

ECOSYSTEM UNITS OF THE SNAKE/SAHTANEH AREA

Prepared for: Slocan Forest Products
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EXPANDED LEGEND-SNAKE / SAHTANEH STUDY AREA

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1. INTRODUCTION

1.1 Introduction

In the summer of 1997 Shearwater Mapping Ltd. was retained by Slocan Forest Products to prepare maps of Ecosystem Units at a scale of 1:50 000 for the Snake/Sahtaneh Study Area. The area covered included portions of NTS map sheets 94 J/9, 16, I/12, 13, 14, O/1, 8, P/3, 4 and 5. Map sheets 94 I/13 and P/4 are essentially full map sheets.

Following the standards for Terrestrial Ecosystem Mapping in British Columbia (Resources Inventory Committee 1995) 107 plots, and 197 ground visual records were located and sampled. 748 quick visual records were also obtained. All plots were located in the Fort Nelson Moist Warm Boreal White and Black Spruce Variant (BWBSmw2).

1.2 Study Area

The study area (covering 417,960 ha) is depicted in Figure 1 (page 2). The area is divided between the Fort Nelson Lowland and Etsho Plateau Ecosctions. Elevations range from 456m to 750m (1500 to 2465 ft), with the lowest elevations in the southwest, rising to higher elevations in the northeast. The Fort Nelson River runs northward along the western flank of the study area, while the major drainages of the Snake River and Sahtaneh River flow westward. Other tributaries flowing into these two rivers include Hoffard Creek, Utahn Creek, Chuatse Creek, Komie Creek, Moss Creek, Courvoisier Creek and Gunnell Creek. There are no significant lakes within the study area, although Kotcho Lake and Clarke Lake lie just outside the area to the northeast and southwest respectively.

Typical vegetation on mesic sites is composed of predominantly seral forests of trembling aspen and white spruce, with prickly rose, soopolallie and highbush-cranberry dominating the continuous, robust shrub layer. Bunchberry is the only consistently occurring herb, although fireweed, twinflower and trailing raspberry also commonly occur. Mature climax forests of white spruce have less shrub cover and a thick carpet of *Hylocomium splendens*, *Pleurozium schreberi* and *Ptilium crista-*

castrensis. All sites have clayey, silty morainal blanket parent material (fine-textured soil site modifier). Typical sites with medium-textured moraine do not occur. Common soils are Gleyed Gray Luvisol and Orthic Gray Luvisol.

Sandy eolian ridges (which occur rarely) are dominated by very open forests of lodgepole pine, with patchy prickly rose, saskatoon and choke cherry in the shrub layer. Dominant herbs are kinnikinnick and lingonberry. A well-developed layer of

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ground lichens, including *Cladina arbuscula*, *Cladina stellaris*, *Cetraria cucullata* and *Cetraria ericetorum* is usually present. Typical soil development is Orthic Dystric Brunisol.

On medium-textured moraine and level eolian deposits, primarily in the northeast of the study area, open mixed forests of jack pine, lodgepole pine and trembling aspen develop. Prickly rose, soopolallie, fuzzy-spiked wildrye and lingonberry are common understory plant species. Soils are predominantly Eluviated Dystric Brunisols.

Floodplains of the Snake and Sahtaneh Rivers, which are deeply incised into the surrounding till plain, develop productive forests of white spruce and balsam poplar. The vigorous shrub layer is characterized by willow, mountain alder, highbush-cranberry and red-osier dogwood. Common herbs include horsetails, bluejoint, bunchberry and twinflower. Soil developmens, which are highly variable include Cumulic Regosol, Orthic Dystric Brunisol, Cumulic Humic Regosol, Rego Gleysol and Orthic Gleysol.

Wet forested sites have a mixture of white and black spruce, with occasional tamarack occurring. Common shrubs include willows, mountain alder and Labrador tea; common herbs are horsetails, lingonberry, and bunchberry. Characteristic mosses include *Sphagnum* spp., *Hylocomium splendens*, *Pleurozium schreberi*, *Tomenthypnum nitens* and *Ptilium crista-castrensis*. Parent materials include clayey, silty morainal blanket and organic veneer over moraine. Typical soil developments are Orthic Gleysol, Rego Humic Gleysol, Gleyed Gray Luvisol, Terric Fibrisol, and Terric Humic Fibrisol. Frozen soils (Humic Organic Cryosol) occur occasionally.

Bogs, dominated by scrubby black spruce, Labrador tea, leatherleaf, bog-rosemary, lingonberry, and cloudberry are a prominent feature, often occurring as continuous landscapes. A thick spongy, mat of *Sphagnum* spp. is typical and a well-developed cover of *Cladina* spp. is often present. Typical soil developments are Typic Fibrisol and Typic Mesisol.

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Other wetlands including willow - mountain alder swamps, tamarack - buckbean swamps, riparian marshes, and sedge fens occur throughout the study area. Primary parent materials are various depths of organic material over clayey, silty moraine. Soil developments include Typic Fibrisol, Typic Mesisol, Mesic Humisol, Terric Humisol, Orthic Humic Gleysol and Rego Gleysol.

2. METHODOLOGY

A total of 107 plots were located and sampled, as well as 197 ground visual records and 748 quick visual records. Plots were selected to characterize the range of ecosystems and structural stages occurring on the various surficial materials. The existing Site Series classification (DeLong *et al.* 1990) was utilized, except for non-forested units which were named according to RIC standards.

At each plot location reconnaissance (FS882) plot forms were completed according to Luttmerding *et al.* (1990). A complete list of vascular plants was made and percent cover estimates were recorded for each species entry. Dominant mosses, lichens and liverworts were also recorded. Soils were described in terms of horizons, texture, percentage of coarse fragments and presence of roots, with classifications conforming to the Canadian System of Soil Classification (1987). Humus forms were also classified (following Klinka *et al.* 1981) and described. Surficial geology terminology is after Howes and Kenk (1997). Unknown or dubious plant specimens were collected and identified (by J. Penny, B.C. Conservation Data Centre, Trevor Goward (lichens) and . Nomenclature of vascular plants follows Taylor and MacBryde (1977); mosses after Crum *et al.* (1973); lichens according to Hale and Culberson (1970); and liverworts after Stotler and Crandall-Stotler (1977). Also recorded at each plot location were information on coarse woody debris (following RIC standards), wildlife species ratings (capability and suitability) and scat information.

For ground visual records the following parameters were recorded: surveyors, date, mapsheet, aerial photo number, elevation, slope, aspect, slope position, soil moisture regime, soil nutrient regime, soil drainage, soil texture, soil classification, terrain unit, site series, structural stage, site modifier, and Ecosession. In addition a brief summary list of plant species and wildlife ratings was recorded. Quick visual records consisted only of date, surveyors, mapsheet, terrain unit and site series (observations were usually made from helicopter).

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During field sampling the variation in structural stages was sampled. Structural stages sampled, and also mapped, are:

- 1a Non-vegetated (<5% total cover)
- 1b Sparsely vegetated (<10% vascular plants, up to 100% bryophytes/lichens)
- 2 Herb (wetlands or recently logged)
- 3 Shrub/Herb (early successional stage or disclimax / climax communities dominated by shrubby vegetation <10m tall; <20 years for normal forest succession, up to 100+ years for disclimax / climax communities).
- 3a Low Shrub (early successional stage or disclimax / climax communities dominated by shrubby vegetation <3m tall).
- 3b Tall Shrub (early successional stage or disclimax / climax communities dominated by shrubby vegetation >3m tall and 10m).
- 4 Pole sapling (trees greater than 10m tall, <20 years for normal succession or up to 100 years for stagnant stands).
- 5 Forest (40 to 80 years)
- 6 Mature Forest (80 to 140 years)
- 7 Old Forest (>140 years)

Office work consisted of data synthesis (see Appendix B for environmental and vegetation data synthesis tables), ecosystem description and ecosystem mapping. Mapping was done on 1:60 000 black and white aerial photos. Ecosystems were mapped within a terrain unit framework. Map symbols represent the site series and are connotative (dominant trees and shrub/herb/moss or lichen). Site series are subdivided, based on site conditions such as depth of soil, aspect, soil texture and landform. These site modifiers, which are attached to the site series symbols on the maps, are as follows:

- a - active floodplain
- c - coarse-textured
- f - fine-textured
- k - cool, northerly aspect
- n - fan
- p - peaty material on surface
- t - terrace
- w - warm, southerly aspect

Map symbols consist of a site series, site modifier (if applicable) and structural stage. For example:

AMf5

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SwAt - Step moss site series, fine-textured, young forest. Up to two site modifiers can be attached to a site series. Complex (2 or 3 part) map symbols are utilized where landscape, site or vegetation conditions are diverse. For example:

8AMf5 - 2BWp5

Eighty percent SwAt - Step moss site series, fine-textured, young forest with twenty percent Sb - Willow site series, peaty, young forest. Note that for complex map symbols deciles are placed before the site series symbols, and deciles must always total 10 (10 = 100%).

3. BIOGEOCLIMATIC UNITS

The entire study area lies within the Fort Nelson Moist Warm Boreal White and Black Spruce Variant (BWBSmw2). Typical climax forests are dominated by white spruce, with a patchy shrub cover of prickly rose, and occasional highbush-cranberry. Common herbs include bunchberry and twinflower, with frequent occurrences of lingonberry, common mitrewort and one-sided wintergreen. A continuous carpet of *Hylocomium splendens*, *Pleurozium schreberi* and *Ptilium crista-castrensis* is always present. Characteristic soils are Gleyed Gray Luvisols, Orthic Gray Luvisols, and Brunisolic Gray Luvisols. Humus forms are predominantly Hemimors and Hemihumimors.

4. ECOSYSTEM UNITS

An ecosystem unit incorporates site series, site modifiers and structural stages. Forested site series are named according to dominant trees and a shrub, herb, moss, lichen or liverwort. Two letter site series symbols are now standardized for all biogeoclimatic units in the province (Resources Inventory Committee 1995). A summary of all mapped ecosystem units is provided in Table 1.

Table 1. Ecosystem Units of the Snake/Sahtaneh Area

BWBSmw2	01	AMf	SwAt - Step moss, fine-textured
	02	LL	Pl - Lingonberry - Velvet-leaved blueberry, typic

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03	BK BKc	Sb - Lingonberry - Knight's plume, typic Sb - Lingonberry - Knight's plume, coarse- textured
04	BL BLc BLck BLcw BLk BLw	Sb - Lingonberry - Coltsfoot, typic Sb - Lingonberry - Coltsfoot, coarse-textured Sb - Lingonberry - Coltsfoot, coarse- textured, cool aspect Sb - Lingonberry - Coltsfoot, coarse- textured, warm aspect Sb - Lingonberry - Coltsfoot, cool aspect Sb - Lingonberry - Coltsfoot, warm aspect
05	SHa SHt	Sw - Currant - Horsetail, active floodplain Sw - Currant - Horsetail, terrace
06	BBf	Sb - Feathermoss - Bluebells, fine-textured
07	THp	Lt - Horsetail, peaty
08	BS	Sb - Cloudberry - Sphagnum, typic
09	BWf BWp	Sb - Willow, fine-textured Sb - Willow, peaty
10	TB	Lt - Buckbean, typic

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AB	Bebb's willow - Mountain alder - Bluejoint swamp, typic
ABp	Bebb's willow - Mountain alder - Bluejoint swamp, peaty
SS	Scrub birch - Willow - Water sedge fen, typic
SSp	Scrub birch - Willow - Water sedge fen, peaty
WB	Drummond's willow - Bluejoint lowbench/swamp, typic
WB	Drummond's willow - Bluejoint lowbench/swamp, peaty

Each ecosystem is described in terms of dominant and associated plant species for each vegetation layer (trees, shrubs, herbs and mosses/lichens/liverworts). Dominant species have a frequency of 75% or greater, combined with a mean cover of at least 5%. Associated species have a frequency of less than 75% (with any mean cover value) or frequency of 75% or greater combined with mean cover of less than 5%. Frequency is the number of plots (within the sample group) that a species occurs in, expressed as a percentage. Mean cover is the mean of all percent cover ratings for a specific plant within an ecosystem unit.

A number of map units which are not true site series are recognized, including:

GB	Gravel bar
LA	Lake
OW	Open water
RI	River

No descriptions are provided for these units.

For site descriptions, surficial material, soil development and humus forms are listed in order of frequency of occurrence. See Glossary for definition of technical terms.

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5. GLOSSARY

bog	a wetland dominated by acid-loving plants and peat moss where the main source of water is from precipitation.
Blanket	a mantle of unconsolidated materials thick enough to mask minor irregularities of the surface, but still conforming to underlying topography; greater than 1 metre thick.
Cumulic Regosol	a soil lacking development which forms through periodic repeated inundation as evidenced by buried thin humus layers.
fan	a relatively smooth segment of a cone with a slope gradient of up to 26%.
fen	a wetland dominated by sedges and grasses where the main source of water is through-flowing (groundwater)
fluvial	materials transported and deposited by streams and rivers.
glaciofluvial	materials that exhibit clear evidence of having been deposited by glacial meltwater streams.
Humic Gleysol	gleyed soils (subject to fluctuation water tables as evidenced by strong mottling in the soil profile) with humus enriched A horizon.
lacustrine	sediments that have settled from suspension, in bodies of standing fresh water.
Moder	humus form having F and H (humus horizons which have been fragmented through faunal activity).
Mor	humus form having the least level of decomposition dominated by a F horizon (fermented).
morainal	material deposited directly by glacier ice without modification by any other agent of transportation.

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organic	sediments composed largely of organic materials resulting from the accumulation of vegetative matter.
Orthic Dystric	acid soils lacking a well-developed mineral-organic surface horizon.
Orthic Regosol	a soil lacking development, with no horizon differentiation in the soil profile.
plain	a level or very gentle sloping, unidirectional surface.
terrace	a single or assemblage of step-like form(s) where each step-like form consists of a scarp face and a horizontal or gently inclined surface above it.
Terric Mesisol	a moderately well decomposed organic soil with mineral soil contact within 40 cm of the soil surface.
Typic Humisol	organic soils havin the most advanced stage of decomposition.
Typic Fibrisol	organic soils having the least level of decomposition.
Typic Mesisol	organic soils having a moderate level of decomposition.
veneer	a mantle of unconsolidated materials too thin to mask minor irregularities of the surface of the underlying material; thickness ranges form 10 cm to 1 metre.
Brunisolic Gray Luvisol	a luvisolic soil (clay enriched B horizon) that has a weak mineral soil horizon (Bm) on the surface.
Eluviated Dystric Brunisol	an acid soil lacking a well-developed mineral-organic surface horizon, having a strongly leached A horizon.
colian	material transported and deposited by wind.
Fibric Humisol	a humic (well decomposed) organic

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	soil with a sub dominant Fibric (poorly decomposed) layer.
Fibric Organic Cryosol	a cryosolic soil (discontinuous or continuous permafrost) with predominantly fibric organic layer.
Gley Gray Luvisol	a luvisolic soil with gleying as evidenced by mottling in the B and C horizons.
Humic Organic Cryosol	a cryosolic soil (discontinuous or continuous permafrost) with predominantly humic organic layer.
Mesic Fibrisol	a fibric (poorly decomposed) organic soil with a subdominant mesic layer (moderately decomposed) layer.
Mesic Humisol	a humic (well decomposed) organic soil with a subdominant mesic layer (moderately decomposed) layer.
Mesic Organic Cryosol	a cryosolic soil (discontinuous or continuous permafrost) with predominantly mesic (moderately decomposed) layer.
Orthic Gray Luvisol	a soil usually derived from fine-textured parent material, with a clay-enriched B horizon.
Rego Gleysol	a gleysolic soil lacking a B horizon at least 10 cm thick.
Terric Fibrisol	a fibric organic 48A soil with at least 60 cm of organic material over mineral soil.
Terric Humic Fibrisol	a fibric organic soil having at least 60 cm of organic matter (of which at least 12 cm is humic) over mineral soil.

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