REPORT ON SITE GROUPS

IN THE PROVINCIAL

COARSE WOODY DEBRIS DATABASE

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Prepared for the Coarse Woody Debris Working Group

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1. DATABASE CONTENTS

Data were solicited from all groups in the Province thought to have been working with coarse woody debris, either as a separate project or as part of a larger project or inventory (e.g. Terrestrial Ecosystem Mapping or Vegetation Resources Inventory). Criteria were:

- that the data be collected from unharvested or preharvest sites
- that the site be identified to BGC subzone/variant and site series
- that the data include (at a minimum) total volume in m3/ha.

Additional data requested if available were:

- Location
- Date of survey
- Slope
- Aspect
- Elevation
- Year of last known disturbance
- Stand age
- Structural stage
- Timber type
- Volume by diameter class
- Volume by decay class
- Volume by length class
- Total number of pieces/ha.
- Pieces/ha. by diameter class
- Pieces/ha. by decay class
- Pieces/ha. by length class
- Height above ground (no. of pieces per transect)

Diameter classes were: 7.6-20cm; 20.1-40cm; 40.1-60cm; 60.1-80cm; >80cm.
Length classes were: <2.5m; 2.6-5m; 5.1-10m; 10.1-15m; 15.1-20m; 20.1-25m; 25.5-30m; >30m.
Decay classes were as described in the "Field Manual for Describing Terrestrial Ecosystems", 1998.

If necessary, data were recompiled from raw plot data to conform to the above classes. Entries were deleted from the database if zone, subzone or site series data were not available or were ambiguous, or if the structural stage was pole-sapling or earlier. It should be recognized, however, that because the data were collected from projects with disparate objectives, there are a large number of gaps in the collection of other site descriptors and CWD attributes.

The resulting database has 808 entries from coastal ecosystems (CWH and MH zones) and 2394 from Interior ecosystems (all other zones). (April 10, 2003). A list of contributors is shown in Appendix I.

2. SITE GROUPS ANALYSIS

Sites were assigned to groups based on site series. All groups used were at the site alliance level, except for 17 sites in the CWH zone for which no site alliance has been assigned. These sites were assigned to an Order (one step up from Alliance). Note that some site series have not yet been included in the site group hierarchy (April 10, 2003).

2.1 CWD volumes

Descriptive statistics (count, mean, median, percentiles) for CWD volumes in all Interior and Coastal site groups are shown in Appendix II. For all site groups with more than 5 samples, the volume distribution is shown as "box-and-whisker" charts in Figures 1 and 2. Site groups with 5 or fewer samples are omitted for clarity. Box plots show the 25th-75th percentile – that is, 50% of all plots fall within the "box". The line across the "box" shows the median volume for the group. "Whiskers" show the overall range – that is, the upper "whisker" represents the 25% of plots with the highest values, and the lower "whisker" represents the 25% of plots with the lowest values. Note the change in Y axis scale between Figure 1 and Figure 2.

CWD volumes within site groups are not normally distributed, but are strongly skewed towards the low end of the scale (i.e. most values are lower than the mean). Parametric ANOVA is therefore not an appropriate test, and groups were compared using Kruskal-Wallis test and Dunn's Multiple Comparisons Test ($P<0.05$). Volumes from Coastal sites were much higher and much more variable than volumes from Interior sites. Separate analyses for Coastal and Interior site groups were therefore used.

For both Interior and Coastal groups, volumes were significantly different (Kruskal-Wallis test) but not all sites were significantly different from each other (Dunn's Multiple Comparisons test). Figure 3 shows the results of Dunn's Multiple Comparisons test for Interior sites. Cells marked with an "X" indicate groups that are not significantly different from each other; cells shaded green are significantly different.

In general, site groups that are not significantly different from most others are those with small sample sizes i.e. the lack of difference is probably due to a combination of small sample size and the statistical test used, rather than an intrinsic lack of difference between site groups. Figure 4 shows the results of Dunn's Multiple Comparisons test for Interior site groups where the sample size is greater than 5. This suggests that where sample size is sufficient, most groups are significantly different from each other, and any management strategy should reflect this difference.

For Coastal sites, most groups were not significantly different from each other (Dunn's Multiple Comparisons test, $P<0.05$), even though sample sizes for some groups are quite large. Both volume and variability are much higher in Coastal sites than in Interior, and this may be masking differences between site groups. Other factors that may influence CWD volume include:

- ***site age*** – volume generally increases until a balance is reached between input and decay rates (Stevens, 1997), but this may take centuries. There are insufficient samples in the database to confirm trends with stand age. However, most Interior

sites have a much shorter interval between catastrophic disturbances, so the range of stand ages is generally smaller and variation due to age would also be smaller.

- ***tree species*** – CWD volumes are likely to be higher in stands where large trees grow. In Long Beach Model Forest, highest CWD volumes were reported on sites dominated by western redcedar and western hemlock, which reach stem diameters of 2.5m and 1.25m respectively (Van Allen, no date but probably 2001). In this dataset, the highest median volumes are in sites with amabilis fir as leading species; however, the highest volumes are reached by sites with western redcedar as leading species (Figure 6). It is of note that in the Interior, western redcedar is found only in the site groups with the highest volumes (Figure 1).

- ***elevation*** – CWD volumes decreased with increasing elevation, with volumes being considerably higher below 100m (Figure 7). This is reflected in site groups – for instance, 34 of the 43 sites below 100m are either Yc-Alaskan blueberry or Yc-Salal, which have the highest volumes of all site groups (Figure 2). Neither of these site groups was recorded above 200m. Similarly, all but one of the sites below 100m for which tree species was recorded are dominated by western redcedar, whereas most sites above 300m are dominated by Douglas fir. It should be noted, however, that elevation was only recorded for 145 samples (out of 808), of which only 78 also have tree data.

This suggests that site groups may provide an adequate, working basis for assigning CWD volume ranges in the Interior. For the Coast, it may be advisable to utilize a combination of site group with stand age and leading tree species (and possibly elevation), to limit the amount of variability within groups.

2.2 CWD diameter classes

For each site group, diameter class distribution is expressed as the percentage of the total volume in each of the five diameter classes defined on page 1. Diameter class distribution is shown in Figure 8 (Interior groups) and Figure 9 (Coastal groups).

In general, CWD diameter increases with increasing CWD volume – that is, site groups with higher CWD volumes have a higher percentage of that volume in larger-diameter pieces. However, there is sufficient variability in this relationship that site groups with similar volumes may have relatively dissimilar diameter class distributions (i.e. the volume is similar but is made up of different sized pieces). This suggests that further amalgamation of site groups is probably inadvisable, unless they can be shown to be similar in piece size as well as overall volume.

2.3 CWD length classes

Most CWD studies do not record CWD piece length, so this information is frequently lacking in the database. This means that there is insufficient information available on length class distribution to make reliable generalizations.

Figure 1 Volume distribution for Interior site groups (in order of increasing median value)

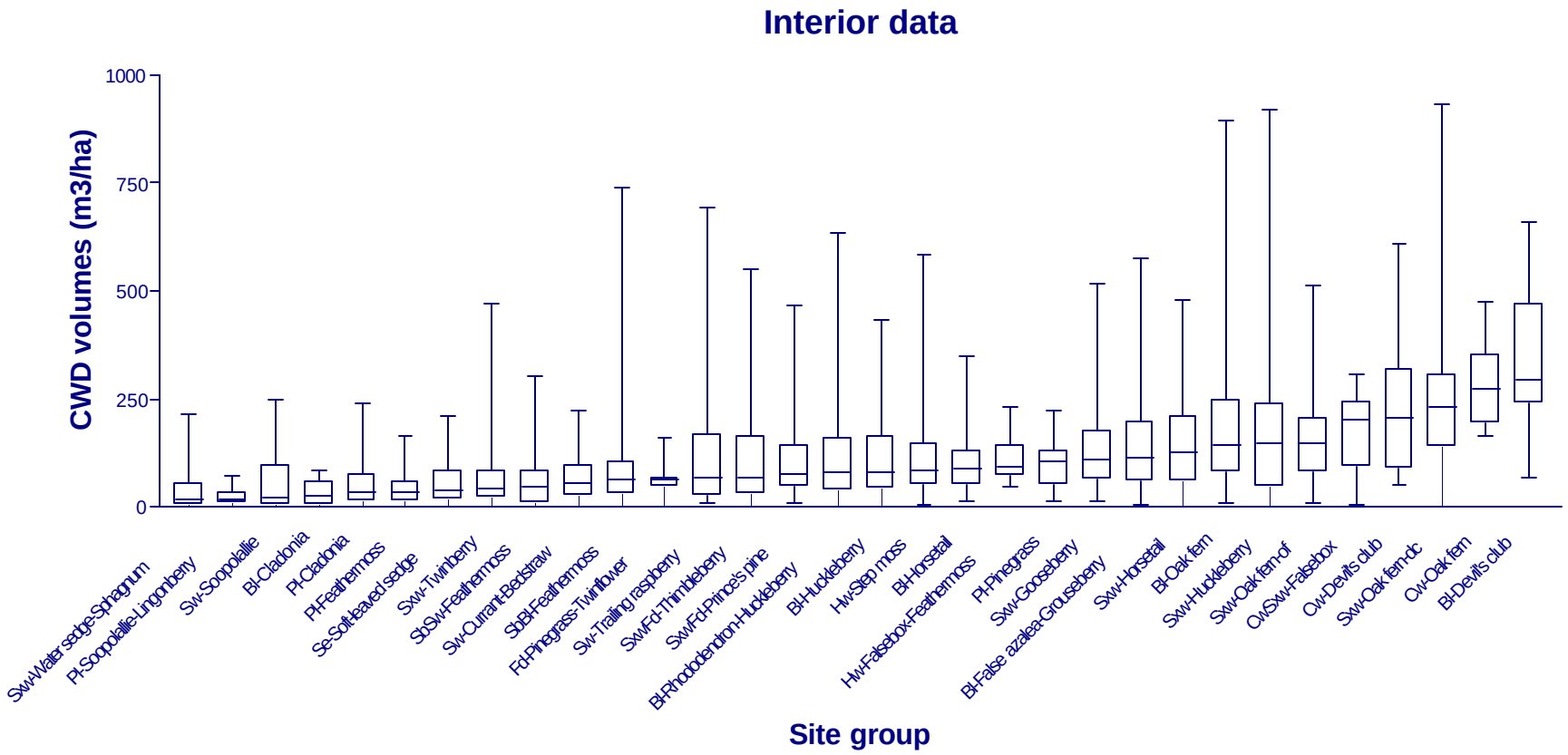


Figure 2 Volume distribution for Coastal site groups (in order of increasing median value)

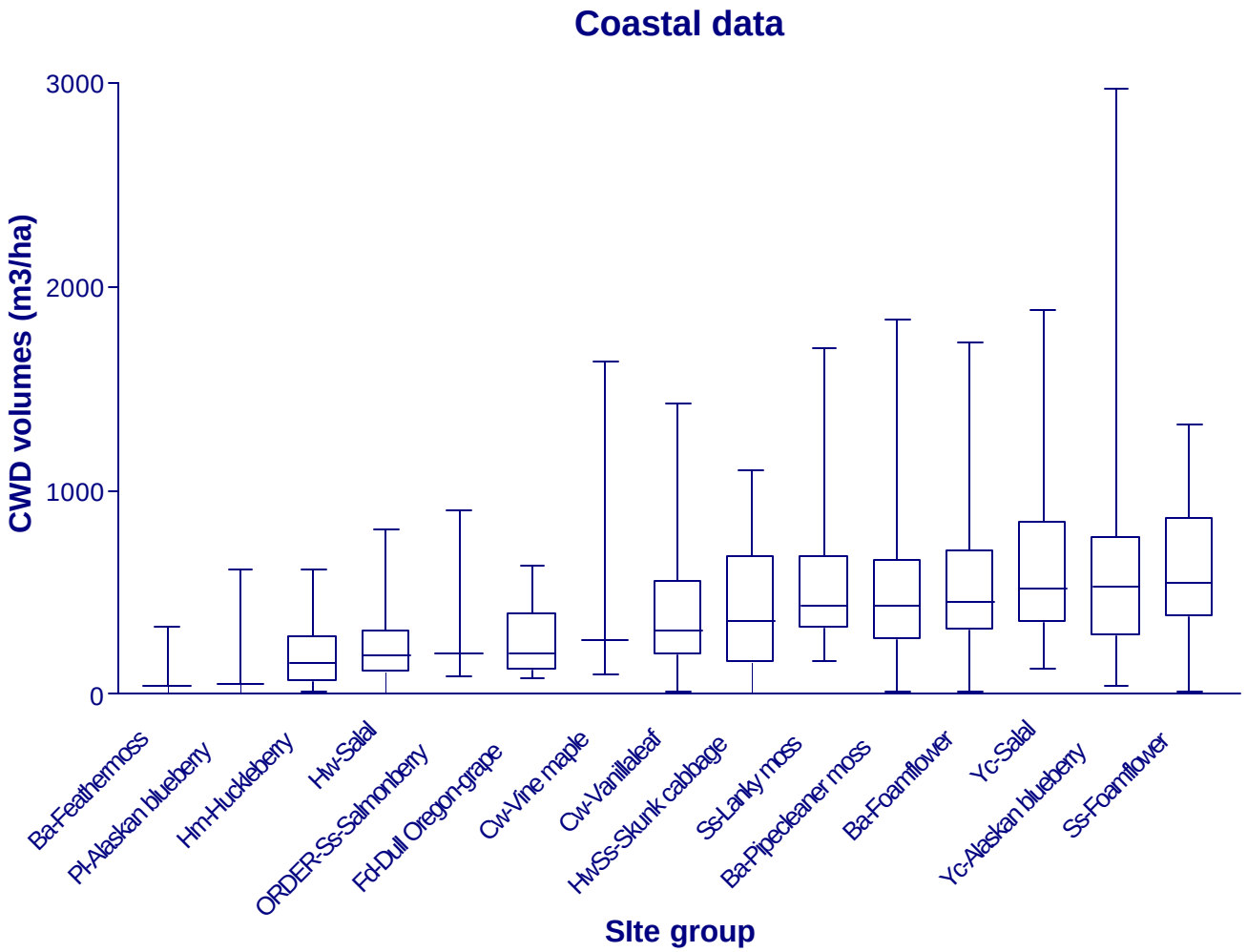
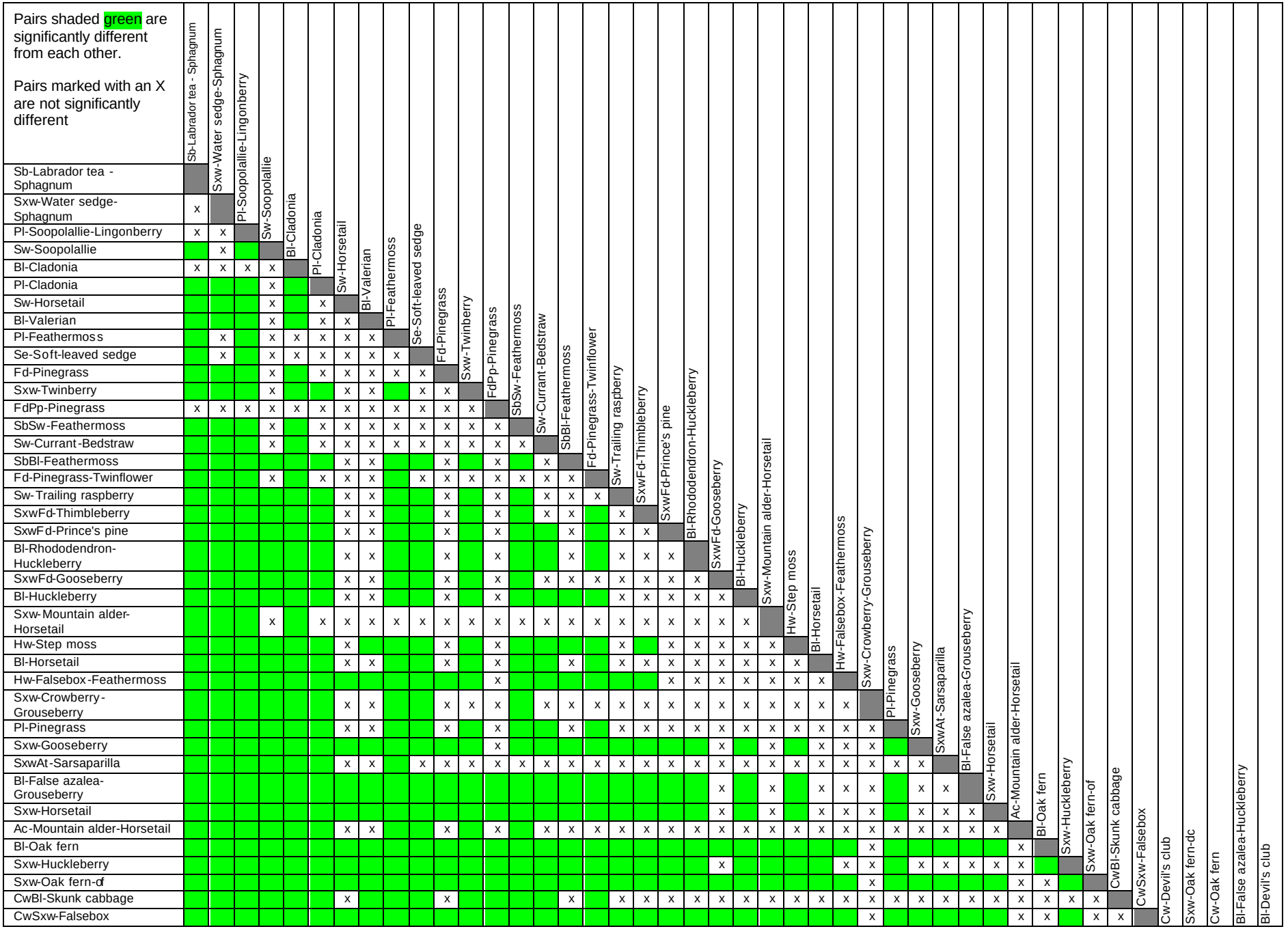


Figure 3 Dunn's Multiple Comparisons test for Interior site groups (all groups)



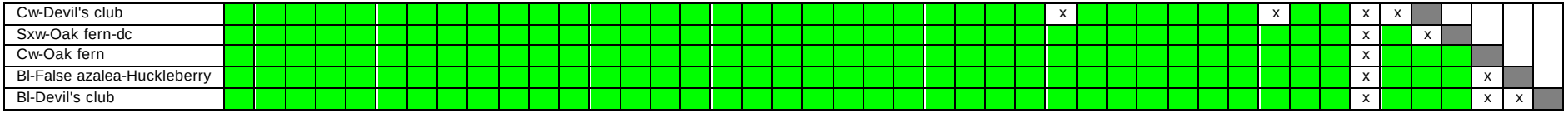


Figure 4 Dunn's Multiple Comparisons test for Interior site groups (groups where n>5)

Pairs shaded green are significantly different from each other.

Pairs marked with an X are not significantly different

	Sxw-Water sedge-Sphagnum	Pl-Soopolallie-Lingonberry	Sw-Soopolallie	Bl-Cladonia	Pl-Cladonia	Pl-Feathermoss	Se-Soft-leaved sedge	Sxw-Twinberry	SbSw-Feathermoss	Sw-Currant-Bedstraw	SbBl-Feathermoss	Fd-Pinegrass-Twinflower	Sw-Trailing raspberry	SxwFd-Thimbleberry	SxwFd-Prince's pine	Bl-Rhododendron-Huckleberry	Bl-Huckleberry	Hw-Step moss	Bl-Horsetail	Hw-Falsebox-Feathermoss	Pl-Pinegrass	Sxw-Gooseberry	Bl-False azalea-Grouseberry	Sxw-Horsetail	Bl-Oak fern	Sxw-Huckleberry	Sxw-Oak fern-of	CwSxw-Falsebox	Cw-Devil's club	Sxw-Oak fern-dc	Cw-Oak fern	Bl-Devil's club
Sxw-Water sedge-Sphagnum				x																											
Pl-Soopolallie-Lingonberry																															
Sw-Soopolallie																															
Bl-Cladonia	x																														
Pl-Cladonia			x																												
Pl-Feathermoss			x																												
Se-Soft-leaved sedge					x																										
Sxw-Twinberry							x																								
SbSw-Feathermoss					x		x																								
Sw-Currant-Bedstraw																															
SbBl-Feathermoss																															
Fd-Pinegrass-Twinflower										x																					
Sw-Trailing raspberry																															
SxwFd-Thimbleberry													x																		
SxwFd-Prince's pine																															
Bl-Rhododendron-Huckleberry															x																
Bl-Huckleberry															x																
Hw-Step moss																															
Bl-Horsetail															x		x	x													
Hw-Falsebox-Feathermoss																															
Pl-Pinegrass															x	x	x		x												
Sxw-Gooseberry																				x											
Bl-False azalea-Grouseberry																						x									
Sxw-Horsetail																						x	x								
Bl-Oak fern																															
Sxw-Huckleberry																															
Sxw-Oak fern-of																															
CwSxw-Falsebox																															
Cw-Devil's club																															

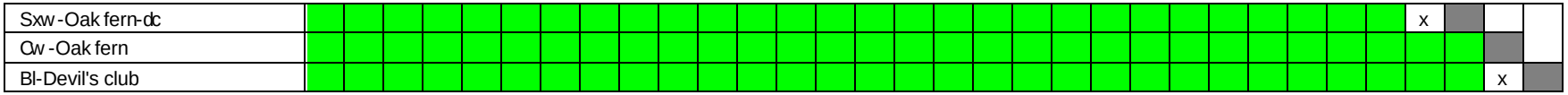


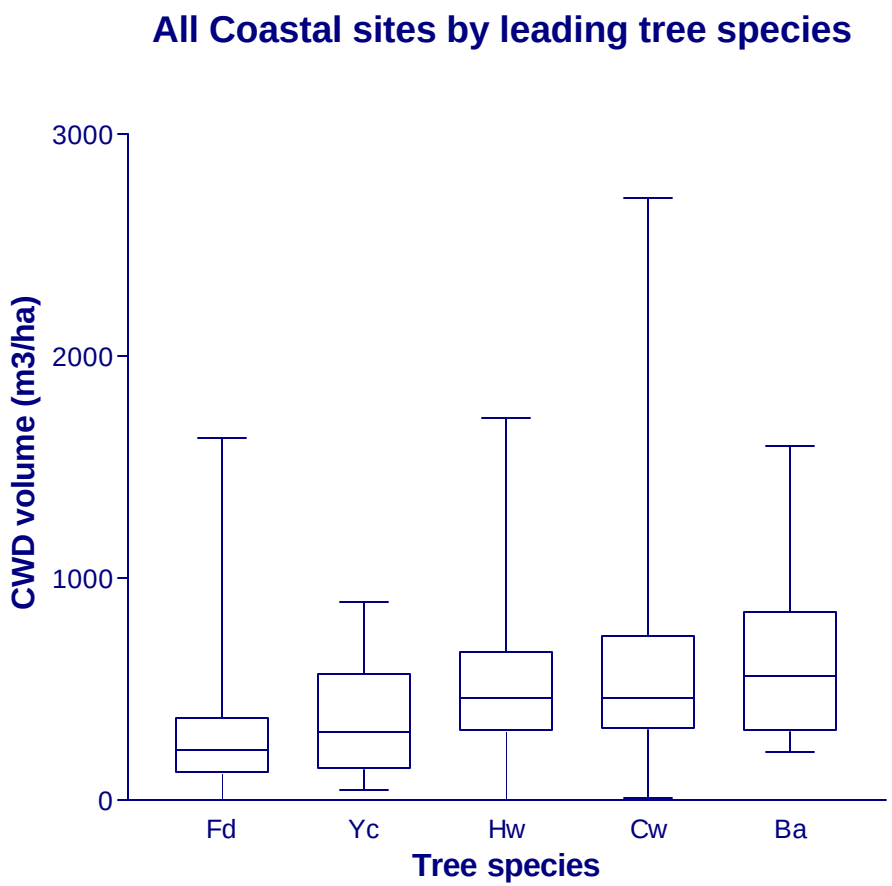
Figure 5 Dunn's Multiple Comparisons test for Coastal site groups (groups where n>=5)

	Ba-Feathermoss	Pl-Alaskan blueberry	Hm-Huckleberry	Hw-Salal	ORDER-Ss-Salmonberry	Fd-Dull Oregon-grape	Cw-Vine maple	Cw-Vanillaleaf	HwSs-Skunk cabbage	Ss-Lanky moss	Ba-Pipecleaner moss	Ba-Foamflower	Yc-Salal	Yc-Alaskan blueberry	Ss-Foamflower
Ba-Feathermoss															
Pl-Alaskan blueberry	x														
Hm-Huckleberry	x	x													
Hw-Salal	x	x	x												
ORDER-Ss-Salmonberry	x	x	x	x											
Fd-Dull Oregon-grape	x	x	x	x	x										
Cw-Vine maple	x	x	x	x	x	x									
Cw-Vanillaleaf	x	x			x	x	x								
HwSs-Skunk cabbage	x	x	x	x	x	x	x	x							
Ss-Lanky moss	x	x			x	x	x	x	x						
Ba-Pipecleaner moss	x	x			x	x	x	x	x	x					
Ba-Foamflower	x	x			x	x	x	x	x	x	x				
Yc-Salal		x			x	x	x		x	x	x	x			
Yc-Alaskan blueberry	x	x			x	x	x	x	x	x	x	x	x		
Ss-Foamflower		x			x	x	x	x	x	x	x	x	x	x	

Pairs shaded green are significantly different from each other.

Pairs marked with an X are not significantly different

Figure 6 Volume distribution for Coastal site groups by leading tree species



species with fewer than 10 samples were omitted for clarity

Figure 7 Volume distribution for Coastal site groups by site elevation

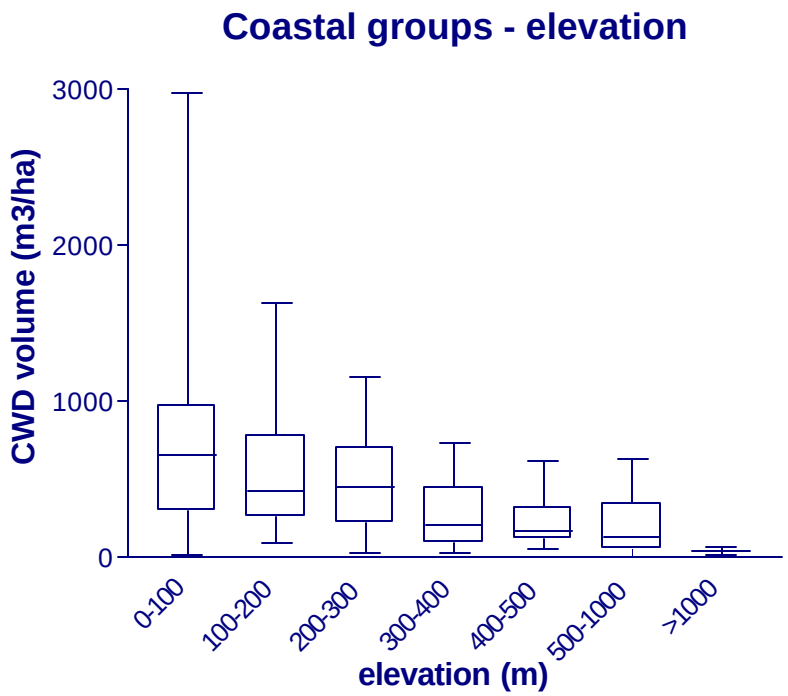


Figure 8 Diameter class distribution for Interior site groups (groups where n>5)

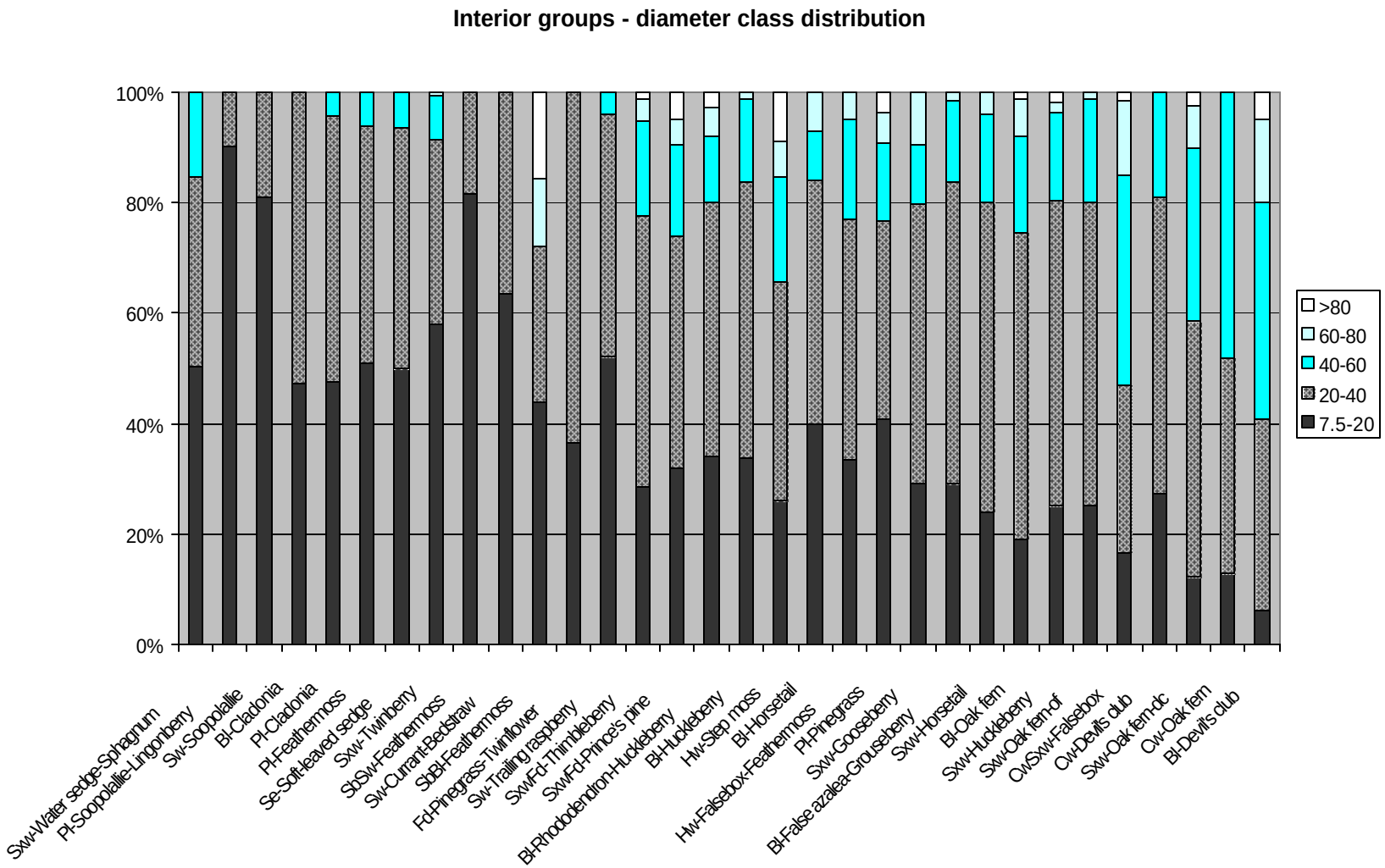
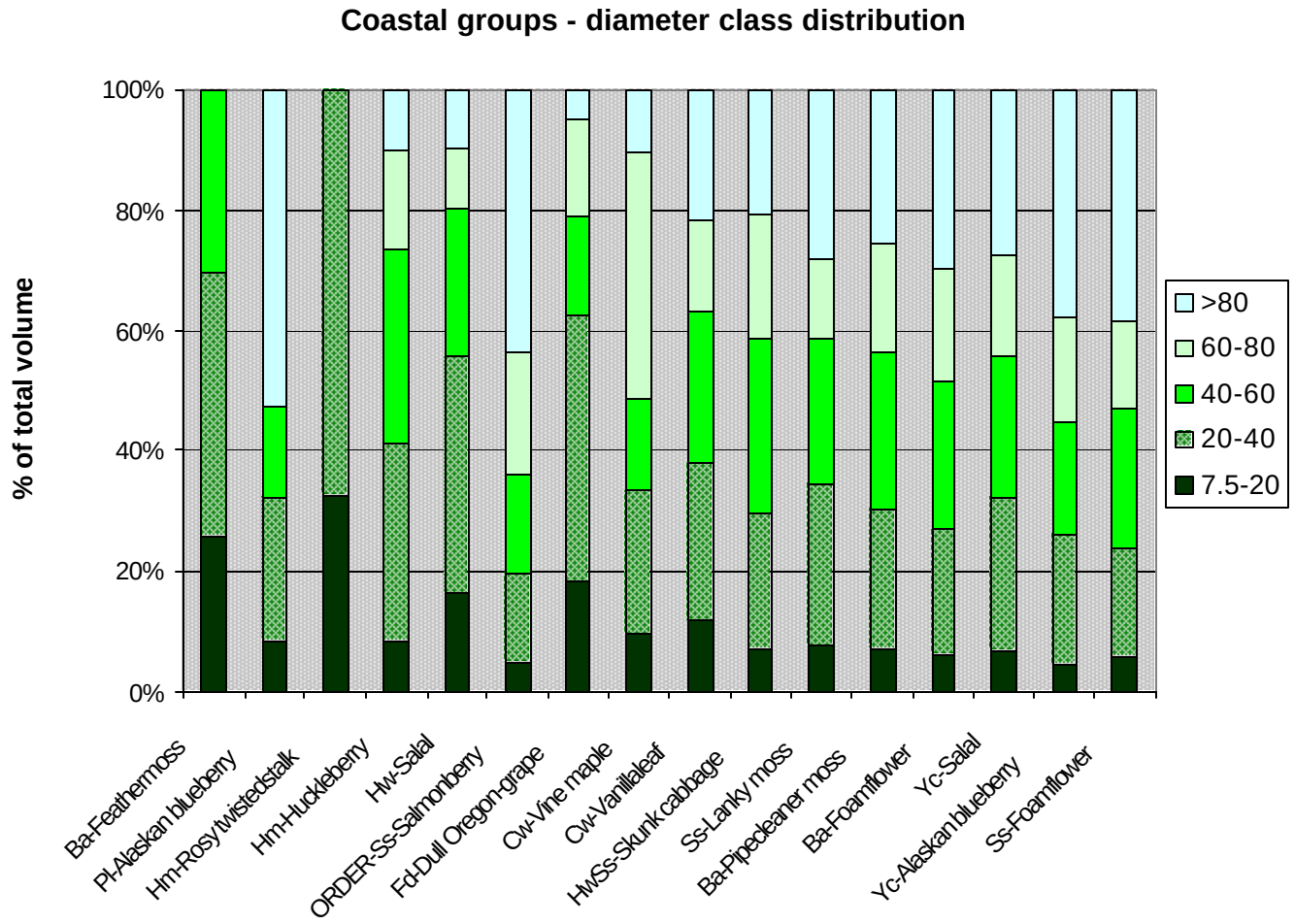


Figure 9 Diameter class distribution for Coastal site groups (groups where n>=5)



3. DATA GAPS FOR SITE GROUPS

Table 1 shows the area harvested by site group, based on data from ISIS/MLSIS 1995-2002. Harvested areas identified by the previous BGC subzone/site series nomenclature (e.g. SBSe instead of SBSmc2) are not included. In addition, some site series have not been assigned to a site alliance. Table 2 lists the area harvested that could not be assigned to a site alliance – either because the identifiers used were out of date, or because the site series have not yet been included in the site group hierarchy.

Table 1 Area harvested by site alliance 1995-2002

Site Alliance	Area harvested (total ha.)	Area harvested (% of total)	No. of plots in database
Ac-Mountain alder-Horsetail	913	0.0	3
Ac-Red-osier dogwood	255	0.0	2
Ba-Feathermoss	31770	1.6	5
Ba-Foamflower	34253	1.7	76
Ba-Pipecleaner moss	78810	4.0	265
Bl-Cladonia	5156	0.3	16
Bl-Devil's club	18997	1.0	11
Bl-False azalea-Grouseberry	20820	1.1	73
Bl-False azalea-Huckleberry	10212	0.5	4
Bl-Grouseberry	10532	0.5	0
Bl-Horsetail	28478	1.4	19
Bl-Huckleberry	17518	0.9	93
Bl-Oak fern	89489	4.5	98
BlPa-Grouseberry	267	0.0	0
Bl-Rhododendron-Grouseberry	**21463**	**1.1**	**0**
Bl-Rhododendron-Huckleberry	36350	1.8	70
Bl-Trapper's tea-Grouseberry	2785	0.1	0
Bl-Valerian	10467	0.5	6
Cw-Devil's club	26853	1.4	11
Cw-Dogwood	740	0.0	0
Cw-Oak fern	30905	1.6	9
Cw-Skunk cabbage	4501	0.2	0
CwSxw-Falsebox	18819	1.0	24
Cw-Vanillaleaf	20117	1.0	79
Cw-Vine maple	2825	0.1	5
Fd-Dull Oregon-grape	286	0.0	9
Fd-Foamflower	568	0.0	1
Fd-Pinegrass	1767	0.1	4
Fd-Pinegrass-Twinflower	51292	2.6	17
FdPp-Pinegrass	213	0.0	1
Fd-Sword fern	281	0.0	3
Hm-Copperbush	115	0.0	1
Hm-Fern-leaved goldthread	899	0.0	3

Site Alliance	Area harvested (total ha.)	Area harvested (% of total)	No. of plots in database
Hm-Huckleberry	8743	0.4	30
Hm-Rosy twistedstalk	1143	0.1	1
Hw-Cladonia	747	0.0	0
Hw-Falsebox	3948	0.2	0
Hw-Falsebox-Feathermoss	23272	1.2	16
Hw-Horsetail-Sphagnum	186	0.0	0
Hw-Salal	30442	1.5	149
HwSs-Skunk cabbage	3669	0.2	28
Hw-Step moss	66913	3.4	168
ORDER-Ss-Salmonberry	1400	0.1	5
Pl-Alaskan blueberry	421	0.0	5
Pl-Cladonia	97127	4.9	76
Pl-Feathermoss	84122	4.3	41
Pl-Pinegrass	66963	3.4	28
PlSe-Pinegrass	2003	0.1	0
Pl-Soopolallie-Lingonberry	1779	0.1	18
Pl-Trapper's tea-Crowberry	523	0.0	0
PlYc-Salal	1600	0.1	4
PlYc-Tufted clubrush	46	0.0	1
SbBl-Feathermoss	14990	0.8	23
Sb-Labrador tea - Sphagnum	515	0.0	4
SbSw-Feathermoss	10418	0.5	19
Se-Soft-leaved sedge	4057	0.2	12
Ss-Foamflower	5245	0.3	16
Ss-Lanky moss	10144	0.5	29
Ss-Salal	49	0.0	0
Sw-Currant-Bedstraw	14397	0.7	8
Sw-Horsetail	10999	0.6	4
Sw-Soopolallie	11633	0.6	18
Sw-Trailing raspberry	25283	1.3	21
SxwAt-Sarsaparilla	121	0.0	3
Sxw-Crowberry-Grouseberry	24484	1.2	2
Sxw-Falsebox-Feathermoss	**23266**	**1.2**	**0**
SxwFd-Gooseberry	8260	0.4	5
SxwFd-Prickly rose	3727	0.2	0
SxwFd-Prince's pine	78393	4.0	62
SxwFd-Thimbleberry	40253	2.0	340
Sxw-Gooseberry	27189	1.4	74
Sxw-Horsetail	117056	5.9	93
Sxw-Huckleberry	95644	4.9	523
Sxw-Mountain alder-Horsetail	6791	0.3	3
Sxw-Oak fern	144473	7.3	240
Sxw-Trapper's tea-Grouseberry	8459	0.4	0
Sxw-Twinberry	69706	3.5	143
Sxw-Water sedge-Sphagnum	610	0.0	29

Site Alliance	Area harvested (total ha.)	Area harvested (% of total)	No. of plots in database
Sxw-Wintergreen-Feathermoss	945	0.0	0
Yc-Alaskan blueberry	8299	0.4	31
Yc-Salal	15832	0.8	55
Yc-Sphagnum	132	0.0	0

Cells shaded yellow represent >1% of the total provincial harvest.
Cells shaded orange represent >1% of the total provincial harvest, but have fewer than 20 plots in the database.
Cells shaded **red** represent >1% of the total provincial harvest, but have no plots in the database.

Table 2 Summary of unidentified harvested areas

Zone	area identified by old BGC		site series unknown		site series not assigned to site alliance		total area harvested
	ha.	%	ha.	%	ha.	%	ha.
BWBS	142	0.1	56083	42.5	995	0.8	132102
CDF	237	26.7	1.5	0.2	20	2.2	886
CWH	8642	3.3	2457	0.9	4736	1.8	265313
ESSF	1544	0.5	3796	1.3	7476	2.5	296576
ICH	2423	1.1	2479	1.1	41715	18.1	229993
IDF	724	0.4	2411	1.2	135140	66.5	203357
MH	556	4.4	133	1.0	0	0.0	12772
MS	706	0.4	1549	1.0	4748	2.9	160976
PP	0	0.0	88	1.7	5043	98.3	5131
SBPS	0	0.0	732	0.5	1181	0.8	150866
SBS	8658	1.4	9589	1.6	11506	1.9	612667

3.1 Summary of data gaps

1. Ecosystems still requiring adequate baseline data

Two site alliances each represent substantial harvested area (>1% of the provincial total), but have no plots providing baseline data for CWD in unmanaged forests. Seven site alliances each represent substantial harvested area (>1% of the provincial total), but are represented by fewer than 20 plots from unmanaged forest. The subzones/site series comprising these groups are shown in Table 3.

Table 3 Subzones/site series requiring additional data

Site Alliance	no. of plots	BGC subzone/site series
Bl-Rhododendron-Grouseberry	0	ESSFdc1/01 ESSFdc1/04 ESSFdc2/01 ESSFdc2/07 ESSFwc4/03 ESSFxc/06 ESSFxv1/06 ESSFxv2/06
Sxw-Falsebox-Feathermoss	0	MSdm1/01 MSdm2/01
Sxw-Crowberry-Grouseberry	2	MSdv/07 MSxv/01 MSxv/04 MSxv/06 MSxv/07
Ba-Feathermoss	5	CWHds1/03 CWHds2/03 CWHms1/01 CWHms1/03 CWHms1/05 CWHms2/01 CWHms2/03 CWHms2/05 CWHws1/01 CWHws1/03 CWHws1/05 CWHws2/01 CWHws2/03 CWHws2/05

Site Alliance	no. of plots	BGC subzone/site series
Cw-Oak fern	9	ICHdk/06 ICHmc1/03 ICHmc2/03 ICHmk2/05 ICHmk3/04 ICHmm/04 ICHmw2/05 IDFmw2/04 ICHvk1/04 ICHvk2/04 ICHwc/01 ICHwk1/01 ICHwk2/01 ICHwk3/01 ICHwk4/01
Cw-Devil's club	11	ICHdw/03 ICHdw/04 ICHmc1/04 ICHmc2/04 ICHmk3/06 ICHmk3/07 ICHmm/05 ICHmm/06 ICHmw1/05 ICHmw2/06 ICHmw3/07 ICHvc/011 ICHvc/012 ICHvk1/01 ICHvk1/05 ICHvk2/01 ICHvk2/05 ICHwc/04 ICHwk1/05 ICHwk1/06 ICHwk2/07 ICHwk3/05 ICHwk3/06 ICHwk4/Fh1 ICHwk4/07 IDFww/06

Site Alliance	no. of plots	BGC subzone/site series
Hw-Falsebox-Feathermoss	16	ICHdw/01a ICHdw/01b ICHmw1/03 ICHmw1/04 ICHmw2/04 ICHmw3/04 ICHmw3/05 ICHwk1/03 ICHwk2/03 IDFww/05 ICHxw/01
Fd-Pinegrass-Twinflower	17	IDFdk3/01 SBSdw1/03
Bl-Horsetail	19	ESSFdc1/06 ESSFdv/06 ESSFmc/09 ESSFmc/10 ESSFmk/06 ESSFmk/07 ESSFmm/Wb1 ESSFmv3/07 ESSFmw/08 ESSFvc/05 ESSFvc/Wb1 ESSFwc2/08 ESSFwk1/07 ESSFwk1/06 ESSFwk2/06 ESSFwv/09 ESSFxc/Ws1 ESSFxc/08 ESSFxv1/09

2. Ecosystems with unidentified harvesting data

Three problem areas exist that may have biased the above summary of data gaps:

- in the BWBS, many harvested areas were not identified to site series. This means that the proportion of area harvested for BWBS site alliances is too low.
- in the IDF, many site series (67% of total area) have not yet been allocated to site alliances. This means that some site alliances may be underrepresented (or not represented) either in harvesting data or in number of plots.
- in the ICH, some site series (18% of total area) have not yet been allocated to site alliances.
- In the PP, most site series have not been allocated to site alliance, but this zone contributes relatively little to the provincial harvest.

4. PRIORITIES FOR DATA COLLECTION

In the Interior, the highest priority for data collection is to increase the number of samples from areas where harvest is substantial but little or no baseline data are currently available from unmanaged forests. These are listed in order of priority in Table 3. Since the primary requirements in managed forests may involve piece length as well as total volume, it is strongly recommended that length (or length class) be included in future CWD surveys wherever possible. Minimum data collection requirements should include:

- BGC zone/subzone
- site series
- total volume
- diameter
- length (or length class)

In Coastal areas, the highest priorities are to increase the number of samples from areas where harvest is substantial but little or no baseline data are currently available from unmanaged forests, and also to identify and quantify the primary sources of variation within site groups. Minimum data collection requirements should therefore include:
BGC zone/subzone

- site series
- stand age
- elevation
- timber type (leading tree species in live stand)
- total volume
- diameter
- length (or length class)

APPENDIX I

List of contributors

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Zone/subzone: ICHmk1; ICHmw2
Reference: H. J. Quesnel, Pam Dykstra and M. P. Curran. (no date) Shelterwood Harvesting in Root-Disease Infected Stands – Pre and Post Harvest Wood Debris. Unpubl. draft rep. on EP1186, Nelson Forest Region.

Contact: Glen Dunsworth, Genecologist, Weyerhaueser (Nanaimo)
Zone/subzone: CWH (various)
Reference: Huggard, D. 2002. Weyerhaueser B.C. Variable Retention adaptive management program. Habitat monitoring 1999-2001 – Summary. Unpubl. rep. prepared for Weyerhaueser B.C.

Contact: J. A. (Tony) Trofymow, Canadian Forest Service, Victoria, B.C.
Zone/subzone: CWHxm ; CWHvm
Reference: Wells, R.W. and J.A. Trofymow. 1997. Coarse woody debris in chronosequences of forests on southern Vancouver Island. Information report BC-X-375. Can. For. Serv., Victoria, B.C.

Contact: Susan Stevenson, Silvifauna Research, Prince George.
Zone/subzone: ICHwk3; ICHvk2; ESSFwc3; ESSFwk2
Reference: Jull, Mike, Susan Stevenson, Bruce Rogers, and Andrea Eastham. 2002. Study Area Monitoring Database, Northern Wetbelt Silvicultural Systems Project. Forestry Innovations Investment (FII) Research Project R02-18 / Forest Renewal BC
Research Project OPR96081.
Database version: NorthernWetbeltSilvSys20020415.mdb. April 15th, 2002. Database and methods documentation available from authors at:
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Contact: Barb Beasley, Long Beach Model Forest
Zone/subzone: CWHvm; CWHvh
Reference (1): Edwards, D., B. Beasley and R. Scott. 2002. Summary report of levels of dead wood in naturally disturbed forests at unlogged sites in Clayoquot Sound, British Columbia. Unpubl. rep. prepared for Long Beach Model Forest. This project received funding support from the Long Beach Model Forest – Canadian Forest Service and Iisaak Forest Resources Ltd. The research crew that collected the data consisted of Robyn Scott, Catherine Jacobsen, Spencer Siwallace, Margret Moeges, Marie-France Martin, and Danielle Edwards and the data compiler was Danielle Edwards.

Reference (2): Beasley, B., Addison, C. and K. Lucas. Clayoquot Sound Amphibian Inventory 1998-1999. An unpublished report submitted to the Long Beach Model Forest Society and the Ministry of Environment, Lands and Parks, September 2000.

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Reference (1): Davis, G. and A. Nemec. 2002. An operational trial to evaluate the effectiveness of using modified bucking/yarding practices in coastal old-growth stands to maximize coarse woody debris levels in the setting: Establishment report. For. Res. Tech Rep. TR-017. Vancouver F.R., Nanaimo, B.C.
Reference (2): Nemec, A.F.L. and G. Davis. 2002. Efficiency of six line-intersect sampling designs for estimating volume and density of coarse woody debris. For. Res. Tech Rep. TR-021. Vancouver F.R., Nanaimo, B.C.

Contact: Chris Ritchie, WLAP, Prince George.
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Reference: Rogers, B. 2002. Robson Valley Enhanced Forest Management Pilot Project – Coarse Woody Debris Assessment Phase III. Unpubl. rep. prepared for MWLAP, Prince George, B.C.

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Reference: Coates, K.D., A. Banner, J.D. Steventon, P. LePage and P. Bartemucci. 1997. The Date Creek silvicultural systems study in the Interior cedar-hemlock forests of northwestern British Columbia. MoF Research Branch, Land Mgmt. Handb. 38.

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Reference: Lofroth, E.C. 1993. Scale dependent analyses of habitat selection by marten in the Sub-Boreal Spruce Biogeoclimatic zone, British Columbia. MSc thesis, Simon Fraser University, Burnaby, B.C. 109 pp.

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Reference(1): Adams, I. 2002. Coarse woody debris in the East Kootenay Region. Unpubl. rep. prepared for Tembec Cranbrook.
Reference(2): TFL14 Spillimacheen TEM project

Contact: Ruth Lloyd rlloyd@bulkley.net
Zone/subzone: SBSdk, SBSmc2, ESSFmc
Reference(1): Lloyd, R. 2003. A comparison of coarse woody debris in harvested and unharvested sites. Morice & Lakes Districts IFPA project no. 442.01.
Reference(2): EFMPP project for Babine Forest Products, Burns Lake
Reference (3): Gosnell TEM project (Office of the Wet'suwet'en)
Reference (4): Morrison TEM project (Houston Forest Products)

APPENDIX II

Descriptive statistics for Interior site groups

Site group	count	mean	SD	min	5th %ile	25th %ile	50th %ile	75th %ile	95th %ile	max
Ac-Mountain alder-Horsetail	3	122	101	15	27	76	136	175	207	215
Bl-Cladonia	16	32	29	0	0	6	24	56	80	86
Bl-Devil's club	11	336	184	68	94	240	293	438	624	660
Bl-False azalea-Grouseberry	73	148	126	4	18	59	114	197	394	577
Bl-False azalea-Huckleberry	4	332	146	218	219	220	291	403	501	525
Bl-Horsetail	19	106	79	13	26	59	88	132	242	351
Bl-Huckleberry	93	112	94	0	13	46	81	156	295	433
Bl-Oak fern	98	178	131	11	35	88	144	246	388	893
Bl-Rhododendron-Huckleberry	70	112	108	0	9	40	78	150	312	635
Bl-Valerian	5	70	56	26	27	30	36	111	142	149
CwBl-Skunk cabbage	1	149	n/a	149	149	149	149	149	149	149
Cw-Devil's club	11	234	169	52	63	95	208	293	517	609
Cw-Oak fern	9	284	100	165	173	200	272	342	433	477
CwSxw-Falsebox	24	173	91	7	19	97	202	241	299	309
Fd-Pinegrass	4	117	179	5	5	5	41	152	335	381
Fd-Pinegrass-Twinflower	15	64	38	2	11	49	66	68	123	160
FdPp-Pinegrass	1	44	n/a	44	44	44	44	44	44	44
Hw-Falsebox-Feathermoss	16	109	50	47	60	72	91	134	190	232
Hw-Step moss	168	116	97	5	22	51	83	147	294	583
Pl-Cladonia	74	54	58	2	3	13	35	76	178	240
Pl-Feathermoss	40	46	42	0	1	14	36	60	130	163
Pl-Pinegrass	28	100	61	13	20	52	107	128	193	223
Pl-Soopolallie-Lingonberry	17	23	19	0	0	9	19	33	55	70
SbBl-Feathermoss	22	112	163	0	8	31	63	79	342	738
Sb-Labrador tea - Sphagnum	4	14	11	0	2	8	15	21	24	25
SbSw-Feathermoss	19	61	73	1	3	10	46	74	154	304
Se-Soft-leaved sedge	11	60	63	1	4	18	39	82	169	212
Sw-Currant-Bedstraw	8	72	71	3	8	27	56	88	185	224
Sw-Horsetail	4	163	280	0	2	9	35	189	503	582
Sw-Soopolallie	18	57	76	0	3	6	22	55	219	249
Sw-Trailing raspberry	21	118	155	9	9	28	67	128	303	692
SxwAt-Sarsaparilla	3	87	50	29	38	71	113	116	119	119
Sxw-Crowberry-Grouseberry	2	99	30	78	80	89	99	110	119	121
SxwFd-Gooseberry	5	122	136	14	17	29	81	138	307	349
SxwFd-Prince's pine	52	113	105	10	13	47	77	136	323	468
SxwFd-Thimbleberry	330	111	108	0	7	29	68	163	338	550
Sxw-Gooseberry	74	130	94	13	25	67	108	171	309	517
Sxw-Horsetail	91	143	112	0	9	59	125	209	371	477
Sxw-Huckleberry	516	161	131	0	6	47	145	239	397	919
Sxw-Mountain alder-Horsetail	3	87	86	5	12	43	82	129	167	176
Sxw-Oak fern-dc	157	241	150	0	23	145	231	306	495	932
Sxw-Oak fern-of	82	165	112	7	16	84	146	204	387	514
Sxw-Twinberry	142	66	75	0	6	24	44	83	232	471
Sxw-Water sedge-Sphagnum	23	39	55	0	0	3	18	53	161	212

APPENDIX III

Descriptive statistics for Coastal site groups

Site group	count	mean	SD	min	5th %ile	25th %ile	50th %ile	75th %ile	95th %ile	max
Ac-Red-osier dogwood	2	299	209	151	165	225	299	373	432	447
Ba-Feathermoss	5	110	132	2	9	38	43	137	290	328
Ba-Foamflower	76	543	353	14	89	309	454	701	1247	1722
Ba-Pipecleaner moss	262	494	319	13	112	265	436	648	1033	1834
Bl-Valerian	1	354	n/a	354	354	354	354	354	354	354
Cw-Vanillaleaf	79	393	300	10	64	189	308	557	1037	1421
Cw-Vine maple	5	766	766	96	130	265	267	1571	1619	1631
Fd-Dull Oregon-grape	9	257	181	74	90	116	201	349	552	628
Fd-Foamflower	1	159	n/a	159	159	159	159	159	159	159
Fd-Sword fern	3	317	140	235	235	235	236	357	454	479
Hm-Copperbush	1	21	n/a	21	21	21	21	21	21	21
Hm-Fern-leaved goldthread	3	42	26	18	20	29	39	54	66	69
Hm-Huckleberry	30	179	141	12	14	72	150	277	403	608
Hm-Rosy twistedstalk	1	117	n/a	117	117	117	117	117	117	117
Hw-Salal	145	231	169	1	43	111	192	309	589	808
HwSs-Skunk cabbage	28	419	307	3	18	152	357	674	893	1100
ORDER-Ss-Salmonberry	5	330	326	89	109	189	196	278	776	901
Pl-Alaskan blueberry	5	239	300	4	6	16	46	515	595	614
PlYc-Salal	4	501	179	358	366	396	443	548	716	758
PlYc-Tufted clubrush	1	465	n/a	465	465	465	465	465	465	465
Ss-Foamflower	16	590	331	16	162	392	543	857	1064	1325
Ss-Lanky moss	29	537	354	163	172	329	431	659	1184	1701
Yc-Alaskan blueberry	31	660	644	43	193	292	526	718	1956	2966
Yc-Salal	55	657	400	124	213	350	522	842	1466	1880