

**Field Guide to Identification and Interpretation  
of  
Hardwood-dominated Ecosystems  
in the SBSdk and ICHmc2  
of the  
Prince Rupert Forest Region**

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**Supplement No. 1  
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for the Prince Rupert Forest Region**



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# Classification of Hardwood Ecosystems of the SBSdk and ICHmc2 within the Prince Rupert Forest Region

## Introduction

Hardwood-dominated stands occupy large areas of the Sub-Boreal Spruce Zone, Dry Cool subzone (SBSdk) and the Interior Cedar-Hemlock Zone, Moist Cold subzone, Hazelton variant (ICHmc2) in the Prince Rupert Forest Region. Upland hardwood stands are dominated primarily by trembling aspen (*Populus tremuloides*), with variable amounts of paper birch (*Betula papyrifera*), black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), and willows, especially Scouler's willow (*Salix scouleriana*). A combination of wildfire, aboriginal burning, and more recent settlement and land clearing has contributed to the abundance of hardwood stands in the valley bottoms of the SBSdk and ICHmc2.

Black cottonwood dominates stands on alluvial fans and floodplains. The initial seral stages are established after flooding events and, less frequently, by debris flows on alluvial fans. Hardwood stands occurring on fluvial benches often have a component of sub-canopy softwoods, primarily hybrid white spruce (*Picea glauca* x *engelmannii*) in the SBSdk subzone and Roche spruce (*Picea sitchensis* x *glauca*), western redcedar (*Thuja plicata*), subalpine fir (*Abies lasiocarpa*), and western hemlock (*Tsuga heterophylla*) in the ICHmc2 variant. The status of rare and/or vulnerable deciduous ecosystems occurring on floodplains and other habitats in the SBSdk and ICHmc2 is discussed by Haeussler (1998a, 1998b).

The hardwood-dominated ecosystems that are the focus of this guide occur in several structural stages, beginning with an initial post-disturbance stage and progressing through the Shrub/Herb, Pole/Sapling, Young Forest, Mature Forest, and Old Forest stages. Hardwood ecosystems sampled in this study range from 60 to 85 years old (Young to Mature Forest). Thus the classification presented here will best "fit" stands of a similar age.

Hardwood stands vary primarily in certain stand structure characteristics (height, diameter, and density at a given age), and in the composition of the understory vegetation associated with the major hardwood tree species. The composition of understory vegetation communities and some structural characteristics in hardwood stands change in a consistent manner with the soil moisture and nutrient regimes. It is these differences in stand structure and vegetation composition that determine the relative value of these ecosystems for range, wildlife, biodiversity, and forestry uses.

Some of the hardwood-dominated ecosystems described in this field guide supplement are distinct seral associations of site series occurring in the SBSdk and the ICHmc2, that would eventually proceed through succession to mixed or coniferous stands. Other units are considered climax or "disclimax" site series, such as the cottonwood floodplain ecosystems and some shrub-dominated

willow and alder communities. These plant associations are considered self-maintaining, due to frequent disturbance (e.g., flooding) or the ability of the dominant species to maintain themselves indefinitely and exclude conifer establishment. For a more detailed account of the classification and interpretation of SBSdk and ICHmc2 hardwood ecosystems, refer to Williams *et al.* (1999).

## Using the Guide

### Reference Materials

This guide presents site identification, classification, and interpretation information for hardwood ecosystems. It is designed as a supplement to *Land Management Handbook No. 26 (LMH 26)*, *A Field Guide to Site Identification and Interpretation for the Prince Rupert Forest Region* (Banner *et al.* 1993). LMH 26 includes diagnostic keys to soil moisture and nutrient regimes, as well as other field keys and tools required to identify hardwood associations. *Land Management Handbook No. 25 (LMH 25)*, *Field Manual for Describing Terrestrial Ecosystems* (B.C. Ministry of Environment, Lands and Parks, and B.C. Ministry of Forests 1998) is also essential for describing and sampling ecosystems in the field. Useful plant identification guides include MacKinnon *et al.* (1992), Pojar and MacKinnon (1994), and Johnson *et al.* (1995).

### Identifying Hardwood Ecosystems

Identifying the ecosystems described in this guide will require a description of the site, soil, and vegetation characteristics of the area under study. This is best facilitated by the completion of an FS882 field form or a ground inspection form (GIF) (see LMH 25). The ecosystem flow charts on pages 5 • 217 and 5 • 228 group the hardwood associations according to landscape position, moisture regime, and site series, and provide vegetation and site features that will aid identification. Once the moisture regime and/or probable site series (LMH 26) has been determined, a limited number of hardwood associations occur within the edatopic range of the site series. Final identification of the hardwood association requires consideration of site characteristics as well as vegetation composition. Note that the same hardwood seral association may often be associated with more than one site series.

Plant lists from field plots will rarely match exactly those presented in the vegetation tables and in the written description for the hardwood association. Descriptions are based on averaging data from several sample plots and often there is considerable variation from site to site. Factors such as grazing pressure and land use history may alter species composition in a given area. It is thus very important to consider site and soil factors when classifying deciduous stands. In this guide, tree species codes are frequently used in association names (see Table 1). These codes are taken from LMH 25.

TABLE 1. Tree species codes used in this guide

Code	Common name	Scientific name
At	trembling aspen	<i>Populus tremuloides</i>
Act	black cottonwood	<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>
Ep	paper birch	<i>Betula papyrifera</i>
Ws	Scouler's willow	<i>Salix scouleriana</i>

### Naming and Coding of Hardwood Ecosystems

Hardwood associations are named using one or two tree or shrub species, followed by one or two understory species that characterize the association. While the species chosen for naming the association are often predominant in these communities, less common but characteristic species are sometimes used to maintain the uniqueness of association names. The “\$” symbol precedes the name of seral hardwood associations that will eventually develop through succession to climax coniferous stands (e.g., \$At – Pink wintergreen represents mesic stands that are expected to develop towards the Sxw – Spirea – Purple peavine (01) site series in the SBSdk). Climax or disclimax hardwood associations that are relatively stable or self-maintaining are treated as site series and are thus not given the “\$” symbol (e.g., the Act – Dogwood – Prickly rose floodplain association maintained by flooding).

A revised set of rules has been developed for coding climax and non-climax associations within the provincial biogeoclimatic ecosystem classification (BEC) system. This system differs somewhat from that described in LMH 26. Only those rules relevant to the forested and shrub-dominated associations described in this supplement are presented here.

#### 1. Forested climax/disclimax associations

Forested hardwood associations interpreted to be climax or disclimax are numbered as site series, using numbers 01 to 29. For example, the Act – Dogwood – Prickly rose association (site series) is numbered as SBSdk/08. Letter codes (a, b, c, etc.) can be used following the site series number (e.g. /08a) to denote site series phases as per LMH 26.

#### 2. Shrub-dominated climax/disclimax associations

Shrub-dominated associations interpreted to be climax or disclimax are numbered as site series, using numbers 50 to 59. For example, the Scouler's willow – Thimbleberry association (site series) is numbered as SBSdk/51.

#### 3. Non-climax seral associations

The following rules are used for coding non-climax seral associations:

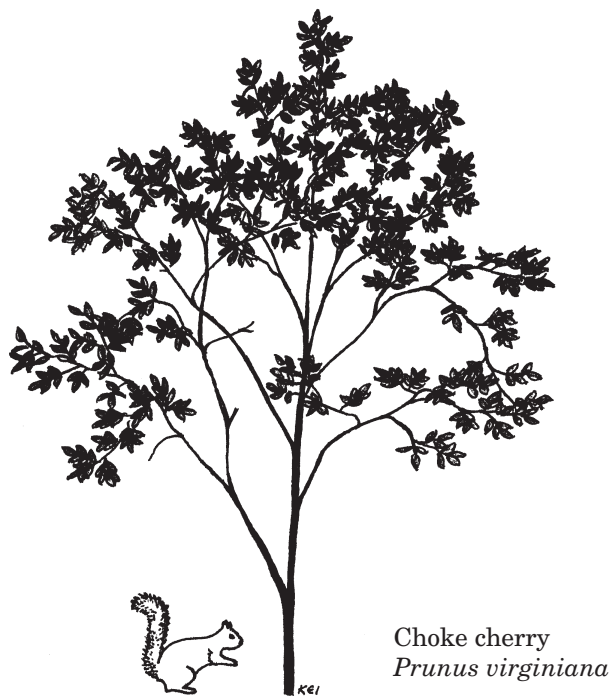
- Existing codes for the leading tree species are used as the first part of the association code (At, Ep, etc.)

2. For the understory species a two-letter lowercase code is used as follows:
  - a) For one-word common names, the first two letters of the word are used (kinnikinnick=ki)
  - b) For two- or three-word common names, the first letter of the first two words is used (lady fern=lf)
  - c) If two understory species are used in the association name, the first letter of each species is used (saskatoon – snowberry=ss)

For example, \$At – Pink wintergreen in the SBSdk is coded as **SBSdk/ Atpw**; Site series codes may also be used in combination with seral association codes to provide more information (e.g., **SBSdk/01 – Atpw**)

## Relationships to Existing Seral Associations Described in LMH 26

Four seral associations have been previously described for the ICHmc2 (see page 5 • 126 in LMH 26). These are numbered 51 to 54 following earlier coding conventions. Three of these associations are conifer-dominated and are thus quite distinct from the hardwood associations presented in this supplement. The \$AtEp – Dogwood association (ICHmc2/53), however, is a hardwood-dominated unit that encompasses two separate seral associations described in this supplement (ICHmc2/Atpw and Atcv). Field personnel may continue to use the seral associations described in LMH 26, in combination with the classification presented in this supplement, but, for the hardwood-dominated units, the classification presented here is more detailed and up to date. This supplement also provides more detailed information on the cottonwood-dominated floodplain ecosystems already described in LMH 26.



## Classification and Description of Hardwood Ecosystems in the SBSdk and ICHmc2

### Mesic to subhygric sites:

**\$At – Pink wintergreen (SBSdk/Atpw; ICHmc2/Atpw)** is common throughout both subzones on level to moderate slopes. This association is best developed on warm aspects with well-drained Brunisols or Luvisols. Aspen is the leading tree species, but Scouler's willow and scattered conifers are often present. Paper birch and beaked hazelnut are common in the ICHmc2. The shrub and herb layers are both well-developed. This unit has medium to high forage values due to abundant herbs and is suitable for timber production due to high tree productivity and favourable soil properties.

### Dry sites:

Four associations occurring on drier sites have been described.

**At – Anemone (SBSdk/50)** is restricted to very dry, thin-soiled, south-facing slopes or crest positions. Rocky outcrops are common, interspersed with moderately stable colluvial slopes. Soils are often fine-textured but with large rock fragments. This unit is transitional to scrub/steppe ecosystems (SBSdk/81). Aspen has low vigour and is present as small clones. Shrubs include saskatoon, common juniper, common snowberry, and choke cherry. The herb layer is quite diverse, including many grass species and wildflowers. Surface organic layers are thin and biologically active. These units make up a small area of the total landscape but are extremely valuable to wildlife because of low snow cover and early spring green-up. This unit was not sampled in the ICHmc2.

**\$At – Kinnikinnick (SBSdk/Atki; ICHmc2/Atki)** is found on dry, south-facing slopes, and level to gently sloping gravelly terraces. Aspen has low vigour and scattered lodgepole pine may be present. The understory shrubs include saskatoon, common juniper, kinnikinnick, and dwarf blueberry. The herb layer is diverse, including many grasses and wildflowers. Herbaceous productivity, however, is usually low. Soils are commonly coarse-textured Brunisols with thin surface organic layers (Moder humus forms). This association is more common than the At – Anemone unit, but still makes up only a small percentage of the landscape. These sites are valuable areas for ungulates and black bear because of low snow cover and early spring green-up. This association is distributed throughout both subzones but is more common in the SBSdk.

**\$Ep – Douglas maple (SBSdk/Epdm; ICHmc2/Epdm)** occurs on rocky colluvial slopes or in areas with bedrock exposure and skeletal soils. Soils are shallow, mostly derived from tree litter filling up cracks between rocks. Paper birch and scattered aspen are common trees. Herbs are sparse, but

berry-producing shrubs such as soapberry, black gooseberry, and kinnikinnick provide food for animals. In the SBSdk, \$Ep – Douglas maple has been observed only on north aspects.

**\$At – Saskatoon – Snowberry (SBSdk/Atss; ICHmc2/Atss)** is found on dry, warm aspects, on mid to upper slope positions. Soils may be coarse- or fine-textured Brunisols, and humus forms are usually Moders. Aspen is usually the only tree species on this site, and the shrub layer is dominated by saskatoon and common snowberry. Herbs are abundant, with numerous grasses and forbs. The moss layer is poorly developed. This unit has high forage potential. It is more common in the SBSdk than in the ICHmc2. A related association restricted mainly to warm aspects in the Hazelton area is dominated by wild cherries (*Prunus virginiana* and *P. pennsylvanica*) as well as beaked hazelnut (Haeussler 1998b).

#### **Fresh to very moist sites:**

Four wetter plant associations are recognized (in addition to floodplains and sites with fluctuating water tables described separately). These sites occur typically in seepage-receiving slope positions, with soils that retain moisture well into the growing season. The four associations are distinguished from one another by differences in aspect and soil moisture.

**\$At – Canada violet (SBSdk/Atcv; ICHmc2/Atcv)** is found on fresh to moist sites with rich soils. Aspen is very productive in this association, but stands often have an open or meadow-like appearance. This unit is herb-dominated, with Canada violet, cow-parsnip, tall larkspur, and grasses dominating. Soils are mainly Eutric Brunisols, though Luvisols also occur. These sites have high forage and wildlife value. Abundant snags resulting from large-diameter trees provide important wildlife habitat. This unit has good potential for aspen management. It is more common in the SBSdk than in the ICHmc2.

**Ws – Thimbleberry (SBSdk/51)** is usually found on cool aspects with late snow retention and some seepage. Soils are moist, rich Luvisols and Brunisols, sometimes with light mottles, especially if fine-textured. Scouler's willow and aspen are the leading tree species, along with scattered paper birch and conifers. Scouler's willow has been measured up to 14 m on these sites, and easily regenerates from stump suckers. These are brushy sites, with vigorous black twinberry, thimbleberry, red-osier dogwood, and scattered devil's club. Herbs are less abundant because of shrub dominance. There is high wildlife value for browsing ungulates in these "old-growth willow" stands. This unit has been found and sampled only in the SBSdk, although occurrences are possible in the ICHmc2.

**Mountain alder – Stinging nettle (SBSdk/52)** is typified by soils that are rich to very rich, and moist to very moist, often in cold-air drainage pockets. Sites are frequently located in seepage-receiving areas, lower/toe slopes, or slight depressions. Mull or Moder humus forms are common. Scattered birch and black cottonwood may be present but cold-air ponding may discourage tree establishment. Shrubs are abundant and vigorous; they include mountain

alder, red elderberry, willows, black twinberry, red-osier dogwood, and scattered devil's club. Herb cover is not as high as the shrub cover, but species composition is diverse, and includes many indicators of nitrogen-rich soil. These include stinging nettle, cow-parsnip, northern starwort, large-leaved avens, nodding wood-reed, bluejoint, and ferns. This unit was found only in the SBSdk.

**Mountain alder – Mitrewort (SBSdk/53; ICHmc2/55)** occurs on moist toe slope areas with some seepage, and medium to rich soils. Moder humus forms are typical. These are brushy sites but common trees include paper birch, black cottonwood, and scattered hybrid spruce. The shrub layer includes highbush-cranberry, beaked hazelnut (in the ICHmc2), Douglas maple, and devil's club, while common herbs include sweet-scented bedstraw, common mitrewort, trailing raspberry, twistedstalk, nodding wood-reed, and scattered ferns and horsetails. Electrified cat's-tail moss is often present. This unit has high wildlife browse value.

#### **Sites with strongly fluctuating water tables:**

Two associations are described. These sites are typically very wet in early spring, often with standing water, but by late summer will often be quite dry. These associations are depicted on a separate edatopic grid; see page 5 • 225.

**\$At – Hardhack (SBSdk/Atha; ICHmc2/Atha)** is found on fine-textured soils with imperfect drainage. In some cases, this unit will have a history of agricultural use. Aspen is the leading species, with scattered lodgepole pine. Hardhack is the dominant shrub and other common species are black twinberry, prickly rose, Scouler's willow, and common snowberry. Productivity of both herbs and shrubs is low to medium although diversity may be high. Soils are Luvisols or Brunisols, often with a compact horizon at 25–35 cm. This unit is found in both subzones.

**\$At – Lady fern (SBSdk/Atlf; ICHmc2/Atlf)** occurs on lower slopes, level areas, and depressions throughout the subzone, on moist to very moist, rich to very rich soils. Soils are commonly mottled or gleyed. High water tables will be present in spring and late fall, but the moisture regime will be fresh to moist in summer and early fall. Black cottonwood, paper birch, and trembling aspen combinations can occur. Shrub cover is well-developed, including vigorous red-osier dogwood, black twinberry, and beaked hazelnut in the ICHmc2. Lady fern is common. This unit has high wildlife value.

#### **Floodplain sites:**

Cottonwood floodplain site series for the SBSdk and ICHmc2 have been previously described in LMH 26 and thus the same site series names and codes are used here. These site series are further divided into phases to recognize differences in bench height, soil drainage, and flooding frequency and duration. Cottonwood floodplain ecosystems in the SBSdk are currently red-listed (considered rare, threatened) by the B.C. Conservation Data Centre; there has been a recent proposal to blue-list (considered vulnerable) cottonwood floodplain ecosystems in the ICHmc2 (Haeussler 1998a, 1998b). An additional

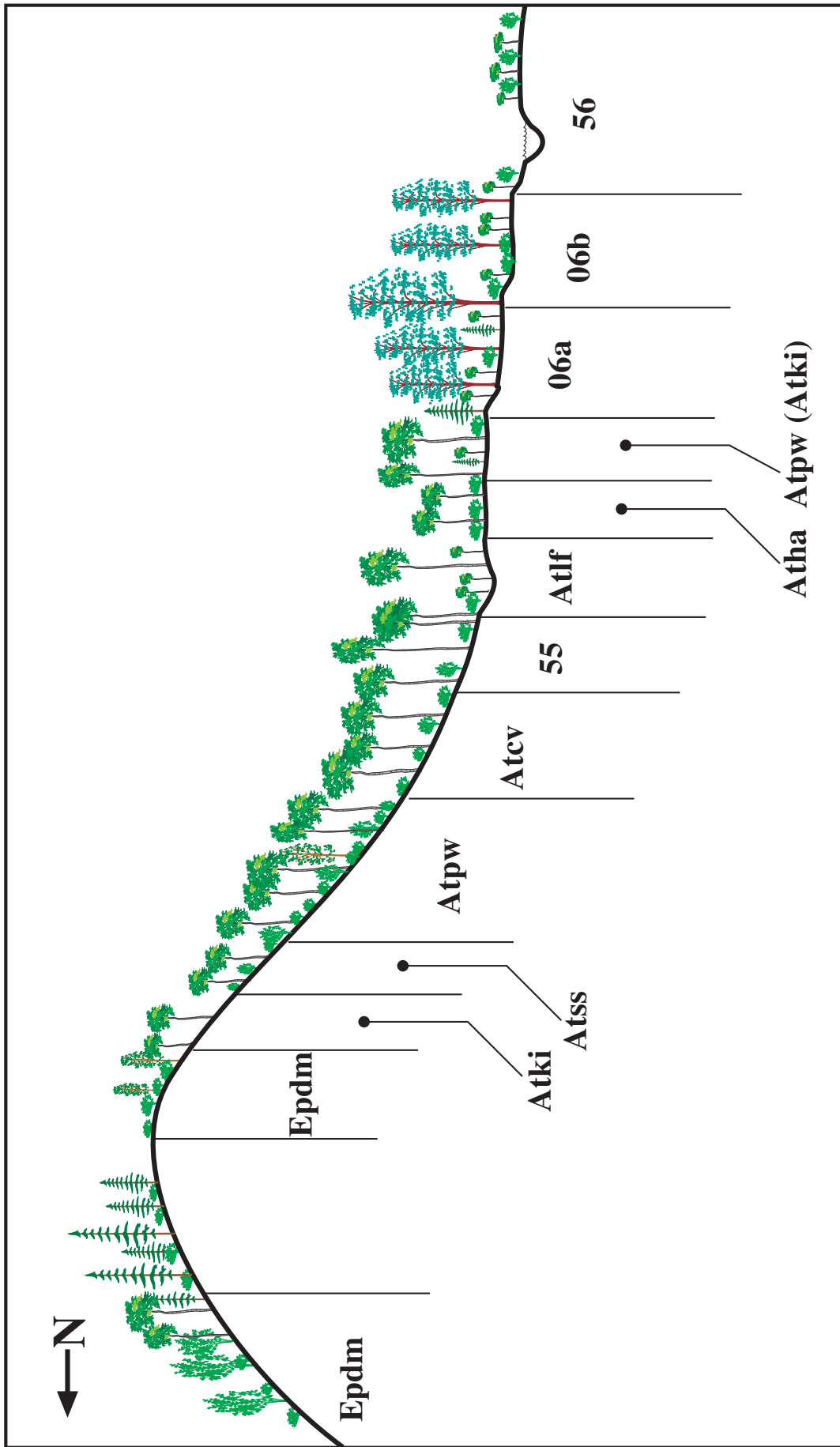
shrub-dominated Drummond's willow – Bluejoint site series is described here and occurs on active low bench sites. Floodplain sites are depicted on a separate edatopic grid; see page 5 • 226.

**Act – Dogwood – Prickly rose; High bench phase (SBSdk/08a) and ActSx – Dogwood; High bench phase (ICHmc2/06a)** occur on the higher fluvial benches associated with rivers and streams throughout the study area. Overbank flooding events are infrequent but seasonally high water tables may bring about subsurface flooding. This phase typically occurs adjacent to larger rivers such as the Bulkley, Morice, Telkwa, Sutherland, Skeena, and Kispiox. Due to coarse-textured fluvial materials, soils are well to moderately well drained. Coarse-textured Brunisols and Regosols are most typical and frequently have mottled horizons. Black cottonwood is the most common deciduous tree, but trembling aspen, paper birch, and willows are common. Conifers are not as restricted to mounds as they are in the SBSdk/08b and ICHmc2/06b. The shrub layer is well-developed and consists of black twinberry, red-osier dogwood, and black gooseberry. Forage and browse potential is low to moderate, but wildlife use is high. Large-diameter snags provide important habitat for cavity-nesting birds.

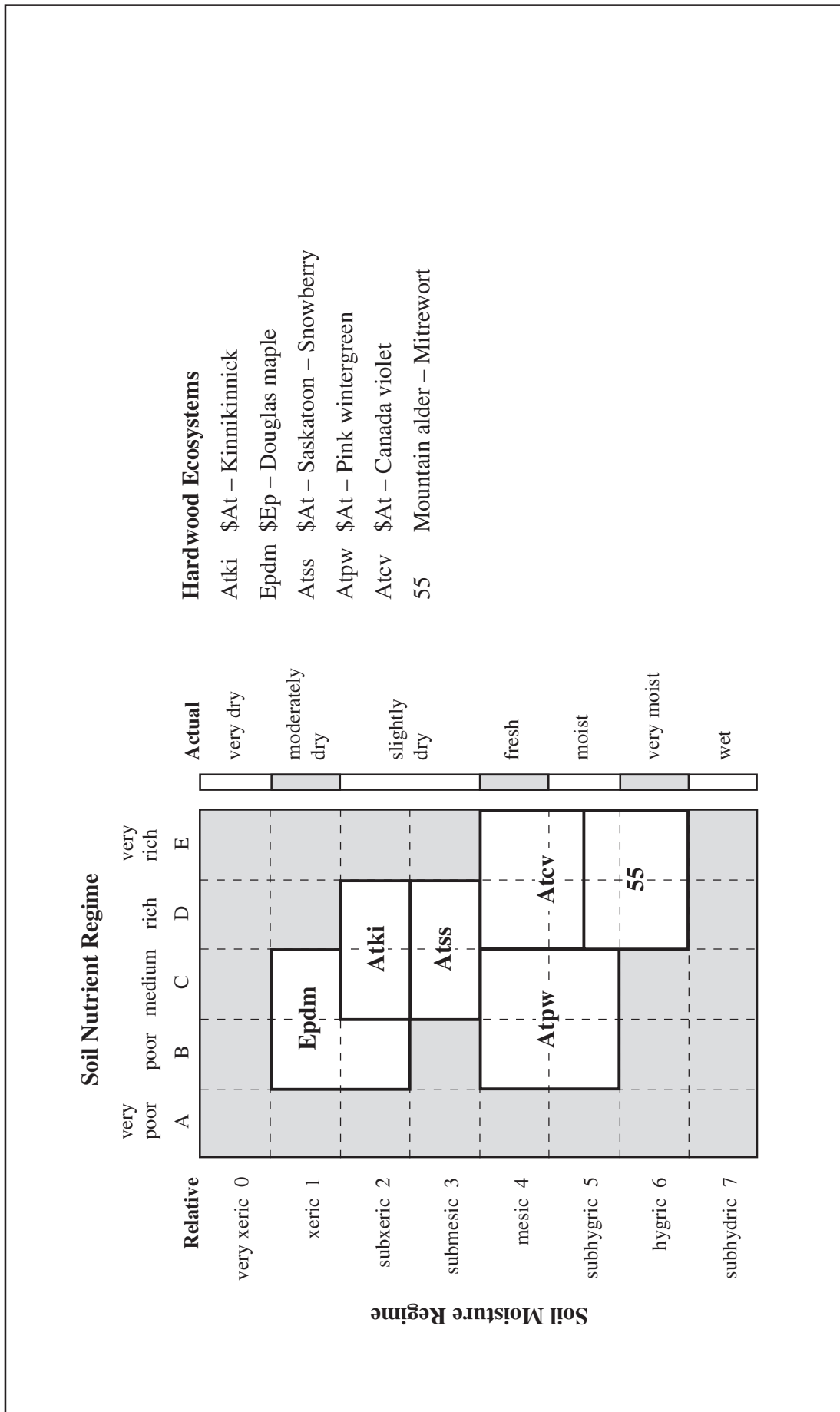
**Act – Dogwood – Prickly rose; Medium bench phase (SBSdk/08b) and ActSx – Dogwood; Medium bench phase (ICHmc2/06b)** occur on mid-bench floodplains that receive frequent subsurface and overbank flooding. As with the high bench phase, this unit typically occurs along the larger rivers in the study area. These sites also occur along the shores of the larger lakes, such as Babine and Francois, where small deltas have developed. Soils are well to imperfectly drained, and are usually Eutric Brunisols or Regosols. Soils typically have buried soil horizons, indicating past flooding events. Mull humus forms are common. Black cottonwood is the leading species and is highly productive. Red-osier dogwood is the dominant shrub, but other species such as black twinberry and mountain alder may be present. Scattered hybrid spruce, if present, grow only on mounds. A diverse herb layer is present (depending on flooding frequency) with plants such as cow-parsnip, enchanter's nightshade, and lady fern indicating high moisture and nutrient availability. Mosses are usually present only on decaying wood. Forage and browse values are high. Large-diameter snags provide important habitat for cavity-nesting birds.

**Drummond's willow – Bluejoint (SBSdk/54; ICHmc2/56)** occurs on low-bench floodplain sites. Soils are silty along meandering streams and rivers such as the Sutherland, but are gravelly when they occur along higher-energy rivers such as the Telkwa or Kispiox. Due to frequent flooding, soils are poorly developed Brunisols or Regosols. Drummond's willow is common but other willows and alders occur as well (Drummond's willow is one of the easiest willows to identify because of the pale, waxy "bloom" on young branches). Trees over 10 m are rare. Herb cover is discontinuous, but frequently includes plants such as broad-leaved willowherb, not found in upland areas. This riparian association has high wildlife values. It occurs in both the SBSdk and ICHmc2.

# ICHmc2 Landscape Profile

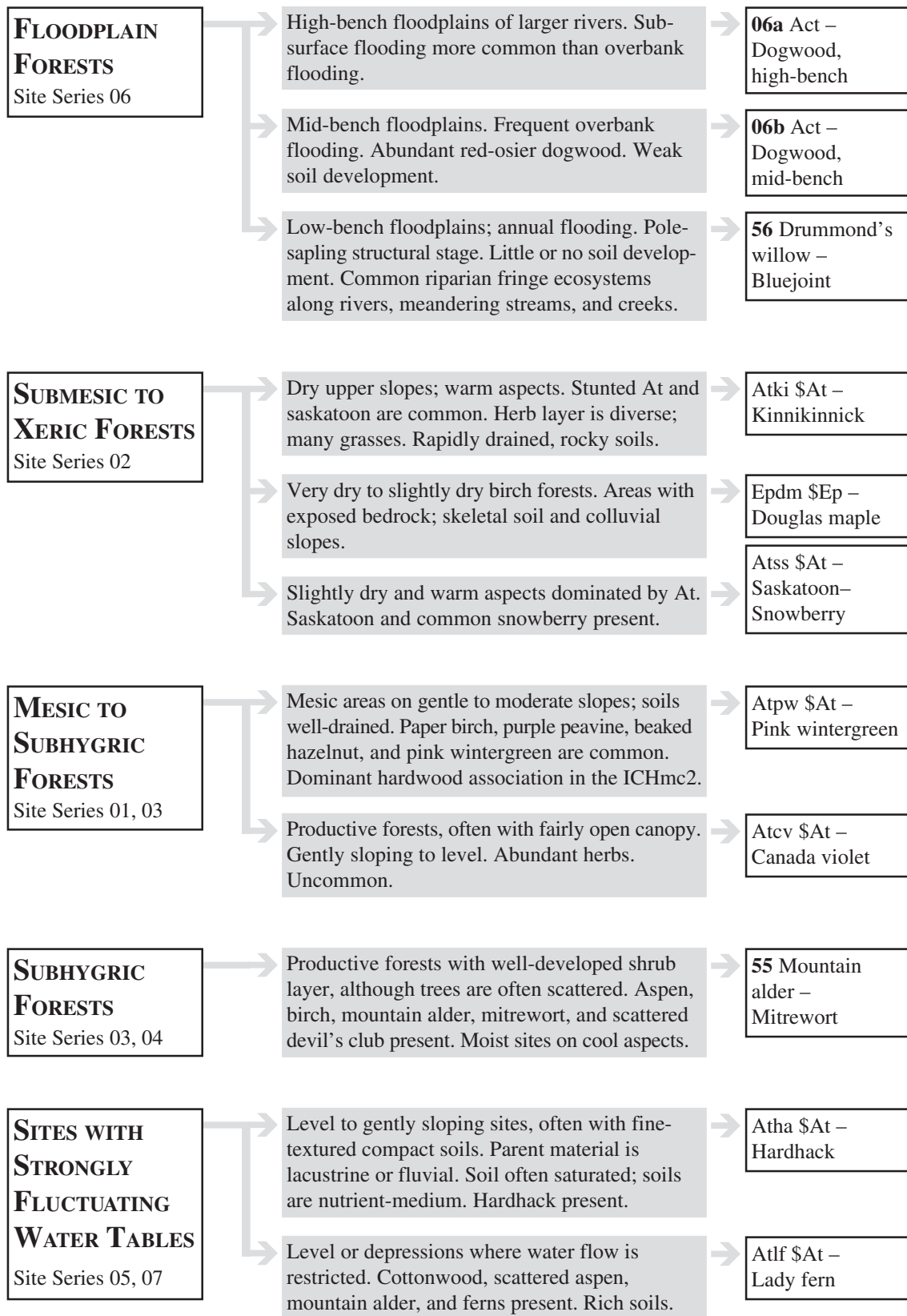


## ICHmc2 Edatopic Grid<sup>a</sup>



<sup>a</sup> See pages 5 • 225 and 5 • 226 for grids depicting sites with strongly fluctuating water tables and floodplain sites.

## ICHmc2 Ecosystems Flowchart





Site Units	Atki	Epdm	Atss	Atpw	Atev	55	Atha	Atlf	06a	06b	56
<b>• Herbs</b>											
<i>Galium triflorum</i>											sweet-scented bedstraw
<i>Aster ciliolatus</i>											fringed aster
<i>Pyrola asarifolia</i>											pink wintergreen
<i>Rubus pubescens</i>											trailing raspberry
<i>Galium boreale</i>											northern bedstraw
<i>Lathyrus nevadensis</i>											purple peavine
<i>Osmorhiza chilensis</i>											mountain sweet-cicely
<i>Orthilia secunda</i>											one-sided wintergreen
<i>Cornus canadensis</i>											bunchberry
<i>Heracleum lanatum</i>											cow-parsnip
<i>Petasites palmatus</i>											palmette-leaved coltsfoot
<i>Smilacina racemosa</i>											false Solomon's-seal
<i>Thalictrum occidentale</i>											western meadowrue
<i>Aralia nudicaulis</i>											wild sarsaparilla
<i>Aster modestus</i>											great northern aster
<i>Epilobium angustifolium</i>											fireweed
<i>Mitella nuda</i>											common mitrewort
<i>Viola canadensis</i>											Canada violet
<i>Actaea rubra</i>											baneberry
<i>Clintonia uniflora</i>											queen's cup
<i>Aster conspicuus</i>											showy aster
<i>Lathyrus ochroleucus</i>											creamy peavine
<i>Vicia americana</i>											American vetch
<i>Geum macrophyllum</i>											large-leaved avens
<i>Linnaea borealis</i>											twinflower
<i>Circaea alpina</i>											enchanter's-nightshade
<i>Sanguisorba canadensis</i>											Sitka burnet
<i>Tiarrella trifoliata</i>											three-leaved foamflower
<i>Urtica dioica</i>											stinging nettle
<b>• Mosses</b>											
<i>Rhytidadelphus triquetrus</i>											electrified cat's-tail moss
<i>Brachythecium</i> spp.											ragged mosses
<i>Mnium</i> spp.											leafy mosses
<i>Pleurozium schreberi</i>											red-stemmed feathermoss
<i>Ptilium crista-castrensis</i>											knight's plume
<i>Hylocomium splendens</i>											step moss
<i>Climacium dendroides</i>											tree moss
<i>Peltigera aphthosa</i>											freckled lichen
<i>Cladonia</i> spp.											cladonia lichens

<sup>a</sup> Prominence bars are described in LMH 26, p. 3 • 6.

[Click here to continue to page 5-220](#)

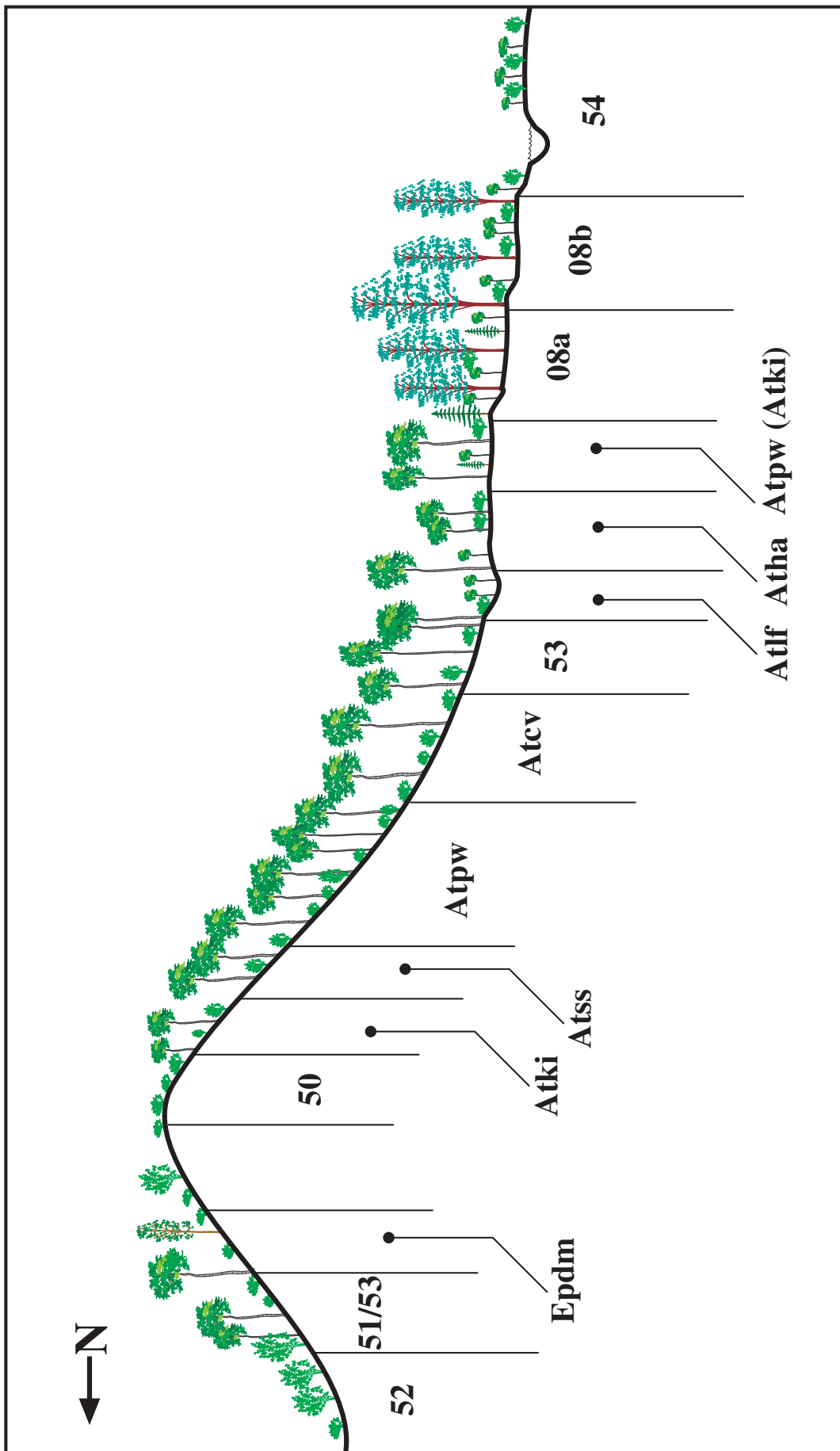
## ICHmc2 Environment Table<sup>a</sup>

Site unit	Soil moisture/nutrients	Slope position	Slope % range	Parent material	Soil classification
Atki	2/C-D	mid - crest	25 - 55	M, C	HFP, DYB
Epdm	1-2/B-C	mid - crest	15 - 85	C	DYB, EB, R
Atss	3/C-D	mid - upper	0 - 80	M, C, FG	DYB, EB
Atpw	4-5/B-C	lower - upper	5 - 55	M, FG, C	DYB, EB
Atcv	4-5/D-E	lower - mid	3 - 62	M, FG, C	DYB, GL, SB
55	5-6/D-E	depressions, level - lower	0 - 40	M, F, C	DYB, EB, MB, HG, GL
Atlf	5-6/D-E	level	0 - 5	LG, M, F	DYB, GL, EB, HG
Atha	4-6/D-E	depressions - level	0 - 4	F, M	G, GL, DYB, EB
06a	4-5/D-E	high-bench floodplains	0	F, FG	EB, R
06b	5-6/D-E	mid-bench floodplains	0	F	R, HG, EB
56	5-7/C-E	low-bench floodplains	0	F	R, G

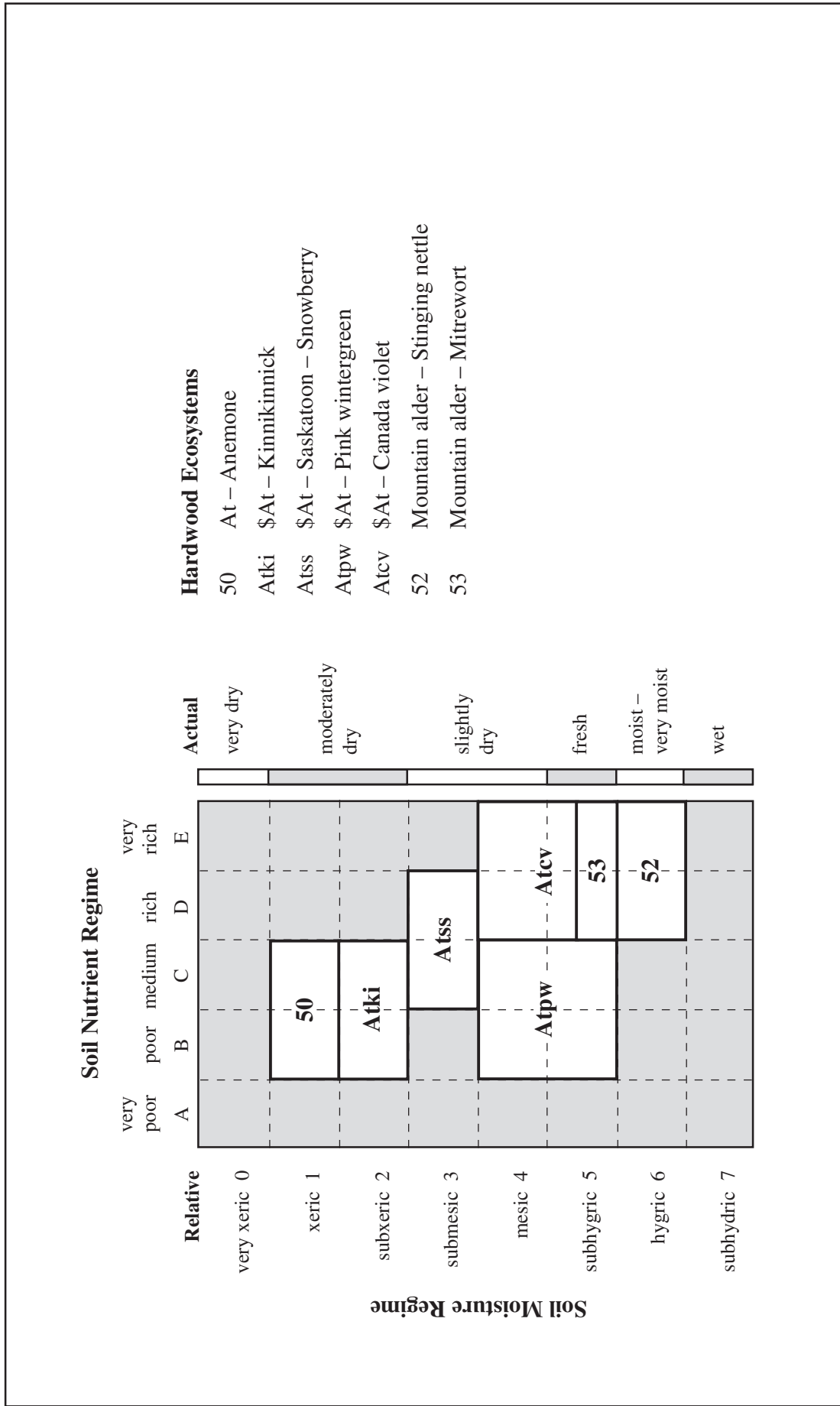
<sup>a</sup> Abbreviations are defined in LMH 25 and LMH 26.

<b>Humus form</b>	<b>Drainage</b>	<b>Possible root-restricting layers</b>	<b>Important site features</b>
Moders, Mulls	r - w	rock, coarse gravels	Soil usually gravelly or stony; also found on glacialfluvial terraces. Low tree vigour.
Moders	x - w	rock, colluvial fragments	Rocky colluvial slopes and exposed bedrock present. Birch common.
Moders	r - w	clay-rich Bt layer	Warm aspects. Less productive than Atpw.
Moders, Mors	w - m	usually deep rooting	Mesic sites.
Moders, Mulls	w - m	usually deep rooting	Warm aspects. Rich soils. Very productive aspen stands. Herb-dominated.
Moders, Mulls	m - i	excessive moisture	Cool aspects. Brushy sites. Seepage common.
Moders, Mors	m - p	clay-rich Bt layer, compact morainal material	Strongly fluctuating water table; very moist to very dry soils. Mottles often present in Bt layer; poor soil aeration.
Moders	m, i	standing water	Strongly fluctuating water table; very moist to very dry soils; rich sites; mottles present.
Moders, Mulls	m	subsurface flooding	Soils often coarse; high water tables.
Moders, Mulls	w, m, i	excessive moisture	Frequent flooding.
Moders, Mulls	m - p	clay-rich Bt layer, compact morainal material	Riparian strips along creeks and rivers; soils may be either silty or gravelly; annual flooding.

**SBSdk Landscape Profile**

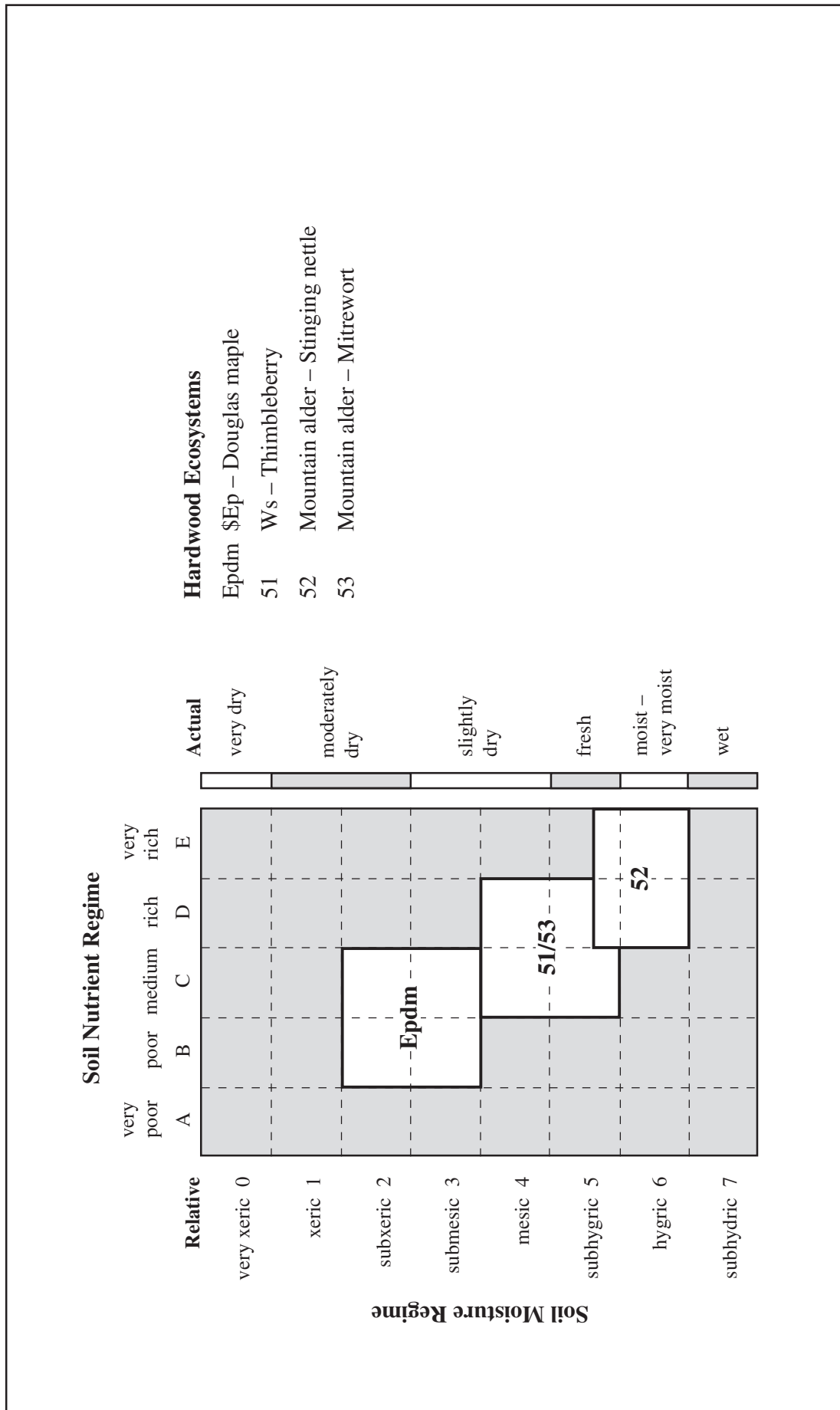


# SBSdk Edatopic Grid for Hardwood Associations<sup>a</sup>

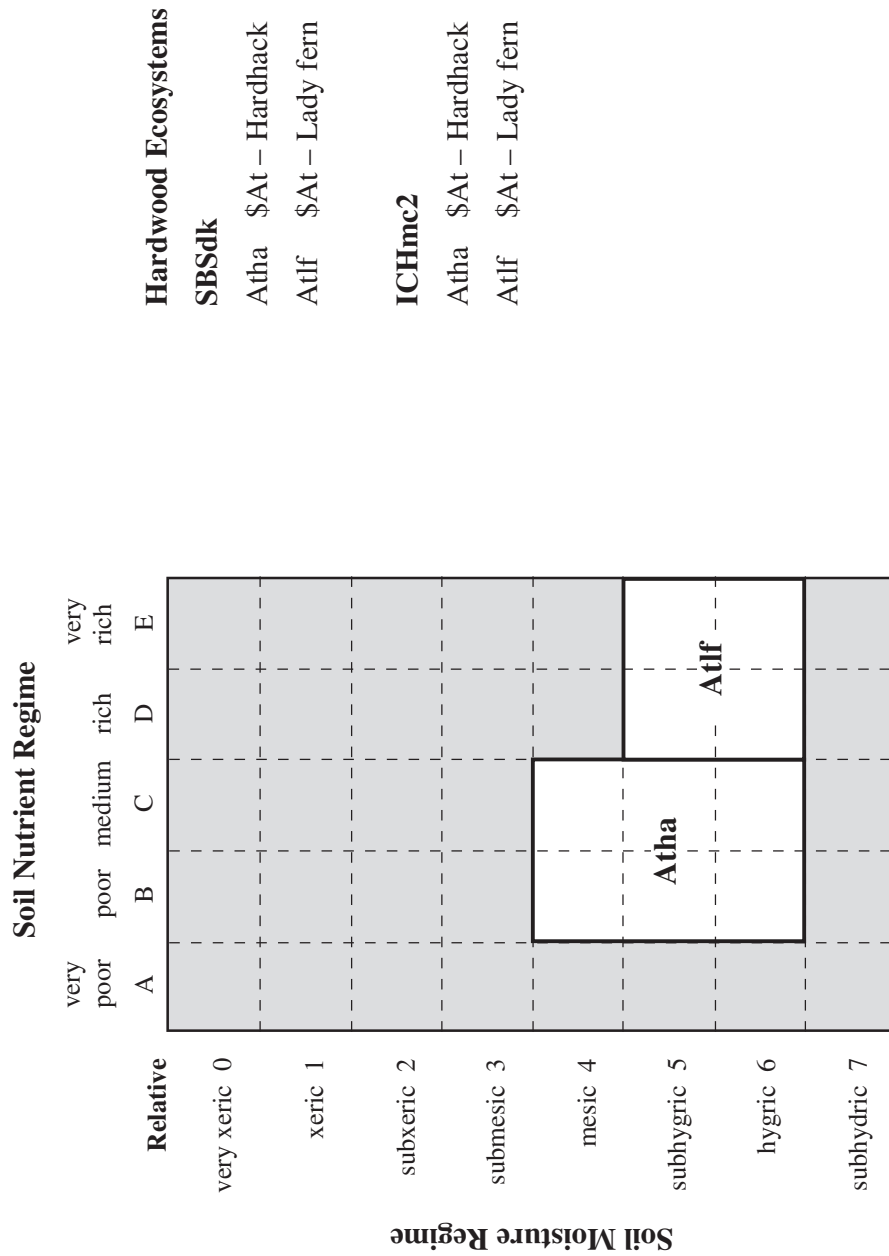


<sup>a</sup> See pages 5 • 224 to 5 • 226 for grids depicting sites on cool aspects, sites with strongly fluctuating water tables, and floodplain sites.

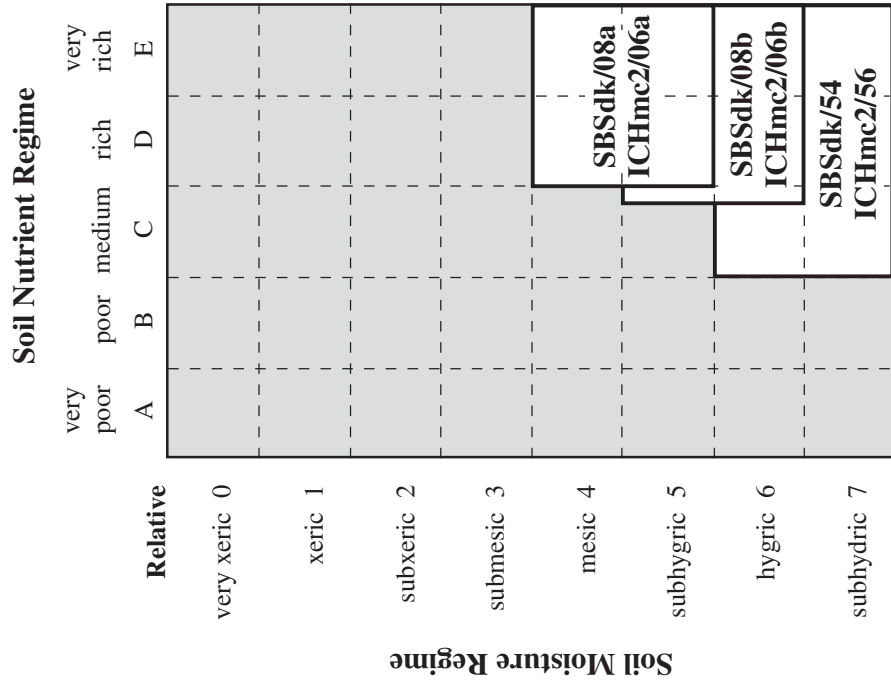
## SBSdk Edatopic Grid for Cool Aspects



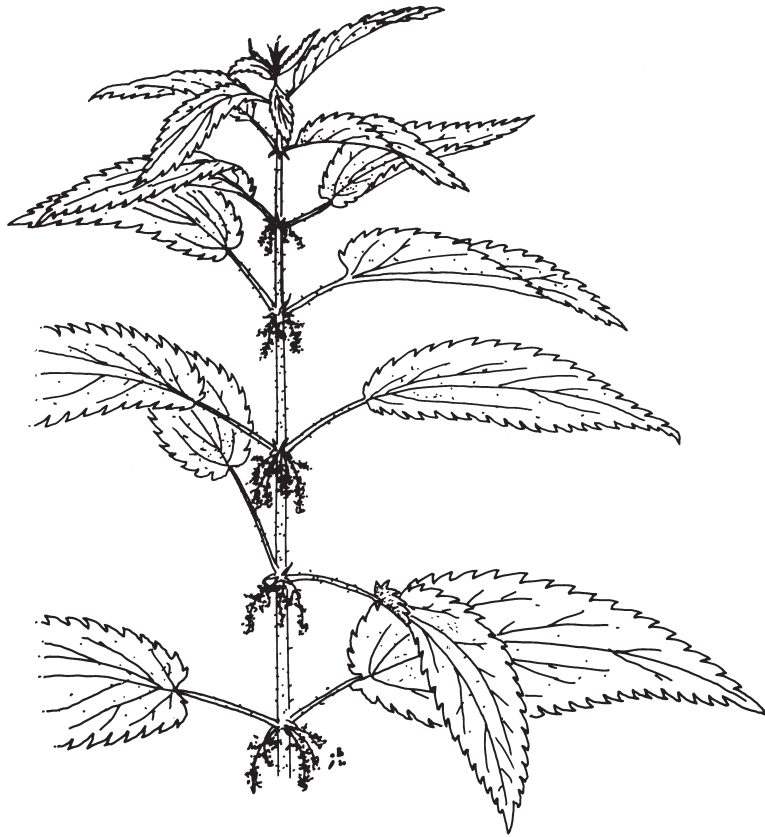
# SBSdk & ICHmc2 Edatopic Grid for Strongly Fluctuating Water Tables



## SBSdk & ICHmc2 Edatopic Grid for Floodplains



- Hardwood Ecosystems**
- SBSdk**
- 08a Act – Dogwood – Prickly rose; High-bench phase
  - 08b Act – Dogwood – Prickly rose; Medium-bench phase
  - 54 Drummond’s willow – Bluejoint
- ICHmc2**
- 06a ActSx – Dogwood; High-bench phase
  - 06b ActSx – Dogwood; Medium-bench phase
  - 56 Drummond’s willow – Bluejoint



Stinging nettle  
*Urtica dioica*

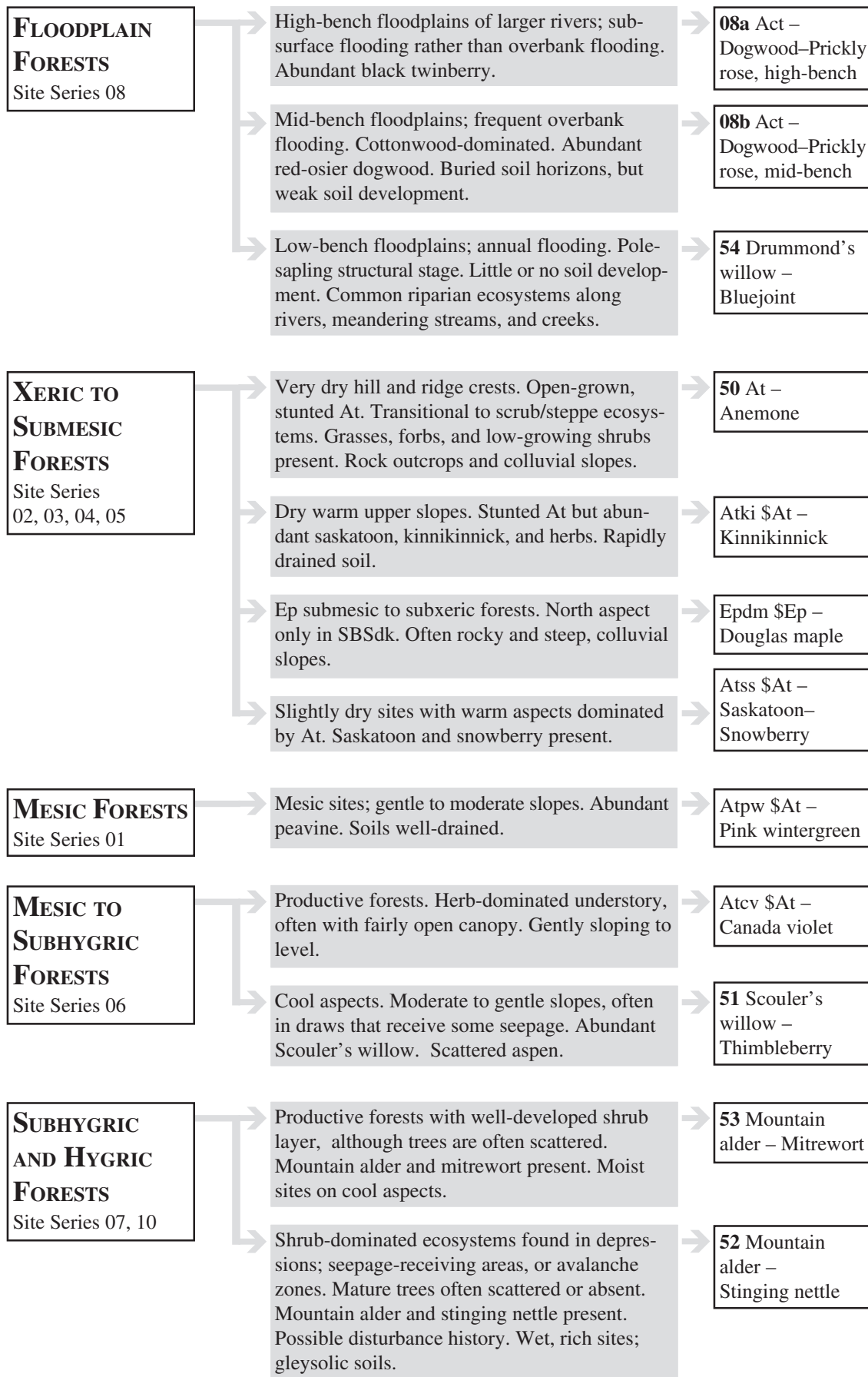


Common mitrewort  
*Mitella nuda*

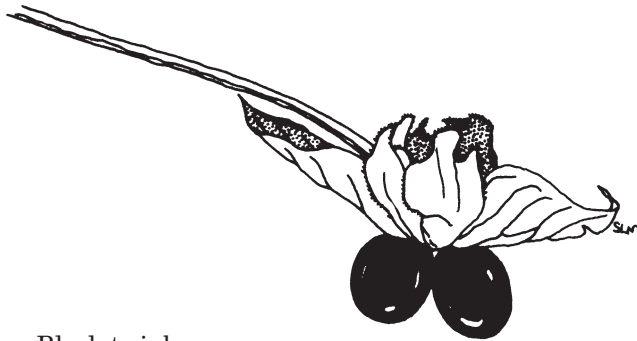
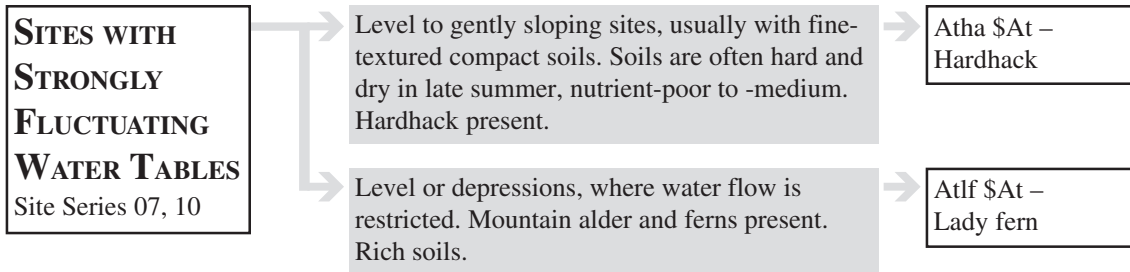


Baneberry  
*Actaea rubra*

# SBSdk Hardwood Ecosystems Flowchart



# SBSdk Hardwood Ecosystems Flowchart (continued)



Black twinberry  
*Lonicera involucrata*



Red elderberry  
*Sambucus racemosa*



Site Units	50	51	52	53	Atha	Atlf	08a	08b	54
<b>• Herbs</b>									
<i>Lathyrus nevadensis</i>									purple peavine
<i>Thalictrum occidentale</i>									western meadowrue
<i>Galium boreale</i>									northern bedstraw
<i>Smilacina racemosa</i>									false Solomon's-seal
<i>Heracleum lanatum</i>									cow-parsnip
<i>Cornus canadensis</i>									bunchberry
<i>Galium triflorum</i>									sweet-scented bedstraw
<i>Aster ciliolatus</i>									fringed aster
<i>Epilobium angustifolium</i>									fireweed
<i>Petasites palmatus</i>									palmate coltsfoot
<i>Pyrola asarifolia</i>									pink wintergreen
<i>Vicia americana</i>									American vetch
<i>Aster conspicuus</i>									showy aster
<i>Rubus pubescens</i>									trailing raspberry
<i>Aralia nudicaulis</i>									wild sarsaparilla
<i>Actaea rubra</i>									baneberry
<i>Fragaria virginiana</i>									wild strawberry
<i>Orthilia secunda</i>									one-sided wintergreen
<i>Limnaea borealis</i>									twinflower
<i>Osmorhiza chilensis</i>									mountain sweet-cicely
<i>Aster modestus</i>									great northern aster
<i>Geum macrophyllum</i>									large-leaved avens
<i>Viola canadensis</i>									Canada violet
<i>Urtica dioica</i>									stinging nettle
<i>Delphinium glaucum</i>									tall larkspur
<i>Lathyrus ochroleucus</i>									creamy peavine
<i>Mitella nuda</i>									common mitrewort
<i>Angelica geniflexa</i>									kneeling angelica
<i>Streptopus amplexifolius</i>									clasping twistedstalk
<i>Clintonia uniflora</i>									queen's cup
<i>Anemone multifida</i>									cut-leaved anemone
<i>Sanguisorba canadensis</i>									Sitka burnet
<b>• Mosses</b>									
<i>Brachythecium</i> spp.									ragged mosses
<i>Pleurozium schreberi</i>									red-stemmed feathermoss
<i>Mnium</i> spp.									leafy mosses
<i>Hylacomium splendens</i>									step moss
<i>Ptilium crista-castrensis</i>									knight's plume
<i>Rhytidadelphus triquetrus</i>									electrified cat's-tail moss
<i>Rhizomnium glabrescens</i>									large leafy moss
<i>Dicranum</i> spp.									heron's-bill mosses
<i>Aulacomnium palustre</i>									glow moss
<b>• Lichens</b>									
<i>Peltigera</i> spp.									peit lichens
<i>Cladonia</i> spp.									reindeer lichens
<i>Cladonia</i> spp.									cladonia lichens

<sup>a</sup> Prominence bars are described in LMH 26, p. 3 • 6.

**SBSdk Environment Table<sup>a</sup>**

Site unit	Soil moisture/nutrients	Slope position	Slope % range	Parent material	Soil classification	Humus form
50	1/B-C	upper - crest	35 - 70	C	EB	Moders
Atki	2-(3)/B-C	level, upper	4 - 15	M, FG	DYB, GL	Moders
Epdm	2-3/C-D	mid - upper	20 - 70	C	EB, DYB	Moders
Atss	3/C-D	level - upper	0 - 60	M, C, LG, FG	GL, MB, DYB, EB	Moders, Mors, Mulls
Atpw	4-5/B-C	level - mid	0 - 55	M, LG, FG	GL, DYB, EB	Moders, Mors
Atcv	4-5/D-E	level - toe - mid	0 - 35	M, FG, LG	GL, EB, DYB, MB	Moders, Mulls
51	4-5/C-D	lower - mid	0 - 40	M, LG, FG	GL, DYB, G, SB	Moders
52	5-6/D-E	depressions, level - mid	0 - 45	F, M, LG, FG	EB, DYB, HG, G, HFP	Moders
53	5/D-E	level - mid	0 - 5	M, FG	DYB, EB	Moders
Atha	4-6/B-C	level - mid	0 - 15	LG, M, F, FG	GL, LG, DYB, EB	Moders
Atlf	5-6/D-E	depressions - level	0 - 4	FG, M, LG	DYB, EB, MB	Moders, Mulls
08a	4-6/D-E	high-bench floodplain	0 - 4	F, FG	DYB, MB, EB, R	Moders, Mulls
08b	5-6/D-E	mid-bench floodplain	0	F	MB, R, DYB, EB	Moders, Mulls
54	5-7/C-E	low-bench floodplain	0	F	R, G	Moders, Mulls

<sup>a</sup> Abbreviations are defined in LMH 25 and LMH 26.

<b>Drainage</b>	<b>Possible root-restricting layers</b>	<b>Important site features</b>
x - r	rock	Warm, very dry. Stunted aspen. Base-rich bedrock. Adjacent to scrub/steppe units.
r	rock, coarse gravels	Soil usually gravelly or stony; also found on glacial fluvial terraces. Low tree vigour.
r - w	rock, colluvial fragments	Northerly (cool) aspects. Rocky soils. Birch common.
r - w	clay-rich Bt layer	Warm aspects. Less productive than Atpw.
w - m	usually deep rooting	Mesic sites.
w - i	usually deep rooting	Warm aspects. Rich soils. Very productive aspen stands. Herb-dominated.
w - i	compact morainal material, clay-rich Bt layers	Cool aspects, usually in draws that receive some seepage. Brush-dominated.
m - p	excessive moisture	Rich, moist sites.
m - i	excessive moisture	Cool aspects. Brushy sites. Slightly wetter than unit 51.
i - p	clay-rich Bt layer, compact morainal material	Strongly fluctuating water tables; very moist to very dry soils; mottles often present in Bt layer; poor soil aeration.
i - p	usually deep rooting	Strongly fluctuating water tables; very moist to very dry soils; rich sites; mottles present.
w - i	usually deep rooting	Soils often coarse; high water tables.
w - i	excessive moisture	Frequent flooding.
m - p	excessive moisture	Riparian strips along creeks and rivers; soils may be either silty or gravelly; annual flooding.

## Site Unit Interpretation Tables

### Range and Wildlife Attributes

Site unit	Shrub cover and vigour	Leading shrubs	Herb cover and vigour
SBSdk/50	low	saskatoon, snowberry, choke cherry	low
Atki	low	saskatoon, prickly rose, snowberry, beaked hazelnut	low
Epdm	low to moderate	Douglas maple, red-osier dogwood, black gooseberry, Scouler's willow	very low to low
Atss	moderate	snowberry, prickly rose, thimbleberry, soopolallie	moderate to high
Atpw	moderate to high	prickly rose, highbush-cranberry thimbleberry, red-osier dogwood, beaked hazelnut	moderate
Atev	moderate to high	thimbleberry, twinberry, prickly rose, red-osier dogwood, beaked hazelnut	very high
SBSdk/51	very high	thimbleberry, devil's club, twinberry, Scouler's willow, red-osier dogwood	moderate
SBSdk/52	very high	mountain alder, twinberry, devil's club, Scouler's willow	high
ICHmc2/55 SBSdk/53	high	devil's club, mountain alder, red-osier dogwood, twinberry	low to moderate
Atha	moderate	hardhack, twinberry, prickly rose	low to moderate
Atlf	very high	prickly rose, twinberry, red-osier dogwood, beaked hazelnut	moderate
ICHmc2/06a SBSdk/08a	high	red-osier dogwood, twinberry, prickly rose, thimbleberry, beaked hazelnut	low to moderate
ICHmc2/06b SBSdk/08b	very high	red-osier dogwood, twinberry, prickly rose	low to moderate
ICHmc2/56 SBSdk/54	moderate	Drummond's willow, twinberry	low to moderate

<b>Leading herbs</b>	<b>Browse/forage potential</b>	<b>Average CWD (m<sup>3</sup>/ha)</b>	<b>Snags/ha</b>	<b>Overall wildlife value</b>
cut-leaved anemone, slender wheatgrass, wild sarsaparilla	low	0.55	2	very high
kinnikinnick, blue wildrye, showy aster	low	0.63	15	very high
purple peavine, blue wildrye, fringed aster	low to medium	1.25	75	moderate
purple peavine, showy aster, western meadowrue	low to medium	1.60	70	high
purple peavine, pink wintergreen, bunchberry	medium to high	1.63	88	moderate
purple peavine, blue wildrye, western meadowrue, wild sarsaparilla	very high	1.17	53	very high
oak fern, false Solomon's seal, purple peavine, baneberry, stinging nettle	very high	0.70	78	high
stinging nettle, lady fern, common horsetail	very high	0.90	18	high
oak fern, lady fern, cow parsnip	high	4.20	21	moderate to high
purple peavine, blue wildrye, fireweed	low to medium	1.04	37	low to moderate
lady fern, purple peavine, bluejoint, common horsetail	very high	2.11	4	high
cow parsnip, blue wildrye, common horsetail, fireweed	medium to high	6.83	23	high
common horsetail, blue wildrye, bluejoint, cow parsnip	very high	6.56	44	very high
bluejoint, great northern aster	low to medium	0.30	1	high

## Site Unit Interpretation Tables

### Timber and Silviculture Attributes<sup>a</sup>

Site unit	Tree productivity	Vegetation potential	Probable soil compaction hazard
SBSdk/50	low	low	low
Atki	low	low	low
Epdm	low to moderate	low	low
Atss	low to moderate	moderate	low
Atpw	moderate	moderate	low to moderate
Atcv	high	moderate to high (herb-dominated)	moderate
SBSdk/51	high	high	moderate
SBSdk/52	moderate	very high	high
ICHmc2/55 SBSdk/53	high	high	high
Atha	low to moderate	moderate	very high
Atlf	high	high	high
ICHmc2/06a SBSdk/08a	very high	high	low on sandy, gravelly soils; high on silty soils
ICHmc2/06b SBSdk/08b	very high	very high	low on sandy, gravelly soils; high on silty soils
ICHmc2/56 SBSdk/54	low; limited by frequent flooding	high	low on sandy, gravelly soils; high on silty soils

<sup>a</sup> Other important silvicultural information for each subzone is found in Banner *et al.* (1993).

Overall suitability for timber production/silviculture	Comments
nil	Moisture deficits.
low to nil	Moisture deficits.
low	Moisture deficits; cool aspects.
low to moderate	Some potential for aspen management.
high	Aspen and birch (in the ICH) management unit.
moderate	Aspen management unit. Winter logging preferable.
low	Often very brushy sites with scattered trees.
low	Often very brushy sites with scattered trees.
low	Brushy sites.
low to moderate	Winter logging only.
low	Possible riparian values.
moderate to high	Cottonwood and spruce management units. Riparian values.
low to moderate	Riparian values.
nil	Riparian values.

## Management Units

Site units described in this guide can be combined into the following “management units” that share similar environmental and floristic characteristics as well as management interpretations.

## Hardwood Management Units

Site unit	Management unit	Generalized site features	Comments
SBSdk/50, Atki, Epdm, Atss	1	Very to slightly dry, coarse soils; upper slopes; often steep.	Low to medium browse/forage productivity; moderate to very high wildlife values.
Atpw, Atpv	2	Fresh, medium to rich soils; often warm aspects. Low to moderate soil compaction hazard.	Medium to high browse/forage potential; moderate to high timber/silviculture values.
SBSdk/51, ICHmc2/55, SBSdk/53	3	Moist, rich soils; seepage often present; often on cool aspects.	Brush-dominated sites. High to very high browse/forage potential; low timber/silviculture values.
Atha	4	Fine-textured Bt horizons with very high compaction hazard.	Low to medium browse/forage potential; low to moderate timber/silviculture values.
SBSdk/52, Atlf	5	Moist and very moist areas on toe slopes and in depressions; rich soils; standing water common in spring and fall.	Brush-dominated sites. Tree productivity is high, but trees tend to be scattered. High wildlife values; low timber/silviculture values.
ICHmc2/06a, SBSdk/08a	6	High-bench floodplains.	Cottonwood and spruce management units with very high riparian and wildlife values.
ICHmc2/06b, SBSdk/08b, ICHmc2/56, SBSdk/54	7	Low- and medium-bench riparian floodplains directly along rivers and creeks; annual flooding.	Very high riparian and wildlife values; nil to moderate timber/silviculture values (depending on flooding frequency).

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Saskatoon  
*Amelanchier alnifolia*



Black gooseberry  
*Ribes lacustre*



Kinnikinnick  
*Arctostaphylos uva-ursi*