

144

Summary of Research on Ecological Reserves Conducted by the
University of British Columbia Group during 1974

26 Feb. 1975

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1. Trout Creek Reserve (No. 7) (Level 3 Intensity)

Five tentative types were recognized and sampled quantitatively. A total of 26 sample plots were established and marked. Six soil pits were excavated and samples taken for chemical and physical analyses. Data analysis is now being completed and an ecosystem classification and map developed.

2. Tow Hill Reserve (No. 9) (Level 3 Intensity)

Twelve tentative ecosystem types were recognized in the following vegetation zones: beach vegetation; dune forest vegetation; bog forest vegetation and raised bog vegetation. Sixty-six sample plots were established and permanently marked. Soil pits were excavated in all the tentative ecosystem types and samples taken for analysis. Data analysis is now complete and the final ecosystem classification, community descriptions and map are being prepared.

3. Skagit Valley - Rhododendron Reserve (No. 21) (Level 1 Intensity)

Reconnaissance work only was initiated on this reserve. A vascular plant species inventory was made and general community characteristics of the reserve assessed. It appears that this reserve is poorly located for the purpose of protecting Rhododendron macrophyllum populations.

4. Tranquille Reserve (No. 29) (Level 3 Intensity)

Four tentative ecosystem types were distinguished and sampled quantitatively. A total of 31 sample plots were established. Soil pits were dug in

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plots representative of the ecosystem types and samples taken for chemical and physical analyses. Data analysis leading to the classification and description of the ecosystem types is being completed.

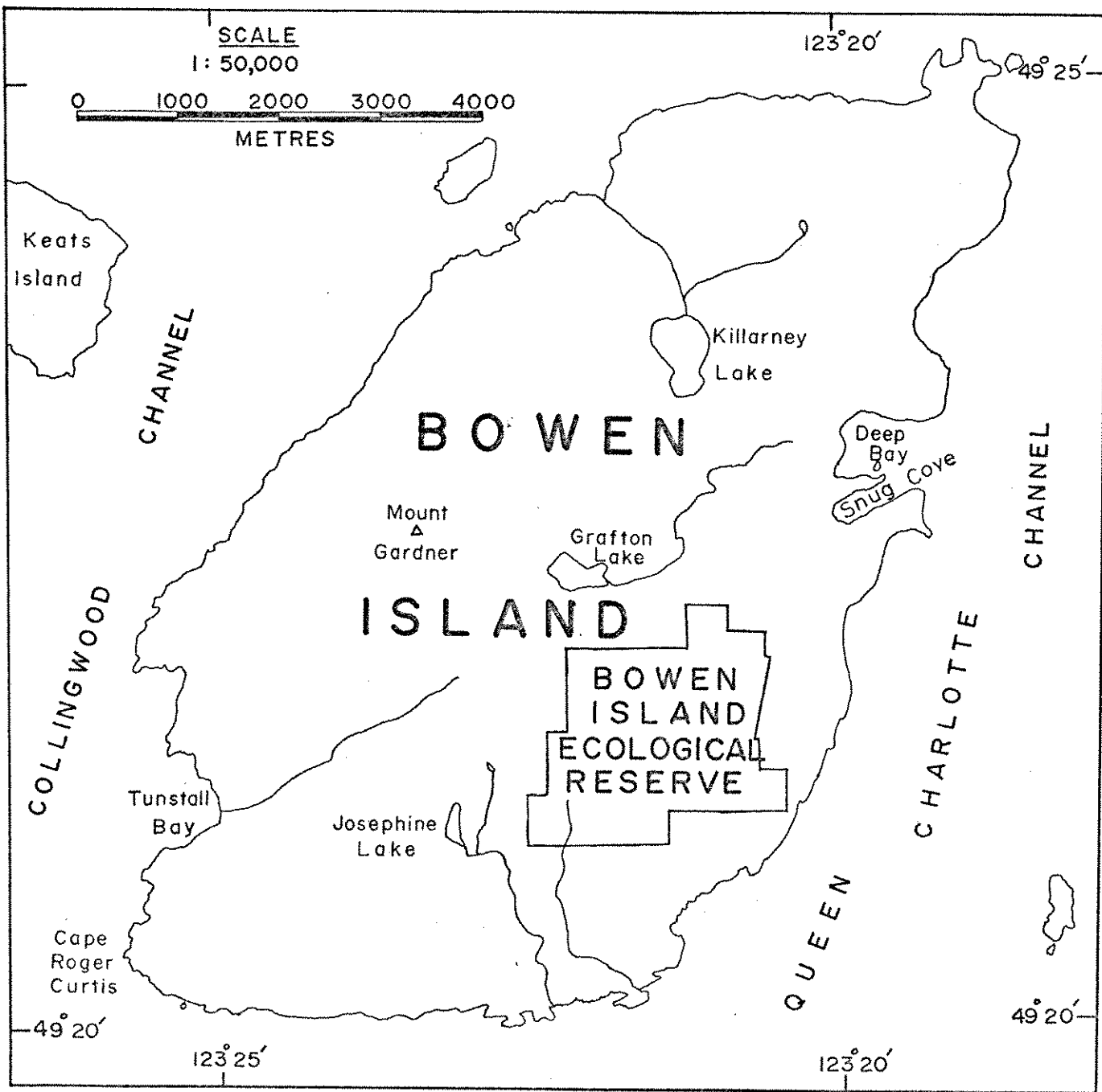
5. Bowen Island Reserve (No. 48) (Level 3 Intensity)

Five ecosystem types were distinguished and sampled quantitatively by the establishment of 31 sample plots. Two additional ecosystem types were recognized but not sampled quantitatively. From these only an inventory of vascular plant and bryophyte species was made. A classification and description of the ecosystem types of the Bowen Island reserve is now being prepared.

6. Drizzel Lake Reserve (No. 52) (Level 3 Intensity)

Tentative ecosystem types were delimited here but no quantitative sampling was done. A vascular plant species inventory was made. Descriptions of the ecosystem types together with a preliminary vegetation map of the reserve is planned.

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Vascular Plant inventory of Bowen Island ER #48

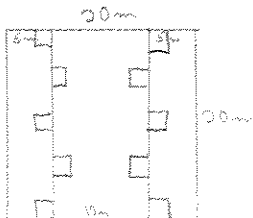
BOWEN ISLAND ECOLOGICAL RESERVE (#48)

Size of Sample Plots

20 m x 20 m

Sampling Scheme

1. All plots were subjectively located and are permanently located by corner stakes.
2. Within the plots the following procedure was used:
 - (a) Tree data were taken on whole plot
 - (b) Shrub data were taken on whole plot
 - (c) Herb, Bryophyte and tree seedling data were taken from ten 1 m x 1 m sub-plots located systematically within the large plot as follows.



Cover values were averaged to get a single value.

Frequency values are based on the number of occurrences in the sub-plots.

3. Cover estimates were made using the same scale as was used for the Tow Hill study.

1977. Vascular plant inventory.

Student M. Bell

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Table 2 *Pseudotsuga menziesii* - *Stokesiella oregana* Association

Stand No.	31	13	16	21	14	24	12	23	29
Aspect	SW	---	SE	W	SE	N	SE	E	WSW
Slope (degrees)	8	---	10	22	13	15	---	6	35
Topography	Bench	Low Ridge	Bench	Mid Slope	Mid Slope	Edge of Bench	Bench	Bench	Mid Slope
Cover (%)	60	90	85	75	85	75	90	90	65
Tree Stratum	30	1	---	2	2	2	---	3	8
High Shrub Stratum	2	1	2	20	2	3	1	1	3
Low Shrub Stratum	50	22	15	40	50	20	12	45	60
Herb Stratum	90	60	60	40	50	45	25	25	40
Bryophyte Stratum									

Species by Stratum^a

Species	31	13	16	21	14	24	12	23	29	% Class
<u>Tree Stratum</u>										
<i>Pseudotsuga menziesii</i>	60	95	85	95	85	85	85	75	65	V
<i>Alnus rubra</i>	---	4	---	---	---	---	4	8	---	II
<u>High Shrub - Transgressive Stratum</u>										
<i>Vaccinium parvifolium</i>	2	P	---	---	2	2	---	4	---	IV
<i>Holodiscus discolor</i>	30	---	---	1	---	1	P	---	12	III
<i>Pseudotsuga menziesii</i>	2	---	1	---	---	1	---	1	---	III

^a Data are: Cover(%) / Frequency (%) and Constancy given by percentage class (I = 1-20%; II = 21-40%; III = 41-60%; IV = 61-80%; V = 81-100%), + indicates cover of less than 1%, P indicates present in the stand but not in the subplots.

Table continued

Stand No.	31.	13	16	21	14	24	12	23	29	% Class
<u>Low Shrub Stratum</u>										
<i>Vaccinium parvifolium</i>	+	3	3	3	4	3	2	4	4	V
<i>Gaultheria shallon</i>	1	2	1	6	1	1	--	2	4	V
<i>Rosa gymnocarpa</i>	3	--	1	--	--	P	--	1	--	III
<i>Holodiscus discolor</i>	--	--	1	1	--	--	--	--	2	III
<i>Berberis nervosa</i>	2	--	--	--	--	--	--	--	2	II
<i>Arelanchier alnifolia</i>	--	--	--	--	--	1	--	1	--	II
<i>Ribes lacustre</i>	P	--	--	--	--	--	P	--	+	II
<u>Herb - Dwarf Shrub Stratum</u>										
<i>Vaccinium parvifolium</i>	1.7/60	2/50	2/70	2/60	7/80	6/90	.5/20	4.5/70	.2/10	V
<i>Trisetum cernuum</i>	4/90	.4/20	.5/20	.6/20	.1/10	1.5/40	+1/0	1/20	.1/20	V
<i>Pseudotsuga menziesii</i>	1.5/80	.2/30	.2/50	.1/20	.3/40	.3/50	+1/0	.1/20	+1/0	V
<i>Pteridium aquilinum</i>	34/80	20/50	16/60	.2/10	23/60	11/40	10/50	42/90	--	V
<i>Polystichum muricatum</i>	8/60	P	1.5/10	5/30	P	1.5/20	4/20	P	2/40	V
<i>Festuca occidentalis</i>	2.5/80	P	2/40	.8/30	.3/20	.2/10	.4/20	P	.1/10	V
<i>Tsuga heterophylla</i>	.2/30	+1/0	.2/40	P	P	+1/0	P	P	P	V
<i>Gaultheria shallon</i>	P	.4/10	+1/0	.8/30	P	P	.1/10	P	P	V
<i>Rubus ursinus</i>	.5/20	P	P	.2/10	+1/0	.1/10	P	P	--	V
<i>Goodenra oblongifolia</i>	.5/40	P	.4/10	.2/10	P	P	P	.5/20	F	V
<i>Linnaea borealis</i>	7.5/60	--	1/40	3/50	.6/30	2/60	--	5/40	3.5/30	IV
<i>Polypodium glycyrrhiza</i>	P	P	--	P	--	.2/10	.3/20	P	.8/40	IV
<i>Viola sp.</i>	8/100	.2/20	.1/10	2/30	.3/20	P	--	--	--	IV
<i>Hieracium albiflorum</i>	1.5/50	.2/10	--	P	--	P	P	P	--	IV

Table continued

Stand No.	31	13	16	21	14	24	12	23	29	% Class
Herb - Dwarf Shrub - Stratum										
<i>Chimaphila menziesii</i>	--	--	P	.2/20	--	P	+/10	--	P	III
<i>Berberis nervosa</i>	5/20	--	--	4/40	2.5/10	P	--	--	4/90	III
<i>Trientalis latifolia</i>	.4/10	--	--	1.5/40	.1/10	--	--	--	.5/20	III
<i>Luzula campestris</i>	1/40	--	.3/20	P	P	P	--	--	--	III
<i>Listera</i> sp.	--	1/50	+/10	--	.8/30	--	P	--	--	III
<i>Kontia parviflora</i>	.2/10	--	--	P	--	P	--	P	--	III
<i>Helodiscus discolor</i>	1.5/40	--	P	--	--	--	--	P	.2/10	III
<i>Galium aparine</i>	3.5/80	--	--	2/40	--	--	--	--	1.5/40	II
<i>Thuja plicata</i>	.3/20	--	--	.1/30	--	--	--	--	P	II
<i>Elymus glaucus</i>	.5/20	--	--	--	P	--	P	--	--	II
<i>Stellaria crispa</i>	--	--	--	--	--	P	.4/10	--	P	II
<i>Alnus rubra</i>	--	--	--	P	--	--	--	--	--	II
<i>Lonicera ciliosa</i>	--	--	--	P	--	--	--	--	P	II
<i>Dryopteris austriaca</i>	--	--	--	P	--	--	P	--	--	II
<i>Acer circinatum</i>	--	--	--	--	--	P	--	P	P	II
Bryophyte - Stratum										
<i>Stokesia oregana</i>	10/80	17/100	17/70	5.5/70	6.3/90	1/30	.4/20	1/20	12/90	V
<i>Rhizomium glabrescens</i>	.6/20	.8/50	.5/30	.5/20	1.7/70	.1/10	.5/20	.6/30	.8/40	V
<i>Hypnum</i> sp.	1/40	1/50	.7/30	4/70	4/60	4/80	+/10	2/60	1.5/60	V
<i>Dicranum fuscescens</i>	3/30	6/60	5/90	3/30	8/80	1.7/60	8/60	2.2/40	.7/70	V
<i>Isoetes elegans</i>	1.5/60	4.5/60	2/60	3/60	8.5/80	10/80	2.7/80	2/70	2.8/100	V
<i>Plagiothecium undulatum</i>	4.5/80	18/90	1.8/30	.3/10	9/70	8.8/30	4.5/30	4.5/40	.1/20	V

Table continued

Stand No.	31	13	16	21	14	24	12	23	29	% Class
<u>Bryophyte Stratum</u>										
<i>Hylacomium splendens</i>	25/100	4/60	4/60	2.2/40	3.5/60	P	P	P	1.2/40	V
<i>Rhyidiopsis robusta</i>	8.5/70	6/50	2.5/20	.8/30	15.5/60	2/30	---	4/10	.3/20	V
<i>Scapania</i> sp.	.4/20	1.5/60	.8/70	2.5/100	2/60	2.5/60	.8/50	P	.7/30	V
<i>Isoetes stoloniferum</i>	.2/10	.2/10	P	.3/10	---	.4/10	.5/20	.2/10	4.5/30	V
<i>Rhacomitrium heterostichum</i>	---	P	.1/10	.6/30	P	.8/50	---	P	.1/10	IV
<i>Unium spinulosum</i>	.8/30	.5/30	1/40	.5/20	---	---	.3/20	---	.3/10	IV
<i>Polytrichum juniperinum</i>	1/30	.3/20	.2/10	P	---	P	.4/20	P	---	IV
<i>Rhytidolepthus loreus</i>	18/80	.1/10	.5/30	.2/10	2/40	---	.1/20	---	.4/10	IV
<i>Pleurozium laetum</i>	.2/10	---	P	---	---	P	P	P	.2/20	III
<i>Dicranum howellii</i>	1.5/40	---	.5/10	---	---	5/70	---	---	---	II
<i>Polytrichum commune</i>	---	P	9/20	---	---	P	---	---	---	II
<i>Pogonatum alpinum</i>	4.5/60	---	---	---	---	7/30	---	---	---	II
<i>Plagiometium insigne</i>	P	---	---	---	---	---	.2/10	---	---	II
<i>Peltigera aphthosa</i>	---	---	P	---	---	---	---	---	.4/10	II
<i>P. membranacea</i>	P	---	---	---	---	---	---	---	P	II
<i>Plagiochila asplenoides</i>	---	---	P	---	---	---	---	---	P	II
<i>Dicranoweisia cirrata</i>	---	---	---	---	---	P	---	---	---	II

Sporadic Species (only in one stand)

High Shrub - Transgressive Stratum*Picea sitchensis* 16(1), *Rosa gymnocarpa* 21(1)

Table continued

Low Shrub Stratum

Menziesia ferruginea 24(1)

Herb - Dwarf Shrub Stratum

Malica subulata 31(7), *Achillea millefolium* 31(P), *Adenocaulon bicolor* 31(+), *Agrostis scabra* 31(P), *Athyrium filix-femina* 31(P),
Blechnum spicant 31(P), *Circea alpina* 29(P), *Coralorrhiza maculata* 29(.1), *Carex* sp. 31(.4), *Epilobium angustifolium* 21(+),
Fragaria vesca 31(2.5), *Lactuca* sp. 31(.8), *Luzula parviflora* 12(.1), *Ranunculus uncinatus* 31(P), *Ribes lacustre* 31(+), *Fyrcia*
picta 16(P), *Sorbus sitchensis* 23(.1), *Tiarella laciniata* 31(P).

Epiphyte - Lichen Stratum

Cladonia impexa 31(P), *Cladodium* sp. 29(.1), *Dicranum tauricum* 24(+), *Peltigera canina* 16(P), *Racomitrium canescens* 31(P).

Table 3 *Pinus contorta* - Moss Association

Stand No.	17	26
Aspect	SE	SE
Slope (degrees)	12	21
Topography	Top of Slope Edge of Rock Outcrop	Edge of Rock Outcrop
Cover (%) Tree Stratum	80	90
High Shrub-Transgressive	1	2
Low Shrub Stratum	1	1
Herb Stratum	2	8
Bryophyte-Lichen Stratum	40	20
Species by Strata ^a		

Tree Stratum

<i>Pseudotsuga menziesii</i>	68	68
<i>Pinus contorta</i>	68	15
<i>Salix</i> sp	2	-

High Shrub-Transgressive Stratum

<i>Vaccinium parvifolium</i>	+	1
<i>Pseudotsuga menziesii</i>	2	+
<i>Holodiscus discolor</i>	-	P

Low Shrub Stratum

<i>Vaccinium parvifolium</i>	2	3
<i>Gaultheria shallon</i>	+	2
<i>Holodiscus discolor</i>	-	1
<i>Rosa gymnocarpa</i>	-	+

^aData are: Cover (%) / Frequency (%) and Constancy given by percentage class (I = 1-20%; II = 21-40%; III = 41-60%; IV = 61-80%; V = 81-100%).

P indicates present in the stand but not the subplots. + indicates a cover of less than .1%.

Table continued

Stand No.	17	26
<u>Herb-Dwarf Shrub Stratum</u>		
<i>Linnaea borealis</i>	3.5/60	.3/10
<i>Vaccinium parvifolium</i>	.1/10	.5/20
<i>Rubus ursinus</i>	+/10	.1/10
<i>Gaultheria shallon</i>	P	.2/10
<i>Rosa gymnocarpa</i>	P	+/10
<i>Pseudotsuga menziesii</i>	P	+/10
<i>Holodiscus discolor</i>	P	P
<i>Festuca occidentalis</i>	P	P
<i>Tsuga heterophylla</i>	P	P
<i>Hieracium albiflorum</i>	P	P
<i>Goodyera oblongifolia</i>	P	P
<i>Calypso bulbosa</i>	P	P
<i>Listera</i> sp	-	.1/10
<i>Berberis nervosa</i>	-	4.8/30
<i>Pteridium aquilinum</i>	-	P
<i>Trientalis latifolia</i>	-	P
<i>Elymus glaucus</i>	-	P
<i>Polypodium glycyrrhiza</i>	-	P
<i>Danthonia spicata</i>	P	-
<i>Pyrola picta</i>	P	-
<i>Pyrola asarifolia</i>	P	-
<i>Lilium columbianum</i>	P	-
<u>Bryophyte-Lichen Stratum</u>		
<i>Dicranum fuscescens</i>	6/90	3.3/70
<i>Rhytidopsis robusta</i>	.4/10	.2/10
<i>Hypnum</i> sp	1.8/50	4.8/80
<i>Isopterygium elegans</i>	3.5/50	14/100
<i>Dicranoseisia cirrata</i>	2.4/30	.2/10
<i>Racomitrium heterostichum</i>	1.2/60	1.5/60

Table Continued

Stand No.	17	26
<u>Bryophyte-Lichen Stratum</u>		
<i>Stokesiella oregana</i>	1.3/30	.4/10
<i>Scapania</i> sp	.1/10	.6/30
<i>Plagiothecium undulatum</i>	2/40	P
<i>Polytrichum juniperinum</i>	P	P
<i>Mnium spinulosum</i>	-	P
<i>Hylocomium splendens</i>	P	P
<i>Dicranum tauricum</i>	P	P
<i>Rhytidiadelphus loreus</i>	2.5/10	-
<i>Polytrichum commune</i>	2.5/10	-
<i>Dicranum howellii</i>	-	.5/20
<i>Isothecium stoloniferum</i>	-	P
<i>Rhizomnium glabrescens</i>	-	P
<i>Cladina impexa</i>	P	-
<i>Rhacomitrium canescens</i>	P	-

Barry

Table 4 *Pseudotsuga menziesii* - *Polystichum muritum* Association

Stand No.	15	7	10	5	25	20	18	8	19
Aspect	SSE	NW	WSW	W	ESE	W	S	SW	W
Slope (degrees)	28°	33°	17°	14°	12°	25°	12°	18°	5°
Topography	Lower Talus	Lower Talus	Mid-Lower Slope	Lower Slope	Mid-Slope	Lower Slope	Lower Slope	Lower Slope & Basin	Lower Slope & Basin
Cover (%)	80	75	85	90	80	95	80	70	90
Tree Stratum	0	10	5	0	1	3	1	1	1
High Shrub Stratum	2	10	1	5	1	1	1	3	1
Low Shrub Stratum	85	45	70	25	75	70	85	55	75
Herb Stratum	7	15	7	12	10	30	40	95	20
Bryophyte Stratum									

Species by Stratum^a

Tree Stratum	% Class									
<i>Pseudotsuga menziesii</i>	67.5	67.5	67.5	67.5	67.5	67.5	67.5	67.5	67.5	40
<i>Alnus rubra</i>	7.5	4	15	4	85	25	15	15	50	50
<i>Tsuga heterophylla</i>	-	4	-	15	-	7.5	-	7.5	-	III
<i>Touja plicata</i>	-	-	-	15	-	-	-	-	-	7.5

^aData are: Cover (%)/Frequency (%), and Constancy by percentage class (I = 1-20%; II = 21-40%; III = 41-60%; IV = 61-80%; V = 81-100%), + indicates cover of less than .1%, P indicates occurrence in the stand but not in the subplots.

Table continued

Stand No.	15	7	10	5	25	20	18	8	19	% Class
<u>High Shrub - Transgressive Stratum</u>										
<i>Hicodiscus discolor</i>	P	4	--	--	--	7.5	--	P	--	III
<i>Pseudotsuga menziesii</i>	--	--	4	--	2	4	P	--	1	III
<i>Vaccinium parvifolium</i>	--	4	--	--	--	--	--	7.5	--	II
<u>Low Shrub Stratum</u>										
<i>Vaccinium parvifolium</i>	2	4	2	2	2	4	3	--	2	V
<i>Rosa gymnocarpa</i>	P	1	1	--	2	2	P	--	1	IV
<i>Ribes lacustre</i>	1	1	--	P	1	--	1	P	P	IV
<i>Gaultheria shallon</i>	P	4	+	2	--	--	2	2	--	IV
<u>Herb - Dwarf Shrub Stratum</u>										
<i>Polystichum munitum</i>	5/60	32/90	22/80	20/90	31/60	60/90	14/40	49/100	40/90	V
<i>Vaccinium parvifolium</i>	.3/30	1.5/60	.5/30	1/50	.5/20	1.4/40	1.5/60	1.5/60	1.2/40	V
<i>Trifolium latifolia</i>	+/10	1/40	1/40	2/80	3/70	2.5/80	.4/20	2/80	1.4/40	V
<i>Pteridium aquilinum</i>	P	1.5/30	28/100	1/40	46/100	2/40	45/100	6/80	47/80	V
<i>Trisetum cernuum</i>	P	.6/40	1.5/60	1/60	4/100	1.5/50	3/70	1.7/90	1.7/60	V
<i>Galium aparine</i>	--	1.2/40	+/10	2/80	2/60	4/60	P	1.6/60	1.1/50	V
<i>Viola sp.</i>	--	1/60	1/40	.4/40	2.5/70	2/70	P	6/100	.3/20	V
<i>Dryopteris austriaca</i>	P	P	.5/20	+/10	.2/10	.4/10	1.7/40	P	1/30	V
<i>Pseudotsuga menziesii</i>	P	P	.1/20	+/10	+/10	P	P	.1/10	+/10	V
<i>Berberis nervos</i>	33/100	3/30	P	P	P	6/30	--	P	P	V
<i>Cocodyera oblongifolia</i>	+/10	.1/20	P	+/10	.2/10	.2/10	--	P	+/10	V
<i>Rubus ursinus</i>	P	P	1/50	P	.1/10	.2/10	P	--	P	V

Table continued

Stand No.	15	7	10	5	25	20	18	8	19	% Class
Herb - Dwarf Shrub - Stratum										
<i>Osmorhiza chilensis</i>	--	--	--	--	.5/20	--	--	.1/10	--	II
<i>Rosa gymnocarpa</i>	--	--	--	--	--	--	.1/10	.2/10	--	II
<i>Lonicera ciliosa</i>	+/10	--	--	P	--	--	--	--	--	II
<i>Listera</i> sp.	--	P	--	--	--	--	--	P	--	II
<i>Circaea alpina</i>	--	--	--	--	P	--	--	P	--	II
<i>Rubus spectabilis</i>	--	--	--	--	--	P	--	--	P	II
<i>Ranunculus uncinatus</i>	--	P	--	--	--	--	--	P	P	II
<u>Bryophyte - Lichen Stratum</u>										
<i>Plagiobhacium undulatum</i>	.5/20	4/30	.1/30	1/60	1/20	5/40	12/80	1.3/60	6/60	V
<i>Rhizomniun glabrescens</i>	1/40	2/100	.4/40	3/80	1/60	2.5/60	3/60	5/80	2.4/70	V
<i>Dicranum fuscescens</i>	.3/20	.7/30	.2/20	.2/20	.4/20	--	3/30	.2/10	.1/10	V
<i>Stokesiella oregana</i>	P	.1/20	.2/20	.4/40	.6/40	.2/20	.1/30	2.4/90	.1/20	V
<i>Rhytidiadelphus loreus</i>	P	1.5/10	.1/20	.1/10	2.5/50	9/50	15/80	9/90	3/50	V
<i>Isoetesium elegans</i>	5/90	--	1/40	P	1.2/60	1/50	1/50	2.3/50	1.7/60	V
<i>Hylacomium splendens</i>	P	.1/20	+/10	P	P	1.5/50	.1/10	.2/10	.8/20	V
<i>Plagiomnium insigne</i>	P	P	P	--	.4/20	+/10	1.2/30	3.5/50	1.7/50	V
<i>Hypnum</i> sp.	3.5/80	P	P	P	.2/10	P	.2/20	P	--	V
<i>Isoetecium stoloniferum</i>	P	P	P	--	P	.4/10	P	P	--	IV
<i>Scapania</i>	1/40	--	--	--	1/40	1.7/60	.4/10	.4/20	.3/20	IV
<i>Mnium spinulosum</i>	1/20	--	--	9/40	1.5/60	2.5/40	--	--	--	III
<i>Rhytidiopsis robusta</i>	--	.2/20	P	--	--	.1/10	.2/10	2/30	--	III
<i>Pogonatum alpinum</i>	--	.2/10	--	--	.2/10	P	--	P	P	III

Table continued

Stand No.	15	7	10	5	25	20	18	8	19	Z Class
<u>Bryophyte - Lichen Stratum</u>										
<i>Plagiothecium laetum</i>	--	--	--	P	1.2/50	--	P	--	P	III
<i>Leucolepis menziesii</i>	--	--	--	--	--	P	--	.4/10	P	II
<i>Polytrichum juniperinum</i>	--	--	P	--	1/20	--	--	--	--	II
<i>Rhacomitrium heterostichum</i>	P	--	--	--	.4/10	--	--	--	--	II
<i>Ectranem tauricum</i>	+/10	--	--	--	.1/10	--	--	--	--	II
<i>Dicranoweisia cirrata</i>	P	--	--	--	P	--	--	--	--	II
<i>Claopodium</i> sp.	P	--	--	--	P	--	--	--	--	II
<u>Sporadic Species (only in one stand)</u>										
<u>High Shrub - Transgressive Stratum</u>										
<i>Rosa gymnocarpa</i> 7(+), <i>Tsuga heterophylla</i> 8(2)										
<u>Low Shrub Stratum</u>										
<i>Holodiscus discolor</i> 20(1), <i>Ilex aquifolium</i> 8(1)										
<u>Herb - Dwarf Shrub Stratum</u>										
<i>Calypso bulbosa</i> 7(P), <i>Epilobium angustifolium</i> 18(P), <i>Hieracium</i> sp. 19(P), <i>Melica subulata</i> 19(P), <i>Ribes lacustre</i> 25(.3/10), <i>Sorbus sitchensis</i> 18(P).										
<u>Bryophyte - Lichen Stratum</u>										
<i>Baccarandia pomiformis</i> 19(P), <i>Dicranum howellii</i> 25(1.2/40), <i>Plagiochila asplenoides</i> 25(P), <i>Rhytidiadelphus triquetrus</i> 20(P), <i>Scieropodium obtusifolium</i> 25(P).										

Lowland

Table 5 *Alnus rubra* - Basin Association

Stand No.	28	30	27	11
Aspect	S	SW	S	SW
Slope (degrees)	5	2	2	4
Topography	Basin (organic)	Basin	Basin (organic)	Basin (mineral)
Cover (%)	80	78	75	75
Tree Stratum				
High Shrub - Transgressive Stratum	1	2	1	-
Low Shrub Stratum	1	2	2	-
Herb - Dwarf Shrub Stratum	60	80	62	45
Bryophyte - Lichen Stratum	15	20	30	40

Species by Stratum^a

Species	28	30	27	11	% Class
<u>Tree Stratum</u>					
<i>Alnus rubra</i>	85	85	75	65	V
<u>High Shrub - Transgressive Stratum</u>					
<i>Vaccinium parvifolium</i>	+	P			III
<u>Low Shrub Stratum</u>					
<i>Vaccinium parvifolium</i>	3	1	1	2	V
<i>Ribes lacustre</i>	+	1	2		IV
<i>Rosa gymnocarpa</i>		+	1		III
<u>Herb - Dwarf Shrub Stratum</u>					
<i>Pteridium aquilinum</i>	36/90	42/90	28/80	11/60	V
<i>Viola</i> sp.	9.7/100	3/70	10/90	.2/10	V
<i>Trisetum cernuum</i>	6/80	3.5/90	3/80	1/70	V

Table continued

Stand No.	28	30	27	11	% Class
Herb. - Dwarf Shrub Stratum (cont'd)					
<i>Folystichum maritum</i>	2/30	3.3/50	3.5/40	4.2/50	V
<i>Vaccinium parvifolium</i>	.7/30	1.2/50	.2/20	.5/30	V
<i>Athyrium filix-femina</i>	.4/10	.4/10	1.4/70	.1/10	V
<i>Galium aparine</i>	2.5/70	3.3/90	2.6/80	2/90	V
<i>Thuja plicata</i>	+/10	.4/20	.2/40	.1/10	V
<i>Tiarella trifoliata</i>	5.5/100	P	5/90	1.3/30	V
<i>Alnus rubra</i>	.8/50	.7/70	.4/40	P	V
<i>Blechnum spicant</i>	1.5/40	.4/10	.5/20	P	V
<i>Ribes lacustre</i>	+/10	.2/10	1/30	P	V
<i>Lactuca muralis</i>	.8/20	2.3/80	1/50	P	V
<i>Carex</i> sp.	.2/20	P	.6/40	.1/10	V
<i>Circaea alpina</i>	3.5/70	P	7/50	P	V
<i>Dicentra formosa</i>	.1/10	.3/40	P	P	V
<i>Deschampsia elongata</i>	.1/10	P	.6/20	P	V
<i>Dryopteris austriaca</i>	+/10	.7/30	P	P	V
<i>Tellima grandiflorum</i>	P	.1/30	.1/20	P	V
<i>Woodlyera oblongifolia</i>	P	P	P	+/10	V
<i>Pseudotsuga menziesii</i>	P	+/10	P	+/10	V
<i>Tsuga heterophylla</i>	.1/10	+/10	P	P	V
<i>Tiarella laciniata</i>	7.5/100		5/80	3/90	IV
<i>Elymus glaucus</i>		1.5/40	4/20	.1/10	IV
<i>Trientalis latifolia</i>		.8/30	+/10	+/10	IV
<i>Ranunculus uncinatus</i>		.1/20	.4/10	.1/10	IV

Table continued

Stand No.	28	30	27	11	% Class
<u>Herb - Dwarf Shrub Stratum (cont'd)</u>					
<i>Luzula parviflora</i>	P		1/40	.3/30	IV
<i>Luzula campestris</i>		.5/30	P	P	IV
<i>Calamagrostis canadensis</i>	.4/20	+/10	.4/30		IV
<i>Rubus hispidus</i>	P	.4/20	P		IV
<i>Gaultheria shallon</i>		+/10	P	P	IV
<i>Cirsium</i> sp.		+/10	2.7/50		III
<i>Gsmorbiza chilensis</i>	.4/10		P		III
<i>Berberis nervosa</i>	P	.2/10			III
<i>Montia parviflora</i>		.2/10		P	III
<i>Adiantum pedatum</i>			P	P	III
<i>Rosa gymnocarpa</i>		P	.1/10		III
<i>Holodiscus discolor</i>		P		P	III
<u>Bryophyte - Lichen Stratum</u>					
<i>Rhytidadelphus loreus</i>	6/70	2.6/90	1/30	3/70	V
<i>Plagiothecium undulatum</i>	.7/30	1.8/70	.5/30	1/30	V
<i>Isopterygium elegans</i>	.7/40	1.6/60	1/20	.7/40	V
<i>Stokesiella oregana</i>	.2/10	.4/20	.4/20	1.2/80	V
<i>Rhizomnium glabrescens</i>	2/70	1.3/50	2/70	.4/40	V
<i>Plagiomnium insigne</i>	1.5/50	2/70	1.1/30	2.6/70	V
<i>Isoetecium stoloniferum</i>	.5/20	.7/30	.5/20	.6/30	V
<i>Hypnum</i> sp.	1/40	.4/20	2/30	.4/40	V
<i>Scapania</i> sp.	1/30	1.3/50	2.5/60	.5/40	V

Table continued

Stand No.	28	30	27	11
<u>Bryophyte - Lichen Stratum (cont'd)</u>				
<i>Hylocomium splendens</i>	P	.4/20	P	.2/20
<i>Mnium spinulosum</i>	.1/10	P	.4/10	.1/10
<i>Dicranum fuscescens</i>	.6/30	2.5/80		.4/30
<i>Pogonatum alpinum</i>	P	.4/30	P	P
<i>Polytrichum juniperinum</i>		P	P	P
<i>Dicranum howellii</i>	2/30		2/60	
<i>Plagiothecium laetum</i>		P		P
<i>Leucolopia menziesii</i>		.2/20		1.5/50
<i>Claopodium</i> sp.	P	P		

^a Data are: Cover (%) and Constancy by percentage class (I = 1-20%; II = 21-40%; III = 41-60%; IV = 61-80%; V = 81-100%) P indicates occurrence in the stand but not in the subplots; + indicates cover less than .1%.

Sporadic Species (only in 1 plot)

Tree Stratum

Pseudotsuga menziesii 28(8), *Thuja plicata* 11(30), *Tsuga heterophylla* 30(8)

High Shrub - Transgressive Stratum

Pseudotsuga menziesii 30(10), *Tsuga heterophylla* 30(1), *Ribes lacustre* 27(+)

Herb - Dwarf Shrub Stratum

Adenocaulon bicolor 30(+), *Amelanchier alnifolia* 27(+), *Aquilegia formosa* 30(+), *Bromus pacificus* 28(P), *Cornus canadensis* 28(P), *Ilex aquifolium* 27(P), *Lycocodium clavatum* 30(P), *Melica subulata* 11(2), *Polypodium glycyrrhiza* 30(P), *Rubus pedatus* 30(P), *Rubus spectabilis* 11(P), *Stellaria crispa* 27(P), *Urtica dioica* 27(P).

Table continued

Bryophyte - Lichen Stratum

Dicranum tauricum 28(.3)

Lawson-Blair

Table 6 The numbers of trees by 10 centimeter diameter classes together with total density for associations studied. The data are expressed as the number of stems per hectare. In each data pair the figure to the left of the slash is living density; figure to the right is dead density.

Association and Species	Trees										Total Density
	0-10 cm	11-20 cm	21-30 cm	31-40 cm	41-50 cm	51-60 cm	61-70 cm	71-80 cm	81-90 cm	90+ cm	
<i>Pinus contorta</i> - Moss											
<i>Pinus contorta</i>	62/325	600/212	175/0	50/0	--	--	--	--	--	--	750/487
<i>Pseudotsuga menziesii</i> (a)	1100/1112	538/150	188/25	25/12	0/25	0/38	0/25	--	--	0/12	1712/1288
			st.	st.	st.	st.	st.			st.	
<i>Pseudotsuga menziesii</i> - <i>Gaultheria shallon</i>											
<i>Pseudotsuga menziesii</i>	89/561	318/332	236/39	157/0	46/0	14/4	14/0	4/0	7/0	4/0	886/907
					st.	st.					
<i>Tsuga plicata</i>	57/7	32/0	4/0	--	--	--	--	--	--	--	93/7
<i>Tsuga heterophylla</i>	4/0	4/0	--	4/0	4/0	--	--	--	--	--	16/0
<i>Alnus rubra</i>	--	4/0	4/4	--	--	--	--	--	--	--	8/4
<i>Pseudotsuga menziesii</i> - <i>Stokesiella oregana</i>											
<i>Pseudotsuga menziesii</i>	67/336	197/317	233/44	147/8	28/17	28/3	3/14	3/8	--	6/8	703/786
		11 st.	3 st.	17 st.	st.	st.	st.	st.		st.	
<i>Alnus rubra</i>	0/6	6/3	6/3	--	--	--	--	--	--	--	12/12

Pseudotsuga menziesii

Table continued

Association and Species	Trees										Total Density
	0-10 cm	11-20 cm	21-30 cm	31-40 cm	41-50 cm	51-60 cm	61-70 cm	71-80 cm	81-90 cm	90+ cm	
<i>Pseudotsuga menziesii</i> - <i>Polytichum muritum</i>	64/75	50/50	31/19	36/3	19/3 st.	8/0	11/0	25/3 st.	8/3 st.	22/14 st.	284/164
<i>Pseudotsuga menziesii</i>											
<i>Thuja plicata</i>	3/6	22/0	6/0	--	--	--	--	--	--	0/6 8 st.	31/19
<i>Tsuga heterophylla</i>	19/0	6/0	3/0	--	--	--	--	--	--	--	28/0
<i>Alnus rubra</i>	--	17/14	58/39	50/3	6/0	6/0	--	--	--	--	139/56
<i>Alnus rubra</i> - Basin											
<i>Pseudotsuga menziesii</i>	--	6/0	--	--	--	--	--	--	--	--	6/0
<i>Thuja plicata</i>	--	6/0	6/0	--	--	12/0	--	--	--	0/50 st.	24/50
<i>Tsuga heterophylla</i>	--	6/0	--	--	--	--	--	--	--	--	6/0
<i>Alnus rubra</i>	0/6	25/50	119/50	125/25	19/6	--	--	--	--	--	288/138

Table continued

Association	<i>Pseudotsuga menziesii</i>			<i>Thuja plicata</i>			<i>Tsuga heterophylla</i>			<i>Pinus contorta</i>		
	Age (yrs.)	Ht. (m.)	dbh (cm.)	Age (yrs.)	Ht. (m.)	dbh (cm.)	Age (yrs.)	Ht. (m.)	dbh (cm.)	Age (yrs.)	Ht. (m.)	dbh (cm.)
<i>Pseudotsuga menziesii</i> - <i>Polystichum munitum</i>	55	30.8	32.2	62	16.4	27.2	35	13.1	14.5	--	--	--
	63	24.1	33.8	64	10.0	18.8	60	20.1	20.8	--	--	--
	64	19.8	35.1	76	12.2	18.0	68	15.5	20.1	--	--	--
	66	43.3	47.8	--	--	--	--	--	--	--	--	--
	67	39.6	69.6	--	--	--	--	--	--	--	--	--
	74	41.8	57.9	--	--	--	--	--	--	--	--	--
	75	36.6	48.8	--	--	--	--	--	--	--	--	--
	80	52.4	89.2	--	--	--	--	--	--	--	--	--
	82	48.8	75.9	--	--	--	--	--	--	--	--	--
	84	23.8	32.5	--	--	--	--	--	--	--	--	--
86	29.0	34.0	--	--	--	--	--	--	--	--	--	
93	49.4	73.7	--	--	--	--	--	--	--	--	--	
96	29.6	50.5	--	--	--	--	--	--	--	--	--	
96	50.6	74.2	--	--	--	--	--	--	--	--	--	
<i>Alnus rubra</i> - Basin	--	--	--	68	24.7	56.1	40	12.2	17.0	--	--	--

Barney Poland

Table 8 Mensurational data for the tree species by association (a)

Association and Species	Max. dbh (b) (cm.)	Avg. dbh (cm.)	Max. Ht. (m.)	Basal Area (m ² /ha)	Density (stems/ha)	Max. Age (yrs.)
<i>Pinus contorta</i> - Moss						
<i>Pinus contorta</i>	34.8	18.46/9.57	28.3	22.4/3.8	750/487	79
<i>Pseudotsuga menziesii</i>	32.0	10.67/11.07	23.7	22.0/36.7	1712/1288	69
<i>Pseudotsuga menziesii</i> - <i>Gaultheria shallon</i>						
<i>Pseudotsuga menziesii</i>	31.3	24.26/10.79	44.0	55.5/20.6	886/907	99
<i>Thuja plicata</i>	18.5	9.51/6.01	12.5	.5/1.03	93/7	60
<i>Tsuga heterophylla</i>	42.2	24.38/0	34.1	1.1/0	16/0	75
<i>Alnus rubra</i>	21.3	20.32/0	21.6	.2/0	8/4	--
<i>Pseudotsuga menziesii</i> - <i>Stokesiella oregana</i>						
<i>Pseudotsuga menziesii</i>	62.5	25.33/15.14	37.8	45.6/28.8	703/786	96
<i>Alnus rubra</i>	23.9	22.73/13.78	23.2	.5/2	11/11	--
<i>Pseudotsuga menziesii</i> - <i>Polystichum munitum</i>						
<i>Pseudotsuga menziesii</i>	120.6	36.94/21.79	54.2	49.0/18.5	264/164	96
<i>Thuja plicata</i>	27.2	16.60/11.24	17.1	.7/30.3	31/19	76
<i>Tsuga heterophylla</i>	20.8	9.93/0	20.1	.3/0	31/0	68
<i>Alnus rubra</i>	50.8	29.11/22.76	35.4	9.9/2.4	139/56	--

Table Mensuration data for the tree species by association (a) (continued)

Association and Species	Max. dbh (cm.)	(b)	Avg. dbh (cm.)	Max. Ht.	Basal Area (m ² /ha)	Density (stems/ha)	Max. Age (yrs.)
<i>Alnus rubra</i> - Basin							
<i>Pseudotsuga menziesii</i>	12.2		--	7.3	--	--	--
<i>Thuja plicata</i>	125.5		53.59/118.47	45.4	10.9/49.8	31/44	--
<i>Tsuga heterophylla</i>	17.0		--	12.2	--	--	40
<i>Alnus rubra</i>	43.9 (d)		29.49/23.32	38.4 (d)	20.8/6.4	286/138	--

(a) Data for average dbh, basal area and density are given as living tree/dead trees.

(b) dbh = diameter at breast height (approx. 1.3 m above ground).

(c) Max. age = age of oldest tree cored

(d) Fire scar

1988

9

Table 9 Height class distribution for tree species. The data are expressed as the number of stems per hectare. Absolute (Abs.) and Relative (Rel.) densities are given for the tree classes.

Association and species	Seedlings 30 cm.	Transgressives 30 cm-3m	Trees							
			3-13m		13-23m		23-33m		33+m	
			Abs.	Rel.	Abs.	Rel.	Abs.	Rel.	Abs.	Rel.
<i>Pinus contorta</i> - Moss	--	--	162	18%	662	74%	75	8%	--	--
<i>Pinus contorta</i>	1,000	100	600	50%	588	50%	--	--	--	--
<i>Pseudotsuga menziesii</i>	--	--	--	--	--	--	--	--	--	--
<i>Pseudotsuga menziesii</i> - <i>Gaultheria shallon</i>	321	21	125	14%	375	43%	321	37%	54	6%
<i>Pseudotsuga menziesii</i>	--	--	79	100%	--	--	--	--	--	--
<i>Thuja plicata</i>	71	--	7	37%	4	21%	4	21%	4	21%
<i>Tsuga heterophylla</i>	--	--	4	50%	4	50%	--	--	--	--
<i>Alnus rubra</i>	--	--	--	--	--	--	--	--	--	--
<i>Pseudotsuga menziesii</i> - <i>Stokesiella oregana</i>	4,938	--	100	13%	341	45%	291	38%	31	4%
<i>Pseudotsuga menziesii</i>	125	--	--	--	--	--	--	--	--	--
<i>Thuja plicata</i>	531	--	--	--	--	--	--	--	--	--
<i>Tsuga heterophylla</i>	--	--	--	--	--	--	--	--	--	--
<i>Alnus rubra</i>	--	--	--	--	--	--	6	100%	--	--

Table continued

Association and species	Seedlings 30 cm.	Trees											
		Transgressives 30cm-3m		3-13m		13-23m		23-33m		33+cm		Abs.	Rel.
		Abs.	Rel.	Abs.	Rel.	Abs.	Rel.	Abs.	Rel.	Abs.	Rel.		
<i>Pseudotsuga menziesii</i> - <i>Polystichum munitum</i>													
<i>Pseudotsuga menziesii</i>	1,194	78	58	22%	50	19%	58	22%	92	35%			
<i>Thuja plicata</i>	389	--	25	75%	8	25%	--	--	--	--			
<i>Tsuga heterophylla</i>	250	22	17	75%	6	25%	--	--	--	--			
<i>Alnus rubra</i>	972	--	--	--	61	43%	47	33%	33	24%			
<i>Alnus rubra</i> - Basin													
<i>Pseudotsuga menziesii</i>	875	75	6	100%	--	--	--	--	--	--			
<i>Thuja plicata</i>	8,812	--	12	40%	--	--	12	40%	6	20%			
<i>Tsuga heterophylla</i>	562	25	6	100%	--	--	--	--	--	--			
<i>Alnus rubra</i>	4,000	--	81	33%	38	15%	88	36%	38	15%			