pink wintergreen purple sweet-cicely sweet-scented bedstraw
<b>Plots</b>	964030, 964043, 961403, 9628595, 9628596				

**Comments:** Mature and old CW forests are expected to be rare due to the frequent flooding and disturbance (movement of stream channel). Humus is absent or very thin.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
CWHwm	GS	00	Sweet gale – Sitka sedge
<p><b>Assumed site modifiers for the typical situation:</b> none  <b>Mapped Modifiers:</b> none  Typic GS occurs on level sites on deep, medium-textured soils. GS is not mapped but has been identified as a unit in the previously mapped area of Flannigan Slough.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	60	
<b>Slope (%)</b>	0	
<b>Aspect (degrees)</b>	none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhydric	medium	
<b>Drainage</b>	poor	
<b>Surficial Material</b>		
fluvial plain		
<b>Soil Development</b>		
Orthic Gleysol		
<b>Humus Form</b>	Mormoder	
<b>Humus Depth (cm)</b>	3	
<b>Coarse Fragments (%)</b>	0	
<b>Soil Texture</b>	silt loam	

**Photo:** no photograph

**MAP**

Symbol/Site Series

Name

GS 00

Sweet gale – Sitka sedge

<b>Map Symbol</b>	GS3a
<b>Plant Species</b>	Low Shrub Climax
<b>Dominants</b>	sweet gale great northern aster bluejoint Aleutian mugwort common horsetail
<b>Associates</b>	highbush-cranberry red raspberry Sitka sedge Sitka burnet kneeling angelica lady fern fireweed Canada goldenrod marsh violet <i>Brachythecium</i> sp. lanky moss <i>Cimacium dendroides</i>
<b>Plots</b>	9628592

**Comments:** GS is not mapped but has been identified as a unit in the previously mapped area of Flannigan Slough. 9628592 is a MoF plot.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
CWHwm	HB	01	HwSs – Blueberry
<p><b>Assumed modifiers for the typical situation:</b> d, j, m  <b>Mapped Modifiers:</b> c, ct, k, kn, ks, kv, qs, r, s, sw, sz, vw, w  Typic HB occurs on gentle slopes on deep medium-textured soils; it is typically found on mid-slope positions. In the study area HB is found on a variety of sites and materials. It is common on cool and warm aspects on all soil depths (k, ks, kv, w, sw, vw). It is also found on very steep slopes on cool and warm aspects with shallow soils (qs, vw). It is also found on coarse-textured soils (c), coarse-textured terraces (ct), colluvial fans on cool aspects (kn) and on ridges (r).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	120 - 695	390
<b>Slope (%)</b>	28 – 70	44
<b>Aspect (degrees)</b>	64 – 335	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic - mesic	(poor) – medium	
<b>Drainage</b>	well – moderately well	
<b>Surficial Material</b>		
mixed fragments, sandy, silty morainal mantle of variable thickness; silty, mixed fragments, sandy morainal blanket and veneer; silty, sandy, angular colluvial blanket; mixed fragments, silty, sandy colluvial veneer; silty, angular colluvial veneer;		
<b>Soil Development</b>		
Ferro-Humic Podzol, Humic-Ferro Podzol, Eutric Brunisol		
<b>Humus Form</b>	Hemimor, Leptomoder, Mors	
<b>Humus Depth (cm)</b>	5 – 40	
<b>Coarse Fragments (%)</b>	12 – 55	
<b>Soil Texture</b>	sandy – silt loam	

**Photo:** C6-17, plot 9903306

MAP

Symbol/Site Series  
HB 01

Name  
HwSs- Blueberry

Map Symbol	HB3	HB4	HB5	HB6	HB7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	western hemlock alders thimbleberry	western hemlock lanky moss step moss	western hemlock mountain hemlock lanky moss step moss	western hemlock mountain hemlock dicranum mosses (broom, curly heron's-bill) (lanky moss) (step moss)	western hemlock mountain hemlock oval-leaved blueberry lanky moss step moss
<b>Associates</b>	oval-leaved blueberry red-elderberry false azalea spiny wood fern oak fern bunchberry	Sitka spruce oval-leaved blueberry false azalea oak fern bunchberry step moss lanky moss	Sitka spruce subalpine fir oval-leaved blueberry false azalea five-leaved bramble bunchberry oak fern red-stemmed feathermoss dicranum mosses common leafy liverwort	Sitka spruce subalpine fir (oval-leaved blueberry) Alaskan blueberry false azalea five-leaved bramble bunchberry oak fern red-stemmed feathermoss common leafy liverwort	Sitka spruce subalpine fir false azalea (Alaskan blueberry) five-leaved bramble bunchberry oak fern red-stemmed feathermoss dicranum mosses (broom, curly-heron's-bill) common leafy liverwort
<b>Plots</b>		964039		9903306, 9903320	9902641, 9903310, G1046

**Comments:** HB sites have a species poor understorey (average cover of 25%) that is dominated by conifers, *Vaccinium* spp. and false azalea. The herb layer is generally sparse (average cover of 7%). Mountain hemlock is generally common in the understorey (A3, B1, B2 layers). Oval-leaved blueberry is absent in the two mature forest inspections. The cover of Alaskan blueberry is low in the inspections. The low cover of blueberries, lanky moss and step moss in the mature forest inspections may be influenced by site characteristics (i.e. both are located on steep warm aspects and 9903306 is at the extreme upper range of the subzone). Moss cover likely decreases with an increase in slope steepness. Devil's club (<2%) may be present in the HB forests. The presence of subalpine fir and common leafy liverwort increases in the upper portion of the subzone. Black cottonwood may be a seral species on some sites (964039).

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
CWHwm	HM	02	HwSs – Step moss
<p><b>Assumed site modifiers for the typical situation:</b> j, m, r, s  <b>Mapped Modifiers:</b> dt, h, k, kv, qv, vw, vz, w  Typic HM occurs on gently sloping, crest positions on shallow soils. In addition to typic sites, it is found on warm and cool aspects on shallow and very shallow soils (w, vw, k, kv) and on very steep warm and cool aspects on very shallow soils (zv, qv). It also occurs on deep soils on terraces (t).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	(20 – 600)	
<b>Slope (%)</b>		
<b>Aspect (degrees)</b>		
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
xeric – subxeric	very poor – medium	
<b>Drainage</b>	rapid – well	
<b>Surficial Material</b>		
organic veneers over rock; colluvial veneers over rock; morainal veneers		
<b>Soil Development</b>		
Folisols, Dystric Brunisols, Podzols		
<b>Humus Form</b>	Mors	
<b>Humus Depth (cm)</b>	0 – 80	
<b>Coarse Fragments (%)</b>	-	
<b>Soil Texture</b>	sandy – sandy loam	

**Photo:** no photograph

**MAP**

**Symbol/Site Series**

**HM 02**

**Name**

**HwSs – Step moss**

Map Symbol	HM3	HM4	HM5	HM6	HM7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	western hemlock Alaskan or oval-leaved blueberry	western hemlock Alaskan or oval-leaved blueberry	western hemlock Alaskan or oval-leaved blueberry lanky moss step moss	western hemlock Alaskan or oval-leaved blueberry lanky moss step moss	western hemlock Alaskan or oval-leaved blueberry lanky moss step moss
<b>Associates</b>	thimbleberry false azalea bunchberry juniper haircap moss	mountain hemlock false azalea step moss lanky moss	Sitka spruce mountain hemlock false azalea bunchberry	Sitka spruce mountain hemlock false azalea bunchberry	Sitka spruce mountain hemlock false azalea bunchberry
<b>Plots</b>					

**Comments:** This description is based on the MoF Regional Field Guide; plot 96-4040 from the 1997 field studies is classified as sites series 02, however it is situated on a glaciofluvial terrace and is described as an area of primary succession.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
CWHwm	SD	04	SsHw – Devil’s club
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped Modifiers:</b> c, cn, k, kn, ks, n, nw, sw, t, w  Typic SD occurs on gentle, lower slope receiving sites on deep, medium-textured soils. It occurs on nutrient rich sites that receive seepage. It is also found on coarse-textured soils (c), on coarse-textured fans (cn), fans (n), fans on cool and warm aspects (kn, nw) cool and warm aspects (k, w), cool and warm aspects on shallow soils (ks, sw) and on terraces (t).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	25 – 555	220
<b>Slope (%)</b>	0 – 69	42
<b>Aspect (degrees)</b>	118 – 328	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
mesic – subhygric	rich	
<b>Drainage</b>	well – moderately well	
<b>Surficial Material</b>		
sandy, angular colluvial veneer and blanket; gravelly, sandy colluvial veneer and blanket; colluvial veneer and very thin veneer; silty, mixed fragments, sandy morainal terrace, undulating		
<b>Soil Development</b>		
Eluviated Dystric Brunisol, Orthic Dystric Brunisol, Orthic Ferro-Humic Podzol, Orthic Eutric Brunisol, Folisol		
<b>Humus Form</b>	Mormoder, Mors, Moders	
<b>Humus Depth (cm)</b>	2 – 60	
<b>Coarse Fragments (%)</b>	35 – 60	
<b>Soil Texture</b>	sandy loam – silt loam	

**Photo: C6-18, plot 9903307**

**MAP**

**Symbol/Site Series**  
SD 04

**Name**  
SsHw – Devil’s club

Map Symbol	SD3	SD4	SD5	SD6	SD7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	devil’s club alders oak fern spiny wood fern	western hemlock devil’s club oak fern spiny wood fern	western hemlock devil’s club spiny wood fern oak fern	western hemlock devil’s club spiny wood fern oak fern	western hemlock Sitka spruce subalpine fir devil’s club alders (Sitka) spiny wood fern oak fern
<b>Associates</b>	western hemlock red-osier dogwood highbush-cranberry salmonberry lady fern goatsbeard	red-osier dogwood highbush-cranberry goatsbeard five-leaved bramble bunchberry leafy mosses	Sitka spruce subalpine fir red-osier dogwood alders oval-leaved blueberry goatsbeard five-leaved bramble bunchberry lanky moss leafy mosses	Sitka spruce subalpine fir mountain hemlock Douglas maple red-osier dogwood alders oval-leaved blueberry goatsbeard five-leaved bramble bunchberry lanky moss leafy mosses (on gentle slopes)	mountain hemlock Douglas maple oval-leaved blueberry five-leaved bramble bunchberry lanky moss leafy mosses (on gentle slopes)
<b>Plots</b>				964028, 964044	964032, 964035, 9903307

**Comments:** Plots 964032 and 964035 may be transitional between site series 03 (SO) and SD. All but one (9903307) of these inspections are situated on steep slopes; this plot has the highest cover of devil’s club. Only three species (western hemlock, devil’s club and oak fern) are present in all plots. A low cover of salmonberry (1%) is present in two of the inspections, while lady fern is only present in one inspection (1% cover). Average total herb and moss layer cover is 38% and 5%, respectively. Species that are also found in SD include black gooseberry, baneberry, sweet-scented bedstraw, clasping twistedstalk, pink wintergreen, sweet-cicely, and foamflowers.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
CWHwm	SF	00	Sedge fen
<p><b>Assumed site modifiers for the typical situation:</b> d, j, p  <b>Mapped Modifiers:</b> none  Typic SF occurs on level sites on organic soils over fluvial materials (adjacent to water bodies). SF has been used to map all stage 2 fens/marshes in the CWHwm.</p>			

#### SITE DESCRIPTION

	Range	Mean
Elevation (m)	60	
Slope (%)	0	
Aspect (degrees)	none	
Moisture Regime	Nutrient Regime	
hydric	rich	
Drainage	very poor	
<b>Surficial Material</b>		
fibric organic veneer over silty fluvial plain		
<b>Soil Development</b>		
Typic Fibrisol		
Humus Form	-	
Humus Depth (cm)	70	
Coarse Fragments (%)	-	
Soil Texture	fibric	

**Photo:** no photograph

**MAP****Symbol/Site Series**  
SF 00**Name**  
Sedge fen

<b>Map Symbol</b>	SF2b
<b>Plant Species</b>	Herb
<b>Dominants</b>	beaked sedge
<b>Associates</b>	marsh cinquefoil
<b>Plots</b>	9628593

**Comments:** This MoF plot is located in Flannigan Slough.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
CWHwm	--	00	Water sedge - Horsetail
<p><b>Assumed site modifiers for the typical situation:</b>  <b>Mapped Modifiers:</b>  This unit occurs on level sites on organic soils over fluvial materials (adjacent to water bodies). This unit has been lumped with SF for mapping purposes.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	10 - 50	30
<b>Slope (%)</b>	0	
<b>Aspect (degrees)</b>	none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhydric - hydric	rich – very rich	
<b>Drainage</b>	very poor	
<b>Surficial Material</b>		
fibric organic veneer and thin veneer over silty fluvial plain; organic veneer over fluvial plain		
<b>Soil Development</b>		
Typic Fibrisol		
<b>Humus Form</b>	Fibrimor	
<b>Humus Depth (cm)</b>	10 – 40	
<b>Coarse Fragments (%)</b>	none	
<b>Soil Texture</b>	fibric	

**Photo:** no photograph

**MAP**

Symbol/Site Series

-- 00

Name

Water sedge - Horsetail

<b>Map Symbol</b>	2b
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	water sedge * Sitka sedge * swamp horsetail * cinquefoil
<b>Associates</b>	scouring rush * bluejoint  very low cover of alder, Mackenzie's willow, and red-osier dogwood
<b>Plots</b>	964029, 964042

**Comments:** \* indicates species that are present in both inspections. One plot is located in Shazah Slough and the other adjacent to the Tulsequah River near the airstrip. This unit has been lumped with SF for mapping purposes.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
CWHwm	--	00	Cinquefoil – Sitka sedge
<p><b>Assumed site modifiers for the typical situation:</b>  <b>Mapped Modifiers:</b>  This unit occurs on level sites on organic soils over fluvial materials (adjacent to water bodies). This unit has been lumped with SF for mapping purposes.</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	60	
<b>Slope (%)</b>	0	
<b>Aspect (degrees)</b>	none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
hydric	medium – rich	
<b>Drainage</b>	very poor	
<b>Surficial Material</b>		
fibric organic veneer over fluvial plain;		
<b>Soil Development</b>		
Typic Fibrisol		
<b>Humus Form</b>	-	
<b>Humus Depth (cm)</b>	60	
<b>Coarse Fragments (%)</b>	none	
<b>Soil Texture</b>	fibric	

**Photo:** no photograph

**MAP**

**Symbol/Site Series**

-- 00

**Name**

**Cinquefoil – Sitka sedge**

<b>Map Symbol</b>	2a
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	Sitka sedge * marsh horsetail * marsh cinquefoil
<b>Associates</b>	sweet gale beaked sedge <i>Utricularia</i> sp.
<b>Plots</b>	9628594

**Comments:** MoF plot from Flannigan Slough. This unit is similar to the Water sedge – Horsetail wetland except this plot is dominated by forbs. This unit has been lumped with SF for mapping purposes.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
CWHwm	SO	03	SsHw – Oak fern
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped Modifiers:</b> g, k, kn, ks, nw, sw, w  Typic SO occurs on gentle slopes on deep, medium-textured soils; it is typically found on mid to lower slope positions on nutrient rich sites receiving some seepage. In the project area it is common on steep slopes. It occurs on cool aspects (k), warm and cool aspect fans and cones (nw, kn) cool aspects with shallow soils (ks), shallow soils on warm aspects (sw), and cool aspects (ks).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	150 - 190	163
<b>Slope (%)</b>	5 – 72	45
<b>Aspect (degrees)</b>	170 – 305	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic – mesic	rich	
<b>Drainage</b>	rapid – moderately well	
<b>Surficial Material</b>		
silty angular colluvial veneer; sandy eolian veneer over gravelly, sandy glaciofluvial terrace; colluvial veneers		
<b>Soil Development</b>		
Humo-Ferric Podzol, Folisol		
<b>Humus Form</b>	Mors	
<b>Humus Depth (cm)</b>	2 – 40	
<b>Coarse Fragments (%)</b>	0 - 75	
<b>Soil Texture</b>	sandy loam - silt loam	

**Photo:** no photograph

**MAP**

**Symbol/Site Series**  
SO 03

**Name**  
SsHw – Oak fern

Map Symbol	SO3	SO4	SO5	SO6	SO7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	western hemlock oval-leaved blueberry thimbleberry spiny wood fern	western hemlock	western hemlock	western hemlock	western hemlock
<b>Associates</b>	alders false azalea red elderberry devil's club oak fern	oval-leaved blueberry false azalea devil's club thimbleberry oak fern spiny wood fern bunchberry three-leaved foamflower step moss	Sitka spruce oval-leaved blueberry false azalea devil's club spiny wood fern oak fern five-leaved bramble bunchberry three-leaved foamflower one-sided wintergreen step moss sickle moss	Sitka spruce subalpine fir oval-leaved blueberry false azalea devil's club spiny wood fern oak fern bunchberry three-leaved foamflower step moss lanky moss electrified cat's-tail moss	Sitka spruce subalpine fir oval-leaved blueberry false azalea devil's club spiny wood fern oak fern bunchberry three-leaved foamflower step moss lanky moss electrified cat's-tail moss
<b>Plots</b>			964041	964034, 964025	

**Comments:** These plots were previously classified as site series 01, however they have been placed in the 03 due to the low cover of devil's club (2-5%), and presence of ferns and foamflowers. A low cover of salmonberry, red-osier dogwood, clasping twistedstalk and lady fern is often present. A low cover of cottonwood/balsam poplar and thimbleberry are present in 964025.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
CWHwm	SS	05	Ss – Salmonberry
<p><b>Assumed site modifiers for the typical situation:</b> a, d, j, m  <b>Mapped Modifiers:</b> c  Typic SS occurs on high bench, active floodplains on deep, medium-textured soils. It also occurs on coarse-textured soils (c).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	55 - 150	100
<b>Slope (%)</b>	0 - 10	4
<b>Aspect (degrees)</b>		
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
mesic – subhygric	rich – very rich	
<b>Drainage</b>		
<b>Surficial Material</b>		
sandy active fluvial plain; gravelly, sandy fluvial terrace; sandy, gravelly fluvial terrace		
<b>Soil Development</b>		
Gleyed Sombric Brunisol, Brunisols		
<b>Humus Form</b>	Mormoder, Mors	
<b>Humus Depth (cm)</b>	5 – 8	
<b>Coarse Fragments (%)</b>	0 – 65	
<b>Soil Texture</b>	sandy – silt loam	

**Photo:** C8-1, plot 9903318

**MAP**

**Symbol/Site Series**  
SS 05

**Name**  
Ss – Salmonberry

Map Symbol	SS3	SS4	SS5	SS6	SS7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	black cottonwood red-osier dogwood salmonberry	black cottonwood Douglas maple devil's club	black cottonwood Douglas maple devil's club baneberry	Sitka spruce salmonberry highbush-cranberry goatsbeard electrified cat's-tail moss <i>Kindbergia praelonga</i> <i>Pyrenula</i> sp.	Sitka spruce western hemlock devil's club alder (Sitka) highbush-cranberry oak fern spiny wood fern three-leaved foamflower
<b>Associates</b>	devil's club oak fern baneberry bluejoint blue wildrye lady fern	salmonberry Sitka spruce red-osier dogwood oak fern baneberry	Sitka spruce western hemlock red-osier dogwood black gooseberry oak fern	Douglas maple oval-leaved blueberry black gooseberry Sitka willow western mountain-ash baneberry kneeling angelica lady fern common horsetail blue wildrye pink wintergreen step moss <i>Brachythecium</i> sp. leafy moss lanky moss cedar-shake liverwort	Douglas maple oval-leaved blueberry lady fern baneberry bunchberry clasping twistedstalk five-leaved bramble pink wintergreen running clubmoss coastal leafy moss <i>Brachythecium</i> sp.
<b>Plots</b>			964026	961405	9903318

**Comments:** These ecosystem units typically have robust and species rich shrub and herb layers. The plot in the mature forest (961405) is more diverse than the plot in old forest, however it has a lower total shrub and herb layer and a much higher moss cover. Devil's club is not found in 961405 while it is abundant in 9903318. A one- percent cover of bluejoint, nodding wood-reed, enchanter's-nightshade, bunchberry, spiny wood fern, sweet-scented bedstraw, one-sided wintergreen and few-flowered meadowrue are also present in 961405.

4.3 MHmm2 – MOIST MARITIME MOUNTAIN HEMLOCK LEEWARD VARIANT

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
MHmm2	AC	00	Avalanche chute (shrub)
<p><b>Assumed site modifiers for the typical situation:</b> c, d, steep – use aspect modifiers  <b>Mapped Modifiers:</b> gk, gq, gw, j, k, kn, ks, kv, nw, qs, sw, sz, vw, w                      Typic AC occurs on steep slopes on deep soils. AC is common on cool (k) and warm (w) aspects. It also occurs in gullies on cool and warm aspects (gk, gw), very steeply sloping gullies on cool aspects (gq), gentle slopes (j), cool aspects with shallow (ks) and very shallow soils (kv), fans/cones on warm and cool aspects (nw, kn), shallow soils on very steeply sloping cool (qs) and warm (sz) aspects (sz), and warm aspects with shallow (sw) and very shallow soils (vw).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	670 - 1010	840
<b>Slope (%)</b>	40 - 80	60
<b>Aspect (degrees)</b>	95 – 203	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric-hygric	rich	
<b>Drainage</b>	moderately well – imperfect	
<b>Surficial Material</b>		
silty, sandy, angular colluvial blanket and veneer; mixed fragments, sandy colluvial material on moderate to moderately steep slopes		
<b>Soil Development</b>		
Humic Gleysol, Brunisols		
<b>Humus Form</b>	Mullmoder	
<b>Humus Depth (cm)</b>	3 – 6	
<b>Coarse Fragments (%)</b>	30 – 60	
<b>Soil Texture</b>	silt loam	

Photo: C4-3, plot 9902692

**MAP**

**Symbol/Site Series**

**AC 00**

**Name**

**Avalanche chute**

<b>Map Symbol</b>	AC3a	AC3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	Sitka alder salmonberry Alaskan blueberry lady fern*	Sitka alder salmonberry * Alaskan blueberry lady fern *
<b>Associates</b>	Sitka mountain-ash devil's club copperbush oval-leaved blueberry false azalea oak fern Indian hellebore Sitka valerian fireweed clasping twistedstalk foamflowers coastal wood fern bunchberry partridge-foot bluejoint five-leaved bramble beech fern	Sitka mountain-ash devil's club copperbush oval-leaved blueberry false azalea oak fern * Indian hellebore * Sitka valerian * fireweed * clasping twistedstalk * foamflowers * coastal wood fern bunchberry partridge-foot bluejoint five-leaved bramble beech fern
<b>Plots</b>		9902692, 9902655

**Comments:** Stage 3a is dominated by shrubs less than 2 m in height; 3b is greater than 2m in height. An \* indicates species that are common to both plots. Plot 9902655 represents the typical alder – fern avalanche track; plot 9902692 is located on a less steep, lower slope and has a shrub layer dominated by Alaskan blueberry, salmonberry and Sitka mountain-ash. Ferns dominate the herb layer in both inspections.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
MHmm2	AC	00	Avalanche chute (herb)
<p><b>Assumed site modifiers for the typical situation:</b> c, d , steep – use aspect modifiers  <b>Mapped Modifiers:</b> k, kn, ks, nw, sw, vw  Typic AC occurs on steep slopes on deep soils. AC is found on cool aspects (k), cool aspects with shallow soils (ks), cool aspect colluvial fans or cones (kn), warm aspect colluvial fans or cones (nw), shallow soils on warm aspects (sw) and on warm aspects on very shallow soils (vw).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	650 - 940	810
<b>Slope (%)</b>	47 - 70	57
<b>Aspect (degrees)</b>	63 – 263	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic - subhygric	medium - rich	
<b>Drainage</b>	rapid – moderately well	
<b>Surficial Material</b>		
sandy, silty, angular colluvial veneer; silty, gravelly, sandy colluvial veneer; angular colluvial material, moderate slope		
<b>Soil Development</b>		
Humic Regosol, Orthic Dystric Brunisol		
<b>Humus Form</b>	Rhizomull, Mor	
<b>Humus Depth (cm)</b>	1 – 5	
<b>Coarse Fragments (%)</b>	30 – 80	
<b>Soil Texture</b>	sandy loam – silt loam	

**Photo:** B6-8, plot 9903328

**MAP****Symbol/Site Series****Name**

AC 00

Avalanche chute

<b>Map Symbol</b>	AC2
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	Sitka valerian * oak fern * northern geranium * large-awned sedge
<b>Associates</b>	arctic lupine * Indian hellebore Sitka burnet partridge-foot mountain-sagewort stream violet lady fern tender sedge fireweed heart-leaved arnica bluejoint arrow-leaved groundsel American Sawara broad-leaved willowherb
<b>Plots</b>	964038, 9903312, 9903328

**Comments:** An \* indicates species that are present in all inspections.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
MHmm2	AF	00	Alder – fern
<p><b>Assumed site modifiers for the typical situation:</b> d, j  <b>Mapped Modifiers:</b> ac, gk, k, ks, r, sw  Typic AF occurs on gentle slopes on deep soils. These units are edaphic shrub communities that are not necessarily subject to snow avalanching. It also occurs on active, coarse-textured soils (ac), gullies on cool aspects (gk), cool aspects (k), cool aspects with shallow soils (ks), ridges (r), and shallow soils on warm aspects (sw).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	605	
<b>Slope (%)</b>	5	
<b>Aspect (degrees)</b>	360	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
(mesic) – hygric	medium - rich	
<b>Drainage</b>	imperfect	
<b>Surficial Material</b>		
angular, sandy morainal blanket		
<b>Soil Development</b>		
Gleysol		
<b>Humus Form</b>	-	
<b>Humus Depth (cm)</b>	0 – 40	
<b>Coarse Fragments (%)</b>	35 – 70	
<b>Soil Texture</b>	sandy	

**Photo:** C4-1, G1032

**MAP****Symbol/Site Series****Name**

AF 00

Alder - Fern

<b>Map Symbol</b>	AF3a	AF3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	Sitka alder spiny wood fern arrow-leaved groundsel	Sitka alder spiny wood fern arrow-leaved groundsel
<b>Associates</b>	white mountain-heather partridge-foot sweet-coltfoot Alaskan mountain-heather arctic lupine large-awned sedge Sitka burnet Sitka valerian Indian hellebore leafy mosses	white mountain-heather partridge-foot sweet-coltfoot Alaskan mountain-heather arctic lupine large-awned sedge Sitka burnet Sitka valerian Indian hellebore leafy mosses
<b>Plots</b>		G1032

**Comments:** AF is an alder dominated shrub unit that is not necessarily prone to avalanching.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
MHmm2	AM	00	Herb meadow
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped Modifiers:</b> k, kn, ks, nw, sw, w  Typic AM occurs on gentle slopes on deep soils. It is most common on steep slopes; it is found on steep slopes on cool aspects (k), cool aspects on shallow soils (ks), cool aspect fans and cones (kn), warm aspect fans and cones (nw), shallow soils on warm aspects (sw) and on warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	945 - 1440	1192
<b>Slope (%)</b>	0 - 72	36
<b>Aspect (degrees)</b>	none, 217	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic – subhygric	medium - rich	
<b>Drainage</b>	well – imperfect	
<b>Surficial Material</b>		
rubbly, sandy, silty fluvial fan; silty, sandy, angular colluvial veneer		
<b>Soil Development</b>		
Orthic Regosol, Dystric Brunisol		
<b>Humus Form</b>	Rhizomull, Mullmoder	
<b>Humus Depth (cm)</b>	2 – 6	
<b>Coarse Fragments (%)</b>	10 – 35	
<b>Soil Texture</b>	loam – silt loam	

**Photo:** HW TR2-3, plot 9902654

**MAP**

**Symbol/Site Series**

**AM 00**

**Name**

**Herb meadow**

<b>Map Symbol</b>	AM2a	AMw2a
<b>Plant Species</b>	Herb Climax	Herb Climax
<b>Dominants</b>	Sitka valerian Sitka burnet white mountain marsh-marigold graceful mountain sedge	mountain sagewort arctic lupine Altai fescue northern geranium net-veined willow
<b>Associates</b>	heart leaved arnica arrow-leaved groundsel swamp horsetail mountain monkshood fan-leaved cinquefoil	creeping willow bog blueberry Sitka burnet scarlet paintbrush single-spike sedge large-awned sedge yellow mountain-avens pink wintergreen unalaska paintbrush northern rice-root spike trisetum alpine azalea alpine bistort yarrow foam lichens rock moss
<b>Plots</b>	964050	9902654

**Comments:** Plot 964050 represents a moist meadow on a gently sloped fluvial site; plot 9902654 represents a submesic – mesic herb meadow found on a steep slope in the upper part of the subzone.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
MHmm2	CA	00	Crowberry – Bog blueberry – Alpine Azalea
<p><b>Assumed site modifiers for the typical situation:</b> c, j, r, s  <b>Mapped Modifiers:</b> dk, dw, h, hv, k, kv, v, vw, w  Typic CA occurs on gently sloped, crest positions on shallow, coarse-textured soils. It also occurs on deep soils on cool (dk) and warm (dw) aspects, hummocks (h), hummocks on very shallow soil (hv), cool aspects (k), cool aspects on very shallow soils (kv), very shallow soils (v), very shallow soils on warm aspects (vw), and warm aspects (w). These ecosystem units are characterized by a dwarf, woody shrub (largely evergreen) layer and lichens.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	940 - 1230	1064
<b>Slope (%)</b>	5 - 35	16
<b>Aspect (degrees)</b>	58 – 114	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
xeric – submesic	very poor – medium	
<b>Drainage</b>	rapid – imperfect	
<b>Surficial Material</b>		
silty, sandy colluvial very thin veneer; sandy, silty, angular colluvial veneer and very thin veneer; silty, sandy, mixed fragments morainal blanket, undulating; rubbly weathered bedrock over undulating rock		
<b>Soil Development</b>		
Dystric Brunisol, Humic Regosol		
<b>Humus Form</b>	Mors, Moders	
<b>Humus Depth (cm)</b>	1 – 5	
<b>Coarse Fragments (%)</b>	5 to > 70	
<b>Soil Texture</b>	sandy – silt loam	

**Photo:** C6-22, G1047

**MAP****Symbol/Site Series**

CA 00

**Name**

Crowberry – Bog blueberry – Alpine azalea

<b>Map Symbol</b>	CA2d
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	
<b>Associates</b>	bog blueberry crowberry alpine azalea white mountain-heather creeping willow Alaskan mountain-heather reindeer lichen whiteworm dicranum mosses foam lichens icelandmoss lichens blistered rocktripe
<b>Plots</b>	964048, 9903335, 9902656, G1047

**Comments:** Bog blueberry, crowberry, white mountain-heather, and reindeer lichens are occasionally dominant with cover up to 20% (average cover for all these species is 8 – 10%). A low cover of several other subalpine and alpine species (moss campion, pussytoes, sedges, and saxifrages) is frequently present. A low cover of krummholz conifers is present in 964048. Total average shrub, herb and moss layer covers are 10%, 32% and 32%, respectively.

<b>BIOGEOCLIMATIC UNIT</b>	MAP		
	Symbol	Site Series	Name
<b>MHmm2</b>	<b>HM</b>	<b>00</b>	<b>Heath meadow</b>
<p><b>Assumed site modifiers for the typical situation:</b> j, r, s  <b>Mapped Modifiers:</b> d, dk, dw, k, kv, vw, w  Typic HM occurs on shallow soils on gentle slopes on crest positions on shallow soils. HM is also found on deep soils (d), deep soils on cool aspects (dk), deep soils on warm aspects (dw), cool aspects (k), cool aspects on very shallow soils (kv), very shallow soils on warm aspects (vw) and on warm aspects (w).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	975 - 1300	1112
<b>Slope (%)</b>	18 - 65	41
<b>Aspect (degrees)</b>	8 – 220	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
xeric – mesic	poor – medium	
<b>Drainage</b>	rapid – moderately well	
<b>Surficial Material</b>		
angular, sandy colluvial veneer and blanket; sandy, angular morainal ridge and moderately steep slope; muddy, mixed fragments, sandy morainal very thin veneer and mantle of variable thickness over undulating rock; colluvial very thin veneer over undulating and moderate sloping rock		
<b>Soil Development</b>		
Orthic Regosol, Orthic Humic Regosol, Orthic Dystric Brunisol		
<b>Humus Form</b>	Mors	
<b>Humus Depth (cm)</b>	1- 40	
<b>Coarse Fragments (%)</b>	0 – 70	
<b>Soil Texture</b>	sandy - loamy	

**Photo:** JS4-15, plot 0002422

**MAP****Symbol/Site Series****HM 00****Name****Heath meadow**

<b>Map Symbol</b>	HM2d
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	white mountain-heather partridge-foot common leafy liverworts dicranum mosses (pale-stalked broom moss, curly heron's-bill)
<b>Associates</b>	mountain hemlock subalpine fir Alaskan mountain-heather yellow mountain-heather pink mountain-heather black alpine sedge cladina lichens rock moss
<b>Plots</b>	964049, 0002422, G58, G1049

**Comments:** Total average herb and moss layer covers for the inspections are 72% and 45%, respectively. White mountain-heather is the dominant species in the herb layer (average of 51% cover).

<b>BIOGEOCLIMATIC UNIT</b>	<b>MAP</b>		
	Symbol	Site Series	Name
<b>MHmm2</b>	<b>MB</b>	<b>01</b>	<b>HmBa – Blueberry</b>
<p><b>Assumed site modifiers for the typical situation:</b> d, m, steep – use aspect modifiers  <b>Mapped Modifiers:</b> h, hs, j, js, k, ks, kv, qs, sw, vw, w  Typic MB occurs on steep slopes on deep, medium-textured soils. This unit typically occurs on middle to upper slopes. It is commonly found on steep cool aspects (k) and steep, warm aspects (w). It is also found on hummocks (h), hummocks with shallow soils, gentle slopes (j); gentle slopes with shallow soils (js); cool aspects with shallow soils (ks) and very shallow soils (kv); very steep cool aspects with shallow soils (qs); and warm aspects with shallow (sw) and very shallow soils (vw).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	765 - 850	800
<b>Slope (%)</b>	32 - 90	52
<b>Aspect (degrees)</b>	55 - 338	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subxeric - mesic	very poor – medium	
<b>Drainage</b>	well – moderately well	
<b>Surficial Material</b>		
sandy, silty, rubbly colluvial veneer and very thin veneer; sandy, mixed fragments colluvial blanket; silty, sandy, angular colluvial veneer; moderately sloping rock;		
<b>Soil Development</b>		
Orthic Humic Regosol, Orthic Humo-Ferric Podzol, Folisol		
<b>Humus Form</b>	Hemimor, Moder	
<b>Humus Depth (cm)</b>	4 – 35	
<b>Coarse Fragments (%)</b>	<20 – 80	
<b>Soil Texture</b>	sandy – silt loam	

**Photo:** B6-17, plot 9903332

**MAP**

**Symbol/Site Series**

**MB 01**

**Name**

**HmBa - Blueberry**

<b>Map Symbol</b>	MB3	MB4	MB5	MB6	MB7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	mountain hemlock oval-leaved blueberry Alaska blueberry	mountain hemlock oval-leaved blueberry common leafy liverworts	mountain hemlock subalpine fir oval-leaved blueberry false azalea common leafy liverworts red-stemmed feathermoss dicranum mosses	mountain hemlock oval-leaved blueberry	mountain hemlock oval-leaved blueberry Alaskan blueberry common leafy liverwort dicranum mosses
<b>Associates</b>	subalpine fir false azalea mountain-heathers	subalpine fir Alaskan blueberry false azalea mountain-heathers red-stemmed feathermoss	Alaskan blueberry yellow mountain-heather Alaskan mountain-heather	Alaskan blueberry false azalea Sitka mountain-ash five-leaved bramble	subalpine fir Sitka spruce western hemlock false azalea Sitka mountain-ash Sitka alder five-leaved bramble white mountain-heather red-stemmed feathermoss step moss pipecleaner moss lanky moss
<b>Plots</b>			G1044		9903309, 9903332

**Comments:** Species composition (especially in the tree and moss layers) between the plots is variable. Oval-leaved blueberry is the most common Vaccinium; Alaskan blueberry is dominant in one inspection. The shrub layer is well developed but species poor. The herb layer is sparse (average total cover 9%). Common leafy liverwort and dicranum mosses are present in all inspections; other species are present in individual inspections.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
MHmm2	MK	00	Mountain hemlock krummholz
<p><b>Assumed site modifiers for the typical situation:</b> j, v  <b>Mapped Modifiers:</b> dk, dw, h, hs, k, ks, q, qs, r, sw, w  Typic MK occurs on very shallow soils on gently sloping sites. It is found on deep soils on warn (dw) and cool (dk) aspects; hummocks (h); hummocks with shallow soils (hs); cool aspects (k); cool aspect on shallow soils (ks); very steep, cool aspects (q); very steep, cool aspects with shallow soils (qs); ridges (r); shallow soils on warm aspects (sw); and on warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	815 - 930	872
<b>Slope (%)</b>	0 - 51	25
<b>Aspect (degrees)</b>	none, 310	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
very xeric – mesic	poor to medium	
<b>Drainage</b>	rapid – imperfect	
<b>Surficial Material</b>		
mixed fragments, silty, sandy colluvial veneer; mixed fragments, silty, sandy morainal mantle of variable thickness and very thin veneer		
<b>Soil Development</b>		
Eluviated Orthic Dystric Brunisol, Dystric Brunisol		
<b>Humus Form</b>	Moder	
<b>Humus Depth (cm)</b>	1 – 7	
<b>Coarse Fragments (%)</b>	15 – 20	
<b>Soil Texture</b>	silt loam	

**Photo:** B6-6, plot 9903327

**MAP**

Symbol/Site Series

Name

MK 00

Mountain hemlock krummholz

Map Symbol	MK3a	MK3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	mountain hemlock white mountain-heather common leafy liverwort	mountain hemlock white mountain-heather common leafy liverwort
<b>Associates</b>	subalpine fir bog-blueberry oval-leaved blueberry crowberry Alaskan mountain-heather yellow mountain-heather icelandmoss cladina lichens dicranum mosses red-stemmed feathermoss foam lichens	subalpine fir bog-blueberry oval-leaved blueberry crowberry Alaskan mountain-heather yellow mountain-heather icelandmoss cladina lichens dicranum mosses red-stemmed feathermoss foam lichens
<b>Plots</b>	9903327, 9903334	

**Comments:** MK appears as thick patches of dwarf /prostrate conifers in stage 3a with openings dominated by mountain-heathers; in stage 3b the conifers are more upright (trees are in the lower end of the 2-10 m range of stage 3b). Species composition may be similar to MM or MB units.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
MHmm2	MM	02	HmBa – Mountain-heather
<p><b>Assumed site modifiers for the typical situation:</b> j, r, s  <b>Mapped Modifiers:</b> h, hv, k, kv, q, v, vw, w, z  Typic MM occurs on gently sloping, crest positions on shallow soils. MM is also found on hummocks (h); hummocks with very shallow soils (hv); cool aspects (k); cool aspects with very shallow soils (kv); very shallow soils (v), warm aspects (w) and warm aspects with very shallow soils (vw); and very steep cool (q) and warm (z) aspects.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	655 - 820	749
<b>Slope (%)</b>	0 - 45	17
<b>Aspect (degrees)</b>	20 – 260, none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
very xeric - subxeric	very poor - medium	
<b>Drainage</b>	rapid - well	
<b>Surficial Material</b>		
angular, silty, sandy colluvial veneer and very thin veneer; silty, sandy very thin veneer of weathered bedrock over undulating rock; silty, mixed fragments, sandy morainal mantle of variable thickness over rock; colluvial very thin veneer and veneer		
<b>Soil Development</b>		
Folisols, Regosols		
<b>Humus Form</b>	Mors, Moders	
<b>Humus Depth (cm)</b>	0 – 40	
<b>Coarse Fragments (%)</b>	< 20	
<b>Soil Texture</b>	sandy - silty	

Photo: B4-18, G37

**MAP**

**Symbol/Site Series**

MM 02

**Name**

**HmBa – Mountain-heather**

Map Symbol	MM3	MM4	MM5	MM6 (or MM3b)	MM7 (or MM3b)
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	mountain hemlock white mountain-heathers	mountain hemlock white mountain-heathers	mountain hemlock white mountain-heather reindeer lichens	mountain hemlock white mountain-heather reindeer lichens	mountain hemlock white mountain-heather reindeer lichens
<b>Associates</b>	western hemlock false azalea oval-leaved blueberry bog blueberry crowberry mountain-heathers dicranum mosses reindeer lichens	western hemlock false azalea oval-leaved blueberry crowberry mountain-heathers dicranum mosses reindeer lichens juniper haircap moss	western hemlock subalpine fir false azalea oval-leaved blueberry bog blueberry crowberry Alaskan mountain-heather pink mountain-heather dicranum mosses cladonia lichens common leafy liverworts hoary rock moss juniper haircap moss foam lichens	western hemlock subalpine fir false azalea oval-leaved blueberry bog blueberry crowberry Alaskan mountain-heather pink mountain-heather dicranum mosses cladonia lichens common leafy liverworts hoary rock moss juniper haircap moss foam lichens	western hemlock subalpine fir false azalea oval-leaved blueberry bog blueberry crowberry Alaskan mountain-heather pink mountain-heather dicranum mosses cladonia lichens common leafy liverworts hoary rock moss juniper haircap moss foam lichens
<b>Plots</b>				964059, G37, G1045, G1050	

**Comments:** Trees in the MM are often low in stature (stunted) and are commonly found in the shrub layers (<10m); mature and old forests are frequently mapped as stage 3b (and as stage 3 in the original map area). MM typically has a herb layer dominated by mountain-heathers or crowberry; the moss layer is generally diverse (average total cover 48%) and composed of different species in the inspections; lichens are more abundant than mosses.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
MHmm2	MO	03	BaHm – Oak fern
<p><b>Assumed site modifiers for the typical situation:</b> d, m, steep slopes – use aspect modifiers  <b>Mapped Modifiers:</b> cw, k, ks, sw, w  Typic MO occurs on steep slopes on deep, medium-textured soils on nutrient rich sites. Within the project area, MO occurs on coarse-textured soils on warm aspects (cw); cool aspects (k); cool aspects with shallow soils (ks); warm aspects (w) and warm aspects with shallow soils (sw).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	630 – 690	651
<b>Slope (%)</b>	6 – 84	39
<b>Aspect (degrees)</b>	60 – 250	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
mesic	medium – rich	
<b>Drainage</b>	well – imperfect	
<b>Surficial Material</b>		
sandy, mixed fragments colluvial veneer; angular, silty, sandy colluvial veneer; rubbly colluvial veneer; colluvial veneer and very thin veneer		
<b>Soil Development</b>		
Sombric Brunisol, Gleyed Regosol, Eluviated Eutric Brunisol		
<b>Humus Form</b>	Mors	
<b>Humus Depth (cm)</b>	7 – 20	
<b>Coarse Fragments (%)</b>	1 – 40	
<b>Soil Texture</b>	sandy – sandy loam	

**Photo:** no photograph

**MAP**

**Symbol/Site Series**

**MO 03**

**Name**

**BaHm – Oak fern**

<b>Map Symbol</b>	MO3	MO4	MO5	MO6	MO7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	mountain hemlock false azalea oval-leaved blueberry	mountain hemlock false azalea	mountain hemlock subalpine fir false azalea black huckleberry step moss red-stemmed feathermoss	mountain hemlock false azalea	mountain hemlock false azalea
<b>Associates</b>	black huckleberry lady fern oak fern five-leaved bramble	oval-leaved blueberry black huckleberry Sitka mountain-ash oak fern five-leaved bramble step moss red-stemmed feathermoss	oval-leaved blueberry Sitka mountain-ash oak fern bunchberry five-leaved bramble pipecleaner moss	western hemlock subalpine fir alder oval-leaved blueberry black huckleberry oak fern five-leaved bramble lady fern bunchberry Sitka valerian foamflowers step moss red-stemmed feathermoss pipecleaner moss leafy mosses lanky moss	western hemlock subalpine fir alder oval-leaved blueberry black huckleberry oak fern five-leaved bramble lady fern bunchberry step moss red-stemmed feathermoss pipecleaner moss leafy mosses lanky moss
<b>Plots</b>			964046	964047, 964037, 964058	

**Comments:** The herb layer is generally more diverse than found in MB ecosystems, however the % cover of individual rich site indicator species is generally low ( $\leq 5\%$ ). A low cover ( $< 1\%$ ) of several other herbs (clasping twistedstalk, heart-leaved arnica, spiny wood fern, and Indian hellebore) is occasionally present in the inspections. The average total herb layer cover is about 15%. The moss layer is not as well developed as found in the MB ecosystems; the average total cover for the plots is about 14%.

<b>BIOGEOCLIMATIC UNIT</b>	<b>MAP</b>		
	Symbol	Site Series	Name
<b>MHmm2</b>	<b>MT</b>	<b>05</b>	<b>BaHm – Twistedstalk</b>
<p><b>Assumed site modifiers for the typical situation:</b> d, m, steep slopes – use aspect modifiers  <b>Mapped Modifiers:</b> ac, cn, j, k, ks, sw, w  Typic MT occurs on steep slopes on deep, medium-textured soils on nutrient rich sites. Within the project area, MT occurs on active fluvial sites on coarse-textured soils (ac); coarse-textured soils on fans (can); gentle slopes (j); cool aspects (k); cool aspects with shallow soils (ks); warm aspects (w) and warm aspects with shallow soils (sw).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>		
<b>Slope (%)</b>		39
<b>Aspect (degrees)</b>		
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric	medium - rich	
<b>Drainage</b>	moderately well – imperfect	
<b>Surficial Material</b>		
<b>Soil Development</b>		
<b>Humus Form</b>		
<b>Humus Depth (cm)</b>		
<b>Coarse Fragments (%)</b>		
<b>Soil Texture</b>		

**Photo:** no photograph

**MAP**

**Symbol/Site Series**

**Name**

**MT 05**

**BaHm – Twisted stalk**

<b>Map Symbol</b>	MO3	MO4	MO5	MO6	MO7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	mountain hemlock false azalea oval-leaved blueberry	mountain hemlock false azalea	mountain hemlock subalpine fir black huckleberry five-leaved bramble rosy twistedstalk	mountain hemlock subalpine fir black huckleberry five-leaved bramble rosy twistedstalk	mountain hemlock subalpine fir black huckleberry five-leaved bramble rosy twistedstalk
<b>Associates</b>	black huckleberry Indian hellebore rosy twistedstalk Sitka valerian oak fern five-leaved bramble	subalpine fir oval-leaved blueberry black huckleberry Indian hellebore rosy twistedstalk oak fern five-leaved bramble leafy mosses	oval-leaved blueberry false azalea Indian hellebore oak fern Sitka valerian foamflowers leafy mosses pipecleaner moss	oval-leaved blueberry false azalea oak fern Sitka valerian foamflowers leafy mosses dicranum mosses pipecleaner moss leafy liverworts	oval-leaved blueberry false azalea oak fern Sitka valerian foamflowers leafy mosses dicranum mosses pipecleaner moss leafy liverworts
<b>Plots</b>					

**Comments:** This description is based on the MoF Regional Field Guide and on inspections in other MHmm2 units in the project area.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
MHmm2	WL	00	Subalpine Wetland
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped Modifiers:</b> ac, p  Typic WL occurs on level sites on deep, medium-textured soils. Willows and horsetails are common species. WL is also found on active fluvial sites with coarse-textures soils (ac) and on peaty veneers (p).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	690 - 815	752
<b>Slope (%)</b>	0	
<b>Aspect (degrees)</b>	none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhydric	rich	
<b>Drainage</b>	imperfect – very poor	
<b>Surficial Material</b>		
silty active glaciofluvial veneer; gravelly, sandy fluvial active plain		
<b>Soil Development</b>		
Orthic Gleysol, Gleysol		
<b>Humus Form</b>	Fibrimor	
<b>Humus Depth (cm)</b>	2 - 7	
<b>Coarse Fragments (%)</b>	0 – 5	
<b>Soil Texture</b>	silt loam - silt	

**Photo:** C7-5, plot 9903311

**MAP**

Symbol/Site Series

Name

WL 00

Subalpine Wetland

Map Symbol	WL2b	WL3a
<b>Plant Species</b>	Herb Climax	Low Shrub Climax
<b>Dominants</b>	common horsetail northern scouring-rush spring moss green-tongue liverwort	Barclay's willow arctic willow common horsetail northern scouring-rush spring moss sickle moss bent-leaf moss
<b>Associates</b>	Barclay's willow Chamisso's cotton-grass Sitka burnet elephant's-head lousewort alpine bistort creeping willow hoary willow white bog orchid Scandinavian sedge	short-fruited willow Sitka alder arctic lupine leatherleaf saxifrage large leafy moss green-tongue liverwort
<b>Plots</b>	9903336	9903311

**Comments:** Low gradient fluvial areas are uncommon in the project area.

<b>BIOGEOCLIMATIC UNIT</b>	MAP		
	Symbol	Site Series	Name
<b>MHmm2</b>	<b>WM</b>	<b>00</b>	<b>Wet seepage meadow</b>
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped Modifiers:</b> a, ac, k, w  Typic WM on gentle slopes on deep, medium - textured soils on moisture receiving positions (assumed modifiers are d, j, m). WM is also found on active fluvial sites (a); active fluvial sites with coarse-textured soils (ac); cool aspects (k); and warm aspects (w).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	1275	
<b>Slope (%)</b>	29	
<b>Aspect (degrees)</b>	250	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric	medium -rich	
<b>Drainage</b>	imperfect	
<b>Surficial Material</b>		
silty, sandy, rubbly weathered bedrock veneer		
<b>Soil Development</b>		
(Rego) Gleysol		
<b>Humus Form</b>	Hemimor	
<b>Humus Depth (cm)</b>	7	
<b>Coarse Fragments (%)</b>	85	
<b>Soil Texture</b>	silt loam	

**Photo:** C8-4, plot 9903330

**MAP****Symbol/Site Series****Name**

WM 00

Wet seepage meadow

<b>Map Symbol</b>	WM2 (a/b)
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	broad-leaved willowherb white mountain-heather cordate-leaved saxifrage
<b>Associates</b>	purple arnica net-veined willow arctic willow graceful mountain sedge Alaskan mountain-heather Oedder's lousewort crowberry Altai fescue spotted saxifrage arctic buttercup Sitka burnet
<b>Plots</b>	9903330

**Comments:** This plot is located adjacent to a small stream in the subalpine. It has a different composition than the moist herb meadow (964050) described in AM.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
MHmm2	YH	07	YcHm – Hellebore
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped Modifiers:</b> none  Typic YH occurs on gentle, lower slopes on deep, medium-textured soils (assumed modifiers are d, j, m). It is found on wet, nutrient rich sites.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	675	
<b>Slope (%)</b>	50	
<b>Aspect (degrees)</b>	90	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
hygic	rich	
<b>Drainage</b>	imperfect	
<b>Surficial Material</b>		
mixed fragments, sandy colluvial veneer and blanket		
<b>Soil Development</b>		
Humic Gleysol		
<b>Humus Form</b>	Mormoder	
<b>Humus Depth (cm)</b>	5	
<b>Coarse Fragments (%)</b>	40	
<b>Soil Texture</b>	silt loam	

**Photo:** C4-6, plot 9902693

MAP

Symbol/Site Series

Name

YH 07

YcHm - Hellebore

Map Symbol	YH3	YH4	YH5	YH6	YH7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	mountain hemlock salmonberry oak fern lady fern	mountain hemlock lady fern oak fern leafy moss	mountain hemlock lady fern oak fern leafy moss	mountain hemlock lady fern streambank arnica oak fern leafy moss spring moss <i>Drepanocladus aduncus</i>	mountain hemlock lady fern streambank arnica oak fern leafy moss spring moss <i>Drepanocladus aduncus</i>
<b>Associates</b>	devil's club Alaskan blueberry false azalea leatherleaf saxifrage Indian hellebore Sitka valerian Sitka burnet	Alaskan blueberry false azalea leatherleaf saxifrage Indian hellebore Sitka valerian Sitka burnet white mountain marsh-marigold	Alaska blueberry false azalea leatherleaf saxifrage Indian hellebore Sitka burnet clasping twistedstalk Sitka valerian white mountain marsh-marigold shiny liverwort	Alaskan blueberry false azalea devil's club Sitka mountain-ash leatherleaf saxifrage Indian hellebore Sitka burnet clasping twistedstalk Sitka valerian large-awned sedge five-stamened mitrewort white mountain marsh-marigold large leafy moss shiny liverwort	Alaskan blueberry false azalea devil's club Sitka mountain-ash leatherleaf saxifrage Indian hellebore Sitka burnet clasping twistedstalk Sitka valerian large-awned sedge five-stamened mitrewort white mountain marsh-marigold large leafy moss shiny liverwort
<b>Plots</b>					9902693

**Comments:** Yellow cedar is not found in the project area. This ecosystem has robust and diverse herb and moss layers.

4.4 SBSmv – MOIST VERY COLD SUB-BOREAL SPRUCE

<b>BIOGEOCLIMATIC UNIT</b>	<b>MAP</b>		
	Symbol	Site Series	Name
SBSmv	AC	00	Avalanche Chute
<p><b>Assumed site modifiers for the typical situation:</b> c, d, steep – use aspect modifiers  <b>Mapped Modifiers:</b> gk, gw, j, k, kn, ks, kv, n, nw, sw, w                  Typic AC occurs on deep coarse-textured soils. It is found on gullies on cool (gk) and warm aspects (gw); gentle slopes (j); cool aspects (k), cool aspect fluvial fans or cones (kn); cool aspects with shallow (ks) and very shallow (kv) soils; fluvial fans or cones (n); warm aspect fluvial fans or cones (nw); warm aspects with shallow soils (sw); and on warm aspects (w).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	85 – 685	470
<b>Slope (%)</b>	20 - 85	50
<b>Aspect (degrees)</b>	28 – 350	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic – subhygric	medium – rich	
<b>Drainage</b>		
<b>Surficial Material</b>		
angular, silty colluvial fan; sandy, rubbly colluvial veneer; colluvial veneer and hummocks; mixed fragments, silty, sandy morainal blanket and mantle of variable thickness		
<b>Soil Development</b>		
Orthic Dystric Brunisol, Eluviated Dystric Brunisol		
<b>Humus Form</b>	Leptomoder, Mor	
<b>Humus Depth (cm)</b>	5 - 40	
<b>Coarse Fragments (%)</b>	5 – 75	
<b>Soil Texture</b>	loamy - silt	

Photo: C4-17, plot 9902696

Symbol/Site Series      Name  
 AC      00                  Avalanche Chute

Map Symbol	AC2	AC3a	AC3b
<b>Plant Species</b>	Herb Climax	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	lady fern bluejoint oak fern fireweed	Sitka alder devil's club lady fern oak fern	Sitka alder devil's club lady fern oak fern
<b>Associates</b>	salmonberry cow-parsnip Sitka burnet arrow-leaved groundsel Indian hellebore goatsbeard large-awned sedge common horsetail mountain sagewort Richardson's geranium Sitka valerian stinging nettle mountain sorrel bluegrass smooth alumroot <i>Brachythecium</i> sp.	red elderberry trailing black currant goatsbeard common horsetail spiny wood fern	red elderberry trailing black currant goatsbeard common horsetail spiny wood fern
<b>Plots</b>	G116		964060, 9902696, 0002406

**Comments:**

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SBSmv	AF	00	Alder – Lady fern
<p><b>Assumed site modifiers for the typical situation:</b> d, j  <b>Mapped Modifiers:</b> gk, gw, k, ks, n, sw, w  Typic AF occurs on gentle slopes on deep soils that receive some seepage or hold snow later in the spring. They often appear as small openings on gently sloped, forested landscapes; they also occur on short, steep slopes that are not subject to avalanching. AC occurs in gullies on cool (gk) and warm (gw) aspects; cool aspects (k); cool aspects on shallow soils (ks); fans or cones (n); shallow soils on warm aspects (sw); and warm aspects (w).</p>			

**SITE DESCRIPTION**

	Range	Mean
Elevation (m)		
Slope (%)		
Aspect (degrees)		
Moisture Regime	Nutrient Regime	
submesic – hygric		
Drainage		
Surficial Material		
Soil Development		
Humus Form		
Humus Depth (cm)		
Coarse Fragments (%)		
Soil Texture		

**Photo: no photograph**

**MAP****Symbol/Site Series****Name****AF 00****Alder – Lady fern**

<b>Map Symbol</b>	AF3a	AF3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	alders (mountain/Sitka) spiny wood fern oak fern	alders (mountain/Sitka) spiny wood fern oak fern
<b>Associates</b>	lady fern Indian hellebore horsetails	lady fern Indian hellebore horsetails
<b>Plots</b>		

<b>Comments:</b>
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BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SBSmv	AS	00	At - Soopolallie –Saskatoon
<p><b>Assumed site modifiers for the typical situation:</b> s, w  <b>Mapped Modifiers:</b> d, g, k, q, v, z  AS is a shrubland unit that typically occurs on steep slopes on warm aspects with shallow soils. It occurs on deep soils on warm aspects (d); in gullies on warm aspects (g); cool aspects (k); very steep cool aspects (q); warm aspects with very shallow soil (v); and very steep warm aspects (z).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	210 - 525	410
<b>Slope (%)</b>	45 - 95	75
<b>Aspect (degrees)</b>	162 – 234	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subxeric (submesic)	medium	
<b>Drainage</b>	rapid	
<b>Surficial Material</b>		
silty, sandy, rubbly colluvial veneer, moderately steep slope; sandy, silty, rubbly colluvial veneer and very thin veneer; silty, sandy, rubbly colluvial veneer over steep and moderately steep rock		
<b>Soil Development</b>		
Orthic Eutric Brunisol, Orthic Sombric Brunisol		
<b>Humus Form</b>	Mormoder, Mullmoder, Moders	
<b>Humus Depth (cm)</b>	3 – 10	
<b>Coarse Fragments (%)</b>	35 – 80	
<b>Soil Texture</b>	sandy loam - silty	

**Photo:** C9-10, G1074

MAP

Symbol/Site Series

AS 00

Name

At - Soopolallie – Saskatoon Shrubland

Map Symbol	AS3	AS4	AS5	AS6	AS7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	trembling aspen soopolallie common juniper	trembling aspen common juniper soopolallie highbush-cranberry	trembling aspen common juniper soopolallie highbush-cranberry	trembling aspen Scouler's willow lodgepole pine common juniper common snowberry saskatoon prickly rose soopolallie	trembling aspen lodgepole pine common juniper common snowberry saskatoon prickly rose soopolallie
<b>Associates</b>	subalpine fir Scouler's willow paper birch highbush-cranberry prickly rose saskatoon dwarf blueberry fowl bluegrass bunchberry twinflower northern geranium heart-leaved arnica fireweed	lodgepole pine Douglas maple subalpine fir Scouler's willow paper birch saskatoon kinnikinnick common snowberry fireweed blue wildrye yarrow heart-leaved arnica	lodgepole pine (subalpine fir) Douglas maple Scouler's willow paper birch saskatoon choke cherry kinnikinnick silvery cinquefoil common snowberry red raspberry red swamp currant three-toothed saxifrage fireweed blue wildrye arctic lupine prairie sagewort yarrow showy Jacob's-ladder spreading dogbane western fescue northern bedstraw	subalpine fir Douglas maple blue wildrye northern bedstraw kinnikinnick spreading dogbane heart-leaved arnica fireweed yarrow twinflower western fescue <i>Brachythecium</i> sp.	subalpine fir Douglas maple Scouler's willow blue wildrye northern bedstraw kinnikinnick spreading dogbane heart-leaved arnica fireweed yarrow twinflower western fescue <i>Brachythecium</i> sp.
<b>Plots</b>	9902645		9903347	G109, G1074	

**Comments:** These units have an open tree canopy and a species rich and well developed tall and low shrub layer. The herb layer is poorly to moderately-well developed. The moss layer is very sparse.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SBSmv	CD	00	Act - Devil's club - Red-osier dogwood – Horsetail
<p><b>Assumed site modifiers for the typical situation:</b> a, d, j, m  <b>Mapped Modifiers:</b> t  Typic CD occurs on active floodplains on high benches on deep, medium-textured soils. CD also occurs on fluvial terraces (t).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	95 - 280	192
<b>Slope (%)</b>	0	0
<b>Aspect (degrees)</b>	none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric	medium - rich	
<b>Drainage</b>	moderately well - imperfect	
<b>Surficial Material</b>		
sandy fluvial veneer over sandy, gravelly fluvial plain; sandy, gravelly fluvial plain; silty, sandy fluvial plain		
<b>Soil Development</b>		
Gleyed Dystric Brunisol		
<b>Humus Form</b>	Mormoder	
<b>Humus Depth (cm)</b>	0 - 12	
<b>Coarse Fragments (%)</b>	0 - 20	
<b>Soil Texture</b>	sandy loam - silt	

**Photo:** C4-19, plot 9902697

MAP

Symbol/Site Series

CD 06

Name

Act - Devil's Club – Red-osier dogwood -Horsetail

Map Symbol	CD3	CD4	CD5	CD6	CD7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	black cottonwood devil's club red-osier dogwood highbush-cranberry common horsetail bluejoint	black cottonwood devil's club red-osier dogwood	white spruce black cottonwood devil's club red-osier dogwood	white spruce black cottonwood subalpine fir devil's club red-osier dogwood <i>Brachythecium</i> sp.	white spruce subalpine fir black cottonwood devil's club oak fern
<b>Associates</b>	white spruce prickly rose oak fern bunchberry small bedstraw	white spruce highbush-cranberry prickly rose common horsetail oak fern bunchberry small bedstraw	subalpine fir highbush-cranberry prickly rose common horsetail oak fern spiny wood fern bunchberry small bedstraw leafy mosses	highbush-cranberry prickly rose common horsetail oak fern spiny wood fern bunchberry small bedstraw leafy mosses	red-osier dogwood highbush-cranberry Sitka/mountain alder red elderberry common horsetail spiny wood fern bunchberry alpine bearberry rosy twistedstalk leafy mosses
<b>Plots</b>				9903351, 9628585	9902697

**Comments:** MoF plot 9628585 is located on the Inklin River just downstream of the Sutlahine River. It had a significant component of red alder, less devil's club and more common horsetail than the other plots. Plot 9903351, located on the Nakina River, contained several species not found in the other plots (i.e. oval-leaved blueberry, false azalea, soopolallie and five-leaved bramble). A low cover of *Ribes* sp. (black gooseberry) may be present in this unit.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SBSmv	CH	00	Act - Prickly rose – Horsetail
<p><b>Assumed site modifiers for the typical situation:</b> a, c, d, j  <b>Mapped Modifiers:</b> n  Typic CH occurs on active floodplains on middle benches on deep, coarse-textured soils. CH also occurs on fluvial fans (n).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	75 - 565	217
<b>Slope (%)</b>	0	0
<b>Aspect (degrees)</b>	none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric - hygric	poor - rich	
<b>Drainage</b>	well – poor	
<b>Surficial Material</b>		
sandy, gravelly active fluvial plain; sandy, silty fluvial veneer and blanket over sandy, gravelly fluvial plain; sandy fluvial veneer and blanket over sandy, gravelly fluvial plain; silty active fluvial plain		
<b>Soil Development</b>		
Orthic Regosol, Orthic Dystric Brunisol, Orthic Gleysol, Gleyed Regosol		
<b>Humus Form</b>	Mormoder, Leptomoder, Moders, Mors	
<b>Humus Depth (cm)</b>	0 – 14	
<b>Coarse Fragments (%)</b>	0 – 90	
<b>Soil Texture</b>	sandy - silty	

Photo: B4-24, plot 9902642

MAP

Symbol/Site Series

CH 00

Name

Act - Prickly rose - Horsetail

Map Symbol	CH3	CH4	CH5	CH6	CH7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	black cottonwood yellow mountain-avens	black cottonwood soopolallie	black cottonwood soopolallie	black cottonwood subalpine fir red-osier dogwood highbush-cranberry prickly rose soopolallie	black cottonwood trembling aspen white spruce red-osier dogwood horsetails (common, meadow)
<b>Associates</b>	lodgepole pine soopolallie subalpine fir Sitka/mountain alder Drummond's willow broad-leaved willowherb great northern aster blue wildrye alpine milk-vetch grey rock moss	lodgepole pine subalpine fir Sitka/mountain alder red alder willows highbush-cranberry blue wildrye great northern aster scouring rush northern scouring-rush	lodgepole pine subalpine fir white spruce red alder paper birch willows Sitka/mountain alder red-osier dogwood highbush-cranberry prickly rose red raspberry blue wildrye scouring rush northern scouring rush wild strawberry	trembling aspen red alder common horsetail mountain/Sitka alder saskatoon devil's club red raspberry Pacific willow bastard toad-flax pink wintergreen prince's pine mountain sweet-cicely	red alder highbush-cranberry prickly rose devil's club common snowberry mountain sweet-cicely great northern aster
<b>Plots</b>	0002417		G107	0002421, G1076	9902642, 9628583

**Comments:** The plots in the stage 7 forests are not similar; MoF plot 9628583 has a deciduous tree canopy with mountain alder in the tall shrub layer and relatively low cover of red-osier dogwood. Plot 9902642 has a mixed tree canopy and a shrubby understorey dominated by red-osier dogwood. Species composition in the tree, shrub and herb layer is variable. The moss layer is very poorly developed.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SBSmv	FA	00	BI – False azalea – Bunchberry
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped Modifiers:</b> k, ks, n, s, sw, t, w  Typic FA occurs on gentle slopes on deep, medium-textured soils. FA also occurs on cool aspects (k); cool aspects on shallow soils (ks); fans (n); shallow soils (s); shallow soils on warm aspects (sw); on terraces (t); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	285 - 700	462
<b>Slope (%)</b>	5 - 46	22
<b>Aspect (degrees)</b>	20 – 170	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
mesic	medium	
<b>Drainage</b>	moderately well – well	
<b>Surficial Material</b>		
silty, sandy morainal mantle of variable thickness; sandy, mixed fragments morainal deposits; mixed fragments, sandy, silty morainal veneers and blankets		
<b>Soil Development</b>		
Orthic Humo-Ferric Podzol, Eluviated Dystric Brunisol		
<b>Humus Form</b>	Hemimor, Mors, Moders	
<b>Humus Depth (cm)</b>	0 – 10	
<b>Coarse Fragments (%)</b>	15 – 35	
<b>Soil Texture</b>	loamy sand – silt loam	

Photo: C6-10, plot 9903304

MAP

Symbol/Site Series

FA 00

Name

B1 - False azalea - Bunchberry

Map Symbol	FA3	FA4	FA5	FA6	FA7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	false azalea oval-leaved blueberry bunchberry	subalpine fir false azalea	subalpine fir false azalea	subalpine fir false azalea	subalpine fir white spruce false azalea oval-leaved blueberry green alder bunchberry red-stemmed feathermoss step moss leafy liverwort
<b>Associates</b>	subalpine fir lodgepole pine fireweed bunchberry oak fern red-stemmed feathermoss	lodgepole pine oval-leaved blueberry bunchberry one-sided wintergreen oak fern three-leaved foamflower red-stemmed feathermoss step moss	lodgepole pine oval-leaved blueberry bunchberry one-sided wintergreen oak fern five-leaved bramble three-leaved foamflower prince's pine red-stemmed feathermoss common leafy liverwort step moss	western hemlock oval-leaved blueberry bunchberry one-sided wintergreen oak fern five-leaved bramble three-leaved foamflower prince's pine red-stemmed feathermoss curly heron's-bill moss common leafy liverwort <i>Brachythecium</i> spp. lanky moss step moss	lodgepole pine oak fern five-leaved bramble one-sided wintergreen stiff clubmoss knight's plume
<b>Plots</b>				964052, 964061, 9903304	G134

**Comments:** This unit is similar to the FF unit at elevations above about 450m. Inspection G134 is located on a steep, cool aspect. Two other visuals (V144, V1216) with detailed species lists were completed at elevations >600m. The moss layer is also well developed in both inspections. It appears that the % cover in the moss layer increases with elevation. One plot 9903304, located near on the Taku River near the King Salmon has a significant component of western hemlock and lanky moss and curly heron's-bill moss; these species are expected near the transition to the CWHwm. White spruce generally forms a minor component of the tree canopy.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SBSmv	FC	00	BIEp - Highbush cranberry – Bunchberry
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped Modifiers:</b> h, k, kn, ks, n, nw, sw, t, w  Typic FA occurs on gentle slopes on deep, medium-textured soils. It is commonly found on inactive glaciofluvial and fluvial materials, especially terraces (t). FC is also found on hummocks (h); cool aspects (k); cool aspects colluvial fans/cons (kn); cool aspects with shallow soils (ks); fans or cones (n); warm aspect fans or cones (nw); terraces (t); warm aspects with shallow soils (sw); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	110 - 315	225
<b>Slope (%)</b>	0 - 50	9
<b>Aspect (degrees)</b>	none, 190 -360	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic - mesic	medium - rich	
<b>Drainage</b>	moderately well - well	
<b>Surficial Material</b>		
silty, sandy, gravelly glaciofluvial plain; silty, sandy glaciofluvial terrace; sandy, silty, mixed fragments morainal veneer over sandy, gravelly glaciofluvial materials; clayey, silty, sandy glaciofluvial veneer over sandy, gravelly glaciofluvial plain; silty, moderately steep glaciofluvial; glaciofluvial terraces; gravelly, sandy fluvial blankets; sandy, fluvial veneer over sandy, gravelly fluvial plain; fluvial terrace		
<b>Soil Development</b>		
Orthic Dystric Brunisol, Eluviated Dystric Brunisol		
<b>Humus Form</b>	Mormoder, Leptomoder, Hemimor	
<b>Humus Depth (cm)</b>	0 – 15	
<b>Coarse Fragments (%)</b>	0 – 80	
<b>Soil Texture</b>	sandy – silt loam	

**Photo:** CT5-18, plot 9903391

MAP

Symbol/Site Series  
FC 00

Name  
BIEp - Highbush cranberry - Bunchberry

Map Symbol	FC3	FC4	FC5	FC6	FC7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	paper birch trembling aspen Douglas maple soopolallie highbush-cranberry fireweed	paper birch subalpine fir trembling aspen lodgepole pine high-bush cranberry bunchberry	subalpine fir paper birch highbush-cranberry bunchberry prince's pine	subalpine fir paper birch white spruce lodgepole pine trembling aspen highbush-cranberry bunchberry red-stemmed feathermoss step moss	subalpine fir white spruce highbush-cranberry red-osier dogwood bunchberry prince's pine oak fern red-stemmed feathermoss step moss
<b>Associates</b>	subalpine fir lodgepole pine Douglas maple common snowberry thimbleberry willows (Scouler's) black gooseberry red swamp currant western mountain-ash blue wildrye northern bedstraw yarrow wild strawberry bunchberry	Douglas maple thimbleberry black gooseberry red swamp currant western mountain-ash blue wildrye northern bedstraw baneberry fireweed	trembling aspen red-osier dogwood Douglas maple devil's club black gooseberry thimbleberry western mountain-ash baneberry rattlesnake plantain	Sitka alder saskatoon red-osier dogwood prickly rose soopolallie oval-leaved blueberry Douglas maple bastard toad-flax prince's pine twinflower baneberry heart-leaved arnica blue wildrye ground cedar one-sided wintergreen mountain sweet-cicely sweet coltsfoot pink wintergreen <i>Brachythecium</i> sp. knight's plume	paper birch trembling aspen Sitka alder prickly rose thimbleberry red swamp currant soopolallie devil's club bastard toad-flax baneberry oak fern twinflower sweet coltsfoot pink wintergreen clasping twistedstalk northern starflower <i>Brachythecium</i> sp. knight's plume electrified cat's-tail moss
<b>Plots</b>			9628557	9903348, 9903392, 9628552, 9628554, 9628565, 9628572, G1075	9903391, 9628584

**Comments:** A low cover of devil's club and thimbleberry and high cover of oak fern are present in one of the old forest plots. A low cover (<1%) of fireweed and northern bedstraw is often present in mature and old forests. These units have a diverse tree, shrub and herb layer. Shrub cover averages about 55% (range 20-99%) while herb cover averages about 40% (range 12 – 75%). Average cover of the moss layer in mature and old forest is 50%.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SBSmv	FF	00	Bl - Bunchberry – Feathermoss
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped Modifiers:</b> gk, gs, gw, h, hs, k, kn, ks, kv, n, qs, r, rs, s, sw, t, vw, w  Typic FF occurs on gentle slopes on deep, medium-textured soils (assumed modifiers are d, j, m). It also occurs in gullies on cool (gk) and warm (gw) aspects; gullies with shallow soils (gs); hummocks (h); hummocks with shallow soils (hs); cool aspects (k); cool aspect fans or cones (kn); cool aspects with shallow soils (ks); cool aspect with very shallow soils (kv); fans and cones (n); very steep slopes with shallow soils (qs); ridges (r); ridges with shallow soils (rs); shallow soils (s); shallow soils on warm aspects (sw); very shallow soils on warm aspects (vw); warm aspects (w); and terraces (t). All but one of the inspections occurred at elevations &gt;450m.</p>			

#### SITE DESCRIPTION

	Range	Mean
Elevation (m)	330 - 790	582
Slope (%)	3 - 82	29
Aspect (degrees)	0 – 332	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
(subxeric) submesic – mesic	poor – medium	
<b>Drainage</b>	rapid – well	
<b>Surficial Material</b>		
sandy, silty, angular colluvial veneer; silty, sandy, angular colluvial veneer; angular, silty, sandy colluvial veneer; silty, sandy, rubbly colluvial blanket and veneer; sandy, mixed fragments, silty morainal blanket; mixed fragments, sandy, muddy morainal mantle of variable thickness; mixed fragments, silty, sandy morainal mantle of variable thickness; sandy, gravelly fluvial fan; silty, gravelly glaciofluvial terrace; undulating and hummocky rock		
<b>Soil Development</b>		
Orthic Dystric Brunisol, Eluviated Eutric Brunisol, Orthic Regosol		
<b>Humus Form</b>	Mormoder, Hemimor, Mor	
<b>Humus Depth (cm)</b>	5 - 11	
<b>Coarse Fragments (%)</b>	<20 – 70	
<b>Soil Texture</b>	sandy – loamy (occasional silty)	

**Photo:** B5-3, plot 9902644

**MAP**

**Symbol/Site Series**  
**FF 00**

**Name**  
**BI – Bunchberry - Feathermoss**

Map Symbol	FF3	FF4	FF5	FF6	FF7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	subalpine fir willows (Bebb's, Scouler's)	subalpine fir bastard toad-flax red-stemmed feathermoss curly heron's-bill moss	subalpine fir red-stemmed feathermoss step moss knight's plume	subalpine fir bunchberry red-stemmed feathermoss common leafy liverwort knight's plume	subalpine fir white spruce red-stemmed feathermoss step moss
<b>Associates</b>	bunchberry bastard toad-flax fireweed heart-leaved arnica tall bluebells red-stemmed feathermoss	white spruce Bebb's willow trembling aspen bunchberry one-sided wintergreen prince's pine common leafy liverwort step moss knight's plume freckle pelt	white spruce bunchberry bastard toad-flax one-sided wintergreen prince's pine dicranum mosses (curly herons'-bill)	western hemlock white spruce Scouler's willow false azalea oval-leaved blueberry bastard toad-flax one-sided wintergreen heart-leaved arnica step moss dicranum mosses (curly heron's-bill)	Scouler's willow highbush cranberry oval-leaved blueberry bunchberry bastard toad-flax baneberry heart-leaved arnica one-side wintergreen prince's pine common leafy liverwort knight's plume dicranum mosses (curly heron's- bill)
<b>Plots</b>		9628576	964076	9903321, 9902644, 9903370, G38, G39, G40	9902647, G1073, G1174

**Comments:** Twinflower, pink wintergreen and freckle pelt are common associates (0.5 – 2%). MoF plot # 9628576 contains trembling aspen, however it occurs at an elevation lower than the other inspections; it is also on glaciofluvial material. Paper birch, devil's club and alder are associates in 9902647 on a steep, northwest aspect. Lodgepole pine is dominant on 2 of 3 inspections on steep warm aspects; soopolallie, fireweed, twinflower, bluejoint, clasping twistedstalk and northern bedstraw are associates on warm aspect inspections (G40, G1073, G1174). MoF plot 9628507 was not used in this description, as it is located outside the project area.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SBSmv	FH	00	Bl – Highbush cranberry – Horsetail
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped Modifiers:</b> g, n, p, t  Typic FH occurs on level to gently sloping sites on deep, medium textured soils (assumed modifiers are d, j, m). FH also occurs in gullies (g); on fans (n); peaty veneers (p); and terraces (t).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	115 – 780	612
<b>Slope (%)</b>	1 – 10	5
<b>Aspect (degrees)</b>	none, 139 - 340	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
mesic – hygric	medium - rich	
<b>Drainage</b>	moderately well - imperfect	
<b>Surficial Material</b>		
gravelly, sandy fluvial fan; silty, sandy, mixed fragments fluvial fan; silty, sandy, fluvial very thin veneer over gravelly, sandy fluvial fan; fibric organic veneer over sandy, muddy fluvial veneer; mixed fragments, muddy, sandy morainal blanket; mixed fragments, silty, sandy morainal mantle of variable thickness; fibric organic veneer over rock		
<b>Soil Development</b>		
Orthic Gleysol, Humic Gleysol, Eluviated Dystric Brunisol, Cumulic Regosol, Gleysols		
<b>Humus Form</b>	Mormoder, Hemimor, Fibrimor	
<b>Humus Depth (cm)</b>	4 to > 40	
<b>Coarse Fragments (%)</b>	0 – 40	
<b>Soil Texture</b>	loamy sand – silt loam, fibric	

**Photo:** C6-3, plot 9903301

MAP

Symbol/Site Series

FH 00

Name

B1 – Highbush cranberry – Horsetail

Map Symbol	FH3	FH4	FH5	FH6	FH7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	red raspberry common horsetail bluejoint balsam poplar	subalpine fir balsam poplar highbush-cranberry common horsetail bluejoint	subalpine fir highbush-cranberry common horsetail bunchberry Sitka burnet	subalpine fir highbush-cranberry common horsetail bunchberry Sitka burnet	subalpine fir hybrid spruce common horsetail sphagnum mosses
<b>Associates</b>	blue wildrye meadow horsetail tall larkspur Kentucky bluegrass northern bedstraw western meadowrue tall bluebells  other species that may be expected include: subalpine fir hybrid spruce willows highbush cranberry fireweed cow parsnip Sitka burnet	hybrid spruce devil's club willows red swamp currant oval-leaved blueberry black gooseberry blue wildrye tall bluebells meadow horsetail fireweed clasping twistedstalk oak fern heart-leaved arnica leafy mosses <i>Brachythecium</i> sp.	hybrid spruce balsam poplar red-osier dogwood devil's club willows red swamp currant black gooseberry oval-leaved blueberry bluejoint meadow horsetail tall bluebells fireweed clasping twistedstalk oak fern cow parsnip heart-leaved arnica <i>Brachythecium</i> sp. common leafy liverwort leafy mosses	hybrid spruce, balsam polar, red-osier dogwood, devil's club, black gooseberry, red swamp currant, prickly rose, red raspberry, Barclay's willow, grey-leaved willow, oval-leaved blueberry, bluejoint, meadow horsetail, fireweed, tall bluebells, clasping twistedstalk, oak fern, cow parsnip, heart-leaved arnica, spiny wood fern, common mitrewort, five-leaved bramble, little buttercup, three-leaved foamflower, common leafy liverwort, leafy mosses, <i>Brachythecium</i> sp., red-stemmed feathermoss	highbush-cranberry, alders (mountain/Sitka), devil's club, Labrador tea, trailing black currant, red swamp currant, oval-leaved blueberry, grey-leaved willow, Barclay's willow, bluejoint, bunchberry, meadow horsetail, fireweed, tall bluebells, arrow-leaved groundsel, clasping twistedstalk, Sitka burnet, oak fern, cow parsnip, heart-leaved arnica, common mitrewort, five-leaved bramble, step moss, common leafy liverwort, leafy mosses, <i>Brachythecium</i> sp., red-stemmed feathermoss, freckle pelt, green tongue-liverwort, spring moss
<b>Plots</b>	9628508			9903371, 9903301, 9902650, 9628573	9902646, 9903344, G1072, G1175

**Comments:** These units have diverse shrub and herb layers, however the composition of these layers is variable. The average shrub and herb cover for mature and old forests is approximately 40% and 77%, respectively. Horsetails are the dominant species (average 70% cover). Many species were present in less than or equal to 50% of the inspections. Balsam poplar is expected in the major river valleys below 450m. Sphagnum moss was a dominant species in two inspections situated on organic veneers (G1175 & 9902646); Labrador tea was an associate in one of these inspections. These organic veneers may be a separate unit that could be identified with further sampling.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SBSmv	FO	00	Bl - Oak fern – Valerian
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped Modifiers:</b> k, w  Typic FO occurs on gentle slopes on deep, medium-textured soils (it is found on receiving sites with cold soils). It is also found on cool (k) and warm aspects (w).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	605 – 705	655
<b>Slope (%)</b>	4 - 12	8
<b>Aspect (degrees)</b>	348 - 64	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric	rich	
<b>Drainage</b>	moderately well - imperfect	
<b>Surficial Material</b>		
silty, sandy fluvial very thin veneer over gravelly, sandy fluvial terrace; mixed fragments, silty morainal blanket and mantle of variable thickness		
<b>Soil Development</b>		
Gleyed Eutric Brunisol, Orthic Humic Gleysol		
<b>Humus Form</b>	Mormoder, Mor	
<b>Humus Depth (cm)</b>	3 – 4	
<b>Coarse Fragments (%)</b>	15 – 20	
<b>Soil Texture</b>	sandy – silt loam	

**Photo:** C6-1, plot 9902700

**MAP**

**Symbol/Site Series**

**FO 00**

**Name**

**BI – Oak fern - Valerian**

<b>Map Symbol</b>	FO3	FO4	FO5	FO6	FO7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	oval-leaved blueberry Sitka valerian horsetails oak fern	subalpine fir Sitka valerian horsetails oak fern	subalpine fir oval-leaved blueberry five-leaved bramble Sitka valerian heart-leaved arnica wood horsetail	subalpine fir oak fern five-leaved bramble Sitka valerian common leafy liverwort	subalpine fir oak fern five-leaved bramble Sitka valerian common leafy liverwort
<b>Associates</b>	subalpine fir black gooseberry Sitka burnet three-leaved foamflower fireweed sweet-scented bedstraw	black gooseberry Sitka burnet three-leaved foamflower five-leaved bramble leafy mosses	black gooseberry western mountain-ash common horsetail Sitka burnet three-leaved foamflower oak fern spiny wood fern pink wintergreen fireweed clasping twistedstalk bunchberry northern twayblade leafy mosses <i>Brachythecium</i> sp.	oval-leaved blueberry false azalea three-leaved foamflower clasping twistedstalk heart-leaved twayblade leafy mosses	oval-leaved blueberry false azalea three-leaved foamflower clasping twistedstalk fireweed heart-leaved twayblade leafy mosses
<b>Plots</b>			964056		9902700

**Comments:**

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SBSmv	LC	00	BIPI - Bastard toad-flax – Lichen
<p><b>Assumed site modifiers for the typical situation:</b> c, d, j  <b>Mapped Modifiers:</b> h, hs, hv, k, ks, kv, r, rs, rv, s, sw, t, vw, w  Typic LC occurs on gentle slopes on deep, coarse-textured soils. It is commonly found on glaciofluvial material (terraces). It is also found on hummocks (h), hummocks with shallow soil (hs); hummocks with very shallow soil (hv); cool aspects (k); cool aspects with shallow soils (kv); ridges (r); ridges with shallow soils (rs); ridges with very shallow soil; shallow soils (s); shallow soils on warm aspects (sw); very shallow soils on warm aspects (vw); and warm aspects.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	195 - 825	516
<b>Slope (%)</b>	0 - 25	9
<b>Aspect (degrees)</b>	none, 188 – 244	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
xeric - subxeric	poor	
<b>Drainage</b>	rapid – well	
<b>Surficial Material</b>		
sandy, gravelly glaciofluvial terrace; gravelly, sandy glaciofluvial terrace; bouldery, gravelly, sandy glaciofluvial terrace; silty, sandy, rubbly colluvial veneer; sandy, angular colluvial veneer; mixed fragments, silty, sandy morainal mantle of variable thickness over undulating rock		
<b>Soil Development</b>		
Orthic Dystric Brunisol, Eutric Brunisol, Orthic Humo-Ferric Podzol		
<b>Humus Form</b>	Hemimor	
<b>Humus Depth (cm)</b>	0 – 6	
<b>Coarse Fragments (%)</b>	20 – 75	
<b>Soil Texture</b>	sandy – loamy	

**Photo:** B5-15, plot 9902652

**MAP**

Symbol/Site Series  
LC 00

Name  
BIPI – Bastard toadflax - Lichen

Map Symbol	LC3	LC4	LC5	LC6	LC7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	lodgepole pine soopolallie	lodgepole pine soopolallie reindeer lichens	lodgepole pine subalpine fir kinnikinnick reindeer lichens	lodgepole pine subalpine fir crowberry reindeer lichens	lodgepole pine subalpine fir kinnikinnick red-stemmed feathermoss
<b>Associates</b>	subalpine fir saskatoon willows arctic lupine fireweed blue wildrye yarrow reindeer lichens cladonia lichens	subalpine fir saskatoon willows arctic lupine fireweed dwarf blueberry kinnikinnick cladonia lichens	soopolallie saskatoon willows dwarf blueberry bastard toad-flax arctic lupine fireweed cladonia lichens dicranum mosses	trembling aspen soopolallie prickly rose saskatoon dusky willow Scouler's willow dwarf blueberry kinnikinnick bastard toad-flax arctic lupine bunchberry heart-leaved arnica twinlineflower fireweed cladonia lichens dicranum mosses red-stemmed feathermoss foam lichens	soopolallie saskatoon Scouler's willow falsebox crowberry bastard toad-flax arctic lupine bunchberry heart-leaved arnica twinlineflower fireweed prince's pine reindeer lichens cladonia lichens dicranum mosses <i>Brachythecium</i> sp. common leafy liverwort freckle pelt
<b>Plots</b>				9902653, 9902652, 9903346, 964062, G1070	0002416

**Comments:** Trembling aspen is present in one of the mature forest inspections. Subalpine firs are generally found in the tall shrub layer. Crowberry has a high % cover in two of the inspections, which results in its placement in the dominant category; cover is low in other inspections. Dwarf blueberry and bastard toad-flax are present in all inspections with average ground covers of 9% and 6 %, respectively. The moss layer is moderately well developed and dominated by lichens. The cover of reindeer lichens ranges from 0 to 30%.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SBSmv	LS	00	PI – Few-flowered sedge – Peat moss
<p><b>Assumed modifiers:</b> d, j, p  <b>Mapped modifiers:</b> none  Typic LS occurs on level sites on organic soils. This unit has been developed (named) following MacKenzie and Shaw (2000). It occurs in localized water collecting and frost prone sites in valley bottoms. It is uncommon in the project area.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	660	660
<b>Slope (%)</b>	0	
<b>Aspect (degrees)</b>	none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhydric	medium	
<b>Drainage</b>	poor	
<b>Surficial Material</b>		
mesic organic plain		
<b>Soil Development</b>		
Mesisol		
<b>Humus Form</b>	Mesimor	
<b>Humus Depth (cm)</b>	>60	
<b>Coarse Fragments (%)</b>	0	
<b>Soil Texture</b>	mesic	

**Photo:** C6-5, plot 9903302

**MAP**

Symbol/Site Series

Name

LS 00

PI - Few-flowered sedge - Peat moss

Map Symbol	LS3	LS4	LS5	LS6	LS7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	few-flowered sedge rush aster bluejoint water sedge	lodgepole pine few-flowered sedge rush aster	lodgepole pine few-flowered sedge rush aster sphagnum moss	lodgepole pine few-flowered sedge rush aster sphagnum moss	lodgepole pine few-flowered sedge rush aster sphagnum moss
<b>Associates</b>	lodgepole pine bog blueberry Labrador tea crowberry Sitka burnet tufted clubrush marsh violet sphagnum mosses	bog blueberry Labrador tea crowberry bluejoint Sitka burnet water sedge tufted clubrush marsh violet sphagnum mosses	subalpine fir bog blueberry Labrador tea crowberry bluejoint Sitka burnet northern starflower white bog orchid tufted clubrush bog cranberry water sedge marsh violet nagoonberry	subalpine fir bog blueberry Labrador tea crowberry bluejoint Sitka burnet northern starflower white bog orchid tufted clubrush bog cranberry water sedge marsh violet nagoonberry	subalpine fir bog blueberry Labrador tea crowberry bluejoint Sitka burnet northern starflower white bog orchid tufted clubrush bog cranberry water sedge marsh violet nagoonberry
<b>Plots</b>					9903302

**Comments:** This unit has an open scrubby tree layer, a well developed herb layer and a nearly continuous moss layer dominated by sphagnum mosses.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SBSmv	SD	00	BISw – Devil’s club – Oak fern
<p><b>Assumed Modifiers:</b> d, j, m  <b>Mapped Modifiers:</b> g, gk, gn, gw, k, kn, ks, n, nw, t, w  Typic SD occurs on gentle slopes on deep, medium textured soils. It occurs on mid to toe of slope positions. It commonly occurs steep slopes on cool aspects (k). SD also occurs on gullies (g); gullies on cool aspects (gk); gullied fluvial fans or cones (gn); cool aspect fans or cones (kn); cool aspects on shallow soils (ks); fans and cones (n); warm aspect fans or cones (nw); terraces (t); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	125 – 730	423
<b>Slope (%)</b>	1 – 80	37
<b>Aspect (degrees)</b>	2 – 360	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
mesic – subhygric	medium – rich	
<b>Drainage</b>	moderately well - well	
<b>Surficial Material</b>		
silty, mixed fragments, sandy morainal blanket; mixed fragments, silty, sandy morainal veneer; sandy, silty, mixed fragments morainal mantle of variable thickness; sandy, silty, rubbly colluvial veneer and blanket; silty, sandy, angular colluvial veneer; silty, gravelly, sandy colluvial fan; sandy, gravelly, silty glaciofluvial blanket over sandy, gravelly morainal blanket; gravelly, silty, sandy morainal veneer over sandy, gravelly glaciofluvial terrace; sandy, gravelly fluvial veneer over silty glaciolacustrine material; colluvial blankets; morainal blankets		
<b>Soil Development</b>		
Orthic Dystric Brunisol, Eluviated Dystric Brunisol, Orthic Eutric Brunisol, Gleyed Brunisol		
<b>Humus Form</b>	Mormoder, Leptomoder, Hemimor, Moder	
<b>Humus Depth (cm)</b>	3 – 50	
<b>Coarse Fragments (%)</b>	0 – 60	
<b>Soil Texture</b>	sandy loam – clay loam	

**Photo:** C9-9, plot 9903345

MAP

Symbol/Site Series

SD 00

Name

BISw – Devil’s club – Oak fern

Map Symbol	SD3	SD4	SD5	SD6	SD7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	devil’s club red-osier dogwood highbush-cranberry oak fern	subalpine fir devil’s club oak fern	subalpine fir hybrid spruce devil’s club red-osier dogwood oak fern common leafy liverwort	subalpine fir hybrid spruce Douglas maple devil’s club oak fern <i>Brachythecium</i> sp. leafy mosses	subalpine fir hybrid spruce devil’s club highbush-cranberry bunchberry spiny wood fern oak fern five-leaved bramble
<b>Associates</b>	subalpine fir black cottonwood paper birch oval-leaved blueberry bunchberry spiny wood fern fireweed	black cottonwood paper birch hybrid spruce red-osier dogwood oval-leaved blueberry bunchberry five-leaved bramble spiny wood fern red-stemmed feathermoss leafy mosses	paper birch false azalea oval-leaved blueberry highbush-cranberry bunchberry spiny wood fern five-leaved bramble three-leaved foamflower northern starflower red-stemmed feathermoss	black cottonwood paper birch western hemlock Sitka alder red-osier dogwood highbush-cranberry baneberry bunchberry spiny wood fern twinflower clasping twistedstalk step moss red-stemmed feathermoss knight’s plume lanky moss electrified cat’s-tail moss common leafy liverwort	black cottonwood red-osier dogwood false azalea oval-leaved blueberry red swamp currant fireweed common horsetail alpine bearberry one-sided wintergreen clasping twistedstalk three-leaved foamflower common leafy liverwort red-stemmed feathermoss <i>Brachythecium</i> sp. step moss leafy mosses (common, large) knight’s plume
<b>Plots</b>			964051, 9628586	9903305, 9903303, 9902695, 9628547, 9628553	9903322, 9903345, 9902643, 9902648, G49, G106, G111, G1042

**Comments:** This unit has a well-developed (average cover 60-70%) and diverse shrub layer; the average cover of devil’s club is >50%. The herb layer is moderately well developed and dominated by ferns. The shrub and herb layer differs somewhat between the mature and old forest. This may be due to the elevations of the plots. All of the inspections in the old forest (with the exception of 9902643) were at elevations >425m (average 560m). The old forest at elevations >425m appear to have greater cover of high-bush cranberry, oval-leaved blueberry, spiny wood fern and five-leaved bramble whereas the forests below 425m often have a component of paper birch, Douglas maple, thimbleberry and baneberry.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SBSmv	SF	00	Sedge – Fuzzy Fen Moss Fen
<p><b>Assumed modifiers:</b> d, j, p  <b>Mapped modifiers:</b> none  Typic SF occurs on level sites or depressions on organic soils. These sites typically have soils saturated near to the surface for most of the year.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	125 - 445	282
<b>Slope (%)</b>	0 - 2	<1
<b>Aspect (degrees)</b>	none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
hygic - subhygic	medium - very rich	
<b>Drainage</b>	poor	
<b>Surficial Material</b>		
fibric organic plain; fibric organic veneer over silty, clayey, mixed fragments morainal deposits		
<b>Soil Development</b>		
Typic Fibrisol, Mesisol		
<b>Humus Form</b>	Mesimor	
<b>Humus Depth (cm)</b>	40 to > 60	
<b>Coarse Fragments (%)</b>	0	
<b>Soil Texture</b>	fibric, mesic	

**Photo:** JS4-5, plot 0002413

**MAP**

Symbol/Site Series

Name

SF 00

Sedge – Fuzzy fen moss Fen

<b>Map Symbol</b>	SF2b
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	water sedge buckbean golden fuzzy fen moss <i>Drepanocladus</i> sp.
<b>Associates</b>	scrub birch hairlike sedge awned sedge few-flowered sedge tufted clubrush bluejoint fringed grass-of-Parnassus white bog orchid
<b>Plots</b>	0002409, 0002413, 964053

**Comments:** All fens dominated by sedges are lumped together in this unit for mapping. Each of the three inspections is dominated by a different species. There is also significant variability between plots for associate species. These units typically contain a few scattered low shrubs and well-developed herb and moss layer. The water table is at or near the surface.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SBSmv	WB	00	Willow – bluejoint
<p><b>Assumed modifiers:</b> d, j, m  <b>Mapped modifiers:</b> c, n  Typic WB occurs on gentle slopes on deep, medium textured soils. Stage 2 and 3 ecosystems often are found in complex in valley bottoms on fluvial deposits and subject to cold air accumulation. WB also occurs on coarse-textured soils (c) and fluvial fans (n).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	70 - 500	352
<b>Slope (%)</b>	0 - 7	4
<b>Aspect (degrees)</b>	none, 156 – 240	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
mesic – subhygric	rich	
<b>Drainage</b>	well – imperfect	
<b>Surficial Material</b>		
sandy glaciofluvial plain; silty, sandy fluvial veneer over sandy fluvial undulating plain; silty fluvial plain over silty, sandy fluvial plain silty, sandy, mixed fragments morainal plain		
<b>Soil Development</b>		
Orthic Eutric Brunisol, Orthic Sombric Brunisol, Dystric Brunisol, Orthic Gleysol		
<b>Humus Form</b>	Mormoder, Leptomoder	
<b>Humus Depth (cm)</b>	4 – 8	
<b>Coarse Fragments (%)</b>	5 – 20	
<b>Soil Texture</b>	sandy – silt loam	

**Photo:** B5-14, plot 9902651 (stage 3b)

**MAP**

**Symbol/Site Series**

**WB 00**

**Name**

**Willow - Bluejoint**

Map Symbol	WB2	WB3a	WB3b
<b>Plant Species</b>	Herb Climax	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	bluejoint blue wildrye Falkland Island sedge tall larkspur western meadowrue	Barclay's willow bluejoint tall bluebells	Barclay's willow bluejoint tall bluebells
<b>Associates</b>	red raspberry subalpine fir fireweed great northern aster fringed brome arctic lupine cow-parsnip yarrow northern bedstraw kneeling angelica showy Jacob's-ladder streambank arnica tall bluebells wild strawberry	mountain alder Drummond's willow red raspberry fireweed Sitka burnet tall larkspur meadow horsetail kneeling angelica oak fern great northern aster cow-parsnip <i>Brachythecium</i> sp.	mountain alder Drummond's willow red raspberry fireweed Sitka burnet tall larkspur meadow horsetail kneeling angelica oak fern great northern aster cow-parsnip <i>Brachythecium</i> sp.
<b>Plots</b>	964063, 9902649, 9902694		9902651

**Comments:** These units typically have a robust and diverse herb layer and a very poorly developed moss layer. The herb layer is composed of a mixture of graminoids and forbs. Plot 964063 is less diverse than the other two inspections.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SBSmv	WH	00	Act – Willow - Horsetail
<p><b>Assumed modifiers:</b> a, c, d, j  <b>Mapped modifiers:</b> none  Typic WH occurs on active floodplains on low benches on deep, coarse-textured soils.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	600	
<b>Slope (%)</b>	2	
<b>Aspect (degrees)</b>	52	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric (hygric)	medium - rich	
<b>Drainage</b>	moderately well	
<b>Surficial Material</b>		
gravelly, sandy active fluvial plain		
<b>Soil Development</b>		
Cumulic Regosol		
<b>Humus Form</b>	Mor	
<b>Humus Depth (cm)</b>	1	
<b>Coarse Fragments (%)</b>	0	
<b>Soil Texture</b>	sandy	

**Photo:** no photograph

**MAP**

Symbol/Site Series

WH 00

Name

Act – Willow - Horsetail

Map Symbol		WH4	WH5	WH6	WH7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	Drummond's willow common horsetail	black cottonwood willows common horsetail	black cottonwood willows common horsetail	black cottonwood willows common horsetail	black cottonwood willows common horsetail
<b>Associates</b>	subalpine fir black cottonwood Mackenzie's willow Scouler's willow Sitka burnet Sitka/mountain alder fireweed pink wintergreen spiny wood fern	red alder subalpine fir Sitka /mountain alder Sitka burnet fireweed pink wintergreen spiny wood fern	red alder subalpine fir red-osier dogwood highbush-cranberry fireweed pink wintergreen spiny wood fern	red alder subalpine fir red-osier dogwood highbush-cranberry devil's club spiny wood fern oak fern pink wintergreen	red alder subalpine fir red-osier dogwood highbush-cranberry devil's club spiny wood fern oak fern pink wintergreen
<b>Plots</b>	964057				

**Comments:**

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SBSmv	WS	00	Willow – Sedge
<p><b>Assumed modifiers:</b> d, j, p  <b>Mapped modifiers:</b> none  Typic WS occurs on level sites or depressions on organic soils.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	700	
<b>Slope (%)</b>	0	
<b>Aspect (degrees)</b>	none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhydric	medium	
<b>Drainage</b>	very poor	
<b>Surficial Material</b>		
organic blanket		
<b>Soil Development</b>		
Typic Mesisol		
<b>Humus Form</b>		
<b>Humus Depth (cm)</b>	>50	
<b>Coarse Fragments (%)</b>		
<b>Soil Texture</b>	mesic	

**Photo:** no photograph

MAP

Symbol/Site Series

WS 00

Name

Willow - Sedge

Map Symbol	WS3a	WS3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	Barclay's willow scrub birch water sedge	white spruce Barclay's willow scrub birch water sedge
<b>Associates</b>	white spruce mountain alder Labrador tea tea-leaved willow mountain willow soopolallie alpine bearberry yellow bog sedge hairlike sedge crowberry common horsetail bog cranberry lingonberry glow moss golden fuzzy fen moss sphagnum mosses <i>Drepanocladus aduncus</i>	Labrador tea tea-leaved willow mountain willow soopolallie alpine bearberry yellow bog sedge hairlike sedge crowberry common horsetail bog cranberry lingonberry glow moss golden fuzzy fen moss sphagnum mosses <i>Drepanocladus aduncus</i>
<b>Plots</b>	9628506	

**Comments:** This unit is based on a MoF plot located out of the project area (upstream in the Inklin River system).

4.5 ESSFmz – MOIST VERY, VERY COLD ENGELMANN SPRUCE – SUBALPINE FIR SUBZONE

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmz	AC	00	Avalanche Chute
<p><b>Assumed site modifiers under the typical situation:</b> c, d  <b>Mapped modifiers:</b> gk, gw, j, k, kn, ks, n, nw, sw, w                      Typic AC occurs on steep slopes on deep (coarse-textured) soils on upper to toe of slope positions. AC is found on gullies on cool (gk) and warm (gw) aspects; gentle slopes (j); cool aspects (k); cool aspect fans or cones (kn); cool aspects with shallow soils (ks); fans or cones (n); warm aspects fans or cones (nw); shallow soils on warm aspects (sw); and on warm aspects (w).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	985 - 1080	1032
<b>Slope (%)</b>	65 - 78	
<b>Aspect (degrees)</b>	92 , 230	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic – subhygric	rich	
<b>Drainage</b>	moderately well – well	
<b>Surficial Material</b>		
sandy, silty, angular colluvial material on moderately steep slope; rubbly colluvial veneer		
<b>Soil Development</b>		
Orthic Dystric Brunisol		
<b>Humus Form</b>	Mormoder, Mulls	
<b>Humus Depth (cm)</b>	3	
<b>Coarse Fragments (%)</b>	65 – 70	
<b>Soil Texture</b>	silt loam	

**Photo:** CT5-24, plot 9903397

**MAP**

**Symbol/Site Series**  
AC 00

**Name**  
Avalanche Chute

Map Symbol	AC2	AC3a	AC3b
Plant Species	Herb Climax	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	Sitka valerian fireweed Sitka burnet Indian hellebore Richardson's geranium arrow-leaved groundsel	Sitka alder spiny wood fern lady fern Indian hellebore	Sitka alder spiny wood fern lady fern Indian hellebore
<b>Associates</b>	arctic willow Barratt's willow little buttercup large-awned sedge small-flowered woodrush mountain sagewort arctic lupine mountain arnica willowherb white mountain-heather partridge-foot alpine speedwell <i>Brachythecium</i> sp.	salmonberry red elderberry trailing black currant goatsbeard clasping twistedstalk oak fern arrow-leaved groundsel	salmonberry red elderberry trailing black currant goatsbeard clasping twistedstalk oak fern arrow-leaved groundsel
<b>Plots</b>	9903397		0002412

**Comments:** Herb climax units are not expected to succeed to shrub stages.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmz	AF	00	Alder – Lady fern
<p><b>Assumed site modifiers for the typical situation:</b> d, j  <b>Mapped modifiers:</b> gk, gw, k, ks, sw, w  Typic AF occurs on gentle slopes on deep soils that receive some seepage or hold snow later in the spring. They often appear as small openings in gently sloped, forested landscapes; they also occur on short, steep slopes that are not subject to avalanching. AF also occurs on gullies on cool (gk) and warm (gw) aspects; cool aspects (k); cool aspect with shallow soils (ks); warm aspects with shallow soil (sw); and on warm aspects (w).</p>			

**SITE DESCRIPTION**

	Range	Mean
Elevation (m)		
Slope (%)		
Aspect (degrees)		
Moisture Regime	Nutrient Regime	
submesic – hygric		
Drainage		
Surficial Material		
Soil Development		
Humus Form		
Humus Depth (cm)		
Coarse Fragments (%)		
Soil Texture		

**Photo:** no photograph

**MAP****Symbol/Site Series****Name**

AF 00

Alder – Lady fern

<b>Map Symbol</b>	AF3a	AF3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	alders (mountain/Sitka) spiny wood fern oak fern	alders (mountain/Sitka) spiny wood fern oak fern
<b>Associates</b>	lady fern Indian hellebore horsetails	lady fern Indian hellebore horsetails
<b>Plots</b>		

<b>Comments:</b>
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BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmz	AL	00	Altai fescue – Lichen
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> hs, k, s, sw, w  Typic AL occurs on gentle slopes on deep, medium-textured soils. It also occurs on hummocks with shallow soils (hs); cool aspects (k); shallow soils (s); shallow soils on warm aspects (sw); and warm aspects (w).</p>			

**SITE DESCRIPTION**

	Range	Mean
Elevation (m)	1348	
Slope (%)	5	
Aspect (degrees)	none (crest)	
Moisture Regime	Nutrient Regime	
submesic	poor	
Drainage	moderately well	
<b>Surficial Material</b>		
silty, mixed fragments, sandy morainal blanket		
<b>Soil Development</b>		
Humus Form	-	
Humus Depth (cm)	-	
Coarse Fragments (%)	35 – 70	
Soil Texture	sandy (to loamy)	

**Photo:** no photograph

**MAP****Symbol/Site Series****Name**

AL 00

Altai fescue – Cladina Lichen

<b>Map Symbol</b>	AL2b
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	Altai fescue dicranum mosses reindeer lichens (star-tipped, lesser green) juniper haircap moss eyed foam
<b>Associates</b>	tea-leaved willow subalpine fir dwarf blueberry crowberry mountain sagewort sedges (large-awned sedge) cladonia lichens icelandmoss freckle pelt
<b>Plots</b>	G1145 (from the ESSFmzp)

**Comments:** Altai fescue and lichens are dominant in the AL unit; dwarf woody shrubs are present as associate species. A low cover (<1%) of sibbaldia, alpine sweetgrass, woodrushes, glaucous gentian and mountain monkshood may be present.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmz	AM	00	Herbaceous meadow
<p><b>Assumed modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> k, ks, n, nw, sw, w  Typic AM occurs on gentle slopes on deep, medium-textured soils. AM also occurs on cool aspects (k); cool aspects with shallow soils (ks); fans or cones (n); shallow soils on fans or cones (nw); shallow soils on warm aspects (sw); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
Elevation (m)	875 - 925	900
Slope (%)	14 - 45	30
Aspect (degrees)	192 - 260	
Moisture Regime	Nutrient Regime	
mesic	rich	
Drainage	moderately well	
<b>Surficial Material</b>		
sandy, mixed fragments, muddy morainal blanket; sandy, mixed fragments, silty morainal blanket		
<b>Soil Development</b>		
Humus Form	Mulls	
Humus Depth (cm)	0 - 10	
Coarse Fragments (%)	<20 - 35	
Soil Texture	silty	

**Photo:** no photograph

**MAP**

Symbol/Site Series

Name

AM 00

Herbaceous Meadow

<b>Map Symbol</b>	AM2a
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	fireweed * bluejoint * cow-parsnip * northern starflower
<b>Associates</b>	tall bluebells * Indian hellebore * asters Sitka burnet northern bedstraw yarrow tall larkspur western meadowrue unalaska paintbrush oak fern arrow-leaved groundsel Sitka valerian bluegrass stinging nettle <i>Brachythecium</i> sp.
<b>Plots</b>	G121, G1060

**Comments:** This unit has a very well developed (approx. 100% cover) and diverse herb layer and a nearly non-existent moss layer. The composition of the AM unit is variable; the \* indicates species that are common to both inspections.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmz	CS	00	Cottongrass – Leatherleaf saxifrage
<p><b>Assumed site modifiers for the typically situation:</b> d, j, m  <b>Mapped modifiers:</b> none  Typic CS occurs on wet, level sites on deep, medium-textured soils.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	920	
<b>Slope (%)</b>	0	
<b>Aspect (degrees)</b>	none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric	medium – rich	
<b>Drainage</b>	poor	
<b>Surficial Material</b>		
silty, sandy glaciofluvial veneer over sandy, gravelly glaciofluvial plain		
<b>Soil Development</b>		
Rego Humic Gleysol		
<b>Humus Form</b>	Fibrimor	
<b>Humus Depth (cm)</b>	7	
<b>Coarse Fragments (%)</b>	30	
<b>Soil Texture</b>	silty loam – sandy loam	

**Photo:** CT6-2, plot 9903398

**MAP**

Symbol/Site Series

Name

CS 00

Cottongrass – Leatherleaf saxifrage

<b>Map Symbol</b>	CS2b
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	narrow-leaved cotton-grass <i>Rhizomnium magnifolium</i>
<b>Associates</b>	creeping willow Barratt's willow bluejoint common horsetail leatherleaf saxifrage Sitka burnet white mountain marsh-marigold Drummond's rush large-awned sedge sweet coltsfoot glow moss sickle moss <i>Pohlia wahlenbergii</i> (pale-leaved thread moss) green-tongue liverwort
<b>Plots</b>	9903398

**Comments:** This inspection is located in the upper reaches of the Tulsequah River system in an area which collects cold air off surrounding icefields (to the west and east). It is in an area mapped as ESSFmzp.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmz	DL	00	Dry lichen
<p><b>Assumed site modifiers for the typical situation:</b> c, s, j  <b>Mapped modifiers:</b> dk, h, hv, k, kv, r, rv, v, vw, w  Typic DL occurs on gentle slopes on shallow, coarse-textured soils. It also occurs deep soils on cool aspects (dk); on hummocks (h); hummocks with very shallow soils (hv); cool aspects (k); cool aspects on very shallow soils (kv); ridges (r) and ridges with very shallow soils (rv); very shallow soils (v); very shallow soils on warm aspects (vw); and warm aspects (w).  This description is based on inspections from the ESSFmzp.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1125 - 1460	1299
<b>Slope (%)</b>	1 - 35	22
<b>Aspect (degrees)</b>	7 – 260, none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
xeric – subxeric	very poor – medium	
<b>Drainage</b>		
<b>Surficial Material</b>		
silty, sandy, angular colluvial mantle of variable thickness; silty, sandy, rubbly colluvial veneer and mantle of variable thickness; silty, sandy, angular weathered bedrock veneer and very thin veneer; silty, sandy, angular, partial colluvial very thin veneer over hummocky rock		
<b>Soil Development</b>		
Sombric Brunisol, Orthic Dystric Brunisol, Orthic Regosol		
<b>Humus Form</b>		
<b>Humus Depth (cm)</b>		
<b>Coarse Fragments (%)</b>		
<b>Soil Texture</b>		

Photo: B5-22, G50

**MAP****Symbol/Site Series****DL 00****Name****Dry Lichen**

<b>Map Symbol</b>	DL2d
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	crowberry
<b>Associates</b>	subalpine fir (krummholz form) bog blueberry entire-leaved mountain avens arctic willow creeping willow net-veined willow Altai fescue arctic lupine alpine bearberry reindeer lichens foam lichens (eyed) ragged paperdoll iceland moss dicranum mosses juniper haircap moss
<b>Plots</b>	9903365, G50, G1140 (G110, G1037 from the ESSFmzp)

**Comments:** DL typically has a moderately well to well-developed herb layer (average cover 67%) dominated by crowberry. One of the lichens species listed as an associate is usually a dominant on an individual site. Average cover of the moss layer is 30%.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmz	FD	00	BI – Devil’s club – Lady fern
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> gk, gw, k, kn, ks, n, sw, w  Typic FD occurs on gentle, lower slope receiving positions on deep, medium-textured soils. It occurs on sites that receive seepage resulting in richer nutrient regimes. FD also occurs on gullies on cool (gk) and warm (gw) aspects; cool aspects (k); cool aspects with shallow soils (ks); cool aspect fans and cones (kn); fans and cones (n); shallow soils on warm aspects (sw); and warm aspects (w).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	750 - 820	785
<b>Slope (%)</b>	13 - 46	30
<b>Aspect (degrees)</b>	45 – 162	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric (hygric)	rich	
<b>Drainage</b>	moderately well – imperfect	
<b>Surficial Material</b>		
silty, sandy, mixed fragments morainal deposits; gravelly, sandy colluvial fan		
<b>Soil Development</b>		
Orthic Regosol, Sombric Brunisol		
<b>Humus Form</b>	Mormoder, Leptomoder	
<b>Humus Depth (cm)</b>	5 –19	
<b>Coarse Fragments (%)</b>	5 – 70	
<b>Soil Texture</b>	sandy – silt loam	

**Photo:** no photograph

**MAP**

**Symbol/Site Series**  
**FD 00**

**Name**  
**B1 – Devil’s club – Lady fern**

Map Symbol	FD3	FD4	FD5	FD6	FD7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	devil’s club oak fern spiny wood fern	subalpine fir devil’s club oak fern spiny wood fern	subalpine fir devil’s club oak fern spiny wood fern common leafy liverwort	subalpine fir devil’s club oak fern spiny wood fern common leafy liverwort	subalpine fir devil’s club oak fern spiny wood fern common leafy liverwort
<b>Associates</b>	subalpine fir oval-leaved blueberry <i>Ribes</i> spp. red elderberry red raspberry bluejoint fireweed	<i>Ribes</i> spp. oval-leaved blueberry five-leaved bramble common leafy liverwort leafy mosses	alder (mountain/Sitka) oval-leaved blueberry <i>Ribes</i> spp. (red swamp currant, trailing black currant, black gooseberry) five-leaved bramble clasping twistedstalk leafy mosses <i>Brachythecium</i> sp.	alder (mountain/Sitka) oval-leaved blueberry <i>Ribes</i> spp. (red swamp currant, trailing black currant, black gooseberry) five-leaved bramble three-leaved foamflower bunchberry clasping twistedstalk leafy mosses <i>Brachythecium</i> sp.	alder (mountain/Sitka) oval-leaved blueberry <i>Ribes</i> spp. (red swamp currant, trailing black currant, black gooseberry) five-leaved bramble three-leaved foamflower clasping twistedstalk bunchberry leafy mosses <i>Brachythecium</i> sp.
<b>Plots</b>				9903324, 9902699	

**Comments:** This unit appears to occur in the lower part of the subzone near the transition to the SBS. Although plot 9902699 is located at 750m elevation it is considered as ESSFmz because it is situated in a high valley near the MH zone. This valley did not have SBS characteristics. Spruce, if present, is a minor component. A low cover of false azalea and highbush-cranberry is found in one of the two inspections; a low - moderate cover of three-leaved foamflower and bunchberry is present in one inspection. Devil’s club (average cover 58%) and ferns (+20%) dominate the understorey.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmz	FF	00	BIHm – Feathermoss
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m , r  <b>Mapped modifiers:</b> g, gk, gw, h, hs, k, ks, kv, n, s, sw, vw, w  Typic FF occurs on gently sloping crest positions on deep, medium-textured soils. This unit is often found on steep mid to upper slopes. FF also occurs in gullies (g); gullies on cool (gk) and warm (gw) aspects; hummocks (h); hummocks with shallow soils (hs); cool aspects (ks); cool aspects with shallow soils (ks) and very shallow soils (kv); fans and cones (n); warm aspects (w), and warm aspects with shallow (sw) and very shallow soils (vw).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	840 - 1210	976
<b>Slope (%)</b>	5 - 60	30
<b>Aspect (degrees)</b>	15 – 298	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
(subxeric) submesic	poor – medium	
<b>Drainage</b>	rapid – moderately well	
<b>Surficial Material</b>		
silty, sandy, rubbly colluvial veneer and blanket; sandy, angular, silty colluvial veneer; silty, sandy colluvial very thin veneer; silty, mixed fragments, sandy morainal mantle of variable thickness and blanket; sandy, silty, mixed fragments morainal veneer and mantle of variable thickness; muddy, sandy, mixed fragments morainal veneer and blanket		
<b>Soil Development</b>		
Orthic Dystric Brunisol, Orthic Humo-Ferric Podzol, Orthic Eutric Brunisol, Regosol		
<b>Humus Form</b>	Hemimor, Mors, Moders	
<b>Humus Depth (cm)</b>	3 – 13	
<b>Coarse Fragments (%)</b>	1 – 45	
<b>Soil Texture</b>	loamy sand – silty	

**Photo:** CT6-17, plot 9903400

MAP

Symbol/Site Series  
FF 00

Name  
BIHm – Feathermoss

Map Symbol	FF3	FF4	FF5	FF6	FF7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	oval-leaved blueberry willows	subalpine fir common leafy liverworts	subalpine fir willow common leafy liverwort	subalpine fir red-stemmed feathermoss common leafy liverworts	subalpine fir oval-leaved blueberry red-stemmed feathermoss common leafy liverwort dicranum mosses (curly heron's-bill moss)
<b>Associates</b>	subalpine fir fireweed bunchberry	oval-leaved blueberry false azalea five-leaved bramble bunchberry one-sided wintergreen red-stemmed feathermoss dicranum mosses	crowberry five-leaved bramble curly heron's-bill moss tall bluebells alpine bearberry Sitka burnet nagoonberry lesser green reindeer lichen dog pelt <i>other species not present in plot but expected:</i> oval-leaved blueberry false azalea bunchberry one-side wintergreen red-stemmed feathermoss dicranum mosses	oval-leaved blueberry false azalea bunchberry five-leaved bramble one-side wintergreen dicranum mosses (curly heron's-bill moss)	white spruce western hemlock false azalea Sitka mountain-ash bunchberry five-leaved bramble one-sided wintergreen common leafy liverwort
<b>Plots</b>			964095	964054, 964066, 964073, G47, G53	9903400

**Comments:** Mountain and western hemlock are found near the transition to the MH zone. Plots 964054, 964095 and 964066 appear to be atypical when compared to the MoF Regional Field Guide for the ESSFwv; none of these inspections contained a well-developed moss layer (low cover of feathermoss). Plot 964095 contains a number of atypical species and may be more representative of parkland; its SMR/SNR is given as 4/D. Plot 964054 also contains some atypical species and may be situated on rich parent material (SMR/SNR = 3/D).

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmz	FH	00	Bl – Lady fern - Horsetail
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> ac, g, gk, k, n, p, t  Typic FH occurs on toe of slope to depressional sites on poorly drained, deep, medium-textured soils. FH is also found on active coarse-textured soils (ac); gullies (g), gullies on cool aspects (gk); cool aspects (k); fans and cones (n); peaty veneers (p); and terraces (t).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	775 - 940	858
<b>Slope (%)</b>	5 -18	11
<b>Aspect (degrees)</b>	130 – 230	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
hygric (subhydryc)	rich	
<b>Drainage</b>		
<b>Surficial Material</b>		
gravelly, sandy, gently sloping, active fluvial material; silty, mixed fragments, sandy morainal mantle of variable thickness		
<b>Soil Development</b>		
Orthic Humic Gleysol		
<b>Humus Form</b>	Rhizomull, Mull	
<b>Humus Depth (cm)</b>	2 - 40	
<b>Coarse Fragments (%)</b>	20 - 70	
<b>Soil Texture</b>	loamy sand - loam	

**Photo:** C7-23, plot 9903316

MAP

Symbol/Site Series  
FH 00

Name  
B1 – Lady fern – Horsetail

Map Symbol	FH3	FH4	FH5	FH6	FH7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	willows common horsetail Sitka valerian Sitka burnet	subalpine fir common horsetail Sitka valerian leafy mosses	subalpine fir common horsetail Sitka valerian leafy mosses	subalpine fir common horsetail meadow horsetail Sitka valerian large leafy moss	subalpine fir common horsetail Sitka valerian five-leaved bramble oak fern leafy mosses
<b>Associates</b>	subalpine fir oval-leaved blueberry oak fern lady fern Indian hellebore bluejoint	willows oval-leaved blueberry spiny wood fern oak fern lady fern Sitka burnet clasping twistedstalk Indian hellebore common leafy liverwort dicranum mosses red-stemmed feathermoss	hybrid spruce willows oval-leaved blueberry trailing black currant false azalea spiny wood fern oak fern lady fern Sitka burnet sweet coltsfoot Indian hellebore green-tongue liverwort common leafy liverwort dicranum mosses red-stemmed feathermoss	hybrid spruce Barclays' and Drummond's willow oval-leaved blueberry trailing black currant black gooseberry false azalea spiny wood fern Sitka burnet sweet coltsfoot clasping twistedstalk mountain bladder fern subalpine buttercup heart-leaved arnica common leafy liverwort red-stemmed feathermoss dicranum mosses green-tongue liverwort  <i>possible species but not present in inspection:</i> five-leaved bramble oak fern lady fern bunchberry	hybrid spruce mountain hemlock oval-leaved blueberry trailing black currant salmonberry devil's club Sitka burnet spiny wood fern sweet-coltsfoot clasping twistedstalk lady fern Indian hellebore green-tongue liverwort red-stemmed feathermoss  <i>possible species but not present in inspection:</i> black gooseberry bunchberry dicranum mosses
<b>Plots</b>				9903316	G45

**Comments:** Mountain hemlock and salmonberry are found in G45; it is located near the boundary of the MH zone. The composition of the understory varied between these plots; ferns are largely absent from 9903316. Plot 993316 also contained a low cover (0.5-1%) of several additional species such as broad-leaved willowherb, tall bluebells, five-stemmed mitrewort, fringed grass-of-Parnassus, kneeling angelica and bluejoint and Indian hellebore. The cover of salmonberry and devil's club in G45 is 6% and 1%, respectively.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmz	FK	00	Subalpine fir krummholz
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> cw, gk, hs, hv, k, ks, kv, rs, s, sw, vw, w  Typic FK occurs on gentle slopes on deep, medium-textured soils. It is commonly found on steep slopes. It is found on coarse-textured soils on warm (cw) aspects; gullies on cool aspects (gk); hummocks on shallow (hs) and very shallow soils (hv); cool aspects (k) with shallow (ks) and very shallow (kv) soils; ridges with shallow soils (rs); shallow soils (s); and warm aspects (w) with very shallow (vw) and shallow soils (sw).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1100	
<b>Slope (%)</b>	60	
<b>Aspect (degrees)</b>	204	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
xeric – mesic	poor – medium	
<b>Drainage</b>	rapid	
<b>Surficial Material</b>		
angular fragments, colluvial material on moderately steep slope (avalanching)		
<b>Soil Development</b>		
<b>Humus Form</b>	<b>Moder</b>	
<b>Humus Depth (cm)</b>	0 – 40	
<b>Coarse Fragments (%)</b>	>70%	
<b>Soil Texture</b>	sandy	

**Photo:** no photograph

**MAP**

**Symbol/Site Series**  
**FK 00**

**Name**  
**Subalpine fir krummholz**

Map Symbol	FK3a	FK3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	subalpine fir common leafy liverwort <i>species expected on shallow soils:</i> white mountain-heather	subalpine fir common leafy liverwort <i>species expected on shallow soils:</i> white mountain-heather
<b>Associates</b>	willows Sitka alder Altai fescue red-stemmed feathermoss pelt lichens dicranum mosses step moss <i>species expected on shallow soils:</i> crowberry mountain arnica running clubmoss	willows Sitka alder Altai fescue red-stemmed feathermoss pelt lichens dicranum mosses step moss <i>species expected on shallow soils:</i> crowberry mountain arnica running clubmoss
<b>Plots</b>	G44 (colluvial slope); see FK in the ESSFmzp for an example of a higher elevation krummholz	

**Comments:** Additional species that may be expected in the FK unit include oval-leaved blueberry, scrub birch, creeping willow and arctic lupine.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmz	FL	00	Bl – Bunchberry – Leafy liverwort
<p><b>Assume site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> gk, gw, h, k, kn, ks, n, nw, qs, r, s, sw, w  Typic FL occurs on gentle slopes on deep, medium-textured soils. It also occurs on gullies on cool (gk) and warm (gw) aspects; hummocks (h); cool aspects (k); cool aspects with shallow soil (ks); cool aspect fans and cones (kn); fans and cones (n), warm aspect fans and cones (nw); very steep slopes with shallow soils (qs); ridges (r); shallow soils (s); warm aspects with shallow soils (sw); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	800 - 1020	894
<b>Slope (%)</b>	3 - 65	28
<b>Aspect (degrees)</b>	10 – 360	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic - mesic	medium	
<b>Drainage</b>	well – moderately well	
<b>Surficial Material</b>		
mixed fragments, sandy, silty morainal mantle of variable thickness; mixed fragments, silty, sandy morainal blanket; sandy, mixed fragments morainal mantle of variable thickness and blanket; sandy, mixed fragments, silty morainal mantle of variable thickness; mixed fragments, silty, sandy morainal mantle of variable thickness; silty, mixed fragments, sandy morainal blanket; sandy, silty, mixed fragments morainal veneer and blanket; silty, sandy, rubbly colluvial blanket; sandy, silty, rubbly colluvial veneer and blanket; mixed fragments, sandy, silty colluvial veneer; rubbly colluvial veneer; rubbly, silty colluvial blanket and veneer		
<b>Soil Development</b>		
Orthic Ferro-Humic Podzol, Orthic Humo-Ferric Podzol, Eluviated Eutric Brunisol, Dystric Brunisol		
<b>Humus Form</b>	Mormoder, Hemimor, Mors	
<b>Humus Depth (cm)</b>	3 – 13	
<b>Coarse Fragments (%)</b>	<20 – 70	
<b>Soil Texture</b>	loamy sand - silty	

**Photo:** B7-19, plot 9903376

**MAP**

**Symbol/Site Series**  
**FL 00**

**Name**  
**BI – Bunchberry – Leafy liverwort**

Map Symbol	FL3	FL4	FL5	FL6	FL7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	subalpine fir oval-leaved blueberry	subalpine fir	subalpine fir red-stemmed feathermoss common leafy liverwort dicranum mosses	subalpine fir oval-leaved blueberry red-stemmed feathermoss common leafy liverwort	subalpine fir oval-leaved blueberry red-stemmed feathermoss common leafy liverwort
<b>Associates</b>	false azalea bunchberry fireweed heart-leaved arnica	Scouler’s willow oval-leaved blueberry soopolallie western mountain-ash crowberry bunchberry heart-leaved arnica arctic lupine one-sided wintergreen running clubmoss ground-cedar common leafy liverwort curly heron’s-bill moss dog pelt reindeer lichens	oval-leaved blueberry five-leaved bramble bunchberry reindeer lichens freckle pelt	false azalea bunchberry one-sided wintergreen five-leaved bramble heart-leaved arnica fireweed dicranum mosses (pale-stalked broom, curly heron’s-bill)	false azalea trailing black currant alder (green/Sitka) bunchberry oak fern five-leaved bramble spiny wood fern fireweed heart-leaved arnica Sitka valerian dicranum mosses pale-stalked broom, curly heron’s-bill) leafy mosses
<b>Plots</b>		964064	G60, G1036, G1041	964072, 9903317, 9903376, G46, G1039, G1059	9628570, G48, G103, G105, G1043

**Comments:** Mountain hemlock and Alaskan blueberry are not dominant species in the ESSFmz within the project area; minor amounts of mountain hemlock are present near the MH zone. The cover of false azalea is highly variable (range 0 – 35%) and it is absent from several inspections, however its average cover is about 5%. Oak fern and Sitka valerian are minor components in the mature forest inspections; three-leaved foamflower is absent from most mesic sites. Common leafy liverwort is dominant in the moss layer along with red-stemmed feathermoss; dicranum mosses are also common. Red-stemmed feathermoss is nearly absent from the two inspections on steep, warm aspects (G48, G1059).

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmz	FM	00	BI – Mountain-heather – Leafy liverworts
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> g, gk, h, hs, k, ks, kv, rs, s, sw, v, vw, w  Typic FM occurs on the upper portion of the ESSFmz subzone near the transition to parkland forest; it occurs on gentle slopes on deep, medium-textured soils. It is common on gently to steeply sloping cool aspects. It occurs on gullies (g); gullies on cool aspects (gk); hummocks (h); hummocks with shallow soils (hs); cool aspects (k); cool aspects with shallow (ks) and very shallow soils (kv); ridges with shallow soils (rs); shallow (s) and very shallow (v) soils; shallow soils on warm aspects (sw); warm aspects with very shallow soils (vw); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	900 – 1130	1040
<b>Slope (%)</b>	2 – 70	38
<b>Aspect (degrees)</b>	2 – 360; none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic - mesic	poor – medium	
<b>Drainage</b>	rapid – moderately well	
<b>Surficial Material</b>		
colluvial blankets and veneers; rubbly colluvial blanket; sandy, silty, rubbly colluvial veneer; mixed fragments, silty, sandy morainal mantle of variable thickness; sandy, mixed fragments, silty morainal blankets and veneers; sandy, silty, mixed fragments morainal veneer and blanket;		
<b>Soil Development</b>		
Eluviated Eutric Brunisol, Orthic Humo-Ferric Podzol, Dystric Brunisols		
<b>Humus Form</b>	Mormoder, Hemimor, Mor	
<b>Humus Depth (cm)</b>	5 – 10	
<b>Coarse Fragments (%)</b>	20 – 70	
<b>Soil Texture</b>	loamy sand - silty	

**Photo:** C7-13, G1052

**MAP**

**Symbol/Site Series**  
**FM 00**

**Name**  
**BI – Mountain-heather – Leafy liverworts**

<b>Map Symbol</b>	FM3	FM4	FM5	FM6	FM7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	subalpine fir oval-leaved blueberry white mountain-heather common leafy liverworts	subalpine fir white mountain-heather common leafy liverwort dicranum mosses	subalpine fir white mountain-heather common leafy liverwort dicranum mosses	subalpine fir common leafy liverwort dicranum mosses (curly heron's-bill, pale-stalked broom) red-stemmed feathermoss	subalpine fir white mountain-heather partridge-foot common leafy liverwort dicranum mosses (curly heron's-bill, pale-stalked broom)  Alaskan mountain-heather or yellow mountain-heather are occasionally dominant
<b>Associates</b>	bunchberry fireweed partridge-foot dicranum mosses red-stemmed feathermoss	oval-leaved blueberry bunchberry five-leaved bramble partridge-foot dicranum mosses red-stemmed feathermoss	false azalea oval-leaved blueberry partridge-foot bunchberry five-leaved bramble mountain leafy liverwort red-stemmed feathermoss	oval-leaved blueberry false azalea white mountain-heather bunchberry five-leaved bramble mountain leafy liverwort  yellow mountain-heather is occasionally present	oval-leaved blueberry five-leaved bramble mountain leafy liverwort red-stemmed feathermoss
<b>Plots</b>				9628555, 964071, G127, G1052, G1058	9628548, 9628549, G51, G1038, G1053, G1054, G1142

**Comments:** FM is generally found on near mesic sites in the upper portion of the ESSFmz subzone. These forests are short and scrubby (may be <10m) with abundant conifers in the shrub layers. Leafy liverworts are typically more abundant than feathermoss. Species with low % cover that may be present as associates include bunchberry, one-sided wintergreen, clubmosses, and pelt lichens. Alaskan blueberry or black huckleberry is occasionally present instead of oval-leaved blueberry. Mountain-heathers and partridge-foot may be less abundant in the mature forests sampled due to site characteristics i.e. two of the inspections are found on steep, warm aspects.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmz	FO	00	BI – Oak fern – Heron’s-bill
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> gk, gw, k, ks, n, sw, w  Typic FO occurs on the lower slope, moisture receiving (seepage) sites on deep, medium-textured soils. It also occurs on gullies on cool aspects (gk); gullies on warm aspects (gw); cool aspects (k); cool aspects with shallow soils (ks); fans and cones (n); shallow soils on warm aspects (sw); and warm aspects (w).</p>			

**SITE DESCRIPTION**

	Range	Mean
Elevation (m)	760	
Slope (%)	25	
Aspect (degrees)	232	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric	rich	
<b>Drainage</b>	moderately well	
<b>Surficial Material</b>		
angular sandy silty colluvial veneer		
<b>Soil Development</b>		
<b>Humus Form</b>	<b>Mull</b>	
<b>Humus Depth (cm)</b>		
<b>Coarse Fragments (%)</b>		
<b>Soil Texture</b>	loamy	

**Photo:** no photograph

**MAP**

**Symbol/Site Series**

**FO 00**

**Name**

**B1 – Oak fern – Heron’s-bill**

<b>Map Symbol</b>	FO3	FO4	FO5	FO6	FO7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	subalpine fir oval-leaved blueberry oak fern leafy mosses	subalpine fir oak fern leafy mosses common leafy liverwort	subalpine fir oak fern spiny wood fern five-leaved bramble red-stemmed feathermoss common leafy liverwort leafy mosses	subalpine fir oak fern spiny wood fern five-leaved bramble red-stemmed feathermoss common leafy liverwort leafy mosses	subalpine fir oak fern spiny wood fern five-leaved bramble red-stemmed feathermoss common leafy liverwort large leafy moss
<b>Associates</b>	spiny wood fern fireweed rosy twisted stalk Sitka valerian Indian hellebore	false azalea oval-leaved blueberry spiny wood fern rosy twistedstalk red-stemmed feathermoss	false azalea trailing black currant devil’s club oval-leaved blueberry three-leaved foamflower rosy twisted stalk Sitka valerian dicranum mosses	false azalea trailing black currant devil’s club oval-leaved blueberry three-leaved foamflower rosy twisted stalk Sitka valerian dicranum mosses	trailing black currant devil’s club oval-leaved blueberry three-leaved foamflower rosy twisted stalk dicranum mosses
<b>Plots</b>					G1040

**Comments:**

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmz	FV	00	BI – Valerian – Sickle moss
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> gk, k, ks, n, sw, w  Typic FV occurs on the lower to toe of slope positions, on deep, medium-textured soils. FV is a high elevation meadow forest (open tree canopy) that occurs near the transition to parkland. It also occurs on gullies on cool aspects (gk); cool aspects (k); cool aspects with shallow soils (ks); fans and cones (n); shallow soils on warm aspects (sw); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	930 - 1235	1046
<b>Slope (%)</b>	12 - 60	31
<b>Aspect (degrees)</b>	40 - 340	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric – hygric	rich	
<b>Drainage</b>	moderately well – imperfect	
<b>Surficial Material</b>		
mixed fragments, muddy morainal blanket; mixed fragments, sandy, muddy morainal blanket; mixed fragments, sandy, muddy colluvial mantle of variable thickness; sandy, rubbly, silty colluvial veneer		
<b>Soil Development</b>		
Rego Humic Gleysol, Gleyed Humic Regosol		
<b>Humus Form</b>	Mormoder, Mors	
<b>Humus Depth (cm)</b>	5 – 7	
<b>Coarse Fragments (%)</b>	15 – 70	
<b>Soil Texture</b>	loamy - clayey	

**Photo:** C7-22, G1056

MAP

Symbol/Site Series

Name

FV 00

BI – Valerian – Sickle moss

Map Symbol	FV3	FV4	FV5	FV6	FV7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	willows Sitka valerian Sitka burnet	subalpine fir Sitka valerian Sitka burnet	subalpine fir Sitka valerian Sitka burnet	subalpine fir Sitka valerian Sitka burnet	subalpine fir Sitka valerian Sitka burnet
<b>Associates</b>	subalpine fir oval-leaved blueberry arrow-leaved groundsel Indian hellebore fireweed cow-parsnip arctic lupine heart-leaved arnica large-awned sedge sweet coltsfoot oak fern mountain monkshood subalpine daisy	willows oval-leaved blueberry arrow-leaved groundsel Indian hellebore fireweed cow-parsnip arctic lupine heart-leaved arnica large-awned sedge sweet coltsfoot oak fern mountain monkshood common leafy liverwort leafy mosses (large) sickle moss <i>Campylium stellatum</i>	willows oval-leaved blueberry arrow-leaved groundsel Indian hellebore fireweed cow-parsnip arctic lupine heart-leaved arnica large-awned sedge fringed grass-of-Parnassus sweet coltsfoot oak fern mountain monkshood common leafy liverwort leafy mosses (large) sickle moss <i>Campylium stellatum</i>	willows oval-leaved blueberry arrow-leaved groundsel Indian hellebore fireweed cow-parsnip arctic lupine heart-leaved arnica large-awned sedge fringed grass-of-Parnassus sweet coltsfoot oak fern mountain monkshood common leafy liverwort leafy mosses (large) sickle moss <i>Campylium stellatum</i>	willows (Barclay's) oval-leaved blueberry arrow-leaved groundsel Indian hellebore fireweed cow-parsnip arctic lupine heart-leaved arnica large-awned sedge fringed grass-of-Parnassus sweet coltsfoot oak fern mountain monkshood common leafy liverwort leafy mosses (large) sickle moss <i>Campylium stellatum</i>
<b>Plots</b>				G1141, G1056	9903313, 9903315

**Comments:** FV has an open tree canopy; trees are often short and scrubby and may grow in clumps (may be <10m). The shrub layer is usually not diverse and is dominated by subalpine fir and willows. The herb layer is very well developed and diverse; several forbs with average cover <1% are recorded in the inspections.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmz	HM	00	Heath meadow
<p><b>Assumed site Modifiers for the typical situation:</b> c, d, j  <b>Mapped modifiers:</b> h, hs, k, ks, r, rs, s, sw, w  Typic HM occurs on gentle slopes on deep, coarse-textured soils. It also occurs on hummocks (h); hummocks with shallow soils (hs); cool aspects (k); cool aspects with shallow soils (ks); ridges (r); ridges with shallow soils (rs); shallow soils (s); shallow soils on warm aspects (sw); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1350	
<b>Slope (%)</b>	8	
<b>Aspect (degrees)</b>	32	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic - mesic	medium	
<b>Drainage</b>	moderately well	
<b>Surficial Material</b>		
rubbly, silty, sandy colluvial veneer		
<b>Soil Development</b>		
Brunisols		
<b>Humus Form</b>	Mors	
<b>Humus Depth (cm)</b>	0 – 40	
<b>Coarse Fragments (%)</b>	20 – 35	
<b>Soil Texture</b>	loamy	

**Photo:** no photograph

**MAP****Symbol/Site Series****Name****HM 00****Heath meadow**

<b>Map Symbol</b>	HM2d
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	white mountain-heather partridge-foot dicranum mosses
<b>Associates</b>	crowberry alpine clubmoss cladonia lichens chocolate lichen lesser green reindeer lichens
<b>Plots</b>	G1144

**Comments:** HM typically has a nearly continuous cover of mountain-heathers. G1144 is located in an area mapped as ESSFmzp.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmz	JL	00	Juniper – Field locoweed – Showy Jacob’s ladder
<p><b>Assumed site modifiers for the typical situation:</b> c, s, w  <b>Mapped modifiers:</b> d, k, v, z  Typic JL occurs on steep slopes on warm aspects on shallow, coarse-textured soils. It also occurs on deep soils (d); cool aspects (k); very shallow soils on warm aspects (v); and very steep slopes on warm aspects (z).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	940 - 1200	1070
<b>Slope (%)</b>	55 - 78	66
<b>Aspect (degrees)</b>	195 – 236	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
xeric – subxeric	poor – rich	
<b>Drainage</b>	rapid	
<b>Surficial Material</b>		
silty, sandy, rubbly colluvial veneer; angular, moderately steep colluvial veneer		
<b>Soil Development</b>		
<b>Humus Form</b>	nil	
<b>Humus Depth (cm)</b>	-	
<b>Coarse Fragments (%)</b>	35 - > 70	
<b>Soil Texture</b>	loamy	

**Photo:** no photograph

**MAP**

**Symbol/Site Series**

**JL 00**

**Name**

**Juniper – Field Locoweed – Showy Jacob’s ladder**

Map Symbol	JL2	JL3a
<b>Plant Species</b>	Herb Climax	Low Shrub Climax
<b>Dominants</b>	field locoweed three-toothed saxifrage	showy Jacob’s-ladder blue wildrye large-awned sedge
<b>Associates</b>	common juniper short-fruited willow Altai fescue fireweed showy Jacob’s-ladder arctic lupine tall bluebells mountain-death camas annual wheatgrass	highbush-cranberry thimbleberry common juniper Douglas maple saskatoon prickly rose common snowberry soopolallie Sitka mountain-ash yarrow western meadowrue brome northern bedstraw common harebell field chickweed spike trisetum dwarf blueberry alpine timothy arctic bluegrass spreading needlegrass
<b>Plots</b>	G114	G104

**Comments:** JL units may have very high species diversity (G104).

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmz	LC	00	BIPI - Cladonia
<p><b>Assumed site modifiers for the typical situation:</b> j, m, r, s  <b>Mapped modifiers:</b> d, gw, h, hv, k, kv, v, vw, w, z  Typic LC occurs on gentle slopes on crest positions on shallow, medium-textured soils. It also occurs on deep soils (d); gullies on warm aspects (gw); hummocks (h); hummocks with very shallow soils (hv); cool aspects (k); cool aspects on very shallow soils (kv); very shallow soils (v); very shallow soils on warm aspects (vw); warm aspects (w); and on very steep slopes on warm aspects (z).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	825 – 1130	960
<b>Slope (%)</b>	0 – 70	14
<b>Aspect (degrees)</b>	180 – 275	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
xeric - subxeric	very poor – poor	
<b>Drainage</b>	rapid – well	
<b>Surficial Material</b>		
silty, sandy, rubbly colluvial very thin veneer; angular, silty, sandy colluvial veneer; silty, sandy, angular colluvial very thin veneer; silty, sandy, angular weathered bedrock; mixed fragments, sandy, silty morainal mantle of variable thickness and very thin veneer; mixed fragments, silty, sandy morainal blanket; mixed fragments, muddy, sandy morainal blanket; partial colluvial very thin veneer and mantle of variable thickness over undulating and hummocky rock; hummocky, rolling, undulating rock		
<b>Soil Development</b>		
Orthic Dystric Brunisol, Orthic Eutric Brunisol		
<b>Humus Form</b>	Lignomoder, Moders, Mulls	
<b>Humus Depth (cm)</b>	0 – 2	
<b>Coarse Fragments (%)</b>	10 – 70	
<b>Soil Texture</b>	sandy loam – silt loam	

Photo: B8-2, G71

**MAP**

**Symbol/Site Series**  
**LC 00**

**Name**  
**BIPI - Cladonia**

Map Symbol	LC3	LC4	LC5	LC6	LC7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	lodgepole pine Scouler's willow kinnikinnick	subalpine fir false azalea	subalpine fir lodgepole pine crowberry <sup>1</sup>	subalpine fir lodgepole pine crowberry <sup>1</sup>	subalpine fir cladonia lichens reindeer lichens
<b>Associates</b>	subalpine fir soopolallie oval-leaved blueberry crowberry	lodgepole pine Scouler's willow soopolallie oval-leaved blueberry common juniper saskatoon kinnikinnick cladonia lichens cottontail foam dog pelt	Scouler's willow oval-leaved blueberry dwarf blueberry kinnikinnick reindeer lichens cladonia lichens dicranum mosses pelt lichens	Scouler's willow oval-leaved blueberry dwarf blueberry kinnikinnick reindeer lichens cladonia lichens juniper haircap moss dicranum mosses common leafy liverwort	Scouler's willow oval-leaved blueberry dwarf blueberry kinnikinnick heart-leaved arnica bastard toad-flax arctic lupine dicranum mosses common leafy liverwort freckle pelt
<b>Plots</b>		964067		9903343, 0002415, G63, G68, G69, G71	G1173

**Comments:** <sup>1</sup> Crowberry is abundant in the inspections that are located on morainal deposits; it is much less common on shallow colluvium and weathered bedrock. Vegetation data from two inspections (964055 and 9903342) were not used to create the species tables. No. 964055 is located on sparsely vegetated rock. No. 9903342 is located on a steep (70%), warm aspect on very thin colluvial veneer. The dominant species in this inspection include subalpine fir, trembling aspen, common juniper, and soopolallie. Associates species include saskatoon, black cottonwood, prickly rose, highbush-cranberry, kinnikinnick, arctic lupine, heart-leaved arnica, three-toothed saxifrage, northern goldenrod, and northern bedstraw. This inspection has a tall shrub structure. This inspection may be more representative of LC mapped on steep aspects than description given above. Typic LC has an open tree canopy, and moderately to sparsely developed shrub layer (dominated by conifers), herb and moss layers. Average % cover for the shrub, herb and moss layers are approximately 40%, 20% and 25%, respectively.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmz	MH	00	BIHm – Heron’s bill
<p><b>Assumed site modifiers for the typical situation:</b> j, m, r, s  <b>Mapped modifiers:</b> d, h, hv, k, kv, v, w  Typic MH occurs on gently sloped crest positions on shallow, medium-textured soils. MH also occurs on deep soils (d); hummocks (h); hummocks on very shallow soil (hv); cool aspects (k); cool aspects on very shallow soils (kv); very shallow soil (v); and warm aspects (w).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	900 - 1165	1071
<b>Slope (%)</b>	2 – 37	17
<b>Aspect (degrees)</b>	28 – 330	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic	poor – medium	
<b>Drainage</b>	well – moderately well	
<b>Surficial Material</b>		
mixed fragments, sandy, silty morainal mantle of variable thickness; mixed fragments, silty, sandy morainal mantle of variable thickness and veneer; silty, sandy, mixed fragments mantle of variable thickness; morainal mantle of variable thickness over sandy, silty, rubbly weathered bedrock; silty, sandy, angular colluvial veneer		
<b>Soil Development</b>		
Orthic Humo-Ferric Podzol, Podzols, Eluviated Dystric Brunisol		
<b>Humus Form</b>	Mors, Mormoder	
<b>Humus Depth (cm)</b>	3 – 10	
<b>Coarse Fragments (%)</b>	20 – 70	
<b>Soil Texture</b>	loamy - silty	

**Photo:** B6-23, G62

**MAP**

Symbol/Site Series

**Name**

MH 00

BIHm – Heron’s-bill

Map Symbol	MH3	MH4	MH5	MH6	MH7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	subalpine fir common leafy liverwort dicranum mosses	subalpine fir common leafy liverwort dicranum mosses	subalpine fir common leafy liverwort red-stemmed feathermoss dicranum moss	subalpine fir common leafy liverwort red-stemmed feathermoss dicranum moss	subalpine fir common leafy liverwort red-stemmed feathermoss dicranum mosses
<b>Associates</b>	white mountain-heather crowberry oval-leaved blueberry	oval-leaved blueberry white mountain-heather crowberry one-sided wintergreen red-stemmed feathermoss	mountain hemlock oval-leaved blueberry white mountain-heather crowberry one-side wintergreen mountain leafy liverwort	mountain hemlock oval-leaved blueberry white mountain-heather crowberry one-side wintergreen mountain leafy liverwort	mountain hemlock oval-leaved blueberry white mountain-heather crowberry one-sided wintergreen mountain leafy liverwort
<b>Plots</b>				G61, G62, G1057	9903325, G52

**Comments:** MH forests are not productive and have a short, scrubby appearance. They have a poorly developed shrub (except for conifers) and herb layers and a well-developed moss layer. Mountain hemlock is a minor species and is found near the transition to the MH zone. This unit is similar to the FF and FM units (less mountain-heather than the FM).

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmz	SF	00	Sedge fen
<p><b>Assumed site modifiers for typical situations:</b> d, j, p  <b>Mapped modifiers:</b> none  Typic SF occurs on level to depressional sites on organic soils.</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	745 - 960	852
<b>Slope (%)</b>	0 - 5	3
<b>Aspect (degrees)</b>	none; 250	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhydric	medium – rich	
<b>Drainage</b>	very poor	
<b>Surficial Material</b>		
mesic organic plain, gentle slope; mesic organic plain		
<b>Soil Development</b>		
Mesisol		
<b>Humus Form</b>	Mesimor	
<b>Humus Depth (cm)</b>	> 60	
<b>Coarse Fragments (%)</b>	-	
<b>Soil Texture</b>	mesic	

**Photo:** C7-15, plot 9903314

**MAP**

**Symbol/Site Series**  
**SF 00**

**Name**  
**Sedge fen**

<b>Map Symbol</b>	SF2b
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	water sedge * leatherleaf saxifrage glow moss * spring moss * sickle moss sphagnum mosses golden fuzzy fen moss
<b>Associates</b>	Barclay's willow * Sitka burnet * white mountain marsh-marigold * fringed grass-of-Parnassus * few-flowered sedge yellow bog sedge yellow-flowered sedge grey sedge soft-leaved sedge rush aster white bog orchid nagoonberry alpine speedwell net-veined willow arrow-leaved groundsel <i>Paludella squarrosa</i> large leafy moss <i>Calliergon</i> sp.
<b>Plots</b>	9903314, 9902698

**Comments:** These plots are diverse in composition; the \* indicates species that are common to both inspections. Plot 9903314 is from a ribbed fen situated over limestone bedrock; plot 9902698 is located in a valley near the transition to the SBS and MH zones.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmz	WG	00	Willow – Valerian – Glow moss
<p><b>Assumed site modifiers for the typical situation:</b> j, d, m  <b>Mapped modifiers:</b> a, ac, g, k, p, w            WG is a shrubland that typically occurs on gentle lower and toe of slope, moisture receiving positions. It occurs on deep medium-textured soils. It is also found on active fluvial soils (a), active coarse-textured soils (ac); gullies (g); cool aspects (k), peaty veneers (p); and warm aspects (w).            This description is based on the description from the ESSFmzp.</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	1292 - 1380	1336
<b>Slope (%)</b>	18 - 35	26
<b>Aspect (degrees)</b>	158 – 353	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric	rich	
<b>Drainage</b>	imperfect	
<b>Surficial Material</b>		
silty, mixed fragments, sandy morainal blanket; sandy, mixed fragments, muddy undulating colluvial blanket		
<b>Soil Development</b>		
Gleyed Humic Regosol		
<b>Humus Form</b>	Moder	
<b>Humus Depth (cm)</b>	0 – 40	
<b>Coarse Fragments (%)</b>	10 – 35	
<b>Soil Texture</b>	loamy – clay loam	

**Photo:** no photograph

**MAP**

**Symbol/Site Series**

**WG 00**

**Name**

**Willow – Valerian – Glow moss**

Map Symbol	WG3a	WG3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	Barclay’s willow Sitka burnet Sitka valerian mountain sagewort glow moss	willows Sitka burnet Sitka valerian mountain sagewort glow moss
<b>Associates</b>	Barratt’s willow subalpine daisy arrow-leaved groundsel fireweed Indian hellebore fringed grass-of-Parnassus mountain monkshood unalaska paintbrush common horsetail white mountain marsh-marigold heart-leaved arnica large-awned sedge net-veined willow small-flowered paintbrush arctic rush yarrow tall bluebells cow-parsnip northern bedstraw alpine hedysarum	subalpine daisy arrow-leaved groundsel fireweed Indian hellebore fringed grass-of-Parnassus mountain monkshood unalaska paintbrush common horsetail white mountain marsh-marigold heart-leaved arnica large-awned sedge net-veined willow small-flowered paintbrush arctic rush yarrow tall bluebells cow-parsnip northern bedstraw alpine hedysarum
<b>Plots</b>	9903381, G1146	

**Comments:** WG typically has a robust and diverse herb layer (average cover (+90%). Several additional species are generally present with less than one- percent cover. WG may be found in complex with areas of parkland forest, herb meadow and wet seepage meadow.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmz	WM	00	Wet seepage meadow
<p><b>Assumed site modifiers for the typical situation:</b> j, p  <b>Mapped modifiers:</b> c, f, k, m  Typic WM occurs on level to gently sloping, receiving sites on organic soils. It also occurs on fine-textured (f) and medium-textured (m) soils.  This description is based on the WM described in the ESSFmzp.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1180 - 1340	1260
<b>Slope (%)</b>	3 - 4	3
<b>Aspect (degrees)</b>	60 - 115	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
hygric - subhydric	rich	
<b>Drainage</b>	imperfect - poor	
<b>Surficial Material</b>		
mesic organic mantle of variable thickness; mesic organic veneer over mixed fragments, sandy, muddy morainal blanket and mantle of variable thickness		
<b>Soil Development</b>		
Mesisol		
<b>Humus Form</b>	Mesimor	
<b>Humus Depth (cm)</b>	0 - 75	
<b>Coarse Fragments (%)</b>	-	
<b>Soil Texture</b>	mesic, mesic/loam	

**Photo:** C8-24, plot 9903339

**MAP**

Symbol/Site Series

Name

WM 00

Wet seepage meadow

<b>Map Symbol</b>	WM2 (WM2a or WM2d)
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	leatherleaf saxifrage * net-veined willow * Sitka burnet * glow moss *
<b>Associates</b>	Barclay's willow * short-fruited willow variable willow large-awned sedge * white mountain marsh-marigold * common horsetail * northern scouring-rush * fringed grass-of-Parnassus * Indian hellebore * western bog-laurel * creeping willow graceful mountain sedge subalpine daisy Altai fescue mountain sagewort white mountain-heather sweet coltsfoot alpine timothy Sitka valerian spring moss green-tongue liverwort
<b>Plots</b>	9903339, G113

**Comments:** An \* indicates species that are common to both inspections. Net-veined willow is dominant in G113 while leatherleaf saxifrage is dominant in 9903339. Units are mapped as WM2a except where dwarf willows are known to be dominant. These units generally contain a few scattered willows and a well-developed and diverse herb layer. The moss layer is variable in cover. G113 is located in the ESSFmzp.

4.6 ESSFmzp – MOIST VERY, VERY COLD PARKLAND ENGELMANN SPRUCE – SUBALPINE FIR SUBZONE

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmzp	AC	00	Avalanche Chute
<p><b>Assumed site modifiers for typical situation:</b> c, d  <b>Mapped modifiers:</b> k, ks, w                      Typic AC occurs on steep slopes on deep soils on toe to upper slope positions. It is found on cool aspects (k), cool aspects on shallow soils (ks) and warm aspects (w). This description is based on inspections from the ESSFmz.</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>		
<b>Slope (%)</b>		
<b>Aspect (degrees)</b>		
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic – hygric		
<b>Drainage</b>		
<b>Surficial Material</b>		
colluvium		
<b>Soil Development</b>		
<b>Humus Form</b>		
<b>Humus Depth (cm)</b>		
<b>Coarse Fragments (%)</b>		
<b>Soil Texture</b>		

**Photo:** no photograph

**MAP**

**Symbol/Site Series**

**AC 00**

**Name**

**Avalanche Chute**

<b>Map Symbol</b>	AC2	AC3a	AC3b
<b>Plant Species</b>		Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	Sitka valerian fireweed Sitka burnet Indian hellebore Richardson's geranium arrow-leaved groundsel	Sitka alder spiny wood fern lady fern Indian hellebore	Sitka alder spiny wood fern lady fern Indian hellebore
<b>Associates</b>	arctic willow Barratt's willow little buttercup large-awned sedge small-flowered woodrush mountain sagewort arctic lupine mountain arnica willowherb white mountain-heather partridge-foot alpine speedwell <i>Brachythecium</i> sp.	salmonberry red elderberry trailing black currant goatsbeard clasping twistedstalk oak fern arrow-leaved groundsel	salmonberry red elderberry trailing black currant goatsbeard clasping twistedstalk oak fern arrow-leaved groundsel
<b>Plots</b>			

**Comments:**

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmzp	AL	00	Altai fescue – (Cladina) Lichen
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> hs, ks, rs, s, sw, w  Typic FL occurs on gentle slopes on deep, medium-textured soils. It is also found on hummocks with shallow soils (hs); cool aspects with shallow soils (ks); ridges with shallow soil (rs); shallow soil (s); shallow soil on warm aspects (sw); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
Elevation (m)	1348	
Slope (%)	5	
Aspect (degrees)	none (crest)	
Moisture Regime	Nutrient Regime	
submesic	poor	
Drainage	moderately well	
<b>Surficial Material</b>		
silty, mixed fragments, sandy morainal blanket		
<b>Soil Development</b>		
Humus Form	-	
Humus Depth (cm)	-	
Coarse Fragments (%)	35 – 70	
Soil Texture	sandy (to loamy)	

**Photo:** no photograph

**MAP****Symbol/Site Series****AL 00****Name****Altai fescue – Cladina Lichen**

<b>Map Symbol</b>	AL2b
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	Altai fescue dicranum mosses reindeer lichens (star-tipped, lesser green) juniper haircap moss eyed foam
<b>Associates</b>	tea-leaved willow subalpine fir dwarf blueberry crowberry mountain sagewort sedges (large-awned sedge) cladonia lichens icelandmoss freckle pelt
<b>Plots</b>	G1145

**Comments:** Altai fescue and lichens are dominant in the AL unit; dwarf woody shrubs are present as associate species. A low cover (<1%) of sibbaldia, alpine sweetgrass, woodrushes, glaucous gentian and mountain monkshood may be present.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmzp	AM	00	Herbaceous meadow
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> k, ks, s, sw, w  Typic AM occurs on gentle slopes on deep, medium-textured soils. It also occurs on cool aspects (k); cool aspects with shallow soils (ks); shallow soils (s); shallow soils on warm aspects (sw); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1350	
<b>Slope (%)</b>	12	
<b>Aspect (degrees)</b>	295	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
mesic – subhygric	mesic – rich	
<b>Drainage</b>	moderately well	
<b>Surficial Material</b>		
mixed fragments, silty colluvial veneer and very thin veneer		
<b>Soil Development</b>		
Orthic Eutric Brunisol		
<b>Humus Form</b>	Rhizomull	
<b>Humus Depth (cm)</b>	3.5	
<b>Coarse Fragments (%)</b>	20	
<b>Soil Texture</b>	silt loam	

**Photo:** B6-19, plot 9903341

**MAP****Symbol/Site Series****Name**

AM 00

**Herbaceous Meadow**

<b>Map Symbol</b>	AM2a
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	Sitka valerian Sitka burnet arrow-leaved groundsel little buttercup Barclay's willow spring moss
<b>Associates</b>	large-awned sedge net-veined willow yarrow meadow horsetail northern scouring-rush sweet coltsfoot glow moss
<b>Plots</b>	9903341

**Comments:** This description is based on a moist herbaceous meadow which contained 15% willow cover; it is perhaps intermediate between the herb meadow (AM) described in the ESSFmz and the willow-glow moss unit. The AM unit described in the ESSFmz sections is likely more representative of a mesic herbaceous meadow.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmzp	CS	00	Cottongrass – Leatherleaf saxifrage
<p><b>Assumed site modifiers for the typically situation:</b> d, j, m  <b>Mapped modifiers:</b> none  Typic CS occurs on wet, level sites on deep, medium-textured soils.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	920	
<b>Slope (%)</b>	0	
<b>Aspect (degrees)</b>	none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric	medium – rich	
<b>Drainage</b>	poor	
<b>Surficial Material</b>		
silty, sandy glaciofluvial veneer over sandy, gravelly glaciofluvial plain		
<b>Soil Development</b>		
Rego Humic Gleysol		
<b>Humus Form</b>	Fibrimor	
<b>Humus Depth (cm)</b>	7	
<b>Coarse Fragments (%)</b>	30	
<b>Soil Texture</b>	silty loam – sandy loam	

**Photo:** see ESSFmz/CS

**MAP**

Symbol/Site Series

Name

CS 00

Cottongrass – Leatherleaf saxifrage

<b>Map Symbol</b>	CS2b
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	narrow-leaved cotton-grass <i>Rhizomnium magnifolium</i>
<b>Associates</b>	creeping willow Barratt's willow bluejoint common horsetail leatherleaf saxifrage Sitka burnet white mountain marsh-marigold Drummond's rush large-awned sedge sweet coltsfoot glow moss sickle moss <i>Pohlia wahlenbergii</i> (pale-leaved thread moss) green-tongue liverwort
<b>Plots</b>	9903398

**Comments:** This inspection is located in the upper reaches of the Tulsequah River system in an area which collects cold air off surrounding icefields (to the west and east).

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmzp	DL	00	Dry lichen
<p><b>Assumed site modifiers for the typical situation:</b> c, s, j  <b>Mapped modifiers:</b> dh, h, hv, k, kv, r, rv, v, vw, w  Typic DL occurs on gentle slopes on shallow, coarse-textured soils. It also occurs on hummocks with deep soils (dh); hummocks (h); hummocks with very shallow soil (hv); cool aspects (k); cool aspects with very shallow soil (kv); ridges (r); ridges with very shallow soil (rv); very shallow soil (v); very shallow soil on warm aspects (vw); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1125 - 1460	1299
<b>Slope (%)</b>	1 - 35	22
<b>Aspect (degrees)</b>	7 - 260, none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
xeric - subxeric	very poor - medium	
<b>Drainage</b>		
<b>Surficial Material</b>		
silty, sandy, angular colluvial mantle of variable thickness; silty, sandy, rubbly colluvial veneer and mantle of variable thickness; silty, sandy, angular weathered bedrock veneer and very thin veneer; silty, sandy, angular, partial colluvial very thin veneer over hummocky rock		
<b>Soil Development</b>		
Sombric Brunisol, Orthic Dystric Brunisol, Orthic Regosol		
<b>Humus Form</b>		
<b>Humus Depth (cm)</b>		
<b>Coarse Fragments (%)</b>		
<b>Soil Texture</b>		

**Photo:** C4-23, G1037

**MAP****Symbol/Site Series****DL 00****Name****Dry Lichen**

<b>Map Symbol</b>	DL2d
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	crowberry
<b>Associates</b>	subalpine fir (krummholz form) bog blueberry entire-leaved mountain avens arctic willow creeping willow net-veined willow Altai fescue arctic lupine alpine bearberry reindeer lichens foam lichens (eyed) ragged paperdoll iceland moss dicranum mosses juniper haircap moss
<b>Plots</b>	9903365, G50, G110, G1037, G1140

**Comments:** DL typically has a moderately well to well-developed herb layer (average cover 67%) dominated by crowberry. One of the lichens species listed as an associate is usually a dominant on an individual site. Average cover of the moss layer is 30%. Inspections G110 and G1037 are found in areas mapped as ESSFmzp.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmzp	FK	00	Subalpine fir krummholz
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> h, hs, hv, k, ks, kv, rs, s, sw, w  Typic FK occurs on gentle slopes on deep, medium-textured soils. It is found on hummocks (h); hummocks with shallow (hs) and very shallow (hv) soil; cool aspects (k); cool aspects with shallow (ks) and very shallow (kv) soil; ridges with shallow soil (rs); shallow soil (s); shallow soil on warm aspects (sw) and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1325	
<b>Slope (%)</b>	40	
<b>Aspect (degrees)</b>	94	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subxeric – mesic	poor – medium	
<b>Drainage</b>	moderately well	
<b>Surficial Material</b>		
mixed fragments, silty, sandy morainal blanket		
<b>Soil Development</b>		
<b>Humus Form</b>	<b>Moder</b>	
<b>Humus Depth (cm)</b>	0 – 40	
<b>Coarse Fragments (%)</b>	20 – 35	
<b>Soil Texture</b>	sandy loam	

**Photo:** B7-15, G66

**MAP**

Symbol/Site Series

FK 00

Name

Subalpine fir krummholz

Map Symbol	FK3a	FK3b
Plant Species	Low Shrub Climax	Tall Shrub Climax
Dominants	subalpine fir white mountain-heather common leafy liverwort	subalpine fir white mountain-heather common leafy liverwort
Associates	crowberry Altai fescue mountain arnica running clubmoss	crowberry Altai fescue mountain arnica running clubmoss
Plots	G66	

**Comments:** Additional species that may be expected in the FK unit include oval-leaved blueberry, scrub birch, creeping willow, arctic lupine, dicranum mosses and dog lichens.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmzp	FM	00	BI – Mountain-heather – Leafy liverworts
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> h, hs, k, ks, rs, s, sw, w  Typic FM is parkland forest that occurs on gentle slopes on deep, medium-textured soils. It also occurs on hummocks (h), hummocks with shallow soils (hs); cool aspects (k); cool aspects with shallow soils (ks); ridges with shallow soils (rs); shallow soils (s); shallow soils on warm aspect (sw); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1175 – 1325	1260
<b>Slope (%)</b>	15 - 37	21
<b>Aspect (degrees)</b>	80 – 194	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic – mesic	poor – medium	
<b>Drainage</b>	well – moderately well	
<b>Surficial Material</b>		
silty, sandy, rubbly colluvial veneer and mantle of variable thickness; silty, sandy, mixed fragments colluvial blanket; mixed fragments, silty, sandy morainal mantle of variable thickness and blanket; mixed fragments, silty morainal mantle of variable thickness; silty, sandy weathered bedrock veneer		
<b>Soil Development</b>		
Eluviated Dystric Brunisol, Orthic Dystric Brunisol		
<b>Humus Form</b>	Hemimor, Mors, Moders	
<b>Humus Depth (cm)</b>	0 – 40	
<b>Coarse Fragments (%)</b>	<20 to >70	
<b>Soil Texture</b>	sandy loam - silty	

**Photo:** B6-19 (view of parkland mosaic)

**MAP**

**Symbol/Site Series**

**FM 00**

**Name**

**B1 – Mountain-heather – Leafy liverworts**

<b>Map Symbol</b>	FM3	FM4	FM5	FM6	FM7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	white mountain-heather partridge-foot	subalpine fir white mountain-heather common leafy liverwort	subalpine fir white mountain-heather common leafy liverwort	subalpine fir white mountain-heather common leafy liverwort	subalpine fir white mountain-heather common leafy liverwort
<b>Associates</b>	subalpine fir oval-leaved blueberry crowberry yellow mountain-heather common leafy liverwort dicranum mosses cladina lichens	oval-leaved blueberry five-leaved bramble partridge-foot crowberry dicranum mosses red-stemmed feathermoss cladina lichens	oval-leaved blueberry five-leaved bramble partridge-foot crowberry yellow mountain-heather dicranum mosses red-stemmed feathermoss cladina lichens	oval-leaved blueberry five-leaved bramble partridge-foot crowberry yellow mountain-heather dicranum mosses red-stemmed feathermoss cladina lichens	oval-leaved blueberry five-leaved bramble partridge-foot crowberry yellow mountain-heather dicranum mosses red-stemmed feathermoss cladina lichens
<b>Plots</b>				9903323, G59, G112, G115, G117	

**Comments:** FM forests consist of patches/clumps of subalpine fir interspersed by heather patches. Trees are short and scrubby. Mature and old forests may have a 3b structure.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmzp	HM	00	Heath meadow
<p><b>Assumed site Modifiers for the typical situation:</b> c, d, j  <b>Mapped modifiers:</b> h, hs, k, ks, r, rs, s, sw, w  Typic HM occurs on gentle slopes on deep, coarse-textured soils. It also occurs on hummocks (h); hummocks with shallow soils (hs); cool aspects (k); cool aspects with shallow soils (ks); ridges (r); ridges with shallow soils (rs); shallow soils (s); shallow soils on warm aspects (sw); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1350	
<b>Slope (%)</b>	8	
<b>Aspect (degrees)</b>	32	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic - mesic	medium	
<b>Drainage</b>	moderately well	
<b>Surficial Material</b>		
rubbly, silty, sandy colluvial veneer		
<b>Soil Development</b>		
Brunisols		
<b>Humus Form</b>	Mors	
<b>Humus Depth (cm)</b>	0 – 40	
<b>Coarse Fragments (%)</b>	20 – 35	
<b>Soil Texture</b>	loamy	

**Photo:** no photograph

**MAP****Symbol/Site Series****Name****HM 00****Heath meadow**

<b>Map Symbol</b>	HM2d
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	white mountain-heather partridge-foot dicranum mosses
<b>Associates</b>	crowberry alpine clubmoss cladonia lichens chocolate lichen lesser green reindeer lichens
<b>Plots</b>	G1144

**Comments:** HM typically has a nearly continuous cover of mountain-heathers.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmzp	JL	00	Juniper – Field locoweed – Showy Jacob’s ladder
<p><b>Assumed site modifiers for the typical situation:</b> c, s, w  <b>Mapped modifiers:</b> v  Typic JL occurs on steep slopes on warm aspects on shallow, coarse-textured soils. It also occurs on very shallow soils (v) on warm aspects. This description is based on inspections from the ESSFmz.</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>		
<b>Slope (%)</b>		
<b>Aspect (degrees)</b>		
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
xeric – subxeric	poor – medium	
<b>Drainage</b>	rapid	
<b>Surficial Material</b>		
mapped on:		
<b>Soil Development</b>		
<b>Humus Form</b>	nil	
<b>Humus Depth (cm)</b>	-	
<b>Coarse Fragments (%)</b>	-	
<b>Soil Texture</b>	-	

**Photo:** no photograph

**MAP**

**Symbol/Site Series**

**JL 00**

**Name**

**Juniper – Field Locoweed – Showy Jacob’s ladder**

<b>Map Symbol</b>	JL2	JL3a
<b>Plant Species</b>	Low Shrub Climax	Low Shrub Climax
<b>Dominants</b>	field locoweed three-toothed saxifrage	showy Jacob’s-ladder blue wildrye large-awned sedge
<b>Associates</b>	common juniper short-fruited willow Altai fescue fireweed showy Jacob’s-ladder arctic lupine tall bluebells mountain-death camas annual wheatgrass	highbush-cranberry thimbleberry common juniper Douglas maple saskatoon prickly rose common snowberry soopolallie Sitka mountain-ash yarrow western meadowrue brome northern bedstraw common harebell field chickweed spike trisetum dwarf blueberry alpine timothy arctic bluegrass spreading needlegrass
<b>Plots</b>	description based on G114 from the ESSFmz	description based on G104 from the ESSFmz

**Comments:**

<b>BIOGEOCLIMATIC UNIT</b>	<b>MAP</b>		
	Symbol	Site Series	Name
<b>ESSFmzp</b>	<b>SF</b>	<b>00</b>	<b>Sedge fen</b>
<p><b>Assumed site modifiers for typical situations:</b> d, j, p  <b>Mapped modifiers:</b> none  Typic SF occurs on level to depressional sites on organic soils. This description is based on inspections from the ESSFmz.</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>		
<b>Slope (%)</b>		
<b>Aspect (degrees)</b>		
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhydric	poor – rich	
<b>Drainage</b>	very poor	
<b>Surficial Material</b>		
organic soils		
<b>Soil Development</b>		
Mesisol		
<b>Humus Form</b>		
<b>Humus Depth (cm)</b>		
<b>Coarse Fragments (%)</b>		
<b>Soil Texture</b>		

**Photo:** no photograph

**MAP**

**Symbol/Site Series**  
**SF 00**

**Name**  
**Sedge fen**

<b>Map Symbol</b>	SF2b
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	water sedge * leatherleaf saxifrage glow moss * spring moss * sickle moss sphagnum mosses golden fuzzy fen moss
<b>Associates</b>	Barclay's willow * Sitka burnet * white mountain marsh-marigold * fringed grass-of-Parnassus * few-flowered sedge yellow bog sedge yellow-flowered sedge grey sedge soft-leaved sedge rush aster white bog orchid nagoonberry alpine speedwell net-veined willow arrow-leaved groundsel <i>Paludella squarrosa</i> large leafy moss <i>Calliergon</i> sp.
<b>Plots</b>	9903314, 9902698

**Comments:** These plots are diverse in composition; the \* indicates species that are common to both inspections. Plot 9903314 is from a ribbed fen situated over limestone bedrock; plot 9902698 is located in a valley near the transition to the SBS and MH zones.

<b>BIOGEOCLIMATIC UNIT</b>	<b>MAP</b>		
	Symbol	Site Series	Name
<b>ESSFmzp</b>	<b>WG</b>	<b>00</b>	<b>Willow – Valerian – Glow moss</b>
<p><b>Assumed site modifiers for the typical situation:</b> j, d, m  <b>Mapped modifiers:</b> k, ks, p, w  WG is a shrubland that typically occurs on gentle lower and toe of slope, moisture receiving positions. It occurs on deep medium-textured soils. It also occurs on cool (k), cool aspects with shallow soils (ks), peaty veneers (p) and warm (w) aspects.</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	1292 - 1380	1336
<b>Slope (%)</b>	18 - 35	26
<b>Aspect (degrees)</b>	158 – 353	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric	rich	
<b>Drainage</b>	imperfect	
<b>Surficial Material</b>		
silty, mixed fragments, sandy morainal blanket; sandy, mixed fragments, muddy undulating colluvial blanket		
<b>Soil Development</b>		
Gleyed Humic Regosol		
<b>Humus Form</b>	Moder	
<b>Humus Depth (cm)</b>	0 – 40	
<b>Coarse Fragments (%)</b>	10 – 35	
<b>Soil Texture</b>	loamy – clay loam	

**Photo:** no photograph

**MAP**

**Symbol/Site Series**

**WG 00**

**Name**

**Willow – Valerian – Glow moss**

Map Symbol	WG3a	WG3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	Barclay’s willow Sitka burnet Sitka valerian mountain sagewort glow moss	willows Sitka burnet Sitka valerian mountain sagewort glow moss
<b>Associates</b>	Barratt’s willow subalpine daisy arrow-leaved groundsel fireweed Indian hellebore fringed grass-of-Parnassus mountain monkshood unalaska paintbrush common horsetail white mountain marsh-marigold heart-leaved arnica large-awned sedge net-veined willow small-flowered paintbrush arctic rush yarrow tall bluebells cow-parsnip northern bedstraw alpine hedysarum	subalpine daisy arrow-leaved groundsel fireweed Indian hellebore fringed grass-of-Parnassus mountain monkshood unalaska paintbrush common horsetail white mountain marsh-marigold heart-leaved arnica large-awned sedge net-veined willow small-flowered paintbrush arctic rush yarrow tall bluebells cow-parsnip northern bedstraw alpine hedysarum
<b>Plots</b>	9903381, G1146	

**Comments:** WG typically has a robust and diverse herb layer (average cover (+90%). Several additional species are generally present with less than one- percent cover. They may be found in complex with areas of parkland forest, herb meadow and wet seepage meadow.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
ESSFmzp	WM	00	Wet seepage meadow
<p><b>Assumed site modifiers for the typical situation:</b> j, p  <b>Mapped modifiers:</b> f, m  Typic WM occurs on level to gently sloping sites on deep, medium-textured soils. It is also found on fine-textured soils (f); gullies (g); cool aspects (k); and medium-textured soils (m).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1180 - 1340	1260
<b>Slope (%)</b>	3 - 4	3
<b>Aspect (degrees)</b>	60 – 115	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
hygric - subhydic	rich	
<b>Drainage</b>	imperfect – poor	
<b>Surficial Material</b>		
mesic organic mantle of variable thickness; mesic organic veneer over mixed fragments, sandy, muddy morainal blanket and mantle of variable thickness		
<b>Soil Development</b>		
Mesisol		
<b>Humus Form</b>	Mesimor	
<b>Humus Depth (cm)</b>	0 – 75	
<b>Coarse Fragments (%)</b>	-	
<b>Soil Texture</b>	mesic, mesic/loam	

**Photo:** see ESSFmz/WM

**MAP**

Symbol/Site Series

Name

WM 00

Wet seepage meadow

<b>Map Symbol</b>	WM2a
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	leatherleaf saxifrage * net-veined willow * Sitka burnet * glow moss *
<b>Associates</b>	Barclay's willow * short-fruited willow variable willow large-awned sedge * white mountain marsh-marigold * common horsetail * northern scouring-rush * fringed grass-of-Parnassus * Indian hellebore * western bog-laurel * creeping willow graceful mountain sedge subalpine daisy Altai fescue mountain sagewort white mountain-heather sweet coltsfoot alpine timothy Sitka valerian spring moss green-tongue liverwort
<b>Plots</b>	9903339, G113

**Comments:** An \* indicates species that are common to both inspections. These units generally contain a few scattered willows and a well-developed and diverse herb layer. The moss layer is variable in cover. Net-veined willow is dominant in G113 while leatherleaf saxifrage is dominant in 9903339. Units are mapped as WM2a except where dwarf willows are known to be dominant. Plot 9903339 is located in the ESSFmz.

4.7 BWBSmc – MOIST COLD BOREAL WHITE AND BLACK SPRUCE

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
BWBSmc	AV	00	Avalanche track
<p><b>Assumed modifiers for the typical situation:</b> steep  <b>Mapped modifiers:</b> k, ks, w                      AV has very limited occurrence in the project area. This description is taken from JMJ, 1997. No true edaphic avalanche tracks were observed during the 2000 sampling season; it is suspected that areas mapped as AV are very similar to seral stages of forested units. It occurs on steep cool aspects (k), cool aspects with shallow soils (ks) and on warm aspects (w).</p>			

**SITE DESCRIPTION**

	Range	Mean
Elevation (m)		
Slope (%)		
Aspect (degrees)		
Moisture Regime	Nutrient Regime	
Drainage		
Surficial Material		
Soil Development		
Humus Form		
Humus Depth (cm)		
Coarse Fragments (%)		
Soil Texture		

**Photo:** no photograph

MAP

Symbol/Site Series

Name

AV 00

Avalanche track

<b>Map Symbol</b>	AV3
<b>Plant Species</b>	Shrub/Herb Climax
<b>Dominants</b>	willows fireweed
<b>Associates</b>	lodgepole pine white spruce
<b>Plots</b>	no plots

**Comments:**

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
BWBSmc	BC	00	Sb – Lingonberry – Coltsfoot
<p><b>Assumed map modifiers for the typical situation:</b>  <b>Mapped modifiers: k</b>  Typic BC occurs on gentle slopes on deep, medium-textured soils on cold sites. It is also found on cool aspects. This unit is very uncommon.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	980	
<b>Slope (%)</b>	8	
<b>Aspect (degrees)</b>	350	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric	medium	
<b>Drainage</b>	moderately well	
<b>Surficial Material</b>		
mixed fragments, sandy, muddy morainal plain		
<b>Soil Development</b>		
Gleyed Regosol		
<b>Humus Form</b>	Hemimor	
<b>Humus Depth (cm)</b>	10	
<b>Coarse Fragments (%)</b>	10	
<b>Soil Texture</b>	loam	

**Photo:** B3-30, plot 9902632

**MAP**

Symbol/Site Series

BC 00

Name

Sb – Lingonberry - Coltsfoot

Map Symbol	BC3	BC4	BC5	BC6	BC7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	lodgepole pine Barclay's willow snow willow	lodgepole pine step moss	white spruce Barclay's willow snow willow alpine bearberry step moss	white spruce Barclay's willow snow willow alpine bearberry step moss	white spruce alpine bearberry step moss red-stemmed feathermoss
<b>Associates</b>	white spruce soopolallie Altai fescue twinflower fireweed bluejoint step moss	white spruce Barclay's willow snow willow soopolallie crowberry twinflower red-stemmed feathermoss	lodgepole pine scrub birch soopolallie dwarf blueberry crowberry twinflower heart-leaved arnica Altai fescue red-stemmed feathermoss reindeer lichen freckle pelt	lodgepole pine scrub birch soopolallie dwarf blueberry crowberry twinflower heart-leaved arnica Altai fescue red-stemmed feathermoss reindeer lichen freckle pelt	lodgepole pine scrub birch Barclay's willow snow willow soopolallie dwarf blueberry crowberry twinflower heart-leaved arnica Altai fescue reindeer lichen freckle pelt
<b>Plots</b>				9902632	

**Comments:** The description of this unit is based on little inspection data. Subalpine fir, Labrador tea, lingonberry and palmate coltsfoot are typically found in BWBSdk1/07 (i.e. based on the Prince Rupert Field Guide), but were absent from the above plot.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
BWBSmc	BH	00	Sb – Horsetail – Sphagnum
<p><b>Assumed modifiers for the typical situation:</b> d, j, p  <b>Mapped modifiers:</b> none            BH is an organic wetland; it occurs on sites with poor soil drainage.</p>			

**SITE DESCRIPTION**

	Range	Mean
Elevation (m)	765	
Slope (%)	10	
Aspect (degrees)	348	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
hygric	medium	
<b>Drainage</b>	poor	
<b>Surficial Material</b>		
organic veneer over gently sloping gravelly glaciofluvial material		
<b>Soil Development</b>		
Gleysol		
<b>Humus Form</b>	Mesimor	
<b>Humus Depth (cm)</b>	26	
<b>Coarse Fragments (%)</b>	95	
<b>Soil Texture</b>	gravelly	

**Photo:** no photograph

**MAP**

Symbol/Site Series

Name

BH 00

Sb – Horsetail - Sphagnum

Map Symbol	BH3	BH4	BH5	BH6	BH7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	lodgepole pine short-fruited willow Labrador tea crowberry common horsetail	lodgepole pine Labrador tea crowberry red stemmed feathermoss	subalpine fir lodgepole pine Labrador tea crowberry red-stemmed feathermoss step moss leafy liverworts	subalpine fir lodgepole pine Labrador tea crowberry red-stemmed feathermoss step moss leafy liverworts	subalpine fir lodgepole pine Labrador tea crowberry red-stemmed feathermoss step moss leafy liverworts
<b>Associates</b>	scrub birch bunchberry red-stemmed feathermoss	subalpine fir short-fruited willow scrub birch common horsetail bunchberry step moss sphagnum mosses leafy liverworts	white spruce scrub birch short-fruited willow common horsetail bastard toad-flax bunchberry lingonberry glow moss sphagnum mosses pelt lichens	white spruce scrub birch short-fruited willow common horsetail bastard toad-flax bunchberry lingonberry glow moss sphagnum mosses pelt lichens	white spruce scrub birch short-fruited willow common horsetail bastard toad-flax bunchberry lingonberry glow moss sphagnum mosses pelt lichens
<b>Plots</b>					0002426

**Comments:** These are scrubby, wet forests. Black spruce is listed as a dominant species in the Prince Rupert Field Guide for the BWBSdk1/09, however it was not present in the plot.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
BWBSmc	BL	00	Sb – Lingonberry – Knight’s plume
<p><b>Assumed map modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> c, ch, ck, cn, cr, ct, h, hs, k, ks, n, r, s, sw, t  Typic BL occurs on gently sloping to level sites on deep, medium-textured soils; it is found on sites subject to cold air accumulation. It is typically found on level to mid slope site positions. It is also found on coarse-textured soils (c), coarse-textured soils on hummocks (ch); coarse-textured soils on cool aspects (ck); coarse-textured fans (cn); coarse-textured soils on ridges (cr); coarse-textured terraces (ct); hummocks (h); hummocks with shallow soils (hs); cool aspects (k); cool aspects with shallow soils (ks); fans (n); ridges (r); shallow soils (s); shallow soils on warm aspects (sw) and terraces (t).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	920 - 1040	961
<b>Slope (%)</b>	1 – 40	13
<b>Aspect (degrees)</b>	none; 14 - 340	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic – mesic	poor	
<b>Drainage</b>	moderately well - well	
<b>Surficial Material</b>		
undulating sandy, gravelly glaciofluvial material; sandy, gravelly glaciofluvial scarps; silty, sandy, mixed fragments morainal blankets; mixed fragments, silty, sandy morainal blankets		
<b>Soil Development</b>		
Orthic Dystric Brunisol		
<b>Humus Form</b>	Hemimor, Mormoder, Mull	
<b>Humus Depth (cm)</b>	6 – 9 (plots)	
<b>Coarse Fragments (%)</b>	56	
<b>Soil Texture</b>	sandy – loamy (occasionally silty)	

**Photo:** C11-19, G1126

**MAP**

Symbol/Site Series

Name

BL 00

Sb – Lingonberry – Knight’s plume

Map Symbol	BL3	BL4	BL5	BL6	BL7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	lodgepole pine Scouler’s willow Labrador tea crowberry	lodgepole pine Labrador tea crowberry lingonberry red-stemmed feathermoss	lodgepole pine subalpine fir Labrador tea crowberry lingonberry red-stemmed feathermoss step moss	lodgepole pine subalpine fir Labrador tea crowberry red-stemmed feathermoss step moss	white spruce lodgepole pine subalpine fir Labrador tea crowberry red-stemmed feathermoss step moss
	subalpine fir grey-leaved willow Altai fescue red-stemmed feathermoss freckle pelt	subalpine fir white spruce Scouler’s willow grey-leaved willow step moss leafy liverworts freckle pelt cladonia lichens reindeer lichens	white spruce Scouler’s willow grey-leaved willow Altai fescue leafy liverworts freckle pelt cladonia lichens reindeer lichens	white spruce bastard toad-flax twinflower lingonberry Altai fescue leafy liverworts curly heron’s-bill moss freckle pelt cladonia lichens reindeer lichens	bastard toad-flax twinflower lingonberry Altai fescue curly heron’s-bill moss freckle pelt
<b>Plots</b>			G129, G130	0002407, 0002418, G1003, G1126	0002408

**Comments:** Trembling aspen was present in the older forest; black spruce was present in one plot along with a significant cover of bog blueberry. A low cover of prickly rose, bunchberry, twinflower and arctic lupine are often present. This unit was initially based on the BWBSdk1/04.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
BWBSmc	BS	00	Sb – Labrador tea – Sphagnum
<p><b>Assumed modifiers for the typical situation:</b> d, j, p  <b>Mapped modifiers:</b> none            BS is an organic bog forest; it occurs on sites with poor to very poor soil drainage. It has been mapped in the original core area (JMJ, 1997).</p>			

#### SITE DESCRIPTION

	Range	Mean
Elevation (m)		
Slope (%)		
Aspect (degrees)		
Moisture Regime	Nutrient Regime	
subhydric	poor - medium	
Drainage	poor	
<b>Surficial Material</b>		
organic veneer and blankets		
<b>Soil Development</b>		
Humus Form		
Humus Depth (cm)		
Coarse Fragments (%)		
Soil Texture		

**Photo:** no photograph

**MAP**

**Symbol/Site Series**

**BS 00**

**Name**

**Sb – Horsetail - Sphagnum**

<b>Map Symbol</b>	BH3	BH4	BH5	BH6	BH7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	Labrador tea scrub birch	Labrador tea scrub birch	Labrador tea scrub birch	Labrador tea scrub birch	Labrador tea scrub birch
<b>Associates</b>	black spruce crowberry cloudberry sphagnum mosses golden fuzzy fen moss	black spruce crowberry cloudberry sphagnum mosses golden fuzzy fen moss	black spruce crowberry cloudberry sphagnum mosses golden fuzzy fen moss	black spruce crowberry cloudberry sphagnum mosses golden fuzzy fen moss	black spruce crowberry cloudberry sphagnum mosses golden fuzzy fen moss
<b>Plots</b>					

**Comments:** This description is taken from MJM, 1997 which was taken from Banner et al., 1993.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
BWBSmc	FL	00	Altai fescue – Reindeer lichen
<p><b>Assumed site modifiers for the typical situation:</b> d, j  <b>Mapped modifiers:</b> none            FL typically occurs on gently sloping sites on deep medium-textured soils. These units often occur in valley bottom slope positions in complex with SA ecosystems. Cold air drainage influences these ecosystems resulting in edaphic plant communities. This ecosystem unit description is taken from JMJ, 1997. It appears to be similar to the FL unit found in the SWBmk.</p>			

**SITE DESCRIPTION**

	Range	Mean
Elevation (m)		
Slope (%)		
Aspect (degrees)		
Moisture Regime	Nutrient Regime	
Drainage		
Surficial Material		
Soil Development		
Humus Form		
Humus Depth (cm)		
Coarse Fragments (%)		
Soil Texture		

**Photo:** no photograph

**MAP**

Symbol/Site Series

Name

FL 00

Altai fescue – Reindeer lichen

<b>Map Symbol</b>	FL2b
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	Altai fescue <i>Cladonia</i> sp.
<b>Associates</b>	<i>Stereocaulon</i> spp. red-stemmed feathermoss
<b>Plots</b>	

**Comments:** No inspections were cited in JMJ, 1997 for this unit. The source of the description was given as Ketcheson, 1990.

<b>BIOGEOCLIMATIC UNIT</b>	<b>MAP</b>		
	Symbol	Site Series	Name
<b>BWBSmc</b>	<b>JS</b>	<b>00</b>	<b>Juniper – Kinnikinnick – Sage</b>
<p><b>Assumed site modifiers for the typical situation:</b> w (steep slopes)  <b>Mapped modifiers:</b> g, gs, k, ks, n, s, v, z  Typic JS occurs on significant slopes (&gt;25%) on warm aspects. It also occurs in gullies (g); gullies with shallow soils (gs); cool aspect (k); cool aspects with shallow soils (ks); fans or cones (n); shallow soils (s); very shallow soils (v); and very steep slopes (z).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	700 – 1016	858
<b>Slope (%)</b>	25 – 65	45
<b>Aspect (degrees)</b>	152 – 228	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
xeric - submesic	poor – medium	
<b>Drainage</b>	well	
<b>Surficial Material</b>		
gravelly, sandy fluvial deposits on moderately steep slopes sandy, angular colluvial very thin veneer		
<b>Soil Development</b>		
Orthic Eutric Brunisol		
<b>Humus Form</b>	Mor	
<b>Humus Depth (cm)</b>	0 – 40	
<b>Coarse Fragments (%)</b>	35, >70	
<b>Soil Texture</b>	sandy – loamy	

**Photo:** no photograph

**MAP**

Symbol/Site Series

Name

JS 00

Juniper – Kinnikinnick - Sage

Map Symbol	JS3a	JS3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	common juniper kinnikinnick	lodgepole pine trembling aspen common juniper kinnikinnick
<b>Associates</b>	lodgepole pine soopolallie saskatoon trembling aspen prickly rose white pussytoes showy Jacob's-ladder northern bedstraw yarrow glaucous bluegrass spreading needlegrass large-awned sedge field locoweed	soopolallie saskatoon prickly rose white pussytoes showy Jacob's-ladder northern bedstraw yarrow glaucous bluegrass spreading needlegrass large-awned sedge field locoweed
<b>Plots</b>	964096, G1008	

**Comments:**

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
BWBSmc	KS	00	Kinnikinnick – Sage
<p><b>Assumed site modifiers for the typical situation:</b> j, s  <b>Mapped modifiers:</b> dw, dz, w, z  KS is a dwarf shrub – herb unit that typically occurs on gentle slopes on shallow soils. It also occurs on deep soils on warm aspects (dw); deep soils on very steep slopes on warm aspects (dz); warm aspects (w); and very steep warm aspects (z).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1005 - 1030	1018
<b>Slope (%)</b>	59 – 65	62
<b>Aspect (degrees)</b>	148 - 160	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
xeric - subxeric	poor – medium	
<b>Drainage</b>	rapid – well	
<b>Surficial Material</b>		
angular colluvial veneers, moderately steep slope; silty, sandy, mixed fragments morainal material, moderately steep slope		
<b>Soil Development</b>		
Orthic Dystric Brunisol		
<b>Humus Form</b>		
<b>Humus Depth (cm)</b>	0-40	
<b>Coarse Fragments (%)</b>	35 – 80	
<b>Soil Texture</b>	loamy – silty loam	

**Photo:** no photograph

**MAP**

Symbol/Site Series

Name

KS 00

Kinnikinnick - Sage

Map Symbol	KS2a	KS2b
Plant Species	Herb Climax	Herb Climax
Dominants	prairie sagewort small-flowered penstemon	spike trisetum
Associates	trembling aspen common juniper prickly rose saskatoon kinnikinnick Rocky mountain fescue Sandberg's bluegrass pasture sedge spikelike goldenrod three-toothed saxifrage lance-leaved stonecrop	prairie sagewort kinnikinnick Rocky mountain fescue slender wheatgrass
Plots	9902682	G131

**Comments:**

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
BWBSmc	LL	00	PI – Lingonberry – Feathermoss
<p><b>Assumed site modifiers for the typical situation:</b> c, d, j  <b>Mapped modifiers:</b> f, h, hs, hv, k, ks, n, r, rs, s, sw, t, v, w  Typic LL occurs on gently slopes on deep, coarse-textured soils. It also occurs on fine-textured soils (f); hummocks (h); hummocks on shallow soils (hs); hummocks on very shallow soils (hv); cool aspects (k); cool aspects with shallow soils (ks); fans or cones (n); ridges (r); ridges with shallow soils (rs); shallow soils (s); shallow soils on warm aspects (sw); terraces (t); very shallow soils (v); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	700 – 990	845
<b>Slope (%)</b>	0 – 29	8
<b>Aspect (degrees)</b>	none; 130 – 238	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
xeric - subxeric	poor	
<b>Drainage</b>	rapid – well	
<b>Surficial Material</b>		
undulating gravelly, silty, sandy glaciofluvial material; sandy, mixed fragments glaciofluvial terrace; sandy, gravelly glaciofluvial terrace; sandy, silty, rubbly colluvial veneer		
<b>Soil Development</b>		
Orthic Dystric Brunisol		
<b>Humus Form</b>	Hemimor, Mors	
<b>Humus Depth (cm)</b>	0-40	
<b>Coarse Fragments (%)</b>	35 – 75	
<b>Soil Texture</b>	sandy, sandy loam (occasionally silty)	

**Photo:** B1-5, G2

**MAP**

Symbol/Site Series

Name

LL 00

PI – Lingonberry – Feathermoss

Map Symbol	LL3	LL4	LL5	LL6	LL7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	lodgepole pine soopolallie	lodgepole pine reindeer lichens pelt lichens	lodgepole pine reindeer lichens cladonia lichens pelt lichens	lodgepole pine subalpine fir reindeer lichens	lodgepole pine subalpine fir reindeer lichens
<b>Associates</b>	trembling aspen grey-leaved willow twinflower kinnikinnick arctic lupine fireweed Altai fescue cladonia lichens reindeer lichens pelt lichens	white spruce subalpine fir trembling aspen grey-leaved willow soopolallie crowberry twinflower kinnikinnick red-stemmed feathermoss cladonia lichens	white spruce subalpine fir trembling aspen soopolallie grey-leaved willow crowberry twinflower Altai fescue lingonberry kinnikinnick red-stemmed feathermoss step moss	white spruce trembling aspen soopolallie grey-leaved willow prickly rose crowberry twinflower arctic lupine Altai fescue lingonberry kinnikinnick bunchberry clubmosses cladonia lichens red-stemmed feathermoss step moss pelt lichens	white spruce trembling aspen soopolallie grey-leaved willow prickly rose crowberry twinflower arctic lupine Altai fescue lingonberry kinnikinnick bunchberry clubmosses cladonia lichens red-stemmed feathermoss step moss pelt lichens
<b>Plots</b>				9902628, 9902679	G2, G95, G124

**Comments:** The moss layer is generally well developed in this unit and is dominated by red-stemmed feather moss, reindeer lichens and cladonia lichens; other species that may be present include foam lichens and icelandmoss lichens. The inspection (G124) on a steep warm aspect differed from other inspections for this unit; common juniper, soopolallie and field locoweed are dominants while the moss layer is poorly developed.

<b>BIOGEOCLIMATIC UNIT</b>	<b>MAP</b>		
	Symbol	Site Series	Name
<b>BWBSmc</b>	<b>LS</b>	<b>00</b>	<b>Labrador tea – Sphagnum</b>
<p><b>Assumed modifiers for the typical situation:</b> j, p  <b>Mapped modifiers:</b> none          LS is a wetland that typically occurs on level sites (depressions) with organic soils. LS is mapped in the original map area and the description is based on JMJ, 1997.</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>		
<b>Slope (%)</b>		
<b>Aspect (degrees)</b>		
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhydric	poor - medium	
<b>Drainage</b>	poor	
<b>Surficial Material</b>		
organic		
<b>Soil Development</b>		
Rego Gleysol		
<b>Humus Form</b>		
<b>Humus Depth (cm)</b>		
<b>Coarse Fragments (%)</b>		
<b>Soil Texture</b>		

**Photo:** no photograph

**MAP**

**Symbol/Site Series**

**Name**

LS 00

Labrador tea – Sphagnum

<b>Map Symbol</b>	LS3a
<b>Plant Species</b>	Shrub Climax
<b>Dominants</b>	Labrador tea sphagnum mosses
<b>Associates</b>	scrub birch glow moss golden fuzzy fen moss
<b>Plots</b>	

**Comments:**

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
BWBSmc	SA	00	Scrub birch – Altai fescue – Coral Lichen
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> c, g, k, n, t  Typic SA occurs on gentle slopes on deep, medium-textured soils on sites subject to cold air ponding. It is also found on coarse-textured soils (c); in gullied terrain (g); on cool aspects (k); on fans (n); and on terraces (t). This description is based on the SA unit from the SWBmk.</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>		
<b>Slope (%)</b>		
<b>Aspect (degrees)</b>		
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic -mesic	poor – medium	
<b>Drainage</b>	well – moderately well	
<b>Surficial Material</b>		
mapped on:		
<b>Soil Development</b>		
<b>Humus Form</b>		
<b>Humus Depth (cm)</b>		
<b>Coarse Fragments (%)</b>		
<b>Soil Texture</b>		

**Photo:** see SA unit in SWMmk

**MAP**

**Symbol/Site Series**

SA 00

**Name**

Scrub birch – Willow – Altai fescue

Map Symbol	SA3a	SA3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	scrub birch short-fruited willow Altai fescue	scrub birch short-fruited willow Altai fescue
<b>Associates</b>	Barratt's willow shrubby cinquefoil tall bluebells mountain sagewort kinnikinnick fireweed brome grass sedges (single-spike) reindeer lichens cladonia lichens step moss <i>Brachythecium</i> sp. dicranum mosses ragged paperdoll eyed foam pelt lichens red-stemmed feathermoss	Barratt's willow shrubby cinquefoil tall bluebells mountain sagewort kinnikinnick fireweed brome grass sedges (single-spike) reindeer lichens cladonia lichens step moss <i>Brachythecium</i> sp. dicranum mosses ragged paperdoll eyed foam pelt lichens red-stemmed feathermoss
<b>Plots</b>	based on data from the SWBmk	

**Comments:**

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
BWBSmc	SC	00	Sw – Currant – Horsetail
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> a, ac, c, cg, cn, g, gk, gw, k, kn, n, nw, p, t, w  Typic SC occurs on level to toe of slope positions on deep, medium-textured soils (imperfectly to poorly drained soils). This unit is frequently found on fluvial materials (plains or fans (n). It also occurs on active soils (a); active, coarse-textured soils (ac); coarse-textured soils (c); coarse-textured fans (cn); gullies (g); gullies on cool aspects (gk); gullies on warm aspects (gw); cool aspects (k); cool aspect fans or cones (kn); warm aspect fans or cones (nw); peaty veneers (p); terraces (t); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	695 – 985	897
<b>Slope (%)</b>	0 – 25	11
<b>Aspect (degrees)</b>	none; 40 – 140	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric –hygric	medium – very rich	
<b>Drainage</b>	moderately well – imperfect	
<b>Surficial Material</b>		
gravelly, sandy fluvial plain; sandy, gravelly fluvial fan; sandy fluvial fan; blocky fluvial veneer over sandy, gravelly fluvial fan; sandy, silty, mixed fragments morainal blankets		
<b>Soil Development</b>		
Orthic Regosol; Orthic Dystric Brunisol; Gleyed Dystric Brunisol		
<b>Humus Form</b>	Mor; Lignomor; Hemimor	
<b>Humus Depth (cm)</b>	0 – 40	
<b>Coarse Fragments (%)</b>	0 – 70	
<b>Soil Texture</b>	sandy; silty	

**Photo:** C3-25, plot 9902690

**MAP**

Symbol/Site Series  
SC 00

Name  
Sw – Currant - Horsetail

Map Symbol	SC3	SC4	SC5	SC6	SC7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	willows (Alaska, white, grey-leaved) common horsetail and/or meadow horsetail	subalpine fir common horsetail and/or meadow horsetail	subalpine fir common horsetail and/or meadow horsetail	subalpine fir common horsetail and/or meadow horsetail	subalpine fir white spruce common horsetail and/or meadow horsetail bunchberry red-stemmed feathermoss step moss
<b>Associates</b>	subalpine fir white spruce tall bluebells bluejoint heart-leaved arnica fireweed cow parsnip bunchberry	white spruce willows (Alaska, white, grey-leaved) bunchberry tall bluebells heart-leaved arnica twinflower step moss red-stemmed feathermoss leafy mosses	white spruce willows (Alaska, white, grey-leaved) red swamp currant bunchberry bluejoint tall bluebell heart-leaved arnica fireweed cow parsnip twinflower step moss red-stemmed feathermoss leafy mosses leafy liverworts	white spruce willows (Alaska, white, grey-leaved) oval-leaved blueberry dwarf blueberry bunchberry bluejoint tall bluebells heart-leaved arnica Sitka burnet clasping twistedstalk cow parsnip baneberry leafy mosses leafy liverworts	willows (Alaska, white) prickly rose trailing black currant red swamp currant skunk currant wood horsetail bluejoint heart-leaved arnica tall bluebells fireweed twinflower one-sided wintergreen stiff clubmoss dog pelt
<b>Plots</b>				964091, 9902662, G1002	9902690, G1006

**Comments:** Inspections located in stage 7 forests had significant cover of feathermosses (and no leafy mosses) while the composition of the moss layer in the stage 6 forests inspected were significantly different (nil feathermosses). Highbush cranberry is listed as an indicator in the Prince Rupert Field Guide for the BWBSdk1/08 but was not present in the inspections.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
BWBSmc	SF	00	Sedge fen
<p><b>Assumed site modifiers for the typical situation:</b> d, j, p  <b>Mapped modifiers:</b> n  Typic SF occurs on level to depressional sites on organic soils. It also occurs on fluvial fans (n).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	900 - 940	913
<b>Slope (%)</b>	0	0
<b>Aspect (degrees)</b>	none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
hygric - subhydric	medium – very rich	
<b>Drainage</b>	very poor – poor	
<b>Surficial Material</b>		
fibric organic veneer over silty, sandy, gravelly glaciofluvial plain; organic veneers and blankets mesic organic plain organic plain		
<b>Soil Development</b>		
Gleysol; Mesisol; Typic Fibrisol		
<b>Humus Form</b>	Fibrimor	
<b>Humus Depth (cm)</b>		
<b>Coarse Fragments (%)</b>	0	
<b>Soil Texture</b>	fibric, mesic	

**Photo:** C13-12, plot 0002403

**MAP**

Symbol/Site Series

Name

SF 00

Sedge fen

<b>Map Symbol</b>	SF2b
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	sedges (water, inflated)
<b>Associates</b>	scrub birch tea-leaved willow short-fruited willow bilberry willow Cusick's sedge glow moss water moss large leafy moss spring moss leafy liverwort
<b>Plots</b>	964086, 9903357, 0002403, G1004A

**Comments:** The species composition of these wetlands is variable.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
BWBSmc	SG	00	Sw – Willow – Glow moss
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> a, ac, c, cn, g, k, kn, n, p  Typic SG is a swamp forest that occurs on deep, medium-textured soils. It also occurs on active fluvial sites (a); active fluvial sites on coarse-textured soils (ac); coarse-textured soils (c); coarse-textured fans (cn); gullies (g), cool aspects (k); cool aspect fans or cones (kn); fans (n); and peaty veneers (p).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	700 – 975	850
<b>Slope (%)</b>	0 – 5	2
<b>Aspect (degrees)</b>	none; 80 – 310	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
hygric - subhydryc	poor – rich	
<b>Drainage</b>	poor – very poor (imperfect)	
<b>Surficial Material</b>		
sandy, silty fluvial veneer over gravelly , sandy fluvial plain silty, gravelly active fluvial plain humic organic veneer over mixed fragments, sandy, silty morainal blanket fibric organic plain mesic organic plain humic organic plain		
<b>Soil Development</b>		
Orthic Gleysol; Orthic Humic Gleysol; Typic Humisol		
<b>Humus Form</b>	Hydromoder, Fibrimor	
<b>Humus Depth (cm)</b>	0 – 40; >40	
<b>Coarse Fragments (%)</b>	0, 0 – 40	
<b>Soil Texture</b>	silty, fibric, mesic, humic	

**Photo:** C2-24, plot 9902680

**MAP**

**Symbol/Site Series**  
**SG 00**

**Name**  
**Sw – Willow – Glow moss**

Map Symbol	SG3	SG4	SG5	SG6	SG7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	scrub birch sedges (water sedge, bristly-stalked, yellow bog) golden fuzzy fen moss sphagnum	white spruce scrub birch Labrador tea golden fuzzy fen moss sphagnum	white spruce scrub birch Labrador tea willows horsetails golden fuzzy fen moss glow moss	white spruce subalpine fir Labrador tea scrub birch willows (short-fruited, tea-leaved, Barclay's, bilberry) horsetails (common, wood) glow moss	white spruce subalpine fir Labrador tea scrub birch willows (short-fruited, tea-leaved, Barclay's, bilberry) horsetails (common, wood) glow moss red-stemmed feathermoss curly heron's-bill moss
<b>Associates</b>	white spruce Labrador tea willows (tea-leaved, bilberry, short-fruited) shrubby cinquefoil crowberry alpine bearberry cloudberry bog blueberry bog cranberry horsetails (marsh, common) Sitka burnet marsh cinquefoil glow moss sickle moss red-stemmed feathermoss	willows (tea-leaved, bilberry, short-fruited) shrubby cinquefoil crowberry bog blueberry sedges alpine bearberry horsetails glow moss red-stemmed feathermoss step moss	subalpine fir shrubby cinquefoil crowberry bog blueberry sedges horsetails red-stemmed feathermoss sphagnum moss step moss	shrubby cinquefoil alpine bearberry bog blueberry crowberry sedges golden fuzzy fen moss red-stemmed feathermoss curly heron's-bill moss sphagnum moss step moss pelt lichens	shrubby cinquefoil crowberry bunchberry lingonberry golden fuzzy fen moss sphagnum moss pelt lichens
<b>Plots</b>	9804733, 9902617, G64			9902680, G16	0002411

**Comments:** Stage 3 units were initially classified as site series BWBSdk1/10 but the Prince Rupert Regional Ecologist recommended combining with site series BWBSdk1/11; these units are transitional to bog units and to non-forested wetlands; they often have scattered, short stunted trees (<10m). Black spruce was generally absent. Mature and old forests have open canopies, shrubby understories and diverse, dense moss layers.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
BWBSmc	SM	00	Sw – Knight’s plume – Step moss
<p><b>Assumed site modifiers for the typical situation:</b> c, d, j  <b>Mapped modifiers:</b> f, g, gk, gw, h, hs, k, kn, ks, kv, mw, n, nw, r, rs, s, sw, t, w  Typic SM occurs on gentle slopes on deep, coarse-textured soils. It is found on all slope positions (except depressions), but is most common on level sites and lower to upper slope positions. It occurs on fine-textured soils (f); gullies (g); gullies on cool aspects (gk); gullies on warm aspects (gw); hummocks (h); hummocks on shallow soil (hs); cool aspects (k); cool aspect fans or cones (kn); cool aspects with shallow (ks) or very shallow soils (kv); medium-textured soils on warm aspects (mw); ridges (r); ridges with shallow soils (rs); shallow soils (s); warm aspect (w); warm aspects with shallow soils (sw); and terraces (t).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	680 – 1070	855
<b>Slope (%)</b>	0 – 42	14
<b>Aspect (degrees)</b>	999, 59 – 350	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic – mesic	poor – medium	
<b>Drainage</b>	well – moderately well	
<b>Surficial Material</b>		
silty, sandy, mixed fragments morainal deposits (mantle of variable thickness, blankets, plains); sandy morainal blanket; undulating, sandy, mixed fragments, silty morainal deposits; mixed fragments, muddy, sandy morainal blanket and mantle of variable thickness; sandy, silty, mixed fragment morainal deposits; silty, mixed fragments, sandy morainal deposits; sandy, gravelly & gravelly, sandy glaciofluvial materials (terraces, undulating); cobble, gravelly, sandy fluvial and colluvial fans; occasionally on silty, sandy colluvial veneers and veneers of coarse weathered bedrock		
<b>Soil Development</b>		
Orthic Dystric Brunisol; Orthic Sombric Brunisol		
<b>Humus Form</b>	Hemimor, Mor, Moders	
<b>Humus Depth (cm)</b>	0 – 40	
<b>Coarse Fragments (%)</b>	20-35, 35-70, >70	
<b>Soil Texture</b>	sandy – silty	

**Photo:** B1-6, plot 9902618

**MAP**

Symbol/Site Series

SM 00

Name

Sw – Knight’s plume – Step moss

Map Symbol	SM3	SM4	SM5	SM6	SM7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	lodgepole pine trembling aspen willows (Scouler’s, grey-leaved) soopolallie heart-leaved arnica Altai fescue fireweed	lodgepole pine trembling aspen red-stemmed feathermoss step moss	lodgepole pine red-stemmed feathermoss step moss	subalpine fir white spruce red-stemmed feathermoss step moss	subalpine fir white spruce red-stemmed feathermoss step moss
<b>Associates</b>	arctic lupine tall bluebells kinnikinnick twinflower	white spruce subalpine fir willows crowberry kinnikinnick arctic lupine twinflower bunchberry fireweed knight’s plume	white spruce subalpine fir willows (grey-leaved) crowberry dwarf blueberry kinnikinnick twinflower bunchberry arctic lupine fireweed Altai fescue knight’s plume reindeer lichens	lodgepole pine willows (grey-leaved, Scouler’s) soopolallie Labrador tea bunchberry twinflower heart-leaved arnica arctic lupine crowberry kinnikinnick heron’s-bill mosses knight’s plume pelt lichens cladonia lichens reindeer lichens	bunchberry twinflower stiff clubmoss one-side wintergreen pink wintergreen bastard toad-flax curly heron’s-bill moss knight’s plume freckle pelt
<b>Plots</b>	G11		964088, 964098	0002423, 9902618, 9903389, G6, G7, G12, G13, G25, G26, G31, G92, G123, G1007, G1080, G1176	9902664, 9902684, G1085, G133, G1170, G1171

**Comments:** G11 was located in a trembling aspen stand; lodgepole pine is found on other stage 3 units. Subalpine fir is common in the tree and shrub layers of mature and old forest; these forests typically have a poorly developed shrub layer (dominated by conifers) and a sparse herb layer. Highbush-cranberry, an indicator species listed in the Prince Rupert Field Guide for the WBWSdk1/01 is generally absent, while a low cover of prickly rose is sometimes present. The moss layer often consists of a well-developed carpet of feathermosses.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
BWBSmc	SR	00	Sw – Scouring-rush – Step moss
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> c, cn, g, gk, gw, k, ks, n, w  Typic SR occurs on gentle, lower slope moisture receiving sites on deep, medium-textured soils. It also occurs on coarse-textured soils (c); coarse-textured fans (cn); gullies (g); gullies on cool aspects (gk); gullies on warm aspects (gw); cool aspects (k); cool aspects with shallow soils (ks); fans (n); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
Elevation (m)	900 - 970	935
Slope (%)	5 - 10	7
Aspect (degrees)	20 - 288	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric	medium - rich	
<b>Drainage</b>	moderately well	
<b>Surficial Material</b>		
sandy, silty fluvial veneer over blocky glaciofluvial deposits silty, sandy, gravelly fluvial fan		
<b>Soil Development</b>		
<b>Humus Form</b>	Moder	
<b>Humus Depth (cm)</b>	0 - 40	
<b>Coarse Fragments (%)</b>	<20, 35 - 70	
<b>Soil Texture</b>	silty – sandy	

Photo: C11-8, G1119

**MAP**

Symbol/Site Series

SR 00

Name

Sw – Scouring-rush – Step moss

Map Symbol	SR3	SR4	SR5	SR6	SR7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	willows white spruce bluejoint fireweed	white spruce step moss	white spruce short-fruited willow step moss	white spruce short-fruited willow step moss	white spruce short-fruited willow step moss
<b>Associates</b>	lodgepole pine scrub birch soft-leaved sedge crowberry Altai fescue twinflower	lodgepole pine willows scrub birch soft-leaved sedge crowberry Altai fescue twinflower fireweed red-stemmed feathermoss reindeer lichens pelt lichens	lodgepole pine scrub birch willows bluejoint soft-leaved sedge crowberry Altai fescue twinflower red-stemmed feathermoss glow moss reindeer lichens pelt lichens	lodgepole pine scrub birch bilberry willow bluejoint soft-leaved sedge crowberry Altai fescue twinflower nagoonberry red-stemmed feathermoss glow moss lesser green reindeer lichen pelt lichens	scrub birch bilberry willow bluejoint soft-leaved sedge crowberry Altai fescue twinflower nagoonberry red-stemmed feathermoss glow moss lesser green reindeer lichen pelt lichens
<b>Plots</b>					G1119, V452

**Comments:** A low cover of dwarf scouring rush is listed in the Prince Rupert Field Guide as an indicator for the BWBSdk1/06.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
BWBSmc	SS	00	SwPI – Soopolallie – Twinflower
<p><b>Assumed site modifiers for the typical situation:</b> c, d, j  <b>Mapped modifiers:</b> a, hs, k, ks, mw, nw, rs, s, sw, t, w,  Typic SS occurs on gentle slopes on deep, medium-textured soils with rich nutrient regimes. It also occurs on active fluvial sites (a); hummocks with shallow soils (h); cool aspects (k); cool aspects with shallow soils (ks); medium-textured soils on warm aspects (mw); ridges with shallow soils (rs) shallow soils (s); shallow soils on warm aspects (sw); terraces (t); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	760 - 1045	918
<b>Slope (%)</b>	0 - 60	19
<b>Aspect (degrees)</b>	none; 127 – 358	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
(subxeric) submesic - mesic	medium - rich	
<b>Drainage</b>	well – moderately well	
<b>Surficial Material</b>		
mixed fragments, muddy, sandy morainal deposits (blankets, mantles of variable thickness); rubbly, mixed fragments, sandy morainal deposits (mantle of variable thickness); mixed fragments morainal blankets; silty, mixed fragments, sandy morainal veneers; sandy, gravelly fluvial plains and terraces; sandy, gravelly glaciofluvial fan; sandy, mixed fragments glaciofluvial deposits; gravelly, sandy glaciofluvial deposits (moderately steep slopes and hummocky); angular, very thin colluvial veneers over morainal deposits; silty, sandy, rubbly colluvial veneers and very thin veneers		
<b>Soil Development</b>		
Orthic Dystric Brunisol; Orthic Eutric Brunisol; Eluviated Eutric Brunisol, Brunisolic Gray Luvisol		
<b>Humus Form</b>	Hemimor, Rhizomull, Mor, Mormoder, Moder	
<b>Humus Depth (cm)</b>	0 – 40	
<b>Coarse Fragments (%)</b>	15 – 70	
<b>Soil Texture</b>	sandy to silty loam	

**Photo:** B4-1, plot 9902634

**MAP**

**Symbol/Site Series**  
**SS 00**

**Name**  
**SwPI – Soopolallie – Twinflower**

Map Symbol	SS3	SS4	SS5	SS6	SS7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	trembling aspen willows (Scouler's, Bebb's, grey-leaved) soopolallie	lodgepole pine willows (Scouler's, Barratt's) soopolallie	lodgepole pine	lodgepole pine subalpine fir soopolallie kinnikinnick	white spruce subalpine fir black cottonwood Scouler's willow soopolallie twinflower bunchberry
<b>Associates</b>	lodgepole pine black cottonwood white spruce scrub birch prickly rose common juniper fireweed heart-leaved arnica twinflower arctic lupine spikelike goldenrod Altai fescue kinnikinnick alpine bearberry crowberry step moss red-stemmed feathermoss reindeer lichens	subalpine fir scrub birch common juniper arctic lupine heart-leaved arnica crowberry fireweed Altai fescue twinflower spikelike goldenrod step moss red-stemmed feathermoss reindeer lichens pelt lichens	white spruce subalpine fir trembling aspen willows (Scouler's, Bebb's) soopolallie scrub birch common juniper crowberry heart-leaved arnica twinflower kinnikinnick arctic lupine fireweed clubmosses step moss red-stemmed feathermoss pelt lichens cladonia lichens reindeer lichens	white spruce black cottonwood trembling aspen Scouler's willow prickly rose saskatoon heart-leaved arnica bastard toad-flax fireweed twinflower bunchberry step moss heron's-bill moss red-stemmed feathermoss freckle pelt	lodgepole pine trembling aspen prickly rose highbush-cranberry heart-leaved arnica bastard toad-flax tall bluebells fireweed alpine milk-vetch step moss heron's-bill moss ragged moss red-stemmed feathermoss freckle pelt
<b>Plots</b>	964084, G1024	964085	964078, 964083, 964097	964070, 9902634, 9902635, G65, G1081	0002427, 9902681

**Comments:** It is expected that soopolallie would be a dominant in young forests although it was only found to be in one of three sites sampled. Black cottonwood was dominant in one of the old forests sampled. These forests have a fairly open tree canopy a moderately well developed shrub layer dominated by soopolallie, a moderately well developed and diverse herb layer and a sparsely developed moss layer (average cover of 13% on sites sampled).

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
BWBSmc	SW	00	Sw – Wildrye – Feathermoss
<p><b>Assumed site modifiers for the typical situation:</b> d, m, w  <b>Mapped modifiers:</b> s, v  Typic SW occurs on steep warm aspects on deep, medium-textured soils. It also occurs on shallow (s) and very shallow (v) soils. This unit is taken from JMJ, 1997; it is mapped within the original map area on warm aspects. It is somewhat similar to the SS ecosystem found on warm aspects.</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>		
<b>Slope (%)</b>		
<b>Aspect (degrees)</b>		
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic	poor to medium	
<b>Drainage</b>	well – moderately well	
<b>Surficial Material</b>		
<b>Soil Development</b>		
<b>Humus Form</b>		
<b>Humus Depth (cm)</b>		
<b>Coarse Fragments (%)</b>		
<b>Soil Texture</b>		

**Photo:** no photograph

**MAP**

**Symbol/Site Series**  
**SW 00**

**Name**  
**Sw – Wildrye – Feathermoss**

Map Symbol	SW3	SW4	SW5	SW6	SW7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	trembling aspen soopolallie	trembling aspen	trembling aspen soopolallie	lodgepole pine step moss red-stemmed feathermoss	lodgepole pine step moss red-stemmed feathermoss
<b>Associates</b>	lodgepole pine black huckleberry prickly rose saskatoon high-bush cranberry heart-leaved arnica fuzzy-spiked wildrye fireweed	lodgepole pine black huckleberry prickly rose saskatoon high-bush cranberry fuzzy-spiked wildrye	soopolallie black huckleberry prickly rose saskatoon high-bush cranberry fuzzy-spiked wildrye step moss red-stemmed feathermoss	trembling aspen black huckleberry soopolallie prickly rose saskatoon high-bush cranberry fuzzy-spiked wildrye fireweed	soopolallie black huckleberry prickly rose saskatoon high-bush cranberry fuzzy-spiked wildrye fireweed
<b>Plots</b>					

**Comments:** Plot 964069 was classified as SW in the JMJ, 1997. However the area the plot is located in has been re-mapped as SBSmv. Black huckleberry is not expected to occur within the BWBSmc subzone.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
BWBSmc	WF	00	Willow – Birch Floodplain
<p><b>Assumed site modifiers for the typical situation:</b> a, d, m  <b>Mapped modifiers:</b> c, n  Typic WF occurs on level to depression sites on (active) deep, medium-textured fluvial soils. It is also found on coarse-textured soils (c) and fluvial fans (n). This unit is mapped near the SWBmk boundary.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1050 - 1060	1050
<b>Slope (%)</b>	0 – 1	
<b>Aspect (degrees)</b>	none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic – subhygric	medium – rich	
<b>Drainage</b>	well – imperfect	
<b>Surficial Material</b>		
silty fluvial very thin veneer over sandy, gravelly fluvial plain; sandy fluvial terrace		
<b>Soil Development</b>		
Orthic Regosol, Gleyed Dystric Brunisol		
<b>Humus Form</b>	Rhizomull, Mormoder	
<b>Humus Depth (cm)</b>	1 – 25	
<b>Coarse Fragments (%)</b>	0	
<b>Soil Texture</b>	sand – silt	

**Photo:** no photograph

**MAP**

**Symbol/Site Series**  
**WF 00**

**Name**  
**Willow – Birch Floodplain**

<b>Map Symbol</b>	WF3a	WF3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	scrub birch short-fruited willow Altai fescue	scrub birch short-fruited willow Altai fescue
<b>Associates</b>	tall bluebells mountain sagewort kinnikinnick fireweed brome grass dwarf blueberry northern bedstraw reindeer lichens cladonia lichens juniper haircap moss step moss dicranum mosses ragged paperdoll eyed foam pelt lichens red-stemmed feathermoss	tall bluebells mountain sagewort kinnikinnick fireweed brome grass dwarf blueberry northern bedstraw reindeer lichens cladonia lichens juniper haircap moss step moss dicranum mosses ragged paperdoll eyed foam pelt lichens red-stemmed feathermoss
<b>Plots</b>	based on 9902640, 0002414 from the SWB	

**Comments:** This unit best describes scrub birch – willow units found on fluvial materials subject to cold air accumulation.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
BWBSmc	WS	00	Willow – Sedge wetland
<p><b>Assumed modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> a, an, c, n, p, t            WS is a shrub wetland that typically occurs on level sites (depressions) on deep mineral soils. It also occurs on active fluvial sites (a); active fluvial fans (an); fluvial fans (n); peaty veneers (p); and terraces (t). WS found on organic soils are mapped as WSp and are described in a separate table.</p>			

**SITE DESCRIPTION**

	Range	Mean
Elevation (m)	885	885
Slope (%)	0	0
Aspect (degrees)	none	
Moisture Regime	Nutrient Regime	
subhydric	rich	
Drainage	imperfect (poor)	
<b>Surficial Material</b>		
silty, sandy fluvial active veneer over pebbly, sandy fluvial active plain		
<b>Soil Development</b>		
Rego Gleysol		
Humus Form	-	
Humus Depth (cm)	2	
Coarse Fragments (%)	0	
Soil Texture	sandy – sandy loam	

**Photo:** no photograph

**MAP**

Symbol/Site Series

Name

WS 00

Willow – Sedge wetland

Map Symbol	WS3a	WS3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	short-fruited willow tea-leaved willow scrub birch bog blueberry glow moss	short-fruited willow tea-leaved willow scrub birch glow moss
<b>Associates</b>	white spruce Labrador tea crowberry shrubby cinquefoil bluejoint western bog-laurel Sitka burnet sphagnum moss sickle moss	white spruce Labrador tea crowberry bog blueberry shrubby cinquefoil bluejoint western bog-laurel Sitka burnet sphagnum moss sickle moss
<b>Plots</b>	0002429	

**Comments:** Six plots were use to create this unit during the classification process, however five of these plots (9628502, 9628520, 962827, 9628560, 9628567) are located outside the project area and were not used to create this description.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
BWBSmc	WSp	00	Willow – Sedge wetland; organic
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> p  This is a shrub wetland that typically occurs on level sites (depressions) on deep organic soils. It is mapped as WSp. It has been lumped with WS for mapping purposes but is described here separately for potential interpretations.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	740 - 930	819
<b>Slope (%)</b>	0 - 2	0.5
<b>Aspect (degrees)</b>	none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhydric	rich – very rich	
<b>Drainage</b>	poor – very poor	
<b>Surficial Material</b>		
organic blanket over fluvial plain organic veneer over fluvial deposits organic plain fibric organic plain		
<b>Soil Development</b>		
Fibric Mesisol; Mesisol; Gleyed Humic Regosol		
<b>Humus Form</b>	Fibrimor	
<b>Humus Depth (cm)</b>	0 – 40; > 60	
<b>Coarse Fragments (%)</b>	-	
<b>Soil Texture</b>	mesic, fibric	

**Photo:** C1-8, G17

**MAP**

Symbol/Site Series

Name

WSp 00

Willow – Sedge wetland

Map Symbol	WSp3a	WSp3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	willows (tea-leaved, Barclay's, short-fruited) scrub birch water sedge golden fuzzy fen moss glow moss	willows (grey-leaved) sedges golden fuzzy fen moss
<b>Associates</b>	white spruce shrubby cinquefoil nagoonberry marsh cinquefoil sphagnum moss leafy mosses <i>Paludella squarrosa</i> <i>Drepanocladus fuitans</i>	white spruce scrub birch sedges (Ross', inflated) common horsetail tall bluebells alpine hedysarum sweet coltsfoot
<b>Plots</b>	9902691, G17	964079, 964092

**Comments:**

4.8 SWBmk – MOIST COOL SPRUCE – WILLOW – BIRCH

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmk	AJ	00	At – Juniper - Kinnikinnick
<p><b>Assumed modifiers for the typical situation:</b> s, w  <b>Mapped modifiers:</b> c, d, dr, g, k, n, r, v                      Typic AJ occurs on significant slopes on warm aspects on shallow soils. It also occurs on coarse-textured soils on warm aspects (c); deep soils on warm aspects (w); deep soils on ridges (dr); gullies (g); cool aspects (k); fans (n); ridges (r); and on very shallow soils on warm aspects (v).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	1170 - 1200	1183
<b>Slope (%)</b>	0 - 52	29
<b>Aspect (degrees)</b>	none, 158 – 239	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subxeric	poor	
<b>Drainage</b>	rapid	
<b>Surficial Material</b>		
angular colluvial veneer sandy, angular colluvial very thin veneer and veneer angular colluvial veneer and blanket		
<b>Soil Development</b>		
Orthic Regosol, Orthic Dystric Brunisol		
<b>Humus Form</b>	Hemimor, Mormoder, Mor	
<b>Humus Depth (cm)</b>	0 – 5	
<b>Coarse Fragments (%)</b>	70 – 85	
<b>Soil Texture</b>	loamy sand – sandy loam	

Photo: C2-3, plot 9902671

**MAP**

Symbol/Site Series

Name

AJ 00

At – Juniper - Kinnikinnick

Map Symbol	AJ3	AJ4	AJ5	AJ6	AJ7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	trembling aspen common juniper kinnikinnick	trembling aspen common juniper kinnikinnick	trembling aspen common juniper kinnikinnick	trembling aspen common juniper kinnikinnick	trembling aspen common juniper kinnikinnick
<b>Associates</b>	subalpine fir Scouler's willow prickly rose scrub birch bog blueberry dwarf blueberry Altai fescue fireweed crowberry arctic lupine lingonberry heart-leaved arnica northern bedstraw	subalpine fir Scouler's willow prickly rose scrub birch bog blueberry dwarf blueberry Altai fescue fireweed crowberry arctic lupine lingonberry heart-leaved arnica northern bedstraw	subalpine fir Scouler's willow prickly rose scrub birch bog blueberry dwarf blueberry Altai fescue fireweed crowberry arctic lupine lingonberry heart-leaved arnica northern bedstraw	subalpine fir Scouler's willow prickly rose scrub birch bog blueberry dwarf blueberry Altai fescue fireweed crowberry arctic lupine lingonberry heart-leaved arnica northern bedstraw	subalpine fir Scouler's willow prickly rose scrub birch bog blueberry dwarf blueberry Altai fescue fireweed crowberry arctic lupine lingonberry heart-leaved arnica northern bedstraw
<b>Plots</b>	9902671, 9902676, G1015				

**Comments:** The sites sampled as stage 3 forests did not appear to have potential to develop into forests > 10m in height. However, AJ has been mapped with structural stages 4-6 on some sites that have appropriate site characteristics.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmk	AM	00	Altai fescue – Mountain sagewort
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> c, ct  Typic AM occurs on level to gentle slopes on deep, medium-textured soils. It also occurs on coarse-textured soils (c) and coarse-textured terraces (ct).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1065	
<b>Slope (%)</b>	0	
<b>Aspect (degrees)</b>	none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
mesic	rich	
<b>Drainage</b>	well	
<b>Surficial Material</b>		
sandy, blocky, mixed fragments, glaciofluvial terrace		
<b>Soil Development</b>		
<b>Humus Form</b>	Mulls	
<b>Humus Depth (cm)</b>	> 40	
<b>Coarse Fragments (%)</b>	35 – 70	
<b>Soil Texture</b>	sandy	

Photo: B4-17, G36

**MAP**

Symbol/Site Series

Name

AM 00

Altai fescue – Mountain sagewort

<b>Map Symbol</b>	AM2b
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	Altai fescue mountain sagewort
<b>Associates</b>	bluejoint yarrow single-spike sedge fireweed unalaska paintbrush northern bedstraw diverse-leaved cinquefoil small-flowered woodrush spikelike goldenrod small-flowered penstemon
<b>Plots</b>	G36

**Comments:** This inspection was located on a glaciofluvial terrace above the active floodplain in the O'Donnell River drainage.

<b>BIOGEOCLIMATIC UNIT</b>	<b>MAP</b>		
	Symbol	Site Series	Name
<b>SWBmk</b>	<b>AV</b>	<b>00</b>	<b>Avalanche track</b>
<p><b>Assumed modifiers for the typical situation:</b> steep  <b>Mapped modifiers:</b> k, ks, n, w</p> <p>AV is an avalanche track that was mapped in the original map area (JMJ, 1997) along Wilson Creek and very few other locations. This description is taken from JMJ, 1997. No true edaphic avalanche tracks were observed during the 2000 sampling; season; it is suspected that areas mapped as AV are seral stages of forested units. It occurs on cool aspects (k); cool aspects with shallow soils (ks); fans (n); and warm aspects (w).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>		
<b>Slope (%)</b>		
<b>Aspect (degrees)</b>		
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
<b>Drainage</b>		
<b>Surficial Material</b>		
<b>Soil Development</b>		
<b>Humus Form</b>		
<b>Humus Depth (cm)</b>		
<b>Coarse Fragments (%)</b>		
<b>Soil Texture</b>		

**Photo:** no photograph

**MAP****Symbol/Site Series****Name**

AV 00

Avalanche track

<b>Map Symbol</b>	AV3, AV3a, AV3b
<b>Plant Species</b>	Shrub/Herb Climax
<b>Dominants</b>	willows fireweed
<b>Associates</b>	lodgepole pine white spruce
<b>Plots</b>	no plots

**Comments:** Assume that the difference in stage 3a to 3b is only in structure (shrub height) and not in species composition.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmk	BL	00	Scrub birch – Lichen
<p><b>Assumed site modifiers for the typical situation:</b> c, j, s  <b>Mapped modifiers:</b> d, dh, dk, dr, dw, gk, gw, h, hv, k, kn, n, r, t, vw, w (see next unit for a description of BL on deep soils i.e. BLd3a, BLdh3a, BLdk3a, BLdr3a, BLdw3a, BLt3a). Typic BL occurs on gentle slopes (crests or upper slopes) on shallow, coarse-textured soils. BL also occurs on deep soils (d); deep soils on hummocks (dh); deep soils on cool aspects (dk); deep soils on ridges (dr); deep soils on warm aspects (dw); gullies on cool aspects (gk); gullies on warm aspects (gw); hummocks (h); hummocks on very thin soils (hv); cool aspects (k); cool aspect fans or cones (kn); fans (n); ridges (r); terraces (t); very shallow soils on warm aspects (vw); and warm aspects (w).</p>			

**SITE DESCRIPTION**

	Range	Mean
Elevation (m)	1235	
Slope (%)	50	
Aspect (degrees)	283	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
xeric - subxeric	poor	
<b>Drainage</b>	rapid	
<b>Surficial Material</b>		
silty, sandy, mixed fragments morainal deposits (moderate and moderately steep slopes)		
<b>Soil Development</b>		
<b>Humus Form</b>	Moder	
<b>Humus Depth (cm)</b>	<10	
<b>Coarse Fragments (%)</b>	35 – 75	
<b>Soil Texture</b>	loamy	

**Photo:** B11-10, G93

**MAP****Symbol/Site Series****Name****BL 00****Scrub birch – Lichen**

<b>Map Symbol</b>	BL3a
<b>Plant Species</b>	Low Shrub Climax
<b>Dominants</b>	scrub birch lingonberry icelandmoss lichens
<b>Associates</b>	crowberry kinnikinnick bog blueberry willows Altai fescue arctic lupine cladina lichens foam lichens witch's hair lichen haircap mosses
<b>Plots</b>	G93

**Comments:** Plot G93 had a low cover of scrub birch (it could represent a dwarf shrub – lichen ecosystem).

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmk	BLd	00	Scrub birch – Lichen
<p><b>Assumed site modifiers for the typical situation:</b>  <b>Mapped modifiers:</b>  This unit has been lumped with the BL unit for mapping. This unit occurs on gentle slopes on deep soils and is mapped as BLd3a, BLdh3a, BLdk3a, BLdr3a, BLdw3a and BLt3a.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1275	
<b>Slope (%)</b>	1	
<b>Aspect (degrees)</b>	none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
xeric - subxeric	poor	
<b>Drainage</b>	moderately well	
<b>Surficial Material</b>		
sandy, silty, mixed fragments morainal terrace		
<b>Soil Development</b>		
<b>Humus Form</b>	<b>Moder</b>	
<b>Humus Depth (cm)</b>	0 – 10	
<b>Coarse Fragments (%)</b>	35 – 70	
<b>Soil Texture</b>	silty	

**Photo:** B3-32, plot 9902633

**MAP**

Symbol/Site Series

Name

BLd 00

Scrub birch – Lichen

<b>Map Symbol</b>	BLd3a
<b>Plant Species</b>	Low Shrub Climax
<b>Dominants</b>	scrub birch reindeer lichens
<b>Associates</b>	Altai fescue dwarf blueberry mountain sagewort small-flowered woodrush haircap mosses dicranum mosses red-stemmed feathermoss foam lichen cladonia lichens
<b>Plots</b>	G30, G102, 0002414, 9902633

**Comments:** This unit has a greater component of mosses in the D layer compared to the similar SWBmks unit.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmk	FC	00	BI – Crowberry – Feathermoss
<p><b>Assumed modifiers for the typical situation:</b> c, d, j  <b>Mapped modifiers:</b> gk, gw, h, hs, k, kn, ks, n, nw, r, rs, s, sw, t, vw, w  Typic FC occurs on gentle slopes on deep, coarse-textured soils. It also occurs on gullies on cool aspects (gk); gullies on warm aspects (gw); hummocks (h); hummocks with shallow soils (hs); cool aspects (k); fans or cones on cool aspects (kn); cool aspects on shallow (ks); fans (n); fans or cones on warm aspects (nw); ridges (r); ridges with shallow soils (rs); shallow soils (s); shallow soils on warm aspects (sw); terraces (t); very shallow soils on warm aspects (vw); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1070 - 1275	1175
<b>Slope (%)</b>	5 - 75	32
<b>Aspect (degrees)</b>	10 - 302	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic (mesic)	poor - medium	
<b>Drainage</b>	well – moderately well	
<b>Surficial Material</b>		
sandy, mixed fragments morainal deposits; mixed fragments, sandy morainal deposits; mixed fragments, silty, sandy morainal deposits; sandy, mixed fragments, silty morainal deposits; sandy, gravelly fluvial veneer over sandy, silty, mixed fragments morainal deposits; silty, rubbly, sandy colluvial veneer; sandy, mixed fragments colluvial veneer; silty, sandy, angular colluvial veneer		
<b>Soil Development</b>		
Orthic Eutric Brunisol, Orthic Dystric Brunisol, Orthic Sombric Brunisol		
<b>Humus Form</b>	Hemimor, Mormoder, Mullmoder, Mor, Moder	
<b>Humus Depth (cm)</b>	2 - 32	
<b>Coarse Fragments (%)</b>	20 - 80	
<b>Soil Texture</b>	sandy - silty	

**Photo:** C1-6, plot 9902622

MAP

Symbol/Site Series  
FC 00

Name  
BI – Crowberry - Feathermoss

Map Symbol	FC3	FC4	FC5	FC6	FC7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	lodgepole pine shrub birch crowberry step moss	lodgepole pine subalpine fir crowberry	subalpine fir crowberry cladonia lichens leafy liverwort	subalpine fir crowberry	subalpine fir crowberry
<b>Associates</b>	subalpine fir Labrador tea willows (creeping, tea-leaved) Sitka alder twinflower four-angled mountain-heather arctic lupine lingonberry kinnikinnick red-stemmed feathermoss leafy liverworts juniper haircap moss pelt lichens reindeer lichen cladonia lichens icelandmoss	scrub birch Labrador tea willows arctic lupine lingonberry red-stemmed feathermoss step moss dicranum moss leafy liverworts juniper haircap moss pelt lichens	lodgepole pine scrub birch Labrador tea willows arctic lupine lingonberry red-stemmed feathermoss step moss dicranum mosses leafy liverworts juniper haircap moss reindeer lichens sickle moss pelt lichens	lodgepole pine scrub birch soopolallie Bebb's willow common juniper dwarf blueberry arctic lupine heart-leaved arnica Altai fescue red-stemmed feathermoss step moss dicranum mosses leafy liverworts reindeer lichens cladonia lichens pelt lichens	lodgepole pine scrub birch soopolallie common juniper dwarf blueberry arctic lupine heart-leaved arnica Altai fescue red-stemmed feathermoss step moss dicranum mosses leafy liverworts reindeer lichens cladonia lichens pelt lichens
<b>Plots</b>	G132, G1125		G94, G1026, G1153	964100, 9902622, 9902665, 9902683, 9902687, G1	

**Comments:** Mature stands generally have an open canopy, often composed of short trees. The moss layer is generally moderately well developed and diverse; however no one species appears to be dominant. One of the inspections for stage 3 (G132) was located on a steep, cool aspect on an stand initiated by avalanching; this plot has a high cover of step moss and a component of four-angled mountain-heather.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmk	FF	00	BI – Feathermoss
<p><b>Assumed modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> c, ch, ck, cn, ct, cw, g, gk, gw, h, hs, k, kn, ks, kv, n, nw, r, rs, s, sw, w  Typic FF occurs on gentle slopes on deep, medium-textured soils. It also occurs on coarse-textured soils (c); coarse-textured soils on hummocks (ch); coarse-textured soils on cool aspects (ck); coarse-textured soils on fans (cn); coarse-textured soils on terraces (t); coarse-textured soils on warm aspects (cw); gullies (g); gullies on cool aspects (gk); gullies on warm aspects (gw); hummocks (h); hummocks with shallow soils (hs); cool aspects (k); cool aspect fans or cones (kn); cool aspects on shallow (ks) and very shallow (kv) soils; fans (n); fans or cones on warm aspects (nw); ridges (r); ridges with shallow soils (rs); shallow soils (s); shallow soils on warm aspect (sw); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1045 - 1335	1192
<b>Slope (%)</b>	0 - 60	23
<b>Aspect (degrees)</b>	none, 17 – 310	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic - mesic	poor – medium	
<b>Drainage</b>	well – moderately well	
<b>Surficial Material</b>		
morainal deposits with the following textures: sandy , silty, mixed fragments; silty, sandy, mixed fragments; sandy, mixed fragments, silty; silty, mixed fragments, sandy; mixed fragments, sandy, silty; mixed fragments, muddy, sandy; muddy, mixed fragments, sandy; sandy, mixed fragments; mixed fragments, sandy; mixed fragments, silty; mixed fragments; angular, muddy, sandy; angular, colluvial veneers and thins veneers; rubbly, silty colluvial blankets; clayey, silty, sandy fluvial veneer over fluvial plain		
<b>Soil Development</b>		
Orthic Dystric Brunisol; Orthic Eutric Brunisol; Orthic Regosol		
<b>Humus Form</b>	Mor, Hemimor, Humimor	
<b>Humus Depth (cm)</b>	3 – 18	
<b>Coarse Fragments (%)</b>	10 - >70	
<b>Soil Texture</b>	sandy - silty	

**Photo:** B4-11, plot 9902639

**MAP**

**Symbol/Site Series**

**Name**

**FF 00**

**BI - Feathermoss**

Map Symbol	FF3	FF4	FF5	FF6	FF7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	bunchberry fireweed juniper haircap moss fire moss	subalpine fir bunchberry	subalpine fir step moss red-stemmed feathermoss	subalpine fir step moss red-stemmed feathermoss	subalpine fir step moss red-stemmed feathermoss dicranum mosses
<b>Associates</b>	subalpine fir lodgepole pine Scouler's willow prickly rose dwarf blueberry heart-leaved arnica twinflower arctic lupine Altai fescue slender hawkweed sedges	lodgepole pine Scouler's willow scrub birch crowberry twinflower heart-leaved arnica step moss red-stemmed feathermoss	white spruce lodgepole pine Scouler's willow scrub birch crowberry bunchberry pelt lichens	white spruce lodgepole pine scrub birch crowberry bunchberry dicranum mosses reindeer lichens cladonia lichens pelt lichens	white spruce crowberry bunchberry twinflower leafy liverworts reindeer lichens cladonia lichens pelt lichens
<b>Plots</b>	G1017, G1068		964099	964082, 9902630, 9902631, 9902638, 9902639, G21, G24, G79, G1005, G1019, G1027, G1031, G1084, G1091, G1139, G1152, G1160	9902666, 9902668, G89, G1010, G1169

**Comments:** Some stands in the upper elevations of the zone have mature trees less than 10m tall; these stands are treated as mature (stage 6).

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmk	--	00	BI – Bunchberry – Leafy liverworts
<p>Assumed site modifiers for the typical situations: none  Mapped modifiers: none  This unit was lumped with the FF unit for mapping purposes. It occurs on gentle slopes on deep, medium-textured soils.</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	1120 - 1360	1221
<b>Slope (%)</b>	3 - 45	28
<b>Aspect (degrees)</b>	1 - 268	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic - mesic	poor – medium	
<b>Drainage</b>	well – moderately well	
<b>Surficial Material</b>		
morainal deposits with the following textures: silty, mixed fragments, sandy; silty, sandy, rubbly; silty, sandy, mixed fragments; sandy, silty, mixed fragments; sandy, muddy, mixed fragments; sandy, mixed fragments; silty, sandy, angular colluvial veneer; silty, rubbly, sandy colluvial veneers; sandy, silty, rubbly colluvial veneers; sandy, gravelly glaciofluvial very thin veneer over mixed fragments, silty morainal deposits		
<b>Soil Development</b>		
Orthic Dystric Brunisol		
<b>Humus Form</b>	Mor, Moder, Mormoder, Hemimor	
<b>Humus Depth (cm)</b>	0 – 10	
<b>Coarse Fragments (%)</b>	20 – 70	
<b>Soil Texture</b>	sandy - silt	

**Photo:** B2-8, plot 9902620

**MAP**

Symbol/Site Series

-- 00

Name

**B1 – Bunchberry – Leafy liverworts**

Map Symbol	3	4	5	6	7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
Dominants	subalpine fir crowberry fireweed juniper haircap moss	subalpine fir crowberry common leafy liverwort	subalpine fir crowberry common leafy liverwort dicranum mosses	subalpine fir crowberry common leafy liverwort dicranum mosses	subalpine fir common leafy liverwort
Associates	scrub birch willows oval-leaved blueberry heart-leaved arnica	scrub birch willows oval-leaved blueberry heart-leaved arnica one-side wintergreen red-stemmed feathermoss dicranum mosses	scrub birch oval-leaved blueberry heart-leaved arnica one-sided wintergreen four-angled mountain-heather red-stemmed feathermoss cladina lichens pelt lichens	scrub birch oval-leaved blueberry heart-leaved arnica one-side wintergreen four-angled mountain-heather red-stemmed feathermoss cladina lichens pelt lichens	skunk currant trailing black currant bunchberry fireweed mountain arnica one-sided wintergreen pink wintergreen stiff clubmoss dicranum mosses step moss freckle pelt
Plots				9902616, 9902619, 9902620, G76, G77, G1001, G1168	9902661

**Comments:** The one inspection (9902661) found in the stage 7 forest differed from those in stage 6. It did not contain crowberry and had associates uncommon in the other stages (currants, cow parsnip, and asters).

<b>BIOGEOCLIMATIC UNIT</b>	<b>MAP</b>		
	Symbol	Site Series	Name
<b>SWBmk</b>	<b>FL</b>	<b>00</b>	<b>Altai fescue – Lichen</b>
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> c, ch, cr, ct, gk, k, ks, r, s, sw, w  Typic FL occurs on level to gentle slopes on deep, medium-textured soils. FL also occurs on coarse-textured soils (c); coarse-textured soils on hummocks (ch); coarse-textured soil on ridges (cr); coarse-textured soils on terraces (ct); gullies on cool aspects (gk); cool aspects (k); cool aspects with shallow soils (ks); ridges (r); shallow soils (s); shallow soils on warm aspects (sw); and warm aspects.</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	1195 – 1280	1238
<b>Slope (%)</b>	0 - 6	3
<b>Aspect (degrees)</b>	none, 230	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
mesic - subhygric	rich	
<b>Drainage</b>	well – moderately well	
<b>Surficial Material</b>		
mixed fragments, sandy, silty morainal mantle of variable thickness; mixed fragments, silty, sandy glaciofluvial terrace		
<b>Soil Development</b>		
<b>Humus Form</b>	Mulls	
<b>Humus Depth (cm)</b>	0 – 40	
<b>Coarse Fragments (%)</b>	20 – 35	
<b>Soil Texture</b>	loamy – silty	

**Photo:** C3-21, G1029

**MAP****Symbol/Site Series****Name****FL 00****Altai fescue - Lichen**

<b>Map Symbol</b>	FL2b
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	Altai fescue reindeer lichens red-stemmed feathermoss
<b>Associates</b>	dwarf blueberry mountain sagewort alpine sweetgrass northern goldenrod small-flowered woodrush Sitka burnet diverse-leaved cinquefoil timber oatgrass junegrass mountain forget-me-not juniper haircap moss foam lichens cladonia lichens
<b>Plots</b>	G1029, G1161

<b>Comments:</b>
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BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmk	FM	00	BI – Scrub birch – Step moss
<p><b>Assumed site modifiers for the typical modifiers:</b> d, j, m  <b>Mapped modifiers:</b> a, c, cg, cn, g, gk, gw, k, ks, n, s, sw, w  Typic FM occurs on gentle slopes on deep, medium-textured soils. It also occurs active fluvial sites (a); coarse-textured soils (c); gullied, coarse-textured soils (cg); coarse-textured soils on fans (cn); gullies (g); gullies on cool aspects (gk); gullies on warm aspects (gw); cool aspects (k); cool aspect with shallow soils (ks); fans (n); shallow soils (s); shallow soils on warm aspects (sw); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1050 - 1330	1188
<b>Slope (%)</b>	1 - 27	27
<b>Aspect (degrees)</b>	18 – 286; none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric (hygric)	poor – medium	
<b>Drainage</b>	moderately well – imperfect	
<b>Surficial Material</b>		
morainal deposits with the following textures: sandy, silty, blocky; angular, sandy, mixed fragments; mixed fragments, silty; sandy, mixed fragments, silty; mixed fragments, muddy, sandy; muddy, mixed fragments, sandy; mixed fragments, sandy, silty angular colluvial blankets on moderate slopes		
<b>Soil Development</b>		
Orthic Humic Gleysol, Orthic Gleysol		
<b>Humus Form</b>	Hemimor, Lignomor, Mormoder, Mor	
<b>Humus Depth (cm)</b>	5 – 13	
<b>Coarse Fragments (%)</b>	<20 – 70	
<b>Soil Texture</b>	sandy - silty	

**Photo:** B3-17, plot 9902629

**MAP**

Symbol/Site Series

FM 00

Name

BI – Scrub birch Step moss

Map Symbol	FM3	FM4	FM5	FM6	FM7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	willows crowberry fireweed	subalpine fir Labrador tea crowberry	subalpine fir Labrador tea crowberry red-stemmed feathermoss step moss	subalpine fir Labrador tea scrub birch red-stemmed feathermoss step moss	subalpine fir Labrador tea crowberry red-stemmed feathermoss step moss
<b>Associates</b>	subalpine fir scrub birch Labrador tea bunchberry heart-leaved arnica Altai fescue horsetails	scrub birch willows twinflower bunchberry Altai fescue red-stemmed feathermoss step moss	scrub birch willows Sitka alder bog blueberry bunchberry twinflower Altai fescue stiff clubmoss Sitka burnet dicranum mosses leafy liverworts cladonia lichens pelt lichens	white spruce short-fruited willow tea-leaved willow Barclay's willow crowberry bunchberry heart-leaved arnica horsetails (meadow, wood, common) twinflower Altai fescue tall bluebells dicranum mosses leafy liverworts pelt lichens cladonia lichens reindeer lichens	white spruce scrub birch short-fruited willow tea-leaved willow bog blueberry alpine bearberry bunchberry lingonberry dicranum mosses pelt lichens sphagnum moss
<b>Plots</b>			G23	9902629, 9902677, G20, G91, G1014, G1154	G1016

**Comments:** A low cover (<1%) of species such as lingonberry, one-side wintergreen, fireweed is often present. Horsetails and leafy liverworts were each abundant in one plot. The cover of Labrador tea seems to decrease with an increase in elevation in the zone.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmk	JK	00	Juniper – Kinnikinnick
<p><b>Assumed site modifiers for the typical situation:</b> s, w  <b>Mapped modifiers:</b> d, g, h, k, kv, n, q, r, v, z  Typic JK occurs on significant slopes (&gt;25%) on warm aspects and shallow soils. It is also found on deep soils (d); gullies (g); hummocks (h); cool aspects (k); cool aspects on very shallow soils (kv); fans (n); very steep cool aspects (q); ridges (r); very shallow soils (v); and very steep slopes (z).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1200 - 1330	1247
<b>Slope (%)</b>	50 - 72	58
<b>Aspect (degrees)</b>	160 – 207	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
xeric - submesic	poor – rich	
<b>Drainage</b>	rapid – well	
<b>Surficial Material</b>		
rubbly, silty colluvial material (hummocky, undulating) silty, sandy, rubbly colluvial blanket sandy, silty, angular colluvial veneer		
<b>Soil Development</b>		
Orthic Eutric Brunisol, Orthic Humic Regosol, Orthic Dystric Brunisol		
<b>Humus Form</b>	Mor, Mormoder	
<b>Humus Depth (cm)</b>	0 – 3	
<b>Coarse Fragments (%)</b>	20 – 45	
<b>Soil Texture</b>	loamy sand - loamy	

**Photo:** C3-23, plot 9902689

**MAP**

Symbol/Site Series

Name

JK 00

Juniper – Kinnikinnick

Map Symbol	JK3a	JK3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	common juniper kinnikinnick	subalpine fir common juniper kinnikinnick
<b>Associates</b>	subalpine fir trembling aspen scrub birch grey-leaved willow Scouler's willow Altai fescue crowberry three-toothed saxifrage white mountain-heather cladonia lichens cladina lichens	scrub birch trembling aspen grey-leaved willow Scouler's willow Altai fescue crowberry three-toothed saxifrage white mountain-heather cladonia lichens cladina lichens
<b>Plots</b>		964077, 964103, 9902689

**Comments:** The trees in this unit are generally short and scrubby (<10m); the majority are found in the low shrub layer. The moss layer is very poorly developed and mean cover is less than 5%.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmk	LC	00	PI – Crowberry - Lichen
<p><b>Assumed site modifiers for the typical situation:</b> c, d, j  <b>Mapped modifiers:</b> h, hs, k, ks, kv, n, r, rs, s, sw, t, w  Typic LC occurs on gentle slopes on deep, coarse-textured soils. It also occurs on hummocks (h); hummocks with shallow soils (hs); cool aspects (k); cool aspects with shallow (ks) and very shallow soils (kv); fans (n); ridges (r); ridges with shallow soils (rs); shallow soils (s); shallow soils on warm aspects (sw); terraces (t); and warm aspects.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1050 - 1120	1085
<b>Slope (%)</b>	0 - 15	4
<b>Aspect (degrees)</b>	none, 300 – 360	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subxeric	poor	
<b>Drainage</b>	rapid – well	
<b>Surficial Material</b>		
gravelly, sandy glaciofluvial veneer over sandy, pebbly glaciofluvial terrace; sandy, gravelly glaciofluvial terraces and undulating material; sandy, mixed fragments, undulating morainal deposits; silty, sandy, angular colluvial veneer		
<b>Soil Development</b>		
Orthic Dystric Brunisol		
<b>Humus Form</b>	Mor, Mormoder, Moder	
<b>Humus Depth (cm)</b>	0 – 5	
<b>Coarse Fragments (%)</b>	30 – 70	
<b>Soil Texture</b>	sandy – sandy loam	

**Photo:** C10-6, G1093

**MAP**

Symbol/Site Series

Name

LC 00

PI – Crowberry - Lichen

Map Symbol	LC3	LC4	LC5	LC6	LC7
Plant Species	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	lodgepole pine scrub birch crowberry Altai fescue	lodgepole pine crowberry	lodgepole pine subalpine fir crowberry reindeer lichens cladonia lichens	lodgepole pine subalpine fir crowberry reindeer lichens cladonia lichens	lodgepole pine subalpine fir scrub birch crowberry Altai fescue reindeer lichens cladonia lichens foam lichens
<b>Associates</b>	Scouler’s willow prickly rose kinnikinnick arctic lupine haircap mosses	Scouler’s willow scrub birch prickly rose kinnikinnick Altai fescue bunchberry arctic lupine reindeer lichens cladonia lichens red-stemmed feathermoss haircap mosses	white spruce Scouler’s willow scrub birch prickly rose kinnikinnick Altai fescue bunchberry lingonberry arctic lupine ragged paperdoll foam lichens red-stemmed feathermoss haircap mosses pelt lichens	white spruce Scouler’s willow scrub birch prickly rose kinnikinnick Altai fescue bunchberry lingonberry arctic lupine ragged paperdoll foam lichens red-stemmed feathermoss step moss dicranum mosses leafy liverworts haircap mosses pelt lichens	white spruce dwarf blueberry western fescue lingonberry ragged paperdoll red-stemmed feathermoss
<b>Plots</b>				9902688, 9903350, 9903352, G128	G1093

**Comments:** Several species (white spruce, Scouler’s willow, leafy liverworts, step moss) listed in stage 6 were found in only one of the inspections. White spruce and subalpine fir are often found in the tall shrub layer. These units generally have an open tree canopy and a well developed (average 72 % cover) and diverse moss layer dominated by lichens.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmk	--	00	BI – Crowberry - Lichen
<p><b>Assumed modifiers for the typical situation:</b> none  <b>Mapped modifiers:</b> none  This unit has been lumped with the LC unit for mapping purposes. It typically occurs on gentle slopes on deep, coarse-textured soils. This unit is generally found at elevations (&gt;1100m) greater than the pine dominated LC unit. This unit is most associated with coarse to coarse-loamy till (often ablation till) whereas the LC unit is more often associated with glaciofluvial materials.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1135- 1340	1220
<b>Slope (%)</b>	5 - 45	23
<b>Aspect (degrees)</b>	18 – 340	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
xeric – submesic	poor (medium)	
<b>Drainage</b>	rapid – well	
<b>Surficial Material</b>		
silty, sandy, mixed fragments morainal deposits (blankets, veneers, mantles of variable thickness); sandy, silty, mixed fragments morainal deposits; sandy, mixed fragments morainal deposits; angular, sandy morainal deposits; silty, mixed fragments, sandy, morainal deposits; sandy, mixed fragments, silty morainal deposits; silty, rubbly colluvial veneers and very thin veneers; sandy, mixed fragments glaciofluvial deposits		
<b>Soil Development</b>		
Orthic Dystric Brunisol		
<b>Humus Form</b>	Mor, Hemimor, Moder	
<b>Humus Depth (cm)</b>	0 – 10	
<b>Coarse Fragments (%)</b>	20 – 70, >70	
<b>Soil Texture</b>	sandy – silty	

**Photo:** C10-4, G1092

**MAP**

Symbol/Site Series

Name

-- 00

B1 – Crowberry - Lichen

Map Symbol	3	4	5	6	7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	subalpine fir scrub birch crowberry	subalpine fir scrub birch crowberry reindeer lichens	subalpine fir crowberry reindeer lichens	subalpine fir crowberry reindeer lichens	subalpine fir crowberry reindeer lichens cladonia lichens
<b>Associates</b>	lodgepole pine Altai fescue bog blueberry	lodgepole pine bog blueberry lingonberry cladonia lichens foam lichens red-stemmed feathermoss step moss pelt lichens	lodgepole pine scrub birch bog blueberry lingonberry cladonia lichens foam lichens red-stemmed feathermoss step moss pelt lichens	lodgepole pine scrub birch bog blueberry lingonberry cladonia lichens foam lichens red-stemmed feathermoss step moss dicranum mosses icelandmoss lichens pelt lichens	scrub birch green light freckle pelt dicranum mosses red-stemmed feathermoss step moss common leafy liverwort few-finger lichen
<b>Plots</b>				9902663, G90, G1030, G1090, G1118	9902670, G34, G1089, G1092

**Comments:** These units generally have an open tree canopy and a well developed (average 78 % cover) and diverse moss layer dominated by lichens. Stage 3b forests, with short stunted trees (in B1 layer) are treated as mature forest (G1030, G1090).

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmk	SA	00	Scrub birch – Altai fescue
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> c, ck, ct, cw, g, gk, gw, k, kn, ks, n, s, sw, t, w</p> <p>Typic SA occurs on gentle slopes on deep, medium-textured soils on sites subject to cold air ponding. It also occurs on coarse-textured soils (c); coarse-textured soils on cool aspects (ck); coarse-textured soils on terraces (ct); coarse-textured soils on warm aspects (cw); gullies (g); gullies on cool aspects (gk); gullies on warm aspects (gw); cool aspects (k); cool aspect fans or cones (kn); cool aspects with shallow soils (ks); fans (n); shallow soils (s); shallow soils on warm aspects (sw); terraces (t); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1040 - 1060	1050
<b>Slope (%)</b>	0 - 14	7
<b>Aspect (degrees)</b>	none, 167	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic - subhygric	medium – rich	
<b>Drainage</b>	well – imperfect	
<b>Surficial Material</b>		
organic veneer over mixed fragments morainal blanket; silty fluvial very thin veneer over sandy, gravelly fluvial plain; sandy fluvial terrace		
<b>Soil Development</b>		
Orthic Regosol, Humic Regosol, Gleyed Dystric Brunisol		
<b>Humus Form</b>	Rhizomull, Humimor, Mormoder	
<b>Humus Depth (cm)</b>	1 – 25	
<b>Coarse Fragments (%)</b>	0 – 20	
<b>Soil Texture</b>	sand – silt; organic veneers	



**MAP**

**Symbol/Site Series**

SA 00

**Name**

Scrub birch – Altai fescue

Map Symbol	SA3a	SA3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	scrub birch short-fruited willow Altai fescue	scrub birch short-fruited willow Altai fescue
<b>Associates</b>	Barratt’s willow shrubby cinquefoil tall bluebells mountain sagewort kinnikinnick fireweed brome grass sedges (single-spike) reindeer lichens cladonia lichens step moss <i>Brachythecium</i> sp. dicranum mosses ragged paperdoll eyed foam pelt lichens red-stemmed feathermoss	Barratt’s willow shrubby cinquefoil tall bluebells mountain sagewort kinnikinnick fireweed brome grass sedges (single-spike) reindeer lichens cladonia lichens step moss <i>Brachythecium</i> sp. dicranum mosses ragged paperdoll eyed foam pelt lichens red-stemmed feathermoss
<b>Plots</b>	964081, 9902640, 0002414	

**Comments:** This unit best describes scrub birch units found in valley bottoms subject to cold air accumulation. SA mapped in the upper parts of the zone near the SWB scrub boundary may be more similar to the SWBmks/SA unit.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmk	SF	00	Sedge – Fuzzy fen moss
<p><b>Assumed site modifiers for the typical situation:</b> d, j, p  <b>Mapped modifiers:</b> ac  Typic SF occurs on level sites or depressions on organic soils. This unit also occurs on active fluvial sites on coarse-textured soils (ac).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1135 - 1150	1142
<b>Slope (%)</b>	0 - 4	2
<b>Aspect (degrees)</b>	30 – 144, none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhydric – hydric	medium – very rich	
<b>Drainage</b>	poor – very poor	
<b>Surficial Material</b>		
mesic organic plain humic organic plain		
<b>Soil Development</b>		
Typic Mesisol, Mesisols		
<b>Humus Form</b>	Mesimor	
<b>Humus Depth (cm)</b>	>60	
<b>Coarse Fragments (%)</b>	0	
<b>Soil Texture</b>	mesic – humic	

**Photo:** B4-7, plot 9902636

**MAP****Symbol/Site Series**

SF 00

**Name**

Sedge – Fuzzy fen moss

<b>Map Symbol</b>	SF2b
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	water sedge net-veined willow golden fuzzy fen moss
<b>Associates</b>	scrub birch shrubby cinquefoil bilberry willow tufted clubrush graceful mountain sedge alpine meadowrue glow moss leafy liverwort
<b>Plots</b>	9902678, 9902636, 964104

**Comments:** Other species of sedges that may be present with low cover include hairlike sedge, Lapland sedge and Sitka sedge. Low cover (<1%) of alpine bearberry and scouring rushes is common. MoF plots 9628591 and 9628590 were located in SWB wetlands outside the project area but were not used for this description.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmk	SG	00	Sw – Labrador tea – Glow moss
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> ac, c, g, k, p  Typic SG occurs on gentle slopes on deep, medium-textured soils. SG also occurs on active fluvial sites with coarse-textured soils (ac); coarse-textured soils (c); gullies (g); cool aspects (k); and peaty soils (p).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1065 - 1210	1131
<b>Slope (%)</b>	5 - 32	12
<b>Aspect (degrees)</b>	20 – 357	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
(subhygric) hygric - subhydric	poor – medium (rich)	
<b>Drainage</b>	imperfect - poor	
<b>Surficial Material</b>		
sandy, mixed fragments, silty morainal blankets; mixed fragments, sandy morainal blankets; sandy, mixed fragments morainal blankets; mixed fragments, muddy, sandy morainal deposits; mixed fragments, sandy, silty morainal deposits; mesic organic veneer over sandy, silty, mixed fragments morainal deposits; organic veneer over gravelly, sandy glaciofluvial terrace; organic veneer over sandy, gravelly fluvial plain		
<b>Soil Development</b>		
Rego Gleysol, Orthic Gleysol		
<b>Humus Form</b>	Hemimor, Mormoder, Fibrimor	
<b>Humus Depth (cm)</b>	6 – 40, >40	
<b>Coarse Fragments (%)</b>	20 – 70	
<b>Soil Texture</b>	sandy - silty	

**Photo:** B10-2, G80

**MAP**

**Symbol/Site Series**  
**SG 00**

**Name**  
**SG – Labrador tea – Glow moss**

Map Symbol	SG3	SG4	SG5	SG6	SG7
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest
<b>Dominants</b>	scrub birch Labrador tea willows crowberry glow moss golden fuzzy fen moss	white spruce scrub birch Labrador tea willows crowberry glow moss golden fuzzy fen moss sphagnum mosses	white spruce scrub birch Labrador tea willows (Barclay's, tea-leaved, short-fruited) crowberry bog blueberry glow moss golden fuzzy fen moss sphagnum mosses	white spruce scrub birch Labrador tea Barclay's willow tea-leaved willow crowberry bog blueberry glow moss golden fuzzy fen moss sphagnum mosses	white spruce tea-leaved willow Barclay's willow glow moss golden fuzzy fen moss water sedge step moss
<b>Associates</b>	white spruce lodgepole pine horsetails lingonberry net-veined willow sphagnum mosses red-stemmed feathermoss step moss	subalpine fir lodgepole pine horsetails lingonberry sedges net-veined willow red-stemmed feathermoss step moss pelt moss	subalpine fir lodgepole pine horsetails alpine bearberry lingonberry sedges net-veined willow red-stemmed feathermoss step moss leafy liverworts pelt lichens	subalpine fir lodgepole pine short-fruited willow alpine bearberry horsetails (common, wood, meadow) lingonberry sedges (water, soft-leaved) net-veined willow red-stemmed feathermoss step moss leafy liverworts pelt lichens	subalpine fir scrub birch Labrador tea short-fruited willow crowberry bog blueberry horsetail (common) Sitka burnet net-veined willow red-stemmed feathermoss sphagnum mosses spring moss pelt lichens
<b>Plots</b>				9902626, 9902673, 9902686, 9903362, G80	G1023, G1028

**Comments:** These units typically have a open canopy and shrubby understorey; trees are often short and scrubby (<10m). Stands with trees less than 10m in height have been treated as mature. Labrador tea, scrub birch and crowberry were not dominant in the two ground inspections in the stage 7 forest.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmk	WG	00	Willow – Groundsel
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> a, ac, c, cn, ct, g, k, p  Typic WG occurs on gentle slopes on deep, medium-textured soils on moisture receiving sites. It also occurs on active fluvial sites (a); active fluvial sites with coarse-textured soils (ac); coarse-textured soils (c); coarse-textured soils on fans (cn); coarse-textured soils on terraces (ct); gullies (g); cool aspects (k); and peaty veneers (p).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	1085 - 1305	1214
<b>Slope (%)</b>	20	
<b>Aspect (degrees)</b>	42 – 331, none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric – hygric	medium – rich	
<b>Drainage</b>	imperfect – poor	
<b>Surficial Material</b>		
mixed fragments, muddy, sandy morainal blanket and mantle of variable thickness; mixed fragments, sandy, silty morainal blanket; sandy, silty glaciofluvial blanket; silty fluvial veneer over fluvial plain; sandy, gravelly fluvial plain; fibric organic veneer over mixed fragments, sandy, muddy morainal blanket; mesic organic veneer over mixed fragments, silty morainal blanket; humic organic veneer silty, sandy glaciofluvial plain		
<b>Soil Development</b>		
Orthic Humic Gleysol		
<b>Humus Form</b>	Fibrimor, Moders, Mulls	
<b>Humus Depth (cm)</b>	0 to > 40	
<b>Coarse Fragments (%)</b>	0 – 70	
<b>Soil Texture</b>	fibric, mesic, humic; sandy - silty	

**Photo:** C10-18, G1101

**MAP**

**Symbol/Site Series**

**WG 00**

**Name**

**Willow – Groundsel**

Map Symbol	WG3a	WG3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	tea-leaved willow Barratt's willow net-veined willow glow moss golden fuzzy fen moss	tea-leaved willow short-fruited willow Barratt's willow sphagnum mosses glow moss
<b>Associates</b>	scrub birch Barclay's willow Sitka burnet alpine meadowrue arrow-leaved groundsel mountain sagewort sweet coltsfoot Altai fescue sedges sphagnum mosses sickle moss juniper haircap moss dicranum moss	scrub birch Barclay's willow subalpine fir bluejoint arrow-leaved groundsel Sitka burnet common horsetail crowberry net-veined willow alpine bearberry sedges (hairlike, Scandinavian) twinflower Labrador tea golden fuzzy fen moss <i>Brachythecium</i> sp. pelt lichens large leafy moss fire moss sickle moss
<b>Plots</b>	0002401, 9903387, G1067, G1101, G1172	G33, G1021, G1083, G1162

**Comments:** The average cover of the shrub, herb and moss layers all fall between 58 – 60 %. These units have moderately well developed to very well developed and diverse herb layers.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmk	WM	00	Willow – Mountain sagewort
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> ac, c, ck, g, gk, gw, k, ks, s, sw, w  Typic WM occurs on gentle slopes on deep, medium-textured soils on nutrient rich sites. It also occurs on active fluvial sites with coarse-textured soils (ac); coarse-textured soils (c); coarse-textured soils on cool aspects (ck); gullies (g); gullies on cool aspects (gk); gullies on warm aspects (gw); cool aspects (k); cool aspects on shallow soils (ks); shallow soils (s); shallow soils on warm aspects (sw); and warm aspects (w).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	1275	
<b>Slope (%)</b>	20	
<b>Aspect (degrees)</b>	146	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
mesic - subhygric	medium – rich	
<b>Drainage</b>	well	
<b>Surficial Material</b>		
mixed fragments, muddy, sandy morainal mantle of variable thickness		
<b>Soil Development</b>		
<b>Humus Form</b>	(Moder)	
<b>Humus Depth (cm)</b>	0 - 10	
<b>Coarse Fragments (%)</b>	(20 – 70)	
<b>Soil Texture</b>	loamy	

**Photo:** see WM in SWMmks

**MAP**

**Symbol/Site Series**

**WM 00**

**Name**

**Willow – Mountain sagewort**

<b>Map Symbol</b>	WM3a	WM3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	scrub birch short-fruited willow Altai fescue dwarf blueberry	scrub birch short-fruited willow Altai fescue dwarf blueberry
<b>Associates</b>	mountain sagewort mountain arnica tall bluebells fireweed mountain monkshood (tea-leaved willow) (Barratt's willow) (bluejoint) (arrow-leaved groundsel) (Sitka burnet) (Sitka valerian) haircap moss red-stemmed feathermoss	mountain sagewort mountain arnica tall bluebells fireweed mountain monkshood (bluejoint) (arrow-leaved groundsel) (Sitka burnet) (Sitka valerian) haircap moss red-stemmed feathermoss
<b>Plots</b>	G27	

**Comments:** Data and species shown in brackets are extrapolated from the WM unit in the SWBmks subzone (see comments for the SWBmks/WM unit for a further description).

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmk	WS	00	Willow – Sedge wetland
<p><b>Assumed modifiers for the typical situation:</b> d, j, p  <b>Mapped modifiers:</b> a, n            WS is a shrub wetland that typically occurs on level sites (depressions) on deep soils. It also occurs on active fluvial sites (a) and fans (n).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1050 - 1190	1118
<b>Slope (%)</b>	0 - 3	1
<b>Aspect (degrees)</b>	none; 310	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
hygric - subhydryc		
<b>Drainage</b>	imperfect – very poor	
<b>Surficial Material</b>		
organic veneer over silty lacustrine plain; mesic organic veneer over mixed fragments, silty morainal blanket; fibric organic veneer over silty lacustrine plain;		
<b>Soil Development</b>		
Orthic Gleysol, Organic		
<b>Humus Form</b>	Fibrimor	
<b>Humus Depth (cm)</b>	0 – 60	
<b>Coarse Fragments (%)</b>	20 – 35 in underlying mineral	
<b>Soil Texture</b>	fibric, mesic/ silty	

**Photo:** C2-6, plot 9902672

**MAP**

**Symbol/Site Series**

**WS 00**

**Name**

**Willow – Sedge wetland**

<b>Map Symbol</b>	WS3a	WS3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	tea-leaved willow bilberry willow Barclay's willow water sedge golden fuzzy fen moss glow moss <i>Brachythecium</i> sp.	tea-leaved willow arctic willow water sedge large leafy moss
<b>Associates</b>	net-veined willow Barratt's willow sedges Sitka burnet arrow-leaved groundsel dwarf scouring rush yarrow brown moss ( <i>Drepanocladus</i> sp.) leafy moss	white spruce willows marsh cinquefoil bluejoint glow moss sickle moss
<b>Plots</b>	G35, G99	9902672

**Comments:**

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmk	WV	00	Willow – Valerian
<p>Assumed modifiers for the typical situation: d, j            Mapped modifiers: c, n, p, w            Typic WV occurs on gentle slopes on moisture receiving sites on deep soils. It is also found on coarse-textured soils (c); fans (n); peaty soils (p); and warm aspects (w). This unit may be found upslope of willow – sedge wetlands in areas of cold air ponding.</p>			

**SITE DESCRIPTION**

	Range	Mean
Elevation (m)	1115 - 1225	1170
Slope (%)	3 - 7	5
Aspect (degrees)	110 – 187	
Moisture Regime	Nutrient Regime	
hygric	rich	
Drainage	imperfect – poor	
<b>Surficial Material</b>		
mesic organic veneer over mixed fragments, silty morainal blanket; mixed fragments, sandy, muddy glaciolacustrine veneer over mixed fragments, silty, sandy morainal deposits		
<b>Soil Development</b>		
Orthic Gleysol		
<b>Humus Form</b>		
Humus Depth (cm)	0 – 40	
Coarse Fragments (%)	5 – 35	
Soil Texture	silty – clay loam	

Photo: B8-17, plot 9903382

**MAP****Symbol/Site Series****WV 00****Name****Willow – Valerian**

<b>Map Symbol</b>	WV2a
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	net-veined willow water sedge Sitka burnet arrow-leaved groundsel golden fuzzy fen moss
<b>Associates</b>	Sitka sedge alpine meadowrue white mountain marsh-marigold subalpine daisy rayless alpine butterweed Altai fescue Barclay's willow glow moss sickle moss
<b>Plots</b>	9903382

**Comments:** The herb layer in this plot is very diverse, however many species have <1% cover. Total herb and moss layer cover is 90 and 70%, respectively. This unit is similar to the herb dominated WV unit found in the SWBmks subzone.

**4.9 SWBmks – MOIST COOL SCRUB SPRUCE – WILLOW – BIRCH**

<b>BIOGEOCLIMATIC UNIT</b>	<b>MAP</b>		
	Symbol	Site Series	Name
<b>SWBmks</b>	<b>BC</b>	<b>00</b>	<b>Scrub birch – Narrow-leaved cottongrass</b>
<p><b>Assumed site modifiers for the typical situation:</b> d, j, p  <b>Mapped modifiers:</b> none                  This unit typically occurs on level to gently sloping sites on organic soils. It is very uncommon.</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	1415	
<b>Slope (%)</b>	1	
<b>Aspect (degrees)</b>	-	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
hygric	poor	
<b>Drainage</b>		
<b>Surficial Material</b>		
organic blanket		
<b>Soil Development</b>		
Mesic Organic Cryosol		
<b>Humus Form</b>		
<b>Humus Depth (cm)</b>		
<b>Coarse Fragments (%)</b>	-	
<b>Soil Texture</b>	fibric – mesic	

**Photo:** B11-4, plot 9903388

**MAP**

Symbol/Site Series

Name

BC 00

Scrub birch – Narrow-leaved cottongrass

<b>Map Symbol</b>	BC3a
<b>Plant Species</b>	Low Shrub Climax
<b>Dominants</b>	scrub birch narrow-leaved cottongrass
<b>Associates</b>	tea-leaved willow Labrador tea crowberry cloudberry lingonberry sweet coltsfoot sedges sphagnum moss <i>Aulacomnium turgidum</i> common haircap moss cladonia lichens
<b>Plots</b>	9903388

<b>Comments:</b>
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BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmks	BL	00	Scrub birch – Lichen
<p><b>Assumed modifiers for the typical situation:</b> c, j, s  <b>Mapped modifiers:</b> d, dk, dw, g, h, hv, k, kv, r, t, v, vw, w (d, dk, dw, t are described in separate tables that follow this description)  Typic BL occurs on gentle slopes (crests or upper slopes) on shallow, coarse-textured soils. BL also occurs on deep soils (d); deep soils on cool (dk) and warm (dw) aspects; gullies (g); hummocks (h); hummocks on very shallow soils (hv); cool aspects (k); cool aspects on very shallow soils (kv); ridges (r); terraces (t); very shallow soils (v); very shallow soils on warm aspects (vw); and warm aspects (w). A description of BL on deep soils (d, dk, dw) is given separate table that follow this description.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1320 - 1560	1462
<b>Slope (%)</b>	10 - 45	24
<b>Aspect (degrees)</b>	70 - 354	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
xeric – subxeric (submesic)	poor	
<b>Drainage</b>	rapid – well	
<b>Surficial Material</b>		
sandy, angular colluvial veneer; angular colluvial veneer; sandy, mixed fragments colluvial veneer and very thin veneer; sandy, silty, mixed fragments colluvial veneer; rubbly colluvial veneer; silty, sandy, mixed fragments morainal veneer and mantle of variable thickness; silty, sandy, rubbly morainal veneer and mantle of variable thickness; sandy, silty, mixed fragments morainal veneer and mantle of variable thickness; veneers and very thin veneers of angular weathered bedrock; veneers and very thin very veneers of blocky, sandy mixed fragment weathered bedrock; veneers and very thin veneers of pebbly, sandy weathered bedrock		
<b>Soil Development</b>		
Orthic Dystric Brunisol		
<b>Humus Form</b>	Mor, Moder	
<b>Humus Depth (cm)</b>	1- 10	
<b>Coarse Fragments (%)</b>	35 – 80	
<b>Soil Texture</b>	sandy - loamy (silty)	

**Photo:** C11-13, G1122

**MAP****Symbol/Site Series****Name****BL 00****Scrub birch – Lichen**

<b>Map Symbol</b>	BL3a
<b>Plant Species</b>	Low Shrub Climax
<b>Dominants</b>	scrub birch lingonberry ragged paperdoll reindeer lichen (lesser green, star-tipped, grey)
<b>Associates</b>	tea-leaved willow Altai fescue crowberry bog blueberry mountain sagewort foam lichens (eyed, cottontail) cladonia lichens green witch's hair awned haircap moss
<b>Plots</b>	9902669, 9903355, G4, G5, G8, G88, G1020, G1088, G1115, G1122, G1124, G1135, G1137, G1158

**Comments:** The cover of scrub birch is variable (10 – 75%, average 42%); foam lichens are common and are often dominant. The moss layer cover is generally moderately well developed (average cover of 58%) and is largely composed of lichens. Willows and subalpine fir (shrubs) are also occasionally present.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmks	BLd	00	Scrub birch – Lichen
<p><b>Assumed site modifiers for the typical situation:</b> none  <b>Mapped modifiers:</b> none  This unit has been lumped with BL for mapping purposes. It is found on deep soils and is mapped as BLd3a, BLdk3a, BLdw3a, and BLt3a. It typically occurs on gentle slopes on deep, coarse-textured soils.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1320 - 1500	1413
<b>Slope (%)</b>	8 – 20	14
<b>Aspect (degrees)</b>	3 – 273	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subxeric – submesic	poor (occasionally medium)	
<b>Drainage</b>	rapid – well	
<b>Surficial Material</b>		
silty, mixed fragments, sandy morainal blanket and mantle of variable thickness; silty, sandy, mixed fragment morainal deposits (blankets, gentle slopes); mixed fragments, sandy morainal blankets; mixed fragments, sandy undulating glaciofluvial deposits; gravelly, sandy fluvial material over morainal blanket; mixed fragments, silty, sandy colluvial deposits over gravelly, sandy glaciofluvial terrace and undulating deposits		
<b>Soil Development</b>		
Orthic Dystric Brunisol		
<b>Humus Form</b>	Mormoder, Mor, Moder	
<b>Humus Depth (cm)</b>	1- 10	
<b>Coarse Fragments (%)</b>	20 – 70, >70	
<b>Soil Texture</b>	sandy - loamy (silty)	

**Photo:** C1-11, G19

**MAP****Symbol/Site Series****BLd 00****Name****Scrub birch – Lichen**

<b>Map Symbol</b>	BLd3a, BLdk3a, BLdw3a, BLt3a
<b>Plant Species</b>	Low Shrub Climax
<b>Dominants</b>	scrub birch reindeer lichen (lesser green, star-tipped, grey) foam lichens
<b>Associates</b>	tea-leaved willow Altai fescue crowberry creeping willow lingonberry cladonia lichens icelandmoss lichen juniper haircap moss red-stemmed feathermoss dicranum mosses
<b>Plots</b>	9902667, G9, G19, G22, G30, G85, G1112, G1113

**Comments:** These units have a moderately well developed (average 60% cover) but species poor shrub layer; the herb layer is generally poorly developed. The moss layer cover is moderately well developed (average cover of 66%) and is largely composed of lichens. Reindeer lichens are most dominant (average cover about 38 %). Mosses usually account for a minor proportion of the total D layer cover.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmks	FL	00	Altai fescue – Lichen
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> c, ch, cs, ct, cw, h, hs, k, kn, ks, r, rs, s, sw, v, w  Typic FL occurs on level to gentle slopes on deep, medium-textured soils. It is also found on coarse-textured soils (c); coarse-textured soils on hummocks (ch); shallow, coarse-textured soils (cs); coarse-textured soils on terraces (ct); coarse-textured soils on warm aspects (cw); hummocks (h); hummocks on shallow soils (hs); cool aspects (k); cool aspect fans or cones (kn); cool aspects on shallow soils (ks); ridges (r); ridges on shallow soils (rs); shallow soils (s); shallow soils on warm aspects (sw); very shallow soils (v); and warm aspects (w)</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1320 – 1515	1420
<b>Slope (%)</b>	0 – 12	4
<b>Aspect (degrees)</b>	5 – 256, none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic – mesic	poor – medium	
<b>Drainage</b>	well – moderately well	
<b>Surficial Material</b>		
sandy, silty, mixed fragments morainal blanket; sandy, mixed fragments, silty morainal blankets; mixed fragments, silty, sandy morainal deposits; silty, mixed fragments, sandy morainal fragments; mixed fragments, silty, sandy morainal veneer and blanket; sandy, gravelly glaciofluvial veneers over silty, mixed fragments, sandy morainal deposits; sandy, gravelly glaciofluvial veneer over sandy, silty, mixed fragments morainal deposits; silty, sandy, gravelly glaciofluvial deposits		
<b>Soil Development</b>		
Orthic Melanic Brunisol, Orthic Dystric Brunisol, Brunisols		
<b>Humus Form</b>	Mormoder, Mors	
<b>Humus Depth (cm)</b>	0 – 10	
<b>Coarse Fragments (%)</b>	15 – 70, >70	
<b>Soil Texture</b>	sandy loam – silty	

**Photo:** C10-19, plot 9903360

**MAP****Symbol/Site Series****Name****FL 00****Altai fescue - Lichen**

<b>Map Symbol</b>	FL2b
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	Altai fescue reindeer lichen
<b>Associates</b>	scrub birch tea-leaved willow dwarf blueberry mountain sagewort sibbaldia sedges (inland, graceful mountain) alpine clubmoss foam lichens ragged paperdoll juniper haircap moss cladonia lichens
<b>Plots</b>	9903356, 9903359, 9903360, 9903386, G100, G1098, G1100, G1165

**Comments:** The cover of shrubs (scrub birch, willows) is generally less than 5%. The cover of Altai fescue and reindeer lichens average about 30% and 40%, respectively. A low cover (<1%) of alpine sweetgrass, glaucous gentian, and crowberry is common.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmks	FP	00	BI – Scrub birch - Crowberry –Partridgefoot
<p><b>Assumed site modifiers for the typical situation:</b> c, d, j  <b>Mapped modifiers:</b> h, k, kn, ks, kv, r, s, sw, w  Typic FP occurs on gentle slopes on deep, coarse-textured soils. FP also occurs on gullies (g); hummocks (h); cool aspects (k); cool aspects on shallow (ks) and very shallow (kv) soils; fans (n); ridges (r); shallow soils (s); shallow soils on warm aspects (sw); very shallow soils on warm aspects (vw); warm aspects (w); and very steep warm aspects (z);</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	1360 – 1555	1439
<b>Slope (%)</b>	4 – 35	17
<b>Aspect (degrees)</b>	4 – 280	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic - subhygric	poor – medium	
<b>Drainage</b>	well – imperfect	
<b>Surficial Material</b>		
silty, sandy, mixed fragments morainal deposits; morainal mantle of variable thickness over undulating rock; silty, mixed fragments, sandy morainal blanket; sandy, gravelly glaciofluvial veneer over mixed fragments morainal mantle of variable thickness and blanket		
<b>Soil Development</b>		
Orthic Sombric Brunisol, Gleyed Eutric Brunisol		
<b>Humus Form</b>	Moder, Mor, none	
<b>Humus Depth (cm)</b>	0 – 10	
<b>Coarse Fragments (%)</b>	20 - 75	
<b>Soil Texture</b>	sandy - loamy	

**Photo:** C3-12, G1025

**MAP**

**Symbol/Site Series**  
**FP 00**

**Name**  
**BI – Scrub birch -Crowberry - Partridgefoot**

Map Symbol	FP3	FP4	FP5	FP6	FP7	FP3a or FP3b
<b>Plant Species</b>	Shrub	Pole Sapling	Young Forest	Mature Forest	Old Forest	Low Shrub Climax or Tall Shrub Climax
<b>Dominants</b>	subalpine fir scrub birch Altai fescue	subalpine fir scrub birch	subalpine fir common leafy liverwort	subalpine fir common leafy liverwort	subalpine fir common leafy liverwort	subalpine fir common leafy liverwort
<b>Associates</b>	crowberry partridge-foot arctic willow four-angled mountain-heather Alaskan mountain-heather pink mountain-heather white mountain-heather false-polytrichum dicranum mosses common leafy liverwort	crowberry Altai fescue partridge-foot arctic willow four-angled mountain-heather Alaskan mountain-heather pink mountain-heather white mountain-heather partridge-foot Altai fescue western fescue arctic willow dicranum mosses common leafy liverwort	scrub birch crowberry four-angled mountain-heather Alaskan mountain-heather pink mountain-heather white mountain-heather partridge-foot Altai fescue western fescue arctic willow alpine clubmoss dicranum mosses sickle moss false-polytrichum grey rock moss cladonia lichens red-stemmed feathermoss step moss reindeer lichens sickle moss	scrub birch crowberry four-angled mountain-heather Alaskan mountain-heather pink mountain-heather white mountain-heather partridge-foot Altai fescue western fescue arctic willow alpine clubmoss woolly lousewort dicranum mosses sickle moss false-polytrichum grey rock moss cladonia lichens red-stemmed feathermoss step moss reindeer lichens sickle moss	scrub birch crowberry four-angled mountain-heather Alaskan mountain-heather pink mountain-heather white mountain-heather partridge-foot Altai fescue western fescue arctic willow alpine clubmoss woolly lousewort dicranum mosses sickle moss false-polytrichum grey rock moss cladonia lichens red-stemmed feathermoss step moss reindeer lichens sickle moss	scrub birch crowberry four-angled mountain-heather Alaskan mountain-heather pink mountain-heather white mountain-heather partridge-foot Altai fescue western fescue arctic willow alpine clubmoss woolly lousewort dicranum mosses sickle moss false-polytrichum grey rock moss cladonia lichens red-stemmed feathermoss step moss reindeer lichens sickle moss
<b>Plots</b>						9903353, 964074, G29, G1025, G1132

**Comments:** Trees in this unit often grow in clumps and are short and scrubby (<10m in height). All of the inspections were located in tall shrub climax (structural stage 3b).

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmks	JK	00	Juniper – Kinnikinnick
<p><b>Assumed site modifiers for the typical situation:</b> s, w  <b>Mapped modifiers:</b> d, hv, k, kv, q, rv, v, z  Typic JK occurs on significant slopes (&gt;25%) on warm aspects on shallow soils. It is also found on deep soils (d); hummocks on very shallow soils (hv); cool aspects (k); cool aspects with very shallow soils (kv); very steep cool aspects (q); ridges on very shallow soils (rv); very shallow soils (v); and very steep warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1375 - 1395	1385
<b>Slope (%)</b>	40 – 70	53
<b>Aspect (degrees)</b>	126 – 260	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
xeric - submesic	poor	
<b>Drainage</b>	rapid – well	
<b>Surficial Material</b>		
colluvial blankets and veneers sandy, angular colluvial veneer and very thin veneer silty, sandy, rubbly colluvial veneer		
<b>Soil Development</b>		
Orthic Eutric Brunisol, Orthic Dystric Brunisol		
<b>Humus Form</b>	none, Mormoder, Moder	
<b>Humus Depth (cm)</b>	0 – 10	
<b>Coarse Fragments (%)</b>	16 – 70	
<b>Soil Texture</b>	sandy – loamy	

**Photo:** B3-22, plot 9902627

**MAP**

Symbol/Site Series

Name

JK 00

Juniper – Kinnikinnick

Map Symbol	JK3a	JK3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	common juniper kinnikinnick	subalpine fir common juniper kinnikinnick
<b>Associates</b>	subalpine fir scrub birch short-fruited willow bog blueberry Altai fescue crowberry fireweed arctic lupine entire-leaved mountain-avens white mountain-heather lingonberry	scrub birch short-fruited willow bog blueberry Altai fescue crowberry fireweed arctic lupine entire-leaved mountain-avens white mountain-heather lingonberry
<b>Plots</b>	964075, 9902627, G75	

**Comments:** Short-fruited willow and scrub birch were only present in one of the three plots so they were placed in the associate category even though these species were dominant in the plot. A low cover of species such as mountain sagewort, northern goldenrod, moss campion, small-flowered penstemon, showy Jacob's-ladder, stonecrops and mountain death-camas is typical for this unit.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmks	NC	00	Netted willow – Cetraria
<p><b>Assumed site modifiers for the typical situation:</b> c, d, j, r  <b>Mapped modifiers:</b> k, s  Typic NC occurs on gentle slopes (crests) on deep, coarse-textured soils. NC also occurs on cool aspects (k) and shallow soils (s). The description is taken from the JMJ, 1997 mapping.</p>			

**SITE DESCRIPTION**

	Range	Mean
Elevation (m)		
Slope (%)		
Aspect (degrees)		
Moisture Regime	Nutrient Regime	
subxeric – mesic	poor – medium	
Drainage		
Surficial Material		
Soil Development		
Humus Form		
Humus Depth (cm)		
Coarse Fragments (%)		
Soil Texture		

**Photo:** no photograph

**MAP****Symbol/Site Series**  
NC 00**Name**  
Netted willow - Cetraria

<b>Map Symbol</b>	NC2
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	<i>Cetraria</i> spp. common corral lichen (foam lichen)
<b>Associates</b>	netted willow bog blueberry lingonberry velcro lichen

<b>Comments:</b>
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BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmks	NW	00	Netted willow – Altai fescue – Mountain sagewort
<p><b>Assumed site modifiers for the typical situation:</b> c, d, j  <b>Mapped modifiers:</b> h, k, ks, kv, r, s, sw, v, vw, w  Typic NW occurs on gentle slopes on deep soils subject to periglacial process (most frequently solifluction but also cryoturbation and nivation). It also occurs on hummocks (h); cool aspects (k); cool aspect with shallow soils (ks); cool aspect on very shallow soils (kv); ridges (r); shallow soils (s); shallow soils on warm aspects (sw), very shallow soils (v); very shallow soils on warm aspects (vw); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1410 - 1590	1500
<b>Slope (%)</b>	10 - 35	23
<b>Aspect (degrees)</b>	46 – 294	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
(submesic) mesic (subhygric)	poor – rich	
<b>Drainage</b>	well – moderately well	
<b>Surficial Material</b>		
silty, sandy, mixed fragments morainal veneers and blankets; silty, mixed fragments, sandy morainal blankets and veneers; sandy, silty, mixed fragments morainal veneers and blankets; sandy, silty, rubbly colluvial blankets; silty, mixed fragments morainal blankets and veneers; sandy, silty, rubbly colluvial blankets and veneers; sandy, mixed fragments, silty colluvial blankets and veneers		
<b>Soil Development</b>		
Orthic Sombric Brunisol, Orthic Melanic Brunisol		
<b>Humus Form</b>	Rhizomull, Moders, Mulls, Mors	
<b>Humus Depth (cm)</b>	<40	
<b>Coarse Fragments (%)</b>	15 – 70, >70	
<b>Soil Texture</b>	loamy - silty	

Photo: B7-21, plot 9903378

**MAP**

**Symbol/Site Series**

NW 00

**Name**

Netted willow – Altai fescue – Mountain sagewort

<b>Map Symbol</b>	NW2b	NW2d
<b>Plant Species</b>	Herb Climax	Herb Climax
<b>Dominants</b>	Altai fescue mountain sagewort juniper haircap moss	Altai fescue
<b>Associates</b>	net-veined willow arctic willow creeping willow crowberry yellow mountain-heather arrow-leaved groundsel Sitka valerian Sitka burnet sedges (graceful mountain sedge) partridge-foot small-flowered woodrush dicranum moss step moss red-stemmed feathermoss leafy liverworts foam lichens reindeer lichens glow moss	mountain sagewort net-veined willow arctic willow creeping willow crowberry four-angled mountain-heather pink mountain-heather white mountain-heather Alaskan mountain-heather entire-leaved mountain-avens scrub birch subalpine fir alpine clubmoss sedges (graceful mountain sedge) dicranum moss juniper haircap moss eyed foam (partridge-foot, small-flowered woodrush)
<b>Plots</b>	9903393, G101	9903378, G81, G1022, G1149, G1151, G1164, G1167

**Comments:** Diversity is generally high in this unit, however species composition is quite variable. Cover of any one species in the inspections is rarely above 20%. One of the dwarf willows is often a dominant in the NW2d unit

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmks	SA	00	Scrub birch – Altai fescue
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> c, k, ks, n, s, sw, w  Typic SA occurs on gentle slopes on deep, medium-textured soils. SA also occurs on coarse-textured soils (c); cool aspects (k); cool aspects on shallow soils (ks); fans (n); shallow soils (s); soil shallow on warm aspects (sw); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1320 - 1615	1436
<b>Slope (%)</b>	1 - 55	18
<b>Aspect (degrees)</b>	8 - 280	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic – mesic	poor – medium	
<b>Drainage</b>	rapid - imperfect	
<b>Surficial Material</b>		
silty, sandy, morainal blanket; mixed fragments, sandy, silty morainal blanket; silty, mixed fragments, sandy morainal deposits; mixed fragments, silty, sandy morainal blankets; muddy, sandy, rubbly morainal veneer; mixed fragments, sandy morainal blanket; silty, sandy, angular colluvial veneer; sandy, angular, silty colluvial veneer; sandy, silty, angular colluvial veneer and blanket		
<b>Soil Development</b>		
Orthic Dystric Brunisol, Orthic Regosol, Dystric Brunisol		
<b>Humus Form</b>	Mormoder, Moder, Mor	
<b>Humus Depth (cm)</b>	0 – 10	
<b>Coarse Fragments (%)</b>	20 - 70	
<b>Soil Texture</b>	sandy - silty	

**Photo:** B10-15, G84

**MAP**

**Symbol/Site Series**  
SA 00

**Name**  
Scrub birch – Altai fescue

Map Symbol	SA3a	SA3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	scrub birch crowberry	scrub birch crowberry
<b>Associates</b>	tea-leaved willow short-fruited willow dwarf blueberry Altai fescue red-stemmed feathermoss cladonia lichens reindeer lichens (star-tipped, grey, lesser green) juniper haircap moss eyed foam	tea-leaved willow short-fruited willow dwarf blueberry Altai fescue red-stemmed feathermoss cladonia lichens reindeer lichens (star-tipped, grey, lesser green) juniper haircap moss eyed foam
<b>Plots</b>	9902624, 9902675, 9903354, 9903373, G74, G84, G1109, G1111, G1116, G1121, G1130, G1136	based on 3a plots

**Comments:** The low shrub layer (scrub birch) is typically 1 to 1.5m in height; canopy height decreases with an increase in elevation. The cover of scrub birch ranges from about 10 to 99% (average of 60%). Crowberry is listed as a dominant, however the % cover was extremely variable (i.e. crowberry was absent in 4 of the inspections). The % cover of lichens, especially reindeer lichens, is also variable. A low cover (<1%) of mountain sagewort is also typical.

<b>BIOGEOCLIMATIC UNIT</b>	<b>MAP</b>		
	Symbol	Site Series	Name
<b>SWBmks</b>	<b>SF</b>	<b>00</b>	<b>Sedge fen</b>
<p><b>Assumed site modifiers for the typical situation:</b> d, j, p  <b>Mapped modifiers:</b> none  Typic SF occurs on level sites or depressions on organic soils.</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	1545	
<b>Slope (%)</b>	0	
<b>Aspect (degrees)</b>	none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhydric	medium – (rich)	
<b>Drainage</b>	poor	
<b>Surficial Material</b>		
fibric organic veneer over clayey, sandy, silty lacustrine plain		
<b>Soil Development</b>		
<b>Humus Form</b>	-	
<b>Humus Depth (cm)</b>	>40	
<b>Coarse Fragments (%)</b>	0	
<b>Soil Texture</b>	fibric/silty	

**Photo:** B10-14, G83

**MAP**Symbol/Site Series  
SF 00Name  
Sedge fen

<b>Map Symbol</b>	SF2b
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	sedges (water sedge)
<b>Associates</b>	narrow-leaved cottongrass willows water moss ( <i>Calliergon sarmentosum</i> ) brown mosses ( <i>Drepanocladus revolvens</i> , <i>Drep. sp.</i> ) <i>Paludella squarrosa</i> sphagnum mosses
	G83

<b>Comments:</b>
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BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmks	WG	00	Willow – Groundsel
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> a, ac, c, g, p  Typic WG occurs on level to gently sloping, moisture receiving (seepage) sites on deep, medium-textured soils. WG also occurs on active fluvial sites (a); active fluvial sites on coarse-textured soils (ac); coarse-textured soils (c); gullies (g); and peaty veneers (p).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1325 - 1500	1415
<b>Slope (%)</b>	2 – 20	12
<b>Aspect (degrees)</b>	134 – 349	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
(subhygric) hygric	medium – rich	
<b>Drainage</b>	moderately well – poor	
<b>Surficial Material</b>		
silty, mixed fragments, sandy morainal blanket and mantle of variable thickness; silty, sandy, mixed fragments morainal blanket; silty, sandy, mixed fragments fluvial veneer; mixed fragments fluvial blanket; silty, sandy, mixed fragments fluvial plain; silty, sandy, rubbly colluvial veneer and blanket; fibric organic mantle of variable thickness and plain		
<b>Soil Development</b>		
Orthic Gleysol, Orthic Melanic Brunisol		
<b>Humus Form</b>	Leptomoder, Fibrimor, Rhizomull, Moders	
<b>Humus Depth (cm)</b>	2 to > 40	
<b>Coarse Fragments (%)</b>	0 – 95	
<b>Soil Texture</b>	fibric, sandy – silt loam	

**Photo:** B9-22, plot 9903384

**MAP**

**Symbol/Site Series**

**WG 00**

**Name**

**Willow – Groundsel**

<b>Map Symbol</b>	WG3a	WG3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	tea-leaved willow net-veined willow bluejoint glow moss	tea-leaved willow Altai fescue mountain sagewort Sitka valerian Sitka burnet glow moss common leafy liverwort sickle moss
<b>Associates</b>	scrub birch Barratt's willow Barclay's willow subalpine fir Sitka burnet Sitka valerian arrow-leaved groundsel mountain sagewort Altai fescue sweet coltsfoot white mountain marsh-marigold small-flowered woodrush bog blueberry graceful mountain sedge unalaska paintbrush single-spike sedge sphagnum mosses golden fuzzy fen moss single moss <i>Pohlia wahlenbergii</i>	net-veined willow small-flowered woodrush graceful mountain sedge little buttercup Indian hellebore nagoonberry bluegrass alpine timothy alpine speedwell red-stemmed feathermoss woollybear lichens leafy mosses
<b>Plots</b>	9903366, 9903384, G1087, G1099, G1129, G1150	9903394

**Comments:**

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmks	WM	00	Willow – Mountain sagewort
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> c, cw, g, gw, k, kn, ks, n, s, sw, w  Typic WM occurs on gentle slopes on deep, medium-textured soils on nutrient rich sites. It occurs on mid to toe of slope positions and occasionally in depressions. It also occurs on coarse-textured soils (c); coarse-textured soils on warm aspects (cw); gullies (g); gullies on warm aspects (gw); cool aspect (k); cool aspect fans or cones (kn); cool aspects on shallow soils (ks); fans (n); shallow soils (s); shallow soils on warm aspects (sw); and warm aspects (w).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	1380 - 1500	1433
<b>Slope (%)</b>	15 - 42	25
<b>Aspect (degrees)</b>	70 – 286	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
mesic – subhygric	rich	
<b>Drainage</b>		
<b>Surficial Material</b>		
mixed fragments, silty, sandy morainal blanket mixed fragments, sandy, muddy morainal blanket and veneer sandy, silty, angular colluvial veneer clayey, silty colluvial veneer mixed fragment, silty, sandy colluvial blanket		
<b>Soil Development</b>		
<b>Humus Form</b>	Moders	
<b>Humus Depth (cm)</b>	0 – 40	
<b>Coarse Fragments (%)</b>	<20 – 70	
<b>Soil Texture</b>	loamy – clayey	

**Photo:** C11-14, G1123

**MAP**

**Symbol/Site Series**

**WM 00**

**Name**

**Willow – Mountain sagewort**

Map Symbol	WM3a	WM3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	scrub birch tea-leaved willow Barratt's willow Altai fescue	scrub birch tea-leaved willow Altai fescue
<b>Associates</b>	fireweed tall bluebells rayless alpine butterweed mountain sagewort kinnikinnick net-veined willow dwarf blueberry northern bedstraw northern goldenrod yarrow mountain monkshood diverse-leaved cinquefoil bluejoint spike trisetum dicranum mosses juniper haircap moss pelt lichens	short-fruited willow Barratt's willow mountain sagewort Sitka burnet small-flowered woodrush bluejoint Sitka valerian arrow-leaved groundsel fireweed nagoonberry unalaska paintbrush mountain monkshood sedges (graceful mountain, inland, shore) common horsetail tall bluebells heart-leaved arnica arctic lupine Indian hellebore net-veined willow common leafy liverwort subalpine fir
<b>Plots</b>	G1114	G1108, G1110, G1117, G1123

**Comments:** These units have a well developed shrub layer (average cover 68%) and a robust, diverse herb layer (range 60-100%, average cover of 85%). Species composition of the herb layer is variable. The moss layer is generally poorly developed (average cover of 6%).

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmks	WS	00	Willow – Sedge wetland
<p><b>Assumed modifiers for the typical situation:</b> d, j, p  <b>Mapped modifiers:</b> none            WS is a shrub wetland that typically occurs on level sites (depressions) on organic soils.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1330	
<b>Slope (%)</b>	3	
<b>Aspect (degrees)</b>	49	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhydric	medium – (medium)	
<b>Drainage</b>	poor – very poor	
<b>Surficial Material</b>		
mesic organic plain over mixed fragments, muddy, sandy morainal blanket		
<b>Soil Development</b>		
Mesisol		
<b>Humus Form</b>	Mesimor	
<b>Humus Depth (cm)</b>	>60	
<b>Coarse Fragments (%)</b>	-	
<b>Soil Texture</b>	mesic/sandy clay loam	

**Photo:** B8-1, plot 9903379

**MAP**

Symbol/Site Series

Name

WS 00

Willow – Sedge wetland

Map Symbol	WS3a	WS3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	tea-leaved willow russet sedge glow moss golden fuzzy fen moss <i>Paludella squarrosa</i>	tea-leaved willow russet sedge glow moss golden fuzzy fen moss
<b>Associates</b>	water sedge single-spike sedge net-veined willow narrow-leaved cotton-grass subalpine daisy crowberry nagoonberry sphagnum mosses <i>Calliargon</i> sp. large leafy moss	willows water sedge single-spike sedge net-veined willow narrow-leaved cotton-grass subalpine daisy nagoonberry sphagnum mosses <i>Calliargon</i> sp. large leafy moss
<b>Plots</b>	9903379	

**Comments:**

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
SWBmks	WV	00	Willow – Valerian
<p><b>Assumed modifiers for the typical situation:</b> d, j  <b>Mapped modifiers:</b> ac, c, k, n, w  Typic WV occurs on gentle slopes on moisture receiving sites on deep soils. WV also occurs on active fluvial sites on coarse-textured soils (ac); coarse-textured soils (c); cool aspects (k); fans (n); and warm aspects (w).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	1360 -1400	1380
<b>Slope (%)</b>	8 -20	14
<b>Aspect (degrees)</b>	7 – 360	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric – hygric	medium - rich	
<b>Drainage</b>	moderately well – imperfect	
<b>Surficial Material</b>		
silty, mixed fragments, sandy morainal blanket silty, sandy, mixed fragments fluvial plain		
<b>Soil Development</b>		
Orthic Dystric Brunisol		
<b>Humus Form</b>		
<b>Humus Depth (cm)</b>	0 – 40	
<b>Coarse Fragments (%)</b>	25 – 70	
<b>Soil Texture</b>	sandy loam – loamy	

**Photo:** no photograph

**MAP**

**Symbol/Site Series**  
**WV 00**

**Name**  
**Netted willow – Groundsel - Valerian**

<b>Map Symbol</b>	WV2a	WV2d
<b>Plant Species</b>	Herb climax	Herb Climax
<b>Dominants</b>	Sitka valerian Indian hellebore arrow-leaved groundsel arctic lupine glow moss spring moss	tea-leaved willow Alaskan mountain-heather glow moss <i>Paludella squarosa</i> sickle moss
<b>Associates</b>	tea-leaved willow Sitka burnet bluejoint sweet coltsfoot fireweed large-awned sedge white mountain marsh-marigold mountain sagewort mountain arnica dwarf blueberry subalpine fir subalpine daisy unalaska paintbrush sphagnum mosses <i>Campylium stellatum</i> golden fuzzy fen moss large leafy moss	scrub birch arrow-leaved groundsel sweet coltsfoot western bog-laurel creeping willow graceful mountain sedge subalpine fir spring moss water moss ( <i>Calliergon sp.</i> ) <i>Brachythecium sp.</i>
<b>Plots</b>	9903363	G1131

**Comments:** These plots differ in species composition, however are grouped together for mapping because of similarity in structure and site position; G1131 is not as diverse as 9903363. The shrub layer of both is poorly developed and low in stature (<1m). Herb and moss layers are moderately well to well developed and diverse (when lumped the average cover is 71 and 85%, respectively).

#### 4.10 AT - ALPINE TUNDRA ZONE, BOUNDARY RANGES ECOSECTION

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
AT	AW	00	Mountain avens - Dwarf willows
<p><b>Assumed site modifiers for the typical situation:</b> c, j, s  <b>Mapped modifiers:</b> h, hv, k, kv, r, v, vw, vz, w                      Typical AW occurs on gentle sloping, upper slope and crest positions on shallow coarse-textured soils. It is found on exposed sites. AW also occurs on hummocks (h); hummocks on very shallow soils (hv); cool aspects (k); cool aspects on very shallow soils (kv); ridges (r); very shallow soils (v); very shallow soils on warm aspects (vw) and very steep warm aspects (vz); and on warm aspects.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1325 - 1460	1404
<b>Slope (%)</b>	7 - 84	39
<b>Aspect (degrees)</b>	30 - 321	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
very xeric – submesic	poor - medium	
<b>Drainage</b>		
<b>Surficial Material</b>		
silty, sandy, angular colluvial very thin veneer; silty, rubbly colluvial veneer; angular, moderately steeply colluvial veneer; silty, sandy, angular weathered bedrock veneer and very thin veneer; silty, angular weathered bedrock very thin veneer; sandy, silty, angular weathered bedrock very thin veneer; silty, angular, sandy morainal mantle of variable thickness and very thin veneer		
<b>Soil Development</b>		
Orthic Dystric Brunisol, Dystric Brunisol, Regosols, Orthic Humic Regosol		
<b>Humus Form</b>	Mors, Moders, Mormoder	
<b>Humus Depth (cm)</b>	1 - 6	
<b>Coarse Fragments (%)</b>	70 - 90	
<b>Soil Texture</b>	sandy – silt loam	

**Photo:** C6-20, plot 9903308

**MAP**

Symbol/Site Series

Name

AW 00

Mountain avens – Dwarf willows

<b>Map Symbol</b>	AW2d
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	bog blueberry entire-leaved mountain-avens
<b>Associates</b>	net-veined willow arctic willow creeping willow crowberry alpine azalea sedges (graceful mountain, two-toned sedge, spikenard) Altai fescue reindeer lichens <i>Cetraria</i> spp. (ragged paper doll, furred paperdoll, icelandmoss) foam lichens whiteworm hoary rock moss green witch's hair
<b>Plots</b>	9903308, 9903329, 9903340, 9903395, 0002420, G42, G55

**Comments:** Entire-leaved mountain avens is present in most inspections, however the cover is often <10%; bog blueberry is present in few inspections but it typically has a cover >10% when present. Reindeer lichens may be dominant (+10%) in the moss layer when present. A low cover (<1%) of alpine species such as moss campion, alpine bistort, cinquefoils, mountain sagewort, pussytoes and saxifrages are commonly present. The average total herb and moss layer covers are 32 and 37%, respectively. Lichens are dominant in the diverse moss layer. Exposed bedrock and coarse fragments are common.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
AT	FW	00	Altai fescue – Dwarf willows
<p><b>Assumed site modifiers for the typical situation:</b> j, m, r, s  <b>Mapped modifiers:</b> k, kv, v, vw, w  Typic FW occurs on gentle to moderate slopes on shallow, medium-textured soils. It occurs on upper slopes, ridges and crests positions. FW also occurs on cool aspects (k); cool aspects on very shallow soils (kv); very shallow soils (v); very shallow soils on warm aspects (vw); and warm aspects (w).  This unit was not sampled in the Boundary Ranges Ecosession.</p>			

**SITE DESCRIPTION**

	Range	Mean
Elevation (m)		
Slope (%)		
Aspect (degrees)		
Moisture Regime	Nutrient Regime	
xeric – submesic		
Drainage		
Surficial Material		
Soil Development		
Humus Form		
Humus Depth (cm)		
Coarse Fragments (%)		
Soil Texture		

**Photo:** no photograph

**MAP****Symbol/Site Series**

FW 00

**Name**

Altai fescue – Dwarf willows

<b>Map Symbol</b>	FW2d
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	net-veined willow Altai fescue northern geranium
<b>Associates</b>	arctic willow creeping willow crowberry arctic lupine alpine azalea sedges (graceful mountain, two-toned sedge, spikenard) mountain-heathers
<b>Plots</b>	

**Comments:** This description is base on the FW unit from the AT zone in the THH Ecosession and the herb meadow in the MHmm2 subzone.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
AT	MD	00	Mountain hemlock krummholz
<p><b>Assumed site modifiers for the typical situation: s</b>  <b>Mapped modifiers: w, z</b>  Typic MD occurs on shallow colluvium over rock or rock. MD also occurs on warm aspects (w) and very steep warm aspects (z).</p>			

**SITE DESCRIPTION**

	Range	Mean
Elevation (m)	+1200	
Slope (%)		
Aspect (degrees)		
Moisture Regime	Nutrient Regime	
subxeric – submesic	poor – medium	
Drainage	well – moderately well	
Surficial Material		
Soil Development		
Humus Form		
Humus Depth (cm)		
Coarse Fragments (%)		
Soil Texture		

**Photo:** no photograph

**MAP**

Symbol/Site Series

Name

MD 00

Mountain hemlock krummholz

Map Symbol	MD3a	MD3b
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	mountain hemlock white mountain-heather common leafy liverwort	mountain hemlock white mountain-heather common leafy liverwort
<b>Associates</b>	subalpine fir bog-blueberry oval-leaved blueberry crowberry Alaskan mountain-heather yellow mountain-heather icelandmoss cladina lichens dicranum mosses red-stemmed feathermoss	subalpine fir bog-blueberry oval-leaved blueberry crowberry Alaskan mountain-heather yellow mountain-heather icelandmoss cladina lichens dicranum mosses red-stemmed feathermoss
<b>Plots</b>		

**Comments:** MD appears as a thick patch of dwarf /prostrate conifers. This description is based on the MK unit from the MHmm2 subzone. MD is found at lower elevations of the zone.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
AT	MM	00	Mountain heather meadow
<p><b>Assumed site modifiers for the typical situation:</b> d, j  <b>Mapped modifiers:</b> hs, hv, k, ks, kv, s, sw, vw, w  Typic MM occurs on gentle slopes on deep soils. In the BOR Ecosection it is frequently found on steep slopes. MM also occurs on hummocks on shallow (hs) and very shallow (hv) soils; cool aspects (k); cool aspects on shallow (ks) and very shallow (kv) soils; shallow soils (s); shallow soils on warm aspects (sw); very shallow soils on warm aspects (vw); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1220 – 1300	1261
<b>Slope (%)</b>	38 – 49	43
<b>Aspect (degrees)</b>	237 – 308	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic – mesic	poor	
<b>Drainage</b>	well – imperfect	
<b>Surficial Material</b>		
sandy, silty, mixed fragments morainal veneer and mantle of variable thickness; mixed fragments, sandy colluvial veneer; silty, sandy, angular colluvium on moderate slopes; silty, sandy, mixed fragments colluvial veneer		
<b>Soil Development</b>		
Orthic Dystric Brunisol, Dystric Brunisol		
<b>Humus Form</b>	Mors, Mormoder	
<b>Humus Depth (cm)</b>	2 – 4	
<b>Coarse Fragments (%)</b>	35 – 75	
<b>Soil Texture</b>	loamy sand – silt loam	

Photo: C8-11, plot 9903331

**MAP**

Symbol/Site Series

Name

MM 00

Mountain heather meadows

<b>Map Symbol</b>	MM2d
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	white mountain-heather Alaskan mountain-heather partridge-foot leafy liverworts (mountain, common) dicranum mosses (pale-stalked broom)
<b>Associates</b>	bog blueberry yellow mountain-heather pink mountain-heather alpine clubmoss hoary rock moss
<b>Plots</b>	9903331, 9903399, G41, G122

**Comments:** Mountain-heathers typically form a dense carpet in the herb layer; average total herb cover for the inspections is 82%. Total average moss cover is 47%.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
AT	WM	00	Wet seepage meadow
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> none  Typic WM occurs on gentle sloping, moisture receiving sites on deep, medium-textured soils. This description is based on WM inspections from the THH Ecosection.</p>			

**SITE DESCRIPTION**

	Range	Mean
Elevation (m)	+1200m	
Slope (%)		
Aspect (degrees)		
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric – hygric	medium - rich	
<b>Drainage</b>	moderately well – poor	
<b>Surficial Material</b>		
<b>Soil Development</b>		
<b>Humus Form</b>		
<b>Humus Depth (cm)</b>		
<b>Coarse Fragments (%)</b>		
<b>Soil Texture</b>		

**Photo:** no photograph

**MAP**

Symbol/Site Series

Name

WM 00

Wet seepage meadow

<b>Map Symbol</b>	WM2b
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	creeping willow glow moss
<b>Associates</b>	net-veined willow arrow-leaved groundsel mountain sagewort Sitka burnet buttercup large-headed sedge graceful mountain sedge large-awned sedge wood saxifrage white mountain marsh-marigold sidewalk moss arctic willow <i>Pohlia wahlenbergii</i>
<b>Plots</b>	

**Comments:** Based on wet meadow units from the THH and TEP Ecoregions; few species are common to all inspections. A different sedge species is present in each inspection.

4.11 AT - ALPINE TUNDRA ZONE, TAHLTAN HIGHLAND ECOSECTION

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
AT	AM	00	Herbaceous meadow
<p><b>Assumed site modifiers for the typical situation:</b> j, s  <b>Mapped modifiers:</b> w                      Typic AM occurs on gentle slopes on shallow soils. AM is found on sites with near-mesic moisture regimes and medium to rich soil nutrient regimes. It also occurs on warm aspects. AM ecosystems are composed of dwarf willows and various forbs.</p>			

SITE DESCRIPTION

	Range	Mean
Elevation (m)	1520 - 1580	1515
Slope (%)	23 - 40	31
Aspect (degrees)	116 – 190	
Moisture Regime	Nutrient Regime	
mesic	(medium) rich	
Drainage	moderately well	
<b>Surficial Material</b>		
silty, rubbly, sandy colluvial veneer and mantle of variable thickness; sandy, silty, angular colluvial veneer and blanket		
<b>Soil Development</b>		
Orthic Dystric Brunisol, Dystric Brunisol		
Humus Form	Mors, Mormoder	
Humus Depth (cm)	2 - 3	
Coarse Fragments (%)	30 - 35	
Soil Texture	sandy loam – silt loam	

Photo: JS4-8, plot 0002419

**MAP****Symbol/Site Series****AM 00****Name****Herbaceous meadow**

<b>Map Symbol</b>	AM2a
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	creeping willow partridge-foot Sitka burnet
<b>Associates</b>	white-mountain marsh-marigold sibbaldia mountain sagewort net-veined willow cut-leaved anemone diverse-leaved cinquefoil arctic bluegrass few-flowered sedge graceful mountain sedge large-awned sedge arctic woodrush small-flowered woodrush mountain arnica sidewalk moss
<b>Plots</b>	0002404, 0002419

**Comments:** A low cover of species such as sweet coltsfoot, arrow-leaved groundsel, mountain forget-me-not, yarrow, Drummond's rush, alpine timothy, spike trisetum, broad-leaved willow-herb is generally present in AM. The herb layer is well-developed (total cover 90 – 99%), while the moss layer is sparse (average cover of 3%).

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
AT	AW	00	Mountain avens - Dwarf willows
<p><b>Assumed site modifiers for the typical situation:</b> c, j, s  <b>Mapped modifiers:</b> h, hv, k, kv, nw, r, v, vw, w  Typic AW occurs on gentle sloping, upper slope and crest positions on shallow coarse-textured soils. It is found on exposed sites. AW also occurs on hummocks (h); hummocks on very shallow soils (hv); cool aspects (k); cool aspects on very shallow slopes (kv); fans or cones on warm aspects (nw); ridges (r); very shallow soils (v); very shallow soils on warm aspects (vw); and warm aspects (w).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	1350 - 1640	1480
<b>Slope (%)</b>	0 - 70	21
<b>Aspect (degrees)</b>	96 – 230, none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subxeric	poor – medium	
<b>Drainage</b>	rapid – well	
<b>Surficial Material</b>		
silty, sandy, angular colluvial very thin veneer; silty, sandy, rubbly colluvial veneer; sandy, rubbly colluvial veneer; silty, sandy, angular weathered bedrock mantle of variable thickness and very thin veneer; sandy, mixed fragments, silty morainal mantle of variable thickness; mixed fragments, muddy morainal mantle of variable thickness; mixed fragments, silty, sandy morainal mantle of variable thickness		
<b>Soil Development</b>		
Orthic Dystric Brunisol, Orthic Melanic Brunisol		
<b>Humus Form</b>	Mors	
<b>Humus Depth (cm)</b>	0 – 4	
<b>Coarse Fragments (%)</b>	15 – 70	
<b>Soil Texture</b>	loamy sand – silty	

**Photo:** B6-18, plot 9903333

**MAP**

Symbol/Site Series

Name

AW 00

Mountain avens – Dwarf willows

<b>Map Symbol</b>	AW2d
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	entire-leaved mountain-avens Altai fescue net-veined willow <i>Cetraria</i> spp. lichens (ragged paperdoll, icelandmoss) reindeer lichens
<b>Associates</b>	short-fruited willow scrub birch crowberry green witch's hair foam lichens juniper haircap moss
<b>Plots</b>	9903333, 9903367, 9903375, 0002405, G119, G120, G1055

**Comments:** A low cover (<1%) of several alpine species such as northern goldenrod, alpine bistort, mountain harebell, moss campion, and saxifrages are commonly present. The average total shrub, herb and moss layer covers are 6%, 55% and 50%, respectively. Exposed bedrock and coarse fragments are very uncommon (as opposed to the AW in the BOR Ecosection).

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
AT	FC	00	Altai fescue – Cladonia grassland
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> s  Typic FC occurs on gentle slopes on deep medium-textured soils. FC also occurs on shallow soils (s).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	1580	
<b>Slope (%)</b>	12	
<b>Aspect (degrees)</b>	156	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
	medium	
<b>Drainage</b>	well	
<b>Surficial Material</b>		
rubby, muddy, sandy morainal mantle of variable thickness		
<b>Soil Development</b>		
Orthic Sombric Brunisol		
<b>Humus Form</b>	-	
<b>Humus Depth (cm)</b>	< 40	
<b>Coarse Fragments (%)</b>	35 – 70	
<b>Soil Texture</b>	loamy	

**Photo:** B8-3, G72

**MAP**

Symbol/Site Series

Name

FC 00

Altai fescue – Cladonia grassland

<b>Map Symbol</b>	FC2b
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	Altai fescue creeping willow awned haircap moss
<b>Associates</b>	mountain sagewort alpine bistort graceful mountain sedge moss campion lesser green reindeer lichen foam lichens pale-stalked broom moss
<b>Plots</b>	G72

**Comments:** Total herb and moss layer cover in this inspection is 30% and 66%, respectively. An unknown crustose lichen dominates the moss layer.

<b>BIOGEOCLIMATIC UNIT</b>	<b>MAP</b>		
	Symbol	Site Series	Name
<b>AT</b>	<b>FK</b>	<b>00</b>	<b>Subalpine fir krummholz</b>
<p><b>Assumed site modifiers for the typical situation:</b> j, m, s  <b>Mapped modifiers:</b> k, w  Typic FK occurs on gentle slopes on shallow, medium-textured soils. It also occurs on cool (k) and warm (w) aspects (w).  This description is based on the FK unit from the ESSFmzp.</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	+ 1400	
<b>Slope (%)</b>		
<b>Aspect (degrees)</b>		
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subxeric - submesic	poor – medium	
<b>Drainage</b>		
<b>Surficial Material</b>		
<b>Soil Development</b>		
<b>Humus Form</b>		
<b>Humus Depth (cm)</b>		
<b>Coarse Fragments (%)</b>		
<b>Soil Texture</b>		

**Photo:** no photograph

**MAP****Symbol/Site Series****FK 00****Name****Subalpine fir krummholz**

<b>Map Symbol</b>	<b>FK3a</b>	<b>FK3b</b>
<b>Plant Species</b>	Low Shrub Climax	Tall Shrub Climax
<b>Dominants</b>	subalpine fir white mountain-heather common leafy liverwort	subalpine fir white mountain-heather common leafy liverwort
<b>Associates</b>	crowberry Altai fescue mountain arnica running clubmoss	crowberry Altai fescue mountain arnica running clubmoss
<b>Plots</b>		

**Comments:** This description is based on the FK unit from the ESSFmzp. Additional species that may be expected in the FK unit include oval-leaved blueberry, arctic lupine, dicranum mosses and dog lichens.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
AT	FW	00	Altai fescue - Dwarf willows
<p><b>Assumed site modifiers for the typical situation:</b> j, m, r, s  <b>Mapped modifiers:</b> h, k, kv, q, w</p> <p>Typic FW occurs on gentle slopes to moderate slopes on shallow medium-textured soils. It occurs on upper slopes, ridges and crests positions. It is also found on hummocks (h); cool aspects (k); cool aspects on very shallow soils (kv); very steep cool aspects (q); and warm aspects (w). FW is often associated with landscapes affected by periglacial process (i.e. solifluction, cryoturbation). In the project area it is commonly found on mid to upper slopes.</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	1525 - 1655	1595
<b>Slope (%)</b>	7 - 62	35
<b>Aspect (degrees)</b>	124 - 350	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic - mesic	medium	
<b>Drainage</b>	rapid - moderately well	
<b>Surficial Material</b>		
silty, sandy, rubbly colluvial blanket; sandy, angular colluvial veneer; rubbly, silty colluvial blanket, undulating		
<b>Soil Development</b>		
Orthic Melanic Brunisol, Dystric Brunisol		
<b>Humus Form</b>	Rhizomull, Mormoder, Moder	
<b>Humus Depth (cm)</b>	3 - 9	
<b>Coarse Fragments (%)</b>	35 - 75	
<b>Soil Texture</b>	loamy sand - silty	

**Photo:** C8-22, plot 9903338

**MAP**

Symbol/Site Series

Name

FW 00

Altai fescue – Dwarf willows

<b>Map Symbol</b>	FW2d
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	net-veined willow Altai fescue
<b>Associates</b>	scrub birch arctic willow mountain sagewort entire-leaved mountain-avens pale-stalked broom moss <i>Cetraria</i> spp. (ragged paperdoll, icelandmoss) dicranum mosses red-stemmed feathermoss crumpled-leaf moss
<b>Plots</b>	9903338, 0002424, G73, G78

**Comments:** The average total herb cover is 60%; the total cover of the moss layer varies significantly between the inspections (range 1 – 55%). G78 has a diverse moss layer.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
AT	MM	00	Mountain heather meadow
<p><b>Assumed site modifiers for the typical situation:</b> d, j  <b>Mapped modifiers:</b> hs, k, ks, nw, s, sw, w  Typic MM occurs on gentle slopes on deep soils. It also occurs on hummocks with shallow soils (hs); cool aspects (k); cool aspects on shallow soils (ks); fans or cones on warm aspects (nw); shallow soils (s); shallow soils on warm aspects (sw); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1440 - 1475	1450
<b>Slope (%)</b>	17 - 38	24
<b>Aspect (degrees)</b>	40 - 170	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic - mesic	medium - rich	
<b>Drainage</b>	rapid - moderately well	
<b>Surficial Material</b>		
silty, sandy, rubbly morainal blanket; rubbly colluvial veneer and very thin veneer; rubbly, silty, sandy colluvial veneer and blanket		
<b>Soil Development</b>		
Orthic Eutric Brunisol, Orthic Sombric Brunisol		
<b>Humus Form</b>	-	
<b>Humus Depth (cm)</b>	1 - 2	
<b>Coarse Fragments (%)</b>	20 - 40	
<b>Soil Texture</b>	sandy loam - silt loam	

Photo: B8-12, plot 9903380

**MAP****Symbol/Site Series****Name****MM 00****Mountain heather meadows**

<b>Map Symbol</b>	MM2d
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	white mountain-heather creeping willow
<b>Associates</b>	crowberry pink mountain-heather mountain sagewort partridge-foot Sitka burnet alpine clubmoss net-veined willow narcissus anemone * compact selaginella * Altai fescue * arctic willow * large-awned sedge * alpine clubmoss hoary rock moss glow moss sickle moss * hair cap mosses
<b>Plots</b>	964065, 9903380, G73

**Comments:** Plot 9903380 is the best example of a “typic” mountain-heather meadow. Inspections 964065 and G73 contain a mix of mountain-heathers and dwarf willows. An \* indicates species found only in 964065; this inspection also has characteristics of the FW unit. The average total herb and moss layer cover is 77% and 10%, respectively.

<b>BIOGEOCLIMATIC UNIT</b>	<b>MAP</b>		
	Symbol	Site Series	Name
<b>AT</b>	<b>SF</b>	<b>00</b>	<b>Scrub birch – Altai fescue</b>
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> w  Typic SF occurs on gentle slopes on deep, medium-textured soils. It also occurs on warm aspects.  This description is based on the SF found in the Teslin Plateau Ecosection.</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>		
<b>Slope (%)</b>		
<b>Aspect (degrees)</b>		
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
xeric - mesic	poor - medium	
<b>Drainage</b>	rapid – moderately well	
<b>Surficial Material</b>		
<b>Soil Development</b>		
<b>Humus Form</b>		
<b>Humus Depth (cm)</b>		
<b>Coarse Fragments (%)</b>		
<b>Soil Texture</b>		

**Photo:** no photograph

**MAP****Symbol/Site Series****Name**

SF 00

Scrub birch – Altai fescue

<b>Map Symbol</b>	SF3a
<b>Plant Species</b>	Low Shrub Climax
<b>Dominants</b>	scrub birch reindeer lichens (lesser green, grey)
<b>Associates</b>	tea-leaved willow bog blueberry Altai fescue alpine sweetgrass net-veined willow lingonberry green witch's hair haircap mosses Cetraria spp. (icelandmoss, ragged paperdoll, furred paperdoll) foam lichens (eyed, cottontail) cladonia lichens
<b>Plots</b>	

**Comments:** The shrub layer is short (<30-50cm). The average shrub, herb and moss layer cover is 41%, 24%, 42%, respectively. Alpine fescue is present in all inspections. The cover of reindeer lichens ranges from 0 – 25%. A large number of species with low cover are found in the herb and moss layers. This description is based on inspections in the SF unit from the TEP Ecoregion.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
AT	WM	00	Wet seepage meadow
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> f  Typic WM occurs on gentle sloping, moisture receiving sites on deep, medium-textured soils. It also occurs on fine-textured soils (f).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1405 - 1475	1445
<b>Slope (%)</b>	5 - 10	7
<b>Aspect (degrees)</b>	4 – 209	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhygric - hygric	rich	
<b>Drainage</b>	moderately well – poor	
<b>Surficial Material</b>		
sandy, mixed fragments, silty morainal blanket; angular, silty, sandy colluvial mantle of variable thickness; organic veneer and very thin veneer over colluvial veneer and blanket		
<b>Soil Development</b>		
Gleyed Humic Regosol, Orthic Gleysol		
<b>Humus Form</b>	Mulls	
<b>Humus Depth (cm)</b>	7 – 10	
<b>Coarse Fragments (%)</b>	30 – 70	
<b>Soil Texture</b>	sandy loam – silty, mesic	

**Photo:** see WM in the TEP Ecosession

**MAP**

Symbol/Site Series

Name

WM 00

Wet seepage meadow

<b>Map Symbol</b>	WM2b
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	creeping willow glow moss
<b>Associates</b>	net-veined willow * arrow-leaved groundsel * mountain sagewort Sitka burnet buttercup large-headed sedge graceful mountain sedge large-awned sedge wood saxifrage white mountain marsh-marigold sidewalk moss arctic willow <i>Pohlia wahlenbergii</i>
<b>Plots</b>	964068, 9903337, G125

**Comments:** Few species are common to all inspections (indicated with an \*). A different sedge species is present in each inspection.

4.11 AT - ALPINE TUNDRA ZONE, TESLIN PLATEAU

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
AT	AM	00	Herbaceous meadow
<p><b>Assumed site modifiers for the typical situation:</b> j, m, s  <b>Mapped modifiers:</b> none                      Typic AM occurs on gentle slopes on deep soils. This ecosystem is very rare in the TEP Ecosection. This description is based on inspections in THH Ecosection.</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>		
<b>Slope (%)</b>		
<b>Aspect (degrees)</b>		
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
mesic	mesic (rich)	
<b>Drainage</b>	well – moderately well	
<b>Surficial Material</b>		
<b>Soil Development</b>		
<b>Humus Form</b>		
<b>Humus Depth (cm)</b>		
<b>Coarse Fragments (%)</b>		
<b>Soil Texture</b>		

**Photo:** no photograph

**MAP**

**Symbol/Site Series**

**AM 00**

**Name**

**Herbaceous meadow**

<b>Map Symbol</b>	AM2a
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	creeping willow partridge-foot Sitka burnet
<b>Associates</b>	white-mountain marsh-marigold sibbaldia mountain sagewort net-veined willow cut-leaved anemone diverse-leaved cinquefoil arctic bluegrass few-flowered sedge graceful mountain sedge large-awned sedge arctic woodrush small-flowered woodrush mountain arnica sidewalk moss
<b>Plots</b>	

**Comments:**

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
AT	AW	00	Mountain avens - Dwarf willows
<p><b>Assumed site modifiers for the typical situation:</b> c, j, s  <b>Mapped modifiers:</b> d, h, hv, k, kv, r, rv, v, vw, w, z  Typic AW occurs on gentle sloping, upper slope and crest positions on shallow coarse-textured soils. It occurs on exposed sites. AW also occurs on deep soils (d); hummocks (h); hummocks on very shallow soils (hv); cool aspects (k); cool aspects on very shallow soils (kv); ridges (r); ridges on very shallow soils (rv); very shallow soils (v); very shallow soils on warm aspects (vw); warm aspects (w); and very steep warm aspects (z).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1330 - 1735	1593
<b>Slope (%)</b>	0 - 50	18
<b>Aspect (degrees)</b>	17 – 330, none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
very xeric – submesic	poor – medium	
<b>Drainage</b>	rapid – well	
<b>Surficial Material</b>		
sandy, silty, rubbly weathered bedrock veneer and very thin veneer; mixed fragments, silty sandy weathered bedrock veneer; sandy, angular weathered bedrock veneer; sandy, angular colluvial blanket; rubbly, muddy colluvial veneer and very thin veneer; silty, sandy, mixed fragments colluvial veneer; silty, sandy, angular colluvial veneer and blanket; sandy, silty, angular colluvial veneer and blanket; sandy, silty, rubbly colluvial veneer; sandy, angular, silty colluvial veneer		
<b>Soil Development</b>		
Orthic Eutric Brunisol, Orthic Sombric Brunisol, Orthic Dystric Brunisol		
<b>Humus Form</b>	Mors, Moder, none	
<b>Humus Depth (cm)</b>	0 – 2	
<b>Coarse Fragments (%)</b>	25 – 80	
<b>Soil Texture</b>	sandy loam – silty	

**Photo:** C9-7, plot 9902685

**MAP**

Symbol/Site Series

Name

AW 00

Mountain avens – Dwarf willows

<b>Map Symbol</b>	AW2d
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	entire-leaved mountain-avens <i>Cetraria</i> spp. (ragged paperdoll, icelandmoss)
<b>Associates</b>	bog blueberry Altai fescue net-veined willow creeping willow arctic lupine one-headed pussytoes lingonberry sedges (two-toned, graceful mountain) green witch's hair foam lichens
<b>Plots</b>	964101, 9902685, 9903349, 9903364, 9903372, G14, G18, G96, G1009, G1078, G1107, G1133, G1166

**Comments:** A low cover (<1%) of several species such as three-toothed saxifrage, moss campion, alpine sweetgrass, brackish locoweed and four-angled mountain-heather is often present. The total average cover of the shrub, herb and moss layers is 11%, 46% and 35%, respectively. Lichens dominate the moss layer. Some exposed bedrock, coarse fragments and mineral soils are typically present in these units.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
AT	FC	00	Altai fescue – Cladonia grassland
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> c, h, k, ks, r, s, sw, w  Typic FC occurs on gentle slopes on deep medium-textured soils. FC also occurs on coarse-textured soils (c); hummocks (h); cool aspects (k); cool aspects on shallow soils (ks); ridges (r); shallow soils (s); shallow soils on warm aspects (sw); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1480 - 1700	1626
<b>Slope (%)</b>	7 - 33	12
<b>Aspect (degrees)</b>	88 – 290	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
(subxeric) submesic - mesic	poor – medium	
<b>Drainage</b>	rapid – moderately well	
<b>Surficial Material</b>		
sandy, silty angular morainal veneer; silty, mixed fragments, sandy morainal mantle of variable thickness; silty, rubbly morainal mantle of variable thickness; mixed fragments silty morainal mantle of variable thickness and blanket; mixed fragments, silty, sandy morainal blanket, gentle slope; mixed fragments, sandy, silty morainal veneer; silty, mixed fragments colluvial veneer and blanket; silty, sandy, angular colluvial blanket; silty, sandy, angular colluvial veneer and blanket		
<b>Soil Development</b>		
Orthic Dystric Brunisol, Orthic Regosol		
<b>Humus Form</b>	Rhizomull, Mors	
<b>Humus Depth (cm)</b>	1 – 3	
<b>Coarse Fragments (%)</b>	20 – 70	
<b>Soil Texture</b>	loamy sand – silty	

**Photo:** C11-10, plot 9903358

**MAP**

Symbol/Site Series

Name

FC 00

Altai fescue – Cladonia grassland

<b>Map Symbol</b>	FC2b
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	Altai fescue net-veined willow
<b>Associates</b>	graceful mountain sedge mountain sagewort alpine sweetgrass creeping willow arctic bluegrass entire-leaved mountain-avens arctic willow ragged paperdoll reindeer lichens cladonia lichens foam lichens haircap mosses
<b>Plots</b>	9902660, 9903358, 9903390, G1094, G1095, G1105, G120, G1156

**Comments:**

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
AT	FW	00	Altai fescue - Dwarf willows
<p><b>Assumed site modifiers for the typical situation:</b> j, m, r, s  <b>Mapped modifiers:</b> d, dk, dw, h, k, kv, q, vw, w, z</p> <p>Typic FW occurs on gentle to moderate slopes on shallow medium-textured soils. It occurs on upper slopes, ridges and crests positions. FW is commonly associated with landscapes influenced by periglacial process (i.e. solifluction and cryoturbation). It also occurs on deep soils (d); deep soils on cool (dk) and warm (dw) aspects; hummocks (h); cool aspects (k); cool aspects on very shallow soils (kv); very steep cool aspects (q); very shallow soils on warm aspects (vw); warm aspects (w); and very steep warm aspect (z).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1550 – 1800	1694
<b>Slope (%)</b>	22 – 42	33
<b>Aspect (degrees)</b>	88 – 359	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
very xeric – mesic	very poor – medium	
<b>Drainage</b>	rapid – moderately well	
<b>Surficial Material</b>		
silty, sandy, angular colluvial veneers and blankets; sandy, angular colluvial veneer and blanket; angular colluvial veneer and very thin veneer;		
<b>Soil Development</b>		
Orthic Dystric Brunisol		
<b>Humus Form</b>	Mor, Moder	
<b>Humus Depth (cm)</b>	1 – 3	
<b>Coarse Fragments (%)</b>	15 to >70	
<b>Soil Texture</b>	sandy - silty	



**MAP**

Symbol/Site Series

Name

FW 00

Altai fescue – Dwarf willows

<b>Map Symbol</b>	FW2d
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	Altai fescue <i>Cetraria</i> spp. (ragged paperdoll, icelandmoss)
<b>Associates</b>	scrub birch net-veined willow creeping willow arctic willow bog blueberry entire-leaved mountain-avens graceful mountain sedge mountain sagewort four-angled mountain-heather crowberry reindeer lichens green witch's hair foam lichens dicranum mosses juniper haircap moss
<b>Plots</b>	9903369, 9903385, G1096, G1102, G1127, G1157

**Comments:** Altai fescue is not a dominant on the very xeric sites (these sites are transitional to the AW unit). Net-veined willow is typically present along with a component of other dwarf willow species, and to a lesser extent mountain-heather and crowberry. A low cover of other alpine species such as moss campion, mountain harebell, alpine sweetgrass, one-headed pussytoes, arctic bluegrass, woodrushes and sedges are often present. The average total cover of the shrub, herb and moss layers is 6%, 44%, and 45%, respectively.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
AT	MM	00	Mountain heather meadow
<p><b>Assumed site modifiers for the typical situation:</b> d, j  <b>Mapped modifiers:</b> k, ks, s, sw, w  Typic MM occurs on gentle slopes on deep soils. It is also found on cool aspects (k); cool aspects on shallow soils (ks); shallow soils (s); shallow soils on warm aspects (sw); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1485 - 1640	1565
<b>Slope (%)</b>	7 - 17	13
<b>Aspect (degrees)</b>	320 - 5	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
submesic - mesic	poor (medium)	
<b>Drainage</b>	moderately well	
<b>Surficial Material</b>		
silty, sandy, mixed fragments morainal blanket; silty, mixed fragments, sandy morainal blanket; sandy, angular colluvial veneer and blanket		
<b>Soil Development</b>		
Orthic Dystric Brunisol, Dystric Brunisol		
<b>Humus Form</b>	Mors, Humimor	
<b>Humus Depth (cm)</b>	2 - 3	
<b>Coarse Fragments (%)</b>	35 - 70	
<b>Soil Texture</b>	sandy - loamy	

**Photo:** C10-23, plot 9903361

**MAP****Symbol/Site Series****Name****MM 00****Mountain heather meadows**

<b>Map Symbol</b>	MM2d
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	four-angled mountain-heather Alaskan mountain-heather
<b>Associates</b>	tea-leaved willow Altai fescue creeping willow sedges (graceful mountain, two-toned, black alpine, single-spike) alpine clubmoss sibbaldia partridge-foot * icelandmoss juniper haircap moss foam lichens pale-stalked broom moss * common leafy liverwort * reindeer lichens
<b>Plots</b>	9903361, 9903368, G1097, G1134

**Comments:** The cover of mountain-heathers is 25 – 40 % in this unit; it contains a more diverse herb layer than the M from the BOR Ecoregion. An \* indicates species that are occasionally a dominant. The average total shrub, herb and moss layer cover is 2%, 71% and 58%, respectively.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
AT	SF	00	Scrub birch – Altai fescue
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> k, ks, rs, s, sw, w  Typic SF occurs on gentle slopes on deep, medium-textured soils. It also occurs on cool aspects (k); cool aspects on shallow soils (ks); ridges on shallow soil (rs); shallow soils (s); shallow soils on warm aspects (sw); and warm aspects (w).</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1500 – 1680	1580
<b>Slope (%)</b>	3 – 40	27
<b>Aspect (degrees)</b>	110 – 348	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
xeric - mesic	poor – medium	
<b>Drainage</b>	rapid – moderately well	
<b>Surficial Material</b>		
silty, rubbly colluvial veneer and blanket; sandy, silty, rubbly colluvial undulating blanket; sandy, mixed fragments colluvial mantle of variable thickness; sandy, angular colluvial veneer; silty, sandy, mixed fragments morainal blankets and veneers; sandy, silty, angular weathered bedrock veneer		
<b>Soil Development</b>		
Orthic Dystric Brunisol, Orthic Eutric Brunisol		
<b>Humus Form</b>	Mors, Moders, Mormoder	
<b>Humus Depth (cm)</b>	3 – 6	
<b>Coarse Fragments (%)</b>	35 – 75	
<b>Soil Texture</b>	sandy – silty	

**Photo:** C14-2, plot 0002410

**MAP****Symbol/Site Series****Name**

SF 00

Scrub birch – Altai fescue

<b>Map Symbol</b>	SF3a
<b>Plant Species</b>	Low Shrub Climax
<b>Dominants</b>	scrub birch reindeer lichens (lesser green, grey)
<b>Associates</b>	tea-leaved willow bog blueberry Altai fescue alpine sweetgrass net-veined willow lingonberry green witch's hair haircap mosses Cetraria spp. (icelandmoss, ragged paperdoll, furred paperdoll) foam lichens (eyed, cottontail) cladonia lichens
<b>Plots</b>	964102, 0002410, 9903396, G32, G97, G1138, G1148

**Comments:** The shrub layer is short (<30-50cm). The average shrub, herb and moss layer cover is 41%, 24%, 42%, respectively. Alpine fescue is present in all inspections. The cover of reindeer lichens ranges from 0 – 25%. A large number of species with low cover are found in the herb and moss layers.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
AT	WL	00	Alpine wetland
<p><b>Assumed site modifiers for the typical situation:</b> d, j, p  <b>Mapped modifiers:</b> none  Typic WL occurs on level sites on organic veneers. It is uncommon.</p>			

#### SITE DESCRIPTION

	Range	Mean
<b>Elevation (m)</b>	1630	
<b>Slope (%)</b>	0	
<b>Aspect (degrees)</b>	none	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
subhydric	poor	
<b>Drainage</b>	very poor	
<b>Surficial Material</b>		
fibric organic veneer over pebbly, sandy fluvial plain		
<b>Soil Development</b>		
(Gleysol)		
<b>Humus Form</b>	-	
<b>Humus Depth (cm)</b>	< 60	
<b>Coarse Fragments (%)</b>	20 – 35 in underlying mineral	
<b>Soil Texture</b>	fibric/sandy	

**Photo:** no photograph

**MAP****Symbol/Site Series****WL 00****Name****Alpine wetland**

<b>Map Symbol</b>	WL2b
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	beaked sedge polar willow
<b>Associates</b>	northern scouring-rush narrow-leaved cotton-grass glow moss
<b>Plots</b>	G1104

**Comments:** Wetlands are uncommon and very small in size in the AT zone.

BIOGEOCLIMATIC UNIT	MAP		
	Symbol	Site Series	Name
AT	WM	00	Wet seepage meadow
<p><b>Assumed site modifiers for the typical situation:</b> d, j, m  <b>Mapped modifiers:</b> ac, k, w  Typic WM occurs on gentle sloping, moisture receiving sites on deep, medium-textured soils. It also occurs on active fluvial sites on coarse-textured soils (ac); cool aspects (k); and warm aspects (w).</p>			

**SITE DESCRIPTION**

	Range	Mean
<b>Elevation (m)</b>	1590	
<b>Slope (%)</b>	10	
<b>Aspect (degrees)</b>	190	
<b>Moisture Regime</b>	<b>Nutrient Regime</b>	
hygric	medium	
<b>Drainage</b>	imperfect (poor)	
<b>Surficial Material</b>		
sandy active fluvial veneer over angular, sandy morainal blanket		
<b>Soil Development</b>		
Orthic Gleysol		
<b>Humus Form</b>	-	
<b>Humus Depth (cm)</b>	6	
<b>Coarse Fragments (%)</b>	5	
<b>Soil Texture</b>	sandy	

**Photo:** B7-20, plot 9903377

**MAP****Symbol/Site Series****Name**

WM 00

Wet seepage meadow

<b>Map Symbol</b>	WM2b
<b>Plant Species</b>	Herb Climax
<b>Dominants</b>	creeping willow graceful mountain sedge black alpine sedge glow moss pale-stalked broom moss sickle moss
<b>Associates</b>	yellow bog sedge two-toned sedge Alaskan mountain-heather white mountain-marsh-marigold mountain sagewort sweet coltsfoot large leafy moss
<b>Plots</b>	9903377

**Comments:** These wet meadows are uncommon and generally small in size.

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## **TABLES**

**Table 1: Ecosystem Units Mapped in the Tulsequah Chief Mine and Access Road Expanded Map Area**

**Other sparsely or non-vegetated units**

Ecosystem Unit	Site Series Name	Mapped Site Modifiers
EX	Exposed soil	
GB	Gravel bar	k
LA	Lake	
OW	Shallow open water	
PD	Pond	
RI	River	
RO	Rock outcrop	
TA	Talus	
RR	Rural Residential	g, h, k, r, w, z
UR	Urban/Suburban	k, w





## **APPENDIX A**

## APPENDIX A. STANDARD TERRAIN LEGEND - LONG VERSION

### (1) TERRAIN POLYGON SYMBOLS

**Simple Terrain Units:** e.g., texture ----> gFt - J <---- process  
 surficial material \_\_\_\_/ \\_\_\_\_ surface expression

Note: Two or three letters may be used to describe any characteristic other than surficial material, or letters may be omitted if information is lacking.

**Composite Units:** Two or three groups of letters are used to indicate that two or three kinds of terrain are present in a polygon. Deciles are used to indicate the relative proportions of each kind of terrain.

e.g., 8Mv 2Rs indicates that the polygon consists of 80% Mv and 20% Rs.

**Stratigraphic Units:** Groups of letters are arranged one above the other where one or more kinds of surficial material overlie a different material or bedrock:

e.g.,  $\frac{Mv}{Rr}$  indicates that Mv overlies Rr.

$\frac{/Mv}{Rr}$  indicates that Rr is partially buried by Mv

### (2) MATERIALS

A	Anthropogenic materials	Artificial materials, and materials modified by human actions such that their original physical appearance and properties have been drastically altered.
C	Colluvium	Products of gravitational slope movements; materials derived from local bedrock and major deposits derived from drift; includes talus and landslide deposits.
D	Weathered bedrock	Bedrock modified <i>in situ</i> by mechanical and chemical weathering.
E	Eolian sediments	Sand and silt transported and deposited by wind; includes loess.
F	Fluvial materials	Sands and gravels transported and deposited by streams and rivers; floodplains, terraces and alluvial fans.
FA	"Active" fluvial materials	Active deposition zone on modern floodplains and fans; active channel zone.

**(2) MATERIALS cont'd**

FG	Glaciofluvial materials	Sands and gravels transported and deposited by meltwater streams; includes kames, eskers and outwash plains.
I	Ice	Permanent snow and ice; glaciers.
L	Lacustrine sediments	Fine sand, silt and clay deposited in lakes, and beach gravels and sand.
LG	Glaciolacustrine sediments	Fine sand, silt and clay deposited in ice-dammed lakes; beach gravels and sand.
M	Till	Material deposited by glaciers without modification by flowing water. Typically consists of a mixture of pebbles, cobbles and boulders in a matrix of sand, silt and clay.
M1	Ablation till	Material accumulated on top of a melting glacier; coarse textured and less consolidated than basal till.
M2	Little Ice Age till	Moraines and till deposited by alpine and valley glaciers during Little Ice Age advance and recession.
O	Organic materials	Material resulting from the accumulation of decaying vegetative matter; includes peat and organic soils.
R	Bedrock	Outcrops, and bedrock within a few centimetres of the surface.
U	Undifferentiated materials	Different surficial materials in such close proximity that they cannot be separated at the scale of the mapping.
V	Volcanic materials	Unconsolidated pyroclastic sediments.
W	Marine sediments	Sediments deposited by settling and gravity flows in brackish or marine waters, and beach sands and gravels.
WG	Glaciomarine sediments	Sediments laid down in marine waters in close proximity to glacier ice, and beach sands and gravels.

**(3) TEXTURE**

Specific Clastic Terms

c	clay	< 2 $\mu$ m	k	cobbles	64 - 256 mm
z	silt	62.5 - 2 $\mu$ m	b	boulders	> 256 mm
s	sand	2 mm - 62.5 $\mu$ m	a	blocks	angular boulders
p	pebbles	2 - 64 mm			

Common Clastic Terms

f	finer	any or all of c, z, and fine s
d	mixed fragments	mixed angular and rounded fragments
g	gravel	any or both of p and k; may include b
r	rubble	angular particles, 2 - 256 mm
x	angular fragments	mix of both r and a
m	mud	mix of both c and z
y	shells	shell or shell fragments

Organic Terms

e	fibric
---	--------

u	mesic
h	humic

#### (4) SURFACE EXPRESSION

a	moderate slope(s)	predominantly planar slopes; 15-26 <sup>o</sup> (27-49%).
b	blanket	material >1-2m thick with topography derived from underlying bedrock (which may not be mapped) or surficial material.
c	cone	a fan-shaped surface that is a sector of a cone; slopes 15 <sup>o</sup> (27%) and steeper.
d	depression	enclosed depressions.
f	fan	a fan-shaped surface that is a sector of a cone; slopes 3-15 <sup>o</sup> (5-27%).
h	hummocky	steep-sided hillocks and hollows; many slopes >15 <sup>o</sup> (27%).
j	gentle slope(s)	predominantly planar slopes; 3-15 <sup>o</sup> (5-27%).
k	moderately steep slope	predominantly planar slopes; 26-35 <sup>o</sup> (49-70%).
m	rolling topography	linear rises and depressions; <15 <sup>o</sup> (27%).
p	plain	0-3 <sup>o</sup> (0-5%).
r	ridges	linear rises and depressions with many slopes >15 <sup>o</sup> (27%).
s	steep slope(s)	slopes steeper than 35 <sup>o</sup> (70%).
t	terrace(s)	stepped topography and benchlands.
u	undulating topography	hillocks and hollows; slopes predominantly <15 <sup>o</sup> (27%).
v	veneer	material <1-2m thick with topography derived from underlying bedrock (may not be mapped) or surficial material; may include outcrops of underlying material.
w	mantle of variable thickness	material of variable thickness infilling depressions in an irregular substrate (rock or surficial material).
x	thin veneer	a thin veneer, where material is predominantly 10-25 centimeters thick.

**(5) GEOLOGICAL PROCESSES AND MASS MOVEMENT SUB-CLASSES**

A	Avalanches	Slopes modified by frequent snow avalanches.
Af	Avalanches: major tracks	In zones of coniferous forest: broad avalanche track(s) occupied by predominantly shrubby, deciduous vegetation.
Am	Avalanches: minor tracks	Similar to above, but generally narrower than the height of adjacent trees.
Aw	Avalanches: mixed	Includes both major and minor avalanche tracks.
Ao	Avalanches: old tracks	Clearly visible on air photos, but less well defined than active tracks because they are partly or completely occupied by young conifers.
B	Braiding channel	Channel zone with many diverging and rejoining channels; channels are laterally unstable.
C	Cryoturbation	Heaving and churning of soil/surficial materials due to frost action.
D	Deflation	Removal of sand and silt particles by wind action.
E	Glacial meltwater channels	Areas crossed by meltwater channels that are too small or too numerous to map individually.
F	Failing	Slope experiencing slow mass movement, such as sliding or slumping.
H	Kettled	Area includes numerous small depressions and/or lakes where buried blocks of ice melted.
I	Irregularly sinuous channel	Channel displays irregular turns and bends.
J	Anastamosing channel	Channels diverge and converge around semi-permanent islands.
K	Karst processes	Solution of carbonates (limestone, dolomite) resulting in development of collapse and subsidence features.
L	Surface seepage	Abundant seepage.
M	Meandering channel	Channel characterized by regular turns and bends.
N	Nivation	Surface modified by hollows developed around semi-permanent snowbanks.
P	Piping	Subsurface erosion of silty sediments by flowing water resulting in the formation of underground conduits.
R	Rapid mass movement	Slope affected by processes such as debris flows, debris slides, and rockfall.
S	Solifluction	Slope modified by slow downslope movement of seasonally frozen regolith.
U	Inundated	Areas submerged in standing water from a seasonally high watertable.
U1	Inundated due to beavers	Areas submerged by shallow standing water behind beaver dams.
V	Gullying	Slope affected by gully erosion.
W	Washing	Winnowing of fines by flowing water; development of lag deposits.
X	Permafrost processes	Processes related to the presence of permafrost and permafrost aggradation or degradation.
Z	Periglacial processes	Solifluction, nivation and cryoturbation occurring together in a single terrain polygon.

Mass Movement Sub-Classes

-F"	Slow m.m. (initiation zone)	-Fu, -Ru	Slump in surficial material: slow, rapid
-R"	Rapid m. m. (initiation zone)	-Fx, -Rx	Slump-earthflow: slow, rapid
-Fc	soil creep	-Rb	Rockfall
-Fe	Earthflow	-Rd	Debris flow
-Fg	Rock creep	-Rf	Debris fall
-Fj	Lateral spread in surficial materials	-Rr, -Fr	Rockslide: slow, rapid
-Fk	Tension cracks	-Rs, -Fs	Debris slide: slow, rapid
-Fm, -Rm	Slump in bedrock: slow, rapid	-Rt	Debris torrent
-Fp, -Rp	Lateral spread in bedrock: slow, rapid	-Fu, -Ru	Slump in surficial materials

**(6) SOIL DRAINAGE CLASSES**

x	very rapidly drained	Water is removed from the soil very rapidly in relation to supply.
r	rapidly drained	water is removed from the soil rapidly in relation to supply
w	well drained	water is removed from the soil readily but not rapidly
m	moderately well drained	water is removed from the soil somewhat slowly in relation to supply
i	imperfectly drained	water is removed from the soil sufficiently slowly in relation to supply to keep the soil wet for a significant part of the growing season
p	poorly drained	water is removed so slowly in relation to supply that the soil remains wet for a comparatively large part of the time the soil is not frozen
v	very poorly drained	water is removed from the soil so slowly that the water table remains at or on the surface for the greater part of the time the soil is not frozen

Where two drainage classes are shown:

if the symbols are separated by a comma, e.g., w, i then no intermediate classes are present;

if the symbols are separated by a dash, e.g., w-i then all intermediate classes are present.

## Bedrock Classification Codes

### Sedimentary Rocks

	EITHER		OR	
Clastic, calcareous	fine grained	<b>kf</b>	calcareous siltstone calcareous mudstone calcareous shale	<b>kz</b> <b>kd</b> <b>kh</b>
	medium grained	<b>km</b>	calcareous sandstone calcareous greywacke calcareous arkose	<b>ks</b> <b>kg</b> <b>ka</b>
	coarse grained	<b>kc</b>	calcareous conglomerate calcareous breccia	<b>kn</b> <b>kb</b>
Clastic non-calcareous	fine grained	<b>uf</b>	siltstone mudstone shale	<b>zl</b> <b>md</b> <b>sh</b>
	medium grained	<b>um</b>	sandstone greywacke arkose	<b>ss</b> <b>gk</b> <b>ak</b>
	coarse grained	<b>uc</b>	conglomerate breccia	<b>cg</b> <b>bx</b>
Precipitates	calcareous	<b>pk</b>	travertine limestone dolomite	<b>tv</b> <b>ls</b> <b>do</b>
	non-calcareous	<b>pu</b>	gypsum limonite barite	<b>gy</b> <b>li</b> <b>ba</b>
Organic	calcareous	<b>ok</b>	marl	<b>ma</b>
	carbonaceous	<b>oc</b>	lignite coal	<b>lg</b> <b>co</b>

### Igneous Rocks

	EITHER		OR	
Intrusive	acid (felsic)	<b>ia</b>	syenite granite quartz monzonite granodiorite	<b>sy</b> <b>gr</b> <b>qm</b> <b>gd</b>
	intermediate	<b>ii</b>	quartz diorite diorite	<b>qd</b> <b>di</b>
	basic	<b>ib</b>	quartz gabbro gabbro pyroxenite peridotite dunite	<b>qg</b> <b>gb</b> <b>py</b> <b>pd</b> <b>du</b>
Extrusive	acid (felsic)	<b>ea</b>	trachyte rhyolite dacite	<b>tr</b> <b>rh</b> <b>da</b>
	intermediate	<b>ei</b>	andesite	<b>an</b>
	basic	<b>eb</b>	quartz basalt basalt	<b>qb</b> <b>bs</b>
	recent lava flow	<b>la</b>		
	pyroclastic	<b>ep</b>	tuff volcanic breccia agglomerate	<b>tu</b> <b>vb</b> <b>ag</b>

Metamorphic Rocks

	EITHER		OR	
Foliated	fine grained	<b>ff</b>	slate phyllite	<b>sl</b> <b>ph</b>
	medium to coarse grained	<b>fm</b>	schist gneiss granite gneiss diorite gneiss	<b>sc</b> <b>gn</b> <b>gg</b> <b>dg</b>
	coarse grained	<b>fc</b>	migmatite	<b>mi</b>
Non-foliated	fine grained	<b>nf</b>	argillite serpentinite	<b>ar</b> <b>sp</b>
	medium to coarse grained	<b>nm</b>	granulite quartzite hornfels	<b>gl</b> <b>qt</b> <b>hf</b>
	coarse grained	<b>nc</b>	amphibolite hornblendite	<b>am</b> <b>hb</b>
	calcareous	<b>nk</b>	marble dolomite marble serpentine marble	<b>mb</b> <b>dm</b> <b>sm</b>

## **APPENDIX B**