



**TERRESTRIAL ECOSYSTEM MAPPING  
for the  
CLAYOQUOT SOUND AREA**

**INTERIM DOCUMENT**

**YEAR THREE**

*for:*

**MINISTRY OF FORESTS  
PORT ALBERNI FOREST DISTRICT**

*by:*

**MADRONE CONSULTANTS LTD.  
1081 Canada Avenue, Duncan, BC V9L 1V2**

**March 1999**

**ACKNOWLEDGMENTS**

Madrone Consultants Ltd. would like to acknowledge the contribution that the following people made to the completion of the fieldwork, maps, and this report. Stuart Fraser was initially responsible for overall project management and client liaison for the project in year one and two; however, Kate Miller has now taken over this role.

Helen Reid planned and organized the field trips carried out for Year Three in 1998. Helen Reid, Jan Teversham, and Julie Williams collected ecosystem data. Jason Hindson collected specific soil and bioterrain data. Linda Veach and Tania Tripp collected wildlife data.

Bioterrain typing in Year 3 has been the sole responsibility of Jason Hindson. Bob Maxwell of the Ministry of Environment, Lands and Parks (MOELP) correlated this typing. Ecosystem mapping has been the work of Helen Reid; external correlation of the ecosystem mapping was provided by Ted Lea (Ministry of Environment).

Kate Miller coordinated mapping. Monorestitution and data capture were performed in house by Ernie Pacholuk, Renato Berlanda, and Kathy Tait. Hugh Hamilton Ltd. provided GIS support for the final edits, map legends, and final maps. Work with wildlife and plot specific databases has been the difficult, but ultimately, rewarding task of Julie Williams. She also supervised polygon database entry and checking.

The report is a combined effort of several people. Helen Reid wrote the area specific ecosystem descriptions. Jason Hindson provided the soil discussion in the main report and the terrain sections in the area specific reports. Julie Williams produced all the material in the appendices. Bryan Tasaka created the study area maps. Jan Teversham and Julie Williams edited this edition. Sandra Bird has taken all this information and created the document you are about to read.

---

**TABLE OF CONTENTS**

Acknowledgments.....	i
Table of Contents.....	ii
List of Tables.....	iv
List of Figures and Photographs.....	iv
<b>1.0 INTRODUCTION .....</b>	<b>1</b>
<b>2.0 DESCRIPTION OF THE STUDY AREA.....</b>	<b>2</b>
2.1 Location.....	2
2.2 Land Tenure .....	2
2.3 Physical Description .....	5
2.4 Biogeoclimatic Units .....	6
<b>3.0 METHODOLOGY .....</b>	<b>7</b>
3.1 Data Sources.....	7
3.2 Fieldwork.....	7
3.3 Ecosystem Classification and Mapping .....	8
3.4 Wildlife Fieldwork and Habitat Assessment.....	8
3.5 Data Limitations and Map Reliability .....	8
<b>4.0 RARE VASCULAR PLANTS AND PLANT COMMUNITIES.....</b>	<b>10</b>
4.1 Rare Vascular Plants.....	10
4.2 Rare Plant Communities.....	10
<b>5.0 ECOSYSTEM DESCRIPTIONS .....</b>	<b>12</b>
5.1 Vegetation Descriptions .....	20
5.2 Coastal Western Hemlock Zone, Very Wet Hypermaritime Subzone, Southern Variant (CWHvh1).....	21
5.2.1. Forested Site Series.....	21
5.2.2 Deciduous, Shrub, and Herb Dominated Ecosystems .....	46
5.3 Coastal Western Hemlock Zone, Very Wet Maritime Subzone, Submontane and Montane Variants (CWHvm1 and vm2).....	52
5.3.1 Forested Site Series.....	52
5.3.2. Deciduous, Shrub, and Herb Dominated Ecosystems .....	80
5.4 Sparsely Vegetated, Non-Vegetated, and Anthropogenic Units of the CWH .....	89
5.4.1 Beach .....	89
5.4.2 Cobble Beach.....	89
5.4.3 Cliff .....	89
5.4.6 Gravel Bar .....	92
5.4.7 Gravel Pit.....	92
5.4.8 Lake .....	93
5.4.9 Mudflat Sediment .....	93
5.4.10 Shallow Open Water.....	94
5.4.11 Pond .....	94
5.4.12 River .....	95
5.4.13 Rock Outcrop.....	95
5.4.14 Road Surface.....	96
5.4.15 Rural .....	96
5.4.16 Salt Water .....	96

5.4.17	Talus .....	96
5.4.18	Wave Cut Platform.....	97
5.5	Mountain Hemlock Zone, Moist Maritime Subzone, Windward Variant (MHmm1 and MHmmp1).....	98
5.5.1	Forested Site Series.....	98
5.5.2	Shrub and Herb Dominated Ecosystems .....	106
	Ecosystem: LD Arctic lupine – Subalpine daisy.....	107
5.5.3	Sparsely Vegetated, Non-Vegetated, and Anthropogenic Units .....	112
<b>6.0</b>	<b>SPECIFIC AREA DESCRIPTIONS .....</b>	<b>116</b>
6.1	Bulson Creek.....	121
6.1.1	Introduction .....	121
6.1.2	Biogeoclimatic Boundaries .....	121
6.1.3	Analysis of Ecosystem Unit Differences.....	122
6.2	Flores Island.....	126
6.2.1	Introduction .....	126
6.2.2	Biogeoclimatic Boundaries .....	126
6.2.3	Initial Analysis of Ecosystem Unit Differences .....	126
6.3	Kennedy River.....	133
6.3.1	Location and Extent.....	133
6.3.2	Topography and Drainage .....	134
6.3.3	Terrain .....	134
6.3.4	Biogeoclimatic zones .....	135
6.3.5	Ecosystems.....	135
6.3.6	Sampling Intensity .....	137
6.4	Muriel Ridge .....	141
6.4.1	Location and Extent.....	141
6.4.2	Topography and Drainage.....	141
6.4.3	Terrain.....	142
6.4.4	Biogeoclimatic zones: .....	142
6.4.5	Ecosystem.....	142
6.4.6	Sampling Intensity.....	144
<b>7.0</b>	<b>REFERENCES .....</b>	<b>147</b>
<b>8.0</b>	<b>APPENDICES .....</b>	<b>150</b>
8.1	Appendix I. Identified Plant Species in Clayoquot Sound.....	150
8.2	Appendix II: Vascular and Non-Vascular Plants.....	162
8.3	Appendix III: B.C. Conservation Data Centre Tracking List for Port Alberni Portion of the Southern Vancouver Island Forest District .....	176
8.4	Appendix IV: Site Modifiers for Atypical Conditions.....	184
8.5	Appendix V: Structural Stages and Codes .....	186
8.6	Appendix VI: Soil Classification .....	188

---

**List of Tables**

Table 1. Areas Mapped.....	2
Table 2. Biogeoclimatic Units in Clayoquot Sound.....	6
Table 3. CDC Rare Plant Communities Identified Within Study Area to Date.....	10
Table 4: Ecosystems considered rare in the Clayoquot Sound Area.....	11
Table 5. Clayoquot Sound: Coastal Western Hemlock Zone, Very Wet Hypermaritime Subzone, Southern Variant (CWHvh1) Forested Site Series.....	13
Table 6. Clayoquot Sound: Coastal Western Hemlock Zone, Very Wet Hypermaritime Subzone, Southern Variant (CWHvh1)Deciduous, Shrub, and Herb Dominated Ecosystem Units.....	14
Table 7. Clayoquot Sound: Coastal Western Hemlock Zone, Very Wet Maritime Subzone, Submontane and Montane Variants (CWH vm1 and vm2)Forested Site Series.....	15
Table 8. Clayoquot Sound: Coastal Western Hemlock Zone, Very Wet Maritime Subzone, Submontane and Montane Variants (CWH vm1 and vm2) Deciduous, Shrub, and Herb Dominated Ecosystem Units.....	16
Table 9. Clayoquot Sound – CWH Sparsely Vegetated, Non-Vegetated, and Anthropogenic Units.....	17
Table 10. Clayoquot Sound: Mountain Hemlock Zone, Moist Maritime Subzone, Windward Variant (MHmm1) and Parkland Variant (MHmmp1)Forested Site Series.....	18
Table 11. Clayoquot Sound: Mountain Hemlock Zone, Moist Maritime Subzone, Windward Variant (MHmm1) and Parkland Subzone (MHmmp1)Shrub and Herb Dominated Ecosystem Units.....	19
Table 12. Clayoquot Sound: Mountain Hemlock Zone, Moist Maritime Subzone, Windward Variant (MHmm1) and Parkland Subzone (MHmmp1)Sparsely Vegetated, Non-Vegetated, and Anthropogenic Units.....	19
Table 13. Bulson Creek Biogeoclimatic Unit Boundaries.....	121
Table 14. Differences between Shearwater and Madrone in CWHvm Mapping for Bulson Creek.....	122
Table 15. Differences between Shearwater and Madrone in MHmm1 Mapping for Bulson Creek.....	123
Table 16. Sparsely Vegetated, Non-Vegetated, and Anthropogenic Units (Bulson Creek)	123
Table 17. The Use of Site Modifiers (Bulson Creek).....	124
Table 18. Flores Island Biogeoclimatic Unit Boundaries.....	126
Table 19. Differences between Shearwater and Madrone in CWHvh1 Mapping for Flores Island.....	127
Table 20. Differences between Shearwater and Madrone in CWHvm Mapping for Flores Island.....	128
Table 21. Sparsely-vegetated, Non-Vegetated and Anthropogenic Units (Flores Island)...	129
Table 22. The Use of Site Modifiers (Flores Island).....	129
Table 23: Ecosystems of the Kennedy River Area.....	138
Table 24. Ecosystems of the Muriel Ridge Study Area.....	145

**List of Figures**

Figure 1. Clayoquot Study Areas.....	4
Figure 2. Watershed Map.....	117
Figure 3. Kennedy River Study Area.....	133
Figure 3. Muriel Ridge Study Area.....	141

**List of Photographs**

Photo 1:	Mesic forests HS6 on Flores Island.....	22
Photo 2:	RO with LR in the Atleo area.....	24
Photo 3:	LS3b in Plot H5 on Hesquiat Peninsula.....	26
Photo 4:	RC6 in Plot V95T63 on Hesquiat Peninsula.....	28
Photo 5:	RF7 in Plot M21 in the Bedwell area.....	30
Photo 6:	RS6 in Plot V95T143 in the Catface area.....	32
Photo 7:	SF7 in the Fortune Channel area.....	35
Photo 8:	Sitka spruce – Kindbergia (SK), Structural Stage 7.....	37
Photo 9:	SS7 in Plot V95T142 in the Catface area.....	40
Photo 10:	SW7 in Plot VK120 in the Catface area.....	42
Photo 11:	Plot K15 YG3b on Hesquiat Peninsula.....	44
Photo 12:	CM2c in Plot 3H113 Kennedy River area.....	47
Photo 13:	DS2 near Estevan Lighthouse on Hesquiat Peninsula in Plot K9.....	48
Photo 14:	GS2b in Plot G3J74 Muriel Ridge.....	49
Photo 15:	Herbaceous SM2 on Hesquiat Peninsula in Plot V95T60.....	51
Photo 16:	AB6 in the CWHvm2 in the Ursus Creek watershed.....	52
Photo 17:	AF6 in the CWHvm1 on Flores Island.....	55
Photo 18:	AS7 in the CWHvm1 Tranquil Creek watershed.....	57
Photo 19:	CW4 in Plot VK19 Catface area.....	59
Photo 20:	HD7 in the CWHvm1 Plot 2H143 in the Atleo area.....	61
Photo 21:	HS7 in the CWHvm1 in the Tranquil Creek watershed Plot H5.....	63
Photo 22:	LC7 in the CWHvm2 in the Ursus Creek watershed.....	65
Photo 23:	LS7 in the CWHvm1 Plot 2VH351 in the Atleo area.....	67
Photo 24:	MM3b in the CWHvm1 Plot G3J27.....	69
Photo 25:	Logged skunk cabbage site in the Catface area RC3 in Plot V95T132.....	72
Photo 26:	RS6 in Plot G3H114 Kennedy River watershed.....	74
Photo 27:	SS7 in Plot H1 in the Sydney River floodplain.....	76
Photo 28:	Plot V95T122 showing a YG7 site in the Fortune Channel area.....	78
Photo 29:	AW5 in Plot V95T106 in the Atleo area.....	80
Photo 30:	GS2 in K75 Cotter Creek.....	82
Photo 31:	PD3b in plot 3H111 Kennedy River watershed.....	84
Photo 32:	SA3 in the CWHvm2 Plot H64 in the Tofino Creek watershed.....	85
Photo 33:	SC2 in Plot VH40 in the Tranquil Creek watershed.....	86
Photo 34:	WS3b in Plot H39 Tranquil Creek watershed.....	88
Photo 35:	ES1 Slide after road construction in Plot V95T128 in the Catface area.....	91
Photo 36:	GB1 on the Bulson River.....	92
Photo 37:	LA in the Ursus Creek watershed adjacent to Plot 2H23.....	93
Photo 38:	Bulson River.....	95
Photo 39:	MB6 in the Ursus Creek watershed.....	98
Photo 40:	MM in Plot V95T50 Pretty Girl area.....	100
Photo 41:	MO7 in Plot H67 Tofino Creek watershed.....	102
Photo 42:	MT7 in Plot 2H303 Ursus Creek watershed.....	104
Photo 43:	IF2a in plot 3H07 Kennedy River area.....	106
Photo 44:	Id2A IN PLOT 3h03 Kennedy River Watershed.....	107
Photo 45:	Plot 2H306 of MH3a Ursus Creek watershed.....	108
Photo 46:	MK3a in plot 3H01 in Kennedy River Area.....	109
Photo 47:	VS2a in Plot 3H05 Kennedy River Watershed.....	111
Photo 48:	Rock bluffs mixed with mesic forest MB in the Tofino Creek watershed.....	114





**TERRESTRIAL ECOSYSTEM MAPPING  
for the  
CLAYOQUOT SOUND AREA**



## 1.0 INTRODUCTION

The objective of this project is to classify, map at a scale of 1:20,000, and describe the natural ecosystems within the study area according to Resource Inventory Committee (RIC) Standards of 1995/96 for Year One and 1998 for Years Two and Three. Interpretations of the map units can then be made for wildlife values for the focal species of this project (black bear, coastal black-tailed deer, Roosevelt elk, Bald Eagle, and Marbled Murrelet). This information should provide a sound ecological basis for subsequent wildlife and biodiversity management in the area.

This report is part of a Multi-year Inventory Study conducted by Madrone Consultants Ltd. on behalf of the Ministry of Forests. The project was funded by Forest Renewal B.C. as part of the Forest Renewal Plan (FRP) announced April 14, 1994, by the Government of British Columbia. It is part of the Integrated Terrain Stability, Terrestrial Ecosystem, Hydriparian, and Landslide Inventory at Clayoquot Sound, British Columbia.

## 2.0 DESCRIPTION OF THE STUDY AREA

### 2.1 Location

Clayoquot Sound, the focus of this inventory project, stretches along the West Coast of Vancouver Island for approximately 95 km from Nootka Sound in the north to the middle of Florencia Bay in the south. Elevation ranges from sea level to the alpine, but most of the area lies below 800 m.

The project involves mapping the entire area over what is intended to be a four-year period. The study area for the Year One (1996–1997) portion of the project is comprised of seven separate areas within Clayoquot Sound while Year Two (1997–1998) is comprised of five areas. In Year Three (1998–1999), two more areas were added. These areas are identified below in Table 1 and are illustrated in Figure 1.

**Table 1. Areas Mapped**

Year One (1996-97)	Size in Hectares
Bedwell	5,543
Catface/Cypre/Cotter	19,214
Fortune Channel	6,719
Hesquiat Peninsula	10,841
Sydney River	5,594
Tofino Creek	4,503
Tranquil Creek	5,871
total	58,285
Year Two (1997-98)	Size in Hectares
Atleo	10,634
Hesquiat	15,245
Marble	723
Pretty Girl	10,795
Ursus Creek	7,349
total	44,746
Year Three(1998-99)	Size in Hectares
Kennedy River	22,347
Muriel Ridge	3,627
total	25,974

### 2.2 Land Tenure

A large part of the Pacific Rim National Park lies within Clayoquot Sound while only the southwestern portion of Strathcona Provincial Park is included. There are also two small provincial parks, Gibson Marine Provincial Park on Flores Island and Maquinna Provincial Park at Hot Springs Cove, that incorporate hot springs. Thirteen new provincial parks were created in 1993. Several of these are within areas now mapped. These include Clayoquot Plateau, Dawley Passage, Hesquiat Lake, Hesquiat Peninsula, Sydney Inlet, Sulphur Passage, and Tranquil Creek.

Much of the forested land of Clayoquot Sound lies within Tree Farm Licenses 54 and 44 but some adjacent timber licenses are also held in the Sydney River and Hesquiat Lake areas.

The major community of Tofino lies at the end of Highway 3 on the tip of Esowista Peninsula. There are many small Indian Reserves divided between four different bands scattered throughout the Sound. Several of these reserves have small communities such as Ahousat, Opitsat, and Hot Springs Cove. Other scattered inhabited locations include Estevan Lighthouse, several logging camps, isolated private residences and lodges.

**Figure 1. Clayoquot Study Areas**

### 2.3 Physical Description

Clayoquot Sound is located on the western side of the Insular Mountains physiographic region described in Holland (1976). This region is made up of the Estevan Coastal Plain and the Vancouver Island Mountains. The Estevan Plain is generally 2 km to 3 km wide between the coastline and the foot of the mountains and is less than 50 m in elevation. It is underlain by soft Tertiary and Pleistocene deposits mantled in most places by recent deposits that result in a rolling or undulating surface. In places, thick marine and marine-deltaic deposits form terraces with gentle surfaces and steep, commonly unstable, scarps. Elsewhere, much of the lowland area is covered with morainal deposits that generally conform to the shape of the underlying rock. Organic deposits have frequently accumulated in depressions on these surficial deposits.

In contrast, the Vancouver Island Mountains rise to over 1,500 m within the study area. However, much of the area is under 800 m in elevation, and Hesquiat Peninsula does not exceed 200 m. Slopes are steep with irregular rocky peaks. The main rock types are Jurassic basalts and rhyolites of the West Coast Complex and Triassic volcanics of the Karmutsen Formation

Slopes generally support morainal deposits that overlie an irregular rock surface. On steeper mid-slopes, the morainal material is complexed with colluvium. Upper slopes generally contain rubbly colluvium complexed with steep, exposed rock. Crests and peaks comprise exposed rock with pockets of shallow morainal veneers. Fluvial deposits are limited to small fluvial fans that occur in valley bottom locations and narrow bands of active floodplains in the larger river valleys. Fluvioglacial deposits occur as higher fluvial benches within the main valleys. Moderately drained organic deposits commonly occur over bedrock on upper slopes, while poorly drained organic materials are found in pockets associated with wetlands.

The coastline is extremely irregular. Barclay Sound and Nootka Sound are large areas of exposed open water, while Clayoquot Sound comprises a series of nine long, narrow, salt and fresh water inlets that dissect the land. The many islands that lie between the inlets and the open ocean vary tremendously in size from tiny rock outcrops to Flores Island that is almost 20 km long.

Brunisols and Podzols are the most common soil orders found in the study area. Regosols occur quite frequently. Gleysols are more limited in occurrence. The most common organic soils are within the Folisol great group. Other organic soils such as Mesisols and Humisols occur infrequently while Fibrisols are very limited in occurrence.

Brunisols and Podzols have developed in all the surficial materials found in the study area; however, Podzols are the most common. These occur at all elevations on a variety of imperfectly to rapidly drained sites. Regosols are found in a wide range of geologically younger surficial materials, which include thin veneers of weathered bedrock and recent colluvial, fluvial, and marine deposits. The location of Gleysols is not dictated by a specific surficial material but rather by the presence of imperfect to very poor drainage. Soils of this order are common in areas such as depressions with stagnant water and gentle slopes where the soil is saturated for long periods of time. On poorly to very poorly drained sites, organic soils have also developed on organic surficial material. Folisols develop in well to moderately well drained sites. They are shallow and overlie rock or shallow mineral soil.

For a further description of soil orders, their great groups, and sub-groups, the *Canadian System of Soil Classification* (1998) should be referenced. Detailed descriptions of soils examined in the field are in the detailed plots completed for the study.

## 2.4 Biogeoclimatic Units

The study area is located in the Windward Island Mountains Ecosection (WIM). Three biogeoclimatic zones are represented: the Coastal Western Hemlock (CWH) zone, the Mountain Hemlock (MH) zone, and a very minor component of the Alpine Tundra (AT) zone. Zones, subzones, and variants are shown in Table 2.

**Table 2. Biogeoclimatic Units in Clayoquot Sound**

Zone	Subzone	Variant	Name
<b>CWH</b>			<b>Coastal Western Hemlock Zone</b>
	CWHvh		Very Wet Hypermaritime CWH
		CWHvh1	Southern Variant
	CWHvm		Very Wet Maritime CWH
		CWHvm1	Submontane Variant
		CWHvm2	Montane Variant
<b>MH</b>			<b>Mountain Hemlock Zone</b>
	MHmm		Moist Maritime MH
		MHmm1	Windward Variant
	MHmmp		Moist Maritime Parkland MH
		MHmmp1	Windward Variant
<b>AT</b>			<b>Alpine Tundra Zone</b>

There are two subzones and three variants of the CWH within Clayoquot Sound. The southern variant of the very wet hypermaritime subzone (vh1) occurs along the outer coast up to a maximum elevation of 200 m. Both the submontane and montane variants of the very wet maritime subzone (vm) of the CWH are present. The submontane variant (vm1) lies below 600 m, while the montane variant (vm2) lies between 600 m and 800 m throughout the area.

The Mountain Hemlock (MH) zone is represented by the moist maritime subzone, windward variant (MHmm1), and lies above 800 m near the outer coast. Nine hundred meters above sea level has previously been suggested as the lower boundary of the MH along the west coast in the Clayoquot Sound area (Green and Klinka, 1994); however, based on field work, it appears that 800 m better reflects the ecological conditions along the outer coastal areas. The parkland subzone of the MHmm1 begins between 1,200 m and 1,250 m.

The Alpine Tundra Zone is limited to a very few locations within the study area in Strathcona Park mainly on Mariner and Splendor Mountains. These areas have not yet been mapped.

---

### 3.0 METHODOLOGY

#### 3.1 Data Sources

Plot data and maps from earlier work conducted for International Forest Products Ltd. (Interfor) (Madrone Consultants Ltd. 1995, 1996), the Ministry of Forests (Lewis, 1992), and the Ministry of the Environment, Lands and Parks (Shearwater Mapping Ltd., 1995) have been used in the production of the maps. Forest cover maps and TRIM sheets were used for basic tree cover and topographic information. Diapositives of 1996 colour aerial photography were used for bioterrain polygon delineation and subsequent ecosystem subdivisions for Year One. Colour photos (1996) of colour aerial photography were used in Years Two and Three.

Other background information utilized included recent Conservation Data Centre (CDC) tracking lists for vertebrate wildlife, plants, and ecosystems, and relevant background reports. Rare element records for the study area were also requested from the CDC (see Appendix III).

#### 3.2 Fieldwork

Field sampling in 1996 was carried out in two field trips. The first consisted of three two-person crews sampling between October 8 and 12. The second consisted of four two-person crews sampling between October 18 and 25. Data collection followed methods in the *Field Manual for Describing Ecosystems* (1996). A total of 555 plots were sampled in the 1996 field season. Of this total, 118 plots were detailed (Ecosystem Field Form FS 882(1) HRE 96/4), 271 were visuals, and 166 were air calls. Air calls are considered visual in the Year One contract but are identified separately from the ground based visual plots on the maps. Data collected from 1994 and 1995 field work has been used in this mapping project and all plots from these previous projects are considered as visual plots. For the particular areas surveyed in 1996, this includes 47 visual plots sampled by Terry Lewis in 1993, 78 sampled by Madrone Consultants Ltd. in 1994, and 95 sampled by Madrone Consultants in 1995. The total number of plots used in Year One is 609 plus 166 air calls.

Field sampling in 1997 was also carried out in two field trips. The first consisted of three two-person crews sampling between October 3 and 11, 1997. The second consisted of three two-person crews sampling between October 17 and 23, 1997. Data collection followed methods in the *Field manual for Describing Ecosystems* (1996). A total of 676 plots were sampled. Of this total, 57 were full ecosystem plots (Ecosystem Field Form FS882(1) HRE 96/4), 116 were ground inspections, 356 were visuals, and 147 were air calls. Data collected in 1994 and 1995 field work by Madrone Consultants Ltd. was used in this project and includes 20 ground inspections and 168 visuals. Data collected in 1994 by Shearwater Mapping Ltd. was also used and includes 3 full ecosystem plots, 25 ground inspections, and 1 visual. A total of 746 plots plus 147 air calls were used for mapping in Year Two.

Field Sampling in 1998 was completed in one field trip that consisted of two three person crews sampling between September 20 and 27, 1998. An earlier reconnaissance flight with limited data collection was carried out on August 19, 1998, so as to sample areas in the parkland. Data collection followed methods in the *Describing Ecosystems in the Field* (1998). A total of 382 plots were sampled. Of this total, 31 were full ecosystem plots (Ecosystem Field Form FS882(1) HRE 96/4), 101 were ground inspections, 247 were visuals. The total number of air calls was 120. Data collected between 1995 and 1996 by Madrone Consultants Ltd. was also used in this project for Muriel Ridge mapping and includes 2 detailed plots, and 26 visuals. A total of 407 plots plus 120 air calls were used for mapping in Year Three.

### 3.3 Ecosystem Classification and Mapping

Parkland boundaries were identified on the air photos, and bioterrain polygons were then delineated. These polygons were sometimes further subdivided for ecosystem labeling on a basis of aspect or structural stage variations. The air photos were then digitized. Biogeoclimatic boundaries for the MH and CWH were added to the resultant maps, and subsequent to Year One, these boundaries were also added to the air photos. The polygons cut by these boundaries were adjusted to avoid creating tiny slivers. A second digitizing was carried out, and the polygons were numbered at this time to facilitate data entry of ecosystem and bioterrain attributes for each polygon.

Classification and presentation of the mapping follow the methodology documented in *Standards for Terrestrial Ecosystem Mapping for British Columbia*, Review Draft (1995), and the Addenda (1996) for Year One mapping. Subsequent mapping used the 1998 edition. Each ecosystem is assigned a two letter symbol that is equivalent to one BEC site series for most forested sites. *The Field Guide for Site Identification and Interpretation for the Vancouver Forest Region* (Green and Klinka, 1994) was used to determine Site Series. Sparsely vegetated, non-vegetated, and anthropogenic units follow the symbols assigned in Addenda (1996) for Year One and the TEM Standard (1998) for subsequent years. New ecosystem symbols have been assigned to any remaining ecosystems identified in the area. Site modifiers of aspect have been added on appropriately steep slopes (>35%), and soil depth modifiers and landform features have been added to atypical sites using the current Site Series Master Coding List. Structural stages describe the current vegetation stage by a seven level system that has been modified from Hamilton (1988). Tables 5 to 12 list the ecosystems identified by subzone/variant, structural stages, and some environmental parameters associated with each ecosystem.

### 3.4 Wildlife Fieldwork and Habitat Assessment

For discussion of wildlife, refer to *Addenda, Wildlife Interpretations for Ecosystem Mapping of the Clayoquot Sound Area, Interim Document, Year Three (1998-1999)*, Madrone Consultants Ltd.

### 3.5 Data Limitations and Map Reliability

Mesic (01) ecosystems within the CWHvm1 show greater variation within them than with adjacent ecosystems. There are two distinctly different mesic ecosystems within the vm1 on Vancouver Island which have been identified in various reports (Clayoquot Sound Scientific Panel 1995; SCHIRP 1994) but which are not clearly defined in the guidebook used for identifying ecosystems in the field (Green and Klinka, 1994). The normal mesic ecosystem, HwBa-Blueberry, occurs in similar environments to a nutrient poor salal phase that is dominated by western redcedar, western hemlock, and tall salal. However, the environmental parameters used to differentiate ecosystems such as terrain type, gradient, slope position, and moisture availability do not appear to differentiate between these two phases. It is thought that stagnant conditions lead to the nutrient poor salal phase while perhaps windthrow events will tend to lead to richer conditions (SHIRP, 1994). Plots that have been identified in the field as being salal phase are indicated in the plot databases. To map the two phases, differentiation would have to be made between mesic sites dominated by western redcedar and western hemlock (salal phase) and those dominated by amabilis fir and western hemlock.

A further problem in using the guidebook for the West Coast is the classification of floodplain ecosystems. The low benches are identified as Act-willow, but neither black cottonwood nor



shrub willows have been found on active floodplains within Clayoquot Sound. Species that define these frequently flooded floodplains are red alder and salmonberry.

According to the field guide for this area (Green and Klinka, 1994), the CwSs-Goldthread ecosystem (YG) is rare in the vm1. However, in the Clayoquot Sound area, this ecosystem is found from sea level up to the higher elevations of vm2 on poorly drained, gentle slopes, and is, therefore, quite frequent within the vm1.

The labeling system designated by RIC for the two CWH subzones present in the study area creates confusion in that the mesic ecosystem for the CWHvh1 is labeled as HS and a similar label is allotted to the submesic ecosystem of the CWHvm. The dry, rich ecosystem 04 in the vm is labeled the same as the poor submesic ecosystem 03 in the vh1 (RS). The floodplain unit 09 in the vm1 is labeled the same as an outer coast ecosystem 14 in the vh1 (SS). Hence, on the same mapsheet, the same symbols appear in two adjacent subzones, but they are, in fact, different ecosystems.

## 4.0 RARE VASCULAR PLANTS AND PLANT COMMUNITIES

### 4.1 Rare Vascular Plants

A comparison of those plants listed in the rare vascular plant tracking list for the Port Alberni portion of the Southern Vancouver Island Forest District was made against all plants identified from detailed plots in Year One and Two. The tracking list is in Appendix III. One blue listed species, *Jaumea carnosa* or fleshy jaumea, was identified in plot 9623506 on Hesquiatic Peninsula near Estevan Point. This species has a global rating of G3G4<sup>1</sup> and a provincial rating of S2S3.

Two other listed species may have been found, but complete verification was not possible. *Epilobium ciliatum* was identified in plot 9622144 in the Tranquil Creek Watershed. The subspecies *watsonii*, or purple-leaved willowherb, is blue listed. It has a global rating of G5T? and a provincial rating of S2S3. The only *Cardamine* species found during fieldwork occurred in plot 9622134 in Gunner Inlet. The species *Cardamine parviflora* or small-flowered bitter-cress with a global rating of G5 and a provincial rating of S1? is listed.

For Year 3 data, the comparison was made using all identified plants with a percent cover value assigned from detailed, ground and visual plots. *Hedysarum occidentale*, a blue listed species, was identified in plots 9810801 and 9801910 in the Kennedy River study area. It has a global rating of G5 and a provincial rating of S2S3. Another listed species may have been found but final identification was not possible. *Anemone drummondii* was found in V3H04, also in the Kennedy River area. The variety *drummondii* is blue listed.

### 4.2 Rare Plant Communities

All listed rare plant communities for the study area are shown in Appendix III. Several plant communities, listed as rare by the Conservation Data Centre (CDC), have been mapped and are summarized below in Table 3.

**Table 3. CDC Rare Plant Communities Identified Within Study Area to Date**

Scientific Name	Common Name	Site Series	Ecosystem Label	Provincial Rank	Provincial List
<i>Abies amabilis/Thuja plicata-Rubus spectabilis</i> , very wet maritime	Amabilis fir/Western redcedar-salmonberry, very wet maritime	CWHvm1 and 2:07	AS	S3	Blue
<i>Picea sitchensis-Rubus spectabilis</i> , very wet maritime	Sitka spruce-salmonberry, very wet maritime	CWHvm1:09	SS	S2	Red
<i>Thuja plicata/Tsuga heterophylla-Polystichum munitum</i>	Western redcedar/Western hemlock-sword fern	CWHvm1 and 2:04	RS	S3?	Blue
<i>Tsuga heterophylla/Pinus contorta-Cladina rangiferina</i>	Western hemlock/Lodgepole pine-Cladina	CWHvm1 and 2:02	LC	S2S3	Blue
<i>Tsuga heterophylla/Thuja plicata-Gaultheria shallon</i> , very wet maritime	Western hemlock/Western redcedar-salal, very wet maritime	CWHvm1 and 2:03	HS	S2S3	Blue

<sup>1</sup> G = global rank; S = provincial rank. Rank number: 1 = critically imperiled because of extreme rarity; 2 = imperiled because of rarity or because of some factor(s) making it vulnerable to extirpation or extinction; 3 = rare or uncommon (greater than 100 occurrences); 4 = frequent to common; 5 = common to very common; ? = indicates that limited information is available or the number of extant occurrences is estimated.

The ecosystems listed above as being rare by CDC are limited to forested ecosystems that have been previously identified. Several of these ecosystems occur relatively frequently in the Clayoquot Sound area. The ecosystem units HS, LC, and AS can be locally common in some areas; however, several shrubby and herbaceous ecosystems that have been identified during the past five years of fieldwork in the study area occur less frequently. In many cases these ecosystems are limited to a few polygons in the approximately 130 000 hectares that have been mapped so far. The following ecosystems should therefore be considered as rare in the Clayoquot Sound area.

**Table 4: Ecosystems considered rare in the Clayoquot Sound Area**

BEC Unit	Ecosystem Label	Ecosystem Name
CWHvh1	BS	Bulrush-Sitka burnet marsh
CWHvh1	CM	Rocky Mountain cow-lily-Marsh cinquefoil marsh
CWHvh1	PD	Pacific crabapple-Red-osier dogwood
CWHvh1	SB	Sedge-Buckbean marsh
CWHvh1	SM	Sweetgale-Sphagnum
CWHvm1/2	IF	Indian hellebore-Fern
CWHvm1/2	PD	Pacific crabapple-Red-osier dogwood
CWHvm1/2	SC	Sphagnum-Cotton-grass
CWHvm1/2	SG	Sphagnum – Deer cabbage
CWHvm1/2	WS	Willow-Salmonberry swamp
MHmm1/mmp 1	IF	Indian hellebore-Fern
MHmm1/mmp 1	LD	Arctic lupine-Subalpine daisy
MHmm1/mmp 1	SC	Sphagnum – Cotton-grass
MHmm1/mmp 1	VS	Sitka valerian-Sedge meadow

## 5.0

## 5.0 ECOSYSTEM DESCRIPTIONS

The following section provides more detailed descriptions of each ecosystem. Tables 5 to 12 list the ecosystems by biogeoclimatic zone, subzone, and variant. Structural stages and site modifiers mapped, as well as site attributes typical for the ecosystem, are listed. Details of site modifiers, structural stages, and soil classifications are shown in Appendices IV, V, and VI. Following the tables, the vegetation of each ecosystem is then described in detail.

Ecosystem descriptions appear in the following order:

### **Coastal Western Hemlock Zone, Very Wet Hypermaritime Subzone, Southern Variant (CWHvh1)**

Table 5: Forested Site Series

Table 6: Deciduous, Shrub, and Herb Dominated Ecosystem

### **Coastal Western Hemlock Zone, Very Wet Hypermaritime Subzone, Submontane (CWHvm1) and Montane (CWHvm2) Variants**

Table 7: Forested Site Series

Table 8: Deciduous, Shrub, and Herb Dominated Ecosystems

### **Coastal Western Hemlock Zone (CWH)**

Table 9: Sparsely Vegetated, Non-Vegetated, and Anthropogenic Units

### **Mountain Hemlock Zone, Moist Maritime Subzone, Windward Variant (MHmm1) and Parkland Subzone (MHmmp1)**

Table 10: Forested Site Series

Table 11: Shrub and Herb Dominated Ecosystems

Table 12: Sparsely Vegetated, Non-Vegetated, and Anthropogenic Units

**Table 5. Clayoquot Sound: Coastal Western Hemlock Zone, Very Wet Hypermaritime Subzone, Southern Variant (CWHvh1) Forested Site Series**

Ecosystem Unit	BEC Site Series	Site Modifiers Used	Structural Stages Present	Slope Position/Gradient	Terrain	Examples of Soil Type	Moisture/Nutrient Status
AL	10 Dr - Lily-of-the-valley		3, 4	-floodplain -flat	Active fluvial plain	R.	6-7, D-E
HS	01 CwHw - Salal	c, h, k, n, q s, t, v, w, z	3, 4, 5, 6, 7	- lower to mid slopes - moderate to gentle gradient	Morainal and marine blankets. Also fluvioglacial deposits	HFP., O. DYB., SM HFP.	4 -5, A-C
LR	02 PIYc - <i>Racomitrium</i>	h, k, v, w, z	3a,3b,5, 6, 7	- crest - moderate to gentle gradient	Thin organic or mineral veneers over bedrock	R, O. DYB. Non-soil	0, A-C
LS	12 PIYc - <i>Sphagnum</i>		3b, 5, 7	- level to depressional slope - flat to gentle gradient	Organic veneers and blankets	M, FI. M.	6-7, A-B
RC	13 CwSs - Skunk cabbage	n, t	3, 4, 5, 7	- lower to level slope - flat	Organic veneers	FI. M.	6-7, C-E
RF	05 CwSs - Sword fern	j, s, w	3, 6, 7	- lower slopes - steep gradient	Organic or colluvial veneers over bedrock	FO., O. SB.	2-3, D-E
RS	03 CwHw - Salal	h, k, q,v, w, z	3, 4, 5, 6, 7	- crest to mid slope - gentle to steep gradient	Colluvial, morainal or organic veneers over bedrock Shallow soils	FO.	1-2, A-C
SD	07 CwSs - Devil's club	c, g, h, k, n, q, s, t, v, w	3, 4, 5, 6, 7	- lower to level slope - gentle to moderate gradient	Morainal blankets and organic veneers over bedrock	HU. FO., GL. FHP.	5-6, D-E
SF	06 CwSs - Foamflower	h, j, k, n, s, v, w	3, 4, 5, 6, 7	- mid to lower slope - gentle to steep gradients	Fluvial and fluvioglacial	GL. DYB.	3-4, D-E
SK	15 Ss - <i>Kindbergia</i>	k, s, v, w	3, 4, 5, 6, 7	- level - flat to gentle gradient	Marine blankets	GL.HR., GLSM. FHP.	3-5, B-C
SL	08 Ss - Lily-of- the-valley		3, 4, 6, 7	- floodplain - flat	Active fluvial plain	O. HR., CU. HR., O. HFP.	5-6, D-E
SS	14 Ss - Salal	h, s, v	4, 6, 7	- level - flat	Organic veneers over bedrock	SM. HFP., GL. BR.	1-2, A-C
SW	17 Ss - Swordfern	k, s, v, w	5, 6, 7	- lower slope - gentle to moderate gradient	Marine blanket		3-5, C-E
YG	11 CwYc - Goldthread	h	3,3b, 6, 7	- lower slope, level or depressional - flat to very gentle gradient	Organic veneers over marine, morainal and fluvioglacial deposits	O.G., GL. HFP. GL.FHP	5-6, A-B

**Table 6. Clayoquot Sound: Coastal Western Hemlock Zone, Very Wet Hypermaritime Subzone, Southern Variant (CWHvh1)Deciduous, Shrub, and Herb Dominated Ecosystem Units**

Ecosystem Unit	Site Modifiers Used	Structural Stages Present	Slope Position/Gradient	Terrain	Examples of Soil Type	Moisture/ Nutrient Status
AW Red alder – Fern	k, n, w, z	3, 4, 5	- mid to lower - moderate gradient	Colluvial blankets		3-4, C-D
BS Bulrush – Sitka burnet		2b	- depressional - flat	Organic blankets adjacent to lakes		6-7, D-E
CM Rocky Mountain low lily – Marsh cinquefoil		2c	- depressional - flat	Organic blankets or fine fluvial deposits adjacent to lakes	O.G.	7, D-E
DS Dunegrass – Silverweed	n	2b	- level - flat	Sandy marine deposits	O. HR. O.R.	1-2, C-D
GS Tufted hairgrass – Silverweed	n	2b	- level - flat	Silty marine deposits	O. HR., HU. M.	6-7, C-D
PD Pacific crabapple – Red osier dogwood		3b	-level/depressional -flat	Marine deposits	CU. R.	6-7, C-D
SB Sedge – Buckbean		2b	- level/depressional - flat	Organic veneer		7, D-E
SM Sweet gale – <i>Sphagnum</i>		2b, 3a	- lower to level - flat	Organic veneer		7, A-B

**Table 7. Clayoquot Sound: Coastal Western Hemlock Zone, Very Wet Maritime Subzone, Submontane and Montane Variants (CWH vm1 and vm2) Forested Site Series**

Ecosystem Unit	BEC Site Series	Site Modifiers Used	Structural Stages Present	Slope Position/Gradient	Terrain	Examples of Soil Type	Moisture/Nutrient Status
AB	01 HwBa - Blueberry	g, h, k, n, q, r, s, t, v, w, z	3, 4, 5, 6, 7	- mostly mid slope but all possible - gentle to very steep gradient	Colluvial and morainal veneers and blankets. Organic veneer over bedrock. Also fluvial glacial and fluvial fans.	O. DYB., FR. HFP., GL. DYB., LI.FO. O. FHP., GL.FHP, SM.HFP, E.DYB	3-4, A-C (Salal phase A-B, Normal phase C)
AF	05 BaCw - Foamflower	g, h, j, k, n, s, t, w	3, 4, 5, 6, 7	- mostly mid slope to lower - moderate to steep gradient	Fluvial fans, colluvial fans and blankets.	R., E. DYB., O.R., O. HFP., O.DYB. O.FHP.	3-4, D-E
AS	07 BaCw - Salmonberry	g, k, n, q, s, t, v, w, z	3, 4, 5, 6, 7	- lower to mid slope - gentle to very steep gradient	Morainal, colluvial, and fluvial deposits.	O. HFP., O.FHP., GL.DYB.	5-6, D-E
CW	11 (vm1) Act - Willow		3, 4, 5	- floodplain - flat	Active fluvial plain.	O.R.	5-7, D-E
HD	06 HwBa - Deer fern	g, h, j, k, n, q, s, t, v, w, z,	3, 4, 5, 6, 7	- mid to lower slope - moderate to steep gradient	Morainal blankets and veneers and organic veneers over bedrock.	HU. FO., HI.FO., O.HR., O.R. SM. HFP., O. HFP., GL. HFP., O. DYB., GL. SB.	5-6, A-C
HS	03 HwCw - Salal	h, k, n, q, r, v, w, z	3, 4, 5, 6, 7	- crest to lower slopes - gentle to steep gradient	Colluvial, morainal, and organic veneers over bedrock.	FO., O. DYB., O. HR., O.HFP.	1-2, A-C
LC	02 HwPI - <i>Cladina</i>	h, k, q, v, w, z	3a, 3b, 5, 6, 7	- crest to mid slope - gentle to moderate gradient	Organic veneers over bedrock outcroppings.	FO.	0, A-C
LS	13 (vm1) & 10 (vm2) PI - <i>Sphagnum</i>	h, v	3a, 3b, 5, 6, 7	- level slope - flat to gentle gradient	Organic veneers and blankets.	GL.DYB.	7, A-B
MM	02(MHmm1) HmBa- Mountain heather	h, k, v	3a, 3b, 7	- crest and upper slopes - gentle to moderate gradient	Thin morainal and organic veneers over bedrock		0-1, A-C
MT	05 (MHmm1) BaHm – Twisted stalk. Includes 06 and 07 in Mhmm1 also	k, s	7	- mid to lower slopes - moderate gradient	Colluvial and morainal veneers		5-6, C-E
RC	14 (vm1) & 11 (vm2) CwSs - Skunk cabbage	k, n	3, 4, 6, 7	- lower to level slope - flat to moderate gradient	Organic veneers or fluvial/ morainal.	H.	7, C-E
RS	04 CwHw - Swordfern	k, s, t, v, w	3, 5, 6, 7	- upper slopes - steep to moderate gradient	Colluvial veneers, base-rich parent materials.	O. DYB. O.FHP.	1-2, D-E
SS	09 (vm1) Ss – Salmonberry		3, 4, 5, 6, 7	- floodplain - level gradient	Fluvial plain.	O. HR., O.R.	3-6, D-E
YG	12 (vm1) & 09 (vm2) CwYc - Goldthread	h, k, n, s, v, w	3, 3b, 5, 6, 7	- mid slope to toe - level to gentle gradient	Organic veneer or morainal.	FE.G., TY.H., GL.FHP, GL.DYB	6, A-C

**Table 8. Clayoquot Sound: Coastal Western Hemlock Zone, Very Wet Maritime Subzone, Submontane and Montane Variants (CWH vm1 and vm2) Deciduous, Shrub, and Herb Dominated Ecosystem Units**

Ecosystem Unit	Site Modifiers Used	Structural Stages Present	Slope Position/Gradient	Terrain	Examples of Soil Type	Moisture/ Nutrient Status
AW Red alder-Fern maybe in vh1 too	g, k, n, s, w, z	3, 4, 5	-mid to lower -moderate gradient	Colluvial blankets		3-4, C-D
DS Dunegrass – Silverweed		2b	- level - flat	Sandy marine deposits	O. H.R.	6-7, D-E
GS Tufted hairgrass - Silverweed	n	2b	-level -flat	Silty marine deposits	O.R. , TY.H.	6-7, C
IF Indian hellebore- Fern	n	2a	-lower gentle to moderate gradient	Colluvial blanket- avalanche track	O.SB.	5D
PD Pacific crabapple-Red osier-dogwood		3b	-level, depressional --flat	Silty material.Fluctuating water table	O.G.	6D
SA Salmonberry- Sitka alder	g, j, k, n, q,s, v, w, z	3	- upper slopes - moderate gradient	Colluvial blanket- avalanche track	R.	5-6, D-E
SC <i>Sphagnum</i> - Cotton-grass	n,t	2a, 2b	- mid to lower slopes - moderate to flat gradient	Organic blanket	TY.M.	7, C-E
SG <i>Sphagnum</i> -Deer cabbage		2b	- lower to level slope - flat to gentle gradient	Organic blanket	M	7, A-B
SM Sweet gale – <i>Sphagnum</i> moss		2b, 3a	- lower to level - flat	Organic veneer		7, A-B
WS Willow-Salmonberry		3	-level -flat	Active floodplain or organic blanket	M	6-7, C-E



**Table 9. Clayoquot Sound – CWH Sparsely Vegetated, Non-Vegetated, and Anthropogenic Units**

Ecosystem Unit	Site Modifiers Used	Structural Stages Present
BE Beach		1
CB Cobble Beach		-
CG Cultivated Garden		3
CL Cliff	q	1
ES Exposed Soil	g, k, n, w, z	1
GB Gravel Bar	a, k, n, w	1
GP Gravel Pit		1
LA Lake		-
MU Mudflat Sediment	n	1
OW Shallow Open Water		-
PO Pond		-
RI River		-
RO Rock Outcrop	g, h, k, q, r, w, z	1
RP Road Surface		-
RR Rural		-
SO Salt Water		-
TA Talus	k, n, w	1
UR Urban		-
WP Wave-cut Platform		1

**Table 10. Clayoquot Sound: Mountain Hemlock Zone, Moist Maritime Subzone, Windward Variant (MHmm1) and Parkland Variant (MHmmp1) Forested Site Series**

Ecosystem Unit	BEC Site Series	Site Modifiers Used	Structural Stages Present	Slope Position/Gradient	Terrain	Examples of Soil Type	Moisture/ Nutrient Status
MB	01 HmBa-Blueberry ( Includes 04 HmBa-Bramble)	g, h, j, k, n, q, r, s, v, w, z	3a, 3b, 3, 4, 5, 6, 7	- crest to mid slopes - moderate to steep gradient	Colluvial , organic and morainal veneers over bedrock	HU. FO., O. HR.	2-5, A-C
MM*	02 HmBa-Mountain heather	g, h, k, q, v, w, z	3a, 3b, 3, 4, 5, 6, 7	- crest and upper slopes - gentle to moderate gradient	Thin morainal and organic veneers over bedrock	HU. FO., O. HFP	0-1, A-C
MO	03 HmBa-Oak fern	g, j, k, n, s, v, w, z	3, 4, 5, 6, 7	- upper to lower slope position - moderate to steep gradient	Organic veneer over bedrock	FO., HE. FO.	2-4, D-E
MT*	05 (includes 06 HmYc - Deer cabbage, 07) BaHm - Twisted stalk	a, h, j, k, n, q, s, v, w, z	3a, 3b, 4, 5, 6, 7	-mid to lower slopes -moderate gradient	Colluvial and morainal veneers	E. DYB.	5-6, C-E

\* Mapped in the CWHvm1 and 2 in Kennedy River study area.

**Table 11. Clayoquot Sound: Mountain Hemlock Zone, Moist Maritime Subzone, Windward Variant (MHmm1) and Parkland Subzone (MHmmp1) Shrub and Herb Dominated Ecosystem Units**

Ecosystem Unit	Site Modifiers Used	Structural Stage Present	Slope Position/Gradient	Terrain	Examples of Soil Type	Moisture/Nutrient Status
IF Indian hellebore-Fern	w	2a	-lower -moderate to gentle gradient	Colluvial blanket-avalanche track		5D
LD Arctice lupine-Subalpine daisy	k,w	2a	-upper slope -steep gradient	Colluvial blankets	SM. HFP.	2-5,C-D
MH Mountain-heather heath	h, k, q, w	2d,	-crest -gentle to moderate gradient	Morainal veneers		0-1, A-C
MK Mountain hemlock krummholz	h, k, q, r, v, w, z	3a	- crest and upper slopes - gentle gradient	Rock outcrops with shallow soils	O.DYB.	0-1, A-C
SA Salmonberry-Sitka alder	g, h, k, n, q, v, w, z	3	- upper slope - moderate to steep gradient	Colluvial blankets-avalanche tracks		3-5, D-E
SC <i>Sphagnum</i> - Cotton-grass	n	2b	-mid to lower slopes -gentle to flat	Organic blankets		7, C-E
VS Sitka valerian - Sedge	a, n	2a	-toe -gentle gradient	Fluvial fans	O.DYB.	5-6D

**Table 12. Clayoquot Sound: Mountain Hemlock Zone, Moist Maritime Subzone, Windward Variant (MHmm1) and Parkland Subzone (MHmmp1) Sparsely Vegetated, Non-Vegetated, and Anthropogenic Units**

Ecosystem Unit	Site Modifiers Used	Structural Stage Present
CL Cliff	q, z	1
GB Gravel Bar	k	1
ES Exposed Soil	g, k, s, w, z	1
LA Lake		-
OW Open Shallow Water		-
PS Permanent Snow	k, w, z	-
RO Rock Outcrop	g, h, k, n, q, r, w, z	1
TA Talus	k, n, q, w, z	1

### 5.1 Vegetation Descriptions

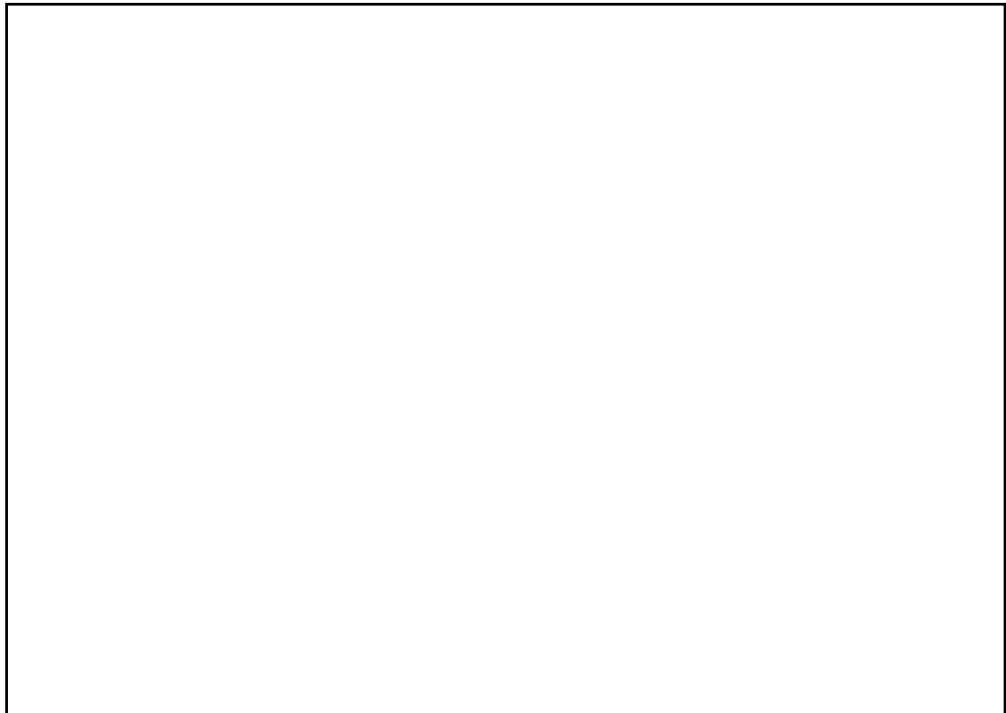
The following descriptions have been developed from plot information collected during previous fieldwork carried out in 1994 and 1995, detailed plots from Year One, detailed plots and ground inspections completed in Year Two, and all data collected in Year 3. The tables that accompany the ecosystem descriptions describe each structural stage that may occur. Structural stage 3 is used for ecosystems that have been disturbed by logging, avalanches, or fire and will ultimately return to a forested state. Structural stages 3a and 3b are used for permanent shrub ecosystems caused by excessive moisture or harsh climatic conditions. Where “no information” is used in a table, the structural stage has been mapped, but no field data has been collected to date. The fieldwork in Year Three was designed specifically to fill in all structural stage information of forested site series, where possible, and to have complete descriptions for all other ecosystems.

Plants are identified in the following descriptions by common name. The corresponding Latin name is listed in Appendix I. All vascular and non-vascular species identified to date are listed separately in Latin in Appendix II. Species that have only been collected in Year Three are shown in bold.

**5.2 Coastal Western Hemlock Zone, Very Wet Hypermaritime Subzone, Southern Variant (CWHvh1)****5.2.1. Forested Site Series****5.2.1.1 Red alder - Lily-of-the-valley****Plots:** 3 visuals**Site Series:** 10 Dr – Lily-of-the-valley**Ecosystem:** AL**Structural Stages:** Shrub and pole sapling stages. Mature and old forests are not possible in this ecosystem.**General Distribution:** These ecosystems are rare as they are limited to low benches on active floodplains where flooding is prolonged, and occur only on the southern portion of the Catface study area adjacent to Cypre River where flooding is frequent.**Description:** These floodplain forests are alder or salmonberry dominated with very few herbs. The moss layer is very poorly developed because of the frequent flooding.**Typical Situation:** Low bench flood plain; coarse textured soils.**Assumed Modifiers:** a, c

**5.2.1.2 Western hemlock - Salal****Site Series:** 01 CwHw - Salal**Ecosystem:** HS**Structural Stages:** Old forests are common. Shrubby, pole sapling, or young stands occur where there is a history of logging, slope failure, or past fires.**General Distribution:** Mesic ecosystems occur on moderate to gentle slopes of all aspects in low elevation areas. They tend to be most common on mid to lower slopes, but they can occur in all slope positions.**Typical Situation:** Gentle slopes; middle slope position; deep, medium textured, mineral soils.**Assumed Modifiers:** d, j, m**Photo 1**Mesic forests  
HS6 on  
Flores Island

Structural Stage	3	4	5	6	7
<b>Plots</b>	M40, T52, G3J80, 29 visuals	G3J83, G3J85, 3 visuals	2D10, K06, M44, M51, G2K06 8 visuals	2K42 20 visuals	H06, K79, 2H143, 2H146, M18a, 2D16, 2K04, G2H226, G2H320, G2K257, G2K236, G3J65, G3J79, G3J84, 30 visuals
<b>Site Modifiers</b>	h, k, n, s, t, v, w, z	h, k, n, q, s, t, v, w, z	k, s, v, w,	h, k, n, s, v, w, z	c, h, k, n, q, s, t, v, w, z
<b>Dominant Vegetation</b>	Western redcedar and western hemlock are the major regenerating tree species. Red alder, Douglas-fir and yellow-cedar are scattered throughout. Salal is commonly at least 25% cover, and salmonberry can be as high. Other shrubs found in mesic sites, such as oval-leaved blueberry and red huckleberry, are all scattered, each with less than 10% cover. Deer fern cover ranges from more than 65% to being scattered. Fireweed is quite common. Moss cover also varies considerably but includes step moss and Oregon beaked moss.	Following logging, regeneration is dense often with more than 50% cover of planted Douglas-fir and western hemlock with minor amounts of western redcedar. Under such dense tree cover, there is no significant herb or bryophyte layer.	Mesic sites in the vh1 are dominated by western hemlock, western redcedar, and localized occurrence of amabilis fir. Salal with 10% cover dominates the shrub layer but is not as vigorous as in older forests. Salmonberry, evergreen huckleberry, false azalea, red huckleberry, and Alaskan blueberry are sometimes present, but each have less than 10% cover. Scattered to abundant deer fern occurs in the herb layer. Herbs are very scattered or absent. Moss cover is often less than 50%. Lanky, coastal leafy, Oregon beaked, and step mosses all commonly occur.	Mesic sites in the vh1 are dominated by western hemlock, western redcedar, and localized occurrence of amabilis fir. Salal, sometimes to 3 m in height and with more than 60% cover, dominates the shrub layer. Salmonberry, evergreen huckleberry, false azalea, red huckleberry, and Alaskan blueberry are sometimes present but with each having less than 10% cover. Scattered to abundant deer fern occurs in the herb layer. Herbs are very scattered or absent. Moss cover is often less than 50% but can be a continuous carpet. Lanky, coastal leafy, Oregon beaked, and step mosses all commonly occur.	Mesic sites in the vh1 are dominated by western hemlock, western redcedar, and localized occurrence of amabilis fir. Salal, sometimes to 3 m in height and with more than 60% cover, dominates the shrub layer. Salmonberry, evergreen huckleberry, false azalea, red huckleberry, and Alaskan blueberry are sometimes present but with each having less than 10% cover. Scattered to abundant deer fern occurs in the herb layer. Herbs are very scattered or absent. Moss cover is often less than 50% but can be a continuous carpet. Lanky, coastal leafy, Oregon beaked, and step mosses all commonly occur.
<b>Associates</b>			Spiny wood fern, twinflower, and sword fern may be scattered.	Twinflower, sword fern, false-lily-of-the-valley, bracken fern, bunchberry, and foamflower may occur	Twinflower, sword fern, false-lily-of-the-valley, bracken fern, bunchberry, and foamflower may occur

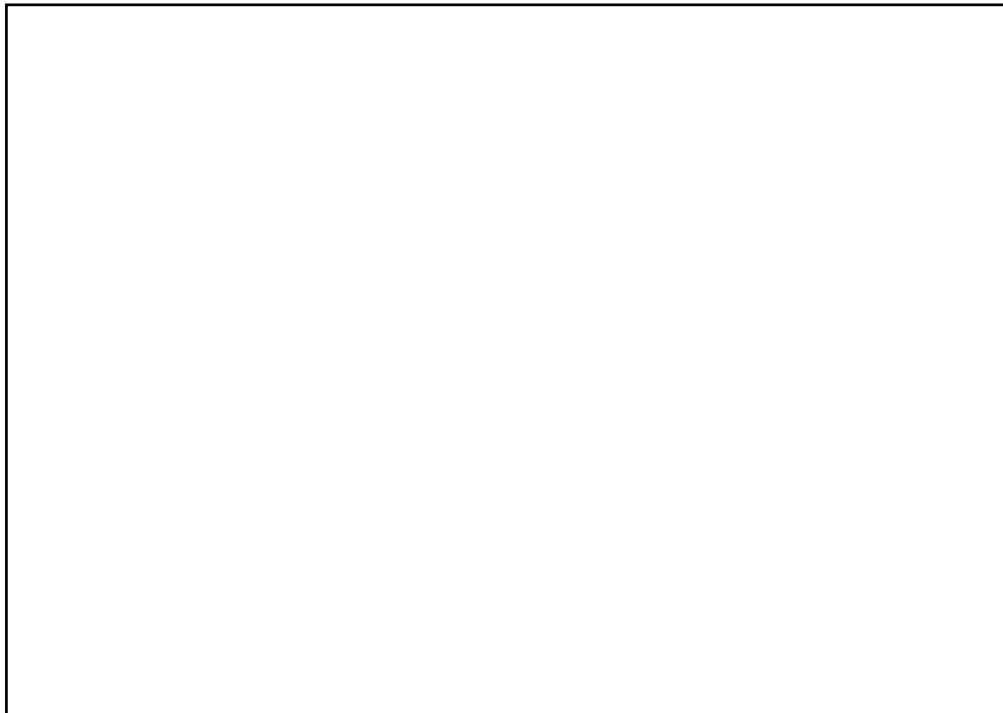
**5.2.1.3 Lodgepole pine - Racomitrium****Site Series:** 02 PIYc - Racomitrium**Ecosystem:** LR**Structural Stages:** These forests range from young to old. They are not logged commercially.**General Distribution:** These stands are found adjacent to rock outcrops in crest positions and are typically on moderate slopes. They are also quite common along the coastline where terrain is rocky and soils shallow. Overall, these ecosystems are infrequent within the study area.**Typical Situation:** Gentle slopes; crest position; shallow soils**Assumed Modifiers:** j, r, s**Photo 2**RO with LR  
in the  
Atleo area



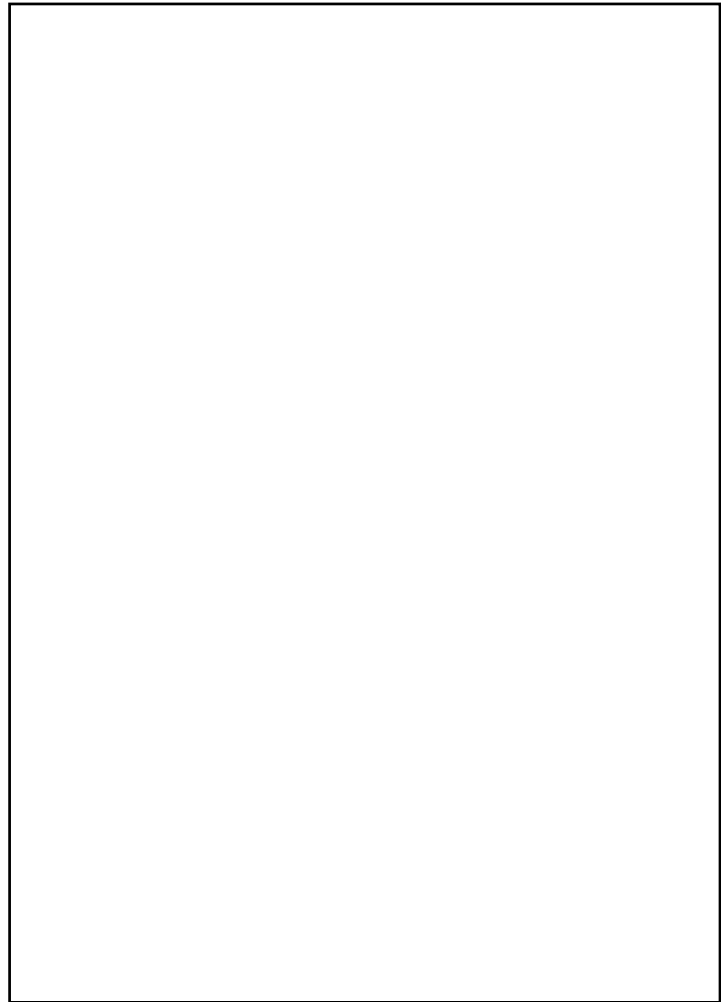
Structural Stage	3	3a 3b	4	5	6	7
Plots		K66 5 visuals		3 visuals	1 visual	M09, 2H142, M55 5 visuals
Site Modifiers		h, k, v, w		h, k, v, w	h, v, w	h, k, r, v, w, z
Dominant Vegetation	No information	Similar to 7 except trees are more stunted and open	Not mapped	Similar to 7 except trees are more stunted.	Similar to 7	These rocky sites have an open, stunted tree cover of lodgepole pine together with minor amounts of western redcedar, western hemlock, yellow-cedar, and isolated Douglas-fir and western white pine. The low shrub layer is dominated by low salal and evergreen huckleberry, with scattered red huckleberry. Herbs are often poorly developed but scattered crowberry and Davidson's penstemon may occur. <i>Cladina</i> sp., <i>Cladonia</i> sp., and broom moss carpet much of the ground but bare rock occurs too.
Associates						Other herbs may include bunchberry, twinflower, oatgrass, and Wallace's selaginella. Other bryophytes can be varied, including broom moss.

**5.2.1.4 Lodgepole pine - Sphagnum****Site Series:** 12 PIYc - Sphagnum**Ecosystem:** LS**Structural Stages:** Young and old forests occur. Some of the poorer forests are labeled as shrub-dominated 3b because the trees are so stunted.**General Distribution:** These bog woodlands occur infrequently as they are only found in very poorly drained pockets where organic blankets have been able to develop. They are often complexed with extensive bog woodland or with bogs in the wettest areas, and are most common on the Hesquiat Peninsula.**Typical Situation:** Treed bog; organic wetland.**Assumed Modifiers:** p**Photo 3**LS3b in Plot  
H5 on  
Hesquiat  
Peninsula

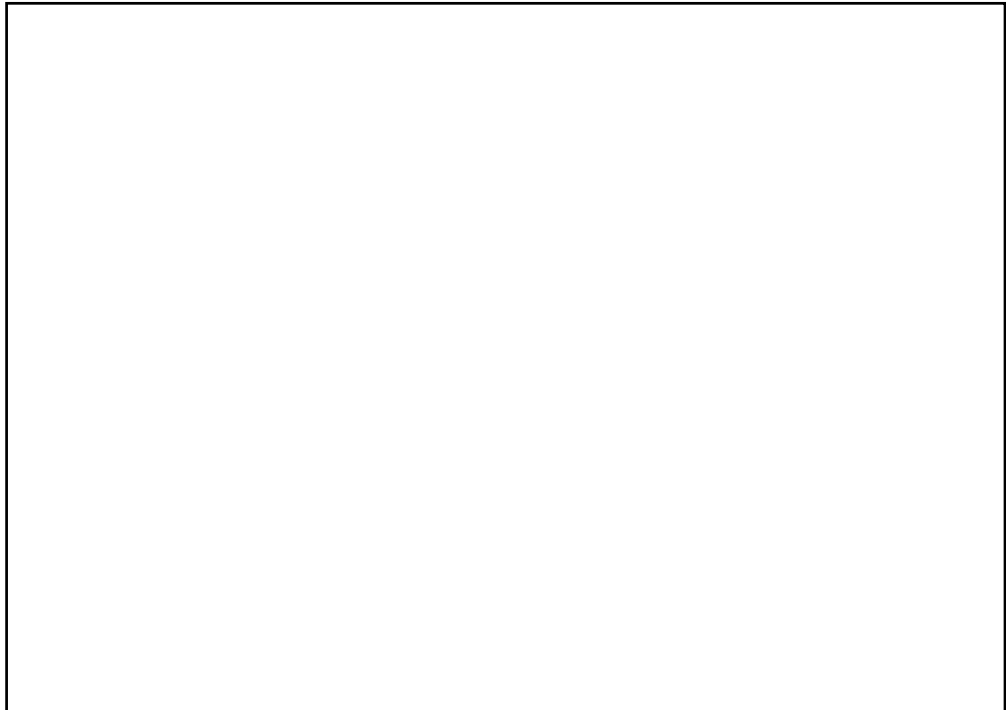
Structural Stage	3b	4	5	6	7
Plots	H05, J21, K45 1 visual		G2H144, 1 visual	1 visual	K61 1 visual
Site Modifiers					
Dominant Vegetation	Similar to 7, but trees are stunted.	Not mapped	These stands are open and dominated by lodgepole pine. They are very similar in species composition to structural stage 7 stands. Yellow-cedar, western redcedar, and western hemlock are also present. Slough sedge, goldthread, skunk cabbage, bunchberry, and deer fern may be scattered in the herb layer. <i>Shagnum</i> moss covers the ground.	Similar to 7	These poor, wet bog forests have an open stunted tree and shrub cover dominated by lodgepole pine, although yellow-cedar, western hemlock, and western redcedar may all be present. Labrador tea and bog-laurel are the most characteristic shrubs, but they may be quite scattered. Salal, evergreen huckleberry, false azalea, and red huckleberry are scattered. Deer fern and crowberry are common in the herb layer. Bog cranberry, fern-leaved goldthread, false-lily-of-the-valley, bunchberry, and skunk cabbage may be locally common or scattered. <i>Sphagnum</i> mosses carpet the ground, and lichens and hoary rock moss are present on hummocks.
Associates					

**5.2.1.5 Western redcedar - Skunk cabbage****Site Series:** 13 CwSs - Skunk cabbage**Ecosystem:** RC**Structural Stages:** Shrub, pole sapling, young and old forests have been mapped.**General Distribution:** These ecosystems develop in wet but rather stagnant soil conditions on level terrain. Small pockets occur infrequently throughout the area.**Typical Situation:** Swamp forest, poorly drained, deep mineral soil.**Assumed Modifiers:** d**Photo 4**RC6 in  
Plot V95T63  
on Hesquiat  
Peninsula

Structural Stage	3	4	5	6	7
Plots	M64 3 visuals			T10 3 visuals	G2K239 1 visual
Site Modifiers		t			n
Dominant Vegetation	The same tree and shrub species are present in logged areas as in more mature sites, but red alder and salmonberry tend to be more abundant. Similar herbs and mosses occur.	No information	No information	Similar to 7	Western redcedar and western hemlock are the main tree species. Shrubs are rather scattered and include salal, salmonberry, red huckleberry, false azalea, and Alaskan and oval-leaved blueberries. Skunk cabbage is a conspicuous component of the herb layer, but other species are also common. These include deer fern, false-lily-of-the-valley, fern-leaved goldthread, sedges, and bunchberry. Step, lanky, common green <i>Sphagnum</i> , and large leafy mosses are all common.
Associates				Similar to 7	Yellow-cedar, Sitka spruce, lodgepole pine, and red alder can also occur. Pacific crabapple is often present as a small tree. Shiny liverwort may be present.

**5.2.1.6 Western redcedar - Sword fern****Site Series:** 05 CwSs - Sword fern**Ecosystem:** RF**Structural Stages:** Shrub dominated sites occur where logging has taken place. Mature and old forests are present adjacent to these logged areas.**General Distribution:** These forests are rare in the study area and usually occur on moderate to steep colluvial slopes with a rich nutrient status. They are mapped only in a few areas.**Typical Situation:** Significant slopes (greater than 35%) of deep, medium textured soils; upper and middle slope position; richer nutrient regime.**Assumed Modifiers:** d, m**Photo 5**RF7 in Plot M21 in the  
Bedwell area

Structural Stage	3	4	5	6	7
Plots				M23a,G2K10, G2K02 1 visual	M21 1 visual
Site Modifiers		s, w	s, w	s, w	j, s, w
Dominant Vegetation	No information	No information	No information	Similar to 7	Western hemlock dominates this unit. Western redcedar and Sitka spruce are also common, and there is some scattered Douglas-fir. The shrub layer is rather sparse and includes evergreen huckleberry, red huckleberry, salmonberry, and salal. The herb layer is a thick carpet of sword fern with a lesser amount of deer fern. This dense fern layer excludes most other herbaceous growth, but foamflower can be present. Bryophytes are rather limited with Oregon beaked moss the most common species and lesser amounts of flat moss.
Associates					

**5.2.1.7 Western redcedar - Salal****Site Series:** 03 CwYc - Salal**Ecosystem:** RS**Structural Stages:** Shrub dominated sites and young to old forests occur.**General Distribution:** These ecosystems are limited to areas of shallow soils that often occur in mosaics with hummocky or steep rock outcrops (RO) and xeric LR ecosystems. They are found on all aspects in crest or upper slope positions in all the low elevation study areas. Gradients are typically moderate to gentle.**Typical Situation:** Gentle slopes; upper slope to crest position; shallow soils.**Assumed Modifiers:** j, r, s**Photo 6**RS6  
Plot V95T143  
in Catface



<b>Structural Stage</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<b>Plots</b>	6 visuals	1 visual	G2K114 2 visuals	G2K233 3 visuals	2K35, K70, T30 G2H141, G3J72, G95M16 15 visuals
<b>Site Modifiers</b>	h, k, q, v, w	h, k, v	h, k, v, w	h, k, q, v, w, z	h, k, v, w, z
<b>Dominant Vegetation</b>	Shrubs are similar to the older stands but may be so dense that herbs are absent and the moss layer is poorly developed. Tree species will be similar to those of older forests, but they will not be as dense as in regenerating stands of moister ecosystems	Insufficient information	Western hemlock dominates the fairly open canopy with Douglas-fir and western redcedar present. The shrub layer is fairly dense, dominated by low salal. Evergreen huckleberry and red huckleberry are scattered. Herbs are sparse and include twinflower, swordfern, and deerfern. Step moss and Oregon beaked moss cover the ground.	Similar to 7	Western hemlock and western redcedar are the main tree species but Douglas-fir, western white pine and yellow-cedar occurs in some sites. The dense shrub layer is comprised of low salal and evergreen huckleberry, with scattered red huckleberry and regenerating western hemlock and redcedar. Step moss typically carpets the ground. Lanky moss and lichens also occur.
<b>Associates</b>					The herb layer is poorly developed, although bunchberry, deer fern and twinflower will often be present.

### 5.2.1.8 Sitka spruce - Devil's club

**Site Series:** 07 CwSs - Devil's club

**Ecosystem:** SD

**Structural Stages:** Mature and old stands occur, but logging has resulted in shrub, sapling, and young stands.

**General Distribution:** These moist, rich ecosystems are largely limited to lower slope positions and streamside locations where slopes are gentle to moderate. They occur in most of the low elevation areas but are not extensive.

**Typical Situation:** Gentle slopes of lower receiving sites; deep, medium textured soils; seepage.

**Assumed Modifiers:** d, j, m

Structural Stage	3	4	5	6	7
<b>Plots</b>	T51, G2D019, G2H93a, G3J70 4 visuals	3 visuals	3 visuals	5 visuals	T50, 2D20, 2K108, 2K236, G2H149 8 visuals
<b>Site Modifiers</b>	g, h, k, n, s, t, v, w	g, h, k, n, s, t, v, w	n, s, w	k, n s, t	c, g, k, n, q, s, v, w
<b>Dominant Vegetation</b>	Shrub growth is dense, dominated by salmonberry and regenerating or planted tree species. Other shrub species include red elderberry and Alaska blueberry. Deer fern is common while foamflower and spiny wood fern are sparse. Mosses are varied and include slender beaked moss.	Dense coniferous stands occur often with greater than 75% cover. Douglas-fir has been planted in some areas, but, under natural conditions, the species of the mature forests would regenerate. Salmonberry may be very dense under this closed canopy and herbs very scattered. Oregon beaked and large leafy moss are common but do not form thick carpets.	Insufficient information	Similar to 7	Western redcedar, western hemlock, and Sitka spruce are the main tree species. Salmonberry is the most dominant shrub species. Alaskan and oval-leaved blueberries may be quite common while false azalea and salal are more scattered. Sword fern and deer fern are abundant while lady fern and spiny wood fern may also be present. Three-leaved foamflower can be locally abundant. Cooley's hedge-nettle and scattered skunk cabbage indicate the moist conditions. Mosses are varied. Step moss, lanky moss, and Oregon beaked moss are dominant, but large leafy moss, common green <i>Sphagnum</i> , shiny liverwort, palm tree moss, and coastal leafy moss may be quite common.
<b>Associates</b>					Red alder is scattered.

### 5.2.1.9 Sitka spruce - Foamflower

**Site Series:** 06 CwSs - Foamflower

**Ecosystem:** SF

**Structural Stages:** Mature forests and old stands occur, but logging has resulted in shrub, sapling, and young stands.

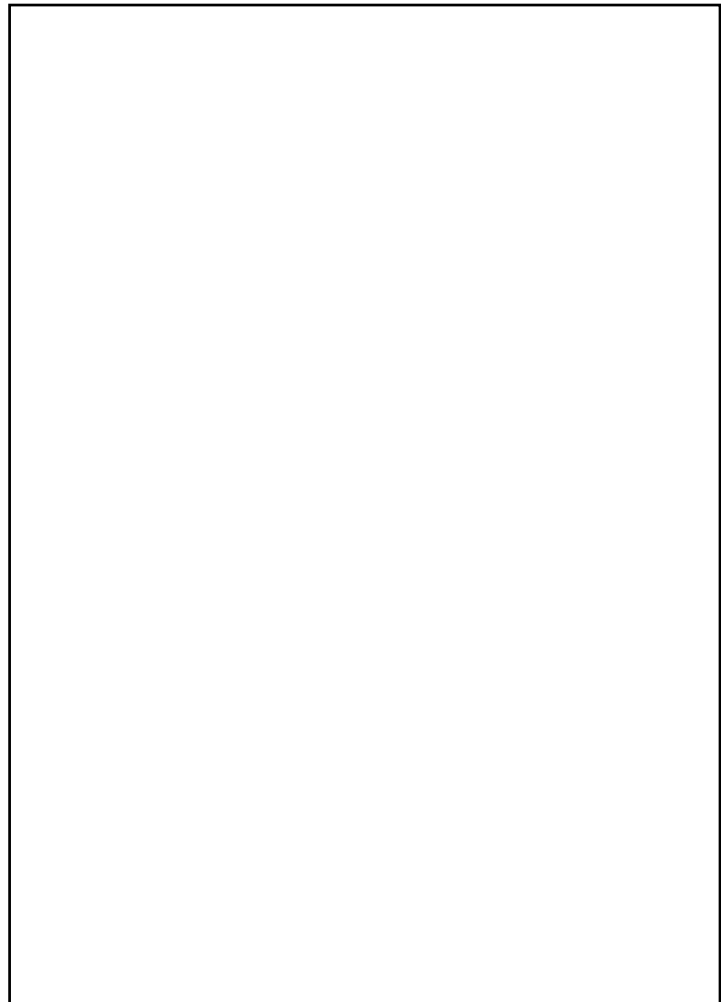
**General Distribution:** These ecosystems occur on lower, moderate to gentle slopes of creek valleys and are often in a complex with the moister ecosystems (SD). Morainal and colluvial deposits are deep. They occur throughout the study areas but are not extensive.

**Typical Situation:** Significant slope (greater than 35%) of deep, medium textured soils; middle slope position; richer nutrient regime.

**Assumed Modifiers:** d, m

**Photo 7**

SF7 in the Fortune Channel area



Structural Stage	3	4	5	6	7
<b>Plots</b>	4 visuals	5 visuals	G2K251, M43, G3J66 5 visuals	M41, K70, G2D22, G2D15, G2H232 4 visuals	7 visuals
<b>Site Modifiers</b>	j, k, n, s, w	h, j, k, n, s, w	j, k, n, s	j, n, w	j, k, n, s, w
<b>Dominant Vegetation</b>	These recently logged sites are dominated by salmonberry and regenerating conifers including western hemlock, western redcedar, and Sitka spruce. Sword fern is present in the herbaceous layer.	These logged sites are often dominated by red alder. Western redcedar and western hemlock are regenerating. Salmonberry and salal are dense in the understorey. Deer fern is quite abundant, while sword fern and three-leaved foamflower are scattered. Mosses are sparse.	Red alder is a major regenerating tree species together with western redcedar, western hemlock, and amabilis fir. In some cases, Douglas-fir has been planted and forms a major component. Tree cover is 80% to 90%, so that understorey development is limited. Shrubs are not abundant, but salal and red huckleberry are the most common, while oval-leaved blueberry, salmonberry, and false azalea are sometimes scattered. Ferns such as deer fern, sword fern, and spiny wood fern occur but are not dense. Flowering herbs are almost lacking. Mosses are limited to logs.	Similar to 7	These rich mesic sites are dominated by western redcedar, western hemlock, and Sitka spruce. Red alder also occurs in some sites. Amabilis fir is common as an understorey species. Shrubs are not abundant, but salal and red huckleberry are the most common, while oval-leaved blueberry, salmonberry, and false azalea are sometimes scattered. Deer fern is abundant, but other herb species characterize these richer sites and include three-leaved foamflower, spiny wood fern, and sword fern. Mosses are varied and include Oregon beaked moss, coastal leafy moss, step moss, and lanky moss.
<b>Associates</b>					

**5.2.1.10 Sitka spruce - Kindbergia****Site Series:** 15 Ss - Kindbergia**Ecosystem:** SK

**Structural Stages:** Most forests are old, but all structural stages are present. Some forests have been logged, but the range of structural stages is also a result of high winds along the outer coast.

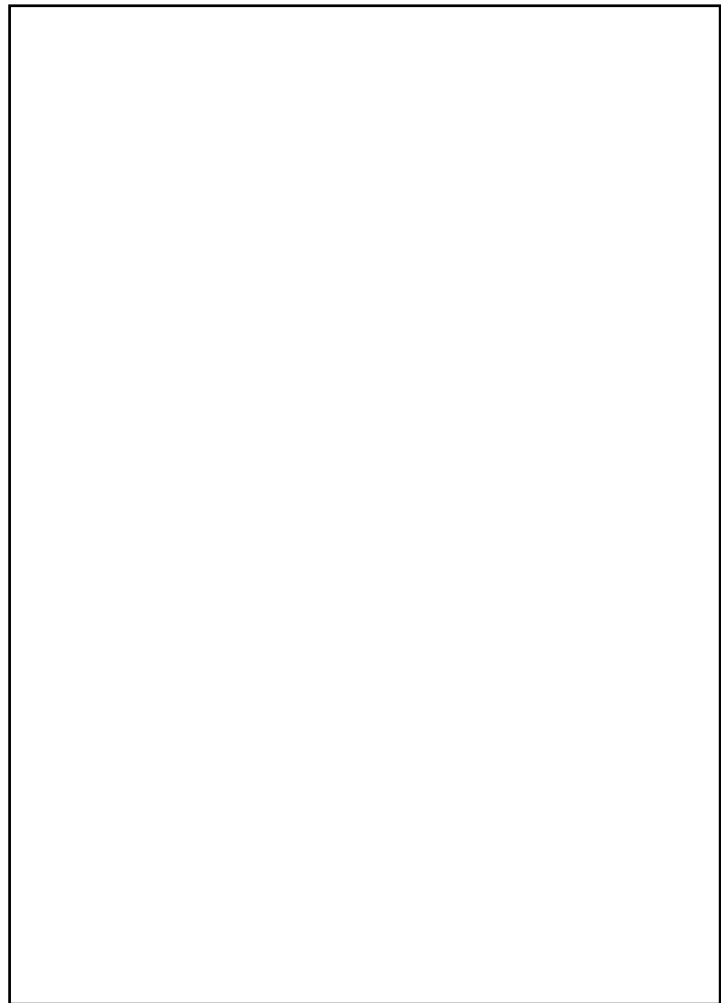
**General Distribution:** This ecosystem is limited to coastal locations on level to gently sloping, sandy beach plain deposits. It is most common along the outer coast of the Hesquiat Peninsula and Hesquiat study areas. It is also found in small patches along the southern coast of Catface.

**Typical Situation:** Deep, coarse textured soils of old beach plains, shoreline/ocean spray.

**Assumed Modifiers:** c, d

**Photo 8**

Sitka Spruce - Kindbergia  
(SK), Structural Stage 7



Structural Stage	3	4	5	6	7
Plots		3 visuals		T08,T11 1 visual	J22 1 visual
Site Modifiers	s, v, w,	k, v, w			k, s, v, w
Dominant Vegetation	No information	These pole sapling stands are located adjacent to beaches where winds are strong. Dense Sitka spruce with scattered western redcedar and western hemlock dominate. Salal is dense in the understory. Salmonberry and twinberry can be scattered. Herbs are sparse and include swordfern.	No information	Similar to 7	These forests are dominated by Sitka spruce, but western hemlock and western redcedar are also common in the tree canopy. Salal is often dense and tall, especially where strong winds keep the canopy more open. Salmonberry can be scattered in the understory. Evergreen huckleberry and false azalea are sparse. The herb layer is generally rather sparse and includes false lily-of-the-valley, sword fern, and deer fern. Oregon beaked moss dominates the moss layer.
Associates					

### 5.2.1.11 *Sitka spruce - Lily-of-the-valley*

**Site Series:** 08 Ss - Lily-of-the-valley

**Ecosystem:** SL

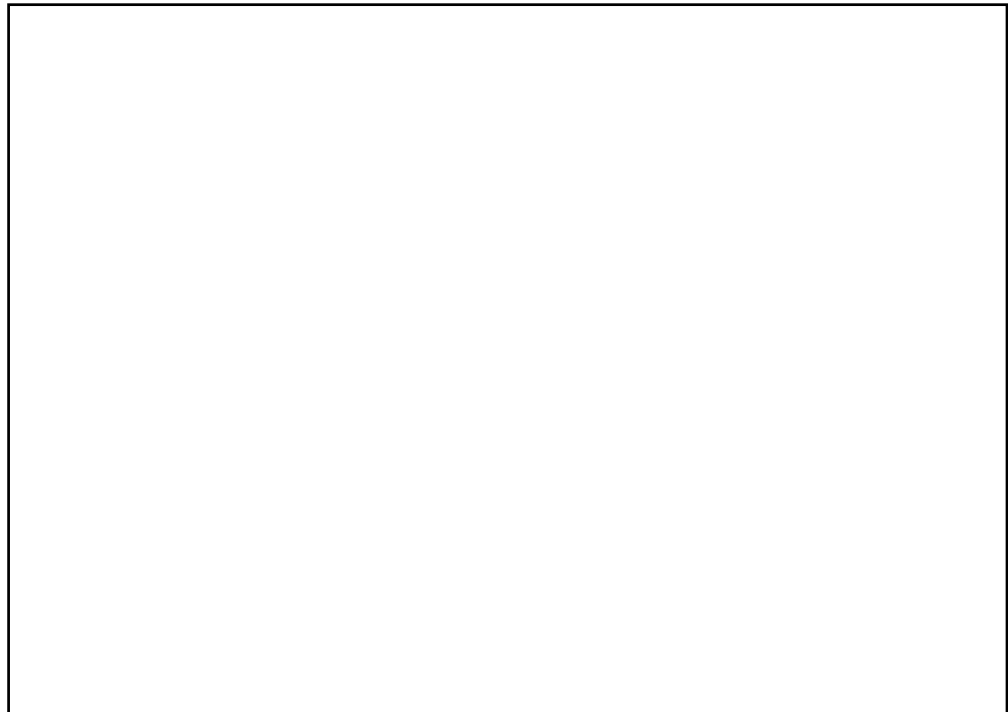
**Structural Stages:** Mature and old forests occur, but shrub and sapling stands have developed after logging.

**General Distribution:** Floodplain vegetation within the vh1 in this area is limited. It occurs on high benches within a floodplain where the water table fluctuates but the surfaces are freely drained. It is most commonly found along the Cypre River in the Catface study area and in the Hesquiat area.

**Typical Situation:** High bench – flood plain; deep, medium textured soils.

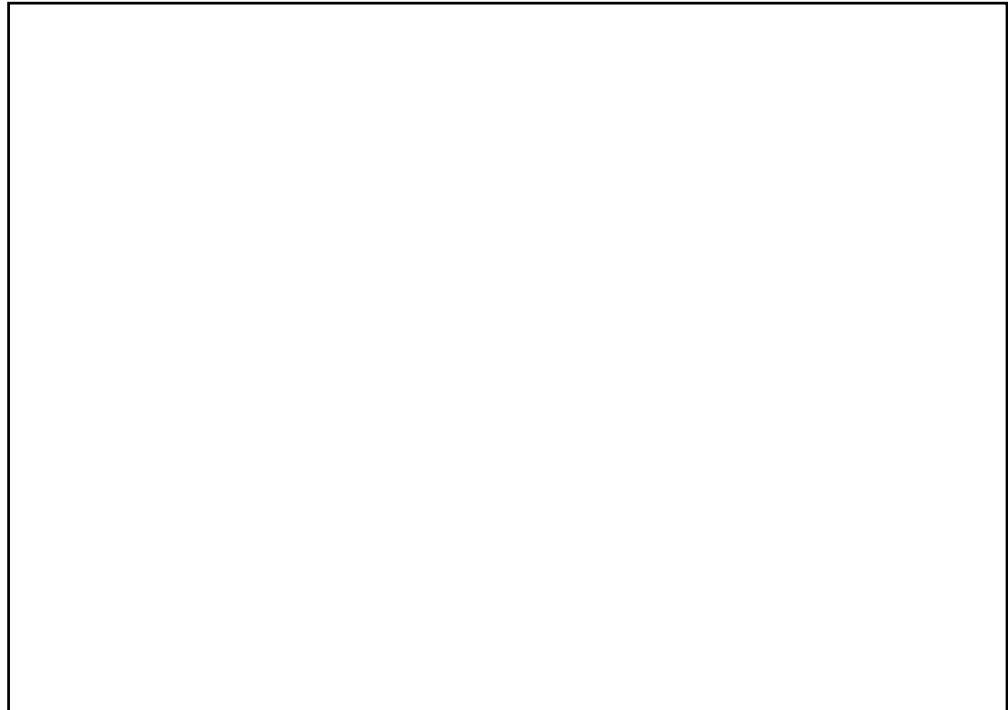
**Assumed Modifiers:** a, d, m

Structural Stage	3	4	5	6	7
Plots		K77, 2T41	M43, T49, 1 visual	K78, G2H277 1 visual	2K01 3 visuals
Site Modifiers					
Dominant Vegetation	No information	Red alder with western redcedar and Sitka spruce can form a dense tree canopy in regenerating young stands. Salmonberry is be dense, but the herb layer may be as lush as a mature floodplain. Sword fern deer fern and false-lily-of-the-valley may occur. Orewgon beaked moss, slender beaked moss, coastal leafy moss, and lanky moss are all present.	A mixed stand of red alder, Sitka spruce, and western redcedar occurs. The shrub layer is dominated by salmonberry with scattered salal, Nootka rose, Pacific crabapple, and cascara. Herbs are limited to sword fern, while slender beaked moss, coastal leafy moss, and lanky moss are all present.	Similar to 7	Sitka spruce is dominant in the tree cover of a mature floodplain ecosystem, although amabilis fir, western hemlock, and western redcedar may also be common. The tall shrub layer is primarily comprised of salmonberry, but red alder is present as well. Salal, false azalea, Alaskan blueberry, red huckleberry, cascara, devil's club, and thimbleberry may all occur in this lush ecosystem. Red-osier dogwood occurs by creeks, while Pacific crabapple is found near the shoreline. The herb layer is also diverse and lush. Sword fern, deer fern, three-leaved foamflower, false lily-of-the-valley, false bugbane, violets, fringe cup, and lady fern often occur. Mosses are abundant and include lanky, step, and coastal leafy mosses.
Associates		Sedges, lady fern, piggy-back plant, three-leaved goldthread, and foamflower thrive in these moist conditions.			

**5.2.1.12**      *Sitka spruce - Salal***Site Series:** 14 Ss - Salal**Ecosystem:** SS**Structural Stages:** Pole sapling, mature and old forests have been mapped.**General Distribution:** These are shoreline ecosystems of poor, rocky headlands. Slopes are gentle to level. Plot data are too limited to characterize this unit well.**Typical Situation:** Deep, medium textured soils of beach plains, shoreline/ocean spray.**Assumed Modifiers:** d, m**Photo 9**SS7 in  
Plot V95T142  
in the  
Catface area



Structural Stage	3	4	5	6	7
Plots			1 visual	T10, G2K12	H04
Site Modifiers		v	s, v		h, s, v
Dominant Vegetation	No information	No information	Insufficient information	Similar to 7	Sitka spruce, Amabilis fir, western hemlock, and western redcedar grow above a dense shrub layer of salal. Other shrubs are sparse but include false azalea, salmonberry, and red huckleberry. Herbs are poorly developed under the thick salal, but scattered sword fern, deer fern, and false-lily-of-the-valley occasionally occur. Mosses are quite varied with Oregon beaked moss being common.
Associates					

**5.2.1.13 Sitka spruce - Sword fern****Site Series:** 17 Ss - Sword fern**Ecosystem:** SW**Structural Stages:** They are mainly old forests, but there are some younger stands, such as in Boat Basin, where logging occurred about 60 years ago.**General Distribution:** This ecosystem is found only along the shoreline of the outer coast on old marine terraces and scarps. Slope gradients are gentle to moderate.**Typical Situation:** Marine terrace/scarp; shoreline/ocean spray; richer nutrient regime.**Assumed Modifiers:** t**Photo 10**SW7 in  
Plot VK120  
in the  
Catface area

<b>Structural Stage</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<b>Plots</b>		1 visual	1 visual	2 visuals	2K11, K12, G2K38, G2H01 6 visuals
<b>Site Modifiers</b>		k, v, w	w	k, w	k, s,v, w
<b>Dominant Vegetation</b>	Not mapped	Insufficient information	Younger forests have a similar species composition in all strata as more mature forests. Red alder, Douglas-fir, and amabilis fir are also present.	Similar to 7	These coastal forests are dominated by Sitka spruce and western hemlock. Shrubs are not abundant but include salal, red huckleberry, evergreen huckleberry, and false azalea. Sword fern and deer fern are common in an otherwise limited herb layer. Oregon beaked moss, coastal leafy moss, and flat moss all occur.
<b>Associates</b>					

**5.2.1.14 Yellow-cedar - Goldthread****Site Series:** 11 CwYc - Goldthread**Ecosystem:** YG

**Structural Stages:** These are mature and old forests but in the poorer sites tree growth is stunted and a structural stage of 3b has been assigned. One logged site is mapped (structural stage 3).

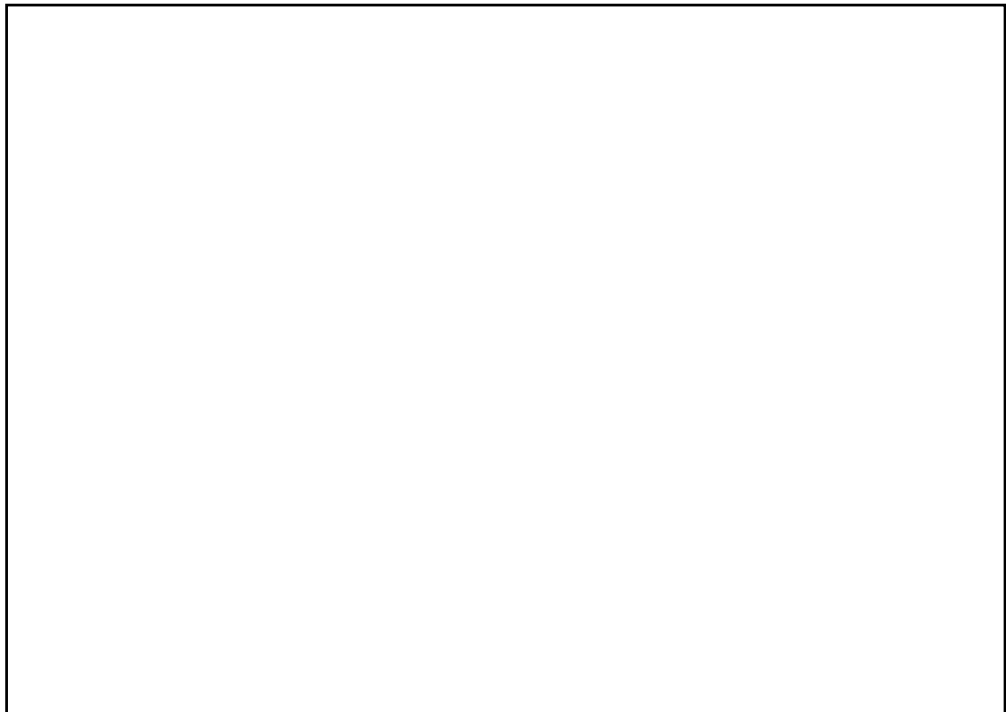
**General Distribution:** These open, bog forests grow on organic veneers in poorly drained, flat or depressional sites throughout the study areas. The wetter pockets grade into bog woodland (LS) and bog (SM) while the better drained areas grade into mesic (HS) ecosystems.

**Typical Situation:** Depression to lower slope; organic bog forest.

**Assumed Modifiers:** j, p

**Photo 11**

Plot K15  
YG3b on  
Hesquiat  
Peninsula



Structural Stage	3	3b	4	5	6	7
<b>Plots</b>	1 visual	K15 1 visual		1 visual	G2K246 1 visual	2H03, K80, M42, G2K03, G2H220 3 visuals
<b>Site Modifiers</b>					h	h
<b>Dominant Vegetation</b>	After logging, the same tree species as in mature units thrive in the shrub layer and make up 30% of the cover. Salal remains as the main shrub, and salmonberry may be quite common, while characteristic herb and moss species remain.	Similar to 7, but trees are stunted	Not mapped	Insufficient information	Similar to 7	Western hemlock, western redcedar, yellow-cedar, amabilis fir, and lodgepole pine form a rather poor tree canopy. Low salal and red huckleberry are abundant in the shrub layer. Blueberries and evergreen huckleberry are also present. Deer fern, bunchberry, false lily-of-the-valley, fern-leaved goldthread, and sedges form a distinctive herb layer. Step, lanky, Oregon-beaked, and <i>Sphagnum</i> mosses form a carpet.
<b>Associates</b>						Western white pine, red alder, and western yew can also occur. Skunk cabbage and Indian hellebore are often scattered.

**5.2.2 Deciduous, Shrub, and Herb Dominated Ecosystems****5.2.2.1 Red Alder - Fern****Plots:** 1 visual**Ecosystem:** AW, Red alder - Fern**Site Modifiers:** k, n, w, z**Structural Stages:** These units are shrub-dominated or young stands (3, 4, 5).**General Distribution:** These ecosystems grow on stabilized slope failures that are scattered throughout the study areas in mid to lower slope positions.**Typical Situations:** Lower slope; depositional zones of slope failures; deep soils.**Assumed Modifiers:** d**Description:** These deciduous stands are probably a seral stage of the rich mesic O6 ecosystem as Sitka spruce, western redcedar, and western hemlock are sometimes present in the understory.**5.2.2.2 Bulrush - Sitka burnet marsh****Plots:** 1 visual**Ecosystem:** BS Bulrush - Sitka burnet marsh**Structural Stages:** This wetland is herbaceous (2b).**General Distribution:** This wetland type has only been mapped around the edges of Kanim Lake in Hesquiat.**Typical Situation:** Deep, organic deposits adjacent to lakes.**Assumed Modifiers:** p**Description:** Hard-stemmed bulrush dominates the vegetation in this lake edge marsh. Sitka sedge, water sedge, and Sitka burnet are scattered around the edge of the wetland. Shrubs are also sparsely scattered on the edge of this wetland and include sweet gale, crabapple, willow, and hardhack.

**5.2.2.3 Rocky Mountain cow-lily – Marsh cinquefoil marsh****Plots:** 3H113, 1 visual**Ecosystem:** CM, Rocky Mountain cow-lily – Marsh cinquefoil marsh**Structural Stages:** This herbaceous ecosystem is dominated by aquatic plants (2c).

**General Distribution:** These small marshes are infrequent within Clayoquot Sound. Many of them are too small to map and are present as a small fringe around ponds and open water. One area is mapped on a small lake in the Muriel Ridge study area and although small ponds exist in the Kennedy River watershed in the vm1, they are too small to be included in polygon labels. This ecosystem has also been mapped in the vh1 in Hesquiat study area.

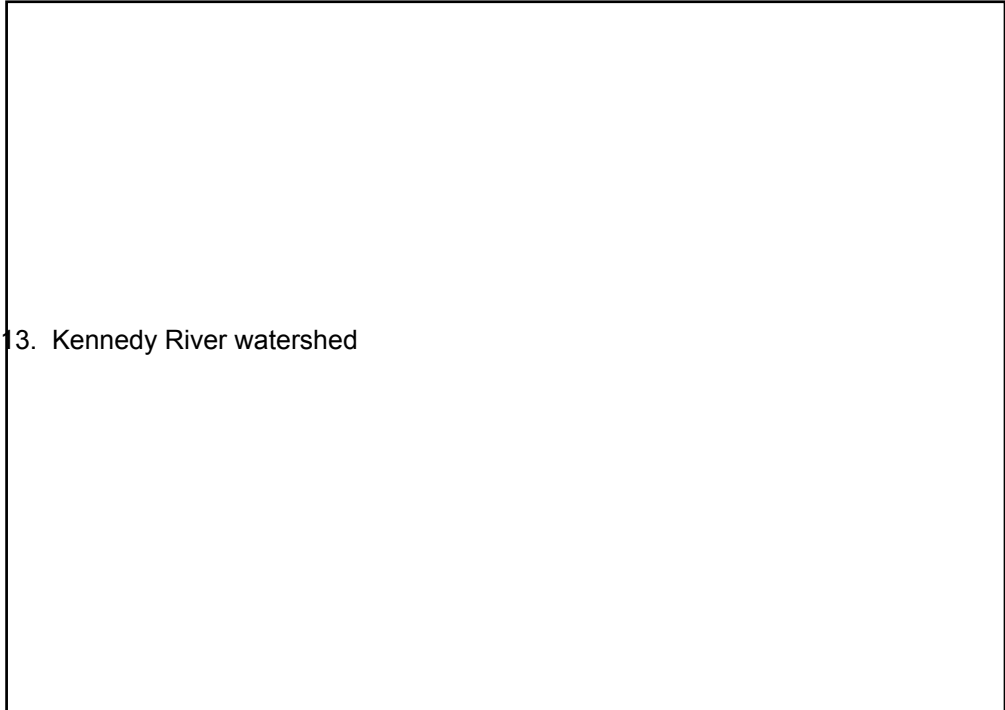
**Typical Situation:** Deep, organic deposits adjacent to lakes, ponds and shallow water

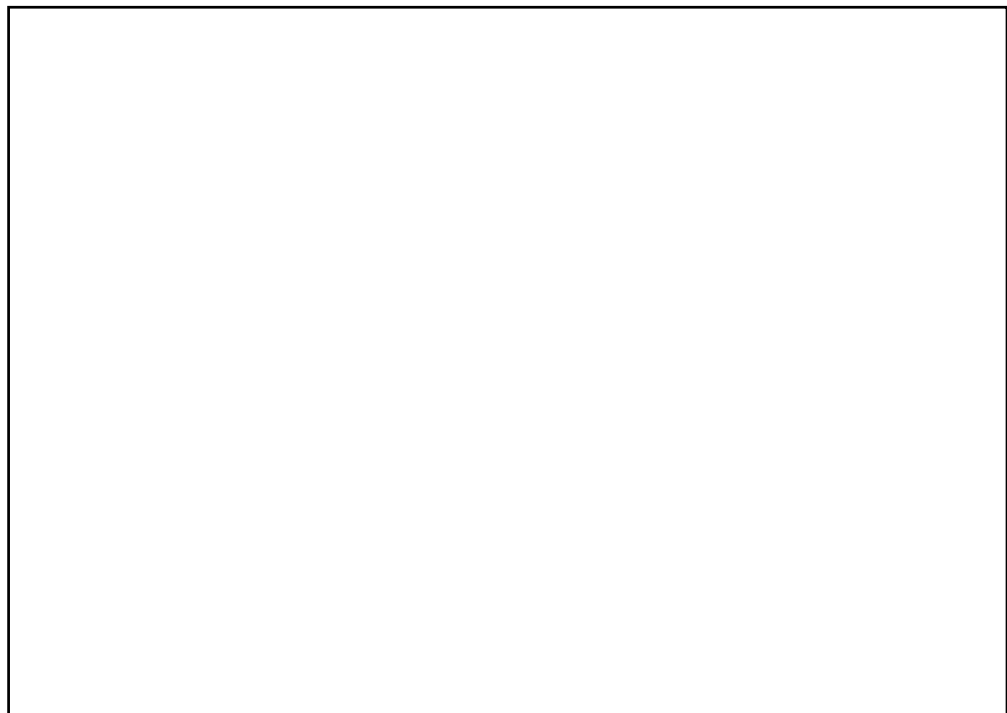
**Assumed Modifiers:** p

**Description:** This marsh is characterized by high cover of Rocky Mountain cow-lily in standing water. Marsh cinquefoil and buckbean also dominate this herbaceous wetland. Sitka sedge, Merten's sedge, slough sedge, scouring rush, and marsh violet are scattered throughout. The shrub layer is sparse but includes sweet gale, hardhack, and red alder.

**Photo 12**

CM2c in plot 3H113. Kennedy River watershed

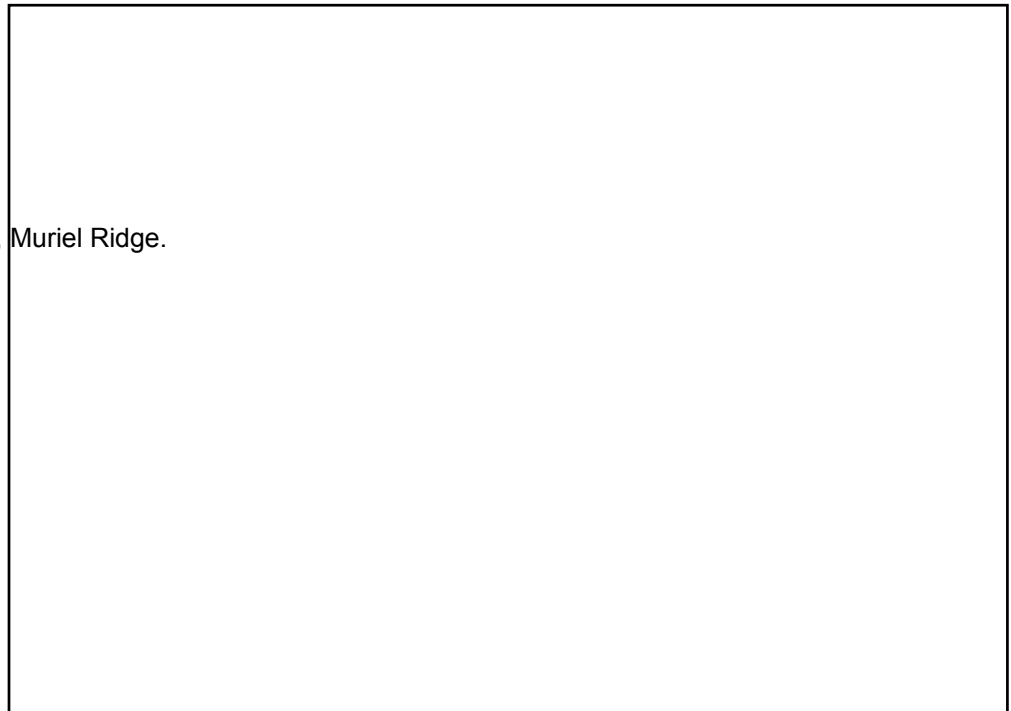


**5.2.2.4 Dunegrass - Silverweed****Plots:** K09, 2T39, 5 visuals**Ecosystem:** DS, Dunegrass – Silverweed**Site Modifiers:** n**Structural Stages:** This is a herb dominated ecosystem with structural stage (2b).**General Distribution:** This beach edge ecosystem grows on wind blown sand deposits that have accumulated above the high tide level. Polygons are small and usually occur in complexes with sandy beaches (BE).**Typical Situation:** Located adjacent to beaches on sandy deposits.**Assumed Modifiers:** c**Description:** Dunegrass is the dominant species in the areas that fringe beaches above the high-tide level. Silverweed, yarrow, and sea plantain are all common. Sitka spruce seedlings may occur on logs. Sometimes a shrubby fringe dominated by Nootka rose occurs immediately adjacent to this grass dominated area, but dunegrass is still very common. Pacific crabapple may occur as a tall shrub.**Photo 13**DS2b near  
Estevan  
Lighthouse  
on Hesquiat  
Peninsula  
in Plot K9

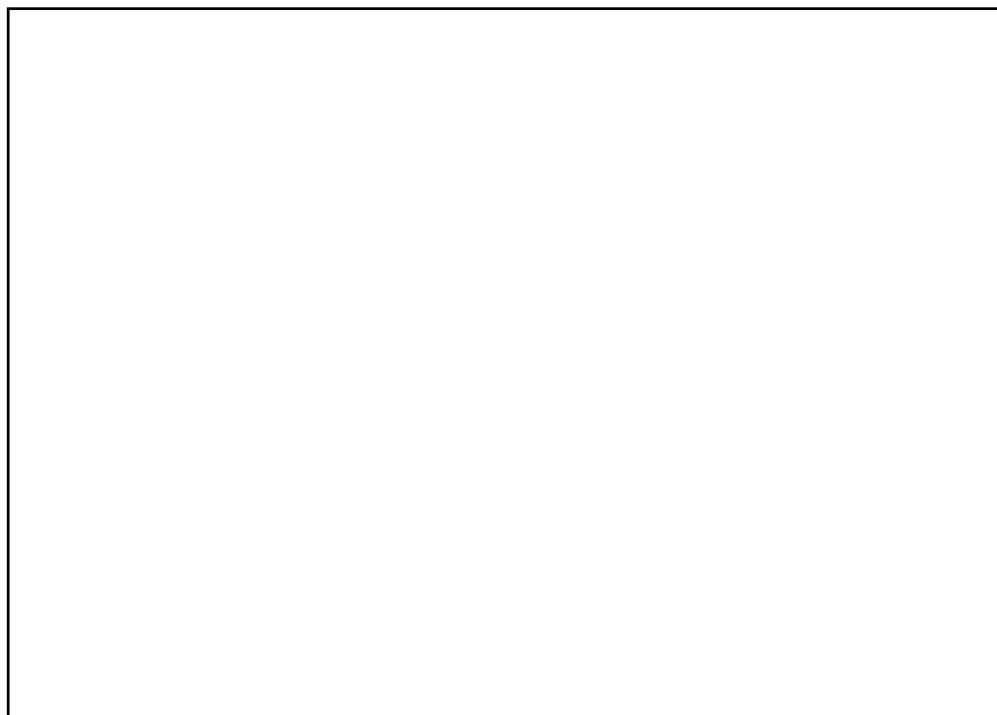


**5.2.2.5 Tufted hairgrass - Silverweed****Plots:** 2D23, K75, T48, G3J74, 6 visuals**Ecosystem:** GS, Tufted hairgrass - Silverweed**Site Modifiers:** n**Structural Stages:** This is always a herb dominated ecosystem with a structural stage of 2b.**General Distribution:** These ecosystems grow in fine silty deposits in the intertidal zone usually adjacent to estuary shorelines. They are infrequent in occurrence.**Typical Situation:** Intertidal position; fine deposits.**Assumed Modifiers:** a, f**Description:** These marshes exist below high-tide level in estuarine locations. They are dominated by dense swaths of tufted hairgrass. Other grasses and silverweed are common while, orache and sea arrow-grass are more scattered.**Photo 14**

GS2b in Plot G3J74, Muriel Ridge.



**5.2.2.6 Pacific crabapple – Red-osier dogwood****Plots:** 1 visual**Ecosystem:** PD, Pacific crabapple – Red-osier dogwood**Structural Stage:** This is a tall shrub ecosystem with a structural stage of 3b.**General Distribution:** This ecosystem is rare in Clayoquot Sound and occurs only near the outer coast of Hesquiat Peninsula and the Muriel Ridge area in the vh1.**Typical Situation:** Fluctuating water table.**Assumed Modifiers:** None**Description:** Red-osier dogwood forms an impenetrable tall shrub layer beneath which there is a scattered occurrence of salal, Nootka rose, salmonberry, and oval-leaved blueberry. The ground is almost bare of herbaceous or mossy vegetation, with very sparse skunk cabbage and sword fern.**5.2.2.7 Sedge – Buckbean****Plots:** 2 visuals**Ecosystem:** SB, Sedge - Buckbean**Structural Stages:** This fen is a herb dominated ecosystem (2b).**General Distribution:** These rich fens are rare in Clayoquot Sound. They occur on slight depressions and usually adjacent to lakes and large ponds. Several of these sites are mapped in the southern portion of Hesquiat.**Typical Situation:** Deep, organic deposits adjacent to lakes.**Assumed Modifiers:** p**Description:** A variety of sedges dominate the diverse herbaceous layer including Sitka and slough sedges. Buckbean, Sitka burnet, and marsh cinquefoil are common. Rocky Mountain cow-lily and greater bladderwort are scattered in standing water. Other species usually scattered in this community are sundews, violets, skunk cabbage, sticky false asphodel, and scouring rush. Sweet gale and crabapple generally skirt the edge of these wetlands.

**5.2.2.8 Sweet gale - Sphagnum****Plots:** G2H140, 10 visuals**Ecosystem:** SM, Sweet gale - *Sphagnum***Site Series:** Similar to 32 Non-forested slope/blanket bog described in the CWHvh2 in the Prince Rupert Field Guide.**Structural Stages:** This ecosystem can be dominated by herbs with a structural stage 2b or low shrubs with a structural stage 3a.**General Distribution:** This bog ecosystem occurs on organic veneers in slight depressions. Bedrock is sometimes exposed on the higher parts of very gently undulating surfaces. Usually surrounded by bog forests or woodlands, these sites are most common on the Hesquiat Peninsula. Small pockets are scattered throughout other study areas where the CWHvh1 is present.**Typical Situation:** Shallow to very shallow organic veneers.**Assumed Modifiers:** p**Description:** The shrub layer is dominated by sweet gale, but scattered shrubs of lodgepole pine and western redcedar may occur, and Labrador tea is often quite common. Common juniper in a prostrate form is scattered in the bogs of the Hesquiat Peninsula. The herb layer is quite diverse and usually includes bog-laurel, black crowberry, bog cranberry, round-leaved sundew, beaked sedge, and three-leaved goldthread. Rocky Mountain cow-lily occurs in small ponds. Scattered skunk cabbage, running clubmoss, sticky false asphodel, and shooting stars may also be found. A thick carpet of *Sphagnum* moss covers the ground, but glow moss can also be locally abundant, while hoary rock moss occurs wherever there are rock outcroppings.**Photo 15**Herbaceous  
SM2b on  
Hesquiat  
Peninsula in  
Plot V95T60

### 5.3 Coastal Western Hemlock Zone, Very Wet Maritime Subzone, Submontane and Montane Variants (CWHvm1 and vm2)

#### 5.3.1 Forested Site Series

##### 5.3.1.1 Western hemlock - Blueberry

**Site Series:** 01 HwBa - Blueberry

**Ecosystem:** AB

**Structural Stages:** Mature and old stands occur, but logging has resulted in shrub, sapling, and young stands. Shrub-dominated and young forests also occur on old avalanche tracks at higher elevations.

**General Distribution:** This is the most common ecosystem unit in the study area. Mesic forests are found in all slope positions with varying aspect, terrain, gradient, and elevation within the subzone. They occur on slightly deeper and moister soils than submesic ecosystems and are most extensive on mid to lower slope positions. They are often complexed with moister ecosystems (AS) on the lower slopes and sub mesic (HS) units on upper slopes. They occupy the slopes of the depressions in hummocky terrain. Those plots identified as the salal phase tend to have a lower slope gradient than the normal phase.

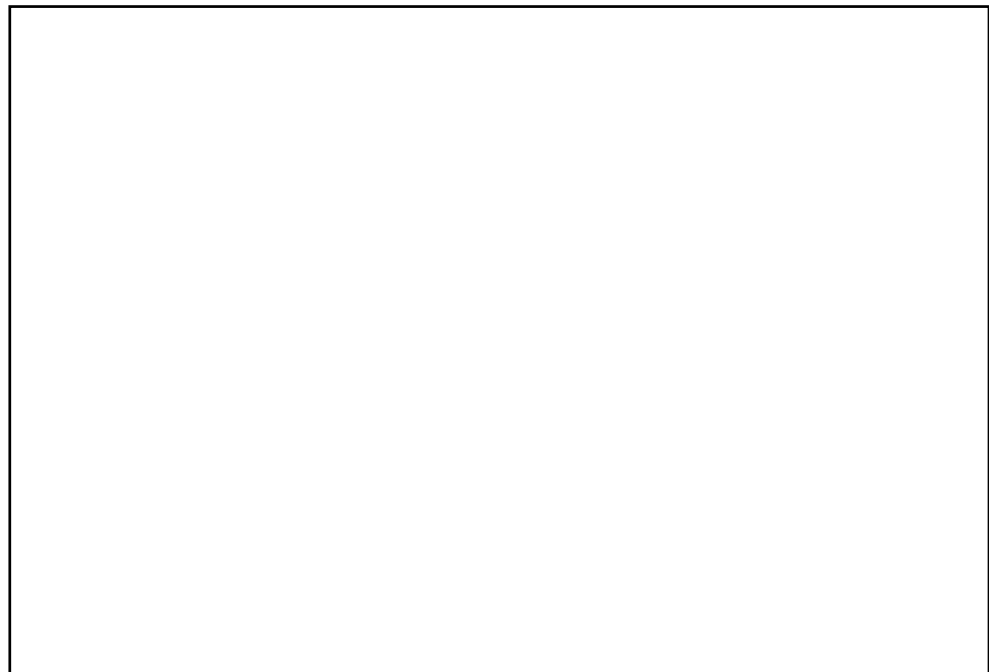
**Comments: The Salal phase:** In this nutrient poor phase of a mesic site, salal and deer fern become very vigorous and abundant in the understorey, while yellow-cedar becomes more common in the tree canopy and amabilis fir is absent. Salal and deer fern, often with over 50% cover, can completely dominate a site so that other herb and moss species are very sparse. These poor sites have not been mapped separately, as they are included in the mesic 01 site series. Plots that have been identified as the salal phase are identified in the comments column in the polygon database.

**Typical Situation:** Gentle slopes, middle slope position; deep, medium textured soils.

**Assumed Modifiers:** d, j, m

#### Photo 16

AB6 in the  
CWHvm2 in  
Ursus Creek  
watershed



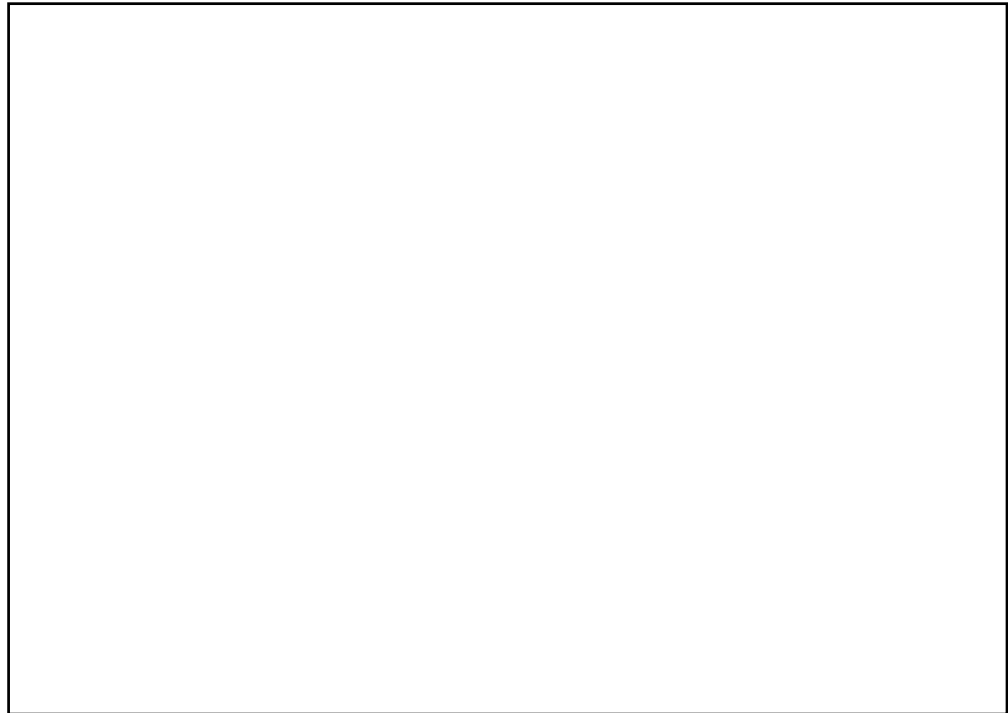
Structural Stage	3 Shrub	4 Pole sapling	5 Young forest	6 Mature forest	7 Old forest
<b>Plots</b>	3J51, G2D68, G2D69, G3H40, G3H70, G3H96, G3H107, G3J86, G3J92 25 visuals	G95T47, G3J95 8 visuals	H25, G2K19, K06, G2H337, G3H45, G3J105 11 visuals	2K20, 2K23, 2K46, S04, S36, T04, 2H363, 3H23, 3J87, G2D02, G2D60, G2D61, G2H353, G2H361, G2K59, G2K119, G2K204, G2K228, G2K261, G94U14, G3H78, G3H79, G3H82, G3J46, G3J50, G3J54 38 visuals	T01, T05, T08a, T09, J17, T19, M15, 94U06, 2H171, 2H176, 2D06, 2K08, 2K31, 3H29, 3H66, G95M02, G95K45, G95H109, G95H103, G94U26, G94U06, G94U03, G2K17, G2K18, G2D66, G3H99, G3H104, G3J36, G3J61, G3J100, G3J101 53 visuals
<b>Site Modifiers</b>	g, h, k, n, q, s, t, v, w, z	g, h, k, n, s, v, w, z	k, n, r, s, t, v, w, z	g, h, k, n, s, t, v, w, z	g, h, k, n, q, r, s, t, v, w, z
<b>Dominant Vegetation</b>	Shrubs tend to be dense. Salal cover can be well over 60% and salmonberry is sometimes scattered. <i>Vaccinium</i> species are usually present, but are not dense. Tree species are usually Amabilis fir, western hemlock and western redcedar. Yellow-cedar may occur at higher elevations. Deer fern is scattered to common. Bunchberry and fireweed are usually present and can be abundant. Mosses are very scattered but usually include some lanky moss. In the salal phase, salal with up to 90% cover, deer fern, and scattered salmonberry are often the only noticeable species present.	Pole sapling and young forests have a dense cover of western redcedar, western hemlock, and amabilis fir, so understorey species are usually very limited.	Pole sapling and young forests have a dense cover of western redcedar, western hemlock, and amabilis fir. <i>Vaccinium</i> species and ferns are sparse. Moss cover is usually limited but includes lanky, step, and Oregon beaked mosses.	Western hemlock, amabilis fir, and western redcedar dominate the tree canopy and also occur in the shrub layer. Alaskan and oval-leaved blueberries and red huckleberry are common in the shrub layer, but the cover does not usually exceed 50%. Salal density varies tremendously, but in the normal phase, it is somewhat scattered. Deer fern cover is usually about 10% to 20% in the herb layer. Step and lanky mosses are abundant.	Western hemlock, amabilis fir, and western redcedar dominate the tree canopy and are common in the shrub layer. Alaskan and oval-leaved blueberries and red huckleberry are common in the shrub layer, but the cover does not usually exceed 50%. Salal density varies tremendously, but, in the normal phase, it is somewhat scattered and can be absent at higher elevations. Deer fern cover varies from very scattered to 40%. Sword fern is scattered. Step and lanky mosses are abundant while coastal leafy moss is usually present but scattered.
<b>Associates</b>				Yellow-cedar and mountain hemlock are occasionally present at higher elevations, and Douglas-fir occurs in	Yellow-cedar and mountain hemlock are occasionally present at higher elevations, and Douglas-fir occurs in

				<p>some sites. False azalea is often present but scattered. Other herbs may include three-leaved goldthread, bunchberry, twinflower and sword fern. Oregon beaked moss, common green <i>Sphagnum</i>, and yellow-ladle liverwort also occur. Pipecleaner moss becomes common with increasing elevation.</p>	<p>some sites. Evergreen huckleberry is scattered at lower elevations. False azalea is often present but scattered. Other herbs may include bunchberry, twinflower, three-leaved goldthread, and false-lily of-the-valley. Oregon beaked moss, common green <i>Sphagnum</i>, and yellow-ladle liverwort also occur. Pipecleaner moss becomes common with increasing elevation.</p>
--	--	--	--	---	--

**5.3.1.2      *Amabilis fir* - Foamflower****Site Series:** 05 BaCw - Foamflower**Ecosystem:** AF**Structural Stages:** Shrub dominated, pole sapling, young, mature, and old forests are present. Logging is the primary cause of disturbance. At higher elevations near the headwaters of creeks, slumping has also caused some disturbance.**General Distribution:** These nutrient rich mesic forests are quite common but are usually limited in occurrence to fluvial and colluvial fans of mid to lower slopes where richer conditions, deep soil, and good drainage all exist.**Typical Situation:** Significant slope (greater than 35%); middle slope position; deep, medium textured soils; richer nutrient regime.**Assumed Modifiers:** d, m**Photo 17**AF6 in the  
CWHvm1 on  
Flores Island

Structural Stage	3	4	5	6	7
<b>Plots</b>	G3J113 12 visuals	K05, G3H93, G3J94, G3J114, G3J115 9 visuals	S24, G2H331, G3H47, G3J96, G3J99, G3J112, G3J116 6 visuals	K05, 2H22, G95T107, G2H342, G3H84, G3H86 14 visuals	H41, H51, H56, H57, S29, K87, 2D63, 2H352, G2D62, G2K48, G95K43, G3H119, G3J91, G3J118 17 visuals
<b>Site Modifiers</b>	j, k, n, s, t, v, w	g, j, k, n, s, t, v, w	g, j, k, n, s, t, w	j, k, n, s, t, w	j, k, n, q, s, t, v, w, z
<b>Dominant Vegetation</b>	In recently logged, shrub-dominated stands, fireweed grows abundantly, but this dies out as soon as the coniferous trees reach high shrub level. The shrubs and herbs found in the mature stands occur, but the other herbs and the moss layer is much less well developed.	These logged, pole sapling stands are dominated by dense amabilis fir and western hemlock. Scattered red alder may be present. The understory is generally sparse and may include scattered oval-leaved and Alaskan blueberries and salmonberry in the shrub layer. Sword fern, deer fern, spiny wood fern, foamflower, and bunchberry occur in the herbaceous layer. Mosses are sparse.	Amabilis fir and western hemlock dominate the tree canopy. Red alder and western redcedar can also be present. Red huckleberry, salmonberry, and salal are scattered. Sword fern, deer-fern and foamflower are common. Mosses are varied and not abundant.	Similar to 5	These forests are usually dominated by amabilis fir and western hemlock. Shrub species are not dense. Red huckleberry is the most common. More diversity is found within the herb layer. Ferns are characteristic of this ecosystem and always include deer fern and sword fern. Three-leaved foamflower and five-leaved bramble are also common. Lanky moss dominates the moss layer.
<b>Associates</b>			Douglas fir has been planted in the Kennedy River watershed. False lily-of-the-valley, western trillium, vanilla-leaf and false bugbane occur in the Kennedy River watershed		Western redcedar and Sitka spruce can also occur. Yellow-cedar and mountain hemlock occur at higher elevations, and salmonberry may be scattered. Evergreen huckleberry may occur at low elevations with scattered lady fern and spiny wood fern and, more rarely, oak fern. Other herbs often include bunchberry and three-leaved goldthread. Oregon beaked moss is also common, and yellow-ladle liverwort is abundant on rotting logs.



**5.3.1.3      *Amabilis fir* - Salmonberry****Site Series:** 07 BaCw - Salmonberry**Ecosystem:** AS**Structural Stages:** Shrub, pole sapling, young, mature, and old forests are present. Disturbance has been caused by logging.**General Distribution:** These moist, rich forests usually occur on lower slopes and in valley bottom locations adjacent to streams and where soils are deep and moist year round. They are not extensive in the study area, but they are quite common and are often mapped in complexes with mesic forests that occupy drier convex areas of the slope. Slope gradients are usually moderate, but both gentle and steep gradients do occur.**Typical Situation:** Gentle, receiving, lower slope; deep, medium textured soils.**Assumed Modifiers:** d, j, m**Photo 18**AS7 in the  
CWHvm1  
Tranquil Creek  
watershed

Structural Stage	3	4	5	6	7
<b>Plots</b>	3J89, G3H108 8 visuals	G2K230 5 visuals	2D54, G3H90, G3J109 4 visuals	3H27, G2D52, G3H55 8 visuals	M14, H58, H67, G2K120, G94U04, G94U16, G94U41, G3H95, G3J26 8 visuals
<b>Site Modifiers</b>	g, k, n, q, s, t, v, w, z	g, k, n, q, s, t, v, w, z	j, k, n, q, s, t, v, w	g, k, n, q, s, t, v, w	g, k, n, q, s, t, v, w, z
<b>Dominant Vegetation</b>	Very dense salmonberry with cover of up to almost 100% is found on logged sites. Thimbleberry, stink currant, and red elderberry are much less common. Red alder, amabilis fir, western redcedar, Douglas fir and western hemlock thrive. Ferns such as lady, sword and deer, occur but are not usually abundant. Fireweed is scattered to quite abundant.	The upper shrub layer usually consists of denser red alder with scattered Amabilis fir, Douglas-fir, and western hemlock. The lower shrub layer is also dense with high salmonberry. Devil's club is common, and the herbaceous cover consists primarily of lady fern, swordfern, and foamflowers.	The canopy is dominated by western hemlock and amabilis fir. Western redcedar and red alder is scattered. Shrubs include dense salmonberry with devil's club and Vaccinium species. Western redcedar and western hemlock regenerate underneath. Ferns can be lush and include swordfern, lady fern, spiny wood fern and deer fern. The sparse moss layer consists of step moss, Oregon beaked moss, lanky moss, and wavy moss.	Similar to 7	Amabilis fir, western redcedar, and western hemlock form the main canopy in these rich, moist forests. Sitka spruce is sometimes locally common. Western hemlock regenerates well in the understorey. Red alder is scattered in these rather open canopy forests. Salmonberry and devil's club in the shrub layer characterize these ecosystems. Blueberries, red huckleberry, salal, and false azalea are scattered. Salal is sometimes more abundant on rotting wood. Lady fern, deer fern, sword fern, three-leaved and cut-leaved foamflowers, and bunchberry are all common. Mosses include lanky and step mosses and common green <i>Sphagnum</i> .
<b>Associates</b>	Rich indicator site species are more common in the Kennedy River watershed. Foamflower, oak and spiny wood ferns, false bugbane and vanilla leaf all occur.				

**5.3.1.4      *Black cottonwood - Willow*****Site Series:** (vm1) 11 Act - Willow**Ecosystem:** CW**Structural Stages:** Shrub-dominated to young stands of alder are present.**General Distribution:** These deciduous dominated floodplain ecosystems occupy gravel and sand bars in active floodplains and are limited in occurrence to small polygons along the larger creeks.**Description:** There is no black cottonwood in the Clayoquot area, and the vegetation on mid to lower bench floodplains that are frequently flooded is always composed of red alder and salmonberry.**Typical Situation:** Low, bench floodplain; coarse textured soil.**Assumed Modifiers:** a, c**Photo 19**CW4 in  
Plot VK19  
Catface area

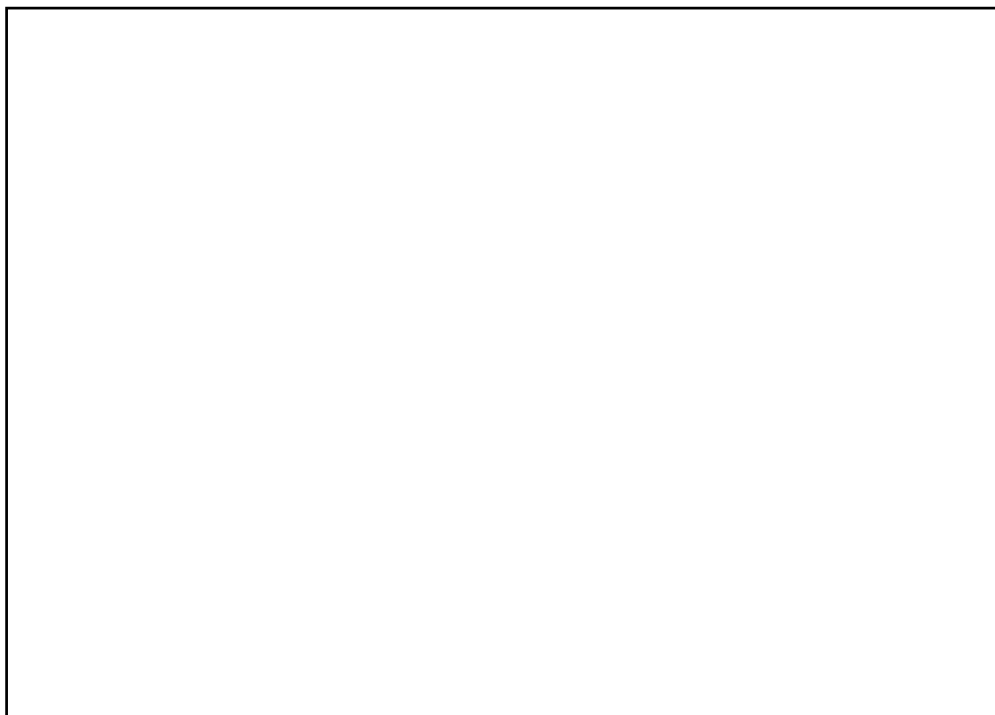
Structural Stage	3	4	5	6	7
<b>Plots</b>	G2H354, G2K265, G94U01, G3J106	H02, K16 5 visuals		Not possible	Not possible
<b>Site Modifiers</b>					
<b>Dominant Vegetation</b>	These sites are red alder dominated and are frequently flooded so that coniferous species cannot invade successfully. A dense, even aged stand of red alder occurs with salmonberry as the dominant shrub species. Herbs can be diverse and usually include deer fern, coast boykinia, sweet-scented bedstraw, sword fern, foam flowers, piggy-back plant, and stream violet. Bryophytes can be quite common and include snake liverwort, Oregon beaked moss, palm tree moss.	These sites are red alder dominated and are frequently flooded so that coniferous species cannot invade successfully. A dense, even aged stand of red alder occurs with salmonberry as the dominant shrub species. Herbs can be diverse and usually include deer fern, coast boykinia, sweet-scented bedstraw, sword fern, foam flowers, piggy-back plant, and stream violet. Bryophytes can be quite common and include snake liverwort, Oregon beaked moss, palm tree moss.	Similar to 4 but alder has reached self thinning stage. Trees are more spaced.		
<b>Associates</b>	Other shrubs may include thimbleberry, stink currant, oval-leaved and Alaska blueberries, and red huckleberry. The herb layer can be varied and includes cow parsnip, grasses, false lily-of-the-valley, self-heal, and miner's lettuce, wall lettuce, small flowered alumroot, mountain sweet-cicely.	Other shrubs may include thimbleberry, stink currant, oval-leaved and Alaska blueberries, and red huckleberry. The herb layer can be varied and includes cow parsnip, grasses, false lily-of-the-valley, self-heal, miner's lettuce, wall lettuce, small flowered alumroot, and mountain sweet-cicely.			

**5.3.1.5 Western hemlock - Deer fern****Site Series:** 06 HwBa - Deer fern**Ecosystem:** HD**Structural Stages:** Shrub to old forests are present. Disturbance has been caused by logging.**General Distribution:** These moist forests tend to occur where seepage ensures year round moisture, and this appears to be most common on mid to lower, steep, cool aspect slopes. It also occurs in the same conditions on the north sides of tributaries in some areas. They are often mapped in a complex with mesic forests.**Typical Situation:** Significant slope (greater than 35%); lower slope position; deep, medium textured soils; seepage.**Assumed Modifiers:** d, m**Photo 20**HD7 in the  
CWHvm1  
Plot 2H143  
in the  
Atleo area

Structural Stage	3	4	5	6	7
<b>Plots</b>	H32, T46, G2H24 7 visuals	3 visuals	2 visuals	2D53, T01a, G95T100, G2H339, G3H54 13 visuals	M02, H20, H52, S25, S26, J18, K07, T16, T45, 2H28, G2H349, G94U05, G94U15, G95T102, G3H77 25 visuals
<b>Site Modifiers</b>	h, k, n, s, v, w, z	h, k, s, v, w	k, s, t	k, q, s, v, w, z	g, j, k, n, q, s, v, w, z
<b>Dominant Vegetation</b>	Scattered red huckleberry, salmonberry, oval-leaved and Alaska blueberries occur. The herb layer is well developed after logging. Deer fern dominates with >50% cover, and scattered fireweed is present. The moss layer tends to be patchy but includes lanky moss.	Very dense stands of young western hemlock and western redcedar occur. Shrub layers poorly developed, although salal is usually scattered. Deer fern remains dense while the moss layer is poorly developed.	Insufficient information	Similar to 7	Western redcedar may be very common in these moist forests, but western hemlock is usually co-dominant. Amabilis fir is more scattered but common in the understorey and shrub layers. Other tree species occur in the shrub layers. Shrub species may be poorly developed with scattered salmonberry, blueberries, and, possibly, false azalea. Salal may be scattered or very common. Deer fern is always abundant and is sometimes so dense that no other herbs or mosses are found. Lanky moss and step moss are very common while coastal leafy moss also occurs.
<b>Associates</b>					Yellow-cedar and mountain hemlock occur at higher elevations. Where ferns are not present, bunchberry and twinflower are common. Common green <i>Sphagnum</i> can occurs in extensive patches. Oregon beaked moss may be common.

**5.3.1.6 Western hemlock - Salal****Site Series:** 03 HwCw - Salal**Ecosystem:** HS**Structural Stages:** Shrub dominated, pole sapling, young, mature, and old forests are present. Disturbance has been caused by logging and windthrow.**General Distribution:** These submesic forests occur throughout the entire study area and usually occur where soils are thin on veneers of colluvial or morainal material on moderate to steep slopes. Commonly, these ecosystems occur on crest and upper slope positions where they are complexed with mesic forests. They are also common in hummocky terrain.**Typical Situation:** Gentle slope, upper slope position; shallow soils.**Assumed Modifiers:** j, s**Photo 21**

HS7 in the  
CWHvm1 in  
Tranquil Creek  
watershed  
Plot H5



Structural Stage	3	3b	4	5	6	7
<b>Plots</b>	3H57, 94U1, G2K259 6 visuals	<b>V3J22</b>	1 visual	6 visuals	2D03, G95H102 13 visuals	J19, M57, S27, 2K224, K79, 2H27, 94U21, G2H16a, G2H333, G2H367, G2K103, G94U27, G3H76, G3J59, G3J64, G3J97 45 visuals
<b>Site Modifiers</b>	h, k, n, v, w, z	k, v, z	h, k, v, w	h, k, q, r, v, w, z	h, k, q, r, v, w, z	h, k, n, q, r, v, w, z
<b>Dominant Vegetation</b>	Salal becomes extremely dense with up to 90% cover after logging. Moss cover is reduced, but the same species occur. Fireweed is scattered, but the herb layer is still sparse usually.	Similar to 7 but very stunted trees	No information	Similar to 7	Similar to 7	These ecosystems exhibit rather poor growth, and there is quite an open canopy of yellow-cedar, western redcedar, and western hemlock in the tree and high shrub layers. Low salal with 30% to 50% cover is the dominant shrub. Evergreen huckleberry is quite common at low elevations, especially in areas transitional to the vm1. Red huckleberry, oval-leaved blueberry, amabilis fir, western and mountain hemlock are scattered in the low shrub layer. The herb layer is rather sparse but is characterized by twinflower, scattered bunchberry, false-lily-of-the-valley, small deer fern, and running clubmoss. The moss layer is a carpet of step moss and lanky mosses.
<b>Associates</b>				Similar to 7	Similar to 7	Western white pine, lodgepole pine, and, occasionally, mountain hemlock are very scattered, and in some areas Douglas-fir veterans occur. Alaskan blueberry and false azalea may occur.



**5.3.1.7 Lodgepole pine - Cladina****Site Series:** 02 HwPI - Cladina**Ecosystem:** LC**Structural Stages:** Shrub dominated, and pole sapling stands are absent as there has been no logging. Young, mature, and old forests occur.**General Distribution:** These ecosystems of xeric rocky sites are not extensive in the study area but are locally common in a few areas. They are usually complexed with rock outcrops (RO) and submesic ecosystems (HS) and are most common on dry hummocky terrain. They also occur along rocky coastline.**Typical Situation:** Gentle slope, crest position; shallow soils.**Assumed Modifiers:** j, r, s**Photo 22**LC7 in the  
CWHvm2  
in the  
Ursus Creek  
watershed

Structural Stage	3a/3b	4	5	6	7
<b>Plots</b>	T03a, 94U2, 3H36, 3J69 6 visuals		G2D07 4 visuals	6 visuals	G2H174, G95H104 17 visuals
<b>Site Modifiers</b>	h, k, v, w, z		h, k, v, w	h, k, q, v	h, k, r, v, w, z
<b>Dominant Vegetation</b>	These forests are similar to structural stage 7 except they are more open and stunted.	Not mapped	These forests are similar to structural stage 7 forests except tree cover is more stunted and open.	Rather stunted lodgepole pine is most common on these dry, rocky sites, although a variety of other tree species occur. Western hemlock, yellow-cedar, and western redcedar are usually present. The tree canopy is open, and the tree species also occur in the shrub layer. Snags and dead trees are common. Stunted trees and salal are the dominant shrubs. Salal is low and more scattered (<20% cover) than in less xeric ecosystems. Red huckleberry may be present at lower elevations while oval-leaved blueberry is scattered in the vm2. <i>Cladina</i> sp. and hoary rock moss usually cover much of the ground, and patches of bare rock are common. The herb layer is poorly developed but includes twinflower.	Stunted lodgepole pine is most common on these dry, rocky sites, although a variety of other tree species occur. Western hemlock, yellow-cedar, and western redcedar are usually present. The tree canopy is open, and the tree species also occur in the shrub layer. Snags and dead trees are common. Stunted trees and salal are the dominant shrubs. Salal is low and more scattered (<20% cover) than in less xeric ecosystems. Red huckleberry may be present at lower elevations while oval-leaved blueberry is scattered in the vm2. <i>Cladina</i> sp. and hoary rock moss usually cover much of the ground, and patches of bare rock are common. The herb layer is poorly developed but includes twinflower.
<b>Associates</b>	Similar to 7		Similar to 7	Douglas-fir and western white pine are often scattered. Mountain hemlock occurs with increasing elevation. California oatgrass, bracken fern, Alaska saxifrage, Wallace's selaginella, and Davidson's penstemon may be scattered at low elevations, while at higher elevations ericaceous species such as pink and white mountain heathers and crowberry can be scattered.	Douglas-fir and western white pine are often scattered. Mountain hemlock occurs with increasing elevation. California oatgrass, bracken fern, Alaska saxifrage, Wallace's selaginella, and Davidson's penstemon may be scattered at low elevations while at higher elevations ericaceous species such as pink and white mountain heathers and crowberry can be scattered.

**5.3.1.8 Lodgepole pine - Sphagnum**

**Site Series:** (vm1) 13 PI - Sphagnum  
(vm2) 10 PI - Sphagnum

**Ecosystem:** LS

**Structural Stages:** All forests are old but are often stunted, resulting in several structural stages.

**General Distribution:** These bog woodlands are found on deep organic deposits that have accumulated in slight depressions. They are limited in occurrence.

**Typical Situation:** Treed bog; organic.

**Assumed Modifiers:** p

**Photo 23**

LS7 in the  
CWHvm1  
Plot 2VH351  
in the Atleo area



Structural Stage	3a/3b	4	5	6	7
<b>Plots</b>	3H22, G3H75G3J49, G3J60 2 visual		2 visuals	T03 1 visual	G95H44 2 visuals
<b>Site Modifiers</b>					v, h
<b>Dominant Vegetation</b>	Tree species vary but always include lodgepole or western white pine, yellow-cedar or western redcedar and mountain or western hemlock. These can occur scattered in the tree, tall or low shrub layers. Other shrubs can be sparse but usually include salal and oval-leaved blueberry. Other <i>Vaccinium</i> species may also occur. Crowberry, deer-cabbage, deer fern, bunchberry and twinflower are present in the herb layer. Mosses and lichens are varied. Cladina species, Sphagnum and Racomitrium mosses all may occur.	Not mapped	Similar to 7	Similar to 7	These wet, nutrient poor ecosystems have a very open canopy of stunted yellow-cedar and mountain hemlock with more scattered western redcedar, western hemlock, lodgepole pine and western white pine. Characteristic shrubs are salal, Alaskan blueberry, red huckleberry, Labrador tea, and bog-laurel. Three-leaved goldthread, bunchberry, twinflower, deer fern, sedges, and scattered skunk cabbage are common in the herb layer. Sphagnum mosses predominate, but step moss and lichens carpet the drier hummocks. Lanky moss is also common.
<b>Associates</b>	Other herb species may include king gentian, round-leaved sundew and bracken fern. Lanky, step and curly heron's bill mosses may be locally common.				Yellow-cedar can be very common in the shrub layer.

## 5.3.1.9

***Mountain hemlock – Mountain heather*****Site Series:** 02 HmBa - Mountain heather**Ecosystem:** MM**Structural Stages:** Old stands occur but trees in these areas are sometimes stunted and are mapped as shrub-dominated ecosystems (3a,3b and 7).**General Distribution:** These ecosystems only occur on the north facing slopes and upper valley of the Kennedy River where cold air drainage causes dry and moist Mountain Hemlock zone ecosystems to occur at lower elevations.**Typical Situation:** Gentle slopes; crest position; shallow soils.**Assumed Modifiers:** j, r, s**Photo 24**MM3b in the CWHvm1 Plot G3J27. Kennedy River area.  


Structural Stage	3a/3b	7
<b>Plots</b>	G3J27	
<b>Site Modifiers</b>	h, k, v	h, k ,v,
<b>Dominant Vegetation</b>	Yellow-cedar, mountain hemlock, and scattered lodgepole pine, occur in open stands of very stunted trees. Copperbush is very scattered. Pink and white mountain heathers and crowberry dominate the herb layer. Bunchberry and partridgefoot are sparse. Lanky moss, Cladina species, and hoary rock moss are very common in these units.	Similar to structural stages 3a/3b
<b>Associates</b>		

**5.3.1.10 Mountain hemlock - Twisted stalk****Site Series:** 05 BaHm – Twisted stalk**Ecosystem:** MT**Structural Stages:** Old forests occur**General Distribution:** This ecosystem is has been mapped within the CWHvm in the upper Kennedy River valley because of the predominance of mountain hemlock and copperbush.**Typical Situation:** Significant slopes (greater than 35%); deep, medium textured soils; middle to lower slope position; seepage; richer nutrient regime.**Assumed Modifiers:** d, m**Description:** In this project, polygons mapped as this ecosystem (MT) may also include other ecosystems listed in the Vancouver field guide: 06 HmYc – Deer-cabbage (MD) and 07 YcHm – Hellebore (YH). These ecosystems cannot be separated out by air photo interpretation and small pockets exist.

<b>Structural Stage</b>	7
<b>Plots</b>	G3J29,G3J33 1 visual
<b>Site Modifiers</b>	j, k, s
<b>Dominant Vegetation</b>	Mountain hemlock, amabilis fir, and yellow-cedar form the fairly open tree and tall shrub canopy. The low shrub layer consists of dense copperbush with scattered oval-leaved blueberry, salmonberry and false azalea. The herbaceous layer is varied and includes fern-leaved goldthread, pink mountain heather, bunchberry, Indian hellebore, five-leaved bramble, skunk cabbage, deer fern, and rosy twisted stalk. The bryophyte layer can be thick in some areas and includes common green sphagnum, pipecleaner moss, and lanky moss.
<b>Associates</b>	

**5.3.1.11**                      ***Western redcedar - Skunk cabbage***

**Site Series:** (vm1) 14 CwSs - Skunk cabbage  
(vm2) 11 CwSs - Skunk cabbage

**Ecosystem:** RC

**Structural Stages:** Most sites are old forests, but small pockets have been logged.

**General Distribution:** These ecosystems usually develop in wet and rather stagnant soil conditions on level terrain. Several units also occur on moderate, lower slopes where seepage is present.

**Typical Situation:** Swamp forest; level to depression; deep, medium textured soil; poorly drained.

**Assumed Modifiers:** d, j, m

**Photo 25**

Logged skunk  
cabbage site  
in the Catface  
area

RC3 in  
Plot V95 T132

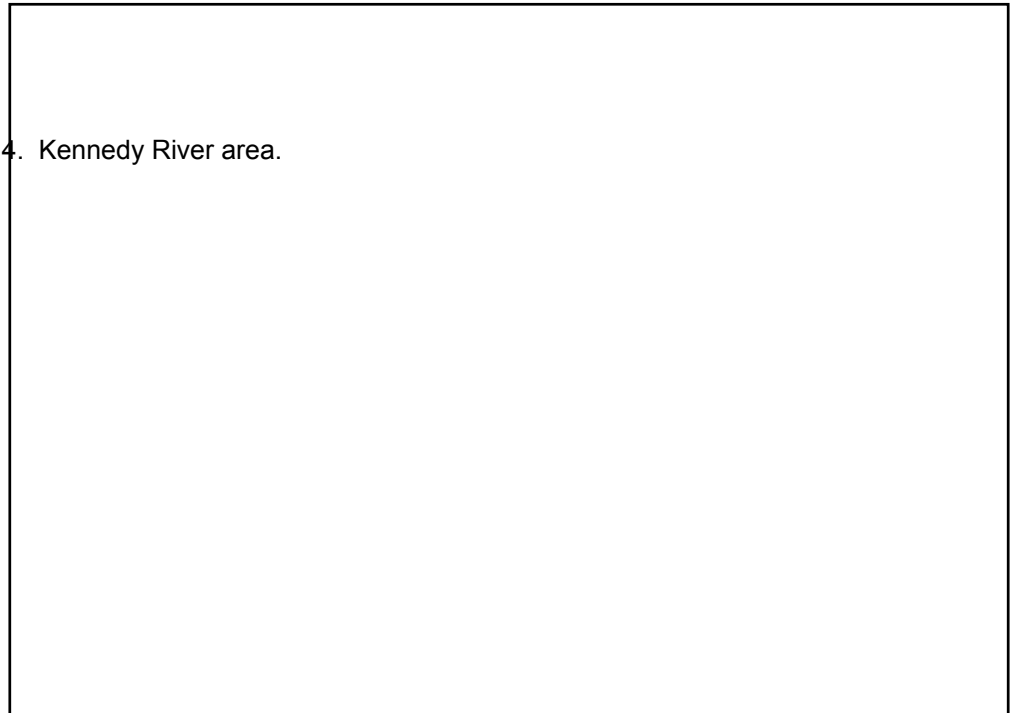




Structural Stage	3	4	5	6	7
Plots	, G3H89 4 visuals		1 visual	G2K50	2H14, 3J62, 3H87 4 visuals
Site Modifiers			k	k	k, n
Dominant Vegetation	Tree regeneration was sparse in the sites observed. Sedges and skunk cabbage were the most common species but were not abundant. <i>Sphagnum</i> and other mosses formed a carpet.	No information	Insufficient information	Similar to 7	Large western redcedar, western hemlock, and scattered Sitka spruce form the main tree canopy. Salmonberry is common. Salal is confined to rotting logs. Skunk cabbage is abundant, and deer fern, three-leaved foamflower, and sedges are common. On sloped sites, canopy cover is very open and the site is more fen-like. Skunk cabbage still occurs. Also present in the herb layer are lady fern and a variety of grasses and sedges.
Associates				Similar to 7	Amabilis fir and yellow-cedar can also occur, and Pacific crabapple can be common near the coast. Alaskan, oval-leaved blueberries and red huckleberry often occur.

**5.3.1.12**                      ***Western redcedar – Swordfern*****Site Series:** 04 CwHw – Swordfern**Ecosystem:** RS**Structural Stages:** Mature and old forests are present.**General Distribution:** These nutrient rich, dry forests are rare within the Clayoquot study area and are limited to moderate to steep, colluvial, south facing slopes where parent materials are generally rich. These forests have a limited distribution.**Typical Situation:** Significant slope (greater than 35%); upper slope position; deep, medium textured soils; richer nutrient regime.**Assumed Modifiers:** d, m**Photo 26**

RS6 in plot G3H114. Kennedy River area.



<b>Structural Stage</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<b>Plots</b>	3H58 2 visuals		G2D70, G3H115	2D12, 2K19, G2K18, G94U32, G3H81, G3H114 7 visuals	M09, G94U18, G94U24, G94U24 1 visual
<b>Site Modifiers</b>				k, s, w	k, s, t, v, w
<b>Dominant Vegetation</b>	These logged sites are shrub dominated. Western hemlock, Douglas fir and western redcedar are regenerating. Red huckleberry, oval-leaved blueberry and salmonberry are scattered. Thimbleberry and salal are sparse. Sword fern, bunchberry and fireweed are the most abundant in the herb layer. Deer fern is scattered. Mosses are lacking.	No information	Similar to 7	Similar to 7	These rich, dry forests are dominated by western hemlock and western redcedar. The shrub layer is fairly open with scattered red alder in the upper layer, and red huckleberry, Alaskan blueberry, and salal in the lower layer. Sword fern dominates the herbaceous cover. Deer fern, maidenhair fern and spiny wood fern are scattered. Mosses are sparse.
<b>Associates</b>					Sitka spruce and Douglas-fir can also occur. Salmonberry can be scattered in the shrub layer.

**5.3.1.13**                      ***Sitka spruce - Salmonberry*****Site Series:** (vm1) 09 Ss - Salmonberry**Ecosystem:** SS**Structural Stages:** All structural stages are present. Logging has been the primary disturbance, although old flooding has caused some structural stage 5 and 6 to occur.**General Distribution:** The distribution of these coniferous floodplain forests is extremely limited in the study areas. They occur primarily along the lower to middle reaches of the larger creeks and rivers**Typical Situation:** High, bench floodplain; medium textured soil.**Assumed Modifiers:** a, m**Photo 27**SS7 in  
Plot H1  
Sydney River  
floodplain

Structural Stage	3	4	5	6	7
<b>Plots</b>	H34, G3H110, G3J117 8 visuals	G2D56, G94U34, G94U38, G3H109 5 visuals	G94U02, G3H91 3 visuals	M08, H03, H340, 2K229, G3H52 5 visuals	H01, H25, H50, 3H80, G2H344, G94U07, G3H30, G3J35, G3J110 10 visuals
<b>Site Modifiers</b>					
<b>Dominant Vegetation</b>	Sitka spruce, western redcedar, amabilis fir and western hemlock are scattered in the shrub layer. Salmonberry, is quite common while deer fern and sword fern are somewhat scattered. Mosses are sparse and include lanky and coastal leafy mosses. <i>Scapania</i> is present.	Red alder dominates these young stands with scattered amabilis fir, western redcedar, and Sitka spruce. Salmonberry is dense and tall. Devil's club, and red huckleberry are scattered. The herbaceous layer is similar to that of the mature stand with sword fern, lady fern, deer fern, and sedges most common. Coastal leafy moss and lanky moss are usually present.	These young forests are similar to mature forests except that they have a greater percentage of red alder in the tree canopy. Sitka spruce, western redcedar, and amabilis fir are well represented in the tree layer. Salmonberry is dense in the shrub layer with scattered devil's club and red huckleberries. The herbaceous layer is similar to mature forests but not as lush.	Similar to 7	A variety of trees occur on active floodplains. Sitka spruce, amabilis fir, western hemlock, western redcedar, and red alder all grow well. The shrub understorey is dominated by salmonberry and devil's club that are sometimes dense and rather impenetrable, as well as red huckleberry and Alaska blueberry. Sword fern and deer fern are common while other herbs can be diverse but not consistent. Mosses can be really diverse ,but lanky, step, Oregon beaked, and slender beaked moss are common.
<b>Associates</b>	Logged areas in the Kennedy River valley have a wide variety of shrubs which include Pacific ninebark, black twinberry, hardhack, Scouler's willow, high-bush cranberry, red-osier dogwood, thimbleberry, and Pacific crabapple. None of these are abundant. The herb layer is diverse. Sword fern, false lily-of-the-valley, fireweed, pearly everlasting, leafy aster, sedges, skunk cabbage, deer fern, and lady fern all thrive in these fluvial deposits. Mosses usually have less than 10% cover.			Similar to 7	Alaskan and oval-leaved blueberries, false azalea, red elderberry, and red huckleberry may be present but scattered. Lady fern and spiny wood fern are usually present while maidenhair and oak ferns sometimes occur. Other herbs include three-leaved and cut-leaved foamflowers, three leaved goldthread, bunchberry, sweet-scented bedstraw, five-leaved bramble, false lily-of-the-valley, and false bugbane, piggy back plant, carexes, and grasses..

**5.3.1.14**                      ***Western redcedar - Goldthread***

**Site Series:** (vm1) 12 CwYc - Goldthread  
(vm2) 09 CwYc - Goldthread

**Ecosystem:** YG

**Structural Stages:** All areas are mature or old forest except for small, previously logged areas in the shrub stage and several shrub forests that are kept stunted by coastal winds or extremely poor nutrient availability.

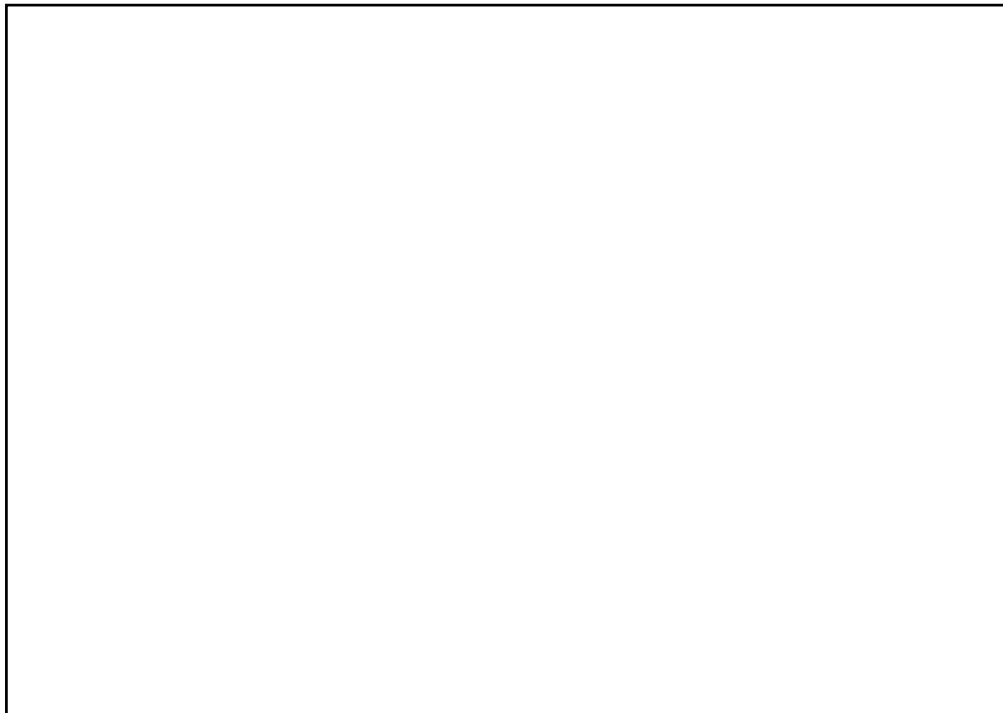
**General Distribution:** These ecosystems are limited to areas of poor drainage and gentle slopes and occur infrequently. On slopes they form complexes with mesic forests while in level or depressional areas they are complexed with bog woodlands and bogs of wetter conditions. In hummocky terrain, these bog forests occur in the small depressions.

**Typical Situation:** Organic, bog forest; depression to lower slope.

**Assumed Modifiers:** j, p

**Photo 28**

Plot V95T122  
showing a  
YG7 site in  
Fortune  
Channel area



Structural Stage	3	3b	4	5	6	7
<b>Plots</b>	3H62 1 visual	G2D04, G2K25, M07		G2D51, G2D67	2D01 12 visuals	S23, 2H32, 2H300, T02, 3J44, G95T57, G95H105, G95H108, G94U22 11 visuals
<b>Site Modifiers</b>				v	h	h, k, n, s, v, w
<b>Dominant Vegetation</b>	The tree species found in mature stands will all be regenerating in logged areas. Salal is always common, Oval leaved blueberry and red huckleberry occur. After logging, herbs become more abundant. Bunchberry, bracken fern, fern-leaved goldthread, or deer fern can locally have cover of up to 50%.	Similar to 7	Not mapped	Similar to 7	Similar to 7	Tree species are mixed on these poorly drained, flat to gently sloping sites. They include yellow-cedar, western redcedar, western hemlock, mountain hemlock, western white pine, and amabilis fir. Tree stature is poor, and the stand is open with many snags. The tree species are common in the shrub layers. Salal is consistently present. The herb layer includes deer fern, fern-leaved goldthread, bunchberry, and twinflower. <i>Sphagnum</i> mosses are dominant, but lanky moss is also common. Hoary rock moss and lichens occur on hummocks.
<b>Associates</b>		Similar to 7		Similar to 7	Similar to 7	Alaskan blueberry, red huckleberry, and false azalea are present but not dense. Evergreen huckleberry is common in areas adjacent to the vh1 variant.

### 5.3.2. *Deciduous, Shrub, and Herb Dominated Ecosystems*

#### 5.3.2.1 *Red alder - Fern*

**Ecosystem:** AW, Red alder – Fern

**Structural Stages:** These units are shrub-dominated or young stands.

**General Distribution:** These ecosystems grow on stabilized slope failures that are scattered throughout the study areas in mid to lower slope positions.

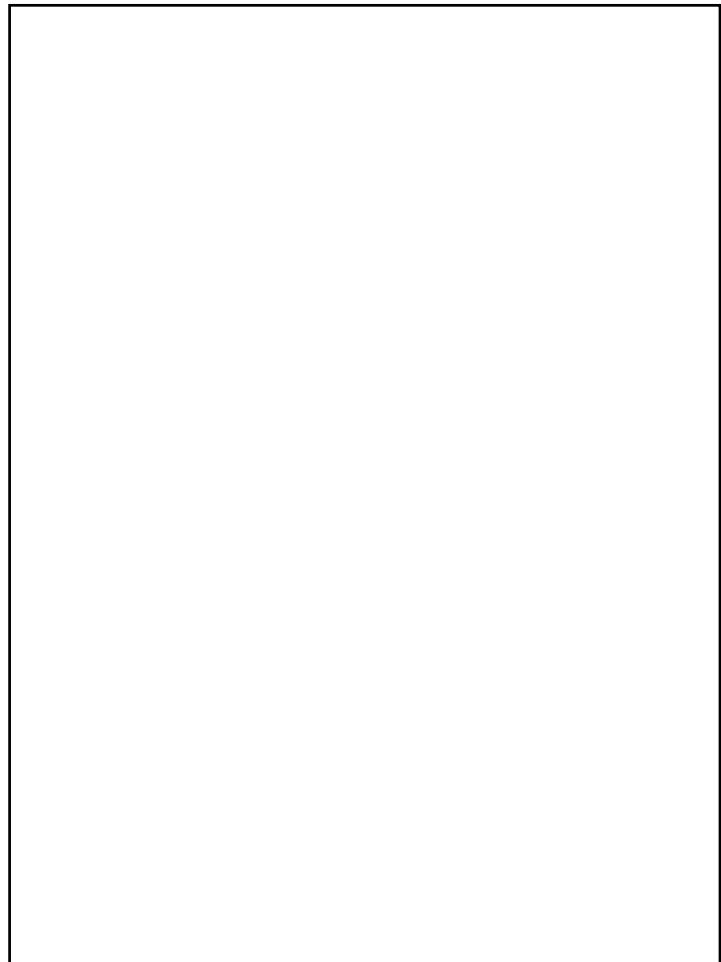
**Typical Situation:** Lower slope; depositional zones of slope failure; deep soils.

**Assumed Modifiers:** d

**Description:** These deciduous stands are probably a seral stage of the rich mesic 05 ecosystem as Sitka spruce, western redcedar, and western hemlock are sometimes present in the understorey.

#### **Photo 29**

AW5 in the Atleo area  
Plot V95T106





Structural Stage	3	4	5	6	7
Plots	5 visuals	6 visuals	G95T104 1 visual	Not possible	Not possible
Site Modifiers	g, k, n, w	k, n, w, z	g, k, n, s, w		
Dominant Vegetation	One recent slide area has dense thimbleberry cover with a scattered cover of coniferous and red alder seedlings. Herbs are rather scattered but varied and include wall lettuce fireweed, thistle, maidenhair fern, bedstraw, lady fern, deer fern, and pearly everlasting	This stage is very similar to structural stage 5. The dense stand of alder is younger and smaller. Western hemlock and western redcedar are scattered in the high shrub layer. Herbs are similar to structural stage 5, although may not be as diverse.	Vigorous growth of red alder and salmonberry are found on stabilizing slope failure sites. The alder forms an even-aged stand beneath which is a dense, tall shrub layer of salmonberry. Western redcedar, western hemlock and Sitka spruce may all be present in an uneven high shrub layer. A variety of ferns are found beneath the salmonberry. These include sword fern, deer fern, spiny wood fern, lady fern, and maidenhair fern. The mosses are varied but poorly developed.		
Associates					

### 5.3.2.2 *Dunegrass – Silverweed*

**Ecosystem:** DS, Dunegrass – Silverweed

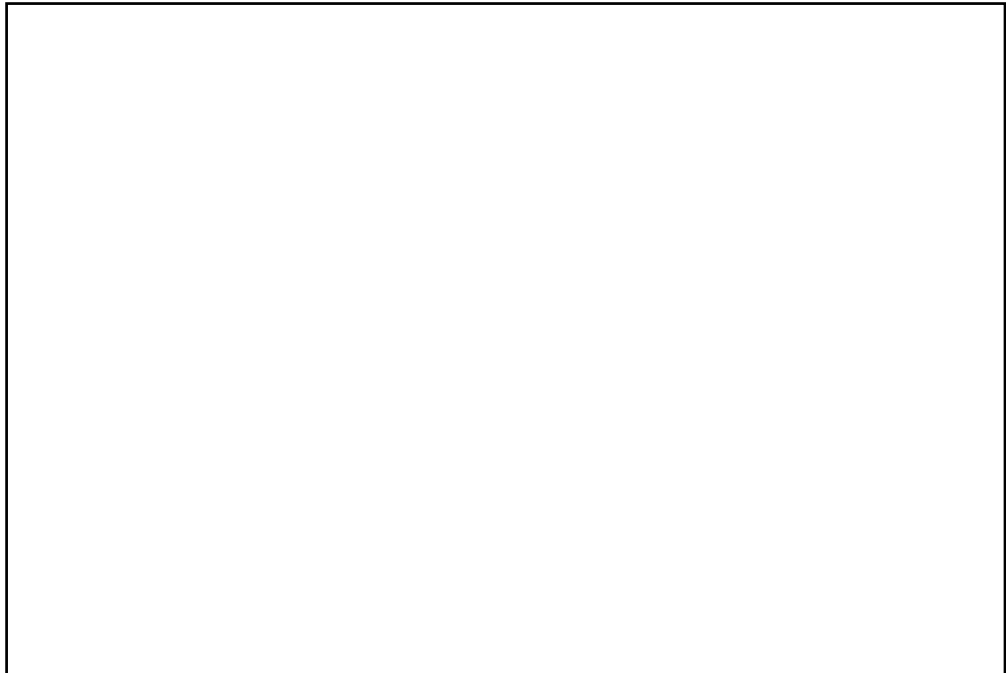
**Structural Stages:** This is a herb dominated ecosystem (2b).

**General Distribution:** This beach edge ecosystem grows on wind blown sand deposits that have accumulated above the high tide level. Polygons are small and usually occur in complexes with sandy beaches (BE).

**Typical Situation:** Adjacent to beaches on sandy deposits.

**Assumed Modifiers:** c

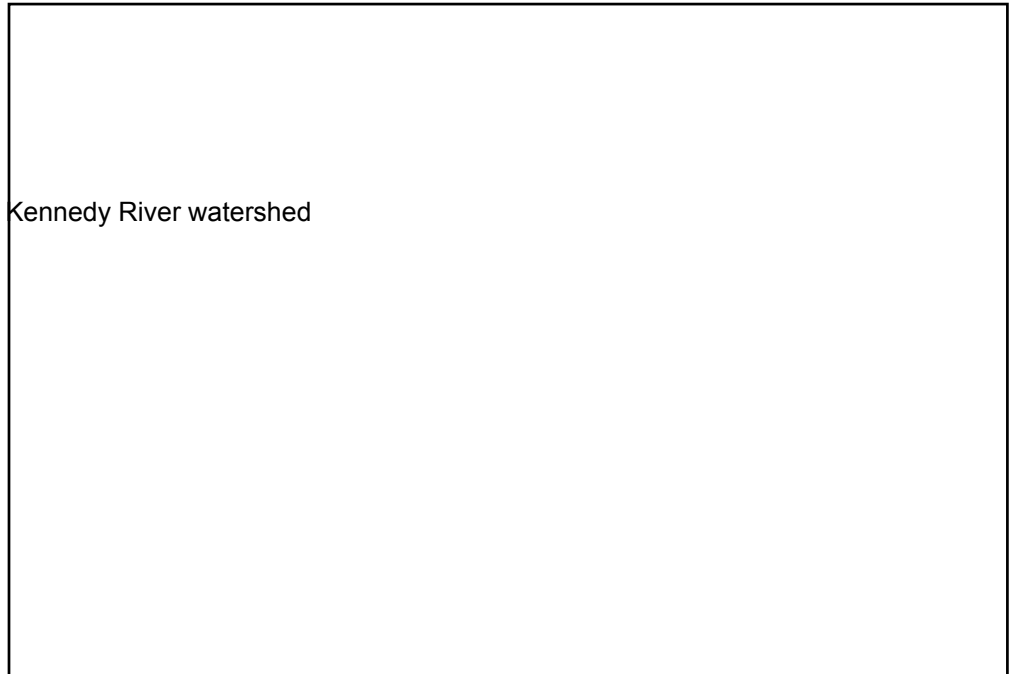
**Description:** Dunegrass is the dominant species in the areas that fringe beaches above the high-tide level. Silverweed, yarrow, and sea plantain are all common. Sitka spruce seedlings may occur on logs. Sometimes a shrubby fringe dominated by Nootka rose occurs immediately adjacent to this grass dominated area, but dunegrass is still very common. Pacific crabapple may occur as a tall shrub.

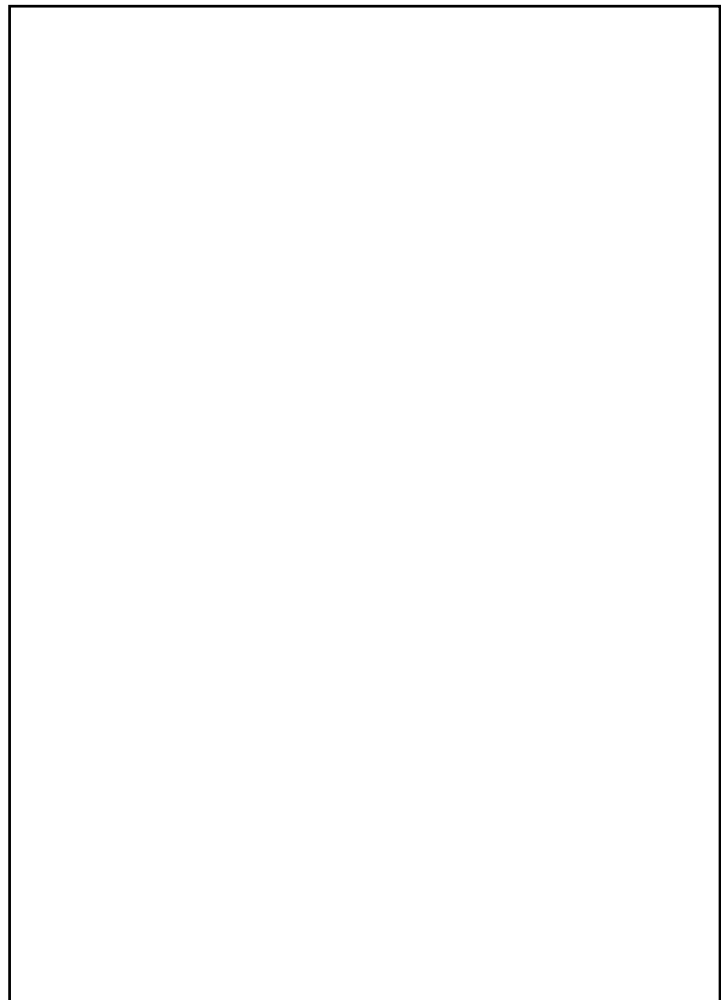
**5.3.2.3 Tufted hairgrass - Silverweed****Plots:** M06, K18**Ecosystem:** GS, Tufted hairgrass - Silverweed**Site Modifiers:** n**Structural Stages:** This is always a herb dominated ecosystem (2b).**General Distribution:** These ecosystems grow in fine silty deposits in the intertidal zone. They are quite rare within the study area.**Typical Situation:** Intertidal position; fine deposits.**Assumed Modifiers:** a, f**Description:** Grass dominated marshes exist below high-tide level in estuarine locations. These are dominated by dense swaths of tufted hairgrass. Other grasses and silverweed are common while orache, American glasswort, and sea arrow-grass are more scattered.**Photo 30**GS2 in K75  
Cotter Creek

**5.3.2.4 Indian hellebore – Fern****Plots:** 3H07**Site Series:** Similar to 51 Avalanche Track described in the Prince Rupert Field Guide.**Ecosystem:** IF, Indian hellebore – Fern slide track**Structural Stages:** These ecosystems are herb dominated (2a)**General Distribution:** These herbaceous slide tracks only occur within the CWHvm in one location in the Marble Creek study area.**Typical Situation:** Gentle to moderate lower colluvial slopes at the toe of avalanche tracks.**Assumed Modifiers:** j**Description:** These herbaceous slide areas have been described for the Prince Rupert Region. They occur on the toe of avalanche tracks, usually below the shrubby ecosystem SA (Salmonberry – Sitka alder). These units consist of a diverse layer of lush herbs dominated by Indian hellebore and lady fern. Cow parsnip, Sitka burnet, alpine lady fern, Sitka valerian and sedges are abundant in these meadows. Other herbs often scattered throughout this ecosystem include leafy aster, foam flowers, western meadow rue and a variety of grasses. A sparse moss layer is usually present and consists primarily of leafy mosses.

**5.3.2.5 Pacific crabapple – Red-osier dogwood****Plots** 3H111, 3H101**Ecosystem:** PD, Pacific crabapple – Red-osier dogwood**Structural Stage:** This is a tall shrub ecosystem (3b).**General Distribution:** This ecosystem is rare in Clayoquot Sound and occurs near the Kennedy River Estuary. It is also found in two areas in the vh1.**Typical Situation:** Fluctuating water table .**Assumed Modifiers:****Description:** Pacific crabapple, red-osier dogwood, and hardhack form an impenetrable tall shrub layer. Slough sedge dominates the herbaceous layer with scattered skunk cabbage and lady fern. A thick layer of hardhack may surround this unit.**Photo 31**

PD3b in plot 3H111. Kennedy River watershed



**5.3.2.6 Salmonberry - Sitka alder****Plots:** H22, G2H364, G2H365, G2K227, G2K209, G3H44, 2 visuals**Site Series:** Similar to 51 Avalanche Track described in the Prince Rupert Field Guide.**Ecosystem:** SA, Salmonberry - Sitka alder**Site Modifiers:** g, j, k, n, q, s, v, w, z**Structural Stages:** These are always shrub-dominated ecosystems (3).**General Distribution:** Old avalanche tracks and inactive talus slopes only occur in a few locations at higher elevations of the vm2.**Typical Situation:** Avalanche tracks; steep to moderate slopes; middle to lower slope positions; deep soils of colluvium.**Assumed Modifiers:** d**Description:** They usually have a dense cover of salmonberry as a vigorous low shrub. Devil's club is common and false azalea is often present. Coniferous species and Sitka alder if present form the high shrub layer. Lady fern, oak fern and sword fern are quite common. Three-leaved foamflower, five-leaved bramble and Indian hellebore are more scattered. Bryophytes cover much of the boulder surfaces and include lanky, step, coastal leafy moss, *Dicranum* and *Scapania* species.**Photo 32**SA3 in the CWHvm2  
Plot H64 in the  
Tofino Creek watershed

**5.3.2.7. Sphagnum – Cotton-grass**

**Plots:** M05, 3H31, 94U36, G2D05, G2H346, G95T42, G94U19, G3H112,  
18 visuals

**Ecosystem:** SC, Sphagnum - Cotton-grass

**Site Modifiers:** n

**Structural Stages:** These are always herb dominated ecosystems (2b).

**General Distribution:** Fens are limited to organic deposits that are adjacent to lakes or are drained by a stream so that there is significant water movement through the soil. They are rarely found in the study area.

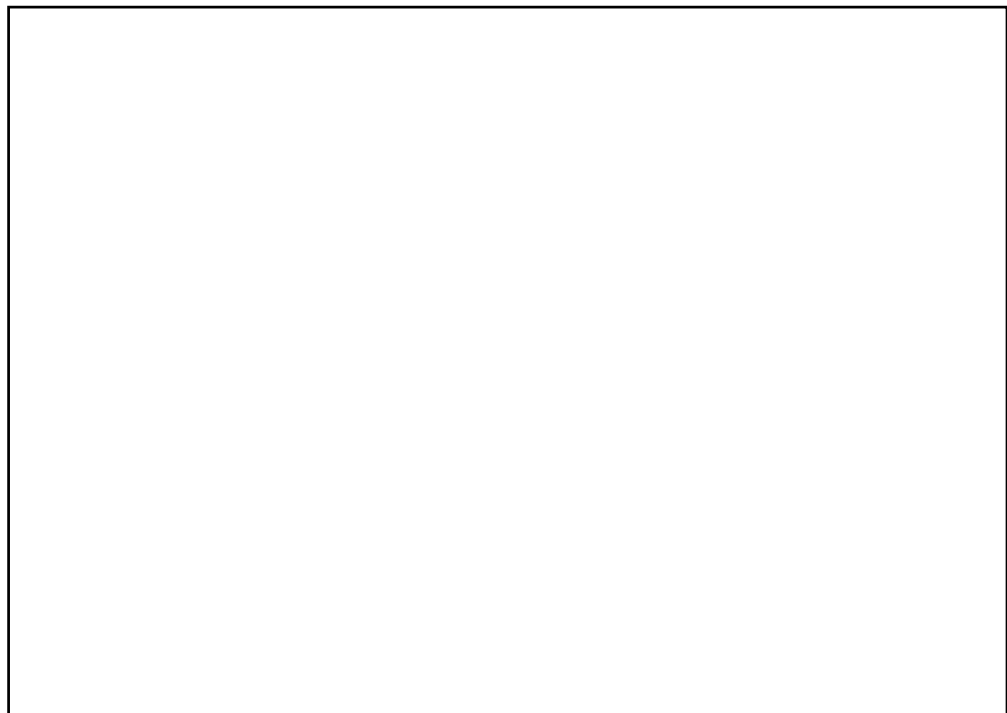
**Typical Situation:** Organic deposits with water movement.

**Assumed Modifiers:** p

**Description:** Various sedges dominate these wetlands and *Sphagnum* mosses. Sedges include narrow-leaved cotton-grass, tufted club rush, three way sedge, and beaked sedge. *Sphagnum* species carpet the ground. The herb layer is diverse. Sitka burnet, long-leaved and round-leaved sundew, king gentian, sticky false asphodel, Sitka valerian, fern-leaved goldthread, deer cabbage, buckbean, deer fern, skunk cabbage, and bunchberry are scattered or locally common. Paintbrush and northern rice root have occurred in several fens.

**Photo 33**

SC2b in plot  
VH40  
Tranquil Creek  
watershed



**5.3.2.8 Sphagnum - Deer cabbage**

**Plots:** S34, G2H15, G2H26, G2H34, G2H173, G95H106, 6 visuals

**Ecosystem:** SG, Sphagnum - Deer cabbage

**Site Series:** Similar to 31 Non-forested Bog described in the Prince Rupert Field Guide.

**Structural Stages:** This is always a herb dominated ecosystem (2b).

**General Distribution:** These bogs found in the middle of deep, poorly drained, organic deposits are rare in the vm in this area. They occur in mosaics with bog woodland (LS) and bog forests (YG).

**Typical Situation:** Deep, organic deposits.

**Assumed Modifiers:** p

**Description:** A variety of shrubby tree species may occur in these open wet sites, and these include yellow-cedar, western redcedar, western white pine, lodgepole pine, western and mountain hemlock, and amabilis fir. The moderate shrub layer usually consists of salal, Labrador tea, false azalea, and bog-laurel. Herbaceous cover is abundant with crowberry, deer-cabbage, and sedges being the most common. Bunchberry, king gentian, bog cranberry, tufted clubrush, and fern-leaved and three-leaved goldthread may all occur. A spongy carpet of *Sphagnum* mosses covers the wettest parts of these bogs, while lichens and hoary rock moss cover the drier hummocks.

**5.3.2.9 Sweet gale – Sphagnum**

**Plots:** 2K15, 2 visuals

**Ecosystem:** SM, Sweet gale – Sphagnum

**Site Series:** 32 Non-forested slope/blanket bog described in the CWHvh2 (in the Prince Rupert Field Guide).

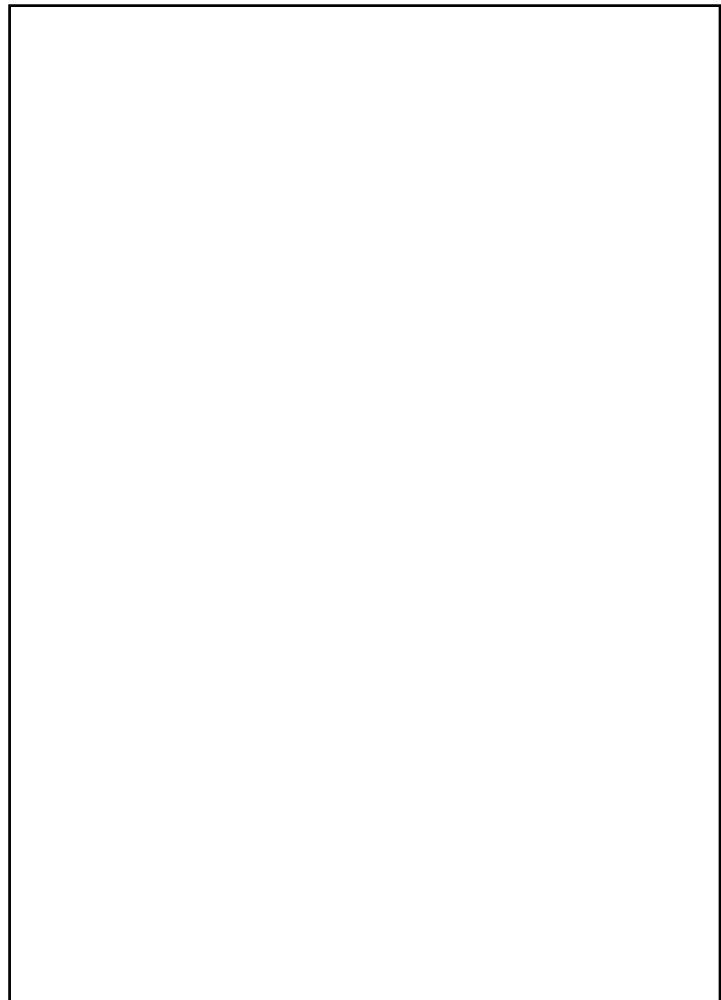
**Structural Stages:** This ecosystem can be dominated by herbs (2b) or low shrubs (3a).

**General Distribution:** This bog ecosystem occurs on organic veneers in slight depressions and are usually surrounded by bog forest and woodlands. In the vm, these units are found only in the Hesquiat, Pretty Girl, and Kennedy River areas.

**Typical Situation:** Shallow to very shallow, organic veneers.

**Assumed Modifiers:** p

**Description:** The shrub layer is dominated by sweet gale, but scattered shrubs of lodgepole pine and western redcedar may occur, and Labrador tea is often quite common. The herb layer is quite diverse and usually includes bog-laurel, black crowberry, bog cranberry, round-leaved sundew, beaked sedge, three-leaved goldthread, and Rocky Mountain cow-lily in small ponds. Scattered skunk cabbage, running clubmoss, sticky false asphodel, and shooting stars may also be found. A thick carpet of *Shagnum* moss covers the ground, but blow moss can also be locally abundant while hoary rock moss occurs where there are rock outcroppings and are usually surrounded by bog forest and woodlands. In the vm, these units are found only in the Hesquiat and Pretty Girl areas.

**5.3.2.10 Willow - Salmonberry****Plots:** H39, K17**Ecosystem:** WS, Willow – Salmonberry**Structural Stage:** These ecosystems are shrub dominated (3b).**General Distribution:** This shrubby ecosystem occurs on organic soils, adjacent to lakeside wetlands where water movement is unimpeded. It rarely occurs in the study area.**Typical Situation:** Active floodplain; organic blanket.**Assumed Modifiers:** a, p**Description:** The dense shrub layer (80%) is dominated by Sitka willow but salmonberry, black twinberry and thimbleberry are also common. Herbaceous cover is moderate (20-40%) and is dominated by piggy-back plant. Other herbs include skunk cabbage, lady fern, Douglas aster, three-leaved foamflower, stream violet, sweet scented bedstraw and other species indicating rich, moist conditions.**Photo 34**WS3b in Plot H39  
Tranquil Creek watershed



## 5.4 Sparsely Vegetated, Non-Vegetated, and Anthropogenic Units of the CWH

### 5.4.1 Beach

**Ecosystem:** BE, Beach

**Structural Stages:** These are essentially non-vegetated (1).

**General Distribution:** Beaches are common along the coastline of Hesquiat Peninsula. They are also scattered along the coastlines of Atleo, Bedwell, Catface, Fortune, and Hesquiat.

**Description:** Beaches are areas of sorted sediments reworked in recent time by wave action. In the study area only those areas of extensive sand are assigned the label BE. They occur mainly in the intertidal zone of the coastline, but the upper section of some beaches may have scattered grasses and herbs and grade into the DS herbaceous unit.

### 5.4.2 Cobble Beach

**Ecosystem:** CB, Cobble beach

**Structural Stages:** Essentially non-vegetated (1).

**General Distribution:** Cobble beaches are quite common along the outer coastline of Hesquiat Peninsula and are not mapped in any other part of the study area .

**Description:** Cobble beaches are non-vegetated and occur in the intertidal zone of the coastline.

### 5.4.3 Cliff

**Ecosystem:** CL Cliff

**Site Modifiers:** q

**Structural Stages:** Essentially non-vegetated (1)

**General Distribution:** Cliffs are rare within Clayoquot Sound and only mapped in the Kennedy River study area.

**Description:** A steep, vertical or overhanging rock face.

#### 5.4.4 *Cultivated Garden*

**Ecosystem:** CG, Cultivated Garden

**Structural Stages:** This is a shrub dominated garden.

**General Distribution:** One unit of 3 ha is located on the eastern portion of the Hesquiat Peninsula study area. Cougar Annie originally developed this area as a garden in the early 1900s. Although the garden has been neglected for many years, the present owner is opening it up again while trying to maintain its wild charm.

**Description:** Several old buildings are found within the main residential area. The remainder of the property is cultivated with ericaceous shrubs, rhododendrons, grasses, and a variety of other cultivars and native species.

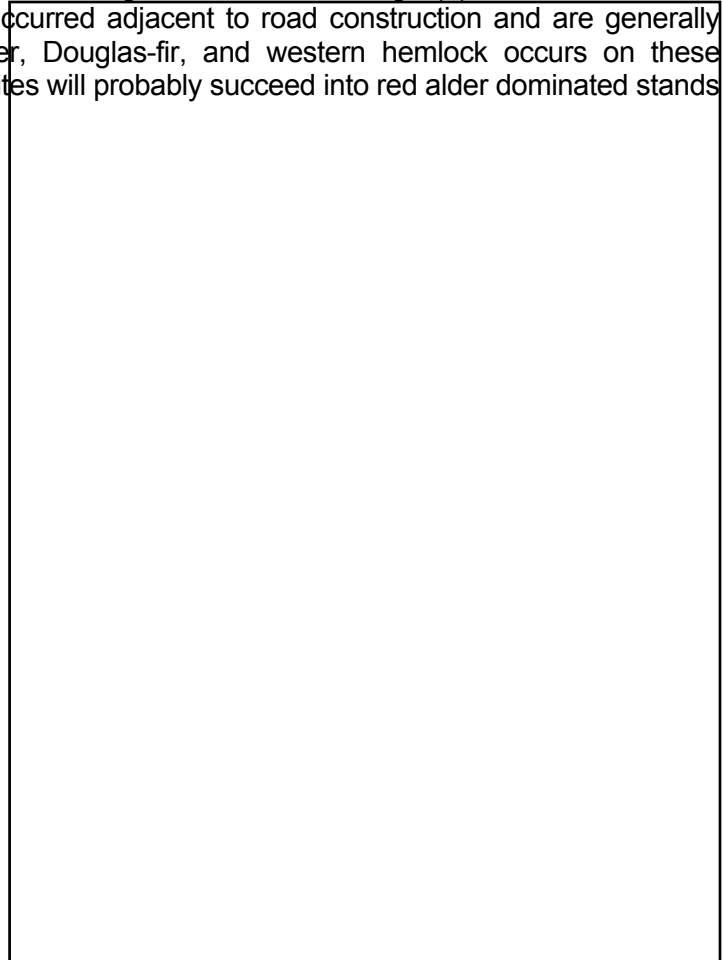
**5.4.5 Exposed Soil****Plots:** 2 visuals**Ecosystem:** ES, Exposed Soil**Site Modifiers:** g, k, n, w, z**Structural Stages:** These are essentially non-vegetated (1).

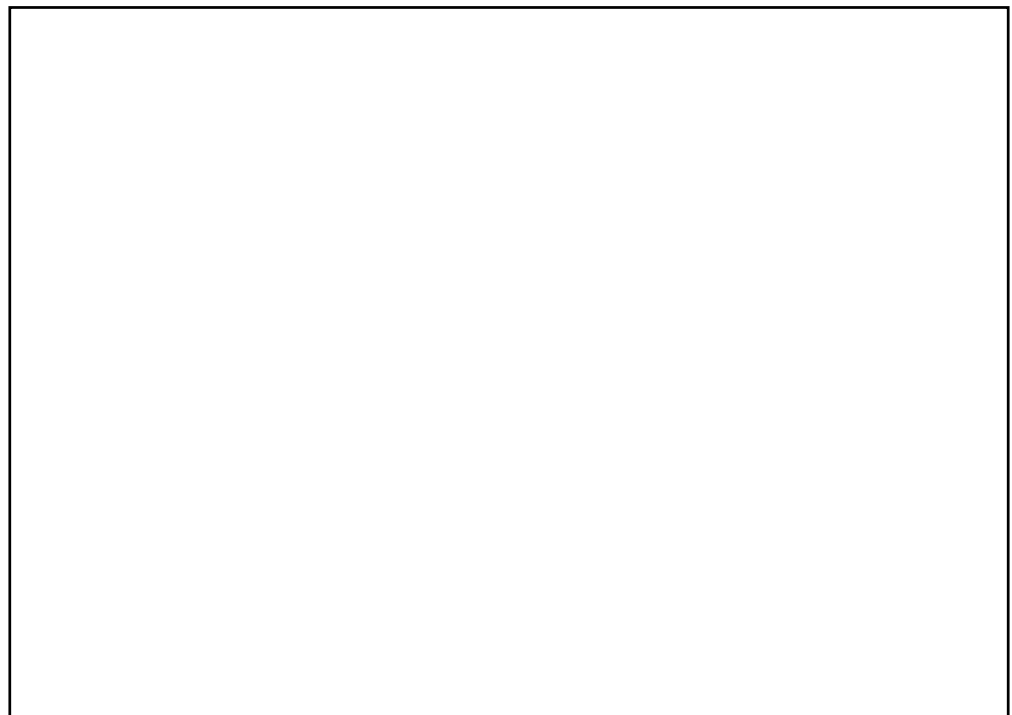
**General Distribution:** Exposed soil includes areas of recent disturbance such as mud slides, debris torrents, avalanches, and human made disturbances. In this project, the ES label is used primarily for recent slides; although, a few avalanche sites have also been mapped at higher elevations. Many large, natural slides have occurred fairly recently throughout the study area. The largest ones are found in the Catface, Bedwell, Hesquiat, Kennedy River, Tranquil, and Tofino Creek study areas. Smaller slides are associated with logging and are locally common but too small to map.

**Description:** Within the study area, this unit consists primarily of non-vegetated slides. Many of the recent, larger slides have been hydro seeded. This would then actually result in the slide area having a herbaceous structural stage. Distinguishing hydro seeded slides from those that are not is difficult, so all are assigned a non vegetated structural stage (1). The recent slides within the logged sites have usually occurred adjacent to road construction and are generally non-vegetated. Invasion by red alder, Douglas-fir, and western hemlock occurs on these exposed mineral surfaces, and these sites will probably succeed into red alder dominated stands (AW).

**Photo 35**

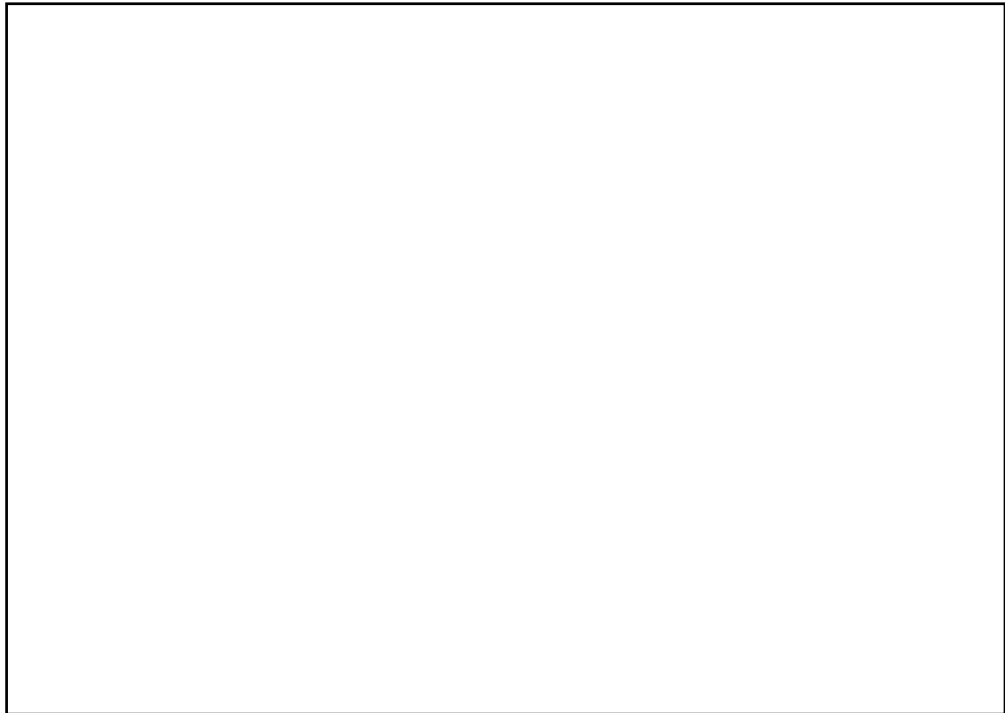
ES1 - Slide after road  
construction in Catface area  
Plot V95T128



**5.4.6 Gravel Bar****Plots:** G3J107, G3J111, 4 visuals**Ecosystem:** GB, Gravel Bar (riparian)**Site Modifiers:** a, k, n, w**Structural Stages:** Gravel bars are essentially non-vegetated (1).**General Distribution:** Along the lower reaches of the larger river and creek systems, the gravel bars are more extensive and can therefore be mapped.**Description:** These sites are small in area and are essentially non-vegetated gravel bars that are inundated for a long duration in high flow periods. On older gravel bars where flooding is less frequent scattered herbs, shrubs, and mosses (less than 10% cover) may be present. This includes willows, grass species, and Siberian miner's-lettuce.**Photo 36**GB1 on the  
Bulson River**5.4.7 Gravel Pit****Ecosystem :** GP, Gravel Pit**Structural Stages:** These are essentially non-vegetated (1).**General Distribution:** Gravel pits are rare and are found in logging areas only.**Description:** Gravel pits are unvegetated excavation sites where sand and gravel has been removed primarily for the purpose of road construction. Most gravel pits are not large enough to map.

**5.4.8 Lake****Ecosystem:** LA, Lake**Structural Stages:** Not applicable**General Distribution:** Lakes are not very common within the study area. The greatest concentration of lakes occurs in the Pretty Girl – Easter Lakes area.**Description:** Lakes are deeper than 2 m and have no vegetation on the surface.**Photo 37**

LA in the  
Ursus Creek  
watershed  
adjacent to  
plot 2H23

**5.4.9 Mudflat Sediment****Ecosystem:** MU, Mudflat Sediment**Site Modifiers:** n**Structural Stages:** These are by definition essentially non-vegetated (1).**General Distribution:** Mudflats are rare in the study area as they only occur in some of the large estuaries.**Description:** Mudflats are flat intertidal areas of fine textured sediment that are essentially non-vegetated, but they may have some scattered grasses, sedges, and algae.

**5.4.10      *Shallow Open Water*****Plots:**            1 visual**Ecosystem:**    **OW, Shallow Open Water****Structural Stages:** Not applicable.**General Distribution:** Lakes less than 2 m in depth are rare in the study area but are scattered throughout.**Description:** Water bodies classified as open water usually have some vegetation on the surface and around the edge where the depth is shallow enough to allow vegetation establishment. Waterlilies occur in the deeper water while sedges, rushes, and buckbean are scattered along the water's edge.**5.4.11      *Pond*****Ecosystem:**    **PO, Pond****Structural Stages:** Not applicable**General Distribution:** Ponds are scattered throughout Clayoquot Sound. The greatest concentration is in the Easter Lakes area of the Pretty Girl study area.**Descriptions:** A small body of water greater than 2 m deep but less than 50 ha in size.

**5.4.12 River****Ecosystem:** RI, River**Structural Stages.** Not applicable.**General Distribution:** Rivers are only mapped in the lower elevations in the vm1 and vh1.**Description:** Rivers are usually mapped in complexes with gravel bars (GB).**Photo 38**

Bulson River

**5.4.13 Rock Outcrop****Plots:** M20, G3H83, G3J23, 5 visuals**Ecosystem:** RO, Rock Outcrop**Site Modifiers:** g, h, k, q, r, w, z**Structural Stages:** These ecosystems are sparsely vegetated (1).**General Distribution:** Rock outcrops occur in all areas. They are often complexed with xeric ecosystems (LC or LR) on hummocky terrain.**Description:** Rock outcrops found in complexes with the most xeric forests are usually rocky crests and hummocks. Hoary rock moss and lichens cover much of the surface. As mineral soil develops, tree species will grow as low and high shrubs and the site will grade into an LC or LR ecosystem. Where rock outcrops are steep or cliff-like, the surfaces are usually non-vegetated except for very scattered tree species. Western redcedar, yellow-cedar and western hemlock have been observed on small ledges or crevices on these steep slopes.

**5.4.14 Road Surface****Ecosystem:** RP**Structural Stages:** Anthropogenic. Not applicable**General Distribution:** Roads are locally common in logged areas, although most road surfaces are too small to map.**Description:** Road surfaces are defined as areas cleared and compacted for the purpose of transporting goods and services by vehicles. They are non-vegetated.**5.4.15 Rural****Plots:** 3 visuals**Ecosystem:** RR, Rural**Structural Stages:** Anthropogenic. Not applicable**General Distribution:** Residential areas are scattered along the coastline.**Description:** These areas include logging camps, First Nations communities, and the lighthouse at Estevan Point. A variety of small buildings are usually present with some scattered shrubs, trees, and grass.**5.4.16 Salt Water****Ecosystem:** SO, Salt Water**Structural Stages:** Not applicable**General Distribution:** These units are rarely mapped in the study area.**Description:** The label SO has been applied to saltwater instead of the label listed in the RIC symbology, SW. The symbol SW is used as a forested site series unit in the CWHvh1. Saltwater refers to water with salinity in excess of 18 ppt and in this study is mainly mapped to identify polygons along the edge of map sheets.**5.4.17 Talus****Ecosystem:** TA, Talus**Site Modifiers:** k, n, w**Structural Stages:** This unit is essentially non-vegetated (1).**General Distribution:** Talus slopes are rare in the CWH but they are mapped in each study area apart from Hesquiat Peninsula.**Description:** Talus is usually located at the foot of steep rock slopes and is the product of successive rock falls. Rock fragments are usually angular and are a type of colluvium. Most slopes are non-vegetated. On older talus slopes a few herbs and mosses may be present.



**5.4.18**      ***Wave Cut Platform*****Ecosystem:** WP, Wave Cut Platform**Structural Stages:** This unit is essentially non-vegetated (1).**Distribution:** Wave cut platforms have been mapped on Hesquiat Peninsula where they are very common along the outer coast.**Description:** These units are located in the intertidal zone and are extensive areas of flat rock that have been smoothed by wave action.

## 5.5 Mountain Hemlock Zone, Moist Maritime Subzone, Windward Variant (MHmm1 and MHmmp1)

### 5.5.1 Forested Site Series

#### 5.5.1.1 Mountain hemlock - Blueberry

**Site Series:** 01 HmBa - Blueberry

**Ecosystem:** MB

**Structural Stages:** Most of the polygons are mature or old forests but some shrubby, pole sapling, and young stands occur on old avalanche tracks at high elevations and on logged sites.

**General Distribution:** Areas of mesic forest are limited to upper slopes above 800 m. They are the most common ecosystem in the MH zone and are often complexed with rock outcrops or parkland (MM).

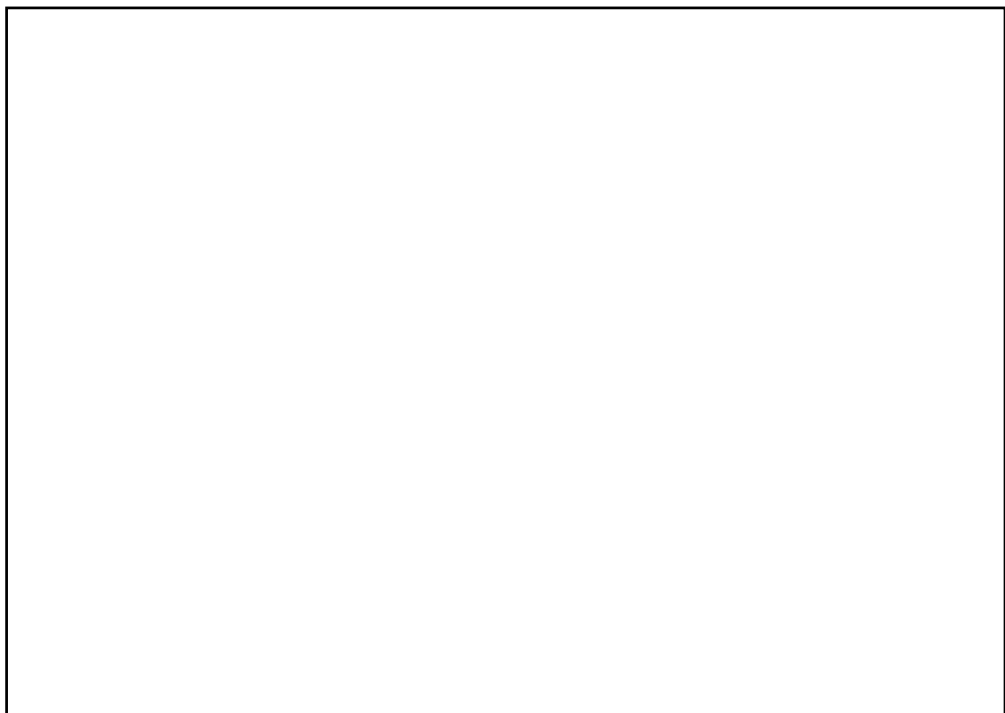
**Typical Situation:** Significant slopes (greater than 35%); deep, medium textured soils.

**Assumed Modifiers:** d, m

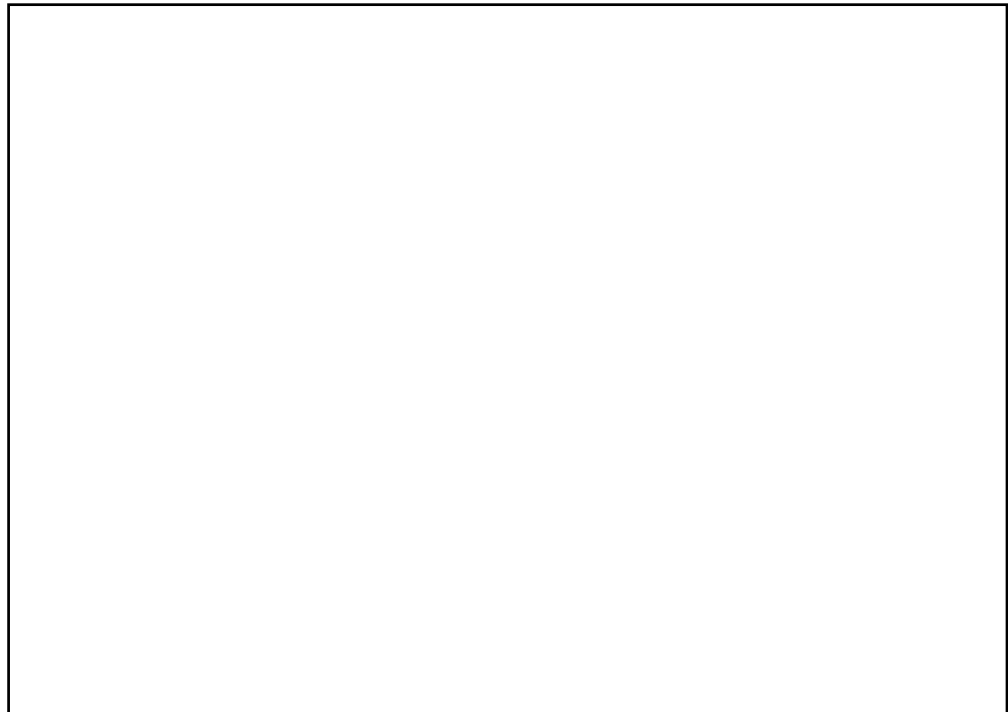
**Description:** This ecosystem also includes 04 HmBa – Bramble, which has been rarely observed and is indistinguishable on aerial photos.

#### Photo 39

MB6 in the  
Ursus Creek  
watershed



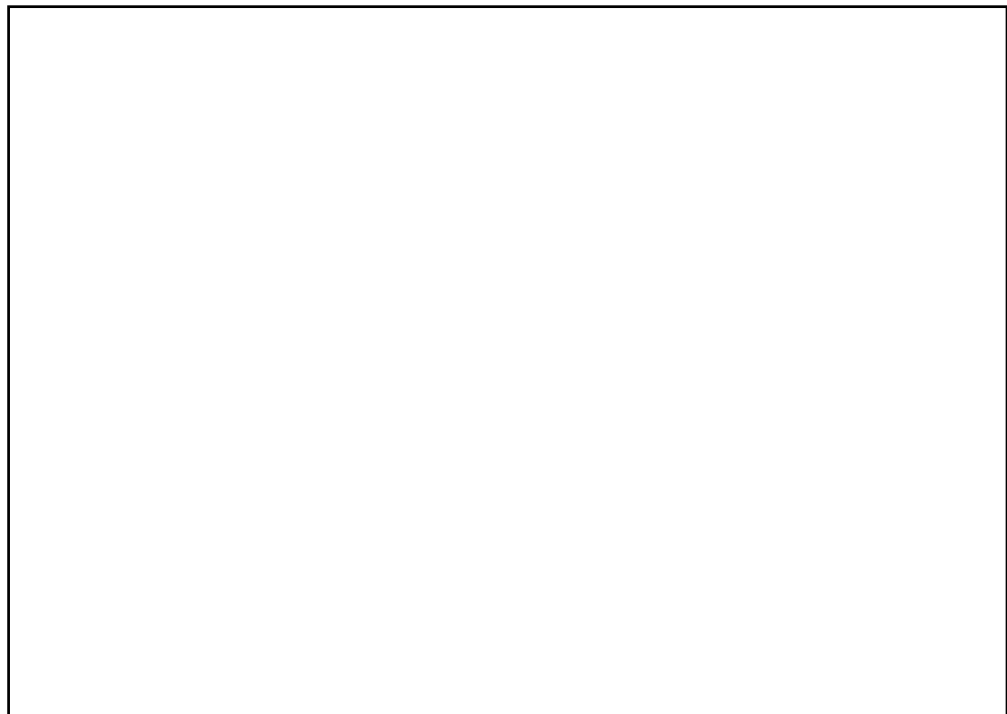
Structural Stage	3	3a/3b	4	5	6	7
Plots		H65 3 visuals	2 visuals	1 visual	S17, S18, K03, G2K13, G2K271 4 visuals	2K02, 94U12, G2K127, G2K203, G2K214, G2K215, G2K216, G2K225, G27274, G95T54, G3J4 8 visuals
Site Modifiers		g, h, j, k, n, q, r, s, v, w, z	g, k, s, v, w, z	h, j, k, s, v, w	g, h, j, k, n, q, s, v, w, z	g, h, j, k, q, r, s, v, w, z
Dominant Vegetation	No information	These stunted forests occur on slopes where soils are usually shallow and climatic conditions are severe. Yellow-cedar, mountain hemlock, and amabilis fir are scattered or in clumps. Copperbush, Alaskan and oval-leaved blueberries can be sparse or common. Herbs are diverse and include deer fern, fern-leaved goldthread, bunchberry, partridgefoot, and white and pink mountain heathers. Bryophytes range from sparse to common and include <i>Dicranum</i> species, <i>cladonia</i> species, lanky moss, step moss, and roadside rock moss.	Insufficient information	Insufficient information	Similar to 7	Mesic forests in the MH zone have a tree cover dominated by mountain hemlock and yellow-cedar. Amabilis fir and western hemlock also occur. The shrub layer has abundant Alaskan and oval-leaved blueberries and black huckleberry. The herb layer is scattered and includes five-leaved bramble, deer fern, bunchberry and pink and white mountain heathers. Mosses are common and include lanky, pipecleaner and <i>Dicranum</i> species.
Associates					Similar to 7	False azalea may occur.

**5.5.1.2 Mountain hemlock – Mountain heather****Site Series:** 02 HmBa - Mountain heather**Ecosystem:** MM**Structural Stages:** Pole sapling, young, mature, and old stands occur. Trees in these areas are sometimes stunted and mapped as shrub-dominated ecosystems.**General Distribution:** These ecosystems only occur along the watershed boundaries in dry, rocky areas above 800 m. They are infrequent in the study area.**Typical Situation:** Gentle slopes; crest position; shallow soils.**Assumed Modifiers:** j, r, s**Photo 40**MM in  
plot V95T50  
Pretty Girl Area

Structural Stage	3a/3b	4	5	6	7
<b>Plots</b>	K01,K02, K81, S15, 2K126, 94U11, G2K201,G2H301, G94U13, G3J15 5 visuals		G2D50 1 visual	1 visual	S01,G2K212, G2K226, G94U30,G3J20 11 visuals
<b>Site Modifiers</b>	h, k, q, v, w	h, k, v, w	h, k, q, v, w	h, k, q,v, w	g, h, k,q, v, w, z
<b>Dominant Vegetation</b>	This unit is similar to structural stage 7 except that the trees are more stunted.	No information	Similar to 7	Similar to 7	Parkland areas on rocky sites tend to be quite xeric. Yellow-cedar, mountain hemlock, and scattered western hemlock, lodgepole pine, and western white pine occur in open stands of stunted trees. Yellow-cedar and amabilis fir are common in the shrub layer, as is Alaskan blueberry. Copperbush , oval-leaved blueberry, and false azalea are scattered. Pink and white mountain heathers dominate the herb layer but crowberry also occurs. Pipecleaner moss, lanky moss lichens and hoary rock moss are very common in these units.
<b>Associates</b>					

**5.5.1.3 Mountain hemlock - Oak fern****Site Series:** 03 HmBa - Oak fern**Ecosystem:** MO**Structural Stages:** Mature, old forests, young forests, and recently logged or pole sapling stands occur. Avalanching has also resulted in some shrubby sites.**General Distribution:** This ecosystem occurs rarely within the study areas, but it is mapped in most areas where the MH zone occurs. It is found on slopes with good drainage and deep soils.**Typical Situation:** Significant slopes (greater than 35%); deep, medium textured soils; richer nutrient regime.**Assumed Modifiers:** d, m**Photo 41**MO7  
in plot H67  
Tofino Creek  
watershed

Structural Stage	3	3b	4	5	6	7
Plots		2 visuals				K62, G2K269, G3J18 1 visual
Site Modifiers	k, s	k, n, s, v	j, k, n, s, w, z	j	j, k, s, v, w	g, j, k, n, s, v, w, z
Dominant Vegetation	No information	Shrub forests have scattered mountain hemlock, western redcedar and amabilis fir. Other shrubs include copperbush, and Alaskan blueberry. The herbaceous layer is diverse with foam flowers and partridgefoot	No information	No information	Similar to 7	The tree layer consists of mountain hemlock, yellow-cedar and amabilis fir. Shrubs include copper bush, Sitka alder, Alaskan blueberry, black huckleberry and salmonberry. Five-leaved bramble, foamflowers, and Indian hellebore occur in the herb layer. Mosses include lanky moss, pipecleaner moss and species of <i>Dicranum</i> .
Associates						

**5.5.1.4. Mountain hemlock - Twisted stalk****Site Series:** 05 BaHm – Twisted stalk**Ecosystem:** MT**Structural Stages:** Old forests occur that are sometimes mapped as shrubby because the trees are stunted.**General Distribution:** This ecosystem is infrequently mapped within Clayoquot Sound. It occurs in the Bedwell, Catface, Kennedy River, and Ursus Creek study areas.**Typical Situation:** Significant slopes (greater than 35%); deep, medium textured soils; middle to lower slope position; seepage; richer nutrient regime.**Assumed Modifiers:** d, m**Description:** In this project, polygons mapped as this ecosystem (MT) may also include other ecosystems listed in the Vancouver field guide: 06 HmYc – Deer-cabbage (MD) and 07 YCHm – Hellebore (YH). These ecosystems cannot be separated out by air photo interpretation and small pockets exist.**Photo 42**MT7 in plot  
2H303  
Ursus Creek  
watershed



Structural Stage	3	3a/3b	4	5	6	7
Plots		K82		G2K211		2H303, G2K269, 3 visuals
Site Modifiers		j, v, w	a, j, k	k	j, k, s, w	a, h, j, k, n, q, s, w, v, z
Dominant Vegetation	No information	Similar to 7 except that the trees are stunted and more open.	Similar to 3a and 3b but the trees are taller and closer together. This unit has been found in areas where avalanching has occurred and eventually will develop to a structural stage 7.	These young forests are similar in species composition to the mature and old forests except that the tree canopy is more open and trees are smaller in size. The canopy is dominated by mountain hemlock with yellow-cedar, mountain hemlock, and amabilis fir in the shrub layer. Other shrubs include copperbush, blueberries, false azalea, and white rhododendron. Herbs are diverse and similar to the older stands.	Similar to 7	Mountain hemlock, amabilis fir, and yellow-cedar form the fairly open tree canopy. The shrub layer can consist of dense copperbush with scattered oval-leaved blueberry, Alaskan blueberry, and false azalea. The herbaceous layer is varied and includes pink and white mountain heathers, Indian hellebore, deer-cabbage, five-leaved bramble, foam flowers, white marsh-marigold and deer fern, and clasping twisted stalk may be present. The bryophyte layer can be thick in some areas and includes pipecleaner moss, lanky moss, mountain leafy liverwort, <i>Cladonia</i> species, <i>Dicranum</i> , and <i>Sphagnum</i> species.
Associates						

## 5.5.2 Shrub and Herb Dominated Ecosystems

### 5.5.2.1. Indian hellebore – Fern

**Plots:** 3H07

**Site Series:** Similar to 51 Avalanche Track described in the Prince Rupert Field Guide.

**Ecosystem:** IF, Indian hellebore – Fern

**Structural Stages:** These ecosystems are herb dominated (2a)

**General Distribution:** These herbaceous slide tracks only occur in the Kennedy River watershed

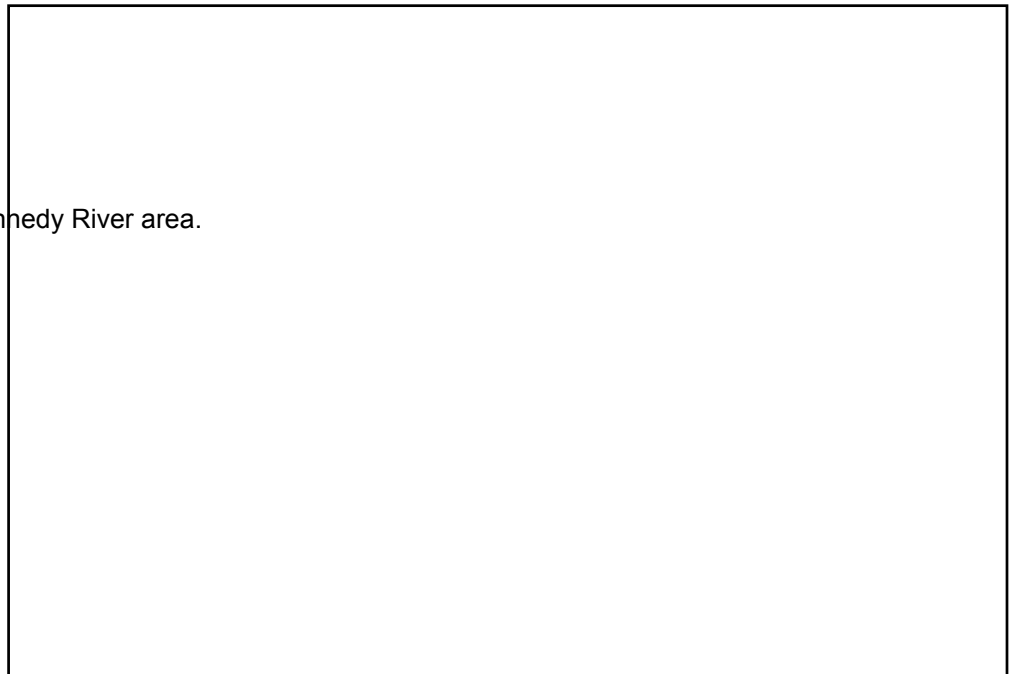
**Typical Situation:** Gentle to moderate lower colluvial slopes at the toe of avalanche tracks.

**Assumed Modifiers:** j

**Description:** These herbaceous slide areas have been described for the Prince Rupert Region. They occur on the toe of avalanche tracks, usually below the shrubby ecosystem SA (Salmonberry – Sitka alder). These units consist of a diverse layer of lush herbs dominated by Indian hellebore and lady fern. Cow parsnip, Sitka burnet, alpine lady fern, Sitka valerian and sedges are abundant in these meadows. Other herbs often scattered throughout this ecosystem include leafy aster, foam flowers, western meadow rue, and a variety of grasses. A sparse moss layer is usually present and consists primarily of leafy mosses.

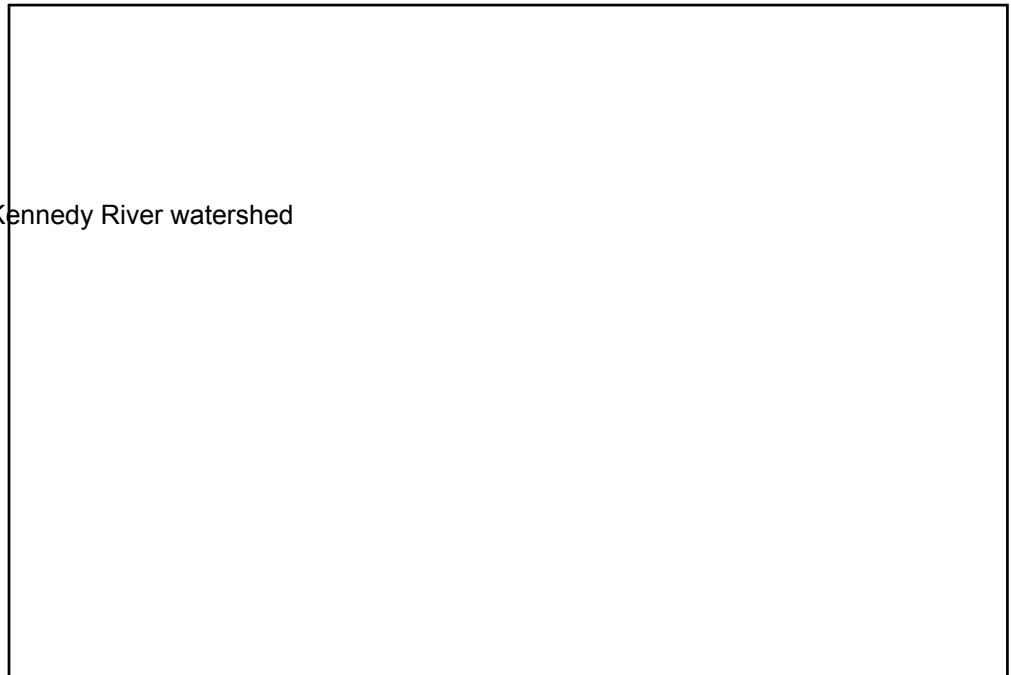
#### Photo 43

IF2a in plot 3H07. Kennedy River area.



**5.5.2.2 Arctic lupine – Subalpine daisy****Plots:** 3H03, G3H15, G3H18, G3J10, 2 visuals**Ecosystem:** LD Arctic lupine – Subalpine daisy**Site Modifiers:****Structural Stages:** This ecosystem is always herbaceous and usually dominated by forbs. (2a).**General Distribution:** These meadows are found on steep colluvial (talus) upper slopes in the Kennedy River study area. They are most common in the parkland subzone (MHmmp1), but can occur below 1200 m in the MHmm1.**Typical Situation:** Steep colluvial slopes, where snow pack lasts late into the year. Aspects are variable.**Assumed Modifiers:** -**Description:** A diverse number of herbs and sedges dominate these lush, moist subalpine meadows. Arctic lupine, subalpine daisy, Sitka valerian, and mountain arnica are abundant. Other species include bracted lousewort, partridgefoot, pink monkey-flower, Alaska saxifrage, stream saxifrage, Tolmie's saxifrage, Indian hellebore, and a variety of grasses. Herbaceous species can vary within these meadows depending upon the amount of seepage. As seepage becomes greater, lupines become more abundant, and the general species diversity is often higher. With even more seepage and steeper slopes, Indian hellebore can dominate.**Photo 44**

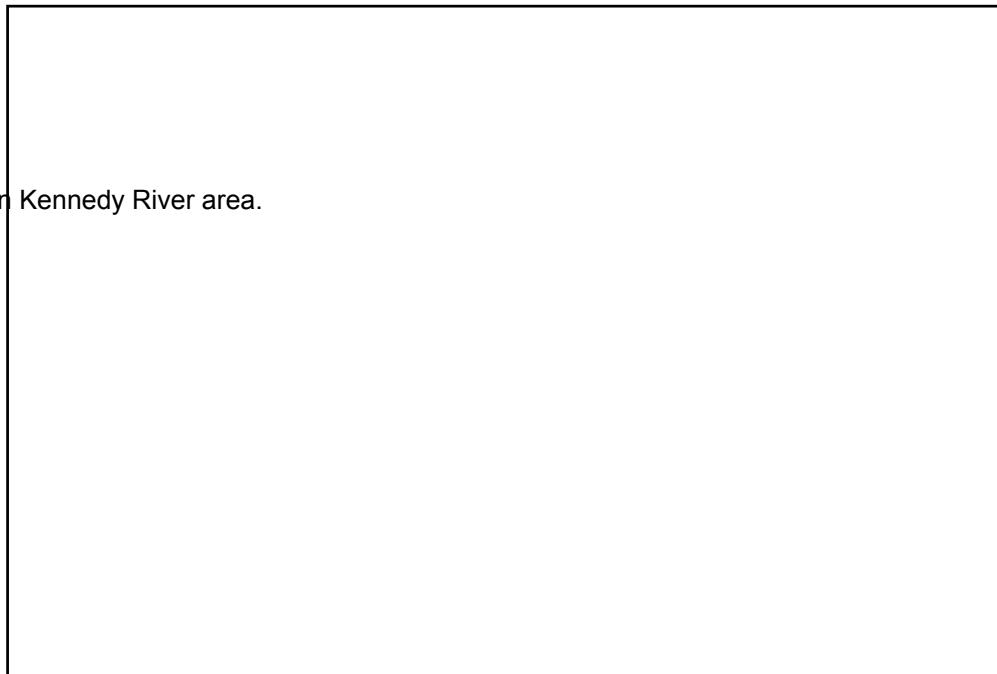
LD2a in plot 3H03. Kennedy River watershed



**5.5.2.3 Mountain heather heath****Plots:** 2H306, H26, G3H2, G3J2, 2 visuals**Ecosystem:** MH, Mountain heather heath**Site Modifiers:** h, k, q, w, z**Structural Stages:** This ecosystem is always a low shrub (2d).**General Distribution:** This unit is rare within the study area and is found only in the parkland (MHmm(p)1). It occurs along the ridgetops of the Cotter Creek drainage in Catface, Kennedy River, Tofino Creek, Tranquil Creek, and Ursus Creek watersheds.**Typical Situation:** Shallow, rocky soils on ridgetops and down gentle to moderate slopes of all aspects.**Assumed Modifiers:** s**Description:** This low shrub ecosystem is usually found in complexes with rock (RO) and krummholz (MK). Scattered mountain hemlock and yellow-cedar may occur. Pink mountain-heather and white mountain-heather dominate the ground cover. Crowberry and blueberries are usually present. Herbs are sparse and may include saxifrage, partridgefoot, and lousewort. Mosses are scattered on the rocks. Pipecleaner moss, *Cladonia*, and species of *Dicranum* are most common.**Photo 45**Plot 2H306  
in MH2d  
Ursus Creek  
watershed

**5.5.2.4 Mountain hemlock – Krummholz****Plots:** 2H307, 94U10, G3H17, 4 visuals**Ecosystem:** MK, Mountain hemlock - krummholz**Site Modifiers:** h, k, q, r, v, w, z**Structural Stages:** These are low shrub ecosystems (3a).**General Distribution:** These shrubby sites are limited to rocky slopes or ridge top locations within the parkland subzone in, Bedwell, Catface, Kennedy River, Tranquil Creek, Tofino Creek and Ursus Creek study areas.**Typical Situation:** Well drained; gentle to steep, rocky slopes of shallow soils; variable aspect.**Assumed Modifiers:** j, s**Description:** Yellow-cedar in a spreading shrub form is the dominant tree species on these dry sites. Mountain hemlock also occurs but tends to be in krummholz form – upright and stunted. Scattered Sitka alder, salal, copperbush, and blueberries may also occur. Crowberry, pink mountain-heather, and white mountain-heather form the main ground cover, but alpine-azalea, partridgefoot, and bunchberry may be scattered. Lichens and mosses are scattered, and bare rock occurs. Pipecleaner moss and species of *Dicranum* are commonly found.**Photo 46**

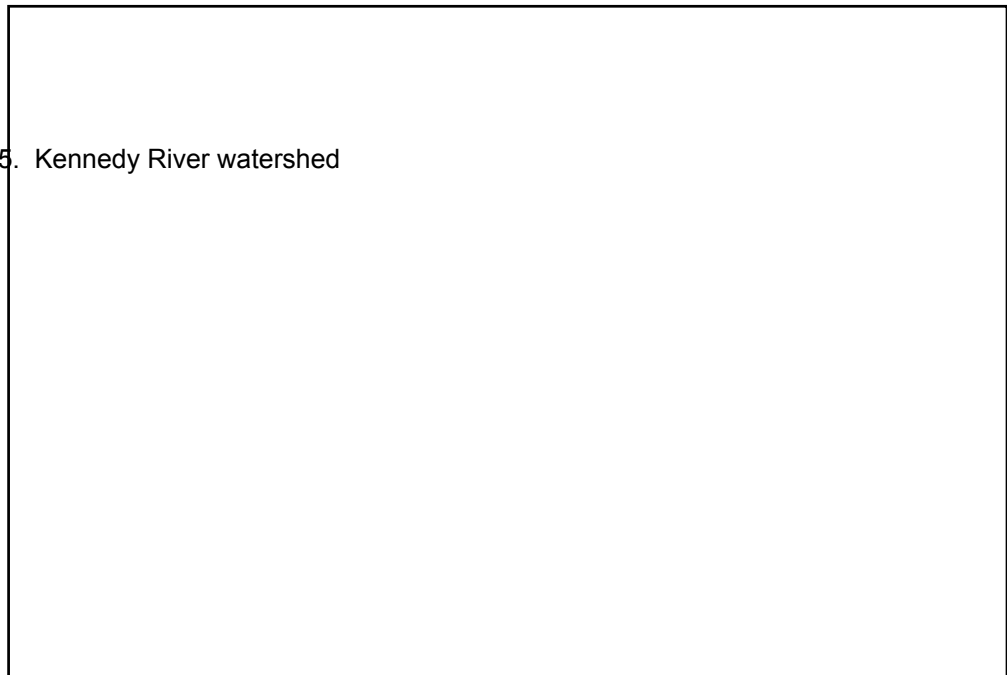
MK3a in plot 3H01 in Kennedy River area.



**5.5.2.5 Salmonberry - Sitka alder****Plots:** 4 visuals**Site Series:** 51 Avalanche track**Ecosystem:** SA, Salmonberry – Sitka alder**Site Modifiers:** g, k, n, q, v, w, z**Structural Stages:** These are always shrub-dominated ecosystems (3).**General Distribution:** These ecosystems are only found scattered in the headwaters of major creeks on avalanche tracks.**Typical Situation:** Limited to active avalanche tracks situated on colluvial blankets and cones.**Assumed Modifiers:** -**Description:** They usually have a dense cover of salmonberry as a vigorous low shrub. Devil's club can be common, and false azalea is often present. Coniferous species and Sitka alder form the tall shrub layer if it is present. Lady fern, oak fern, and sword fern are quite common. Three-leaved foamflower, five-leaved bramble, and Indian hellebore are more scattered. Bryophytes cover much of the boulder surfaces and include lanky, step, and coastal leafy mosses, as well as *Scapania* and *Dicranum* species.**5.5.2.6 Sphagnum – Cotton-grass****Plots:** 94U10, G2H305, 5 visuals**Ecosystem:** SC, Sphagnum – Cotton-grass**Site Modifiers:** n**Structural Stages:** This community is always herbaceous (2b).**General Distribution:** Fens are limited to organic deposits that are adjacent to lakes or are drained by a stream so that there is significant water movement through the soil. They are infrequent in the study area and have only been mapped in the Catface, Bedwell, Hesquiat, Kennedy River, Tranquil Creek, and Ursus Creek study areas.**Typical Situation:** Organic blankets.**Assumed Modifiers:** p**Description:** These wetlands are dominated by various sedges, grasses, and *Sphagnum* mosses. *Sphagnum* species carpet the ground, but the herb layer is quite diverse. Deer cabbage, white marsh-marigold, partridgefoot, white heather, and pink heather are usually present. Sitka alder can be scattered.

**5.5.2.7 Sitka valerian – Sedge meadow****Plots:** 3H05, G3J16, 3 visuals**Ecosystem:** VS, Sitka valerian – Sedge meadow**Site Modifiers:** a,n**Structural Stages:** This ecosystem is dominated by forbs (2a).**General Distribution:** These meadows are limited to fluvial fans. They are infrequent in the study area and have only been mapped in the Kennedy River watershed.**Typical Situation:** Gentle slopes on fluvial fans, where water movement is continuous.**Assumed Modifiers:** j**Description:** These lush diverse meadows are usually dominated by Sitka valerian, sedges, and grasses. Subalpine daisy, arctic lupine, and mountain arnica are also quite common. A variety of moisture loving herbs are scattered throughout these meadows and can include Sitka burnet, broad-leaved marsh marigold, violets, Indian hellebore, and cow parsnip. Indian hellebore and arctic lupine increase in percent cover as seepage increases towards the toe of the fans.**Photo 47**

VS2a in plot 3H05. Kennedy River watershed



**5.5.3 Sparsely Vegetated, Non-Vegetated, and Anthropogenic Units****5.5.3.1 Cliff****Plots:** 1 visual**Ecosystem:** CL, Cliff**Site Modifiers:** q**Structural Stages:** essentially non-vegetated (1)**General Distribution:** Rare within Clayoquot Sound and only mapped in the Kennedy River study area.**Description:** A steep, vertical or overhanging rock face.**5.5.3.2 Gravel Bar****Plots:****Ecosystem:** GB, Gravel Bar**Site Modifiers:** k**Structural Stages:** Gravel bars are essentially non-vegetated (1).**General Distribution:** Along the lower reaches of larger river and creek systems, the gravel bars are more extensive and can therefore be mapped. They are rare in the MHmm1 and have only been mapped in the Kennedy River study area.**Description:** These sites are small and are essentially non-vegetated gravel bars that are inundated for a long duration in high flow periods. On older gravel bars where flooding is less frequent scattered herbs, shrubs, and mosses (less than 10% cover) may be present.**5.5.3.3 Exposed Soil****Plots:** 2 visuals**Ecosystem:** ES, Exposed Soil**Site Modifiers:** g, k, s, w, z**Structural Stages:** Essentially non-vegetated(1).**General distribution:** These units are rare within the study area.**Description:** Most areas mapped ES are recent slides, although some avalanche sites are included.



**5.5.3.4 Lake****Ecosystem:** LA, Lake**Structural Stages:** Not applicable.**General Distribution:** Small lakes are scattered throughout the study areas. Large lakes occur in the Hesquiat, Kennedy River, Pretty Girl, and Tranquil Creek areas.**Description:** Lakes are deeper than 2 m and have no vegetation on the surface.**5.5.3.5 Shallow Open Water****Ecosystem:** OW, Shallow Open Water**Structural Stages:** Not applicable.**General Distribution:** Lakes less than 2 m in depth are rare in the study area but are scattered throughout.**Description:** Water bodies classified as open water usually have some vegetation on the surface and around the edge where the depth is shallow enough to allow vegetation establishment. Sedges and rushes may be scattered along the water's edge.**5.5.3.6 Permanent Snow****Ecosystem:** PS, Permanent Snow**Structural Stages:** Not applicable.**General Distribution:** This unit is rarely mapped but is scattered at high elevations in the parkland subzone.**Description:** This unit consists of snow or ice that is not part of a glacier but persists into the summer months.

**5.5.3.7 Rock Outcrop**

**Plots:** 3J01,(limestone) G3J11, (limestone) 94U39, 5 visuals

**Ecosystem:** RO, Rock Outcrop

**Site Modifiers:** g, h, k, n, q, r, w, z

**Structural Stages:** These are essentially non-vegetated (1).

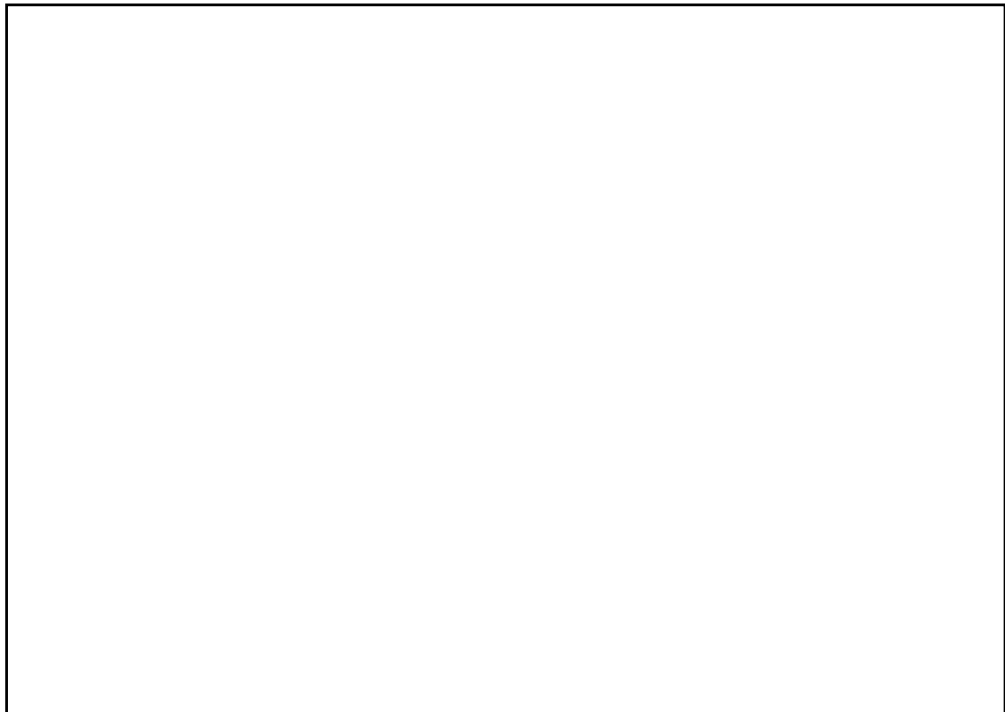
**General Distribution:** Rock outcrops occur along the upper boundaries of several of the study areas.

**Description:** Where these outcrops are generally north-facing, there will be little vegetation at higher elevations. On warmer aspects, outcrops will have significant lichen cover. Isolated yellow cedar and mountain hemlock will occur.

Limestone rock outcroppings in the upper Kennedy River valley have a much greater species diversity in the herb layer than non-calcareous sites. Total cover is very low (<10%), but the number of species is high. Thirty one species were identified in plot 3J01 (9810801) including western hedsarum (*Hedysarum occidentale*) which is blue listed. The most commonly occurring species are green spleenwort, cut-leaved anemone, smooth alumroot, and mountain holly fern. Less common species include willowherbs, several saxifrages, and mountain death camas.

**Photo 48**

Rock bluffs  
mixed with  
mesic forest  
MB in Tofino  
Creek watershed



**5.5.3.8 Talus****Plots:** 3J39, 1 visual**Ecosystem:** TA, Talus**Site Modifiers:** k, n, w, z**Structural Stages:** Non to sparsely vegetated (1).**General Distribution:** Talus slopes are scattered throughout the study area.**Description:** These slopes are rock fragments accumulated at the foot of steep rock slopes, and they are the products of successive rockfalls. In some areas the slopes are unvegetated, but on others, species are quite diverse and include ferns and a variety of forbs.

## **6.0 SPECIFIC AREA DESCRIPTIONS**

Year 1 and 2 areas are listed here but the reports for these areas have already been submitted in the Year 2 report (1998) and are not repeated in this edition.

Two areas, Flores Island and Bulson Creek, were completed in the terrain inventory in Year 1; however, the ecosystem mapping had just been completed by Shearwater Mapping Ltd. and a decision was made not to include these areas in this project for TEM. Differences between the mapping of these areas and the mapping completed under this project are discussed for each area.

A description of each area mapped in Year 3 follows. The general location and extent is described first. Topography and drainage patterns are then described, and variations in terrain are summarized. Watersheds mentioned are shown in Figure 2. For a more detailed account of the various surficial and geomorphic processes, please refer to the terrain inventory report by Madrone Consultants Ltd. in 1999. Biogeoclimatic units present are identified, and a discussion of the ecosystem units and sampling intensity follows.

**Figure 2. Watershed Map**



## **YEAR ONE STUDY AREAS**

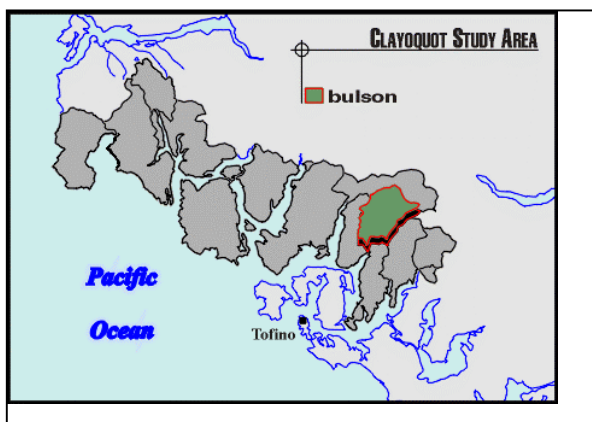
**Bedwell  
Catface  
Fortune  
Hesquiat Peninsula  
Sydney River  
Tofino Creek  
Tranquil Creek**



**YEAR ONE STUDY AREAS  
NOT MAPPED BY  
MADRONE CONSULTANTS**



## BULSON CREEK STUDY AREA





## 6.1 Bulson Creek

### 6.1.1 Introduction

TEM mapping for Bulson Creek watershed was completed by Shearwater Mapping Ltd. for MacMillan Bloedel Limited. Fieldwork was carried out in 1995 and the accompanying report was completed in April 1996 (Clement 1996).

The following comparison of mapping methodology and ecosystem labelling has been made based on information in their report and this report. There are some differences immediately apparent between the mapping completed by the two companies. Biogeoclimatic boundaries, ecosystem units, and site modifiers all vary.

### 6.1.2 Biogeoclimatic Boundaries

The choice of the elevation at which biogeoclimatic units change is shown in Table 13. All boundaries are somewhat different, and it appears that the MHmmp1 parkland has been mapped within the AT on Shearwater maps and as a separate unit in those of Madrone. Any analysis made on the occurrence or area of biogeoclimatic units will not be consistent between study areas and, in the case of the MHmmp1 comparison, is only possible when combined with the AT. Furthermore, the boundaries for the Bulson watershed will not meet the surrounding areas mapped by Madrone.

**Table 13. Bulson Creek Biogeoclimatic Unit Boundaries**

Biogeoclimatic Unit	Field Guide Elevations in metres	Shearwater Elevations in metres	Madrone Elevations in metres
CWHvm1	up to 600	to 600 on warm aspect, 550 on cool aspect	to 600
CWHvm2	600-900	600- 950 on warm aspect 550-900 on cool	600 to 800
MHmm1	900-1300	900/950 to 1250	800 - 1200/1250.
MHmmp1	1300-1600	Not mapped	1200/1250 to approx. 1500-1525.
AT	Above 1600 (Mt. Arrowsmith)	Above 1250	Above approx. 1500 Not mapped yet.

### 6.1.3 Analysis of Ecosystem Unit Differences

There is a significant difference in the use of not only site series but also shrub, herbaceous communities, and sparsely vegetated sites. The following tables list ecosystems identified in one report only. Where the ecosystems are on the same line, it is assumed they are actually equivalent ecosystems given different names by each company. The degree of variation in the two legends together with the different style of labelling will mean that any analysis of ecosystem distribution or frequency will be difficult.

#### 6.1.3.1 CWHvm

Floodplain units dominated by red alder have been mapped as CD by Shearwater and CW by Madrone, but they are probably the same unit. YG units have been mapped quite commonly in the vm1 by Madrone, but not Shearwater. Shrub and herbaceous wetlands match in some cases but both have wetland types unique to their study areas. These differences are summarized in Table 14 below.

**Table 14. Differences between Shearwater and Madrone in CWHvm Mapping for Bulson Creek**

Biogeoclimatic Unit	Shearwater	Madrone
CWHvm 1 and 2	10 CD	
		11CW
		12 in vm1-YG
		AW Red alder-Fern slide/slump
		CM Rocky Mountain cow-lily – Marsh cinquefoil marsh
		IF Indian hellebore - Fern
		PD Pacific crabapple – Red-osier dogwood
		SC Sphagnum-Cotton-grass
	SC Sedge-Skunk Cabbage	SG Sphagnum-Deer cabbage
	WH Sitka willow-Hardhack	WS Willow-Salmonberry
	SH St John's Wort-Tufted hairgrass	

### 6.1.3.2 *MHmm1*

The moister forested units of the MH zone have been mapped quite differently by the two companies; however, the krummholz, heather, and meadow communities of the parkland have been identified by both. Differences are listed in Table 15 below.

**Table 15. Differences between Shearwater and Madrone in MHmm1 Mapping for Bulson Creek**

Biogeoclimatic Unit	Shearwater	Madrone
MHmm1/MHmmp		
	04AB	
	07 YH	
	08YS	
		05/07 MT
	SB Sedge - Burnet meadow	VS Sitka valerian – Sedge meadow
	YM Yellow-cedar-Mountain hemlock krummholz	MK Mountain hemlock krummholz
	MR Mountain heather – Racomitrium scrub	MH Mountain heather meadow
		LD Arctic lupine – Alpine daisy meadow
AT	MR	MH
		MK

### 6.1.3.3 *Sparsely Vegetated, Non-Vegetated, and Anthropogenic Units*

Madrone has identified areas of recent slumping, permanent snowpack and anthropogenic units as shown in Table 16 below.

**Table 16. Sparsely Vegetated, Non-Vegetated, and Anthropogenic Units**

Shearwater	Madrone
	ES Exposed Soil
	GP Gravel Pit
	PS Permanent Snow
	RR Rural

**6.1.3.4 Use of Site modifiers**

According to Clement (1996) and the map legend of Madrone the site modifiers shown in Table 17 have been utilised in the mapping.

**Table 17. The Use of Site Modifiers**

Shearwater	Madrone
	a
c	c
g	g
	h
	j
k	k
n	n
p	p
	q
	r
s	s
t	t
v	v
w	w
	z



## FLORES ISLAND STUDY AREA



## 6.2 Flores Island

### 6.2.1 Introduction

Flores Island TEM mapping was completed by Shearwater Mapping Ltd. for MacMillan Bloedel Limited. Fieldwork was carried out in 1995 and the accompanying report was completed in April 1996 (Clement 1996).

The following comparison of mapping methodology and ecosystem labelling has been made based on information in their report and this report. There are some differences immediately apparent between the mapping completed by the two companies. Biogeoclimatic boundaries, ecosystem units, and site modifiers all vary.

### 6.2.2 Biogeoclimatic Boundaries

The choice of the elevation at which biogeoclimatic units change is shown in Table 18 below. This means that any analysis done on the occurrence, area, etc. of biogeoclimatic units will not be consistent between the different data sets.

**Table 18. Flores Island Biogeoclimatic Unit Boundaries**

Biogeoclimatic Unit	Field Guide Elevations in metres	Shearwater Elevations in metres	Madrone Elevations in metres
CWHvh1	Below 150	Below 150	Below 200
CWHvm1	up to 600	to 600 on warm aspect, 550 on cool	to 600
CWHvm2	600-900	600- 950 on warm aspect 550-900 on cool	600 to 800

### 6.2.3 Initial Analysis of Ecosystem Unit Differences

There is quite a difference in the use of not only site series, but also shrub, herbaceous communities, and sparsely vegetated sites. The following tables list ecosystems used only by one company. Where the ecosystems are on the same line it is assumed they are actually equivalent ecosystems given different names by each company. There is a discrepancy between the units shown on the photos of Flores Island and the units described in the report, hence the comparisons that follow use the report as the basis. The maps and databases have not been seen.

Two changes to Shearwater's database have been made subsequent to discussions with Del Meidinger of the Research Branch in the Ministry of Forests in Victoria. These are shown in the tables below. The degree of variation in the two legends together with the different style of labelling will mean that any analysis of ecosystem distribution or frequency will be difficult.

**6.2.3.1 CWHvh1**

The outer coast units of the CWHvh1 (SS,SK,SW.) on Flores Island were not initially identified. This omission was discussed in 1996 and Shearwater was going to address the issue; however, this is not reflected in the report dated April 1996, but may have been addressed in the databases. Several wetland shrub and herbaceous ecosystems have been identified by Madrone. These differences are summarized in Table 19 below.

**Table 19. Differences between Shearwater and Madrone in CWHvh1 Mapping for Flores Island**

Biogeoclimatic Unit	Shearwater	Madrone	Adjustments by MOF
CWHvh1		08 SL	
		10 AL	
	Now mapped?	14 SS	
	Now mapped?	15 SK	
	Now mapped?	17 SW	
		BS Bulrush - Sitka burnet marsh	
		CM Rocky Mountain cow-lily - Marsh cinquefoil marsh	
	WY Dune wildrye-Yarrow beach estuary	DS Dunegrass-Silverweed	WY changed to DS in Shearwater's database
	TH in CWHvm	GS Tufted hairgrass-Silverweed	
		PC Pacific crabapple-Sedge	
		PD Pacific crabapple-Red-osier dogwood	
		SB Sedge-Buckbean	
	PS Shore pine-Sedge	SM Sweetgale-Sphagnum	

**6.2.3.2 CWHvm**

YG units have been mapped quite commonly in the vm1 by Madrone but not by Shearwater. Floodplain ecosystems have been adjusted by the MOF to match. Shrub and herbaceous wetlands match in some cases, but both have wetland types unique to their study areas. These differences are shown in Table 20 below.

**Table 20. Differences between Shearwater and Madrone in CWHvm Mapping for Flores Island**

Biogeoclimatic Unit	Shearwater	Madrone	Adjustments made by MOF
CWHvm 1 and 2	10 CD		CD has been changed to CW in Shearwater's database.
		11CW	
		12 in vm1-YG	
		AW Red alder-fern slide/slump	
		CM Rocky Mountain cow-lily – Marsh cinquefoil marsh	
		DS Dune grass - Silverweed	
	TH Tufted hairgrass estuary	GS Tufted hairgrass-Silverweed	
		PD Pacific crabapple – Red osier dogwood.	
		SC Sphagnum-grass	
	SC Sedge-Skunk cabbage	SG Sphagnum-Deer cabbage	
		SM Sweetgale-Sphagnum	
	WH Sitka willow-Hardhack	WS Willow-Salmonberry	
	SH St John's wort-Tufted hairgrass		



In Table 21, Madrone has identified several coastal units, areas of recent slumping, and anthropogenic units that Shearwater has not used.

**Table 21. Sparsely-vegetated, Non-Vegetated and Anthropogenic Units (Flores Island)**

Shearwater	Madrone
	BE Beach
	CB Cobble Beach
	ES Exposed Soil
	GP Gravel Pit
	RR Rural
	WP Wave-cut platform

### 6.2.3.3 Use Of Site Modifiers

According to the report by Shearwater (Clement 1996) and the map legend of Madrone, the following site modifiers have been utilized in the mapping.

**Table 22. The Use of Site Modifiers (Flores Island)**

Shearwater	Madrone
	a
c	c
g	g
	h
	j
k	k
n	n
p	p
	q
	r
s	s
t	t
v	v
w	w
	z



## **YEAR TWO STUDY AREAS**

**Atleo  
Hesquiat  
Marble  
Pretty Girl  
Ursus Creek**



## YEAR THREE STUDY AREAS



## KENNEDY RIVER STUDY AREA



### 6.3 Kennedy River

#### 6.3.1 Location and Extent

The Kennedy River watershed lies on the eastern edge of the Clayoquot study area and is shown in Figure 3, below. It extends from sea level to an elevation of approximately 1500 m. Clayoquot Arm, Clayoquot River, and Tofino Creek lie to the west, while Kennedy Lake lies to the south. The northern boundary follows the southern divides of the Ursus Creek and Taylor River watersheds and crosses Highway 4 at Sutton Pass. The boundary then follows the height of land south along the Mackenzie Range. Adder Mountain, 5040 Peak, and Cat's Ear Peak all lie on this boundary. The southern boundary crosses the Kennedy River close to Kennedy Lake and then follows the height of land of the Maitland Range along the western side of the river to Steamboat Mountain. This boundary follows the watershed boundary across the Clayoquot Plateau Provincial Park and then continues in a north-easterly direction along the height of land to the headwaters of Kennedy River. The total area is approximately 20,347 hectares. It is comprised of watershed numbers: 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 306, 307, and 309.

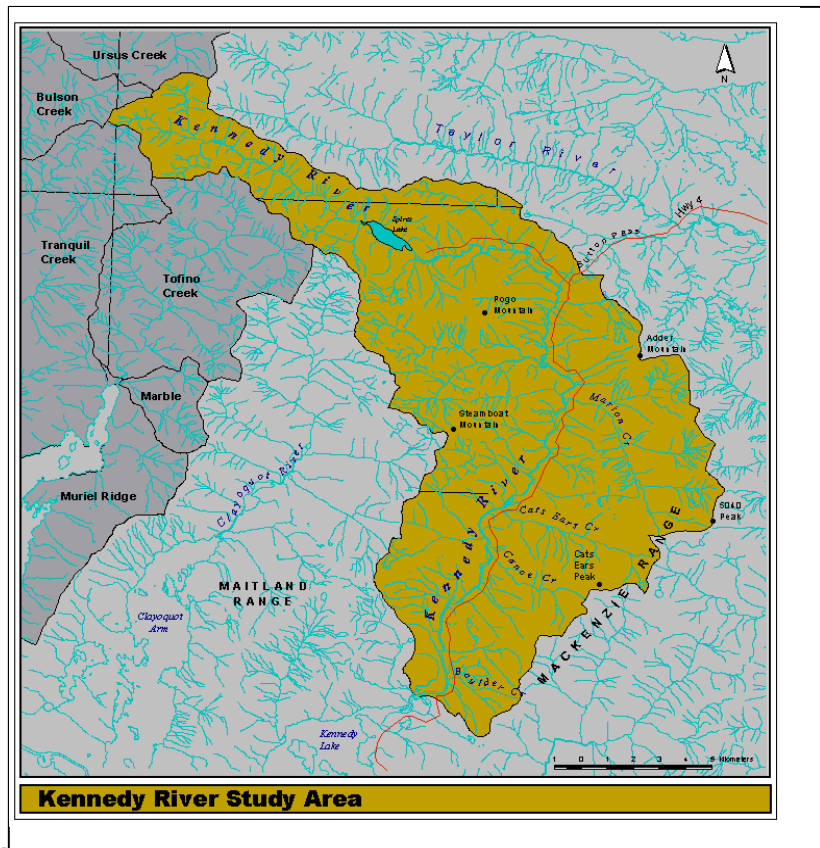


Figure 3. Kennedy River Study Area

### **6.3.2 Topography and Drainage**

Kennedy River is the largest watershed in the Clayoquot Sound study area. The river flows in a predominately southwesterly direction from its headwaters to Sutton Pass, where it changes course abruptly to flow in a southerly direction to Kennedy Lake. Slopes are steep and rugged in the upper valley with generally north and south aspects.

South of Sutton Pass, the valley slopes are steep and rugged above the wide floodplain but sections of more gentle, hummocky terrain are found northwest of Adder Mountain, between Boulder Creek and Canoe Creek, on the upper slopes west of Marion Creek, and on the west side of the river in the southern portion of the study area. Tributary creeks generally flow in an east or west direction into Kennedy River. The main exception to this is Marion Creek that flows north to join the river. The main valley slopes are generally east and west facing, while tributary valleys' sides have north and south aspects

The broad floodplain of Kennedy River extends to its upper reaches. Cat's Ear Creek and Marion Creek also have small pockets of floodplain.

One large lake, Spire Lake, occurs in the northern section of the river valley. This lake was formed by a large slope failure that blocked the river. Small lakes are scattered throughout the hummocky terrain in the subalpine, especially on Clayoquot Plateau. A large lake is located south of Adder Mountain.

### **6.3.3 Terrain**

The Kennedy River study area is characterized by a large glacially U-shaped valley, which contains the Kennedy River, numerous V-shaped, and, to a much lesser extent, U-shaped tributaries. Separating the Kennedy River watershed from adjoining areas are sharp, well-defined ridges. Within the boundaries of the watershed a number of ridges also exist, but these tend to be capped with undulating terrain. A number of high elevation bowls with undulating and hummocky terrain are located in the watershed. Limestone, a significant bedrock type, was found throughout the study area.

In the upper third of the study area the valley is more V-shaped than in its lower reaches. Rockfall and avalanches are common geomorphic processes that result in extensive colluvial slopes, and at the mouth of gullies, cones. These colluvial slopes, in places, extend to the banks of the Kennedy River. Till is scarce and is generally located in undulating and hummocky terrain. Deep till, fluvial, and glaciofluvial deposits are scattered along the valley bottom.

The lower two-thirds of the study area has a much more characteristic U-shape with large fluvial and glaciofluvial deposits and areas of hummocky rock controlled terrain located in the valley bottom. Slopes are not as steep as those in the upper third. In the main and tributary valleys, till and colluvial deposits are common on mid and lower slopes, often complexed with rock. Surficial materials in areas of hummocky and undulating terrain are generally till with exposed bedrock where soils are shallow to absent. Extensive fluvial fans are located at the confluences of the main tributaries with the Kennedy River. These deposits are of both glaciofluvial and fluvial origin. Some portions in this southern part are similar to those in the upper third of the study area where mid to upper slopes are dominated by steep bluffs with extensive talus slopes below. In some locations exposed rock extends from the upper slopes to the banks of the Kennedy River.

Surficial materials, in general, are deposited as a blanket (greater than 1m) on the lower slopes tapering to a veneer (less than 1m) on mid and upper slopes. However, deposits of variable thickness exist throughout the area. This variation from shallow to deep is a result of underlying hummocky rock. Shallow soils are common throughout the study area

at all elevations. This is a result of the steep nature of the slopes and the high percentage of glacially smoothed exposed rock. Deep deposits (greater than 4m) are limited to the extensive talus slopes and the deep alluvial deposits located at the mouth of tributaries and in the Kennedy River valley bottom. Pockets of deep till also exist in the study area but are scarce.

For a more detailed account of the various surficial materials and geomorphic processes located in the Kennedy River study area refer to the terrain inventory report and the accompanying maps (Madrone Consultants Ltd., 1999). The information from the terrain field checks was utilized to increase the accuracy of the bioterrain interpretation.

#### **6.3.4 Biogeoclimatic zones**

There are two biogeoclimatic zones within the Kennedy River study area; the Coastal Western Hemlock (CWH) Zone, and the Mountain Hemlock (MH) Zone. The CWH is represented by the vm1 and vm2 variants and occurs between sea level and 800 m. The MH Zone is represented by the MHmm1 variant, which occurs above 800 m and the mmp1 subzone (parkland) which generally occurs above 1200 m to 1300 m. This zone is continuous along the ridgetops, except in some areas, where elevations drop below 800 m.

#### **6.3.5 Ecosystems**

A complete list of ecosystems that have been mapped in the area appears in Table 23.

Logging is extensive along the floodplain of Kennedy River as far as Spire Lake, beyond which no logging has taken place. In many areas logging extends from floodplain up the valley sides and along major creeks such as Marion Creek and Cat's Ear Creek.

In the CWH, floodplain ecosystems occur along most of Kennedy River. They are also found along Marion Creek, Cat's Ear Creek, and some of the smaller tributaries feeding into Kennedy River. The majority of the high bench sites (SS), once conifer stands, are now herbaceous, shrubby, or very young forests, because of logging. Some patches of old conifer stands are scattered along the river and some of the tributaries. Other more frequently flooded shrubby ecosystems (CW) are rare within the study area and are generally found adjacent to gravel bars (GB) on the main river and some tributaries.

Moist, nutrient rich forests (AS) are common adjacent to Kennedy River and tributaries where soils are deep and moisture is abundant. Many of these ecosystems have been logged and are herbaceous or shrubby.

The moist, but nutrient poor, ecosystems (HD) occur on steep north and northwest facing seepage slopes. These forests are scattered throughout the watershed but are most common in the mid portion of the study area.

Bog forests (YG) are common throughout the vm where slopes are gentle to flat and hummocky. These ecosystems generally occur in complexes with the mesic (AB) or drier (HS) ecosystems. Several bog woodland forests (LS) are located within the vm, one of which is mapped in a complex with a treeless bog (SM). The wet but richer skunk cabbage forests (RC) are also mapped within the study area. These forests are infrequent, and several that are located close to Kennedy River have been logged.

The most common wetland mapped in the study area is the sedge dominated fen (SC), which occurs where water movement is possible. A bog wetland, dominated by sedge (SG), occurs near the headwaters of Kennedy River. The rare, shrubby and red-osier dogwood dominated wetland (PD) is mapped in several areas near the mouth of the Kennedy River.

Rich mesic forests (AF) are present throughout the study area. They are usually found on colluvial and fluvial fans, on lower slopes of valleys, where soils are deep.

Mesic forests (AB) are the most commonly occurring ecosystem within the vm. They occur on all aspects and elevations. Soils are generally deep, but many of these forests are located on shallow soils, especially at higher elevations.

The subxeric, nutrient rich forests (RS), found rarely in Clayoquot sound, are mapped in several areas in the vm1 in the Kennedy River watershed. One old forest is located on the north facing slope above Cat's Ear Creek and one mature forest is located above the Kennedy River near Sutton Pass. Several logged sites and mature forests are mapped on the western slopes of Kennedy River opposite the mouth of Cat's Ear Creek.

Subxeric forests (HS) are usually found on the upper slopes and in areas where the terrain is hummocky and soils are thin. They are often found in complexes with mesic forests (AB), wet forests (YG) and xeric pine forests (LC). When complexed with dry forests (LC), rock outcrops (RO) are often present.

Shrub dominated avalanche track ecosystems (SA) are found at the heads of valleys in the CWHvm, while herbaceous sites (IF), rarely mapped in Clayoquot Sound, are mapped at the toe of two avalanche tracks.

Several recent slides or slope failures (ES) have occurred in the vm. One very large slope failure is present along the upper reaches of Kennedy River, where the accumulated rock has resulted in the formation of Spire Lake. Older slope failures, vegetated by red alder (AW), are scattered but infrequent.

Two ecosystems that occur in the MH zone were mapped within the CWH. The moist ecosystem (MT) was observed in the CWHvm1 and vm2 on the lower north facing slopes and on some level areas in the upper reaches of the Kennedy River valley. The high percentage of copper bush and mountain hemlock on these sites is similar to those sites found in the MH zone. In the same area, the xeric site series MM was also sampled and mapped. These units are found primarily on the hummocky terrain on the south side of the river. In this particular area, field sampling crews noted a higher percent cover of mountain hemlock than is usual for the CWH. It was also present on zonal sites, although not high percent cover down to an elevation of 500 m. Copper bush also was noted to have an unusually high percent cover in the CWH, particularly on poorer sites, where it is often dense.

The MH zone in the Kennedy River watershed is found on most upper slopes. Many of these slopes are extremely steep and rocky, making sampling difficult.

The wet, rich forests (MT) are scattered through the MH. These ecosystems occur close together and cannot be separated by air photo interpretation. The subhygric unit, MT, occurs on steep seepage slopes, while the hygric units, MD and YH occur on lower receiving slopes just below MT. All units occur on deep soils.

Wetlands are rare in the MH. Four pockets of fen units (SC) are mapped.

Mesic forests (MB) are the most common ecosystem found in this zone and occur on all aspects and slopes.

Soils are generally deep, but these units are also often found on shallow and very shallow soil.



Rich mesic forests (MO) are scattered throughout, where soils are deep. They are often on colluvial fans and lower slopes near the headwaters of tributaries. Several sites are located on slopes adjacent to small lakes.

Subxeric parkland (MM) and rock (RO) occur near and along ridgetops where soils are very shallow. Terrain is often hummocky.

Krummholz vegetation (MK) occurs above 1200 m in the MHmmp1 where severe climatic conditions maintain the conifer vegetation in a shrubby form. Mountain heather meadows (MH) occur at these high elevations and are usually in complexes with rock outcrops (RO). Limestone bedrock occurs on Steamboat Mountain and adjacent ridges of Clayoquot Plateau. The ridgetops are sparsely vegetated with scattered herbs and pockets of heath (MH) and Krummholz (MK). *Hedysarum occidentals*, a blue listed species, has been collected from the limestone rock outcrops and talus slopes (TA) in this area.

Avalanche track vegetation occurs near the headwaters of creeks. Most avalanche tracks consist of shrubby vegetation (SA), but one slide track at the headwaters of Kennedy River is dominated by herbaceous vegetation (IF) near the toe. This ecosystem has only been identified in this study area so far.

Two other new herbaceous ecosystems have been identified. Lush meadows (VS) occur on fluvial fans in the MH zone. These gently sloping fans have a continuous water movement where Indian hellebore, sedges and other moisture loving herbs flourish. Another meadow type with somewhat similar species occurs on steep colluvial slopes at high elevations where snow pack lasts late into the year. These meadows are also lush with flowering herbs and vary in species content, depending on moisture availability.

#### **6.3.6 Sampling Intensity**

A total of 406 plots were completed within the study area. Of this total, 26 plots were full ecosystem, 84 were ground inspections, and 296 were visuals. Of these 296 visuals, 88 were air calls. Approximately 2400 polygons have been mapped in this area which therefore results in a sampling intensity of 17% (level 4).

**Table 23: Ecosystems of the Kennedy River Area****Coastal Western Hemlock Zone, Very Wet Maritime Subzone, Submontane and Montane Variants (CWHvm1 and vm2)**

Ecosystem Unit	BEC Site Series	Structural Stages	Frequency of Occurrence in Study Area
<b>Forested Site Series</b>			
AB Western Hemlock- Amabilis Fir - Blueberry	01 HwBa - Blueberry	3, 4, 5, 6, 7	47.5
AF Amabilis Fir - Western Redcedar - Foamflower	05 BaCw - Foamflower	3, 4, 5, 6, 7	15.4
AS Amabilis Fir - Western Redcedar - Salmonberry	07 BaCw - Salmonberry	3, 4, 5, 6, 7	18.2
CW Black Cottonwood – Willow	vm1 11 Act - Willow	3, 4	0.8
HD Western Hemlock - Amabilis Fir - Deer Fern	06 HwBa -Deer Fern	3, 4, 5, 6, 7	4.1
HS Western Hemlock -Western Redcedar - Salal	03 HwCw - Salal	3, 3b, 4, 5, 6, 7	25.3
LC Western Hemlock -Lodgepole Pine - Cladina	02 HwPl - Cladina	3b, 5, 6, 7	4.8
LS Lodgepole Pine - Sphagnum	vm1 13, vm2 10, PL - Sphagnum	3b, 5, 7	0.8
MM Mountain Hemlock -Amabilis Fir - Mountain Heather	MHm1 HmBa -Mountain Heather	3a,3b, 7	0.4
MT Amabilis Fir - Mountain Hemlock - Twisted Stalk	MHm1 05 BaHm - Twistedstalk 06 HmYc - Deer-cabbage 07 YcHm - Sphagnum	7	0.4
RC Western Redcedar- Sitka Spruce – Skunk Cabbage	vm1 14, vm2 11 CwSs – Skunk Cabbage	3, 4, 6, 7	0.4
RS Western Redcedar - Swordfern	04 CwHw - Swordfern	3, 5, 6, 7	0.6
SS Sitka Spruce - Salmonberry	vm1 09 Ss - Salmonberry	3, 4, 5, 6, 7	1.5
YG Western Redcedar Yellow Cedar - Goldthread	vm1 12 , vm2 09, CwYc - Goldthread	3, 3b, 5, 6, 7	2.7
<b>Deciduous, Shrub and Herb Dominated Ecosystems</b>			
AW Red Alder - Fern	-	3, 4, 5	0.3
IF Indian Hellebore – Fern	-	2a	0.1
PD Pacific Crabapple – Red- osier Dogwood	-	3b	0.2
SA Salmonberry - Sitka Alder	-	3	6.3
SC Sphagnum – Cotton-grass	-	2b	0.6
SM Sweet Gale – Sphagnum	-	3a	0.1
SG Sphagnum – Deer Cabbage	-	2b	<0.1

Table 23 continued:

**Coastal Western Hemlock Zone, Very Wet Maritime Subzone, Submontane and Montane Variants (CWHvm1 and vm2) continued:**

Ecosystem Unit	BEC Site Series	Structural Stages	Frequency of Occurrence in Study Area
<b>Sparsely Vegetated, Non-Vegetated and Anthropogenic Units</b>			
CL Cliff	-	1	0.4
ES Exposed Soil	-	1	0.2
GB Gravel Bar	-	1	1.0
GP Gravel Pit	-	1	<0.1
LA Lake	-	-	0.4
OW Shallow Water	-	-	0.2
RI River	-	-	0.8
RO Rock Outcrop	-	1	10.4
RP Road Surface	-	-	0.3
TA Talus	-	1	0.4

**Mountain Hemlock Zone, Moist Maritime Subzone, Windward Variant (MHmm1 and MHmmp)**

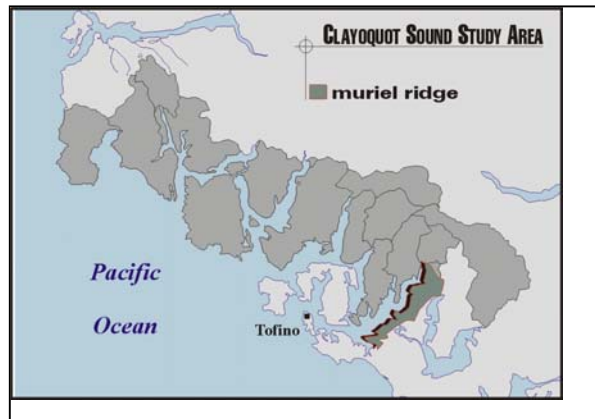
Ecosystem Unit	BEC site series	Structural Stages	Frequency of Occurrence in Study Area
<b>Forested Site Series</b>			
MB Mountain Hemlock - Amabilis Fir - Blueberry	01 HmBa – Blueberry (04 HmBa – Bramble)	3, 3a, 3b, 4, 5, 6, 7	19.4
MM Mountain Hemlock- Amabilis Fir - Mountain Heather	02 HmBa -Mountain Heather	3a, 3b, 4, 5, 6, 7	8.7
MO Mountain Hemlock- Amabilis Fir - Oakfern	03 HmBa – Oakfern	3, 4, 5, 6, 7	2.0
MT Amabilis Fir -Mountain Hemlock - Twisted Stalk	05 BaHm - Twistedstalk (06 HmYc - Deer-cabbage) (07 YcHm – Sphagnum)	3a, 3b, 4, 5, 6, 7	1.5
<b>Shrub and Herb Dominated Ecosystems</b>			
IF Indian Hellebore – Fern	00	2a	<0.1
LD Arctic Lupine – Subalpine daisy	00	2a	0.6
MH Mountain Heather Heath	00	2d	1.4
MK Mountain Hemlock Krummholz	00	3a	2.4
SA Salmonberry - Sitka alder	00	3	2.8
SC Sphagnum - Cotton -grass	00	2b	0.2
VS Sitka Valerian – Sedge	00	2a	0.4

**Mountain Hemlock Zone, Moist Maritime Subzone, Windward Variant (MHmm1 and MHmmp) continued:**

Ecosystem Unit	BEC site series	Structural Stages	Frequency of Occurrence in Study Area
<b>Sparsely Vegetated, Non-Vegetated and Anthropogenic Units</b>			
CL Cliff	-	1	0.3
GB Gravel Bar	-	1	0.1
LA Lake	-	-	0.2
OW Shallow Open Water	-	-	0.2
PS Snow Pack	-	-	<0.1
RO Rock Outcrop	-	1	17.4
TA Talus	-	1	2.0



## MURIEL RIDGE STUDY AREA



## 6.4 Muriel Ridge

### 6.4.1 Location and Extent

Muriel Ridge study area lies along the eastern side of Tofino Inlet extending from sea level up to the ridgetop at a maximum elevation of just over 1100 m. The northern boundary crosses Tofino Creek at the estuary. The boundary then follows the coastline south to Grice Bay, the most southerly portion of the study area. The eastern boundary follows the height of land along the south side of Marble Creek watershed and then runs southward along Muriel Ridge to reach Grice Bay. The total area is approximately 3,627 hectares. It is comprised of watershed numbers: 348, 349X, 351X, 354, 356X, 358X, 360, 363X, and 380X.

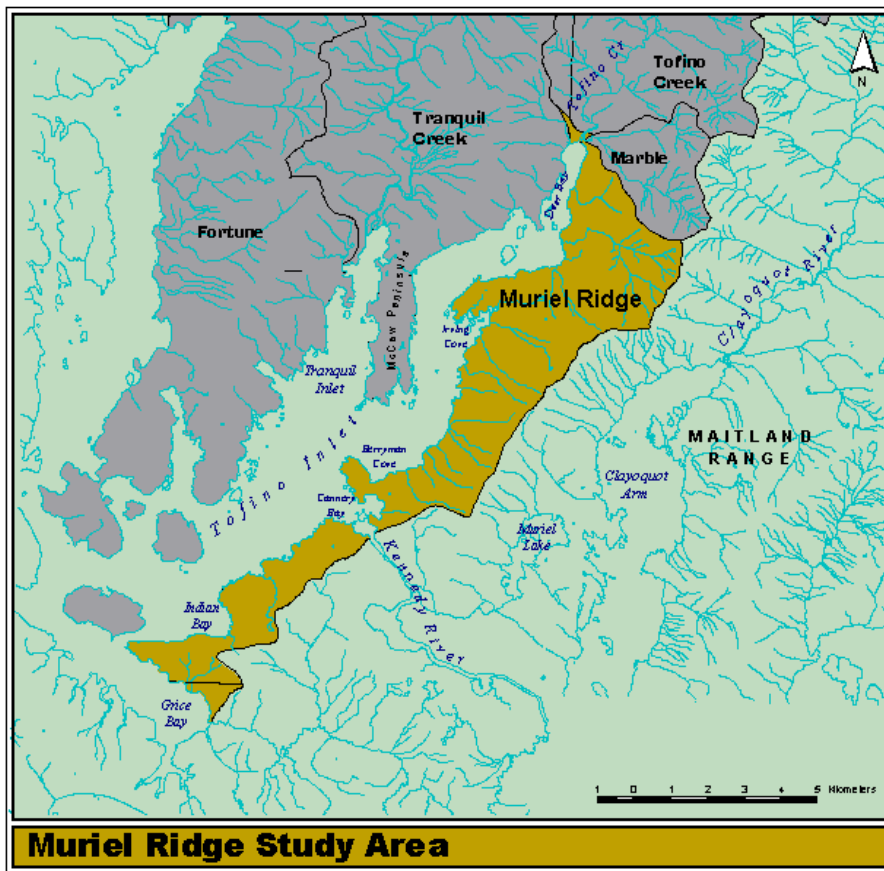


Figure 3. Muriel Ridge Study Area

### 6.4.2 Topography and Drainage

Slopes of the northern half of this watershed are generally west facing and are steep, becoming gentler near the coastline. Creeks draining the northern slopes generally flow east in undefined valleys. The southern half of the study area is hummocky with generally gentle slopes, although some slopes have local short steep sections. Creeks here flow in various directions. Northwest flowing creeks include one that drains a small lake to the east of Indian Bay and one that flows directly into Indian Bay. Several other small creeks flow southwest into Grice Bay. The mouth of Kennedy River lies to the south of Cannery Bay.

### **6.4.3 Terrain**

Exposed bedrock is common throughout the study area, but its surficial expression varies. In the northern most portion of the study area, upper slopes consist of steep bedrock ridges that separate the study area from surrounding watersheds. Avalanching and rockfall are common geomorphic processes and contribute to the lack of surficial materials at higher elevations. Surficial materials such as colluvium and till are more common on mid to lower slopes but exposed, steep rock is still common. A narrow fluvial deposit exists in the valley bottom extending to the mouth where a large glaciofluvial fan is located covered by more recent fluvial deposits.

In the southern half of the study area, the distinct ridges quickly give way to slopes capped by undulating and hummocky terrain. The proportions of exposed rock to surficial material vary. Generally, till is the dominant surficial material but isolated pockets of colluvium occur immediately below steep bedrock areas. Organics, identified in depressional areas of the hummocky terrain, are not widespread. At lower elevations deposits that indicate periods of higher relative sea levels exist. These include the deep glaciofluvial and glaciomarine deposits along the shoreline.

Thin veneers and veneers (less than 1m) are most common on the rock dominated upper slopes and then blankets (greater than 1m) become more common with increasing distance downslope. At lower elevations, till, the most common material, occurs as a mantle of variable thickness. Deposits are thicker in depressions and thin out towards the high points where rock is exposed. Deposits range from blankets to thin veneers. Deep deposits are limited to material of glaciofluvial, glaciomarine, and fluvial origin.

For a more detailed account of the various surficial materials and geomorphic processes located in the Muriel Ridge study area, refer to the terrain inventory report and accompanying maps (Madrone Consultants Ltd., 1999). The information from the terrain field checks was utilized to increase the accuracy of the bioterrain interpretation.

### **6.4.4 Biogeoclimatic zones:**

There are two biogeoclimatic zones within the Muriel Ridge study area: The Coastal Western Hemlock (CWH) Zone and the Mountain Hemlock (MH) Zone. The CWH is represented by the vh1, vm1, and vm2 variants. The CWH vh1 occurs below 200 m along the shoreline. As the vh1 boundary approaches Tofino Creek estuary it becomes a narrow strip just above sea level. The southern portion of the study area is primarily in the vh1. The CWH vm1 and vm2 variants occur above 200 m and form much of the middle and northern portion of the study area. The MH Zone is represented by the MHmm1 variant which occurs above 800 m and is continuous along the ridge tops of the eastern boundary. Two very small pockets of parkland (MHmmp1) subzone occur above 1200 m.

### **6.4.5 Ecosystem**

A complete list of ecosystems that have been mapped in the area appears in Table 24.

The most extensively logged area in the study area is in the central portion along the ridge from the divide to halfway down the slopes, and in the more southerly section down to sea level. The northern area near Tofino Creek has all been clearcut, while very little logging has occurred in the most southerly portion of the study area.

In the CWHvh1 variant the only two small floodplain ecosystems (SL) that occur within the study area are logged units located along the northern boundary in the Tofino Creek estuary. Although one small floodplain is included in a complex polygon label on the southern most tip of the study area, the polygon actually extends outside this study area where the floodplain occurs

The rich, moist ecosystems (SD) occurs where moisture is abundant and drainage is not impeded. These ecosystems are most common adjacent to creeks and on fluvial fans.

Poorly drained bog forests (YG) are quite common throughout the vh where the terrain is hummocky. Several bog woodland forests (LS) are scattered throughout the vh where water movement is impeded and organic deposits have accumulated. Three small wet, but richer forests (RC) occur where water movement is less impeded. Two of these sites are located near the mouth of Kennedy River and one site is located south of Irving Cove.

Several herbaceous wetland types occur within the vh. As well as the treeless bogs (SM) associated with bog forests (YG), a richer wetland (CM) occurs along the outer edges of a small lake (LA) east of Indian Bay.

One tall shrub dominated wetland (PD) occurs at the mouth of Kennedy River. This area, originally a cultivated orchard, is now dominated by dense willows, Pacific crabapple, red osier dogwood, and sedges. The moisture regime is very wet, as small side creeks run through the area. One other site similar to this within Clayoquot Sound is located on the Hesquiat Peninsula. Although the species are slightly different, the expected climax of both sites is most likely the same.

The richer mesic ecosystem (SF) is quite rare within the area and is found on lower colluvial slopes, on level areas adjacent to the wetter SD sites, and on fluvial fans.

The most common ecosystem occurring within the vh is mesic forest (HS). This unit occurs on shallow to deep soils, on hummocky terrain, and on steep to gentle slopes.

Poorer submesic forests (RS) are common in the vh and generally occur above or adjacent to mesic (HS) forests where soils are shallow. The very dry pine ecosystem (LR) often occurs in complexes with these submesic ecosystems and rock outcrops (RO) where soils are very shallow and drainage is rapid.

Herbaceous ecosystems (DS and GS) are scattered along the coastline and are usually adjacent to beaches (BE) or mudflats (MU). They frequently occur on fluvial fans.

In the CWHvm1 one floodplain site (SS) is located on the Tofino Creek estuary. This site has been logged.

Moist, nutrient rich forests (AS) are common adjacent to creeks, where soils are deep and moisture is abundant, while moist, nutrient poor ecosystems (HD) occur on steep north and northwest facing seepage slopes.

Bog forests (YG) are scattered throughout the vm where slopes are gentle to flat and hummocky. These ecosystems generally occur in complexes with the mesic (AB) or drier (HS) ecosystems. Several bog woodland forests (LS) are located within the vm and are also complexed with bog forests (YG). Two small treeless bogs (SG) are located along the eastern boundary of the study area.

Rich mesic forests (AF) are usually found on colluvial and fluvial fans and on lower slopes of creek valleys, where soils are deep. This generally occurs in the western portion of the study area.

Mesic forests (AB) are the most commonly occurring ecosystem in the vm1 and vm2. They occur on all aspects from the upper elevations of the vm to sea level. Soils are generally deep, but many mesic forests are located on shallow soils, especially at higher elevations.

Submesic forests (HS and LC) usually occur in complexes with rock outcroppings (RO). They are found on the upper slopes and in areas where terrain is hummocky and soils are thin.

Three small shrub dominated avalanche track ecosystems (SA) are found at the heads of valleys in the CWHvm2.

The MH zone in the Muriel Ridge study area is limited to the ridges along the northeastern boundary. Most of the zone is very steep and access is difficult. Both the mm1 and mmp1 subzones are represented.

Mesic forest (MB) is the most common ecosystem found in the MH zone. Soils are generally deep, but these units are also often found on shallow and very shallow soil. One small rich mesic site (MO) is mapped.

Submesic parkland (MM) and rock (RO) occur near and along ridgetops where soils are very shallow and conditions xeric.

#### **6.4.6 Sampling Intensity**

A total of 93 plots were completed within the study area. Of this total, 5 plots were full ecosystem plots, 16 were ground inspection plot and 72 were visual plots. Sampling completed in 1994 and 1995 is included under visual plots. Of these 72 visuals, 30 were air calls. Approximately 486 polygons have been mapped in this area, which therefore results in a sampling intensity of 19% (level 4).



**Table 24. Ecosystems of the Muriel Ridge Study Area****Coastal Western Hemlock Southern Very Wet Hypermaritime Variant (CWHvh1)**

Ecosystem Unit	BEC Site Series	Structural Stages	Frequency of Occurrence in Study Area
<b>Forested Site Series</b>			
HS Western Redcedar Western Hemlock - Salal	01 CwHw Salal	3, 4, 6, 7	35.0
LR Lodgepole Pine Yellow Cedar – Racomitrium	02 PIYc Racomitrium	3a, 3b, 5, 7	6.5
LS Lodgepole Pine – Sphagnum	12 PL - Sphagnum	3b	1.8
RC Western Redcedar Sitka Spruce - Skunk Cabbage	13 CwSs - Skunk Cabbage	3, 4, 7	0.7
RS Western Redcedar Yellow Cedar - Salal	03 CwYc - Salal	3, 4, 6, 7	23.3
SD Western Redcedar Sitka Spruce - Devil's Club	07 CwSs Devil's club	3, 4, 5, 6, 7	11.7
SF Western Redcedar Sitka Spruce - Foamflower	06 CwSs - Sword fern	3, 4, 5	3.2
SL Sitka Spruce - Lily-of-the-Valley	08 Ss - Lily-of-the-valley	4, 7	0.5
YG Western Redcedar Yellow Cedar – Goldthread	11 CwYc - Goldthread	3, 6, 7	7.9
<b>Shrub and Herb Dominated Ecosystems</b>			
CM Rocky Mountain Cow lily – Marsh Cinquefoil	-	2c	0.2
DS Dunegrass – Silverweed	-	2b	0.7
GS Tufted Hairgrass – Silverweed	-	2b	2.9
PD Pacific Crabapple – Red-osier Dogwood	-	3b	0.2
SM Sweet Gale – Sphagnum	-	2b, 3a	0.5
<b>Sparsely Vegetated, Non-Vegetated and Anthropogenic Units</b>			
ES Exposed Soil	-	1	0.7
GB Gravel Bar	-	1	0.7
LA Lake	-	-	0.2
MU Mud	-	1	2.0
OW Shallow Open Water	-	-	0.2
RI River	-	-	0.2
RO Rock Outcrop	-	1	1.1
RP Road Surface	-	1	0.5

Table 24 continued:

**Coastal Western Hemlock Very Wet Maritime Submontane and Montane Variants (CWHvm1 and vm2)**

Ecosystem Unit	BEC Site Series	Structural Stages	Frequency of Occurrence in Study Area
<b>Forested Site Series</b>			
AB Western Hemlock Amabilis Fir - Blueberry	01 HwBa - Blueberry	3, 4, 6, 7	34.1
AF Amabilis Fir Western Redcedar - Foamflower	05 BaCw - Foamflower	3, 4, 7	4.5
AS Amabilis Fir Western Redcedar - Salmonberry	07 BaCw - Salmonberry	3, 4, 5, 6, 7	14.5
HD Western Hemlock Amabilis Fir - Deer Fern	06 HwBa -Deer fern	3, 4, 6, 7	8.4
HS Western Hemlock Western Redcedar - Salal	03 HwCw - Salal	3, 4, 5, 6, 7	15.4
LC Western Hemlock Lodgepole Pine - Cladina	02 HwPl - Cladina	3a, 3b, 7	1.8
LS Lodgepole Pine - Sphagnum	vm1 13, vm2 10, PL - Sphagnum	3a, 3b	0.2
RC Western Redcedar Sitka Spruce – Skunk Cabbage	Vm1 14, vm2 11 CwSs – Skunk Cabbage	3	0.2
SS Sitka Spruce - Salmonberry	vm1 09 Ss - Salmonberry	3	0.2
YG Western Redcedar Yellow Cedar - Goldthread	vm1 12 , vm2 09, CwYc - Goldthread	3, 7	2.3
<b>Deciduous, Shrub and Herb Dominated Ecosystems</b>			
AW Red Alder - Fern	-	4	0.2
DS Dunegrass – Silverweed	-	2b	0.2
SA Salmonberry - Sitka Alder	-	3	0.5
SG Sphagnum – Deer Cabbage	-	2b	0.4
<b>Sparsely Vegetated, Non-Vegetated and Anthropogenic Units</b>			
ES Exposed Soil	-	1	0.5
GB Gravel Bar	-	1	0.4
LA Lake	-	-	0.2
OW Shallow Open Water	-	-	0.4
RO Rock Outcrop	-	1	3.6
RP Road Surface	-	-	0.9

**Mountain Hemlock Moist Maritime Windward Variant (MHmm1 and MHmmp)**

Ecosystem Unit	BEC site series	Structural Stages	Frequency of Occurrence in Study Area
<b>Forested Site Series</b>			
MB Mountain Hemlock Amabilis Fir - Blueberry	01 HmBa - Blueberry	3, 4, 5, 6, 7	6.1
MM Mountain Hemlock Amabilis Fir - Mountain Heather	02 HmBa -Mountain Heather	3a, 3b, 6, 7	5.0
MO Mountain Helmlock Amabilis Fir - Oakfern	03 HmBa – Oakfern	7	0.2
<b>Sparsely Vegetated, Non-Vegetated and Anthropogenic Units</b>			
RO Rock Outcrop	-	1	3.4

---

## 7.0 REFERENCES

- Banner, A., W. MacKenzie, S. Haeussler, S. Thomson, J. Pojar, and R. Trowbridge. 1993. *A Field Guide to Site Identification and Interpretation for the Prince Rupert Forest Region*. Ministry of Forests, Victoria, B.C.
- Barton, K. and G. Radcliffe. 1996. *Ecosystem Mapping and Wildlife Interpretations for Cachalot Drainage*. Report and Mapping for International Forest Products Ltd., West Coast Operations, Madrone Consultants Ltd., Duncan, B.C.
- Blower, D. 1988. *Wildlife Distribution Mapping: Big Game Series - Elk*. Ministry of Environment, Lands and Parks, Wildlife Branch, Victoria, B.C.
- British Columbia Parks. 1992. *Guide to Ecological Reserves in British Columbia*. Ecological Reserves Program, British Columbia Parks, Victoria, B.C.
- Canada Soil Survey Committee, Subcommittee on Soil Classification. 1978. *The Canadian System of Soil Classification*. Can. Department of Agriculture Publ. 1646. Supply and Services Canada, Ottawa, Ontario. 164 pp.
- Clement, C. 1996 *Ecosystem Units of Flores Island and the Bulson Creek and Clayoquot River Drainages*. Prepared for Sustainable Forestry Division, MacMillan Bloedel Limited. Nanaimo, B.C.
- Demarchi, D. 1995. *Ecoregions of British Columbia*. 4th edition Map at 1:2,000,000. Ministry of Environment, Lands and Parks, Wildlife Branch, Victoria, B.C.
- Douglas, G. W. et al. 1989. *The Vascular Plants of British Columbia: Part 1*. Special report Series 1. British Columbia Ministry of Forests, Victoria, B.C.
- Douglas, G. W. et al. 1990. *The Vascular Plants of British Columbia: Part 2*. Special report Series 2. British Columbia Ministry of Forests, Victoria, B.C.
- Douglas, G. W. et al. 1991. *The Vascular Plants of British Columbia: Part 3*. Special Report series 3. British Columbia Ministry of Forests, Victoria, B.C.
- Douglas, G. W. et al. 1994. *The Vascular Plants of British Columbia: Part 41*. Special Report series 4. British Columbia Ministry of Forests, Victoria, B.C.
- Green, R. N. and K. Klinka. 1994. *A Field Guide to Site Identification and Interpretation for the Vancouver Forest Region*. Land Management Handbook 28. Ministry of Forests, Research Program, Victoria, B.C.
- Hamilton, E. 1988. *A System for the Classification of Seral Ecosystems Within the Biogeoclimatic Classification System*. First approximation. Research Report RR87004-HQ, Ministry of Forests, Victoria, B.C.
- Holland, S. 1976. *Landforms of British Columbia: A Physiographic Outline*. British Columbia Department of Mines and Petroleum Resources, Victoria, B.C.

- 
- Howes, D. and E. Kenk, eds. 1988. *Terrain Classification System for British Columbia (Revised Edition.)*. British Columbia Ministry of Environment, Victoria, B.C.
- Lewis, T. 1992. *Tofino Creek Ecosystem Units*. Map at 1:15,000. Ministry of Forests, Research Program, Ministry of Forest, Victoria, B.C.
- Madrone Consultants Ltd. 1994. *Expanded Legend for Strathcona Park: Biophysical Habitat Mapping*. A report to accompany mapping at 1:20 000 completed for British Columbia Parks, Ministry of Environment, Lands and Parks, Victoria, B.C.
- Madrone Consultants Ltd. 1995. *Ecosystem Mapping in TFL 54, Clayoquot Sound*. Report for International Forest Products Ltd., West Coast Operations Madrone Consultants, Ltd., Duncan, B.C.
- Madrone Consultants Ltd. 1996. *Ecosystem Mapping in TFL 54, Clayoquot Sound*. Report for International Forest Products Ltd., West Coast Operations Madrone Consultants, Ltd., Duncan, B.C.
- Madrone Consultants Ltd. 1997. *Year One Terrain Inventory: Clayoquot Sound*. Madrone Consultants Ltd., Duncan B.C.
- Madrone Consultants Ltd. 1998. *Year Two Terrain Inventory: Clayoquot Sound*. Madrone Consultants Ltd., Duncan, B. C.
- Meidinger, D. 1988. *Recommended Vernacular Names for Common Plants of British Columbia*. Research Report RR87002-HQ. Internal Reports of the Ministry of Forests and Lands Research Program, Victoria, B.C.
- Ministry of Forests. 1996. *Field Manual for Describing Terrestrial Ecosystems*. Rough Draft. Ministry of Forests, BC Environment, Victoria, B.C.
- Mussio Ventures Ltd. 1997. *Backroad Map Book – Volume II: Vancouver Island*. 2<sup>nd</sup> ed. Mussio Ventures Ltd., New Westminster, B. C.
- Nuszdorfer, F. et al. 1994. *Biogeoclimatic Units of the Vancouver Forest Region*. Mapsheets 4 and 5 at 1:250 000. Ministry of Forests, Research Branch, Victoria, B.C.
- Nyberg, J. B. 1990. *Deer and Elk Habitats in Coastal Forests of Southern British Columbia*. Ministry of Forests, Special Report Series 5, Research Branch, Victoria, B.C.
- Pojar, J. and A. MacKinnon. 1994. *Plants of Coastal British Columbia*. Ministry of Forests, Research Branch. Lone Pine Publishing, B.C.
- Prescott, C. E. and G. F. Weetman (eds.). 1994. *Salal Cedar Hemlock Integrated Research Program: A Synthesis*. Faculty of Forestry, University of British Columbia, Vancouver, B.C.

- 
- Province of British Columbia. 1993. *Clayoquot Sound Land Use Decision, Key Elements*. Province of British Columbia, Victoria, B.C.
- Province of British Columbia. 1993. *Clayoquot Sound Land Use Decision, Background Report*. Province of British Columbia, Victoria, B.C.
- Radcliffe, G. (ed.). 1991. *Clayoquot Sound: Life Support Services and Natural Diversity*. A report prepared under contract to Strategy for Sustainable Development of Clayoquot Sound. Madrone Consultants, Duncan, B.C.
- Radcliffe, G. and M. Ryan. 1996. *Ecosystem mapping and wildlife interpretations for the Chapman-Gray study area*. March 1996 Draft. Madrone Consultants Ltd., Duncan, B.C.
- Resources Inventory Committee. 1995. *Standards for Terrestrial Ecosystem Mapping in British Columbia Review Draft*. Ecosystems Working Group, Resources Inventory Committee, Victoria, B.C.
- Resources Inventory Committee. 1996. *Addenda to Terrestrial Ecosystems Mapping Standards: May 1 1996*. Ecosystems Working Group. Resources Inventory Committee. Victoria, B.C.
- Scientific Panel for Sustainable Forest Practices in Clayoquot Sound. 1995. *Report 5: Sustainable Ecosystem Management in Clayoquot Sound, Planning and Practice*.
- Teversham, J. and M. Jarvis Redelback. 1996. *Ecosystem Mapping and Wildlife Interpretations for TFL 54 in the Clayoquot Sound Area*. May 1996 Draft. Report for International Forest Products Ltd., West Coast Operations Madrone Consultants, Ltd., Duncan, B.C.

## 8.0 APPENDICES

## 8.1 Appendix I. Identified Plant Species in Clayoquot Sound

Species in bold were identified in Year Three.

Common Name	Latin Name
Alaska clubmoss	<i>Lycopodium sitchense</i>
Alaska plantain	<i>Plantago macrocarpa</i>
Alaska saxifrage	<i>Saxifraga ferruginea</i>
Alaskan blueberry	<i>Vaccinium alaskaense</i>
<b>alpine anemone</b>	<b>Anemone drummondii</b>
alpine clubmoss	<i>Lycopodium alpinum</i>
alpine lady fern	<i>Athyrium distentifolium</i>
alpine lady fern	<i>Athyrium distentifolium ssp. americanum</i>
alpine saxifrage	<i>Saxifraga nivalis</i>
<b>alpine speedwell</b>	<b>Veronica wormskjoldii</b>
alpine-azalea	<i>Loiseleuria procumbens</i>
alpine-wintergreen	<i>Gaultheria humifusa</i>
<b>alumroot</b>	<b>Heuchera sp.</b>
amabilis fir	<i>Abies amabilis</i>
American glasswort	<i>Salicornia virginica</i>
American searocket	<i>Cakile edentula</i>
<b>anemone</b>	<b>Anemone sp.</b>
angelica	<i>Angelica sp.</i>
apargidium	<i>Microseris borealis</i>
<b>arctic lupine</b>	<b>Lupinus arcticus</b>
arctic rush	<i>Juncus arcticus</i>
<b>arctic willow</b>	<b>Salix arctica</b>
arctic wintergreen	<i>Pyrola grandiflora</i>
arnica	<i>Arnica sp.</i>
arrow-leaved groundsel	<i>Senecio triangularis</i>
aster	<i>Aster sp.</i>
<b>avens</b>	<b>Geum sp.</b>
awned haircap moss	<i>Polytrichum piliferum</i>
azalea	<i>Menziesia sp.</i>
baldhip rose	<i>Rosa gymnocarpa</i>
beach bindweed	<i>Convolvulus soldanella</i>
beach morning glory	<i>Calystegia soldanella</i>
beach pea	<i>Lathyrus japonicus</i>
beaked sedge	<i>Carex utriculata</i>
bearded fescue	<i>Festuca subulata</i>
<b>bedstraw</b>	<b>Galium sp.</b>
bentgrass	<i>Agrostis sp.</i>
<b>bent-leaf moss</b>	<b>Rhytidiadelphus squarrosus</b>
berry/bramble	<i>Rubus sp.</i>
bigleaf maple	<i>Acer macrophyllum</i>

Common Name	Latin Name
bird's-beak lousewort	<i>Pedicularis ornithorhyncha</i>
bittercress	<i>Cardamine sp.</i>
<b>black alpine sedge</b>	<b><i>Carex nigricans</i></b>
<b>black gooseberry</b>	<b><i>Ribes lacustre</i></b>
black huckleberry	<i>Vaccinium membranaceum</i>
black knotweed	<i>Polygonum paronychia</i>
black twinberry	<i>Lonicera involucrata</i>
blue wildrye	<i>Elymus glaucus</i>
<b>blueberry, huckleberry</b>	<b><i>Vaccinium sp.</i></b>
bluegrass	<i>Poa sp.</i>
bluejoint	<i>Calamagrostis canadensis</i>
blue-leaved huckleberry	<i>Vaccinium deliciosum</i>
bog blueberry	<i>Vaccinium uliginosum</i>
bog cranberry	<i>Oxycoccus oxycoccus</i>
bog St. John's-wort	<i>Hypericum anagalloides</i>
<b>boreal sandwort</b>	<b><i>Minuartia rubella</i></b>
<b>boykina</b>	<b><i>Boykinia sp.</i></b>
bracken fern	<i>Pteridium aquilinum</i>
<b>bracted lousewort</b>	<b><i>Pedicularis bracteosa</i></b>
Braun's holly fern	<i>Polystichum braunii</i>
<b>broad-leaved starflower</b>	<b><i>Trientalis latifolia</i></b>
broom moss	<i>Dicranum scoparium</i>
broomrape	<i>Orobanche sp.</i>
<b>buckbean</b>	<b><i>Menyanthes trifoliata</i></b>
bull thistle	<i>Cirsium vulgare</i>
bulrush/clubrush	<i>Scirpus sp.</i>
bunchberry	<i>Cornus canadensis</i>
<b>buttercup</b>	<b><i>Ranunculus sp.</i></b>
butterwort	<i>Pinguicula sp.</i>
California oatgrass	<i>Danthonia californica</i>
calypogeja	<i>Calypogeja sp.</i>
<b>Canada thistle</b>	<b><i>Cirsium arvense</i></b>
casara	<i>Rhamnus purshiana</i>
cedar-shake liverwort	<i>Plagiochila aspleniformis</i>
cedar-shake liverwort	<i>Plagiochila porelloides</i>
<b>cherry</b>	<b><i>Prunus sp.</i></b>
<b>chickweed</b>	<b><i>Stellaria media</i></b>
clasping twistedstalk	<i>Streptopus amplexifolius</i>
clear moss	<i>Hookeria lucens</i>
cleavers	<i>Galium aparine</i>
clubmoss	<i>Lycopodium sp.</i>
clustered wild rose	<i>Rosa pisocarpa</i>
coast boykinia	<i>Boykinia elata</i>
coast penstemon	<i>Penstemon serrulatus</i>
coastal leafy moss	<i>Plagiomnium insigne</i>

Common Name	Latin Name
coastal pearlwort	<i>Sagina maxima</i>
coil-leaved moss	<i>Hypnum circinale</i>
colonial bentgrass	<i>Agrostis capillaris</i>
colonial bentgrass	<i>Agrostis tenuis</i>
<b>columbine</b>	<b><i>Aquilegia sp.</i></b>
comb liverwort	<i>Riccardia multifida</i>
common butterwort	<i>Pinguicula vulgaris</i>
common fold-leaf liverwort	<i>Diplophyllum albicans</i>
common green sphagnum	<i>Sphagnum girgensohnii</i>
common hair-cap moss	<i>Polytrichum commune</i>
common harebell	<i>Campanula rotundifolia</i>
common horsetail	<i>Equisetum arvense</i>
common juniper	<i>Juniperus communis</i>
common mare's-tail	<i>Hippuris vulgaris</i>
Common orache	<i>Atriplex patula</i>
common plantain	<i>Plantago major</i>
common red sphagnum	<i>Sphagnum capillifolium</i>
common rush	<i>Juncus effusus</i>
common scissor-leaf liverwort	<i>Herbertus aduncus</i>
common spike-rush	<i>Eleocharis palustris</i>
common witch's hair	<i>Alectoria sarmentosa</i>
Cooley's hedge-nettle	<i>Stachys cooleyae</i>
copperbush	<i>Cladothamnus pyroliflorus</i>
cottontail lichen	<i>Stereocaulon paschale</i>
cow-parsnip	<i>Heracleum lanatum</i>
creeping buttercup	<i>Ranunculus repens</i>
creeping-snowberry	<i>Gaultheria hispidula</i>
crowberry	<i>Empetrum nigrum</i>
<b>cuckoo bitter-cress</b>	<b><i>Cardamine pratensis</i></b>
curly heron's-bill moss	<i>Dicranum fuscescens</i>
curly hypnum	<i>Hypnum subimponens</i>
<b>currant or gooseberry</b>	<b><i>Ribes sp.</i></b>
<b>cut-leaved anemone</b>	<b><i>Anemone multifida</i></b>
cut-leaved foamflower	<i>Tiarella trifoliata var. x laciniata</i>
dagger-leaved rush	<i>Juncus ensifolius</i>
Davidson's penstemon	<i>Penstemon davidsonii</i>
deer fern	<i>Blechnum spicant</i>
deer-cabbage	<i>Fauria crista-galli</i>
<b>desert parsley</b>	<b><i>Lomatium sp.</i></b>
devil's club	<i>Oplopanax horridus</i>
devil's matchstick	<i>Pilophorus acicularis</i>
Dewey's sedge	<i>Carex deweyana</i>
<b>ditch-grass</b>	<b><i>Ruppia maritima</i></b>
dog pelt	<i>Peltigera canina</i>
Douglas' aster	<i>Aster subspicatus</i>



Common Name	Latin Name
Douglas maple	<i>Acer glabrum var. douglasii</i>
Douglas-fir	<i>Pseudotsuga menziesii</i>
dull Oregon-grape	<i>Mahonia nervosa</i>
dune wildrye	<i>Leymus mollis</i>
dwarf blueberry	<i>Vaccinium caespitosum</i>
early hairgrass	<i>Aira praecox</i>
enchanter's night-shade	<i>Circaea alpina</i>
<b>eriophyllum</b>	<b><i>Eriophyllum sp.</i></b>
evergreen blackberry	<i>Rubus laciniatus</i>
evergreen huckleberry	<i>Vaccinium ovatum</i>
false azalea	<i>Menziesia ferruginea</i>
false bugbane	<i>Trautvetteria caroliniensis</i>
false lily-of-the-valley	<i>Maianthemum dilatatum</i>
false pixie cup	<i>Cladonia chlorophaea</i>
<b>false Solomon's seal</b>	<b><i>Smilacina racemosa</i></b>
fat bog moss	<i>Sphagnum papillosum</i>
fern-leaved goldthread	<i>Coptis aspleniifolia</i>
few-flowered sedge	<i>Carex pauciflora</i>
field mint	<i>Mentha arvensis</i>
fireweed	<i>Epilobium angustifolium</i>
five-leaved bramble	<i>Rubus pedatus</i>
<b>five-stamened mitrewort</b>	<b><i>Mitella pentandra</i></b>
flat moss	<i>Plagiothecium undulatum</i>
fleabane	<i>Erigeron sp.</i>
fleshy jaumea	<i>Jaumea carnosa</i>
<b>forget-me-not</b>	<b><i>Myosotis sp.</i></b>
<b>fragile fern</b>	<b><i>Cystopteris fragilis</i></b>
freckle pelt	<i>Peltigera aphthosa</i>
fringecup	<i>Tellima grandiflora</i>
<b>fringed grass-of-Parnassus</b>	<b><i>Parnassia fimbriata</i></b>
frog pelt	<i>Peltigera neopolydactyla</i>
fuzzy-spiked wildrye	<i>Leymus innovatus</i>
gentian	<i>Gentiana sp.</i>
giant vetch	<i>Vicia gigantea</i>
glaucous gentian	<i>Gentiana glauca</i>
<b>globeflower</b>	<b><i>Trollius laxus</i></b>
glow moss	<i>Aulacomnium palustre</i>
goatsbeard	<i>Aruncus dioicus</i>
<b>goldenback fern</b>	<b><i>Pentagramma triangularis</i></b>
<b>great burnet</b>	<b><i>Sanguisorba officinalis</i></b>
greater bladderwort	<i>Utricularia vulgaris</i>
green alder	<i>Alnus crispa</i>
green alder	<i>Alnus crispa ssp. crispa</i>
green reindeer lichen	<i>Cladina mitis</i>
<b>green spleenwort</b>	<b><i>Asplenium viride</i></b>

Common Name	Latin Name
<b>green-flowered bog orchid</b>	<b><i>Platanthera hyperborea</i></b>
grey reindeer lichen	<i>Cladina rangiferina</i>
grey rock moss	<i>Racomitrium canescens</i>
grey sedge	<i>Carex canescens</i>
ground-cedar	<i>Lycopodium complanatum</i>
hair bentgrass	<i>Agrostis scabra</i>
hair-cap moss	<i>Polytrichum sp.</i>
<b>hairy arnica</b>	<b><i>Arnica mollis</i></b>
hairy cat's-ear	<i>Hypochoeris radicata</i>
hairy lantern moss	<i>Rhizomnium magnifolium</i>
hard scale liverwort	<i>Mylia taylorii</i>
hardhack	<i>Spiraea douglasii</i>
<b>harebell/bellflower</b>	<b><i>Campanula sp.</i></b>
Hatcher's fan wort	<i>Barbilophozia hatcheri</i>
<b>hawkweed</b>	<b><i>Hieracium sp.</i></b>
<b>heart-leaved arnica</b>	<b><i>Arnica cordifolia</i></b>
heart-leaved twayblade	<i>Listera cordata</i>
hellebore	<i>Veratrum sp.</i>
highbush blueberry	<i>Vaccinium corymbosum</i>
<b>highbush-cranberry</b>	<b><i>Viburnum edule</i></b>
Himalayan blackberry	<i>Rubus discolor</i>
hoary rock moss	<i>Racomitrium lanuginosum</i>
holly fern	<i>Polystichum sp.</i>
horsetail	<i>Equisetum sp.</i>
Idaho blue-eyed-grass	<i>Sisyrinchium idahoense</i>
Idaho blue-eyed-grass	<i>Sisyrinchium idahoense var. macounii</i>
Indian hellebore	<i>Veratrum viride</i>
Indian-pipe	<i>Monotropa uniflora</i>
<b>inflated sedge</b>	<b><i>Carex exsiciata</i></b>
Jeffrey's shooting star	<i>Dodecatheon jeffreyi</i>
juniper haircap moss	<i>Polytrichum juniperinum</i>
king gentian	<i>Gentiana sceptrum</i>
kinnikinnick	<i>Arctostaphylos uva-ursi</i>
Labrador tea	<i>Ledum groenlandicum</i>
lady fern	<i>Athyrium filix-femina</i>
lanky moss	<i>Rhytidiadelphus loreus</i>
large leafy moss	<i>Rhizomnium glabrescens</i>
<b>large-awned sedge</b>	<b><i>Carex macrochaeta</i></b>
large-headed sedge	<i>Carex macrocephala</i>
leafy aster	<i>Aster foliaceus</i>
leatherleaf saxifrage	<i>Leptarrhena pyrolifolia</i>
leathery grape fern	<i>Botrychium multifidum</i>
licorice fern	<i>Polypodium glycyrrhiza</i>
Lingbye's sedge	<i>Carex lyngbyei</i>
lodgepole pine	<i>Pinus contorta</i>

Common Name	Latin Name
lousewort	<i>Pedicularis sp.</i>
lungwort	<i>Lobaria pulmonaria</i>
<b>lupine</b>	<b><i>Lupinus sp.</i></b>
maidenhair fern	<i>Adiantum aleuticum</i>
marsh cinquefoil	<i>Potentilla palustris</i>
marsh violet	<i>Viola palustris</i>
marsh-marigold	<i>Caltha sp.</i>
meadow barley	<i>Hordeum brachyantherum</i>
meadow horsetail	<i>Equisetum pratense</i>
menzies' pipsissewa	<i>Chimaphila menziesii</i>
<b>Merten's rush</b>	<b><i>Juncus mertensianus</i></b>
Mertens' mountain-heather	<i>Cassiope mertensiana</i>
<b>mitrewort</b>	<b><i>Mitella sp.</i></b>
Miyoshi-no fir clubmoss	<i>Huperzia miyoshiana</i>
<b>mountain arnica</b>	<b><i>Arnica latifolia</i></b>
<b>mountain ash</b>	<b><i>Sorbus sp.</i></b>
mountain bentgrass	<i>Agrostis variabilis</i>
<b>mountain death-camas</b>	<b><i>Zigadenus elegans</i></b>
mountain hairgrass	<i>Vahlodea atropurpurea</i>
mountain heather	<i>Phyllodoce sp.</i>
mountain hemlock	<i>Tsuga mertensiana</i>
mountain holly fern	<i>Polystichum lonchitis</i>
mountain sagewort	<i>Artemisia norvegica</i>
<b>mountain sorrel</b>	<b><i>Oxyria digyna</i></b>
mountain sweet-cicely	<i>Osmorhiza chilensis</i>
<b>mountain-heather</b>	<b><i>Cassiope sp., Phyllodoce sp.</i></b>
narrow-leaved cotton-grass	<i>Eriophorum angustifolium</i>
nodding trisetum	<i>Trisetum cernuum</i>
Nootka rose	<i>Rosa nutkana</i>
northern rice-root	<i>Fritillaria camschatcensis</i>
northern starflower	<i>Trientalis arctica</i>
northwestern twayblade	<i>Listera caurina</i>
oak fern	<i>Gymnocarpium dryopteris</i>
oatgrass	<i>Danthonia sp.</i>
one-leaved foamflower	<i>Tiarella trifoliata var. unifoliata</i>
one-sided wintergreen	<i>Orthilia secunda</i>
<b>orchid</b>	<b><i>Plantanthera sp.</i></b>
Oregon beaked moss	<i>Kindbergia oregana</i>
Oregon stonecrop	<i>Sedum oreganum</i>
oval-leaved blueberry	<i>Vaccinium ovalifolium</i>
<b>Pacific bleeding heart</b>	<b><i>Dicentra formosa</i></b>
Pacific crab apple	<i>Malus fusca</i>
Pacific hemlock-parsley	<i>Conioselinum pacificum</i>
Pacific ninebark	<i>Physocarpus capitatus</i>
Pacific reedgrass	<i>Calamagrostis nutkaensis</i>

Common Name	Latin Name
Pacific silverweed	<i>Potentilla anserina ssp. pacifica</i>
<b>Pacific water-parsely</b>	<b><i>Oenanthe sarmentosa</i></b>
<b>paintbrush</b>	<b><i>Castilleja sp.</i></b>
palm tree moss	<i>Leucolepis acanthoneuron</i>
palmate-leaved coltsfoot	<i>Petasites frigidus var. palmatus</i>
parsley fern	<i>Cryptogramma acrostichoides</i>
partridgefoot	<i>Luetkea pectinata</i>
pathfinder	<i>Adenocaulon bicolor</i>
pearly everlasting	<i>Anaphalis margaritacea</i>
peavine	<i>Lathyrus sp.</i>
penstemon	<i>Penstemon sp.</i>
piggy-back plant	<i>Tolmiea menziesii</i>
<b>pink monkey-flower</b>	<b><i>Mimulus lewisii</i></b>
pink mountain-heather	<i>Phyllodoce empetrifomis</i>
<b>pink wintergreen</b>	<b><i>Pyrola asarifolia</i></b>
pipecleaner moss	<i>Rhytidiopsis robusta</i>
<b>pondweed</b>	<b><i>Potamogeton sp.</i></b>
poor-fen sphagnum	<i>Sphagnum angustifolium</i>
poverty oatgrass	<i>Danthonia spicata</i>
prickly rose	<i>Rosa acicularis</i>
<b>prince's pine</b>	<b><i>Chimophila umbellata ssp. occidentalis</i></b>
Puget Sound gumweed	<i>Grindelia integrifolia</i>
purple dead-nettle	<i>Lamium purpureum</i>
purple-leaved willowherb	<i>Epilobium ciliatum</i>
purple-worm liverwort	<i>Pleurozia purpurea</i>
queen's cup	<i>Clintonia uniflora</i>
ragbag	<i>Platismatia glauca</i>
rattlesnake-plantain	<i>Goodyera oblongifolia</i>
red alder	<i>Alnus rubra</i>
red columbine	<i>Aquilegia formosa</i>
red elderberry	<i>Sambucus racemosa</i>
red elderberry	<i>Sambucus racemosa ssp. pubens</i>
red goosefoot	<i>Chenopodium rubrum</i>
red huckleberry	<i>Vaccinium parvifolium</i>
red-osier dogwood	<i>Cornus stolonifera</i>
red-stemmed feathermoss	<i>Pleurozium schreberi</i>
<b>red-stemmed saxifrage</b>	<b><i>Saxifraga lyallii</i></b>
reedgrass	<i>Calamagrostis sp.</i>
ribwort plantain	<i>Plantago lanceolata</i>
ring peltia	<i>Pellia neesiana</i>
rock moss	<i>Racomitrium sp.</i>
Rocky Mountain cow-lily	<i>Nuphar polysepala</i>
<b>rose</b>	<b><i>Rosa sp.</i></b>
<b>Ross' sedge</b>	<b><i>Carex rossii</i></b>

Common Name	Latin Name
<b>rosy pussytoes</b>	<b><i>Antennaria microphylla</i></b>
rosy twistedstalk	<i>Streptopus roseus</i>
round-leaved sundew	<i>Drosera rotundifolia</i>
running clubmoss	<i>Lycopodium clavatum</i>
rush	<i>Juncus sp.</i>
salal	<i>Gaultheria shallon</i>
salmonberry	<i>Rubus spectabilis</i>
<b>sandwort</b>	<b><i>Arenaria sp.</i></b>
<b>sanicle</b>	<b><i>Sanicula sp.</i></b>
<b>saskatoon</b>	<b><i>Amelanchier alnifolia</i></b>
saxifrage	<i>Saxifraga sp.</i>
scarlet paintbrush	<i>Castilleja miniata</i>
<b>St.John's wort</b>	<b><i>Hypericum scouleri</i></b>
<b>Scouler's willow</b>	<b><i>Salix scouleriana</i></b>
sea plantain	<i>Plantago maritima</i>
seabeach sandwort	<i>Honkenya peploides</i>
seacoast angelica	<i>Angelica lucida</i>
sea-milkwort	<i>Glaux maritima</i>
seashore saltgrass	<i>Distichlis spicata var. spicata</i>
seaside arrow-grass	<i>Triglochin maritimum</i>
sedge	<i>Carex sp.</i>
self-heal	<i>Prunella vulgaris</i>
shaggy sphagnum	<i>Sphagnum squarrosum</i>
shooting star	<i>Dodecatheon sp.</i>
shore sedge	<i>Carex limosa</i>
<b>short-beaked agoseris</b>	<b><i>Agoseris glauca</i></b>
showy sedge	<i>Carex spectabilis</i>
<b>sibbaldia</b>	<b><i>Sibbaldia procumbens</i></b>
Siberian miner's-lettuce	<i>Claytonia sibirica</i>
<b>sickle moss</b>	<b><i>Drepanocladus uncinatus</i></b>
sicketop lousewort	<i>Pedicularis racemosa</i>
silverweed	<i>Potentilla anserina</i>
single delight	<i>Moneses uniflora</i>
<b>single-spiked sedge</b>	<b><i>Carex scirpoidea</i></b>
Sitka alder	<i>Alnus crispa ssp. sinuata</i>
Sitka burnet	<i>Sanguisorba canadensis</i>
<b>Sitka mountain-ash</b>	<b><i>Sorbus sitchensis</i></b>
<b>Sitka romanzoffia</b>	<b><i>Romanzoffia sitchensis</i></b>
Sitka sedge	<i>Carex sitchensis</i>
Sitka spruce	<i>Picea sitchensis</i>
Sitka valerian	<i>Valeriana sitchensis</i>
Sitka willow	<i>Salix sitchensis</i>
skunk cabbage	<i>Lysichiton americanum</i>
<b>slender bog orchid</b>	<b><i>Platanthera stricta</i></b>
<b>slender hawkweed</b>	<b><i>Hieracium gracile</i></b>

Common Name	Latin Name
slender-beaked moss	<i>Kindbergia praelonga</i>
slimstem reedgrass	<i>Calamagrostis stricta</i>
slough sedge	<i>Carex obnupta</i>
<b>small twistedstalk</b>	<b><i>Streptopus streptopoides</i></b>
<b>small-awned sedge</b>	<b><i>Carex microchaeta</i></b>
small-flowered alumroot	<i>Heuchera micrantha</i>
small-flowered woodrush	<i>Luzula parviflora</i>
smooth alumroot	<i>Heuchera glabra</i>
snake liverwort	<i>Conocephalum conicum</i>
sorrel	<i>Rumex sp.</i>
speedwell	<i>Veronica sp.</i>
sphagnum	<i>Sphagnum sp.</i>
<b>spike trisetum</b>	<b><i>Trisetum spicatum</i></b>
spiny wood fern	<i>Dryopteris expansa</i>
spleenwort	<i>Asplenium sp.</i>
<b>spotted saxifrage</b>	<b><i>Saxifraga bronchialis</i></b>
spreading phlox	<i>Phlox diffusa</i>
spreading rush	<i>Juncus supiniformis</i>
spreading stonecrop	<i>Sedum divergens</i>
<b>spring beauty/miner's lettuce</b>	<b><i>Claytonia sp.</i></b>
springbank clover	<i>Trifolium wormskjoldii</i>
spruce	<i>Picea sp.</i>
<b>St. John's-wort</b>	<b><i>Hypericum sp.</i></b>
star sedge	<i>Carex echinata</i>
<b>starflower</b>	<b><i>Trientalis sp.</i></b>
star-flowered false Solomon's-seal	<i>Smilacina stellata</i>
step moss	<i>Hylocomium splendens</i>
sticky false asphodel	<i>Tofieldia glutinosa</i>
stiff clubmoss	<i>Lycopodium annotinum</i>
stiff-leaved haircap moss	<i>Polytrichum alpinum</i>
stink currant	<i>Ribes bracteosum</i>
<b>stream saxifrage</b>	<b><i>Saxifraga odontoloma</i></b>
stream violet	<i>Viola glabella</i>
<b>streambank arnica</b>	<b><i>Arnica amplexicaulis</i></b>
<b>subalpine buttercup</b>	<b><i>Ranunculus eschscholtzii</i></b>
subalpine daisy	<i>Erigeron peregrinus</i>
subalpine fir	<i>Abies lasiocarpa</i>
<b>sundew</b>	<b><i>Drosera sp.</i></b>
surf-grass	<i>Phyllospadix sp.</i>
swamp gentian	<i>Gentiana douglasiana</i>
sweet gale	<i>Myrica gale</i>
<b>sweet-cicely</b>	<b><i>Osmorhiza sp.</i></b>
sweet-scented bedstraw	<i>Galium triflorum</i>
sword fern	<i>Polystichum munitum</i>
tall mannagrass	<i>Glyceria elata</i>

Common Name	Latin Name
thimbleberry	<i>Rubus parviflorus</i>
three-leaved foamflower	<i>Tiarella trifoliata</i>
three-leaved foamflower	<i>Tiarella trifoliata</i> var. <i>trifoliata</i>
three-leaved goldthread	<i>Coptis trifolia`</i>
three-way sedge	<i>Dulichium arundinaceum</i>
<b>tiger lily</b>	<b><i>Lilium columbianum</i></b>
<b>Tolmie's saxifrage</b>	<b><i>Saxifraga tolmiei</i></b>
<b>trailing black currant</b>	<b><i>Ribes laxiflorum</i></b>
<b>trailing blackberry</b>	<b><i>Rubus ursinus</i></b>
trailing yellow violet	<i>Viola sempervirens</i>
tufted clubrush	<i>Trichophorum cespitosum</i>
tufted hairgrass	<i>Deschampsia cespitosa</i>
<b>twayblade</b>	<b><i>Listera</i> sp.</b>
twinflower	<i>Linnaea borealis</i>
Vancouver groundcone	<i>Boschniakia hookeri</i>
<b>vanilla-leaf</b>	<b><i>Achlys triphylla</i></b>
variable moss	<i>Isoetecium stoloniferum</i>
<b>vetch</b>	<b><i>Vicia</i> sp.</b>
violet	<i>Viola</i> sp.
wall lettuce	<i>Lactuca muralis</i>
Wallace's selaginella	<i>Selaginella wallacei</i>
water hemlock	<i>Cicuta</i> sp.
water moss	<i>Fontinalis</i> sp.
western bog-laurel	<i>Kalmia microphylla</i>
western bog-laurel	<i>Kalmia microphylla</i> ssp. <i>occidentalis</i>
western fescue	<i>Festuca occidentalis</i>
<b>western fir clubmoss</b>	<b><i>Hyperizia occidentalis</i></b>
<b>western hedysarum</b>	<b><i>Hedysarum occidentale</i></b>
western hemlock	<i>Tsuga heterophylla</i>
western meadowrue	<i>Thalictrum occidentale</i>
<b>western mountain-ash</b>	<b><i>Sorbus scopulina</i></b>
<b>western pasqueflower</b>	<b><i>Anemone occidentalis</i></b>
western rattlesnake-root	<i>Prenanthes alata</i>
western redcedar	<i>Thuja plicata</i>
western tea-berry	<i>Gaultheria ovatifolia</i>
<b>western trillium</b>	<b><i>Trillium ovatum</i></b>
western white pine	<i>Pinus monticola</i>
western witchgrass	<i>Panicum occidentale</i>
western yew	<i>Taxus brevifolia</i>
white beak-rush	<i>Rhynchospora alba</i>
white bog orchid	<i>Platanthera dilatata</i>
white hawkweed	<i>Hieracium albiflorum</i>
<b>white hawkweed</b>	<b><i>Hieracium albiflorum</i></b>
white marsh-marigold	<i>Caltha leptosepala</i> var. <i>biflora</i>
white-flowered rhododendron	<i>Rhododendron albiflorum</i>

Common Name	Latin Name
<b>white-flowered willowherb</b>	<b><i>Epilobium lactiflorum</i></b>
wild strawberry	<i>Fragaria virginiana</i> ssp. <i>glauca</i>
willow	<i>Salix</i> sp.
willowherb	<i>Epilobium</i> sp.
<b>wintergreen</b>	<b><i>Pyrola</i> sp.</b>
wood strawberry	<i>Fragaria vesca</i>
<b>woodrush</b>	<b><i>Luzula</i> sp.</b>
woolly coral	<i>Stereocaulon tomentosum</i>
yarrow	<i>Achillea millefolium</i>
yellow double-leaf wort	<i>Diplophyllum taxifolium</i>
yellow marsh-marigold	<i>Caltha palustris</i>
<b>yellow monkey-flower</b>	<b><i>Mimulus guttatus</i></b>
<b>yellow mountain-avens</b>	<b><i>Dryas drummondii</i></b>
yellow mountain-heather	<i>Phyllodoce glanduliflora</i>
yellow sand-verbena	<i>Abronia latifolia</i>
yellow-cedar	<i>Chamaecyparis nootkatensis</i>
yellow-ladle liverwort	<i>Scapania bolenderi</i>
	<i>Alectoria</i> sp.
	<i>Barbilophozia floerkei</i>
	<b><i>Barbilophozia</i> sp.</b>
	<i>Bazzania denudata</i>
	<i>Bazzania</i> sp.
	<i>Blepharostoma trichophyllum</i>
	<b><i>Brachythecium</i> sp.</b>
	<b><i>Bryoria</i> sp.</b>
	<i>Calypogeja muelleriana</i>
	<i>Campylopus atrovirens</i>
	<i>Cephalozia lunulifolia</i>
	<i>Cetraria</i> sp.
	<i>Cladina alpestris</i>
	<i>Cladina portentosa</i>
	<i>Cladina</i> sp.
	<i>Cladina stellaris</i>
	<i>Cladonia bacillaris</i>
	<i>Cladonia bellidiflora</i>
	<b><i>Cladonia coniocraea</i></b>
	<b><i>Cladonia fimbriata</i></b>
	<i>Cladonia hookeri</i>
	<i>Cladonia macilenta</i>
	<b><i>Cladonia multiformis</i></b>
	<i>Cladonia parasitica</i>
	<i>Cladonia pseudostellata</i>
	<i>Cladonia</i> sp.
	<i>Cladonia squamosa</i>
	<i>Cladonia uncialis</i>



Common Name	Latin Name
	<i>Claopodium sp.</i>
	<i>Climacium dendroides</i>
	<i>Climacium sp.</i>
	<i>Collema sp.</i>
	<i>Dicranella crispa</i>
	<i>Dicranella palustris</i>
	<i>Dicranum sp.</i>
	<i>Dicranum spadiceum</i>
	<b><i>Distichium capillaceum</i></b>
	<b><i>Fissidens adiathoides</i></b>
	<i>Grimmia sp.</i>
	<i>Herbertus sp.</i>
	<i>Homalothecium sp.</i>
	<i>Hylocomium sp.</i>
	<i>Hypnum circinale</i>
	<i>Hypnum sp.</i>
	<i>Hypogymnia inactiva</i>
	<i>Isothecium sp.</i>
	<i>Jungermannia obovata</i>
	<i>Jungermannia sp.</i>
	<i>Lescurea baileyi</i>
	<b><i>Leucoplepis sp.</i></b>
	<i>Lobaria linita</i>
	<i>Lobaria sp.</i>
	<i>Lophozia sp.</i>
	<i>Lophozia ventricosa</i>
	<i>Marchantia polymorpha</i>
	<i>Metzgeria furcata</i>
	<b><i>Mnium sp.</i></b>
	<b><i>Oligotrichium sp.</i></b>
	<i>Pellia sp.</i>
	<i>Peltigera britannica</i>
	<i>Peltigera sp.</i>
	<b><i>Plagiomnium sp.</i></b>
	<i>Pogonatum alpinum</i>
	<i>Pogonatum contortum</i>
	<i>Polypodium sp.</i>
	<b><i>Racomitrium sudeticum</i></b>
	<b><i>Rhizomnium sp.</i></b>
	<i>Rhizoplaca glaucophana</i>
	<b><i>Rhytidiadelphus sp.</i></b>
	<i>Riccardia sp.</i>
	<i>Scapania americana</i>
	<b><i>Scapania paludicola</i></b>
	<i>Scapania sp.</i>

Common Name	Latin Name
	<i>Scapania umbrosa</i>
	<i>Sphagnum lindbergii</i>
	<i>Sphagnum magellanicum</i>
	<i>Sphagnum palustre</i>
	<i>Sphagnum tenellum</i>
	<i>Stereocaulon condensatum</i>
	<i>Stereocaulon sp.</i>
	<b><i>Tortula norvegica</i></b>
	<i>Uloa obtusiuscula</i>

## 8.2 Appendix II: Vascular and Non-Vascular Plants

### Vascular Plants

Latin Name	Common Name
<i>Abies amabilis</i>	amabilis fir
<i>Abies lasiocarpa</i>	subalpine fir
<i>Abronia latifolia</i>	yellow sand-verbena
<i>Acer glabrum var. douglasii</i>	Douglas maple
<i>Acer macrophyllum</i>	bigleaf maple
<i>Achillea millefolium</i>	yarrow
<b><i>Achlys triphylla</i></b>	<b>vanilla-leaf</b>
<i>Adenocaulon bicolor</i>	pathfinder
<i>Adiantum aleuticum</i>	maidenhair fern
<b><i>Agoseris glauca</i></b>	<b>short-beaked agoseris</b>
<i>Agrostis capillaris</i>	colonial bentgrass
<i>Agrostis scabra</i>	hair bentgrass
<i>Agrostis sp.</i>	bentgrass
<i>Agrostis tenuis</i>	colonial bentgrass
<i>Agrostis variabilis</i>	mountain bentgrass
<i>Aira praecox</i>	early hairgrass
<i>Alnus crispa</i>	green alder
<i>Alnus crispa ssp. crispa</i>	green alder
<i>Alnus crispa ssp. sinuata</i>	Sitka alder
<i>Alnus rubra</i>	red alder
<b><i>Amelanchier alnifolia</i></b>	<b>saskatoon</b>
<i>Anaphalis margaritacea</i>	pearly everlasting
<b><i>Anemone drummondii</i></b>	<b>alpine anemone</b>
<b><i>Anemone multifida</i></b>	<b>cut-leaved anemone</b>
<b><i>Anemone occidentalis</i></b>	<b>western pasqueflower</b>
<b><i>Anemone sp.</i></b>	<b>anemone</b>
<i>Angelica lucida</i>	seacoast angelica
<i>Angelica sp.</i>	angelica
<b><i>Antennaria microphylla</i></b>	<b>rosy pussytoes</b>
<i>Aquilegia formosa</i>	red columbine

Latin Name	Common Name
<b><i>Aquilegia sp.</i></b>	<b>columbine</b>
<i>Arctostaphylos uva-ursi</i>	kinnikinnick
<b><i>Arenaria sp.</i></b>	<b>sandwort</b>
<b><i>Arnica amplexicaulis</i></b>	<b>streambank arnica</b>
<b><i>Arnica cordifolia</i></b>	<b>heart-leaved arnica</b>
<b><i>Arnica latifolia</i></b>	<b>mountain arnica</b>
<b><i>Arnica mollis</i></b>	<b>hairy arnica</b>
<i>Arnica sp.</i>	arnica
<i>Artemisia norvegica</i>	mountain sagewort
<i>Aruncus dioicus</i>	goatsbeard
<i>Asplenium sp.</i>	spleenwort
<b><i>Asplenium viride</i></b>	<b>green spleenwort</b>
<i>Aster foliaceus</i>	leafy aster
<i>Aster sp.</i>	aster
<i>Aster subspicatus</i>	Douglas' aster
<i>Athyrium distentifolium</i>	alpine lady fern
<i>Athyrium distentifolium ssp. americanum</i>	alpine lady fern
<i>Athyrium filix-femina</i>	lady fern
<i>Atriplex patula</i>	Common orache
<i>Blechnum spicant</i>	deer fern
<i>Boschniakia hookeri</i>	Vancouver groundcone
<i>Botrychium multifidum</i>	leathery grape fern
<i>Boykinia elata</i>	coast boykinia
<b><i>Boykinia sp.</i></b>	<b>boykinia</b>
<i>Cakile edentula</i>	American searocket
<i>Calamagrostis canadensis</i>	bluejoint
<i>Calamagrostis nutkaensis</i>	Pacific reedgrass
<i>Calamagrostis sp.</i>	reedgrass
<i>Calamagrostis stricta</i>	slimstem reedgrass
<i>Caltha leptosepala var. biflora</i>	white marsh-marigold
<i>Caltha palustris</i>	yellow marsh-marigold
<i>Caltha sp.</i>	marsh-marigold
<i>Calystegia soldanella</i>	beach morning glory
<i>Campanula rotundifolia</i>	common harebell
<b><i>Campanula sp.</i></b>	<b>harebell/bellflower</b>
<b><i>Cardamine pratensis</i></b>	<b>cuckoo bitter-cress</b>
<i>Cardamine sp.</i>	bittercress
<i>Carex canescens</i>	grey sedge
<i>Carex deweyana</i>	Dewey's sedge
<i>Carex echinata</i>	star sedge
<b><i>Carex exsiciata</i></b>	<b>inflated sedge</b>
<i>Carex limosa</i>	shore sedge
<i>Carex lyngbyei</i>	Lingbye's sedge
<i>Carex macrocephala</i>	large-headed sedge
<b><i>Carex macrochaeta</i></b>	<b>large-awned sedge</b>

Latin Name	Common Name
<i>Carex microchaeta</i>	small-awned sedge
<i>Carex nigricans</i>	black alpine sedge
<i>Carex obnupta</i>	slough sedge
<i>Carex pauciflora</i>	few-flowered sedge
<i>Carex rossii</i>	Ross' sedge
<i>Carex scirpoidea</i>	single-spiked sedge
<i>Carex sitchensis</i>	Sitka sedge
<i>Carex sp.</i>	sedge
<i>Carex spectabilis</i>	showy sedge
<i>Carex utriculata</i>	beaked sedge
<i>Cassiope mertensiana</i>	Mertens' mountain-heather
<i>Cassiope sp.</i>	mountain-heather
<i>Castilleja miniata</i>	scarlet paintbrush
<i>Castilleja sp.</i>	paintbrush
<i>Chamaecyparis nootkatensis</i>	yellow-cedar
<i>Chenopodium rubrum</i>	red goosefoot
<i>Chimaphila menziesii</i>	menzies' pipsissewa
<i>Chimophila umbellata ssp. occidentalis</i>	prince's pine
<i>Cicuta sp.</i>	water hemlock
<i>Circaea alpina</i>	enchanter's night-shade
<i>Cirsium arvense</i>	Canada thistle
<i>Cirsium vulgare</i>	bull thistle
<i>Cladina mitis</i>	green reindeer lichen
<i>Cladothamnus pyroliflorus</i>	copperbush
<i>Claytonia sibirica</i>	Siberian miner's-lettuce
<i>Claytonia sp.</i>	spring beauty/miner's lettuce
<i>Clintonia uniflora</i>	queen's cup
<i>Conioselinum pacificum</i>	Pacific hemlock-parsley
<i>Convolvulus soldanella</i>	beach bindweed
<i>Coptis aspleniifolia</i>	fern-leaved goldthread
<i>Coptis trifolia</i>	three-leaved goldthread
<i>Cornus canadensis</i>	bunchberry
<i>Cornus stolonifera</i>	red-osier dogwood
<i>Cryptogramma acrostichoides</i>	parsley fern
<i>Cystopteris fragilis</i>	fragile fern
<i>Danthonia californica</i>	California oatgrass
<i>Danthonia sp.</i>	oatgrass
<i>Danthonia spicata</i>	poverty oatgrass
<i>Deschampsia cespitosa</i>	tufted hairgrass
<i>Dicentra formosa</i>	Pacific bleeding heart
<i>Distichlis spicata var. spicata</i>	seashore saltgrass
<i>Dodecatheon jeffreyi</i>	Jeffrey's shooting star
<i>Dodecatheon sp.</i>	shooting star
<i>Drosera rotundifolia</i>	round-leaved sundew

Latin Name	Common Name
<b><i>Drosera sp.</i></b>	<b>sundew</b>
<b><i>Dryas drummondii</i></b>	<b>yellow mountain-avens</b>
<i>Dryopteris expansa</i>	spiny wood fern
<i>Dulichium arundinaceum</i>	three-way sedge
<i>Eleocharis palustris</i>	common spike-rush
<i>Elymus glaucus</i>	blue wildrye
<i>Empetrum nigrum</i>	crowberry
<i>Epilobium angustifolium</i>	fireweed
<i>Epilobium ciliatum</i>	purple-leaved willowherb
<b><i>Epilobium lactiflorum</i></b>	<b>white-flowered willowherb</b>
<i>Epilobium sp.</i>	willowherb
<i>Equisetum arvense</i>	common horsetail
<i>Equisetum pratense</i>	meadow horsetail
<i>Equisetum sp.</i>	horsetail
<i>Erigeron peregrinus</i>	subalpine daisy
<i>Erigeron sp.</i>	fleabane
<i>Eriophorum angustifolium</i>	narrow-leaved cotton-grass
<b><i>Eriophyllum sp.</i></b>	<b>eriophyllum</b>
<i>Fauria crista-galli</i>	deer-cabbage
<i>Festuca occidentalis</i>	western fescue
<i>Festuca subulata</i>	bearded fescue
<i>Fragaria vesca</i>	wood strawberry
<i>Fragaria virginiana ssp. glauca</i>	wild strawberry
<i>Fritillaria camschatcensis</i>	northern rice-root
<i>Galium aparine</i>	cleavers
<b><i>Galium sp.</i></b>	<b>bedstraw</b>
<i>Galium triflorum</i>	sweet-scented bedstraw
<i>Gaultheria hispidula</i>	creeping-snowberry
<i>Gaultheria humifusa</i>	alpine-wintergreen
<i>Gaultheria ovatifolia</i>	western tea-berry
<i>Gaultheria shallon</i>	salal
<i>Gentiana douglasiana</i>	swamp gentian
<i>Gentiana glauca</i>	glaucous gentian
<i>Gentiana sceptrum</i>	king gentian
<i>Gentiana sp.</i>	gentian
<b><i>Geum sp.</i></b>	<b>avens</b>
<i>Glaux maritima</i>	sea-milkwort
<i>Glyceria elata</i>	tall mannagrass
<i>Goodyera oblongifolia</i>	rattlesnake-plantain
<i>Grindelia integrifolia</i>	Puget Sound gumweed
<i>Gymnocarpium dryopteris</i>	oak fern
<b><i>Hedysarum occidentale</i></b>	<b>western hedysarum</b>
<i>Heracleum lanatum</i>	cow-parsnip
<i>Heuchera glabra</i>	smooth alumroot
<i>Heuchera micrantha</i>	small-flowered alumroot

Latin Name	Common Name
<b><i>Heuchera sp.</i></b>	<b>alumroot</b>
<i>Hieracium albiflorum</i>	white hawkweed
<b><i>Hieracium albiflorum</i></b>	<b>white hawkweed</b>
<b><i>Hieracium gracile</i></b>	<b>slender hawkweed</b>
<b><i>Hieracium sp.</i></b>	<b>hawkweed</b>
<i>Hippuris vulgaris</i>	common mare's-tail
<i>Honkenya peploides</i>	seabeach sandwort
<i>Hordeum brachyantherum</i>	meadow barley
<i>Hypericum anagalloides</i>	bog St. John's-wort
<b><i>Hypericum scouleri</i></b>	<b>Scouler's St. John's wort</b>
<b><i>Hypericum sp.</i></b>	<b>St. John's wort</b>
<b><i>Hyperizia occidentalis</i></b>	<b>western fir clubmoss</b>
<i>Hypnum circinale</i>	coil-leaved moss
<i>Hypochoeris radicata</i>	hairy cat's-ear
<i>Jaumea carnosa</i>	fleshy jaumea
<i>Juncus arcticus</i>	arctic rush
<i>Juncus effusus</i>	common rush
<i>Juncus ensifolius</i>	dagger-leaved rush
<b><i>Juncus mertensianus</i></b>	<b>Merten's rush</b>
<i>Juncus sp.</i>	rush
<i>Juncus supiniformis</i>	spreading rush
<i>Juniperus communis</i>	common juniper
<i>Kalmia microphylla</i>	western bog-laurel
<i>Kalmia microphylla ssp. occidentalis</i>	western bog-laurel
<i>Lactuca muralis</i>	wall lettuce
<i>Lamium purpureum</i>	purple dead-nettle
<i>Lathyrus japonicus</i>	beach pea
<i>Lathyrus sp.</i>	peavine
<i>Ledum groenlandicum</i>	Labrador tea
<i>Leptarrhena pyrolifolia</i>	leatherleaf saxifrage
<i>Leymus innovatus</i>	fuzzy-spiked wildrye
<i>Leymus mollis</i>	dune wildrye
<b><i>Lilium columbianum</i></b>	<b>tiger lily</b>
<i>Linnaea borealis</i>	twinflower
<i>Listera caurina</i>	northwestern twayblade
<i>Listera cordata</i>	heart-leaved twayblade
<b><i>Listera sp.</i></b>	<b>twayblade</b>
<i>Loiseleuria procumbens</i>	alpine-azalea
<b><i>Lomatium sp.</i></b>	<b>desert parsley</b>
<i>Lonicera involucrata</i>	black twinberry
<i>Luetkea pectinata</i>	partridgefoot
<b><i>Lupinus arcticus</i></b>	<b>arctic lupine</b>
<b><i>Lupinus sp.</i></b>	<b>lupine</b>
<i>Luzula parviflora</i>	small-flowered woodrush
<b><i>Luzula sp.</i></b>	<b>woodrush</b>

Latin Name	Common Name
<i>Lycopodium alpinum</i>	alpine clubmoss
<i>Lycopodium annotinum</i>	stiff clubmoss
<i>Lycopodium clavatum</i>	running clubmoss
<i>Lycopodium complanatum</i>	ground-cedar
<i>Lycopodium sitchense</i>	Alaska clubmoss
<i>Lycopodium sp.</i>	clubmoss
<i>Lysichiton americanum</i>	skunk cabbage
<i>Mahonia nervosa</i>	dull Oregon-grape
<i>Maianthemum dilatatum</i>	false lily-of-the-valley
<i>Malus fusca</i>	Pacific crab apple
<i>Mentha arvensis</i>	field mint
<b><i>Menyanthes trifoliata</i></b>	<b>buckbean</b>
<i>Menziesia ferruginea</i>	false azalea
<i>Menziesia sp.</i>	azalea
<i>Microseris borealis</i>	apargidium
<b><i>Mimulus guttatus</i></b>	<b>yellow monkey-flower</b>
<b><i>Mimulus lewisii</i></b>	<b>pink monkey-flower</b>
<b><i>Minuartia rubella</i></b>	<b>boreal sandwort</b>
<b><i>Mitella pentandra</i></b>	<b>five-stamened mitrewort</b>
<b><i>Mitella sp.</i></b>	<b>mitrewort</b>
<i>Moneses uniflora</i>	single delight
<i>Monotropa uniflora</i>	Indian-pipe
<b><i>Myosotis sp.</i></b>	<b>forget-me-not</b>
<i>Myrica gale</i>	sweet gale
<i>Nuphar polysepala</i>	Rocky Mountain cow-lily
<b><i>Oenanthe sarmentosa</i></b>	<b>Pacific water-parsely</b>
<i>Oplopanax horridus</i>	devil's club
<i>Orobanche sp.</i>	broomrape
<i>Orthilia secunda</i>	one-sided wintergreen
<i>Osmorhiza chilensis</i>	mountain sweet-cicely
<b><i>Osmorhiza sp.</i></b>	<b>sweet-cicely</b>
<i>Oxycoccus oxycoccus</i>	bog cranberry
<b><i>Oxyria digyna</i></b>	<b>mountain sorrel</b>
<i>Panicum occidentale</i>	western witchgrass
<b><i>Parnassia fimbriata</i></b>	<b>fringed grass-of-Parnassus</b>
<b><i>Pedicularis bracteosa</i></b>	<b>bracted lousewort</b>
<i>Pedicularis ornithorhyncha</i>	bird's-beak lousewort
<i>Pedicularis racemosa</i>	sickle-top lousewort
<i>Pedicularis sp.</i>	lousewort
<i>Penstemon davidsonii</i>	Davidson's penstemon
<i>Penstemon serrulatus</i>	coast penstemon
<i>Penstemon sp.</i>	penstemon
<b><i>Pentagramma triangularis</i></b>	<b>goldenback fern</b>
<i>Petasites frigidus var. palmatus</i>	palmate-leaved coltsfoot
<i>Phlox diffusa</i>	spreading phlox

Latin Name	Common Name
<i>Phyllodoce empetriformis</i>	pink mountain-heather
<i>Phyllodoce glanduliflora</i>	yellow mountain-heather
<i>Phyllodoce sp.</i>	mountain heather
<i>Phyllospadix sp.</i>	surf-grass
<i>Physocarpus capitatus</i>	Pacific ninebark
<i>Picea sitchensis</i>	Sitka spruce
<i>Picea sp.</i>	spruce
<i>Pinguicula sp.</i>	butterwort
<i>Pinguicula vulgaris</i>	common butterwort
<i>Pinus contorta</i>	lodgepole pine
<i>Pinus monticola</i>	western white pine
<i>Plantago lanceolata</i>	ribwort plantain
<i>Plantago macrocarpa</i>	Alaska plantain
<i>Plantago major</i>	common plantain
<i>Plantago maritima</i>	sea plantain
<b><i>Platanthera sp.</i></b>	<b>orchid</b>
<i>Platanthera dilatata</i>	white bog orchid
<b><i>Platanthera hyperborea</i></b>	<b>green-flowered bog orchid</b>
<b><i>Platanthera stricta</i></b>	<b>slender bog orchid</b>
<i>Poa sp.</i>	bluegrass
<i>Polygonum paronychia</i>	black knotweed
<i>Polypodium glycyrrhiza</i>	licorice fern
<i>Polystichum braunii</i>	Braun's holly fern
<i>Polystichum lonchitis</i>	mountain holly fern
<i>Polystichum munitum</i>	sword fern
<i>Polystichum sp.</i>	holly fern
<b><i>Potamogeton sp.</i></b>	<b>pondweed</b>
<i>Potentilla anserina</i>	silverweed
<i>Potentilla anserina ssp. pacifica</i>	Pacific silverweed
<i>Potentilla palustris</i>	marsh cinquefoil
<i>Prenanthes alata</i>	western rattlesnake-root
<i>Prunella vulgaris</i>	self-heal
<b><i>Prunus sp.</i></b>	<b>cherry</b>
<i>Pseudotsuga menziesii</i>	Douglas-fir
<i>Pteridium aquilinum</i>	bracken fern
<b><i>Pyrola asarifolia</i></b>	<b>pink wintergreen</b>
<i>Pyrola grandiflora</i>	arctic wintergreen
<b><i>Pyrola sp.</i></b>	<b>wintergreen</b>
<b><i>Ranunculus eschscholtzii</i></b>	<b>subalpine buttercup</b>
<i>Ranunculus repens</i>	creeping buttercup
<b><i>Ranunculus sp.</i></b>	<b>buttercup</b>
<i>Rhamnus purshiana</i>	cascara
<i>Rhododendron albiflorum</i>	white-flowered rhododendron
<i>Rhynchospora alba</i>	white beak-rush
<i>Ribes bracteosum</i>	stink currant



Latin Name	Common Name
<b><i>Ribes lacustre</i></b>	<b>black gooseberry</b>
<b><i>Ribes laxiflorum</i></b>	<b>trailing black currant</b>
<b><i>Ribes sp.</i></b>	<b>currant or gooseberry</b>
<b><i>Romanzoffia sitchensis</i></b>	<b>Sitka romanzoffia</b>
<i>Rosa acicularis</i>	prickly rose
<i>Rosa gymnocarpa</i>	baldhip rose
<i>Rosa nutkana</i>	Nootka rose
<i>Rosa pisocarpa</i>	clustered wild rose
<b><i>Rosa sp.</i></b>	<b>rose</b>
<i>Rubus discolor</i>	Himalayan blackberry
<i>Rubus laciniatus</i>	evergreen blackberry
<i>Rubus parviflorus</i>	thimbleberry
<i>Rubus pedatus</i>	five-leaved bramble
<i>Rubus sp.</i>	berry/bramble
<i>Rubus spectabilis</i>	salmonberry
<b><i>Rubus ursinus</i></b>	<b>trailing blackberry</b>
<i>Rumex sp.</i>	sorrel
<b><i>Ruppia maritima</i></b>	<b>ditch-grass</b>
<i>Sagina maxima</i>	coastal pearlwort
<i>Salicornia virginica</i>	American glasswort
<b><i>Salix arctica</i></b>	<b>arctic willow</b>
<b><i>Salix scouleriana</i></b>	<b>Scouler's willow</b>
<i>Salix sitchensis</i>	Sitka willow
<i>Salix sp.</i>	willow
<i>Sambucus racemosa</i>	red elderberry
<i>Sambucus racemosa ssp. pubens</i>	red elderberry
<i>Sanguisorba canadensis</i>	Sitka burnet
<b><i>Sanguisorba officinalis</i></b>	<b>great burnet</b>
<b><i>Sanicula sp.</i></b>	<b>sanicle</b>
<b><i>Saxifraga bronchialis</i></b>	<b>spotted saxifrage</b>
<i>Saxifraga ferruginea</i>	Alaska saxifrage
<b><i>Saxifraga lyallii</i></b>	<b>red-stemmed saxifrage</b>
<i>Saxifraga nivalis</i>	alpine saxifrage
<b><i>Saxifraga odontoloma</i></b>	<b>stream saxifrage</b>
<i>Saxifraga sp.</i>	saxifrage
<b><i>Saxifraga tolmiei</i></b>	<b>Tolmie's saxifrage</b>
<i>Scirpus sp.</i>	bulrush/clubrush
<i>Sedum divergens</i>	spreading stonecrop
<i>Sedum oregonum</i>	Oregon stonecrop
<i>Selaginella wallacei</i>	Wallace's selaginella
<i>Senecio triangularis</i>	arrow-leaved groundsel
<b><i>Sibbaldia procumbens</i></b>	<b>sibbaldia</b>
<i>Sisyrinchium idahoense</i>	Idaho blue-eyed-grass
<i>Sisyrinchium idahoense var. macounii</i>	Idaho blue-eyed-grass
<b><i>Smilacina racemosa</i></b>	<b>false Solomon's seal</b>

Latin Name	Common Name
<i>Smilacina stellata</i>	star-flowered false Solomon's-seal
<b><i>Sorbus scapulina</i></b>	<b>western mountain-ash</b>
<b><i>Sorbus sitchensis</i></b>	<b>Sitka mountain-ash</b>
<b><i>Sorbus sp.</i></b>	<b>mountain ash</b>
<i>Spiraea douglasii</i>	hardhack
<i>Stachys cooleyae</i>	Cooley's hedge-nettle
<b><i>Stellaria media</i></b>	<b>chickweed</b>
<i>Streptopus amplexifolius</i>	clasping twistedstalk
<i>Streptopus roseus</i>	rosy twistedstalk
<b><i>Streptopus streptopoides</i></b>	<b>small twistedstalk</b>
<i>Taxus brevifolia</i>	western yew
<i>Tellima grandiflora</i>	fringecup
<i>Thalictrum occidentale</i>	western meadowrue
<i>Thuja plicata</i>	western redcedar
<i>Tiarella trifoliata</i>	three-leaved foamflower
<i>Tiarella trifoliata</i> var. <i>trifoliata</i>	three-leaved foamflower
<i>Tiarella trifoliata</i> var. <i>unifoliata</i>	one-leaved foamflower
<i>Tiarella trifoliata</i> var. <i>x laciniata</i>	cut-leaved foamflower
<i>Tofieldia glutinosa</i>	sticky false asphodel
<i>Tolmiea menziesii</i>	piggy-back plant
<i>Trautvetteria caroliniensis</i>	false bugbane
<i>Trichophorum cespitosum</i>	tufted clubrush
<i>Trientalis arctica</i>	northern starflower
<b><i>Trientalis latifolia</i></b>	<b>broad-leaved starflower</b>
<b><i>Trientalis sp.</i></b>	<b>starflower</b>
<i>Trifolium wormskjoldii</i>	springbank clover
<i>Triglochin maritimum</i>	seaside arrow-grass
<b><i>Trillium ovatum</i></b>	<b>western trillium</b>
<i>Trisetum cernuum</i>	nodding trisetum
<b><i>Trisetum spicatum</i></b>	<b>spike trisetum</b>
<b><i>Trollius laxus</i></b>	<b>globeflower</b>
<i>Tsuga heterophylla</i>	western hemlock
<i>Tsuga mertensiana</i>	mountain hemlock
<i>Utricularia vulgaris</i>	greater bladderwort
<i>Vaccinium alaskaense</i>	Alaskan blueberry
<i>Vaccinium caespitosum</i>	dwarf blueberry
<i>Vaccinium corymbosum</i>	highbush blueberry
<i>Vaccinium deliciosum</i>	blue-leaved huckleberry
<i>Vaccinium membranaceum</i>	black huckleberry
<i>Vaccinium ovalifolium</i>	oval-leaved blueberry
<i>Vaccinium ovatum</i>	evergreen huckleberry
<i>Vaccinium parvifolium</i>	red huckleberry
<b><i>Vaccinium sp.</i></b>	<b>blueberry, huckleberry</b>
<i>Vaccinium uliginosum</i>	bog blueberry
<i>Vahlodea atropurpurea</i>	mountain hairgrass

Latin Name	Common Name
<i>Valeriana sitchensis</i>	Sitka valerian
<i>Veratrum sp.</i>	hellebore
<i>Veratrum viride</i>	Indian hellebore
<i>Veronica sp.</i>	speedwell
<b><i>Veronica wormskjoldii</i></b>	<b>alpine speedwell</b>
<b><i>Viburnum edule</i></b>	<b>highbush-cranberry</b>
<i>Vicia gigantea</i>	giant vetch
<b><i>Vicia sp.</i></b>	<b>vetch</b>
<i>Viola glabella</i>	stream violet
<i>Viola palustris</i>	marsh violet
<i>Viola sempervirens</i>	trailing yellow violet
<i>Viola sp.</i>	violet
<b><i>Zigadenus elegans</i></b>	<b>mountain death-camas</b>

## Non-Vascular Plants

Latin Name	Common Name
<i>Alectoria sarmentosa</i>	common witch's hair
<i>Alectoria sp.</i>	
<i>Aulacomnium palustre</i>	glow moss
<i>Barbilophozia floerkei</i>	
<i>Barbilophozia hatcheri</i>	Hatcher's fan wort
<b><i>Barbilophozia sp.</i></b>	
<i>Bazzania denudata</i>	
<i>Bazzania sp.</i>	
<i>Blepharostoma trichophyllum</i>	
<b><i>Brachythecium sp.</i></b>	
<b><i>Bryoria sp.</i></b>	
<i>Calypogeja muelleriana</i>	
<i>Calypogeja sp.</i>	calypogeja
<i>Campylopus atrovirens</i>	
<i>Cephalozia lunulifolia</i>	
<i>Cetraria sp.</i>	
<i>Cladina alpestris</i>	
<i>Cladina portentosa</i>	
<i>Cladina rangiferina</i>	grey reindeer lichen
<i>Cladina sp.</i>	
<i>Cladina stellaris</i>	
<i>Cladonia bacillaris</i>	
<i>Cladonia bellidiflora</i>	
<i>Cladonia chlorophaea</i>	false pixie cup
<b><i>Cladonia coniocraea</i></b>	
<b><i>Cladonia fimbriata</i></b>	
<i>Cladonia hookeri</i>	
<i>Cladonia macilenta</i>	
<b><i>Cladonia multiformis</i></b>	
<i>Cladonia parasitica</i>	
<i>Cladonia pseudostellata</i>	
<i>Cladonia sp.</i>	
<i>Cladonia squamosa</i>	
<i>Cladonia uncialis</i>	
<i>Claopodium sp.</i>	
<i>Climacium dendroides</i>	
<i>Climacium sp.</i>	
<i>Collema sp.</i>	
<i>Conocephalum conicum</i>	snake liverwort
<i>Dicranella crispa</i>	
<i>Dicranella palustris</i>	
<i>Dicranum fuscescens</i>	curly heron's-bill moss
<i>Dicranum scoparium</i>	broom moss

Latin Name	Common Name
<i>Dicranum sp.</i>	
<i>Dicranum spadiceum</i>	
<i>Diplophyllum albicans</i>	common fold-leaf liverwort
<i>Diplophyllum taxifolium</i>	yellow double-leaf wort
<b><i>Distichium capillaceum</i></b>	
<b><i>Drepanocladus uncinatus</i></b>	<b>sickle moss</b>
<b><i>Fissidens adiathoides</i></b>	
<i>Fontinalis sp.</i>	water moss
<i>Grimmia sp.</i>	
<i>Herbertus aduncus</i>	common scissor-leaf liverwort
<i>Herbertus sp.</i>	
<i>Homalothecium sp.</i>	
<i>Hookeria lucens</i>	clear moss
<i>Huperzia miyoshiana</i>	Miyoshi-no fir clubmoss
<i>Hylocomium sp.</i>	
<i>Hylocomium splendens</i>	step moss
<i>Hypnum circinale</i>	
<i>Hypnum sp.</i>	
<i>Hypnum subimponens</i>	curly hypnum
<i>Hypogymnia inactiva</i>	
<i>Isothecium sp.</i>	
<i>Isothecium stoloniferum</i>	variable moss
<i>Jungermannia obovata</i>	
<i>Jungermannia sp.</i>	
<i>Kindbergia oregana</i>	Oregon beaked moss
<i>Kindbergia praelonga</i>	slender-beaked moss
<i>Lescuraea baileyi</i>	
<i>Leucolepis acanthoneuron</i>	palm tree moss
<b><i>Leucoplepis sp.</i></b>	
<i>Lobaria linita</i>	
<i>Lobaria pulmonaria</i>	lungwort
<i>Lobaria sp.</i>	
<i>Lophozia sp.</i>	
<i>Lophozia ventricosa</i>	
<i>Marchantia polymorpha</i>	
<i>Metzgeria furcata</i>	
<b><i>Mnium sp.</i></b>	
<i>Mylia taylorii</i>	hard scale liverwort
<b><i>Oligotrichium sp.</i></b>	
<i>Pellia neesiana</i>	ring pellia
<i>Pellia sp.</i>	
<i>Peltigera aphthosa</i>	freckle pelt
<i>Peltigera britannica</i>	
<i>Peltigera canina</i>	dog pelt
<i>Peltigera neopolydactyla</i>	frog pelt

Latin Name	Common Name
<i>Peltigera sp.</i>	
<i>Pilophorus acicularis</i>	devil's matchstick
<i>Plagiochila aspleniformis</i>	cedar-shake liverwort
<i>Plagiochila porelloides</i>	cedar-shake liverwort
<i>Plagiomnium insigne</i>	coastal leafy moss
<b>Plagiomnium sp.</b>	
<i>Plagiothecium undulatum</i>	flat moss
<i>Platismatia glauca</i>	ragbag
<i>Pleurozia purpurea</i>	purple-worm liverwort
<i>Pleurozium schreberi</i>	red-stemmed feathermoss
<i>Pogonatum alpinum</i>	
<i>Pogonatum contortum</i>	
<i>Polypodium glycyrrhiza</i>	licorice fern
<i>Polypodium sp.</i>	
<i>Polytrichum alpinum</i>	stiff-leaved haircap moss
<i>Polytrichum commune</i>	common hair-cap moss
<i>Polytrichum juniperinum</i>	juniper haircap moss
<i>Polytrichum piliferum</i>	awned haircap moss
<i>Polytrichum sp.</i>	hair-cap moss
<i>Racomitrium canescens</i>	grey rock moss
<i>Racomitrium lanuginosum</i>	hoary rock moss
<i>Racomitrium sp.</i>	rock moss
<b>Racomitrium sudeticum</b>	
<i>Rhizomnium glabrescens</i>	large leafy moss
<i>Rhizomnium magnifolium</i>	hairy lantern moss
<b>Rhizomnium sp.</b>	
<i>Rhizoplaca glaucophana</i>	
<i>Rhytidiadelphus loreus</i>	lanky moss
<b>Rhytidiadelphus sp.</b>	
<b>Rhytidiadelphus squarrosus</b>	<b>bent-leaf moss</b>
<i>Rhytidiopsis robusta</i>	pipecleaner moss
<i>Riccardia multifida</i>	comb liverwort
<i>Riccardia sp.</i>	
<i>Scapania americana</i>	
<i>Scapania bolenderi</i>	yellow-ladle liverwort
<b>Scapania paludicola</b>	
<i>Scapania sp.</i>	
<i>Scapania umbrosa</i>	
<i>Sphagnum angustifolium</i>	poor-fen sphagnum
<i>Sphagnum capillifolium</i>	common red sphagnum
<i>Sphagnum girgensohnii</i>	common green sphagnum
<i>Sphagnum lindbergii</i>	
<i>Sphagnum magellanicum</i>	
<i>Sphagnum palustre</i>	
<i>Sphagnum papillosum</i>	fat bog moss

---

Latin Name	Common Name
<i>Sphagnum sp.</i>	sphagnum
<i>Sphagnum squarrosum</i>	shaggy sphagnum
<i>Sphagnum tenellum</i>	
<i>Stereocaulon condensatum</i>	
<i>Stereocaulon paschale</i>	cottontail lichen
<i>Stereocaulon sp.</i>	
<i>Stereocaulon tomentosum</i>	woolly coral
<b><i>Tortula norvegica</i></b>	
<i>Ulota obtusiuscula</i>	

**8.3 Appendix III: B.C. Conservation Data Centre Tracking List for Port Alberni  
Portion of the Southern Vancouver Island Forest District**



**B.C. Conservation Data Centre: Rare Plant Community Tracking List**  
**Port Alberni Forest District**  
**March 16, 1998**

Scientific Name	Common Name	Potential Habitat	Prov. Rank	List
ABIES AMABILIS/PICEA SITCHENSIS - OPLOPANAX HORRIDUS	AMABILIS FIR/SITKA SPRUCE - DEVIL'S CLUB	CWHvm1/08 CWHvm2/08	S3	BLUE
ABIES AMABILIS/THUJA PLICATA - RUBUS SPECTABILIS, MOIST MARITIME 1	AMABILIS FIR/WESTERN REDCEDAR - SALMONBERRY, MOIST MARITIME 1	CWHmm1/07	S1S2	RED
ABIES AMABILIS/THUJA PLICATA - RUBUS SPECTABILIS, MOIST MARITIME 2	AMABILIS FIR/WESTERN REDCEDAR - SALMONBERRY, MOIST MARITIME 2	CWHmm2/08	S3?	BLUE
ABIES AMABILIS/THUJA PLICATA - RUBUS SPECTABILIS, VERY WET MARITIME	AMABILIS FIR/WESTERN REDCEDAR - SALMONBERRY, VERY WET MARITIME	CWHvm1/07 CWHvm2/07	S3	BLUE
ABIES AMABILIS/THUJA PLICATA - TIARELLA TRIFOLIATA, MOIST MARITIME 1	AMABILIS FIR/WESTERN REDCEDAR - FOAMFLOWER, MOIST MARITIME 1	CWHmm1/05	S2?	RED
ABIES GRANDIS - MAHONIA NERVOSA	DOUGLAS-FIR - GRAND FIR - OREGON GRAPE	CDFmm/04	S1S2	RED
ABIES GRANDIS - TIARELLA TRIFOLIATA	WESTERN REDCEDAR - GRAND FIR - FOAMFLOWER	CDFmm/06	S1S2	RED
ALNUS RUBRA - CAREX OBNUPTA; POPULUS BALSAMIFERA SSP. TRICHOCARPA	WESTERN REDCEDAR - SLOUGH SEDGE	CDFmm/14	S1	RED
ALNUS RUBRA - LYSICHTON AMERICANUM	WESTERN REDCEDAR - SKUNK CABBAGE	CDFmm/11	S2S3	BLUE
ANAPHALIS MARGARITACEA - ASTER FOLIACEOUS	ANAPHALIS - ASTER	MHmm1/00	S2S3	BLUE
DESCHAMPSIA CESPITOSA - SIDALCEA HENDERSONII	TUFTED HAIRGRASS - HENDERSON'S CHECKER-MALLOW	CWHxm1/00	S1S2	RED
FESTUCA IDAHOENSIS - KOELARIA MACRANTHA	IDAHO FESCUE - JUNEGRASS	CDFmm/00 CWHxm1/00	S1S2	RED
MYOSURUS MINIMUS - MONTIA SPP. - LIMNANTHES MACOUNII		CDFmm/00	S2S3	BLUE
PHLOX DIFFUSA - SELAGINELLA WALLACEI	PHLOX - MOSS	MHmm1/00	S2S3	BLUE
PICEA SITCHENSIS - RUBUS SPECTABILIS, VERY DRY MARITIME	SITKA SPRUCE - SALMONBERRY, VERY DRY MARITIME	CWHxm2/08 CWHxm1/08	S2	RED
PICEA SITCHENSIS - RUBUS SPECTABILIS,	SITKA SPRUCE - SALMONBERRY, VERY WET	CWHvm1/09	S2	RED

VERY WET MARITIME	MARITIME				
PINUS CONTORTA - SPHAGNUM GIRGENSOHNII, CDFMM	LOGEPOLE PINE - SPHAGNUM	CDFmm/10	S1	RED	
PINUS CONTORTA - SPHAGNUM GIRGENSOHNII, VERY DRY MARITIME	LOGEPOLE PINE - SPHAGNUM, VERY DRY MARITIME	CWHxm1/11 CWHxm2/11	S3?	BLUE	POPULUS
BALSAMIFERA SSP TRICHOCARPA - CORNUS SERICEA	COTTONWOOD - RED-OSIER DOGWOOD	CWHdm/09	S3	BLUE	
		CWHvm1/10 CWHds1/09 CWHds2/09* CWHmm1/09* CWHms1/08* CWHms2/08* CWHws2/08* CWHxm1/09* CWHxm2/09*			
POPULUS BALSAMIFERA SSP TRICHOCARPA - SALIX SITCHENSIS	COTTONWOOD - WILLOW	CWHdm/10 CWHxm2/10 CWHxm1/10	S2S3	BLUE	
PSEUDOTSUGA MENZIESII - ARBUTUS MENZIESII	DOUGLAS-FIR - ARBUTUS	CDFmm/00	S3	BLUE	
PSEUDOTSUGA MENZIESII - GAULTHERIA SHALLON	DOUGLAS-FIR - SALAL	CDFmm/01	S1S2	RED	
PSEUDOTSUGA MENZIESII - PINUS CONTORTA - ARBUTUS MENZIESII	DOUGLAS-FIR - LOGEPOLE PINE - ARBUTUS	CDFmm/02	S2S3	BLUE	
PSEUDOTSUGA MENZIESII - PINUS CONTORTA - CLADINA	DOUGLAS-FIR - LOGEPOLE PINE - CLADINA	CWHxm2/02	S3?	BLUE	
PSEUDOTSUGA MENZIESII - PINUS CONTORTA - RHACOMITRIUM CANESCENS	DOUGLAS-FIR - LOGEPOLE PINE - RHACOMITRIUM	CWHxm1/02	S3?	BLUE	
PSEUDOTSUGA MENZIESII - POLYSTICHUM MUNITUM	DOUGLAS-FIR - SWORD FERN	CWHxm1/04 CWHxm2/04 CWHdm/04	S2	RED	
PSEUDOTSUGA MENZIESII - QUERCUS GARRYANA - MELICA SUBULATA	DOUGLAS-FIR - GARRY OAK - ONIONGRASS	CDFmm/03	S1S2	RED	
PSEUDOTSUGA MENZIESII - TSUGA HETEROPHYLLA - GAULTHERIA SHALLON, DRY MARITIME	DOUGLAS-FIR - WESTERN HEMLOCK - SALAL, DRY MARITIME	CWHxm1/03 CWHxm2/03 CWHdm/03	S2S3	BLUE	
PSEUDOTSUGA MENZIESII - TSUGA HETEROPHYLLA - GAULTHERIA SHALLON, MOIST MARITIME	DOUGLAS-FIR - WESTERN HEMLOCK - SALAL, MOIST MARITIME	CWHmm1/02 CWHmm2/02	S3?	BLUE	

QUERCUS GARRYANA - ARBUTUS MENZIESII	GARRY OAK - ARBUTUS	CDFmm/00	S2?	RED
QUERCUS GARRYANA - BROMUS CARINATUS	GARRY OAK - BROME	CDFmm/00	S1	RED
QUERCUS GARRYANA - HOLODISCUS DISCOLOR	GARRY OAK - OCEAN SPRAY	CDFmm/00	S2	RED
THUJA PLICATA - ACHLYS TRIPHYLLA	WESTERN REDCEDAR - VANILLA LEAF	CDFmm/12	S2	RED
THUJA PLICATA - CAREX OBNUPTA	WESTERN REDCEDAR - SLOUGH SEDGE	CWHxm1/15 CWHxm2/15 CWHdm/15	S2S3	BLUE
THUJA PLICATA - LONICERA INVOLUCRATA	WESTERN REDCEDAR - BLACK TWINBERRY	CWHxm1/14 CWHxm2/14 CWHdm/14	S2	RED
THUJA PLICATA - OEMLERIA CERASIFORMIS	WESTERN REDCEDAR - INDIAN-PLUM	CDFmm/13	S2?	RED
THUJA PLICATA - POLYSTICHUM MUNITUM, VERY DRY MARITIME	WESTERN REDCEDAR - SWORDFERN, VERY DRY MARITIME	CWHxm1/05 CWHxm2/05	S2S3	BLUE
THUJA PLICATA - RUBUS SPECTABILIS	WESTERN REDCEDAR - SALMONBERRY	CWHxm1/13 CWHxm2/13 CWHdm/13	S1S2	RED
THUJA PLICATA - SYMPHORICARPOS ALBUS	WESTERN REDCEDAR - SNOWBERRY	CDFmm/07	S1	RED
THUJA PLICATA - TIARELLA TRIFOLIATA, VERY DRY MARITIME	WESTERN REDCEDAR - FOAMFLOWER, VERY DRY MARITIME	CWHxm1/07 CWHxm2/07	S2S3	BLUE
THUJA PLICATA/CHAMAECYPARIS NOOTKATENSIS - COPTIS ASPLENIIFOLIA, MOIST MARITIME 2	WESTERN REDCEDAR/YELLOW CEDAR - GOLDTHREAD, MOIST MARITIME 2	CWHmm2/07	S2S3	BLUE
THUJA PLICATA/PSEUDOTSUGA MENZIESII - KINDBERGIA OREGANA	WESTERN REDCEDAR - DOUGLAS-FIR - KINDBERGIA	CDFmm/05	S1S2	RED
THUJA PLICATA/TSUGA HETEROPHYLLA - POLYSTICHUM MUNITUM	WESTERN REDCEDAR/WESTERN HEMLOCK - SWORD FERN	CWHvm1/04 CWHvm2/04 CWHmm1/04 CWHmm2/04	S3?	BLUE
TSUGA HETEROPHYLLA/ABIES AMABILIS - RHYTIDIOPSIS ROBUSTA	WESTERN HEMLOCK/AMABILIS FIR - PIPECLEANER MOSS	CWHmm1/01 CWHmm2/01	S3	BLUE
TSUGA HETEROPHYLLA/PINUS CONTORTA - CLADINA RANGIFERINA	WESTERN HEMLOCK/LODGEPOLE PINE - CLADINA	CWHvm1/02 CWHvm2/02	S2S3	BLUE
TSUGA HETEROPHYLLA/PSEUDOTSUGA - KINDBERGIA OREGANA	WESTERN HEMLOCK/DOUGLAS-FIR - KINDBERGIA	CWHxm1/01 CWHxm2/01	S2S3	BLUE
TSUGA HETEROPHYLLA/THUJA PLICATA - BLECHNUM SPICANT	WESTERN HEMLOCK/WESTERN REDCEDAR - DEER FERN	CWHdm/06 CWHxm2/06 CWHxm1/06	S2S3	BLUE

---

TSUGA HETEROPHYLLA/THUJA PLICATA - GAULTHERIA SHALLON, MOIST MARITIME 1	WESTERN HEMLOCK/WESTERN REDCEDAR - SALAL, MOIST MARITIME 1	CWHmm1/03	S2S3	BLUE
TSUGA HETEROPHYLLA/THUJA PLICATA - GAULTHERIA SHALLON, MOIST MARITIME 2	WESTERN HEMLOCK/WESTERN REDCEDAR - SALAL, MOIST MARITIME 2	CWHmm2/03	S3	BLUE
TSUGA HETEROPHYLLA/THUJA PLICATA - GAULTHERIA SHALLON, VERY WET MARITIME	WESTERN HEMLOCK/WESTERN REDCEDAR - SALAL, VERY WET MARITIME	CWHvm1/03 CWHvm2/03	S2S3	BLUE

50 COMMUNITIES LISTED

**B.C. Conservation Data Centre: Rare Vascular Plant Tracking List  
Port Alberni portion of South Island Forest District  
November 6, 1998**

Scientific Name	Common Name	Global Rank	Prov. Rank	List
ABRONIA UMBELLATA SSP ACUTALATA	PINK SAND-VERBENA	G5TXQ	SX	RED
ALLIUM CRENULATUM	OLYMPIC ONION	G4	S1	RED
ALLIUM GEYERI VAR GEYERI	GEYER'S ONION	G4G5T4	S2	RED
ANAGALLIS MINIMA	CHAFFWEED	G5	S2S3	BLUE
ANEMONE DRUMMONDII VAR DRUMMONDII	DRUMMOND'S ANEMONE	G4T4	S2S3	BLUE
APOCYNUM SIBIRICUM VAR SALIGNUM	CLASPING-LEAVED DOGBANE	G5?T?	S1?	BLUE
ASPLENIUM ADULTERINUM	CORRUPT SPLEENWORT	GU	S1?	BLUE
ASTER CURTUS	WHITE-TOP ASTER	G3	S2	RED
ASTER PAUCICAPITATUS	OLYMPIC MOUNTAIN ASTER	G3?	S2S3	BLUE
ASTER RADULINUS	ROUGH-LEAVED ASTER	G4G5	S1	RED
BIDENS AMPLISSIMA	VANCOUVER ISLAND BEGGARTICKS	G3	S3	BLUE
CARDAMINE PARVIFLORA	SMALL-FLOWERED BITTER-CRESS	G5	S1?	BLUE
CAREX FETA	GREENSHEATHED SEDGE	G5	S2S3	BLUE
CAREX PANSA	SAND-DUNE SEDGE	G4	S1?	BLUE
CAREX SCOPARIA	POINTED BROOM SEDGE	G5	S2S3	BLUE
CASTILLEJA AMBIGUA	PAINTBRUSH OWL-CLOVER	G4	S2	RED
CORYDALIS SCOULERI	SCOULER'S CORYDALIS	G4	S2	RED
CRASSULA CONNATA VAR CONNATA	ERECT PIGMYWEED	G5T?	S2	RED
CUSCUTA PENTAGONA	FIVE-ANGLED DODDER	G5	S2S3	BLUE
CYPERUS SQUARROSUS	AWNED CYPERUS	G5	S2	RED
DISPORUM SMITHII	SMITH'S FAIRYBELLS	G5	S2S3	BLUE
DRABA LONCHOCARPA VAR VESTITA	LANCE-FRUITED DRABA	G4T3	S2S3	BLUE
DRYOPTERIS ARGUTA	COASTAL WOOD FERN	G5	S2S3	BLUE
ELATINE RUBELLA	THREE-FLOWERED WATERWORT	G5	S2S3	BLUE
ELEOCHARIS PARVULA	SMALL SPIKE-RUSH	G5	S2S3	BLUE
ELEOCHARIS ROSTELLATA	BEAKED SPIKE-RUSH	G5	S1?	BLUE
EPILOBIUM CILIATUM SSP WATSONII	PURPLE-LEAVED WILLOWHERB	G5T?	S2S3	BLUE
EPILOBIUM DENSIFLORUM	DENSE SPIKE-PRIMROSE	G5	S2	RED
EPILOBIUM GLABERRIMUM SSP FASTIGIATUM	SMOOTH WILLOWHERB	G5T?	S2S3	BLUE
EPILOBIUM LEPTOCARPUM	SMALL-FLOWERED WILLOWHERB	G5	S2S3	BLUE
EPILOBIUM OREGONENSE	OREGON WILLOWHERB	G5	S1?	BLUE
ERYSIMUM ARENICOLA VAR TORULOSUM	SAND-DWELLING WALLFLOWER	G4G5T?	S1?	BLUE
EUPHORBIA SERPYLLIFOLIA	THYME-LEAVED SPURGE	G5	S2S3	BLUE
FRAXINUS LATIFOLIA	OREGON ASH	G5	S1	RED
GITHOPSIS SPECULARIOIDES	COMMON BLUECUP	G5	S2	RED
GLYCERIA LEPTOSTACHYA	SLENDER-SPIKE MANNA GRASS	G3	S2S3	BLUE
GLYCERIA OCCIDENTALIS	WESTERN MANNAGRASS	G5	S2S3	BLUE
HEDYSARUM OCCIDENTALE	WESTERN HEDYSARUM	G5	S2S3	BLUE
HYPERICUM MAJUS	CANADIAN ST. JOHN'S-WORT	G5	S1?	BLUE

HYPERICUM SCOULERI SSP NORTONIAE	WESTERN ST. JOHN'S-WORT	G5T?	S2S3	BLUE
JAUMEA CARNOSA	FLESHY JAUMEA	G3G4	S2S3	BLUE
JUNCUS OXYMERIS	POINTED RUSH	G5	S2S3	BLUE
LASTHENIA MARITIMA	HAIRY GOLDFIELDS	G4	S2S3	BLUE
LILAEA SCILLOIDES	FLOWERING QUILLWORT	G5?	S2S3	BLUE
LIMNANTHES MACOUNII	MACOUN'S MEADOW-FOAM	G3	S3	BLUE
LOPHOCHLAENA REFRACTA VAR REFRACTA	NODDING SEMAPHORE GRASS	G4G5T4	S2S3	BLUE
LOTUS PINNATUS	BOG BIRD'S-FOOT TREFOIL	G5	S1	RED
MARAH OREGANUS	MANROOT	G5	S1?	BLUE
MECONELLA OREGANA	WHITE MECONELLA	G2	S2	RED
MELICA SMITHII	SMITH'S MELIC	G4	S2S3	BLUE
MICROSERIS BIGELOVII	COAST MICROSERIS	G4	S2	RED
MICROSERIS LINDLEYI	LINDLEY'S MICROSERIS	G5	S1	RED
MITELLA CAULESCENS	LEAFY MITREWORT	G5	S1?	BLUE
MONTIA CHAMISSOI	CHAMISSO'S MONTIA	G5	S1?	BLUE
MONTIA DIFFUSA	BRANCHING MONTIA	G4	SH	RED
MONTIA HOWELLII	HOWELL'S MONTIA	G3	S3	BLUE
MYRICA CALIFORNICA	CALIFORNIA WAX-MYRTLE	G5	S2S3	BLUE
MYRIOPHYLLUM QUITENSE BLUE	WATERWORT WATER-MILFOIL	G4?	S2S3	BLUE
MYRIOPHYLLUM USSURIENSE	USSURIAN WATER-MILFOIL	G3	S3	BLUE
NEMOPHILA BREVIFLORA	GREAT BASIN NEMOPHILA	G5	S2S3	BLUE
NOTHOCHELONE NEMOROSA BLUE	WOODLAND PENSTEMON	G5	S2S3	BLUE
OPHIOGLOSSUM PUSILLUM	NORTHERN ADDER'S-TONGUE	G5	S2	RED
ORTHOCARPUS IMBRICATUS	MOUNTAIN OWL-CLOVER	G5	S1	RED
OXALIS OREGANA	REDWOOD SORREL	G5	S1?	BLUE
PLAGIOBOTHRYIS FIGURATUS	FRAGRANT POPCORN-FLOWER	G4	S1	RED
PLEURICOSPORA FIMBRIOLATA	FRINGED PINESAP	G4	SH	RED
POLYGONUM HYDROPIPEROIDES	WATER-PEPPER	G5	S2S3	BLUE
PSILOCARPHUS ELATIOR	TALL WOOLLY-HEADS	G4Q	S1	RED
PYROLA ELLIPTICA	WHITE WINTERGREEN	G5	S1?	BLUE
RANUNCULUS ALISMAEFOLIUS VAR RED	WATER-PLANTAIN BUTTERCUP	G5T5	S1	RED
ALISMAEFOLIUS				
ROMANZOFFIA TRACYI	TRACY'S ROMANZOFFIA	G4	S2S3	BLUE
RUBUS LASIOCOCCUS	DWARF BRAMBLE	G5	S2S3	BLUE
RUBUS NIVALIS	SNOW DEWBERRY	G4?	S2S3	BLUE
RUPERTIA PHYODES	CALIFORNIA-TEA	G4	S2S3	BLUE
SAGINA DECUMBENS SSP OCCIDENTALIS	WESTERN PEARLWORT	G5T?	S2S3	BLUE
SALIX SESSILIFOLIA	SESSILE-LEAVED SANDBAR WILLOW	G4	S2S3	BLUE
SANGUISORBA MENZIESII	MENZIES' BURNET	G3G4	S2S3	BLUE
SANICULA BIPINNATIFIDA	PURPLE SANICLE	G5	S2	RED
SCIRPUS FLUVIATILIS	RIVER BULRUSH	G5	S1?	BLUE
SCROPHULARIA LANCEOLATA	LANCE-LEAVED FIGWORT	G5	S1?	BLUE
SELAGINELLA OREGANA	OREGON SELAGINELLA	G4	S1?	BLUE
SENECIO MACOUNII	MACOUN'S GROUNDSEL	G5	S2S3	BLUE
SIDALCEA HENDERSONII BLUE	HENDERSON'S CHECKER-MALLOW	G3G4	S2S3	BLUE
TOXICODENDRON DIVERSILOBUM	POISON OAK	G5?	S2S3	BLUE
TRIFOLIUM CYATHIFERUM	CUP CLOVER	G4	S1	RED
TRIFOLIUM MACRAEI VAR	MACRAE'S CLOVER	G3G4T3T4	S2S3	BLUE

---

DICHOTOMUM					
TRIGLOCHIN CONCINNUM VAR	GRACEFUL ARROW-GRASS	G5T?	S1	RED	
CONCINNUM					
TRILLIUM OVATUM VAR	HIBBERSON'S TRILLIUM	G5T?	S1?	BLUE	
HIBBERSONII					
VERBENA HASTATA	BLUE VERVAIN	G5	S2	RED	
VIOLA HOWELLII	HOWELL'S VIOLET	G4	S2S3	BLUE	
VIOLA PRAEMORSA SSP PRAEMORSA	YELLOW MONTANE VIOLET		G5T3	S2	
RED					
VIOLA SEPTENTRIONALIS	NORTHERN BLUE VIOLET	G5	S1?	BLUE	
YABEA MICROCARPA	CALIFORNIA HEDGE-PARSLEY	G5?	S1?	BLUE	

**93 TAXA LISTED**

#### 8.4 Appendix IV: Site Modifiers for Atypical Conditions

(as per “Table 3.2” from the *Standard for Terrestrial Ecosystem Mapping in British Columbia*, Resources Inventory Committee, 1995.)

Code	Criteria
<i>Topography</i>	
a	active floodplain <sup>1</sup> – the site series occurs on an active fluvial floodplain (level or very gently sloping surface bordering a river that has been formed by river erosion and deposition), where evidence of active sedimentation and deposition is present.
g	gulying <sup>1</sup> occurring – the site series occurs within a gully, indicating a certain amount of variation from the typical, or the site series has gulying throughout the area being delineated.
h	hummocky <sup>1</sup> terrain (optional modifier) – the site series occurs on hummocky terrain, suggesting a certain amount of variability. Commonly, hummocky conditions are indicated by the terrain surface expression but occasionally they occur in a situation not described by terrain features.
j	gently slope – the site series occurs on gently sloping topography (less than 25% in the interior, less than 35% in the CWH, CDF, and MH zones).
k	cool aspect – the site series occurs on cool, northerly or easterly aspects (285° – 135°), on moderately steep slopes (25%–100% slope in the interior and 35%–100% slope in the CWH, CDF, and MH zones).
n	fan <sup>1</sup> – the site series occurs on a fluvial fan (most common), or on a colluvial fan or cone.
q	very steep cool aspect – the site series occurs on very steep slopes (greater than 100% slope) with cool, northerly or easterly aspects (285°–135°).
r	ridge <sup>1</sup> (optional modifier) – the site series occurs throughout an area of ridged terrain, or it occurs on a ridge crest.
t	terrace <sup>1</sup> – the site series occurs on a fluvial or glaciofluvial terrace, lacustrine terrace, or rock cut terrace.
w	warm aspect – the site series occurs on warm, southerly or westerly aspects (135°–285°), on moderately steep slopes (25%–100% slope in the interior and 35%–100% slope in the CWH, CDF, and MH zones).
z	very steep warm aspect – the site series occurs on very steep slopes (greater than 100%) on warm, southerly or westerly aspects (135°–285°).
<i>Moisture</i>	
x	drier than typical (optional modifier) – describes part of the range of conditions for circummesic ecosystems with a wide range of soil moisture regimes or significantly different site conditions. For example, SBSmc2/01 (Sxw–Huckleberry) has three site phases described, and the submesic phase can be labeled with the “drier than average” modifier (e.g., SBx). This code should be applied only after consultation with the Regional Ecologist.
y	moister than typical (optional modifier) – describes part of the range of conditions for circummesic ecosystems with a wide range of soil moisture regimes or significantly different site conditions. For example, SBSmk1/06 (Sb–Huckleberry–Spirea) is “typically” described as submesic to mesic. When



this site series is found on subhygric or hygric sites, the “y” modifier is used (e.g., Bhy). This code should be applied only after consultation with the Regional Ecologist.

Code	Criteria
<i>Soil</i>	
c	coarse-textured soils <sup>2</sup> – the site series occurs on soils with a coarse texture, including sand loamy sand; and also sandy loam, loam, and sandy clay loam with greater than 70% <b>coarse fragment volume</b> .
d	deep soil – the site series occurs on soils greater than 100 cm to bedrock.
f	fine-textured soils <sup>2</sup> – the site series occurs on soils with a fine texture including silt and silt loam with less than 20% coarse fragment volume; and clay, silty clay, silty clay loam, clay loam, sandy clay and heavy clay with less than 35% coarse fragment volume.
m	medium-textured soils – the site series occurs on soils with a medium texture, including sandy loam, loam and sandy clay loam with less than 70% coarse fragment volume; silt loam and silt with more than 20% coarse fragment volume; and clay, silty clay, silty clay loam, clay loam, sandy clay and heavy clay with more than 35% coarse fragment volume.
p	peaty material – the site series occurs on deep organics or a peaty surface (15–60 cm) <sup>3</sup> over mineral materials (e.g., on organic materials of sedge, spagnum, or decomposed wood).
s	shallow soils – the site series occurs where soils are considered to be shallow to bedrock (20–100 cm).
v	very shallow soils – the site series occurs where soils are considered to be very shallow to bedrock (less than 20 cm).

<sup>1</sup> Howes and Kenk, 1997

<sup>2</sup> Soil textures have been grouped specifically for the purposes of ecosystem mapping.

<sup>3</sup> Canada Soils Survey Committee, 1987

## 8.5 Appendix V: Structural Stages and Codes

(as per "Table 3.3" from the *Standard for Terrestrial Ecosystem Mapping in British Columbia*, Resources Inventory Committee, 1995.)

Structural Stage	Description
<i>Post-disturbance stages or environmentally induced structural development</i>	
<b>1 Sparse/bryoid<sup>2</sup></b>	Initial stages of primary and secondary succession; bryophytes and lichens often dominant, can be up to 100%; time since disturbance less than 20 years for normal forest succession, may be prolonged (50–100+ years) where there is little or no soil development (bedrock, boulder fields); total shrub and herb cover less than 20%; total tree layer cover less than 10%.
<b>Substages</b>	
1a Sparse <sup>2</sup>	Less than 10% vegetation cover;
1b Bryoid <sup>2</sup>	Bryophyte- and lichen-dominated communities (greater than ½ of total vegetation cover).
<i>Stand initiation stages or environmentally induced structural development</i>	
<b>2 Herb<sup>2</sup></b>	Early successional stage or herbaceous communities maintained by environmental conditions or disturbance (e.g., snow fields, avalanche tracks, wetlands, grasslands, <b>flooding</b> , intensive grazing, intense fire damage); dominated by herbs (forbs, graminoids, ferns); some invading or residual shrubs and tress may be present; tree layer cover less than 10%, shrubby layer cover less than or equal to 20% or less than 1/3 of total cover; time since disturbance less than 20 years for normal forest succession; may herbaceous communities are perpetually maintained in this stage.
<b>Substages</b>	
2a Forb-dominant <sup>2</sup>	Herbaceous communities dominated (greater than ½ of the total herb cover) by non-graminoid herbs, including ferns.
2b Graminoid-dominant <sup>2</sup>	Herbaceous communities dominated (greater than ½ of the total herb cover) by grasses, sedges, reeds, and rushes.
2c Aquatic <sup>2</sup>	Herbaceous communities dominated (greater than ½ of the total herb cover) by floating or submerged aquatic plants; does not include sedges growing in marshes with standing water (which are classed as 2b).
2d Dwarf shrub <sup>2</sup>	Communities dominated (greater than ½ of the total herb cover) by dwarf woody species such as <i>Phyllodoce empetriformis</i> , <i>Cassiope mertensiana</i> , <i>Cassiope tetragona</i> , <i>Arctostaphylos arctica</i> , <i>Salix reticulata</i> , and <i>Rhododendron lapponicum</i> . (See list of dwarf shrubs assigned to the herb layer in the <i>Field Manual for Describing Terrestrial Ecosystems</i> ).
<b>3 Shrub/Herb<sup>3</sup></b>	Early successional stage or shrub communities maintained by environmental conditions or disturbance (e.g., snow fields, avalanche tracks, wetlands, grasslands, <b>flooding</b> , intensive grazing, intense fire damage); dominated by shrubby vegetation; seedlings and advance regeneration may be abundant; tree layer cover less than 10%; shrub layer cover greater than 20% or greater than or equal to 1/3 of total cover.

Structural Stage	Description
<b>Substages</b>	
3a Low shrub <sup>3</sup>	Communities dominated by shrub layer vegetation less than 2 m tall; may be perpetuated indefinitely to environmental conditions or repeated disturbance; seedlings and advance regeneration may be abundant; time since disturbance less than 20 years for normal forest succession.
3b Tall shrub <sup>3</sup>	Communities dominated by shrub layer vegetation that are 2–10 m tall; may be perpetuated indefinitely by environmental conditions or repeated disturbance; seedlings and advance regeneration may be abundant; time since disturbance less than 40 years for normal forest succession.
<i>Stem exclusion stages</i>	
<b>4 Pole/Sapling<sup>4</sup></b>	Trees greater than 10m tall, typically dense stocked, have overtopped shrub and herb layers; younger stands are vigorous (usually greater than 10–15 years old); older stagnated stands (up to 100 years old) are also included; self-thinning and vertical structure not yet evident in the canopy – this often occurs by age 30 in vigorous broadleaf stands, which are generally younger than coniferous stand at the same structural stage; time since disturbance ins usually less than 40 years for normal forest succession; u to 100+ years for dense (5,00015,000+ stems per hectare) stagnant stands.
<b>5 Young Forest<sup>4</sup></b>	Self-thinning has become evident and the forest canopy has begun differentiation into distinct layers (dominant, main canopy, and overtopped); vigorous growth and a more open stand than in the pole/sapling sate; time since disturbance is generally 40–80 years but may begin as early as age 30, depending on tree species and ecological conditions.
<i>Understory reinitiation stage</i>	
<b>6 Mature Forest<sup>4</sup></b>	Trees established after the last disturbance have matured; a second cycle of shade tolerant trees may have become established; understories become well developed as the canopy opens up; time since disturbance is generally 80–140 years for biogeoclimatic group A <sup>5</sup> and 80–250 years for group B <sup>6</sup> .
<i>Old-growth stage</i>	
<b>7 Old Forest<sup>4</sup></b>	Old, structurally complex stands composed mainly of shade-tolerant and regenerating tree species, although older seral and long-lived trees from a disturbance such as fire may still dominate the upper canopy; snags and <b>coarse woody debris</b> in all stages of decomposition typical, as are patchy understories; understories may include tree species uncommon in the canopy, due to inherent limitations of these species under the given conditions; time since disturbance generally greater than 140 years for biogeoclimatic group A <sup>5</sup> and greater than 250 years for group B <sup>6</sup> .

- 1 In the assessment of structural state, structural features and age criteria should be considered together. Broadleaf stands will generally be younger than coniferous stands belonging to the same structural stage.
- 2 Substages 1a, 1b, and 2a-d should be used if photo interpretations is possible, otherwise, stage 1 and 2 should be used.
- 3 Substages 3a and 3b may, for example, include very old krummholz less than 2 m tall and very old, low productivity stands (e.g., gob woodlands) less than 10 m tall, respectively. Stage 3, without additional substages, should be used for regenerating forest communities that are herb or shrub dominated, including shrub layers consisting of only 10%-20% tree species, and undergoing normal succession toward climax forest (e.g., recent cut-over areas or burned areas).
- 4 Structural stages 4–7 will typically be estimated from a combination of attributes based on forest inventory maps and aerial photography. In addition to structural stage designation, actual age for forested units can be estimated and included as an attribute in the database, if required.
- 5 Biogeoclimatic Group A includes BWBSdk, BWBSmw, BWBSwk, BWBSvk, ESSFdc, ESSFdk, ESSFdv, ESSFxc, ICHdk, ICHdw, ICHmk1, ICHmk2, ICHmw3, MS (all subzones), SBPS (all subzones), SBSdh, SBSdk, SBSdw, SBSmc, SBSmh, SBSmk, SBSmm, SBSmw, SBSwk1 (on plateau), and SBSwk3.
- 6 Biogeoclimatic Group B includes all other biogeoclimatic units

## 8.6 Appendix VI: Soil Classification

Soil Classification	
<b>Brunisolic Order</b>	
DYB	Dystric Brunisol
E.DYB	Eluviated Dystric Brunisol
GL.DYB	Gleyed Dystric Brunisol
GL.SB	Gleyed Sombric Brunisol
O.DYB	Orthic Dystric Brunisol
O.SB	Orthic Sombric Brunisol
SB	Sombric Brunisol
<b>Gleysolic Order</b>	
FE.G	Fera Gleysol
G	Gleysol
O.G	Orthic Gleysol
<b>Organic Order</b>	
FI.M	Fibric Mesisol
FO	Folisol
H.	Humisol
HE.FO	Hemic Folisol
HI.FO	Histic Folisol
HU.FO	Humic Folisol
HU.M	Humic Mesisol
LI.FO	Lignic Folisol
M	Mesisol
TY.H	Typic Humisol
TY.M	Typic Mesisol
<b>Podzolic Order</b>	
FHP	Ferro-Humic Podzol
FR.HFP	Fragic Humo-Ferric Podzol
GL.FHP	Gleyed Ferro-Humic Podzol
GL.HFP	Gleyed Humo-Ferric Podzol
GLSM.FHP	Gleyed Sombric Ferro-Humic Podzol
HFP	Humo-Ferric Podzol
O.FHP	Ortho Ferro-Humic Podzol
O.HFP	Ortho Humo-Ferric Podzol
SM.HFP	Sombric Humo-Ferric Podzol
<b>Regosolic Order</b>	
CU.HR	Cumulic Humic Regosol
CU.R	Cumulic Regosol
GL.HR	Gleyed Humic Regosol
O.HR	Orthic Humic Regosol
O.R	Orthic Regosol
R	Regosol