

Supplement No. 1

A Field Guide for Site Identification and Interpretation for the Nelson Forest Region

Land Management Handbook 20

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Includes

IDFxh4 – Boundary Very Dry Hot Interior Douglas-fir Variant
ICHdw2 – Boundary Dry Warm Interior Cedar – Hemlock Variant
ICHdm – Dry Mild Interior Cedar – Hemlock Subzone
ESSFdm – Dry Mild Engelmann Spruce – Subalpine Fir Subzone

November 2005



BRITISH
COLUMBIA

Ministry of Forests and Range
Forest Science Program

IDF_{xh4}

Variant Summary

Boundary Very Dry Hot Interior Douglas-fir Variant

Location: Above or adjacent to the PPdh1, eastward from just east of Bridesville, then up the Kettle River to a few kilometres north of Westbridge, eastward to Boundary Creek at Boundary Falls; then from July Creek near Grand Forks to the west side of Christina Lake; and along the Granby River north to Pass and Volcanic Creeks.

Elevation range: 500 to 850 m (cool aspect) or 1050 m (warm aspect), where it extends to valley bottom; 750 to 850 m (cool aspect), 950 to 1050 m (warm aspect), where it is found above the PPdh1.

Climate: The climate of the IDF_{xh4} is intermediate between the PPdh1 and IDFdm1. There are no climate stations within the IDF_{xh4}. Dry soils on mesic and drier sites are a major limitation to tree growth.

Soils, geology, and landforms: In the western portion of the IDF_{xh4} (west of Boundary Falls) relatively rich volcanic rocks (andesite) predominate, along with fine-grained metamorphics and quartzites, while in the east coarse-grained metamorphics (gneiss) and intrusives (granodiorites) are common, with lesser amounts of quartzites and fine-grained metamorphics. Morainal soils are predominant. Colluvial soils are quite frequent in steep rocky terrain. Fluvial deposits are widespread only in the valley bottoms along the Kettle and Granby rivers and many of these have been cultivated. Soil textures reflect the differences in rock type, and are loamy, silty, and clayey in the west and loamy and sandy in the east. Coarse fragment content is generally higher in the east.

Zonal vegetation: Closed, mixed stands of Douglas-fir and larch are predominant. Ponderosa pine is a less frequent member of the tree canopy. The understory is often dominated by mallow ninebark and common snowberry. Birch-leaved spirea and pinegrass are also common. Less frequently, understories on circum-mesic sites have relatively low shrub covers and are dominated by pinegrass.

Distinguishing the IDF_{xh4} from adjacent subzones/variants

In the **PPdh1**:

- grasslands are more widespread
- Lw is rare
- zonal sites have no pinegrass, a more open canopy dominated by Py, and are dominated by bluebunch wheatgrass or fescue species

In the **IDFdm1**:

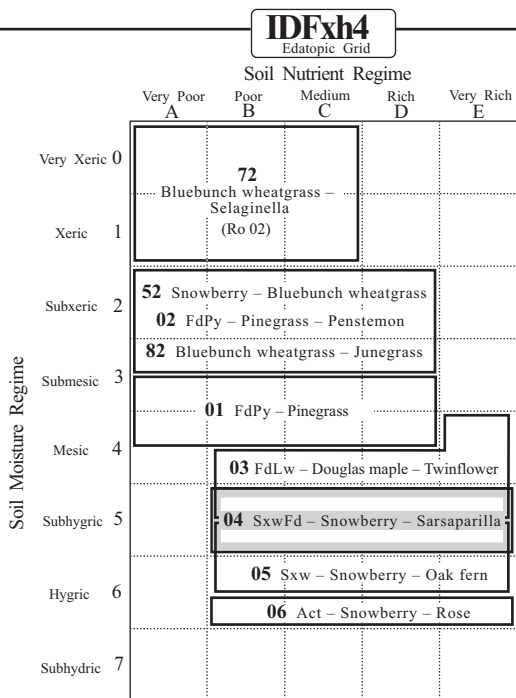
- Pl is common
- mallow ninebark is rare
- open grasslands are less frequent
- persistent shrub fields are not present

Forest characteristics: Three species dominate the forest: Fd and Lw on circum-mesic sites and Py on drier than mesic sites. Partial cutting is the dominant harvest method in this variant; almost all stands have had some impact from historic selective logging and cattle grazing. This has likely reduced the structural diversity one would expect in forests subject to a natural disturbance regime. Mixed-severity fire regimes characterize this variant. Low-intensity ground fires likely were most important on warm aspects and coarse soils where canopies were naturally open. Three studies in the IDF_{xh} document mean fire return intervals of 10 to 17 years.¹ Cooler aspects may have had higher-intensity (stand replacing), less frequent fires. Ep and At, on moister than mesic sites, provide important diversity, especially given the limited conifer species diversity.

¹ See review in Wong, C., B. Dorner, and H. Sandmann. 2003. Estimating historical variability of natural disturbances in British Columbia. B.C. Min. For., Res. Br., B.C. Min. Sustain. Resource. Manage., Resource Plan. Br., Victoria, B.C. Land Manage. Handb. No. 53.

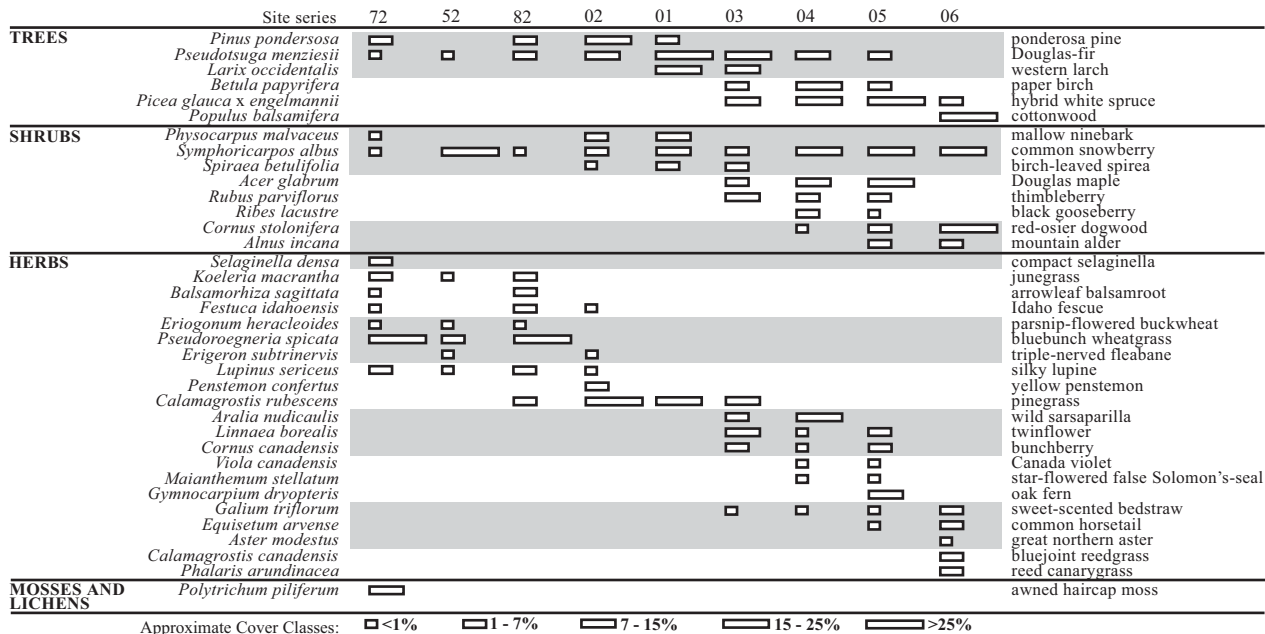
Range characteristics: Many grassland sites have had major weed infestations of cheatgrass, Dalmatian toadflax, knapweeds, St. John's-wort, and other species. Few examples of late-successional grassland exist. Many smaller riparian areas are heavily affected by cattle. Disturbance should be kept to a minimum to reduce the spread of weeds and increase the potential for late successional grasslands to develop.

Wildlife habitat: The grasslands, shrublands, and dry forests of the IDFxh4 provide habitat for numerous species of management concern, including the gopher snake, western rattlesnake, Nuttall's cottontail, and the endangered American badger. California bighorn sheep use the steeper, rocky terrain, especially in winter. Cliffs and rock outcrops are also used by several bat species. The painted turtle and the endangered tiger salamander may inhabit wetlands, while Canyon Wrens can be found in rocky habitats of riparian areas. Large, old trees are important habitat elements for cavity nesters such as Lewis's Woodpecker, Williamson's Sapsucker, Flammulated Owl, and Western Screech Owl and for open nesters such as Great Blue Heron. Historically, most ecosystems in this variant were maintained by frequent, low-intensity wildfires. These areas would benefit from reintroduction of fire and other ecosystem restoration measures such as reduction of forest ingrowth and grazing impacts, and control of noxious weeds.

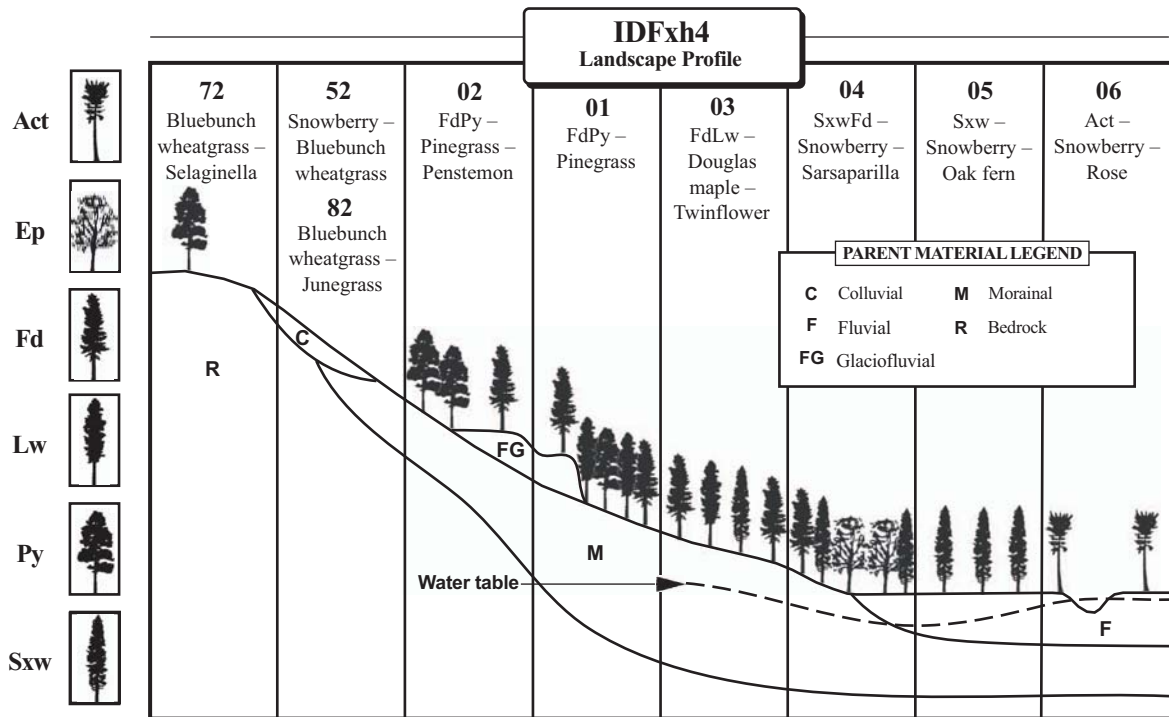


Shading used where considerable overlap in site series occurs.

IDFhx4 Vegetation Table



Approximate Cover Classes: □ <1% □ 1 - 7% □ 7 - 15% □ 15 - 25% □ >25%



IDF_{xh4} Environmental Table

Site series		72	52	82	02	01	03	04	05	06
Number of plots		6	4	12	5	11	7	5	6	3
Soil moisture regime ^a (SMR)		0-1 vx-x	2-3 sx-sm	2-3 sx-sm	(2) ^b -3 (sx)-sm	3-4 sm-m	4-5 m-shg	5 shg	5-(6) shg-(hg)	6 hg
Aspect		mostly warm	warm	mostly warm	variable	neutral, cool	neutral, cool	neutral	neutral, cool	neutral
Slope gradient %		variable	28-70	15-60	0-40	variable	variable	variable (mostly gentle)	variable (mostly flat)	flat
Slope position		crest to upper	crest to mid	upper to mid	crest to mid	mid (level)	(mid) to lower	lower to depression	toe to level	level
Parent material		R(C)	M(D)	M,C	M,FG	M(FG)	M(FG)	F(M)	F(M)	F
Soil texture coarse fragments % (min.- mean -max.)	0-30 cm	L 25-70-90	L 12-32-70	L 1-43-85	L 15-17-25	L 5-30-80	L(S,S) 1-23-40	L,S(C) 0-21-60	L(S) 0-14-35	L(S) 0-0-0
	30+ cm	rock	L 20-48-70	L(C,S) 1-55-85	C,S(L) 25-55-85	L(S) 20-50-85	L 1-36-75	S(C,S,L) 0-25-65	S,C(S) 0-32-90	S 0-0-0
Humus form – LFH thickness cm (min.- mean -max.)		Mull 9-16-38	Mull 38-49-65	Mull 2-26-51	Mull,Moder 3-13-37	Moder (Mor) 2-3-5	Moder (Mull) 2-4-5	Moder,Mull (Mor) 5-10-17	Moder,Mull 1-18-57	Mull 8-19-31
Important site features		rock outcrop	very deep Ah	some shallow soils <100 cm				mottles within 30 cm of surface	mottles within 30 cm of surface	mottles within 15 cm of surface

a Environmental features contained in this table are defined in chapter 3 of LMH 20.

b Values in brackets are less common.

IDFxh4

Management Interpretations

Site series	Number of plots	Common seedling growth limiting factors^a	Vegetation potential - common complexes^b	Road drainage control needs	Common site sensitivities^{a,c}	Other prescription considerations
72	6	n/a	Low – dry grass	Low	n/a	Weeds widespread, avoid disturbance; no timber values
52	4	n/a	High – dry shrub	Low	n/a	Weeds widespread, avoid disturbance; no timber values
82	12	n/a	High – dry grass	Low	n/a	Weeds widespread, avoid disturbance; no timber values
02	5	Dry soil, vegetation	High – pinegrass, Low – dry shrub	Low	Erosion H on fSL soils	Partial cutting recommended; fire-adapted shrubs will increase after fire
01	11	Vegetation, dry soil	High – dry shrub, pinegrass	Low	Erosion and forest floor displacement H	Partial cutting recommended; fire-adapted shrubs will increase after fire
03	7	Air temperature	Medium – montane shrub, pinegrass, mixed broadleaf-shrub	Mod.	Erosion and forest floor displacement H; compaction H on silty soil	Flat sites frost prone

04	5	Air temperature	Medium – montane shrub, mixed broadleaf-shrub	Mod.	Compaction H	Flat sites frost prone, riparian, machine travel on silty soils when dry
05	6	Air temperature	Medium – montane shrub, mixed broadleaf-shrub, mountain alder, cottonwood shrub	Mod.	Compaction H; erosion H	Frost prone, riparian, minimize machine travel
06	3	Air temperature, vegetation, rooting substrate	High – cottonwood-shrub	Mod.	Compaction VH	Frost prone, riparian, minimize machine travel

- a **Caution:** Based on sample plot data; some factors or sensitivities will vary with individual site conditions. Use of original interpretation tools is necessary (i.e., SYTEPREP and site sensitivity keys); these interpretations presented here to highlight common concerns. Sensitivity keys are available in Curran, M., I. Davis, and B. Mitchell. 2000. Silviculture prescription data collection field handbook: interpretive guide for data collection, site stratification, and sensitivity evaluation for silviculture prescriptions. B.C. Min. For., Victoria, B.C. Land Manage. Handb. 47. SYTEPREP: Expert System for Site Preparation and Vegetation Management in Southern Interior British Columbia is found at <<http://www.myacquire.com/spvegman/expertsystem/>>.
- b Complexes described in Operational Summaries for Vegetation Management available online at <<http://www.for.gov.bc.ca/hfp/pubsvegmgmt.htm>>.
- c VH = very high, H = high, steep = >45%

IDF_xh4

Species Selection Recommendations

Site series	Conifer species			Broadleaf species
	Primary	Secondary	Tertiary	
72 Bluebunch wheatgrass – Selaginella	No timber values			
52 Snowberry – Bluebunch wheatgrass	No timber values			
82 Bluebunch wheatgrass – Junegrass	No timber values			
02 FdPy – Pinegrass – Penstemon	Py, Fd ^a	Lw ^b		
01 FdPy – Pinegrass	Fd, Lw	Py ^c	Pl ^{b,e}	
03 FdLw – Douglas maple – Twinflower	Fd ^d , Lw ^d	Py ^c , Sxw, Pl ^{b,e}		Ep, At ^f
04 SxwFd – Snowberry – Sarsaparilla	Sxw, Fd ^d , Lw ^d	Pl	Cw ^d	Ep, At ^f
05 Sxw – Snowberry – Oak fern	Sxw, Fd ^d	Lw ^d , Pl, Cw ^d		Ep, Act ^f , At ^f
06 Act – Snowberry – Rose	Sxw ^g		Cw ^{d,f,g}	Act

a Partial canopy cover required for successful regeneration.

b Restricted to cool or neutral aspects.

c Restricted to warm aspects.

d Restricted by growing-season frosts.

e Suitable on cold air drainage sites.

f Not sampled in this site series, but from observations in adjacent site series and BEC units it may occur.

g Elevated microsites are preferred.

ICHdw2

Variant Summary

Boundary Dry Warm Interior Cedar – Hemlock Variant

Location: The ICHdw2 is found along the Granby River and Burrell Creek from Almond Creek to slightly north of Glouchester Creek, along Burrell Creek, and to just north of the Granby provincial park boundary on the Granby River. It is found above the IDFdm1 and below the ICHmk1. The ICHdw2 comes to the valley bottom north of the confluence of Burrell Creek and the Granby River.

Elevation range: 700 to 1050 m (cool aspect) or 700 to 1250 m (warm aspect), where it extends to valley bottom; 850 to 1050 m (cool aspect), 1050 to 1250 m (warm aspect), where it is found above the IDF.

Climate¹: Moist Climatic Region; very hot, moist summers; very mild winters with light snowfall. Soils generally dry out for long to insignificant time periods in late summer. Snowpacks are very shallow to shallow and of short duration but, combined with the mild climate, result in no significant soil freezing, except for some bladed soils. Major growth-limiting factors include moisture on dry sites and frost on some depressional sites.

Soils, geology, and landforms: Soils are derived primarily from coarse-grained granitic rocks. Moderately rich volcanic rocks along with quartzites and fine textured metasedimentary rocks are also common. Morainal soils are predominant and are generally loamy (sandy loam) or sandy textured. Glaciofluvial soils are less frequent and are sandy textured. Fluvial deposits are small even along Burrell Creek and the Granby River, where fluvial benches seldom extend 100 m from the streambank. Many upland soils have a thin, aeolian-influenced loamy capping.

Zonal vegetation: Closed, mixed stands of Fd and Lw are predominant. Cw is generally found in the lower tree and tall shrub layers. Small amounts of Pw and Hw are also commonly found. There is a wide variety of low shrubs, with falsebox being the most abundant. Common shrubs include Utah honeysuckle, tall Oregon-grape, baldhip rose, thimbleberry, birch-leaved spirea, soopolallie, and black huckleberry. The herb layer is dominated by twinflower. Other common herbs are queen's cup, prince's pine, wild sarsaparilla, bracken, and Hooker's fairybells. Climax stands of Cw and Hw on mesic sites are very rare.

Distinguishing the ICHdw2 from adjacent subzones/variants

In the **IDFxb4:**

- Cw or Pl are not found on zonal sites
- zonal sites are dominated by pinegrass and mallow ninebark

In the **IDFdm1:**

- Cw is not found on zonal sites
- zonal sites are dominated by pinegrass
- Hw is not found on wet sites

In the **ICHmk1:**

- Hw and Pw are rare
- Bl is widespread
- Py is absent
- Sitka alder is more widespread
- high cover of pinegrass (>20%) is common on dry sites
- riparian sites with no Cw are common

¹ No climate stations occur in the ICHdw2. This description comes from stations in the ICHdw1, which is likely slightly warmer and moister than the ICHdw2. Climatic descriptors are defined in Appendix 12 of LMH 20.

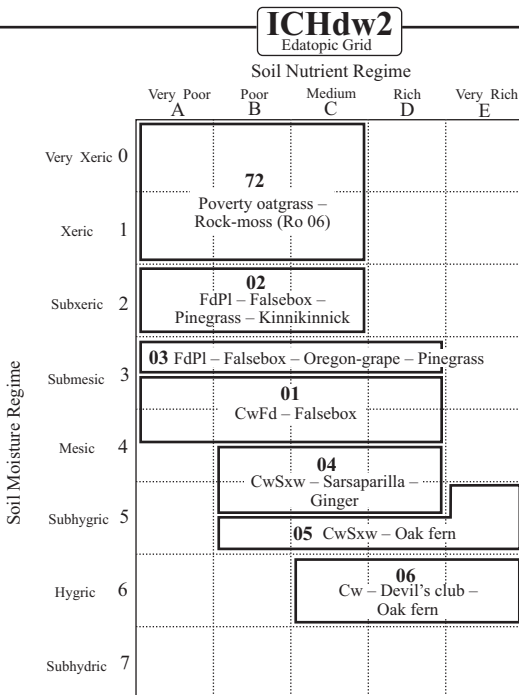
- In the **ICHdw1**:
- Hw is more widespread
 - Bg is sporadically present
 - dry sites have a wider variety of shrub species, such as oceanspray, red-stemmed ceanothus, and mock-orange

- In the **ICHmw2**:
- Hw and Pw are widespread
 - climax Cw and Hw stands with feathermoss-dominated understories are common

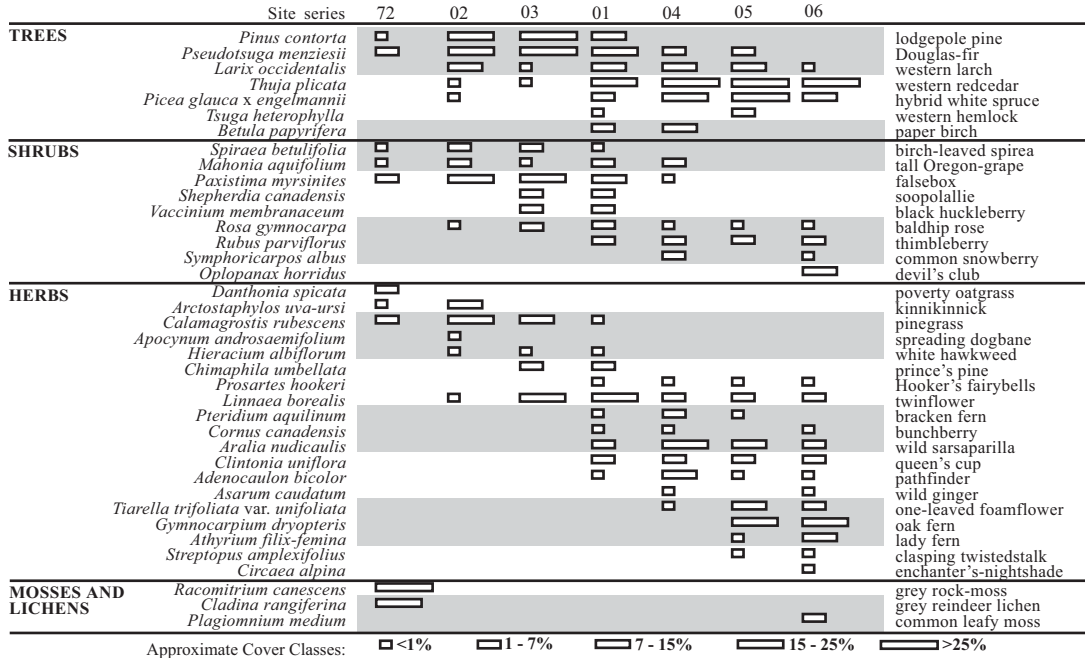
Forest characteristics: Fd, Lw, and PI are the most widespread tree species. Cw is widespread in lower canopy layers and dominates wet sites. Hw is somewhat sporadic and much less abundant than in the ICHdw1. Bg is also absent, in contrast to the ICHdw1 and Py is much less frequent. Late seral stands are almost entirely restricted to wet sites. Birch is common as a component of circum-mesic stands.

Wildlife habitat: The mid-successional stands of PI, Fd, and Lw in the ICHdw2 are used by cavity-nesting birds, many of which feed on bark beetles and other tree-parasitic insects. This variant has some ungulate winter range values, especially for moose. In spring, this ecosystem provides important low-elevation habitat for grizzly bears. Other species of management concern that potentially occur in this variant include Great Blue Heron, Western Screech-Owl, American badger, and wolverine.

Special note: The bulk of the area previously mapped as ICHdw is now recognized as the ICHdw1. The ICHdw1 extends from the west side of Christina Lake eastward.



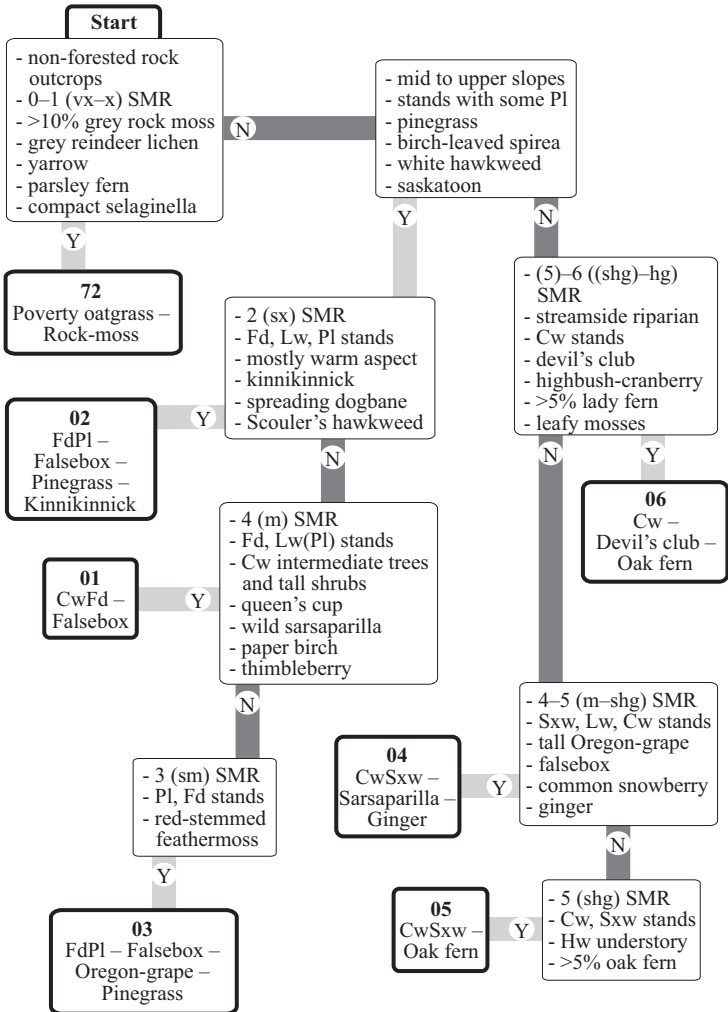
ICHdw2 Vegetation Table

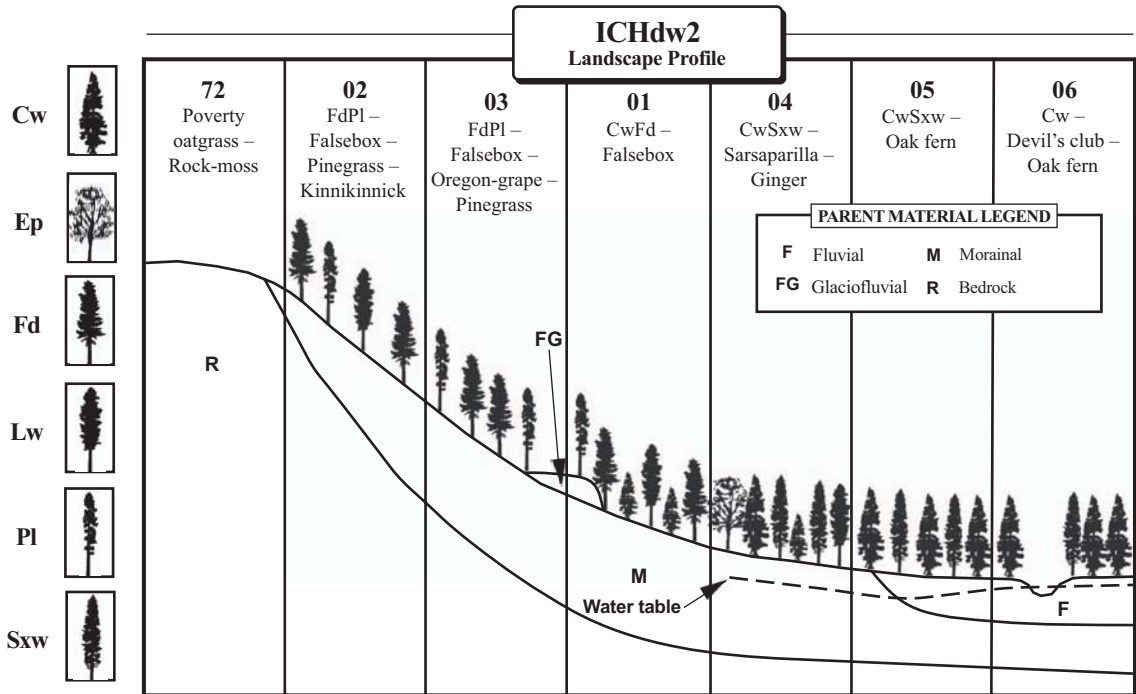


Approximate Cover Classes: □ <1% ▢ 1 - 7% ▣ 7 - 15% ▤ 15 - 25% ▥ >25%

ICHdw2

Site Series Flowchart





ICHdw2 Environmental Table

Site series		72	02	03	01	04	05	06
Number of plots		4	4	5	7	7	5	4
Soil moisture regime ^a (SMR)		0-1 vx-x	2-(3) ^b sx-(sm)	3 sm	(3)-4 (sm)-m	(4)-5 (m)-shg	5-(6) shg-(hg)	(5)-6 (shg)-hg
Aspect		variable	warm, neutral	neutral	neutral, cool	neutral	neutral	neutral
Slope gradient %		variable	variable	variable	variable	0-15	0-8	0-5
Slope position		crest to upper	crest to mid	(upper) to mid	mid (level, lower)	mid to level	toe to level	level (toe)
Parent material		R	M	M(FG)	M(FG)	M(F)	F(M)	F
Soil texture coarse fragments % (min.- mean -max.)	0-30 cm	L(S) 10-29-45	L(S) 10-26-50	S(L) 15-35-70	L 3-37-75	L(\$,C,S) 0-21-50	L(\$,C,S) 0-10-40	S(L,C) 0-3-10
	30+ cm	rock	L(S) 35-55-80	S(L) 20-52-75	S,L 10-61-85	S(\$,L) 0-37-75	C(L,\$) 0-25-55	L(\$,C) 0-40-70
Humus form – LFH thickness cm (min.- mean -max.)		Mull (Moder) 5-11-17	Mor (Mull,Moder) 2-4-8	Mor 1-2-5	Mor 3-4-5	Mor (Mull) 5-10-17	Mull,Mor 7-11-16	Mull (Moder) 15-27-56
Important site features		rock outcrop				mottles below 50 cm from surface	mottles below 30 cm from surface	mottles below 10 cm from surface

a Environmental features contained in this table are defined in chapter 3 of LMH 20.

b Values in brackets are less common.

ICHdw2

Management Interpretations

Site series	Number of plots	Common seedling growth limiting factors ^a	Vegetation potential - common complexes ^b	Road drainage control needs	Common site sensitivities ^{a,c}	Other prescription considerations
72	4	n/a	Low – dry grass	Low	n/a	No timber values
02	4	Dry soil	Medium – dry shrub, pinegrass, bracken, fireweed	Low	Erosion H on fSL, steep soils	Conserve limited organic matter
03	5	Dry soil, vegetation	Medium – fireweed, dry shrub, bracken	Mod.	Erosion and mass wasting H on steep, sandy soils; forest floor displacement H	Conserve limited organic matter
01	7	Vegetation	Medium – mixed broadleaf-shrub, fireweed, bracken	Mod.	Erosion H on steep, fSL soils; forest floor displacement H	Conserve limited organic matter
04	7	Vegetation	High – mixed broadleaf-shrub, fireweed	High	Compaction H on silty or clayey soils; forest floor displacement H on clayey soils	Machine travel on silty soils when dry, minimize machine travel on clayey soils

05	5	Vegetation	High – fireweed, mixed broadleaf-shrub, cottonwood shrub	High	Compaction VH on clayey or silty soils; erosion H on silty soils	Riparian, minimize machine travel on silty or clayey soils
06	4	Vegetation, rooting substrate	High – cottonwood-shrub, fern, mixed shrub, mountain alder	High	Compaction VH; erosion H on silty soils; mass wasting H on clayey soils	Riparian, windthrow hazard, minimize machine travel on silty or clayey soils, water table may rise post-harvest

- a **Caution:** Based on sample plot data; some factors or sensitivities will vary with individual site conditions. Use of original interpretation tools is necessary (i.e., SYTEPREP and site sensitivity keys); these interpretations presented here to highlight common concerns. Sensitivity keys are available in Curran, M., I. Davis, and B. Mitchell. 2000. Silviculture prescription data collection field handbook: interpretive guide for data collection, site stratification, and sensitivity evaluation for silviculture prescriptions. B.C. Min. For., Victoria, B.C. Land Manage. Handb. 47. SYTEPREP: Expert System for Site Preparation and Vegetation Management in Southern Interior British Columbia is found at <<http://www.myacquire.com/spvegman/expertsystem/>>.
- b Complexes described in Operational Summaries for Vegetation Management available online at <<http://www.for.gov.bc.ca/hfp/pubsvegmgmt.htm>>.
- c VH = very high, H = high, steep = >45%

ICHdw2

Species Selection Recommendations

Site series	Conifer species			Broadleaf species
	Primary	Secondary	Tertiary	
72 Poverty oatgrass – Rock-moss	No timber values			
02 FdPl – Falsebox – Pinegrass – Kinnikinnick	Fd, Lw, Pl	Py		
03 FdPl – Falsebox – Oregon-grape – Pinegrass	Lw, Fd, Pl		Sxw ^{c,d} , Cw ^c , Bl ^{c,d} , Py ^{a,b}	Ep, At
01 CwFd – Falsebox	Fd, Lw, Pl	Sxw	Cw, Pw ^e , Hw ^c , Bl ^d	Ep, At
04 CwSxw – Sarsaparilla – Ginger	Lw ^f , Sxw, Fd ^f	Cw ^f	Hw, Bl ^d , Pl ^g , Pw ^g	Ep, At, Act
05 CwSxw – Oak fern	Cw ^f , Sxw	Lw ^{f,h} , Fd ^{f,h}	Pw ^e , Hw, Bl, Pl ^g	Ep, At ^g , Act ^g
06 Cw – Devil’s club – Oak fern	Cw ^f , Sxw	Lw ^{f,h} , Fd ^{f,h}	Hw, Bl, Pl ^g	Ep, At ^g , Act ^g

a Restricted to warm aspects.

b Restricted to lower elevations of biogeoclimatic unit.

c Restricted to cool aspects.

d Restricted to upper elevations of biogeoclimatic unit.

e Risk of white pine blister rust.

f Restricted by growing season frosts.

g Not sampled in this site series, but from observations in adjacent site series and BEC units it may occur.

h Elevated microsites are preferred.

ICHdm

Subzone Summary

Dry Mild Interior Cedar – Hemlock Subzone

Location: The ICHdm is found south of Akokli Creek, in drainages including Arrow, Goat, Kid, Little Moyie, Hawkins, and Freeman, east to Gilnockie Creek, north to Lamb Creek, and then in the St. Mary's River and tributaries. It is generally found above the ICHdw on the west side of the Purcell Mountains and above the MSdk or ICHmk1 in the east. The ESSFdm is generally found above the ICHdm.

Elevation range: Lower boundaries are between 1015 to 1150 m (cool aspect) and between 1300 to 1380 m (warm aspect); upper boundaries are between 1575 and 1625 m (cool aspects) and between 1625 and 1675 m (warm aspects).

Climate: The climate of the ICHdm is intermediate between the ICHdw and the ICHmw2. No climate data are available for the unit.

Soils, geology, and landforms: Fine-textured metasedimentary rock (argillites, mudstones) predominate; quartzites and coarse-grained intrusives are also common. Morainal soils are predominant. Colluvial soils are quite frequent in steep terrain. Soil textures are predominantly loamy (sandy loam, fine sandy loam). Silty soils are also frequent. Aeolian-influenced cappings of about 30 cm in depth are common.

Zonal vegetation: Closed stands dominated by Lw with mixtures of various combinations of Hw, Bl, Pl, Cw, Sxw, and Fd are predominant. Climax Hw stands are uncommon. A wide variety of low shrubs is found with falsebox being the most abundant. Common shrubs include: black huckleberry, false azalea, birch-leaved spirea, and Utah honeysuckle. The herb layer is dominated by twinflower. Other common herbs are arnica (heart-leaved or mountain), queen's cup, prince's pine, pink wintergreen, and round-leaved violet. The uncommon climax Hw stands on mesic sites have sparse shrub and herb layers and abundant feathermosses.

Distinguishing the ICHdm from adjacent subzones/variants

- In the **ICHdw:**
- Bl is rare
 - Py is found on dry sites
 - false azalea is absent
 - Douglas maple is common on mesic and drier sites
-

- In the **ICHmk1:**
- Hw is rare
 - Fd is more abundant on dry sites
 - false azalea is less common
 - common juniper and pinegrass are more abundant on dry sites
-

- In the **ESSFdm:**
- Cw, Lw, Fd, and falsebox are rare, and restricted to lower elevations
 - Se and Bl stands predominate
 - Hw is less abundant, and restricted to lower elevations
 - rhododendron, grouseberry, low bilberry, and beargrass are widespread
-

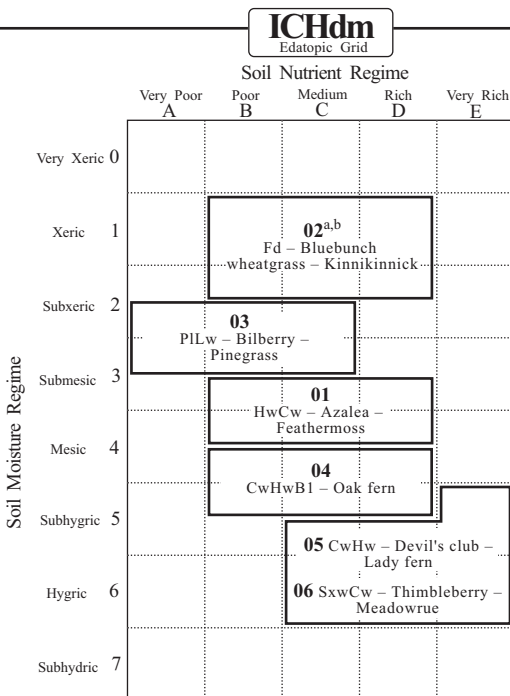
- In the **ESSFwm:**
- Cw, Lw, and Fd are rare
 - Se and Bl stands predominate
 - Hw is less abundant, and restricted to lower elevations
 - rhododendron is widespread
 - false azalea has higher cover
-

- In the **ESSFdk:**
- Cw and Hw are absent
 - Se, Pl, and Bl stands predominate
 - grouseberry and low bilberry are more widespread
 - false azalea has higher cover
-

In the **MSdk**: - Cw and Hw are absent
 - Fd, pinegrass, and soopolallie are more abundant

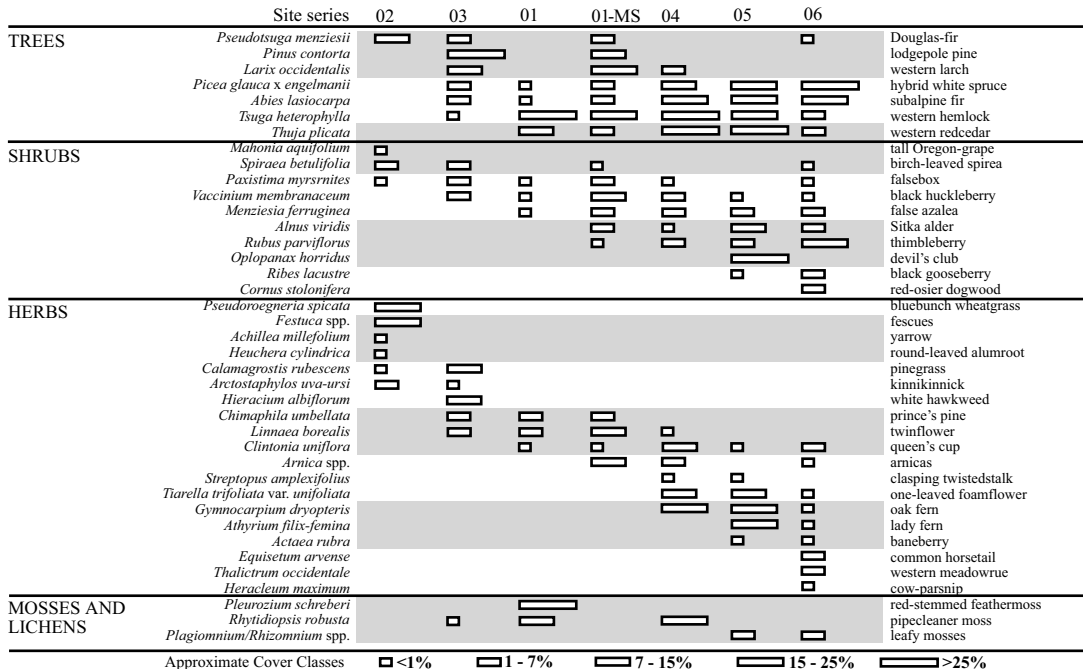
Forest characteristics: Mixed stands of Lw, Pl, Hw, Cw, Sxw, and Bl are most common. Cw and Hw dominate wetter than mesic sites, other than cold air sites. Cold air riparian sites are dominated by Se and Bl. Circum-mesic late seral Hw (Cw) stands are uncommon, although these stands were likely more abundant — considerable areas of this stand type were harvested in the Kid Creek drainage. Deciduous trees are uncommon, with Act and At on riparian sites being the most widespread.

Wildlife habitat: The high tree species diversity in this ICH subzone, especially on mesic sites, supports a diverse wildlife fauna. Important winter ranges for deer, elk, and moose are found on south-facing slopes. Some mid- and late-seral stands in this higher-elevation ICH subzone provide connectivity habitat for the endangered South Purcell subpopulations of the mountain caribou. Other species of management concern include wildlife tree users, Northern Goshawk, and grizzly bear.



- a Rock outcrops have not been sampled in the ICHdm.
 b Dry sites are poorly sampled in the ICHdm. Vegetation may vary from that described herein.

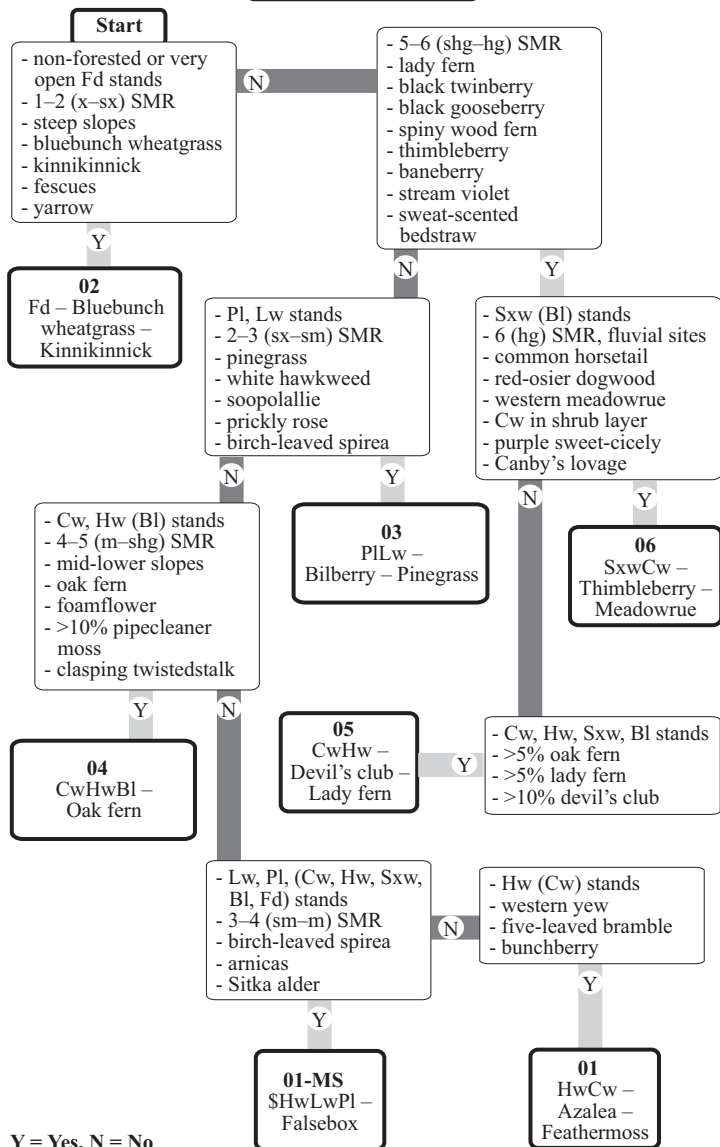
ICHdm Vegetation Table



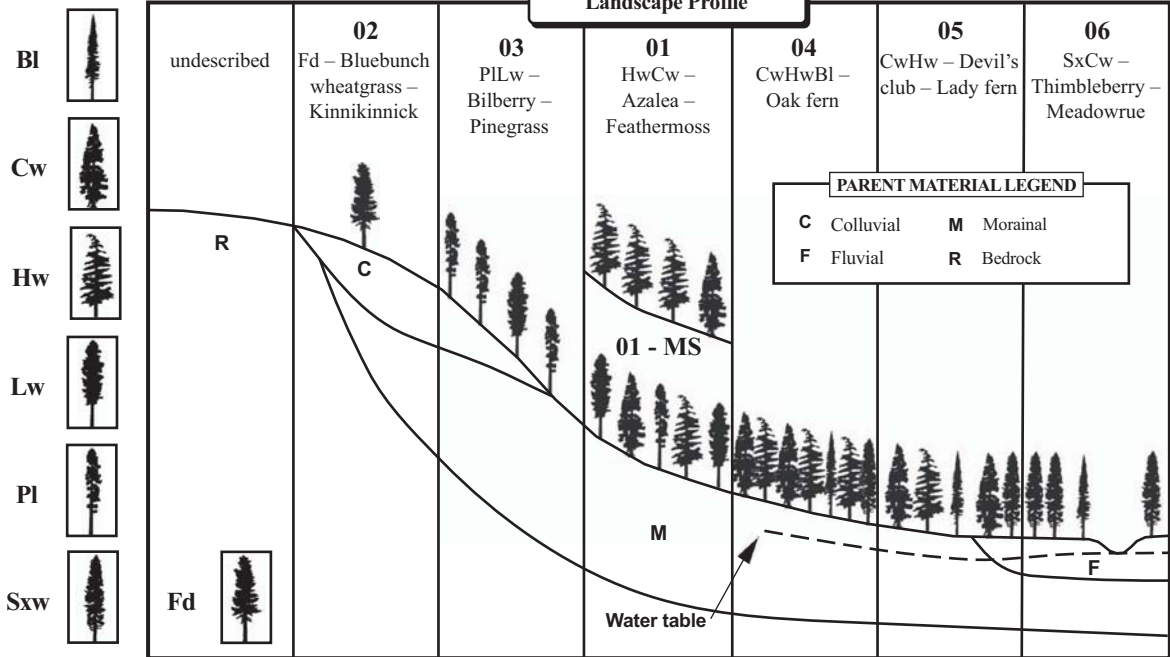
Approximate Cover Classes ▣ <1% ▣ 1 - 7% ▣ 7 - 15% ▣ 15 - 25% ▣ >25%

ICHdm

Site Series Flowchart



ICHdm
Landscape Profile



ICHdm Environmental Table

Site series		02	03	01	01-MS	04	05	06
Number of plots		2	7	2	7	8	5	4
Soil moisture regime ^a (SMR)		1-2 x-sx	2-3 sx-sm	3-4 sm-m	3-4 sm-m	4-5 m-shg	5-6 shg-hg	(5)-6 ^b (shg)-hg
Aspect		variable	variable	neutral	neutral	cool, neutral	neutral	neutral
Slope gradient %		60,75	0-50	2,30	14-60	variable	5-28	0-12
Slope position		crest to upper	mid (upper)	mid, level	mid (lower)	mid to lower	toe (mid)	level (toe)
Parent material		C	C,M ^c	F,L,M	C(FG) ^c	M(C)	F(M)	F
Soil texture coarse fragments % (min.- mean -max.)	0-30 cm	L 20,90	L ^c 20	S 10,12	L ^c 25,85	L, C(S,S) 0-27-60	S(L,S,C) 0-40-90	L(S,S) 0-21-70
	30+ cm	L 60,90	S ^c 25	L,S 10,65	L,S ^c 90	S,C(L,S) 0-44-90	C,S 12-53-85	L(S) 0-51-95
Humus form – LFH thickness cm (min.- mean -max.)		Mull 6,22	Mor ^c 3	Mor 5	Mor ^c 1	Mor 3-4-6	Moder (Mull) 9-15-20	Mull (Moder) 9-25-40
Important site features		colluvial veneers	generally steep				seepage below 50 cm, not found on frost prone sites	mottles within 10 cm, restricted to frost prone sites

a Environmental features contained in this table are defined in chapter 3 of LMH 20.

b Values in brackets are less common.

c Several plots in this site unit do not have data for this attribute.

ICHdm

Management Interpretations

Site series	Number of plots	Common seedling growth limiting factors ^a	Vegetation potential - common complexes ^b	Road drainage control needs	Common site sensitivities ^{a,c}	Other prescription considerations
02	2	Dry soil	Low – dry grass, dry shrub	Low	Erosion, soil displacement, and mass wasting H on steep soils	Conserve limited organic matter, no timber values
03	7	Dry soil, vegetation	Medium – dry shrub, pinegrass, fireweed	Mod.	Erosion and compaction H on silty soils; forest floor displacement H	Conserve limited organic matter
01	9	Cold soil, vegetation	Medium – mixed broadleaf-shrub, fireweed, mixed shrub, dry alder, bracken	Mod.	Erosion and mass wasting H on steep, silty soils; forest floor displacement H on coarse soils; compaction H on silty soils	Conserve limited organic matter, machine travel on silty soils on snow or dry soils
04	8	Vegetation, cold soil	High – mixed shrub, fireweed, wet alder	High	Compaction VH on clayey soils; forest floor displacement H on clayey soils; erosion VH on steep, silty soils; mass wasting H on steep, clayey soils	Random machine travel on snow on silty and clayey soils

05	5	Vegetation, cold soil, rooting substrate	High – fireweed, mixed shrub, fern, wet alder, bracken	High	Compaction VH on clayey soils, H on silty soils; erosion H on silty or sandy soils; mass wasting H on clayey soils	Riparian, random machine travel on snow, silty and clayey soils
06	4	Vegetation, cold soil	High – mixed shrub, wet alder, cottonwood-shrub, fireweed	High	Compaction VH; forest floor displacement H on sandy soil with high coarse fragments	Riparian, windthrow hazard, water table may rise post-harvest, random machine travel on snow, silty and clayey soils

- a **Caution:** Based on sample plot data; some factors or sensitivities will vary with individual site conditions. Use of original interpretation tools is necessary (i.e., SYTEPREP and site sensitivity keys); these interpretations presented here to highlight common concerns. Sensitivity keys are available in Curran, M., I. Davis, and B. Mitchell. 2000. Silviculture prescription data collection field handbook: interpretive guide for data collection, site stratification, and sensitivity evaluation for silviculture prescriptions. B.C. Min. For., Victoria, B.C. Land Manage. Handb. 47. SYTEPREP: Expert System for Site Preparation and Vegetation Management in Southern Interior British Columbia is found at <<http://www.myacquire.com/spvegman/expertsystem/>>.
- b Complexes described in Operational Summaries for Vegetation Management available online at <<http://www.for.gov.bc.ca/hfp/pubsvegmnngt.htm>>.
- c VH = very high, H = high, steep = >45%

ICHdm

Species Selection Recommendations

Site series	Conifer species			Broadleaf species
	Primary	Secondary	Tertiary	
02 Fd – Bluebunch wheatgrass – Kinnikinnick	No timber values			
03 PILw – Bilberry – Pinegrass	Pl, Lw, Fd	Sxw ^{a,b}	Bl ^a , Cw ^a	
01 HwCw – Azalea – Feathermoss	Lw, Fd, Pl	Cw ^a , Sxw ^a	Pw ^c , Bg ^d , Hw ^a , Bl ^a	At
04 CwHwBl – Oak fern	Lw ^e , Pl, Cw ^e , Sxw	Fd ^e , Hw, Bl	Pw ^c	At ^f
05 CwHw – Devil's club – Lady fern	Cw ^e , Hw, Sxw	Bl, Fd ^e , Lw ^e	Pl	At ^f
06 SxwCw – Thimbleberry – Meadowrue	Sxw	Bl, Pl ^g	Fd ^{e,g} , Cw ^e , Hw ^e	Act, At

a Restricted to neutral or northerly aspects.

b Upper elevation of BEC unit.

c Risk of white pine blister rust.

d Restricted to east shore of Kootenay Lake.

e Limited by growing-season frost.

f Not observed on these sites but may likely occur.

g Elevated microsites preferred.

ESSFdm

Subzone Summary

Dry Mild Engelmann Spruce – Subalpine Fir Subzone

Location: The ESSFdm is found south and east of Kootenay Pass in the Priest River, and Boundary and Corn Creek watersheds. Also, in the southern Selkirk it is found east of Blazed Creek and south of Next Creek. In the southern Purcell Mountains, it is found south of Akokli Creek in the Kootenay Lake District and on the east side of the Purcell Divide from Bootleg and Pyramid mountains and the Matthew watershed, through Hellroaring, upper Perry, and Lamb creeks and the upper Moyie River. It is generally found above the ICHdm and below the ESSFdmw (ESSFdm woodland that is mapped as a portion of ESSFdmu).

Elevation range: Lower elevations are between 1525 and 1575 m (cool aspect) and between 1625 and 1650 m (warm aspect); upper elevations range from 1900 to 2080 m. There are two areas of subdued terrain in the upper Little Moyie River and Skelly Creek drainages, where elevations are much lower — lower elevations are 1450 m (cool aspect) and 1510 m (warm aspect).

Climate: The climate of the ESSFdm is intermediate between the ESSFdk and the ESSFwm. No climate stations are found in the ESSFdm. Major growth-limiting factors include cold soil and air temperatures.

Soils, geology, and landforms: Soils are derived primarily from fine-grained metasedimentary rocks: argillites, mudstones, and quartzites. Coarse-grained intrusive rocks, such as granodiorite, are also common. Colluvial soils with high coarse fragment contents and coarse loamy fine fraction textures are widespread. Morainal soils with coarse loamy textures are also widespread. Glaciofluvial soils are less frequent and are sandy textured with high coarse fragment content. Fluvial deposits are limited in extent and uncommon.

Zonal vegetation: Stands are dominated by Bl with lesser amounts of Se. Pl is infrequent. Hw is sporadically seen and can be found to high elevations (above 1800 m). Black huckleberry, false azalea, and rhododendron are abundant. Beargrass, low bilberry, or grouseberry are the dominant herbs. The moss layer is moderately well developed, with ragged mosses (*Brachythecium* spp.) being the most widespread.

Distinguishing the ESSFdm from adjacent subzones/variants

- In the **ICHdm:**
- Cw, Fd, and Lw are widespread
 - Se and Bl are not a dominant stand type
 - rhododendron and false azalea are restricted to cold air pockets
 - beargrass is much less widespread
-

- In the **ESSFwm:**
- oak fern is found on zonal sites
 - beargrass is absent
 - avalanche tracks are more widespread
-

- In the **ESSFdk:**
- Hw is absent
 - Pl, Fd, and Lw are more widespread
 - pinegrass is much more abundant
 - beargrass is rare
-

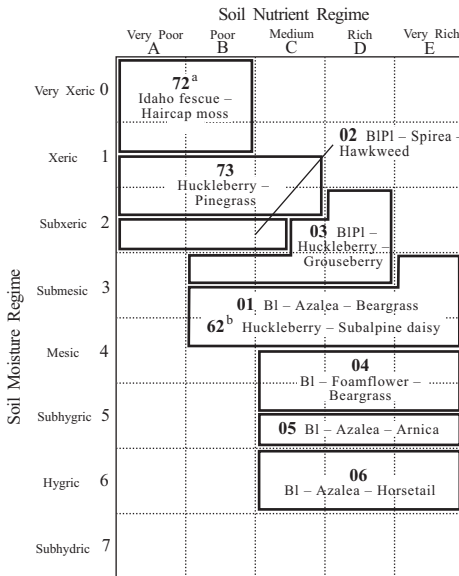
- In the **ESSFdmw (ESSFdmu):**
- stands are generally more open and less productive
 - subalpine meadows are frequently present
 - high elevation species such as mountain heathers and La are present
-

Forest characteristics: Bl is the dominant tree on mesic and moister sites. Bl is also seen frequently on drier sites where Pl is dominant. Se is also widespread on mesic and moister sites and is dominant adjacent to streamsides. Fires have left a range of ages of stands, with old-growth stands being most frequent in wetter situations.

Wildlife habitat: This high-elevation subzone includes late-seral stands that provide essential habitat for the endangered South Selkirk and South Purcell mountain caribou subpopulations. Old-growth patches are also important for wildlife tree-dependent species such as Boreal Chickadee, Three-toed Woodpecker, Pileated Woodpecker, and American marten that use cavities for nesting and roosting in large, old trees. In most site units, this subzone supports a high abundance of berry-bearing shrubs that are important food sources for grizzly bears. Deer, elk, and moose use the ESSFdm as summer range, and wolverine may be found in this subzone throughout all seasons.

Special notes: Site series variations are described for two site series (03 and 01). These variations possess similar environmental conditions and vegetation but differ in their dominant understory species. In site series 03 and 01, sites dominated by beargrass, the 03.1 and 01.1, are distinguished from those dominated by bilberry/grouseberry, the 03.2 and 01.2. While these variations may exhibit similar tree productivity and engineering properties, they are visually quite distinct due to the difference in their dominant understory species. The variations will also have different wildlife values as beargrass is an important forage species for a variety of wildlife. The area immediately south of Kootenay Pass in the southern Selkirks is distinct from the rest of the ESSFdm. This area is dominated by rhododendron and has very little false azalea but is not as wet as the ESSFwc6 immediately to the north. This area is likely a small outlier of areas to the south. Site series assignment may have to rely more heavily on assessment of soil and site conditions in this area.

ESSFdm
Edatopic Grid



a 72 – Idaho fescue – Haircap moss and 73 – Huckleberry – Pinegrass site series poorly sampled and rarely observed in the field.

b 62 – Huckleberry – Subalpine daisy site series found at high elevations (>1850 m). It is found on sites with moist soils interspersed with boulders or rock outcrops and has a wide diversity of plant species.

ESSFdm Vegetation Table

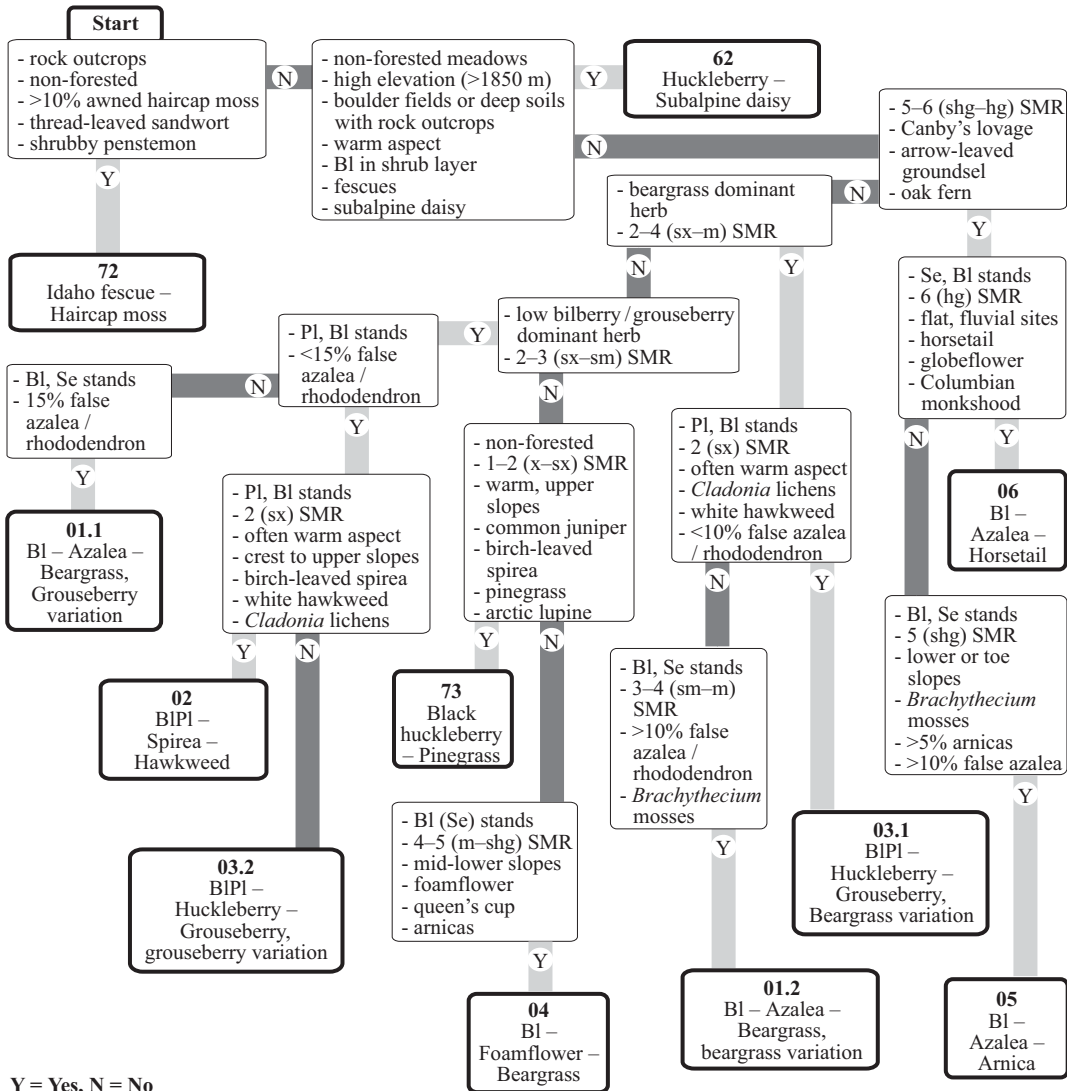
Site series	72	73	62	02	03.1 ^a	03.2 ^b	01.1 ^b	01.2 ^a	04	05	06	
TREES												
<i>Pinus contorta</i>		▣		▣▣	▣▣	▣▣	▣	▣				lodgepole pine
<i>Tsuga heterophylla</i>								▣				western hemlock
<i>Abies lasiocarpa</i>	▣	▣	▣	▣▣	▣▣	▣▣	▣▣	▣▣	▣▣	▣▣	▣▣	subalpine fir
<i>Picea engelmannii</i>			▣	▣	▣	▣	▣	▣	▣	▣	▣	Engelmann spruce
SHRUBS												
<i>Juniperus communis</i>		▣										common juniper
<i>Spiraea betulifolia</i>				▣								birch-leaved spirea
<i>Vaccinium membranaceum</i>	▣	▣▣	▣▣	▣▣	▣	▣	▣	▣	▣	▣	▣	black huckleberry
<i>Rhododendron albiflorum</i>			▣		▣	▣	▣	▣	▣	▣	▣	white-flowered rhodo.
<i>Menziesia ferruginea</i>				▣		▣	▣	▣	▣	▣	▣	false azalea
<i>Alnus viridis</i>				▣		▣			▣			Sitka alder
<i>Ribes lacustre</i>									▣		▣	black gooseberry
HERBS												
<i>Arenaria capillaris</i>	▣▣											thread-leaved sandwort
<i>Penstemon fruticosus</i>	▣▣											shrubby penstemon
<i>Festuca</i> spp.	▣▣		▣▣									fescues
<i>Selaginella densa</i>	▣	▣▣										compact selaginella
<i>Calamagrostis rubescens</i>	▣	▣▣										pinegrass
<i>Lupinus arcticus</i>		▣▣										arctic lupine
<i>Erigeron peregrinus</i>			▣▣									subalpine daisy
<i>Hieracium albiflorum</i>				▣	▣							white hawkweed
<i>Xerophyllum tenax</i>	▣▣		▣	▣	▣▣	▣▣	▣▣	▣	▣			beargrass
<i>Vaccinium scoparium/myrtilloides</i> ^c	▣	▣		▣	▣	▣	▣	▣	▣			grouseberry/bilberry ^c
<i>Arnica</i> spp.		▣		▣		▣		▣		▣▣	▣	arnicas
<i>Clintonia uniflora</i>									▣	▣	▣	queen's cup
<i>Thalictrum occidentale</i>			▣						▣	▣	▣	western meadowrue
<i>Tiarella trifoliata</i> var. <i>unifoliata</i>									▣	▣	▣	foamflower
<i>Ligusticum canbyi</i>										▣	▣	Canby's lovage
<i>Veratrum viride</i>										▣	▣	Indian hellebore
<i>Senecio triangularis</i>											▣▣	arrow-leaved groundsel
<i>Gymnocarpium dryopteris</i>										▣	▣	oak fern
<i>Equisetum arvense</i>											▣	common horsetail
<i>Trollius albiflorus</i>											▣	globeflower
<i>Aconitum columbianum</i>											▣	Columbian monkshood
MOSSES AND LICHENS												
<i>Polytrichum piliferum</i>	▣▣		▣									awned haircap moss
<i>Cladonia</i> spp.		▣		▣	▣							cladonia lichens
<i>Brachythecium</i> spp.									▣	▣		ragged mosses
<i>Mnium</i> spp.											▣	leafy mosses

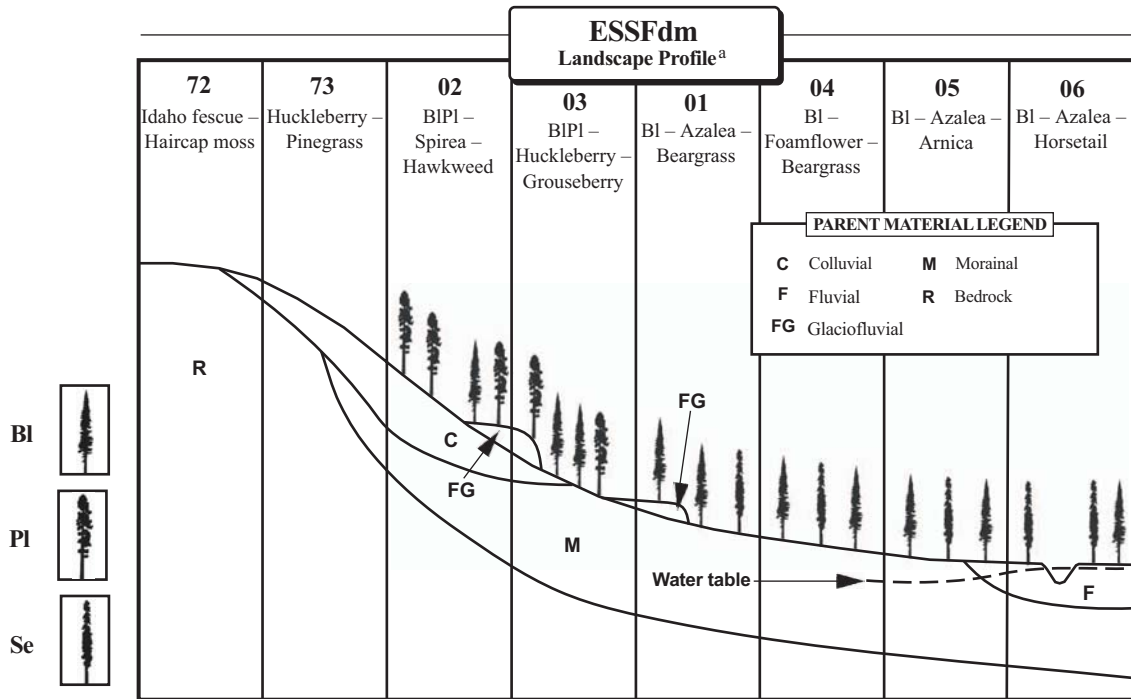
Approximate Cover Classes: ▣ <1% ▣ 1 - 7% ▣ 7 - 15% ▣ 15 - 25% ▣ >25%

- a Beargrass variation
- b Grouseberry variation
- c Grouseberry and bilberry treated together due to difficulties in identification.

ESSFdm

Site Series Flowchart





^a At elevations above 1850 m on warm aspects on steep colluvial slopes, with moist soils and large boulders or rock outcrops, a subalpine meadow is seen: 62 – Huckleberry – Subalpine daisy.

ESSFdm Environmental Table

Site series		72	73	62	02	03	01	04	05	06
Number of plots		2	2	5	5	10	28	12	6	8
Soil moisture regime ^a (SMR)		0-1 vx-x	1-2 x-sx	3-4(5) ^b sm-m (shg)	2 sx	2-3 sx-sm	3-4(5) sm-m (shg)	4(5) m(shg)	5 shg	6(7) hg(shd)
Aspect		variable	warm	warm	warm, neutral	variable	neutral, cool	variable	neutral, cool	neutral
Slope gradient %		33,82	60,67	20-65	variable	10-54	variable	10-48	10-43	0-10
Slope position		crest to upper	upper	variable	crest to upper	upper to mid	upper to mid (lower, level)	mid to lower	mid to toe	toe (level, lower)
Parent material		R, Cv/R	C	C(M)	C(FG)	M(C)	M,C,FG	M(C)	F,M(FG,C)	F(L,O)
Soil texture coarse fragments % (min.- mean -max.)	0-30 cm	L 70-70-70	no data	L 60-73-80	L(S) ^c 40-45-50	L ^c 50-63-75	L ^c 5-44-90	L(S) ^c 10-30-50	L ^c 25-32-40	L(S) 0-18-60
	30+ cm	rock	no data	L 80-86-90	S(L) 50-72-80	L 75-78-80	L(S,S) 20-55-95	L(S,S) 30-57-70	S,L 40-60-80	L(S,C) 10-46-90
Humus form – LFH thickness cm (min.- mean -max.)		Mor 2-4-6	no data	Mull (Mor) 1-6-13	Mor (Mull) 1-4-10	Mor 1-3-5	Mor 1-3-7	Mor 3-5-7	Mor 3-4-5	Mor (Moder. Mull) 3-5-8
Important site features		rock outcrop or shallow soil	shallow soil	moist soil with boulders					mottles within 30 cm of surface	mottles within 15 cm of surface

a Environmental features contained in this table are defined in chapter 3 of LMH 20.

b Values in brackets are less common.

c Several plots in this site unit do not have soil texture or humus form data.

ESSFdm
Management Interpretations

Site series	Number of plots	Common seedling growth limiting factors^a	Vegetation potential - common complexes^b	Road drainage control needs	Common site sensitivities^{a,c}	Other prescription considerations
72	2	n/a	Low – fireweed	Low	n/a	Rock outcrop, no timber values
73	2	n/a	Low – pinegrass, fireweed	Low	n/a	No timber values
62	5	n/a	Moderate – subalpine herb	Mod.	n/a	No timber values
02	5	Cold soil, dry soil	Low – fireweed, ericaceous shrub, dry alder	Low	Erosion H on steep soils; forest floor displacement H	Conserve limited organic matter
03	10	Cold soil, dry soil	Low – fireweed, dry alder, ericaceous shrub	Mod.	Erosion of fSL soils; forest floor displacement H	Conserve limited organic matter
01	28	Cold soil, vegetation	Medium – ericaceous shrub, fireweed	Mod.	Erosion of fSL soils; forest floor displacement H	Conserve limited organic matter

04	12	Cold soil	Medium – ericaceous shrub, fireweed, wet alder	High	Compaction H on silty soils; forest floor displacement H; erosion H on fSL or silty soils	Random machine travel on snow or silty soils
05	6	Cold soil, air temperature, wet soil, vegetation	High – fireweed, wet alder, ericaceous shrub, subalpine herb	High	Erosion H on fSL soils; forest floor displacement H	Riparian, random machine travel on snow or silty soils
06	8	Cold soil, rooting substrate, wet soil, vegetation, soil nutrients	High – bluejoint, mixed shrub, wet alder, fireweed	High	Compaction VH; forest floor displacement H; erosion H on silty and fSL soils; mass wasting H on clayey soils	Riparian, windthrow hazard, water table may rise post-harvest, random machine travel on snow

- a **Caution:** Based on sample plot data; some factors or sensitivities will vary with individual site conditions. Use of original interpretation tools is necessary (i.e., SYTEPREP and site sensitivity keys); these interpretations presented here to highlight common concerns. Sensitivity keys are available in Curran, M., I. Davis, and B. Mitchell. 2000. Silviculture prescription data collection field handbook: interpretive guide for data collection, site stratification, and sensitivity evaluation for silviculture prescriptions. B.C. Min. For., Victoria, B.C. Land Manage. Handb. 47. SYTEPREP: Expert System for Site Preparation and Vegetation Management in Southern Interior British Columbia is available at <<http://www.myacquire.com/spvegman/expertsystem/>>.
- b Complexes described in Operational Summaries for Vegetation Management available online at <<http://www.for.gov.bc.ca/hfp/pubsvegmgmt.htm>>.
- c VH = very high, H = high, steep = >45%.

ESSFdm

Species Selection Recommendations

Site series	Conifer species			Broadleaf species
	Primary	Secondary	Tertiary	
72 Idaho fescue – Haircap moss	No timber values			
73 Huckleberry – Pinegrass	No timber values			
62 Huckleberry – Subalpine daisy	No timber values			
02 BIP1 – Spirea – Hawkweed	Pl	Se, Bl	Pa ^{a,b} , Lw ^c , Fd ^c	
03 BIP1 – Huckleberry – Grouseberry	Pl	Se, Bl	Pa ^{a,b} , Lw ^c , Fd ^c , Hw ^c	
01 Bl – Azalea – Beargrass	Se, Pl	Bl	Hw ^c , Fd ^c , Lw ^c	
04 Bl – Foamflower – Beargrass	Se	Pl, Bl	Hw ^c , Lw ^c	
05 Bl – Azalea – Arnica	Se	Bl	Hw ^c	
06 Bl – Azalea – Horsetail	Se	Bl, Pl ^d		

- a Risk of white pine blister rust.
- b Restricted to upper elevations of biogeoclimatic unit
- c Restricted to lower elevations of biogeoclimatic unit.
- d Elevated microsites preferred.

