

Climate The ICH Zone has cool, wet winters and warm, moist to dry summers (Table 6). Annual precipitation is among the highest in the Region, exceeded only by that of the ESSF and associated alpine and by portions of the SBSwk1. About 40% of the annual precipitation falls during the summer months, from May through September. Peak precipitation periods are early winter and early summer.

TABLE 6 Environmental characteristics of ICH subzones and variants in the Cariboo Forest Region

	ICHdk	ICHmk3	ICHwk2	ICHwk4
Area (km ²)	425	1123	1726	607
Elevation range (m)	900–1250	780–1250	725–1250	800–1250
Climate	no data			no data
Precipitation (mm)				
Mean annual		722	842	
Mean summer		333	354	
Mean winter		389	490	
Mean annual				
Snowfall (cm)		214	262	
Temperature(°C)				
Mean annual		4.2	4.0	
Mean - warmest month		15.0	15.1	
Mean - coldest month		-9.3	-10.0	
Frost-free days		166	165	
Soils				
Zonal soils ^a	Br.G.L.	Br.G.L. (O.HF.P.)	O.HF.P.	O.HF.P.
Zonal humus form ^b	HR (RM)	HR (RM)	HR, RM	HR, RM

^aBr.G.L. = Brunisolic Gray Luvisol; O.HF.P. = Orthic Humo-Ferric Podzol

^bHR = HemiMor; RM = MorModer

Note: ICHmw3 not included due to very small area (32 km²) in Cariboo Forest Region.

Snowfall accounts for about 30–35% of the annual precipitation and results in maximum snowpacks of about 1.5 m on plateau areas and 1.5–2.0 m at upper elevations of the zone in the Quesnel Highland. Mean annual temperatures are among the warmest in the Cariboo Forest Region and are exceeded only by those of the Bunchgrass Zone, portions of the Interior Douglas-fir Zone, and warmest subzones of the Sub-Boreal Spruce Zone. Growing-season frosts are less common in the ICH than in the SBS or IDF zones due to higher humidity and cloud cover, resulting in reduced overnight radiation cooling.

Soils Soils of the ICH are developed primarily on basal moraine (glacial till) deposits. These are derived from a variety of rock types including basalt, schist, limestone, quartzite, phyllite, and siltstone, but due to widespread mixing of rock types, none have a dominant influence on soil development. Soils derived from predominantly volcanic rocks tend to have a loamy to clayey texture; those derived from schists and quartzites tend to be loamy to sandy; and those derived from fine-texture sedimentary rocks tend to be loamy to clayey (Lord 1984).

Fluvial and glaciofluvial deposits are common in the ICH. They tend to be gravelly and sandy and occur as terraces, eskers, kames, and outwash plains. Glaciolacustrine deposits occur locally on valley slopes above the north arm of Quesnel Lake.

Soils on zonal sites range from Brunisolic Gray Luvisols in the drier, plateau portion of the zone to Orthic Humo-Ferric Podzols in the wetter and higher-elevation portions of the zone. Brunisols occur on dry ridge crests and coarse-textured deposits. Gleysols are common on poorly drained deposits. Seepage volumes in the ICH are relatively high, and soils on lower slopes are often mottled.

Subzones and Variants of the ICH Zone in the Cariboo Forest Region

Four ICH subzones, one with two variants and two represented by a single variant, occur in the Cariboo Forest Region:

ICHdk - Dry Cool Subzone

ICHmk - Moist Cool Subzone

ICHmk3 - Horsefly Variant

ICHmw - Moist Wet Subzone

ICHmw3 - Thompson Variant

ICHwk - Wet Cool Subzone

ICHwk2 - Quesnel Variant

ICHwk4 - Cariboo Variant

ICHdk Subzone The ICHdk is a small subzone (425 km²) that occurs just north of Canim Lake on the southeastern Fraser Plateau and the southwestern-most portion of the Quesnel Highland. It occurs at elevations between about 900 and 1250 m on a hilly to low mountainous landscape that rises from Canim Lake northward toward the Quesnel Highland. At lower elevations, it borders the IDFmw2, while at higher

elevations it borders the ICHmk3 and the ESSFwk1. The ICHdk also has a very small area in the adjacent Kamloops Forest Region, just north of Mahood Lake.

The ICHdk is the driest ICH subzone in the Cariboo Forest Region and one of the driest in British Columbia. Although no climate data are available for this subzone, vegetation and soils suggest that precipitation amounts are only slightly greater than, and temperatures similar to, those of the SBSdw1.

Vegetation of the ICHdk is transitional between the SBSdw1 and the ICHmk3 and distinguished from other ICH subzones by relatively dry-climate shrubs such as saskatoon and soopolallie and the prevalence of lodgepole pine forests (Table 7). Climax tree species on zonal sites are western redcedar and subalpine fir, but, due to frequent wildfires, climax forests are uncommon. Douglas-fir and lodgepole pine forests cover most of the landscape. These forests often include scattered western redcedar, subalpine fir, and hybrid white spruce trees in the canopy and abundant redcedar and subalpine fir in the understory. Trembling aspen is also common. Western hemlock is uncommon.

Mature forests on zonal sites typically have a floristically rich and well-developed shrub and herbaceous undergrowth. Common shrubs include falsebox, black huckleberry, thimbleberry, saskatoon, and red-osier dogwood. The herbaceous layer is nearly continuous and includes wild sarsaparilla, twinflower, bunchberry, prince's pine, trailing raspberry, and clasping twistedstalk. Moss cover is also well developed but often obscured by herbaceous vegetation. Principal species are red-stemmed feathermoss and knight's plume.

ICHmk3 Variant The ICHmk3 in the Cariboo Forest Region occurs primarily on the Fraser Plateau, west of Quesnel Lake and along the western third of Horsefly Lake. A smaller portion of the variant occurs in the western Quesnel Highland in the McKinley Creek drainage, including McKinley, Elbow, and Gotchen lakes, and in the Hendrix Creek and Deception Creek valleys. An outlier of the ICHmk3 occurs near Spectacle Lake in Bowron Provincial Park. The variant occurs primarily on gently rolling plateau topography, except in the Hendrix and Deception creek valleys and near Spectacle Lake, where it occupies valley bottoms between low mountains. The ICHmk3 is primarily a transition between the SBSdw1 on plateau landscapes and the wetter ICHwk2 of the more rugged Quesnel Highland.

ICHdk
INTERIOR CEDAR–HEMLOCK
DRY COOL SUBZONE

The ICHdk is a small (430 km²) subzone that occurs just north of Canim Lake along the transition between the Fraser Plateau and the Quesnel Highland. Elevations rise from approximately 900 m in the south near Canim Lake to 1250 m in the north on the edge of the Quesnel Highland.

Distinguishing Adjacent Units from the ICHdk

The **IDFmw2** occurs around Canim Lake at elevations below the ICHdk. The **ICHmk3** and **ICHmw3** occur north and east of the ICHdk in the moister climate of the Quesnel Highland. The **ESSFwk1** occurs at higher elevations on mid elevation mountain slopes. The **SBSdw1** occurs to the west of the ICHdk in the drier climates of the Fraser Plateau.

In the **IDFmw2**, zonal sites have:

- Douglas-fir–dominated climax forests;
- pinegrass;
- no bunchberry, black huckleberry, three-leaved foamflower, five-leaved bramble, or subalpine fir.

In the **SBSdw1**, zonal sites have:

- pinegrass;
- Douglas-fir in climax forests;
- no redcedar, foamflower, rosy twistedstalk, or five-leaved bramble.

In the **ICHmk3**, zonal sites have:

- abundant redcedar in the canopy of mature stands;
- abundant thimbleberry.

In the **ICHmw3**, zonal sites have:

- abundant redcedar and western hemlock in the canopy of mature stands.

Distribution of ICHdk Subzone in the Cariboo Forest Region



In the **ESSFwk1**, zonal sites have:

- white-flowered rhododendron, Sitka valerian, and Indian hellebore;
- no redcedar, Douglas-fir, or wild sarsaparilla.

Site Units of the ICHdk

Zonal Site Series 01 CwSxw - Falsebox - Wintergreen Site Series dominates level sites and gently sloping mid to lower slope positions. The mature forest canopy is a mixture of Douglas-fir, hybrid white spruce, and lodgepole pine. Tree regeneration is predominantly subalpine fir, hybrid white spruce, and scattered redcedar. Trembling aspen and paper birch are common. The undergrowth of mature conifer stands has a moderate to high shrub cover consisting of many species including falsebox, thimbleberry, black huckleberry, and birch-leaved spirea. The herbaceous layer is also vigorous and includes several leafy forbs such as wild sarsaparilla and queen's cup. Mosses, especially red-stemmed feathermoss and knight's plume, form a nearly continuous cover.

Drier Sites Sites drier than the zonal site series are common, occurring primarily on upper slopes and ridge crests, coarse-textured soils, and steep south and west aspects. Compared to zonal sites, they generally have more soopolallie, birch-leaved spirea, and lodgepole pine but less total cover of herbaceous species.

02 CwSxw - Soopolallie Site Series occurs primarily on upper slope positions of moderate to steep (>30%) south- and west-facing slopes (Typic Phase). It also occurs on ridge crests where soils are shallow (<50 cm) to bedrock (Shallow Phase). The mature forest canopy is dominated by large Douglas-fir and/or lodgepole pine but may include scattered redcedar and hybrid white spruce in the lower canopy. Tree regeneration is primarily subalpine fir with a few spruce, Douglas-fir, and redcedar. Shrubs have a moderate to high cover, dominated by falsebox and soopolallie, but herbs are usually not abundant on these dry sites. The abundance of soopolallie together with Douglas-fir distinguishes these sites. Red-stemmed feathermoss and wavy-leaved moss may cover up to 50% of the ground surface.

03 CwSxw - Falsebox - Soopolallie Site Series is relatively uncommon. It occurs most commonly on mid to upper slope positions of south- and west-facing slopes with coarse-textured (sand or >70%

SITE UNITS

coarse fragments) soils. The mature forest canopy is predominantly lodgepole pine. Douglas-fir is infrequent in the canopy and understory. The undergrowth has a moderate cover of shrubs including soopolallie, falsebox, and black huckleberry, but a low diversity of forbs. Red-stemmed feathermoss, knight's plume, and wavy-leaved moss collectively cover most of the surface.

04 CwSxw - Falsebox - Feathermoss Site Series occurs primarily on mid slope position of gentle to moderate (<30%) south-facing slopes. Soils are generally coarse loamy to sandy. Mature forests typically have a Douglas-fir, hybrid white spruce, or occasionally lodgepole pine canopy, and often a high density of subalpine fir and redcedar stems in the regeneration layer. The undergrowth has a sparse cover of shrubs (other than subalpine fir and redcedar) and forbs, but a high percent cover of mosses.

Wetter Sites Forested sites wetter than zonal sites are frequent but usually small and localized. They occur primarily at the base of slopes, in seepage areas, and in local depressions. The vegetation is distinguished from that on drier sites by the presence of moist site indicators including palmate coltsfoot, common mitrewort, and leafy mosses.

05 CwSxw - Thimbleberry Site Series occurs on lower slopes where soils are moistened by low-volume or intermittent seepage during the growing season. The mature forest canopy is relatively open and dominated by hybrid white spruce, lodgepole pine, and occasionally Douglas-fir. A dense shrub layer dominated by thimbleberry is a distinguishing feature of these sites. Other common shrubs include black twinberry, highbush-cranberry, red-osier dogwood, and snow-berry. The herb and moss layers have moderate cover.

06 CwSxw - Raspberry - Oak fern Site Series occurs on mid to lower slope positions of north-facing slopes. Soils are moistened by intermittent seepage during the growing season. The mature forest canopy includes hybrid white spruce, subalpine fir, lodgepole pine, and occasionally Douglas-fir. The undergrowth vegetation is distinguished by several moist site indicators including black twinberry, red raspberry, highbush-cranberry, oak fern, foamflower, sweet-scented bedstraw, and clasping twistedstalk. These form well-developed shrub and herb layers. The vegetation is distinguished from that of the /05 unit by less thimbleberry cover.

07 Sxw - Twinberry - Oak fern Site Series occurs at the toe of slopes where seepage and cold air accumulate. It is often adjacent to streams or wetlands. The mature forest canopy is typically open and dominated by large hybrid white spruce and lodgepole pine. Tree regeneration is usually sparse. The undergrowth vegetation is distinguished by a dense shrub layer dominated by species indicative of cold, moist soils. These include black twinberry, hardhack, and willows. Herbaceous vegetation typically has a sparse to moderate cover predominantly of moist site indicators such as trailing raspberry and western meadowrue. A moderate to high cover of mosses is present. The absence or low cover of frost-intolerant species such as Douglas-fir, redcedar, and falsebox distinguishes these sites.

08 Sxw - Devil's club - Lady fern Site Series occurs on lower and toe slope positions where soils are moistened throughout the growing season by intermittent to persistent seepage water. They are primarily on north aspects. Hybrid white spruce, subalpine fir, and scattered Douglas-fir dominate the mature forest canopy. The undergrowth is distinguished by its high cover of devil's club, often accompanied by other moist-site shrubs including red-osier dogwood, thimbleberry, and black twinberry. The herb layer is characterized by abundant ferns as well as other moist-site herbs. The moss layer is sparse and predominantly leafy mosses and *Brachythecium* mosses.

09 Sxw - Horsetail Site Series occurs in wet depressions and other areas where a water table remains near (<50 cm) the surface throughout the growing season. Soils are usually gleyed beneath thick surface organic layers. The mature forest canopy is relatively open and dominated by redcedar and hybrid white spruce. Tree regeneration is relatively sparse. The shrub layer has a low to moderate cover of moist- or wet-site indicators such as black twinberry, red-osier dogwood, devil's club, and highbush-cranberry. The high cover of common horsetail is a distinguishing key feature of the vegetation. Feathermosses occur on mounds, and leafy mosses and *Brachythecium*

SITE UNITS

mosses occur in wet hollows.

Non-forested Sites Non-forested wetlands are uncommon and generally small. Fens and swamps are most common. Grasslands have not been observed.

Key to Site Units of the ICHdk

- 1a. Moisture regime mesic or drier; no evidence of seepage water or water table within 1 m of surface; slope position crest to lower; common mitrewort, leafy mosses, and palmate coltsfoot absent or incidental (cover <1%).
- 2a. Soils shallow (<50 cm) to bedrock; slope position usually crest or upper; moisture regime xeric to subxeric.
ICHdk/02 CwSxw - Soopolallie;
/02b Shallow Phase
- 2b. Soils deeper; slope position upper to lower (rarely crest); moisture regime subxeric to mesic.
- 3a. Slope gradient moderate to very steep (>20%) and slope aspect SE, S, SW, W (135–280°).
 - 4a Soopolallie abundant (>2% cover but usually >10%); slope position mid or upper and slope gradient usually >30%; moisture regime subxeric or submesic; redcedar regeneration generally not dense.
ICHdk/02 CwSxw - Soopolallie;
/02a Typic Phase
 - 4b. Soopolallie not abundant; slope position usually mid or lower and slope gradient usually <30%; submesic; western redcedar regeneration often dense.
ICHdk/04 CwSxw - Falsebox - Feathermoss
- 3b. Slope gradient gentle (<20%) or if steep then aspect NW, N, NE, or E (281–360 °, 0–134°).
 - 5a. Moisture regime subxeric or submesic; soils sandy (sand or loamy sand), or coarse fragment content very high (>70%), or slope position crest or upper.

- 6a. Soopolallie cover >1%; moisture regime subxeric; western redcedar and subalpine fir regeneration sparse; canopy dominated by lodgepole pine.

ICHdk/03 CwSxw - Falsebox - Soopolallie

- 6b. Soopolallie cover <1%; moisture regime submesic; western redcedar and subalpine fir regeneration usually dense; canopy dominated by Douglas-fir (most common) or lodgepole pine.

ICHdk/04 CwSxw - Falsebox - Feathermoss

- 5a. Moisture regime mostly mesic (occasionally submesic); soils loamy (rarely silty or clayey); soil coarse fragment content low to moderate (<70%), or slope position mostly mid, lower, or level.

ICHdk/01 CwSxw - Falsebox - Wintergreen

- 1b. Moisture regime subhygric to subhydric; evidence of seepage water or water table within 1 m of surface; slope position mostly lower, toe, or depression; common mitrewort, leafy mosses, and coltsfoot cover >1%.

- 7a. Moisture regime subhygric; no evidence of persistent seepage within 50 cm of soil surface; soopolallie cover >1% and oak fern absent or incidental; shrub layer dominated by abundant (>20% cover) thimbleberry.

ICHdk/05 CwSxw - Thimbleberry

- 7b. Moisture regime subhygric or wetter; evidence of persistent seepage or water table within 50 cm of surface; soopolallie absent or incidental (<1% cover) and oak fern usually abundant (>1% cover); shrub layer various.

- 8a. Lady fern cover >1% and either devil's club or common horsetail abundant (>10% cover); enchanter's nightshade usually present; moisture regime subhygric to subhydric.

- 9a. Water table within 60 cm of soil surface during most of the growing season; common horsetail cover >10% and devil's club cover <5%; slope position toe or depression and slope gradient <3%.

ICHdk/09 Sxw - Horsetail

SITE UNITS

9b. Water table not present within 60 cm of soil surface for most of the growing season; common horsetail cover <10% and devil's club cover usually >5%; slope position lower or toe, and slope gradient often >3%.

ICHdk/08 Sxw - Devil's club - Lady fern

8b. Lady fern absent or incidental and neither devil's club nor common horsetail abundant; enchanter's nightshade usually absent; moisture regime subhygric.

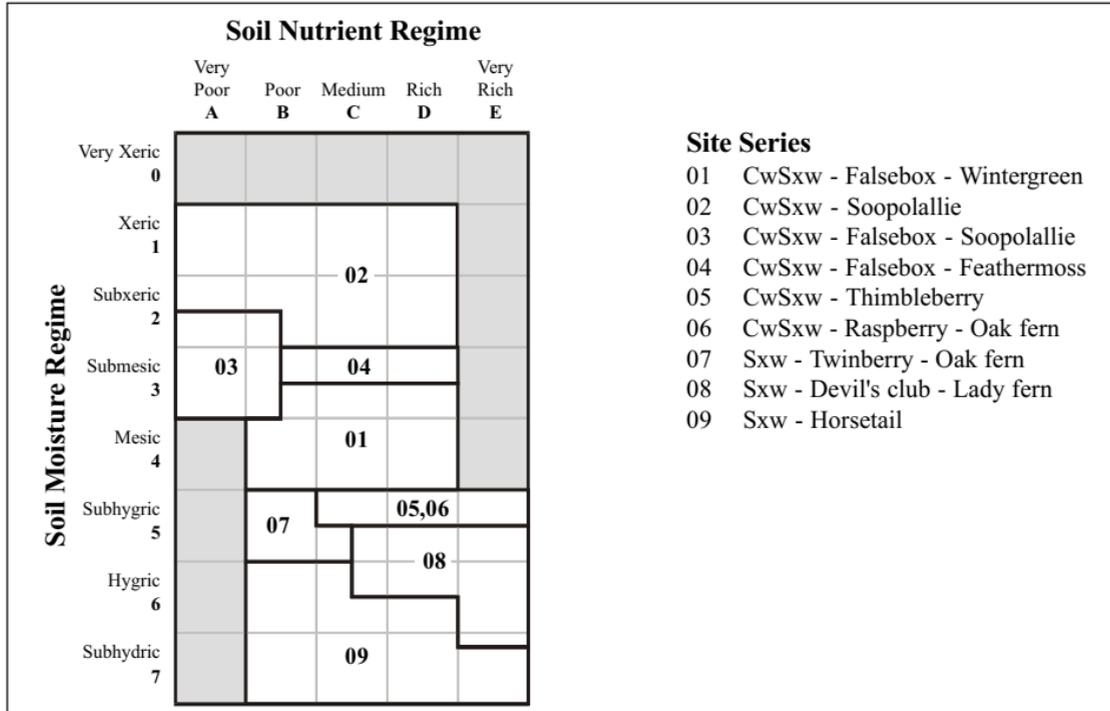
10a. Shrub layer dominated by black twinberry; thimbleberry absent or incidental; usually cold air accumulation areas in toe slope positions adjacent to streams.

ICHdk/07 Sxw - Thimbleberry - Oak fern

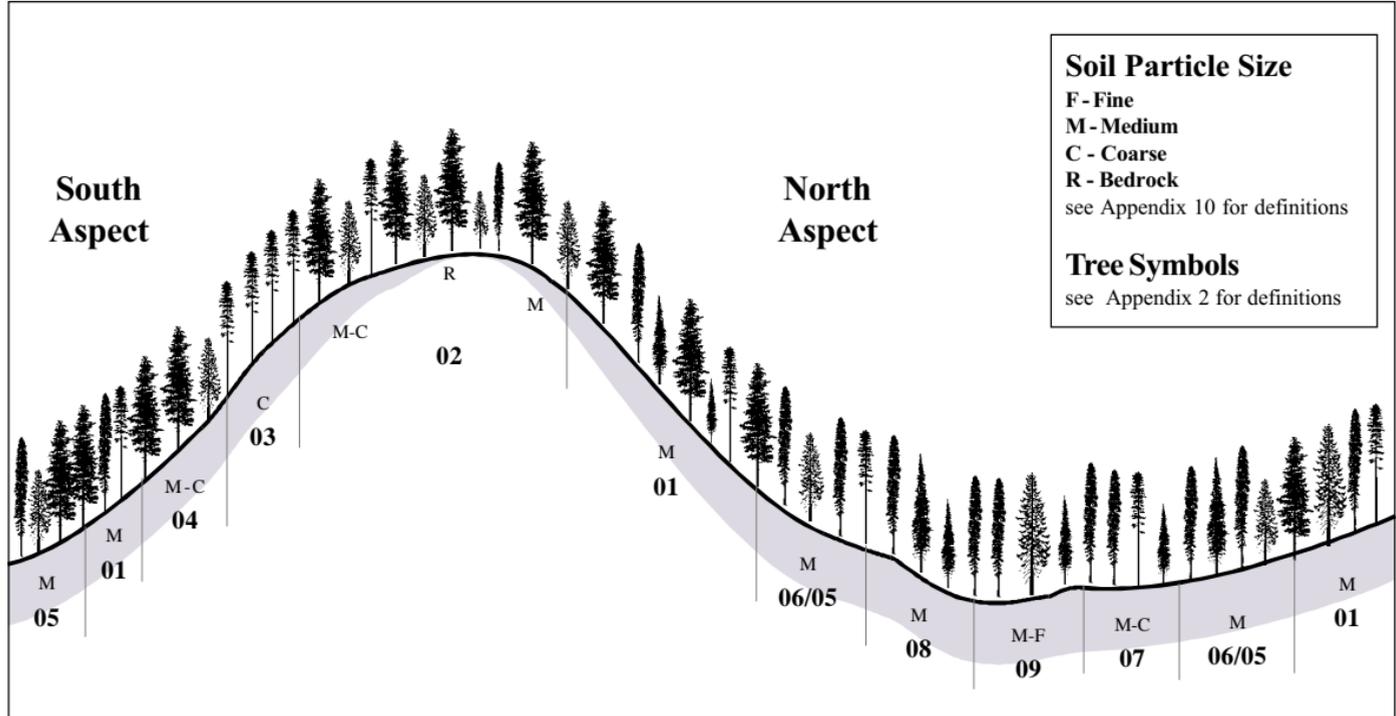
10b. Shrub layer not dominated by black twinberry; thimbleberry usually well represented; primarily lower slopes not in cold air accumulation areas.

ICHdk/06 CwSxw - Raspberry - Oak fern

ICHdk Edatopic Grid



ICHdk Landscape Profile



Site Features of ICHdk Site Series

Site Series	01	02	03	04	05
Key Features	zonal and other gentle to moderate gradient mid and lower slope sites with mesic or submesic moisture regime	a) dry moderate to steep S and W aspects on upper slopes (Typic Phase); b) crest and upper slope positions with shallow (<50 cm) soils over bedrock (Shallow Phase)	dry S and W aspects on soils with sand texture or very high (>70%) coarse fragment content	mid and lower slope positions on S or W aspects, often with coarse loamy soils; often downslope of /02a	moist lower slopes with loamy soils moistened by low-volume or intermittent seepage; most often on S or W aspects.
Soil Moisture / Nutrient Regimes	mesic (submesic) / poor - rich	xeric, subxeric (submesic) / poor - rich	subxeric, submesic / very poor, poor	submesic / poor - rich	subhygic / medium - very rich
Slope Position	mid (upper - level)	upper, crest	upper, mid	mid	lower
Aspect	all	SE, S, SW, W	all, commonly SE, S, SW, W	all, mostly SE, S, SW, W	all, commonly SE, S, SW, W
Slope Grade (%)	5 - 25	0 - 50	(10) 25 - 50	5 - 25	5 - 15
Soil Texture	(gravelly) loamy	gravelly loamy	gravelly sand, gravelly loamy	loamy (sand)	loamy
Humus Form and Thickness (cm)	Hemimor, Mormoder 5 - 10	Hemimor 3 - 5	Hemimor 3 - 4	Hemimor, Mormoder 5 - 7	Hemimor, Mormoder 5 - 11
Occurrence / Size / Distribution	common / moderate / wide	common / small - moderate / wide	uncommon / small - moderate / wide	common / moderate / wide	common / small - moderate / wide

Site Features of ICHdk Site Series (continued)

Site Series	06	07	08	09
Key Features	mid to lower slopes moistened by intermittent seepage; mostly N and E aspects	moist toe slopes that accumulate seepage water and cold air drainage; moist, cold sites often adjacent to streams	very moist lower and toe slopes receiving persistent seepage; primarily on N- or E - facing slopes	wet toe slopes and depressions with near- surface (< 30 cm) water table; wet, cold sites
Soil Moisture / Nutrient Regimes	subhygric / medium - very rich	subhygric / poor, medium	subhygric, hygric / medium - very rich	hygric, subhydric / poor - very rich
Slope Position	mid, lower	toe	lower, toe	toe, depression
Aspect	all, mostly NW, N, NE, E	none	all, mostly NW, N, NE, E	none
Slope grade (%)	5 - 30	< 5	0 - 45	< 5
Soil Texture	loamy	loamy (gravelly sand)	loamy, silty	loamy, silty, (sand)
Humus Form and Thickness (cm)	Hemimor, Mormoder, Leptomoder 6 - 45	Moder 6 - 10	Leptomoder, Hydromor 9 - 55	Hydromor, Histomoder 10 - 50
Occurrence / Size / Distribution	common / small - moderate / wide	uncommon / small - moderate / wide	uncommon / small / wide	common / small / wide

ICHdk Vegetation Table

Site Unit		02	03	04	01	05	06	07	08	09		
Tree Layer	<i>Pseudotsuga menziesii</i>	■■■■		■■■■	■■■■	■■■					Douglas-fir	
	<i>Populus tremuloides</i>	■■■		■■■	■■■	■■■	■■■				trembling aspen	
	<i>Pinus contorta</i>	■■■■	■■■■	■■■■	■■■	■■■		■■■		■	lodgepole pine	
	<i>Abies lasiocarpa</i>	■■■		■■■	■	■■■	■■■		■■■■	■	subalpine fir	
	<i>Picea engelmannii</i> x <i>glauca</i>	■■■	■■■	■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■■	■■■	hybrid white spruce
Shrub Layer	<i>Acer glabrum</i>	■■■									Douglas maple	
	<i>Shepherdia canadensis</i>	■■■■	■■■		■	■■■					soopolallie	
	<i>Pachistima myrsinites</i>	■■■■	■■■	■■■	■■■■	■■■	■■■	■■■			falsebox	
	<i>Amelanchier alnifolia</i>	■■■	■■■	■	■■■	■■■		■■■			saskatoon	
	<i>Thuja plicata</i>	■■■	■■■	■■■	■■■	■■■	■■■			■	western redcedar	
	<i>Vaccinium membranaceum</i>	■■■	■■■	■	■■■	■■■		■	■■■		black huckleberry	
	<i>Cornus stolonifera</i>	■	■		■■■	■■■	■■■		■■■	■■■	red-osier dogwood	
	<i>Lonicera involucrata</i>		■■■			■■■		■■■■	■■■■	■■■■	black twinberry	
	<i>Rubus parviflorus</i>				■■■	■■■■	■■■■		■■■■	■■■	thimbleberry	
	<i>Ribes lacustre</i>				■■■	■■■	■■■	■■■	■■■	■■■	black gooseberry	
	<i>Spiraea douglasii</i>							■■■			hardhack	
	<i>Alnus tenuifolia</i>							■■■	■■■	■■■	mountain alder	
	<i>Oplopanax horridum</i>				■				■■■■	■■■	devil's club	
	Herb Layer	<i>Hieracium albiflorum</i>	■■■									white-flowered hawkweed
		<i>Chimaphila umbellata</i>	■■■	■	■■■	■■■						prince's pine
<i>Goodyera oblongifolia</i>		■■■	■	■■■	■■■	■■■	■■■				rattlesnake-plantain	
<i>Linnaea borealis</i>		■■■	■■■	■	■■■	■■■	■■■	■■■	■■■	■	twinflower	
<i>Aralia nudicaulis</i>		■■■	■	■■■	■■■	■■■	■■■	■■■	■■■		wild sarsaparilla	
<i>Cornus canadensis</i>		■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	bunchberry	
<i>Rubus pedatus</i>			■■■			■■■	■■■	■■■	■■■		five-leaved bramble	
<i>Streptopus roseus</i>		■	■		■■■	■■■	■■■	■■■	■■■	■■■	rosy twistedstalk	
<i>Streptopus amplexifolius</i>					■	■■■	■■■	■■■	■■■	■■■	clasping twistedstalk	
<i>Tiarella trifoliata</i>					■	■■■	■■■	■■■	■■■	■■■	foamflower	
<i>Rubus pubescens</i>					■	■■■	■■■	■■■	■■■	■	trailing raspberry	
<i>Gymnocarpium dryopteris</i>			■			■■■	■■■	■■■	■■■■	■■■■	oak fern	
<i>Equisetum arvense</i>								■■■	■■■	■■■■	common horsetail	
<i>Circaea alpina</i>								■■■	■■■	■■■	enchanter's nightshade	
<i>Athyrium filix-femina</i>								■■■■	■■■■	■■■■	lady fern	
<i>Carex disperma</i>									■■■	soft-leaved sedge		
Moss Layer	<i>Dicranum polysetum</i>	■■■	■■■	■■■	■						wavy-leaved moss	
	<i>Pleurozium schreberi</i>	■■■■	■■■■	■■■■	■■■■	■■■	■■■	■■■■	■■■	■	red-stemmed feathermoss	
	<i>Rhytidadelphus triquetrus</i>	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■	electrified cat's-tail moss	
	<i>Ptilium crista-castrensis</i>	■■■	■■■	■■■■	■■■■	■■■	■■■	■■■■	■■■	■■■	knights' plume	
	<i>Brachythecium</i> spp.		■	■	■■■	■■■	■■■	■■■	■■■	■■■	ragged mosses	
<i>Mnium</i> spp.				■	■■■	■■■	■■■	■■■	■■■	■■■	leafy mosses	

Species abundance: ■ present in 40–60% of plots surveyed; ■■■ >60% of plots, mean cover <1%; ■■■■ >60% of plots, mean cover 1–7%; ■■■■■ >60% of plots, mean cover >7–15%; ■■■■■■ >60% of plots, mean cover >15%



Thimbleberry
Rubus parviflorus



Rosy twistedstalk
Streptopus roseus

ICHdk Silviculture Considerations

Silviculture Practices and Options

Predominant silviculture system in the ICHdk is even-aged management (clearcutting). Following harvesting, sites are usually broadcast burned to reduce slash and vegetation competition, improve planter access, and reduce forest floor layers for planting. Nearly all harvested sites are planted, usually with Douglas-fir and/or lodgepole pine on mesic and drier sites, and with spruce on wetter sites.

Partial harvesting experience in the ICHdk is essentially nonexistent.

Advance regeneration is predominantly Bl, Cw, and Sxw. Bl and Sxw are mostly of good form and vigour but the Cw usually originates by layering and has incipient decay from the parent tree.

Natural restocking has not been widely used operationally as a regeneration method. Fd, Sxw, and Bl natural regeneration ingress generally occurs on exposed mineral soil in cleared openings where competing vegetation is low and seed is abundant.

Principal Insect and Disease Concerns

Cw has a high risk of heart rot on all sites.

Most Bl stems in the canopy of old stands have extensive heart rot, but some data indicate that younger second-growth stands may have much less heart rot.

White pine weevil causes extensive terminal dieback on vigorous, open-grown Sxw on some sites.

Armillaria root rot affects trees of all conifers but is probably less common than in wetter climates. Partial harvest will increase damage.

Two-year-cycle budworm can cause severe defoliation during high-population years.

Spruce beetle damage can be locally high, especially in areas with windthrow and poor logging, and in creek valleys.

Silviculture Considerations Table — Harvest Assumptions

No or limited canopy refers to clearcuts and larger patch (generally >60 m wide) group selection systems;

Canopy present refers primarily to group selection systems with small to medium (generally 30–60 m wide) harvested groups. It refers to single tree selection systems in /03 (Fd stands) and /09 site series.

ICHdk Site Series - Silviculture Considerations

Site series	Ecologically adapted tree species	Principal site factors limiting tree establishment and early growth		Vegetation potential and complex
		No or limited canopy	Canopy present	
01	P:Fd	<i>light deficits (vegetation overtop)</i>		most common: medium to high; Mixed shrub - dry shrub less common: medium; Mixed hardwoods - dry shrub
	PI	Fd, PI, Sxw,	Fd, PI, Sxw,	
	Sxw	At, Ep	At, Ep	
	S:Bl	<i>moisture deficits (S aspects)</i>		•these sites are often rapidly occupied by shrubs and hardwoods following canopy removal and soil disturbance.
	T:Cw	Sxw, Bl, Cw, Ep	Sxw, Bl, Cw, Ep	
	D:At	<i>summer frost (level sites/depressions)</i>		
Ep	Fd, Cw	----		
<ul style="list-style-type: none"> •survival and growth of planted Fd, Sxw, and PI generally adequate to restock clearcut sites and cleared group selection patches if vegetation controlled at planting spot; frost may reduce growth of Fd and Cw on level clearcut sites in some years; •some advance Bl and nearly all advance Cw regeneration has poor form, branch damage, or incipient decay; •natural Fd and Sxw regeneration ingress common on clearcuts and small cleared patches if mineral soil is exposed; •exposed mineral soil usually quickly revegetated; At and Ep abundance often increases significantly following canopy removal and soil disturbance if a seed source is nearby or if they were a component of original stand; •broadcast burning generally reduces vegetation cover for 2–3 years. 				
02	P:Fd	<i>moisture deficits</i>		low; Dry shrub - falsebox
	PI	Fd	Fd	
	D:At	<i>nutrient deficits (shallow soils)</i>		•shrub and herbaceous vegetation cover increase following logging is slow and relatively small.
		Fd	Fd	
<i>rooting restrictions (bedrock)</i>				
<ul style="list-style-type: none"> •timber productivity is low and sites may be difficult to regenerate; •plantation survival and growth limited by dry soils; partial canopy retention may improve plantation success; •planting spots limited by shallow soils in Shallow Phase; •maintenance of soil organic layers and woody debris important for long-term site productivity and natural regeneration. 				

ICHdk Site Series - Silviculture Considerations (continued)

Site series	Ecologically adapted tree species	Principal site factors limiting tree establishment and early growth	Vegetation potential and complex
		No or limited canopy	Canopy present
03	P:PI Fd D:At	<i>moisture deficits</i> <u>Fd</u> <i>light deficits (vegetation overtop)</i> ----	low; Dry shrub - falsebox Fd PI, At
<i>nutrient deficits</i>			
<ul style="list-style-type: none"> •PI stands on these sites most often regenerate naturally following clearcut harvesting if adequate cones present and well distributed, and mineral soil is exposed or forest floor thickness is reduced; •survival and growth of planted PI likely high; vegetation control often not required to meet stocking; •survival and growth of planted Fd expected to be poor (moisture stress); may be improved under partial canopy; •soil organic layer and woody debris removal will reduce the already poor moisture and nutrient status of these sites; maintenance of soil organic layers and woody debris especially important if sites managed for Fd; •steeply sloping shallow soils susceptible to erosion. 			
04	P:Fd PI Sxw S:Bl D:At, Ep	<i>moisture deficits</i> <u>Sxw, Bl</u> <i>light deficits (dense Bl and Cw)</i> Fd, PI, At, Ep	low; Dry shrub - falsebox Sxw, Bl •these sites frequently have a high density of advance Bl and Cw regeneration. Fd, <u>PI</u> , <u>At</u> , <u>Ep</u>
<ul style="list-style-type: none"> •Bl and Sxw growth on these sites generally slow but improved by planting on moister microsites in mixture with PI or Fd; •advance Cw and Bl regeneration is usually of poor form and with incipient decay, and of low value for timber management; •Fd, PI, or Sxw plantation performance may be limited by density of Cw and Bl advance regeneration; •removal of forest floor will likely reduce an already poor moisture and nutrient status, especially on coarse-textured soils; •maintenance of soil organic layers and woody debris important for long-term site productivity and natural regeneration. 			

ICHdk Site Series - Silviculture Considerations (continued)

Site series	Ecologically adapted tree species	Principal site factors limiting tree establishment and early growth		Vegetation potential and complex
		No or limited canopy	Canopy present	
05	P:Fd	<i>light deficits (vegetation overtop)</i>		most common: medium to high; Mixed shrub - moist shrub
	Pl	<u>Fd, Pl, Sxw, Act,</u>	<u>Fd, Pl, Sxw,</u>	less common (No or limited canopy only): medium; Mixed
	Sxw	<u>At, Ep</u>	<u>Act, At, Ep</u>	hardwood - moist shrub
	S:Bl	<i>summer frost (gentle slopes)</i>		
	Cw	Fd, Cw, Sxw	----	•shrub and hardwood cover often increases significantly following canopy removal and soil disturbance
D:Act, At, Ep				
<ul style="list-style-type: none"> •survival and growth of planted Fd, Pl, Sxw, and Bl generally adequate to restock cleared or partial-cut sites if shrub and herbaceous vegetation controlled at planting spot and (for Fd and Pl) if planted in sunny / lightly shaded microsites; •dense stands of mixed hardwoods may develop following extensive mineral soil exposure where seed source is present; •frost damage may be reduced by planting Pl, Sxw, or Bl or by retaining 50% or more of tree canopy; •most advance Bl > 25 cm tall and nearly all advance Cw regeneration has poor form, branch damage, and incipient decay. 				
06	P:Fd	<i>light deficits (vegetation overtop)</i>		most common: medium; Mixed shrub - moist forb
	Pl	<u>Fd, Pl, Act,</u>	<u>Fd, Pl, Act,</u>	less common (No or limited canopy only): medium; Mixed
	Sxw	<u>At, Ep</u>	<u>At, Ep</u>	hardwood - moist shrub;
	S:Bl	<i>summer frost (gentle slopes)</i>		
	Cw	Fd, Cw, Sxw	----	•shrub and hardwood tree cover significantly increase follow canopy removal and soil disturbance
D:Act, At, Ep				
<ul style="list-style-type: none"> •survival and growth of planted Fd, Pl, Sxw, and Bl on clearcuts and group selection patches generally adequate to restock sites if vegetation controlled at planting spot and (for Pl and Fd) if trees planted in sunny / lightly shaded microsites; •competing vegetation can be reduced for 3–5 years by broadcast burning, scarification, or mounding; •risk of frost damage greatest on gentle lower slopes and where downslope air flow is impeded; risk of damage may be reduced by planting Pl or Bl, or by retaining 50% or more of tree canopy; •most advance Bl > 25 cm tall and nearly all advance Cw regeneration has poor form, branch damage, and incipient decay. 				

ICHdk Site Series - Silviculture Considerations (continued)

Site series	Ecologically adapted tree species	Principal site factors limiting tree establishment and early growth		Vegetation potential and complex
		No or limited canopy	Canopy present	
07	P:Fd	<i>light deficits (vegetation overtop)</i>		most common: high; Mixed shrub - moist shrub
	PI Sxw S:Bl D:Act	Fd, PI, Sxw, Bl, Act <i>summer frost</i> Fd, Sxw, Bl <i>cold, moist soils</i> Fd	Fd, PI, Sxw, Bl, Act Fd, Sxw, Bl Fd	less common: medium; Mixed hardwood - moist shrub •dense shrub cover typical of these sites
<ul style="list-style-type: none"> •survival and growth of all species expected to be poor without control of vegetation over seedlings; •planting on raised microsites (natural or artificial) will reduce limitations due to cold soils and overtopping vegetation; •frost-prone sites; damage risk may be reduced by planting PI or Act or, to a lesser degree, by planting under a partial canopy; •trees with large, dense crowns exposed to winds by logging generally very susceptible to windthrow; •natural regeneration ingress of Act often occurs on exposed mineral soil. 				
08	P:Fd	<i>light deficits (vegetation overtop)</i>		most common: high; Mixed shrub - tall fern
	Sxw S:Bl Cw PI D:Act, At, Ep	all species <i>summer frost (gentle slopes)</i> Fd, Cw <i>cold, wet soils (toe slopes)</i> Fd, PI	all species Fd, Cw Fd, PI	less common (No or limited canopy): medium; Hardwood - moist shrub •under a mature canopy, these sites typically have a dense cover of devil's club, which is replaced by a dense cover of other wet-site shrubs and ferns following canopy removal
<ul style="list-style-type: none"> •tree regeneration limited primarily by competing vegetation; Fd, Sxw, Bl, and PI plantations generally adequate to restock cleared or partial-cut sites if vegetation controlled at planting spot and if planted in sunny / lightly shaded microsites; •moderate-intensity broadcast burn will usually reduce above-ground competing vegetation for 2–3 years; •growth generally improved by planting on raised microsites (natural or artificial) due to warmer soils and reduced vegetation; •hardwood tree invasion limited by shrub and herbaceous vegetation; may be rapid if this vegetation is reduced; •risk of frost damage principally on level terrain where cold air accumulates; risk present but less on steeper slopes. 				

ICHdk Site Series - Silviculture Considerations (continued)

Site series	Ecologically adapted tree species	Principal site factors limiting tree establishment and early growth		Vegetation potential and complex
		No or limited canopy	Canopy present	
09	P:Sxw	<i>cold, wet soils</i>		medium; Mixed shrubs - wet forb;
	S:Bl	Sxw, Bl, Pl	Sxw, Bl, Pl	
	Pl	<i>summer frost</i>		•patches of Wet alder vegetation common.
	D:Act	<u>Sxw, Bl</u> <i>light deficits</i> <u>Pl, Act</u>	<u>Sxw, Bl</u> Sxw, Bl, <u>Pl, Act</u>	
<ul style="list-style-type: none"> •low-productivity sites for timber, and restocking often difficult; •survival and growth of all tree species best on raised microsites (natural or artificial) due to warmer soils and reduced above-ground vegetation competition; plantable spots limit planting density; •plantation growth generally slow; •Pl uncommon; mature Pl not well adapted to wet sites; •risk of frost damage to planted Sxw may be reduced somewhat by partial tree or shrub canopy; effects of partial canopy may be overwhelmed by cold air accumulation, especially if large upslope source of cold air is present; •sites very susceptible to soil rutting and compaction; •trees with large, dense crowns exposed to winds by logging generally very susceptible to windthrow. 				

TABLE A1.1. Site units (shaded) in the Cariboo Forest Region and their precorrelation equivalents (unshaded).

Current (correlated) BEC unit code												
BEC Unit		Site unit										
		/01	/02	/03	/04	/05	/06	/07	/08	/09	/10	/11
Equivalent precorrelation code												
BEC Unit		Ecosystem unit										
AT	AT	(site units not yet described)										
BGxh3	PPBGg	(see Iverson and Coupé 1996a)										
BGxw2	PPBGe	(see Iverson and Coupé 1996b)										
CWHds1	CWHc	see Guide for Vancouver Region (Green and Klinka 1994)										
ESSFdc2	ESSFe1	see Guide for Kamloops Forest Region (Lloyd et al. 1990)										
ESSFwc3	ESSFh2	/01	/02	/03								
ESSFwk1	ESSFh1	/01	/02	/03	/05	/04	/07 in part	/07 in part				
ESSFxc	ESSFd	see Guide for Kamloops Forest Region (Lloyd et al. 1990)										
ESSF xv1	ESSFg, ESSF undif	npe	npe	npe	npe	npe	npe	npe	npe	npe		
ESSF xv2	ESSFg, ESSF undif	npe	npe	npe	npe	npe	npe	npe	npe			
ICHdk	ICHe3	/01	/02	/03	/04	/05	/06	/07	/08	/09		
ICHmk3	ICHe2	/01,/04	/02	/03	/05	/06	/07	/08				
ICHmw3	ICHm1	see Guide for Kamloops Forest Region (Lloyd et al. 1990)										
ICHwk2	ICHh1	/01,/05	/02	/03	/04	/06 in part	/06 in part	/07	/08			
ICHwk4	ICHh2	/01,/06	/02	/03	/04	/05	/07	/08	/09			
IDFdk3	IDFb2	/01	/03	/02	/05	/04	/06	/07	/08	/09, /10		
IDFdk4	IDFb5	/01	/02	/03	/04	/05	/06	/07	/08	/09	/10	
IDFdw	IDFundiff.	npe	npe	npe	npe	npe	npe	npe	npe			
IDFmw2	IDFj1	see Guide for Kamloops Forest Region (Lloyd et al. 1990)										
IDFxm	IDFa4	/01	/02	/03	/04	/05	/06	/07	/08	/09		
IDF xw	IDFa2	/01,/05,/07	/02	/03	/04	/06	/08	/09				

^aNo previous equivalent (npe)

APPENDIX 5
ACTUAL SOIL MOISTURE REGIME
RELATIONSHIP TO RELATIVE SOIL MOISTURE
REGIME AND BIOGEOCLIMATIC UNIT

BEC unit	Relative soil moisture regime							
	0	1	2	3	4	5	6	7
BGxh3	ED	ED	ED	ED	ED	SD	M	W
BGxw2	ED	ED	ED	ED	ED	SD	M	W
IDFxw	ED	ED	VD	VD	MD	SD	M	W
IDFxm	ED	ED	VD	VD	MD	SD	M	W
SBPSxc	ED	ED	VD	VD	MD	SD	M	W
SBPSdc	ED	ED	VD	MD	SD	F	M-VM	W
SBPSmk	ED	VD	VD	MD	SD	F	M-VM	W
IDFdk3	ED	VD	VD	VD	MD	F	M	W
IDFdk4	ED	VD	VD	VD	MD	F	M	W
IDFdw	ED	VD	VD	MD	MD	F	VM	W
IDFmw2	VD	VD	VD	MD	SD	F	VM	W
MSxk	VD	VD	VD	VD	MD	F	M	W
MSxv	VD	VD	VD	MD	SD	F	VM	W
SBPSmc	VD	VD	VD	MD	SD	F	M-VM	W
SBSdw1	VD	MD	MD	SD	SD	F	M	W
SBSdw2	VD	MD	MD	SD	SD	F	M	W
SBSmh	VD	MD	MD	SD	SD	M	VM	W
SBSmw	VD	MD	MD	SD	F	M	VM	W
SBSmc1	VD	MD	MD	SD	F	M	VM	W
SBSmc2	VD	MD	MD	SD	F	M	VM	W
SBSwk1	VD	MD	SD	F	F	M	VM	W
ICHdk	VD	VD	VD	MD	SD	M	VM	W
ICHmk3	VD	MD	MD	SD	F	M	VM	W
ICHwk2	VD	MD	SD	F	F	M	VM	W
ICHwk4	VD	MD	SD	F	F	M	VM	W
ESSFxv	VD	VD	MD	MD	SD	F	M	W
ESSFdc2	VD	MD	MD	SD	SD-F	M	VM	W
ESSFwk1	MD	MD	SD	F	M	M	VM	W
ESSFwc3	MD	MD	SD	F	M	M	VM	W

Actual Moisture Regime Codes:

ED=extremely dry; VD=very dry; MD=moderately dry; SD=slightly dry;
 F=fresh; M=moist; VM=very moist; W=wet

TABLE 5.2.1 Distribution of Fen Site Associations by biogeoclimatic zone

	BG PP	BWBS SWB	ESSF	ICH	IDF	MS	SBPS SBS	CDF	CWH	MH
Wf01 Water sedge – Beaked sedge		xx	x	xx	xxx	xxx	xxx		x ⁱ	
Wf02 Scrub birch – Water sedge		xxx	x	xx	xx	xx	xx			
Wf03 Water sedge – Peat-moss			xx				x			
Wf04 Barclay's willow – Water sedge – Glow mosses		x	xxx			x	x			
Wf05 Slender sedge – Common hook-moss		x		xx	xx	xx	xx			
Wf06 Slender sedge – Buckbean		x		x	x		x			
Wf07 Scrub birch – Buckbean – Shore sedge		x		x	x		x			
Wf08 Shore sedge – Buckbean – Hook-moss		x	x		x	x	x			
Wf09 Few-flowered spike-rush – Hook-moss			x			x	x			
Wf10 Hudson Bay clubrush – Red hook-moss							x			
Wf11 Tufted clubrush – Star moss		x	x	x		x	x			
Wf12 Narrow-leaved cotton-grass – Marsh-marigold			xxx							
Wf13 Narrow-leaved cotton-grass – Shore sedge			xx			x				
Wf50 Narrow-leaved cotton-grass – Peat-moss									x	xxx
Wf51 Sitka sedge – Peat-moss				x				xx	xx	
Wf52 Sweet gale – Sitka sedge								xx	xx ^s	
Wf53 Slender sedge – White beak-rush								x	xx ^s	

x = incidental; < 5% of wetlands

i = inland areas only

xx = minor; 5–25% of wetlands

s = southern subzones only

xxx = major; >25% of wetlands

TABLE 5.2.2 Fen Species Importance Table

Species		WF01	WF02	WF03	WF04	WF05	WF06	WF07	WF08
Shrubs	<i>Betula nana</i>								
	<i>Salix barclayi</i>								
	<i>Salix pedicularis</i>								
	<i>Spiraea douglasii</i>								
	<i>Myrica gale</i>								
Herbs and Dwarf Shrubs	<i>Carex utriculata</i>								
	<i>Carex aquatilis</i>								
Shrubs	<i>Comarum palustre</i>								
	<i>Calamagrostis canadensis</i>								
Shrubs	<i>Carex lasiocarpa</i>								
	<i>Menyanthes trifoliata</i>								
Shrubs	<i>Carex limosa</i>								
	<i>Carex chordorrhiza</i>								
Shrubs	<i>Eleocharis quinqueflora</i>								
	<i>Trichophorum alpinum</i>								
Shrubs	<i>Trichophorum cespitosum</i>								
	<i>Eriophorum angustifolium</i>								
Shrubs	<i>Caltha leptosepala</i>								
	<i>Carex anthoxanthea</i>								
Shrubs	<i>Equisetum fluviatile</i>								
	<i>Carex magellanica</i>								
Shrubs	<i>Carex sitchensis</i>								
	<i>Rhynchospora alba</i>								
Shrubs	<i>Carex livida</i>								
	<i>Eriophorum chamissonis</i>								
Shrubs	<i>Vahlodea atropurpurea</i>								
	<i>Drosera anglica</i>								
Shrubs	<i>Hypericum anagalloides</i>								
	<i>Triantha glutinosa</i>								
Shrubs	<i>Schoenoplectus tabernaemontani</i>								
	<i>Fauria crista-galli</i>								
Shrubs	<i>Senecio triangularis</i>								
	<i>Andromeda polifolia</i>								
Shrubs	<i>Kalmia microphylla</i>								
	<i>Oxycoccus oxycoccus</i>								
Shrubs	<i>Triglochin maritima</i>								
	<i>Drosera rotundifolia</i>								
Shrubs	<i>Leptarrhena pyrolifolia</i>								
	<i>Platanthera dilatata</i>								
Shrubs	<i>Sanguisorba canadensis</i>								
	<i>Utricularia intermedia</i>								
Shrubs	<i>Viola palustris</i>								
	<i>Sphagnum</i> Group I								
Lichens and Mosses	<i>Aulaconnium palustre</i>								
	<i>Drepanocladus</i> spp.								
Lichens and Mosses	<i>Sphagnum</i> Group II								
	<i>Tomentypnum nitens</i>								
Lichens and Mosses	<i>Philonotis fontana</i>								
	<i>Calliergon stramineum</i>								
Lichens and Mosses	<i>Scorpidium</i> spp.								
	<i>Campyllum stellatum</i>								
Lichens and Mosses	<i>Warnstorfia</i> spp.								
	<i>Meesia triquetra</i>								

Carex lasiocarpa – *Drepanocladus aduncus*

General Description

Slender sedge – Common hook-moss fens are common throughout the Interior at elevations below 1400 m. These fens occur on peat flats surrounding small lakes and ponds or in infilled palustrine basins. Prolonged shallow surface flooding and continual surface peat saturation are typical.



Carex lasiocarpa and *Drepanocladus aduncus* are constant dominants. Other large water sedges, such as *C. aquatilis* and *C. utriculata*, are also common. There can be a very sparse shrub cover of *Salix pedicellaris*, *S. candida*, or *Betula nana*. The moss layer is usually well developed but is occasionally absent. Hook-

mosses usually dominate with occasional inclusions of other brown mosses.

Deep peat deposits are common but some sites may occur on thin organic veneers. Mesisols are the most common soil type but Humisols and Fibrisols also occur.

Characteristic Vegetation

- Tree layer** (0 - 0 - 0)
- Shrub layer** (0 - 3 - 10)
- Herb layer** (13 - 60 - 100)
- Carex aquatilis*, *C. lasiocarpa*, *C. utriculata*
- Moss layer** (0 - 55 - 100)
- Drepanocladus aduncus*

Comments

Some **Wf05** sites are marsh-like with deep flooding, low diversity, and virtually no moss layer. The related **Wf06** occurs on floating mats with a more equitable water regime and hummock/hollow topography. Slender-sedge fens (**Wf05**, **Wf06**) occur in locations similar to the **Wf01** but seem to represent sites with longer surface saturation and more basic soil water. Similar sites in coastal areas are described by the **Wf53**.

Wetland Edatopic Grid

