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**Ministry of Environment, Lands and Parks
and
Ministry of Forests, North Coast Forest District**

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**TERRESTRIAL ECOSYSTEM MAPPING
for
PRINCESS ROYAL ISLAND
EXPANDED LEGEND and INTERPRETATIONS**

January, 1997
Job No.: 31417-001-310

FINAL REPORT

**Terrestrial Ecosystem Mapping
for Princess Royal Island**

**Expanded Legend and
Interpretations**

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1.0 INTRODUCTION

1.1 BACKGROUND

The objective of this project was to map ecosystem units of Princess Royal Island at a scale of 1:50,000 in portions of map sheets 103A/10, 103A/11, 103A/14, 103A/15, 103H/02, 103H/3, 103H/6, 103H/7. This mapping is to support interpretations regarding wildlife use in the project area.

Princess Royal Island is located in a group of islands which lie along the northern coast of British Columbia. The northern end of the island is located near the entrance to Douglas Channel, approximately 80 km south of Kitimat. Prince Rupert is situated approximately 140 km northwest along the mainland coast. The island is approximately 2200 km² in area.

1.2 OBJECTIVES

The purpose of the project was to provide the Ministry of Environment, Lands and Parks (MELP) and the Ministry of Forests with 1:50,000 Terrestrial Ecosystem Mapping of Princess Royal Island.

The objectives were to:

- produce bioterrain information on aerial photographs (ink on photographs) with polygons coincidental to ecosystem polygons;
- visit 20% of the polygons within the study area; complete a minimum of 120 full ecological plots (ie. site, soils, vegetation, and wildlife plot data) and undertake visual checks for the remaining field truths;
- produce a ready for digitizing 1:50,000 scale Ecosystem Map on mylar with Ecosection, Biogeoclimatic, and Ecosystem Units (with site series, site modifiers and structural stage); the polygons to be numbered and labelled with Ecosystem Units;
- produce coded polygon data forms with bioterrain and ecosystem unit information for each map polygon; and
- produce wildlife capability and suitability rating for red and blue listed wildlife species.

2.0 METHODOLOGY

Field work was conducted in August and September, 1995. Princess Royal Island is unsettled, undeveloped and is not assessable by road. Sampling was largely completed through use of a helicopter. Logging roads occur at limited locations near Chapple Inlet, Drake Inlet and in two northern drainages. Some limited sampling was completed via logging roads in the Chapple Inlet area and by boat in Chapple, Race and Surf Inlets.

Mapping was completed according to the methodology outlined in *Standards for Terrestrial Ecosystem Mapping in British Columbia* (Resources Inventory Committee, 1995) at survey intensity level 4. Bioterrain units form the basic framework for the ecosystem mapping. The ecosystem mapping is based on the three level ecosystem classification framework, which includes ecoregion units, biogeoclimatic units and ecosystem units. Ecosystems units are developed from the site series defined within the existing Ministry of Forests biogeoclimatic ecological classification system (Prince Rupert Forest Region) with the addition of site modifiers and structural stage. Site modifiers further defined the physical conditions of the ecosystem unit and are used to describe characteristics (site, soil and terrain) that are not typical for the site series. Up to two site modifiers may be used in defining ecosystem units. Structural stage defines the current development stage of the plant community.

Ecosystem units of Princess Royal Island were mapped at a scale of 1:50,000 on portions of map sheets 103A/10, 103A/11, 103A/14, 103A/15, 103H/2, 103H/3, 103H/6, and 103H/7. Ecosection, Biogeoclimatic, and Ecosystem Unit lines were inked on mylar. Topographic layers were screened to forty percent. Polygons were numbered and labelled with Ecosystem Units.

The bioterrain and ecosystem unit map legends are attached in Appendices A and B, respectively. One hundred and twenty-five full ecological plots (site, soil, vegetation and wildlife forms) were completed. A list of wildlife species observed during field surveys is included in Appendix C, while a plant species list is included in Appendix D. Slides were taken of the soil and site at each full plot. A list of photographs taken during field surveys is provided in Appendix F.

3.0 DESCRIPTION OF MAP UNITS

3.1 ECOREGIONS

The area mapped at 1:50,000 is located within the Hecate Lowland (HEL) and Kitimat Ranges (KIR) ecosections of the Coastal Gap Ecoregion. Mountains within the Coastal Gap Ecoregion are more rounded and lower in elevation than those found to the north or south (Banner et al., 1993). However, the mountains and associated valley sides are still rugged and steep. The HEL is generally an area of relatively low relief consisting of islands (varying in size from small rocky outcrops to large islands such as Princess Royal Island), channels, and coastal lowlands adjacent to Hecate Strait. The Kitimat Ranges lies to the east of the Hecate Lowland. Relief in the Hecate Lowland is also subdued, yet the mountains and valley sides are very steep and rugged. The mountains in the two ecosections have rounded, dome like tops due to glaciation.

The biogeoclimatic units found in the Hecate Lowland ecosection include the Central Variant of the Coastal Western Hemlock Very Wet Hypermaritime subzone (CWHvh2) and the Windward Variant of the Mountain Hemlock Wet Hypermaritime subzone (MHwh1).

Biogeoclimatic units found in the KIR ecosection include the Submontane Variant of the Coastal Western Hemlock Very Wet Maritime subzone (CWHvm1), Montane Variant of the Coastal Western Hemlock Very Wet Maritime subzone (CWHvm2), and the Windward Variant of the Mountain Hemlock Moist Maritime subzone (MHmm1).

3.2 BIOGEOCLIMATIC UNITS

3.2.1 Coastal Western Hemlock Zone (CWH)

Three Coastal Western Hemlock (CWH) subzone variants are located within the map area. These include: the Central Variant of the Coastal Western Hemlock Very Wet Hypermaritime subzone (CWHvh2); the Submontane Variant of the Coastal Western Hemlock Very Wet Maritime subzone (CWHvm1), and the Montane Variant of the Coastal Western Hemlock Very Wet Maritime subzone (CWHvm2).

The CWH experiences a maritime (or oceanic) climate characterized by relatively mild temperature and heavy rainfall. This zone has the longest growing season in the Prince Rupert Forest Region, however summers are generally cool and cloudy. The autumn and winter are extremely wet and relatively mild. Snowfall in the low lying coastal areas is minimal. Winter temperatures decrease and snowfall increases with increased distance from the coast (Banner et al., 1993).

The CWHvh2 is common on the outer coast in the south half the Prince Rupert Forest Region; on Princess Royal Island (PRI) it is located on the western side of the Island. It is found at elevations ranging from 0m to 600m (Banner et al., 1993). Scrubby, poor forests, bog forests and non-forest bog

wetlands are common on rolling terrain, while productive forests generally occur on steeper, better drained sites. The major tree species in the CWHvh2 are western redcedar, yellow-cedar, western hemlock, shore pine, and Sitka spruce. Mountain hemlock, amabilis fir and red alder also present.

The Submontane Variant of the Coastal Western Hemlock Very Wet Maritime subzone (CWHvm1), and Montane Variant of the Coastal Western Hemlock Very Wet Maritime subzone (CWHvm2), are found in the KIR ecosection on the northeastern and eastern side of PRI. The CWHvm1 is found on the valley bottoms and lower mountain slopes on the eastern/northeastern side of the island at elevations below 350m. Common tree species include western redcedar, western hemlock and amabilis fir. Yellow-cedar and shore pine are common on poor sites in this subzone. The CWHvm2 occurs above the CWHvm1 between the elevations of 350 to 800m. As in the CWHvm1, western redcedar, western hemlock and amabilis fir are the common tree species with yellow-cedar and mountain hemlock increasing in abundance in the upper elevations and near the transition to the MHmm1. Avalanche tracks are common in both the CWHvm subzone variants.

3.2.2 Mountain Hemlock Zones (MH)

The Mountain Hemlock zone is the subalpine zone in the area west of the height (divide) of the Coast Mountain Range. MH forests occupy about 13% of the south half of the Prince Rupert Forest Region (Banner et al., 1993). Mountain hemlock forests are characterized by short, cool summers, wet autumns and long, cool, wet winters (Banner et al., 1993). Wet, heavy snowpacks persist between 5 to 9 months in the Mountain Hemlock zone.

Two Mountain Hemlock subzones are found within the map area. The Windward Variant of the Mountain Hemlock Wet Hypermaritime subzone is located at high elevations (>600m) above the CWHvh2 in the Hecate Lowland. Mountain hemlock and yellow-cedar are the dominant tree species in the MHwh1. Other species include western redcedar, Sitka spruce, western hemlock and amabilis fir. The MHwh1 is restricted to scattered mountain peaks and ridges on the outer coast of Princess Royal Island. Forested areas are commonly interrupted by significant areas of krummholz forest, heathland and rock.

The Windward Variant of the Mountain Hemlock Moist Maritime subzone (MHmm1) is located above the CWHvm2 (approx. >800m; as low as 700m). Mountain hemlock, western hemlock, amabilis fir and yellow cedar are the dominant tree species in this subzone. Krummholz, heathland, and rock frequently occur on the mountain ridges and upper slopes while avalanche tracks are common across steeper sections of the subzone.

3.3 ECOSYSTEM UNITS

3.3.1 Ecosystem Units Mapped on Princess Royal Island

The ecosystem unit incorporates site series, site modifiers and structural stage. Site series have been developed to describe variation at the site level within the biogeoclimatic units (RIC, 1995). The site series describe all land areas capable of supporting a specific climax plant association and reflecting a specified range of soil moisture and nutrient regimes within a subzone or variant (RIC, 1995). A two letter symbol has been assigned to all defined site series. Site series are further described through the use of site modifiers and structural stage. Site modifiers refine site series by describing specific site, soil or terrain characteristics of the ecosystem unit. They generally denote site conditions that differ from typical conditions for a site series. Structural stages describe the existing dominant stand appearance or physiognomy of the ecosystem unit.

The following site series have been mapped:

Map Symbol	Biogeoclimatic unit / Site series	Name
AL	CWHvh2/10	Dr - Lily-of-the-valley
HM	CWHvh2/04	HwSs - Lanky moss
HS	CWHvh2/01	CwHw - Salal
LR	CWHvh2/02	PIYc - Rhacomitrium
LS	CWHvh2/12	PIYc - Sphagnum
RC	CWHvh2/13	CwSs - Skunk cabbage
RF	CWHvh2/05	CwSs - Sword fern
RS	CWHvh2/03	CwSs - Salal
SA	CWHvh2/00	Sitka alder avalanche track
SD	CWHvh2/07	CwSs - Devil=s club
SF	CWHvh2/06	CwSs - Foamflower
SL	CWHvh2/08	Ss - Lily-of-the-valley
ST	CWHvh2/09	Ss - Trisetum
TS	CWHvh2/32	Tufted clubrush - Sphagnum
TM	CWHvh2/33	Tufted hairgrass meadow
YG	CWHvh2/11	CwYc - Goldthread
SS	CWHvh2/14	Ss - Salal
AB	CWHvm1/01	HwBa - Blueberry
AD	CWHvm1/08	BaSs - Devil=s club
AF	CWHvm1/05	BaCw - Foamflower
BS	CWHvm1/32	Beaked sedge - Sphagnum
HS	CWHvm1/03	HwCw - Salal
HD	CWHvm1/06	HwBa - Deer fern
HF	CWHvm1/00	Hardhack fen
LC	CWHvm1/02	HwPl - Cladina

LS	CWHvm1/13	Pl - Sphagnum
RC	CWHvm1/14	CwSs - Skunk cabbage
SA	CWHvm1/51	Sitka alder avalanche track
SC	CWHvm1/00	Ss - Pacific crabapple
SS	CWHvm1/09	Ss - Salmonberry
TS	CWHvm1/31	Tufted clubrush - Sphagnum
YG	CWHvm1/12	CwYc - Goldthread
AB	CWHvm2/01	HwBa - Blueberry
AD	CWHvm2/08	BaSs - Devil=s club
AF	CWHvm2/05	BaCw - Foamflower
BS	CWHvm2/32	Beaked sedge - Sphagnum
LC	CWHvm2/02	HwPl - Cladina
MK	CWHvm2/00	Mountain hemlock krummholz
RC	CWHvm2/11	CwYc - Skunk cabbage
SA	CWHvm2/51	Sitka alder avalanche track
TS	CWHvm2/31	Tufted clubrush - Sphagnum
YG	CWHvm2/12	CwYc - Goldthread
HM	MHwh1/00	Heather meadow
MB	MHwh1/01	HmSs - Blueberry
MK	MHwh1/00	Mountain hemlock krummholz
MM	MHwh1/02	HmYc - Mountain-heather
YG	MHwh1/04	HmYc - Goldthread
SA	MHwh1/51	Sitka alder avalanche track
AB	MHmm1/04	HmBa - Bramble
HM	MHmm1/00	Heather meadow
MB	MHmm1/01	HmBa - Blueberry
MK	MHmm1/00	Mountain hemlock krummholz
MM	MHmm1/02	HmBa - Mountain-heather
MO	MHmm1/03	BaHm - Oak fern
SA	MHmm1/51	Sitka alder avalanche track

A summary of the ecosystem units mapped is provided in Table 3-1. This table provides a brief description of the ecosystem units= key site, soil and terrain characteristics, a list of all the modifiers and structural stages mapped and a list of the dominant plant species for each ecosystem unit.

The following units are not further described in this report.

BP	Buildings (human settlement)
LA	Lake
RO	Rock outcrop
RP	Road, unpaved

Appendix E contains a list of full ecological plots correlated to Ministry of Forest site series.

3.3.2 Site Modifiers

Site modifiers are used to further described site series. Site modifiers refine site series by describing specific site, soil or terrain characteristics of the ecosystem unit. They generally denote site conditions that differ from typical conditions for a site series. Up to two site modifiers can be used with an ecosystem unit.

The following site modifiers have been used:

h	hummocky terrain
j	gentle slopes (less than 35% slope)
k	cool, northerly or easterly aspect (285 - 135 degrees, slopes greater than 35%)
n	fan (colluvial, or fluvial) or cone
r	ridge or crest
h	warm, southerly or westerly aspect (135 - 285 degrees, slopes greater than 35%)
b	folisolic LFH over bedrock (less than 10 cm mineral soil)
p	peaty soil
s	shallow soil (25-100cm to bedrock)
v	very shallow soil (less than 25cm mineral soil over bedrock)

3.3.3 Structural Stages

Structural stages describe the existing dominant stand appearance or physiognomy of the ecosystem unit. One of seven structural stage categories describing the current development stage is assigned to each ecosystem unit.

Symbol Description

1a	Non-vegetated: less than 5% vegetation cover
1b	Sparse: less than 10% vegetative cover
2	Herb: early successional stage disclimax or climax, dominated by herbaceous vegetation (tree cover <10%, herb cover >25% or >=33% of total cover)
3a	Low Shrub: early successional stage disclimax or climax communities dominated by shrub cover <2m in height (tree cover <10%, shrub cover >25% or >= 33% of total cover)
3b	Tall Shrub: early successional stage disclimax or climax communities dominated by shrub cover 2 to 10 m in height (tree cover <10%, shrub cover >25% or >= 33% of total cover)
4	Pole/Sapling: Trees > 10 m tall that have over topped the shrub and herb layers. Stands are typically dense.
5	Young Forest: Self thinning is usually evident and the forest canopy has begun differentiation into distinct layers (40-80 yrs).
6	Mature Forest: Trees that were established after the last disturbance have matured and a second cycle of shade tolerant trees may have established (80 - 20 yrs).
7	Old Forest: Old structurally complex stands (>250 yrs).

3.4 DESCRIPTION OF ECOSYSTEM UNITS

A description of each of the ecosystems mapped in the study area is provided by biogeoclimatic zone in Tables 3-2 to 3-60. These tables include a description of the site, soil and terrain characteristics, a list of each all the site modifiers used for each unit, and a list of plant species for each potential structural stage of the ecosystem unit.

4.0 WILDLIFE CAPABILITY AND SUITABILITY RATINGS

4.1 INTRODUCTION

The following provides comments on wildlife habitat value and potential, and a discussion of the general concepts used to generate suitability and capability ratings.

Suitability and capability ratings were generated for eleven wildlife species (Table 4-1). Preliminary ratings were noted on full and visual plots in the field. Generally, ecosystem units with the same site series and seral stage were rated similarly across a variety of site modifiers. The exceptions were the warm (i.e., w) and cool (i.e., k) aspects. Ecosystem units with warm modifiers were generally rated one level higher than cool aspects. Concepts used for developing species-specific suitability and capability ratings are described below.

An annotated list of wildlife observed during field surveys is provided in Appendix C.

4.2 BLACK BEAR (URAM)

Ratings were not generated separately for each season. Only the season with the highest rating was provided in the look-up tables. Four seasons were considered; spring (P), summer (S), fall (F) and winter (W). Production of herbs and berries was the primary factor considered in generating the ratings. Herbs were considered to be particularly important in spring, whereas berries were considered important in summer and fall. Younger seral stage habitats, particularly rich and productive sites, were rated relatively high compared to forested habitats.

Only avalanche chutes and rich alluvial sites were given a >1= rating. These sites provided an abundance of herbs and berries. Site series with >1= ratings included >SA= (Sitka alder - Avalanche) in all biogeoclimatic zones/subzones, and >SC= (Ss - Pacific crabapple). The values of these habitats are comparable to the best in the province.

A >2= rating was given for early seral stage habitats on rich and productive sites. High herb and berry production on these early seral stage sites are of high value to bears. Other site series which received >2= ratings included: a) CWHvm1, >RC= (CwSs-Skunk cabbage) and >SS= (Ss-Salmonberry); b) CWHvm2, >RC= (CwYc-Skunk cabbage); and c) CWHvh2, >AL= (Dr-Lily-of-the-valley) and >TM= (Tufted hairgrass meadow). The only >2= rating given for the winter (i.e., denning) season was >AD= (BaSs-Devil=s Club; warm aspect) in the CWHvm2. This habitat contained large balsam, spruce and hemlock with good den site potential. Generally, denning habitats on Princess Royal Island were not comparable to the best in the province.

4.3 BLACK-TAILED DEER (ODHC)

Herb production was the primary habitat component considered for generating suitability and capability

ratings for deer habitats. Deer appeared to be abundant on the island and occurred in most habitats from lowland pine forests and blanket bogs to alpine areas. The highest ratings given were >2=. Generally ratings were similar or moderately lower than those for black bear. Early seral stage habitats, avalanche chutes, wet meadows and alluvial floodplain received the highest rating. However, these habitats were considered to be of lower value than the best habitats recognized in the province.

Only summer and winter seasons were considered in generating the ratings. Winter ratings only appeared on the look-up tables for mature or old-growth forests which potentially provide cover and shelter.

4.4 MOUNTAIN GOAT (ORAM)

Viable mountain goat populations do not occur on Princess Royal Island. However, one unconfirmed sighting of a mountain goat was reported by Shaun Sharpe (MOE, Victoria) in 1995.

Only the summer and winter seasons were considered in the rating process. Habitat potential in lowland habitats (i.e., CWHvm1 and CWHvh2) was considered to be nil. Subalpine areas (>MK=, Mountain hemlock krummholz; >MM=, HmYc-Mountain-heather or HmBa-Mountain-heather) in the CWHvm2, MHmm1, MHwh1 potentially provide foraging opportunities year round and thus received moderate ratings. Avalanche chutes (i.e., site series >SA=) again received the highest ratings because of the potentially excellent foraging opportunities in spring and summer. Moderately high capability ratings were also given to early seral stage habitats adjacent to subalpine areas (i.e., age class 2 and 3a provide an abundance of herbaceous vegetation). Forested habitats adjacent to subalpine forests and avalanche chutes were rated depending on their potential to provide escape and winter cover for goats. None of the habitats on Princess Royal Island are comparable to the best habitats known in the province.

4.5 MARTEN (MAAM)

Only presence (U) or absence (X) ratings were determined for marten. Some of the mature, old-growth forested habitats appear to be comparable to the best marten habitats known in the province. Prey availability in these habitats (i.e., birds and squirrel) was high.

All moist, mature forests (generally age class 6 and 7) were considered capable of supporting marten populations. Forest with particularly high coarse woody debris volumes are known to be of higher value to marten, however, because of the low resolution of the rating scale, the relative value of these habitats was not distinguished. Because our knowledge of marten habitat requirements is quite well known, this species should be rated on a four class system in the future.

4.6 KEEN'S LONG-EARED MYOTIS (MYKE)

Only presence (U) or absence (X) ratings were determined for Keen's long-eared myotis. Productive, age class 6 and 7 forests were rated as suitable for this bat species because of the potential for roost

sites. These forested habitats are increasingly important the closer they are to important foraging areas such as wetlands, clearcuts and other open areas. Wetland sites, or early seral stage moist sites were rated as suitable foraging areas for Keen's long-eared myotis. Because of our limited knowledge of habitat requirements of this species, a two class rating system is appropriate.

4.7 BALD EAGLE (BAEA)

Habitats in coastal areas of Princess Royal Island are some of the best in the province. Only CWHvm1 and CWHvh2 biogeoclimatic zones were rated. The value of each ecosystem unit to bald eagle depended on the productivity of the habitat and the seral stage. Those habitats with a large abundance of veteran trees, which are important as perch, roost and nest sites, were rated as high. As productivity and size of trees decreased, ratings were also lowered. Early seral stages (i.e., 1-5) were not considered suitable for bald eagles.

4.8 GREAT BLUE HERON (GBHE)

Habitats on Princess Royal Island are generally unsuitable for great blue herons. Preferred feeding areas such as extensive intertidal flats or shallow lakes are rare on the island. The highest ratings (i.e., moderate suitability) were given to age class >5= habitats which were expected to have a dense, red alder or other deciduous tree cover. These habitats are used as nests sites in other regions. Mature forest in coastal areas were given >Low= ratings because of their potential to provide roost and perch sites for herons feeding in intertidal areas. Alluvial floodplain (i.e., Ss-Pacific crabapple) was also rated as having some suitability for herons.

4.9 SANDHILL CRANE (SACR)

Large bogs and wetlands in the Hecate Lowlands (i.e., CWHvh2) are known breeding areas for sandhill cranes. Wetlands with open water were considered to be important for nesting, whereas vegetated wetlands were considered to be particularly important for foraging. Site series expected to be utilized by sandhill cranes include: a) CWHvm1 - >BS=, >HF=, >SC>and >TS=; b) CWHvm2 - >TS=; and c) CWHvh2 - >LS=, >SC=, >SL=, >ST=, >TM=, >TS= and >YG=. The >TS= (Tufted clubrush - sphagnum) and >TM= (Tufted hairgrass meadows) site series were rated the highest because of their high potential as foraging areas. Open, wetland areas, typically used for nesting were not assessed. Generally, habitats of value to sandhill cranes were located in low relief and low elevation areas.

4.10 NORTHERN GOSHAWK (NOGO)

Productive and moist, mature and old growth forest were considered to be of highest value to northern goshawk. Open stand structure with large mature trees and well developed understorey were considered to have the greatest value. Occurrence was not considered to be dependent on elevation or species composition of forests. Forests of large, old growth trees and a diverse understorey provide nesting opportunities and numerous foraging opportunities.

4.11 MARBLED MURRELET (MAMU)

Productive and most, mature or old growth forests were considered to be of value to marbled murrelets. Only a two class system was utilized, although enough information is now known to use a four class system. Forests with large trees, large limbs and extensive moss cover on the limbs were of highest value to murrelets. Age class 1 to 5 habitats were not considered to be of any value.

4.12 TAILED FROG (ASTR)

Stream characteristics are probably more important habitat components than composition of existing forests. Age class 5 to 7 forested habitats in close proximity to creeks or streams were rated as being suitable for tailed frogs.

NORECOL, DAMES & MOORE, INC.

per:

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Ecologist
Project Manager

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January 2, 1997

REFERENCES

- Banner, A., W. MacKenzie., S. Haeussler, S. Thompson, J. Pojar, and R. Trowbridge. 1993. A Field Guide to Site Identification and Interpretation for the Prince Rupert Forest Region. Land Management Handbook No. 26. BC Ministry of Forests.
- Aerial photographs BC86099 Nos. 037-041, 055-061, 084-092, 106-116, and 124-134; BC86025 Nos. 001-011, 026-033, 106-111, and 095-098.
- Ministry of Forests, Forest Cover Map Series, 1:20,000 Scale Maps. Mapsheet Nos. 103A.066-.068, .075-.078, .085-.087, .095-.097; and 103H.006, .007, .015-.017, .025-.027
- Western Forests Products Ltd., Forest Cover Inventory, 1:20,000 Scale Maps. Map Sheet Nos. 103H.006-.008, .016-.018; and 103A.077, .078, .085, .87, .098
- Ministry of Forests. 1988. Biogeoclimatic and Ecoregion Units of the Prince Rupert Forest Region.
- Ministry of Environment. Biogeoclimatic Units of the Princess Royal Island (undated)
- Resource Inventory Committee. 1995. Standards for Terrestrial Ecosystem Mapping in British Columbia.
- Resource Inventory Committee. May 1996. Addenda to Terrestrial Ecosystem Mapping Standards. (Draft)

TABLES

Table 3-1 Ecosystem units of Princess Royal Island

Map Symbol	Site Series	Name	Description	Site Modifiers & Structural Stage	Dominant Plants
CWHvh2					
AL	CWHvh2/10	Dr - Lily-of-the-valley	Low fluvial bench - prolonged annual flooding; subhygric, permesotrophic	AL5	red alder, salmonberry, false lily-of-the-valley, foamflowers, ferns, skunk cabbage
HM	CWHvh2 - 4	HwSs - Lanky moss	Typic is deep, medium-textured mineral soil, steep slopes (colluvial). Submesic, mesotrophic. Also found on morainal soils, inactive fluvial deposits and on Folisols on steep lithic sites.	HMk7, HMw7, HMsw7, HMvw7, HMbw7, HMks7, HMkv7, HMbk7, HMbh7, HMhs7, HMj7	western hemlock, western redcedar, Sitka spruce, Alaskan blueberry, deer fern, step and lanky mosses
				HMsw6, HMks6, HMkv6	western hemlock, western redcedar, Sitka spruce, Alaskan blueberry, deer fern, step and lanky mosses
				HMks5, HMkv5, HMj5	western hemlock, western redcedar, Alaskan blueberry, deer fern, step and lanky mosses
				HMsw4	western hemlock, western redcedar, deer fern, step and lanky mosses
				HMks3b, HMvw3b	western hemlock, western redcedar, Alaskan blueberry, deer fern
				HMkv3a, HMks3a	western hemlock, western redcedar, Alaskan blueberry, deer fern
HS	CWHvh2/01	CwHw - Salal	Typic is deep, medium-textured, mineral soil on gentle slopes; mesic moisture regimes, submesotrophic - mesotrophic nutrient regime. Thick surface organic horizons are common. Lithic and peaty phases are also found. Also found on shallow soils (gentle slopes), hummocky terrain and steep aspects with organic veneers and shallow soils.	HS7, HSs7, HSv7, HSb7, HSks7, HSkv7, HSvw7, HSbk7, HSsw7, HSbw7, HSbh7, HSs7, HShv7	western redcedar, yellow-cedar, western hemlock, salal, deer fern, bunchberry
				HSs6, HSsw6, HSkv6	western redcedar, yellow-cedar, western hemlock, salal, deer fern, bunchberry
				HSs5	western redcedar, yellow-cedar, western hemlock, salal, deer fern, bunchberry
				HSsw3a	salal, deer fern, bunchberry
LR	CWHvh2/02	PIYc - Rhacomitrium	Typic is shallow soils, gentle to moderate slopes; located on knolls, ridgecrests. Very xeric, oligotrophic sites. Poor tree productivity, often stunted, open canopies (tall shrub structure). Note: Tall shrub structure is equivalent to old growth.	LRb7, LRbk7, LRbw7, LRbh7	shore pine, yellow-cedar, common juniper, crowberry, lignonberry, tufted clubrush, hoary rock moss
				LRv3b, LRb3b, LRkv3b, LRvw3b, LRbk3b, LRbw3b, LRbh3b, LRhv3b	shore pine, yellow-cedar, common juniper, crowberry, lignonberry, tufted clubrush, hoary rock moss

Map Symbol	Site Series	Name	Description	Site Modifiers & Structural Stage	Dominant Plants
LS	CWHvh2/12	PIYc - Sphagnum	Bog woodland/wetland typically found on organic deposits in undulating terrain. Subhydic; oligotrophic - submesotrophic sites. Also occurs on poorly drained mineral soils and steep aspects.	LS7, LSs7	shore pine, yellow-cedar, western redcedar, salal, crowberry, sedges, tufted clubbrush, deer cabbage, sphagnum
			Tree layers are typically scrubby and sparse. Note: tall shrub structure is equivalent to old growth.	LS3b, LSs3b, LSv3b, LSb3b, LSbh3b, LSsw3b, LSkv3b, LSvw3b	shore pine, yellow-cedar, western redcedar, salal, crowberry, sedges, tufted clubbrush, deer cabbage, sphagnum
RC	CWHvh2/13	CwSs - Skunk cabbage	Typic is deep mineral soils; subhydic, permesotrophic sites. poorly drained, level or depressional sites. Common on fluvial sites with organic surface horizon.	RC7, RCp7	western redcedar, yellow-cedar, western hemlock, salal, blueberries, deer fern, skunk cabbage
RF	CWHvh2/05	CwSs - Sword fern	Typic is deep, base rich soils, steep slopes; subxeric, permesotrophic sites. Also occurs on moderately sloping and hummocky terrain with shallow soils.	RFj7, RFjs7, RFhs7	western hemlock, western redcedar, Sitka spruce, sword fern, spiny wood fern
				RFjs5, RFhs5	Western hemlock, western redcedar, Sitka spruce, sword fern, spiny wood fern
				RFbh3b, RFhv3b	Western hemlock, western redcedar, Sitka spruce, sword fern, salmonberry, nodding trisetum
				RFjs1b, RFhs1b	deer fern, sword fern
RS	CWHvh2/03	CwYc - Salal	Typic is shallow soils found on gently sloping knolls, ridgecrests & upper slopes; subxeric, submesotrophic. Very shallow mineral soils or Folisols. Also occurs on steep slopes onFolisols.	RSb7, RSbh7, RSbw7, RSbk7, RShv7	western hemlock, western redcedar, yellow-cedar, salal, deer fern
				RSbw3b	western hemlock, western redcedar, salal, deer fern
SA	CWHvh2/51	Sitka alder avalanche track	Steep avalanche tracks; subhydic, permesotrophic sites.	SAk3a, SAw3a, SAKs3a, SASw3a, SAKv3a, SAVw3a	salmonberry, Devil's club, lady fern
SD	CWHvh2/07	CwSs - Devil's club	Typic is deep soils, gentle to moderate slopes receiving seepage; subhydic, permesotrophic. Also occurs on steep slopes, very shallow to shallow soils. Productive forests.	SD7, SDs7, SDk7, SDw7, SDks7, SSsw7, SDkv7, SDvw7	western hemlock, amabilis fir, Sitka spruce, salmonberry, Devil's club, foamflower, ferns
SF	CWHvh2/06	CwSs - Foamflower	Typic is deep, medium-textured, rich soils on steep, colluvial slopes. Mesic, permesotrophic sites. Also occurs on shallow soils and morainal material and inactive fluvial deposits.	SFk7, SFw7, SFsw7, SFks7, SFkv7, SFj7	western hemlock, western redcedar, Sitka spruce, amabilis fir, Alaskan blueberry, low coverage of foamflowers & variety of ferns
				SFj6, SFks6, SFsw6	western hemlock, western redcedar, Sitka spruce, amabilis fir, Alaskan blueberry, low coverage of foamflowers & variety of ferns
				SFj5, SFk5, SFks5, SFsw5	western hemlock, western redcedar, red alder, Alaskan blueberry, ferns

Map Symbol	Site Series	Name	Description	Site Modifiers & Structural Stage	Dominant Plants
				SFks3a	western hemlock, western redcedar, red alder, salmonberry
SL	CWHvh2/08	Ss - Lily of-the-valley	Floodplain - high fluvial bench site; subhygric, permesotrophic. Productive forests.	SL7	western hemlock, Sitka spruce, salmonberry, spiny wood fern, sword fern, foamflowers
				SL6	western hemlock, Sitka spruce, salmonberry, spiny wood fern, sword fern, foamflowers
				SL5	western hemlock, Sitka spruce, salmonberry, spiny wood fern, sword fern, foamflowers
				SL2	yarrow, tufted hairgrass
SS	CWHvh2/14	Ss - Salal	Found in shoreline areas on exposed, rocky headlands. Subseric, mesotrophic sites. Shallow mineral and folic soils.	SSs7, SSb7	western hemlock, western redcedar, Sitka spruce, salal, false lily-of-the-valley
ST	CWHvh2 - 9	Ss - Trisetum	Floodplain - middle fluvial bench; subhygric; permesotrophic. Deep soils.	ST7	western hemlock, Sitka spruce, lady fern, foamflowers, nodding trisetum, hairy wildrye
				ST5	western hemlock, Sitka spruce, lady fern, foamflowers, nodding trisetum, hairy wildrye, P. enchanter's nightshade
TM	CWHvh2/33	Tufted hairgrass meadow	Estuarine meadow; hygric, permesotrophic.	TM2	yarrow, lovage, great burnet, tufted hairgrass, meadow barley
TS	CWHvh2 - 32	Tufted clubrush - Sphagnum	Slope/blanket bog, typically occurs on poorly drained, organic material on gentle slopes; subhygric, oligotrophic. Also occurs on shallow mineral and organic soils and shallow to very shallow soils on steep, exposed slopes. Edaphic ecosystem unit with low shrub (dwarf trees) or herb structure.	TS3a, TSs3a, TSv3a, TSb3a, TSvw3a, TSsw3a, TSks3a, TSkv3a, TSbk3a, TSbw3a	western redcedar, yellow-cedar, shore pine, sweet gale, Labrador tea, tufted clubrush, beak-sedge, sphagnum, hoary rock moss
				TS2, TSs2, TSb2, TSv2, TSvw2, TSsw2	tufted clubrush, pale sedge, many-flowered sedge, sweet gale, Labrador tea, beak-sedge, sphagnum, hoary rock moss
YG	CWHvh2/11	CwYc - Goldthread	Typic is organic bog forest on gentle slopes; hygric; submesotrophic sites. Also occurs on mineral soils, sites with shallow soils (mineral and organic venners) and hummocky or steep terrain.	YG7, YGb7, YGs7, YGbw7, YGbk7, YGsw7, YGks7, YGvw7, YGkv7, YGhs7, YGhv7	western redcedar, yellow-cedar, shore pine, western hemlock, salal, fern-leaved goldthread, Pacific reedgrass, hellebore, sedges, sphagnum
CWHvm1					
AB	CWHvm1/01	HwBa - Blueberry	Typic is gentle slopes on deep, medium-textured soils. Mesic, mesotrophic sites. Also occurs on shallow soils, Folisols and steep slopes.	AB7, ABs7, ABks7, ABkv7, ABsw7, ABvw7, ABbw7, ABbk7	western hemlock, amabilis fir, salal, Alaskan blueberry, deer fern, bunchberry, five-leaved bramble
				ABks7, ABkv6, ABsw6	western hemlock, amabilis fir, Alaskan blueberry, deer fern, bunchberry, five-leaved bramble
				ABks5, ABkv5	western hemlock, amabilis fir, Alaskan blueberry, deer fern, bunchberry, five-leaved bramble

Map Symbol	Site Series	Name	Description	Site Modifiers & Structural Stage	Dominant Plants
				ABks4	western hemlock, amabilis fir, Alaskan blueberry, deer fern, bunchberry, five-leaved bramble
				AB3b, ABks3b, ABvw3b	western hemlock, amabilis fir, Alaskan blueberry, salmonberry, bunchberry, deer fern
				AB3a, ABvw3a, ABks3a, ABsw3a, ABkv3a	Alaskan blueberry, salmonberry, western hemlock, bunchberry, deer fern
AD	CWHvm1/08	BaSs - Devil's club	Typic is gently sloping receiving area with deep soil; subhygric, permesotrophic sites. Also occurs on steep slopes with deep to shallow soils.	AD7, ADw7, ADk7, ADks7, ADsw7, ADn7	western hemlock, amabilis fir, Sitka spruce, Devil's club, salmonberry, foamflowers, oak fern, spiny wood fern
AF	CWHvm1/05	BaCw - Foamflower	Typic is steep slopes with deep soils. Submesic-mesic, permesotrophic sites. Also occurs on steep sites with shallow soils and on gently sloping sites.	AFj7, AFk7, AFw7, AFks7, AFsw7, AFvw7, AFkv7	western hemlock, amabilis fir, western redcedar, Alaskan blueberry, foamflowers, lady fern, oak fern, spiny wood fern
				AFw6, AFk6, AFsw6, AFks6, AFj6	western hemlock, amabilis fir, western redcedar, Alaskan blueberry, foamflowers, lady fern, oak fern, spiny wood fern
				AFk5, AFks5, AFsw5	western hemlock, amabilis fir, western redcedar, Alaskan blueberry, foamflowers, lady fern, oak fern, spiny wood fern
				AFks4, AFsw4	western hemlock, amabilis fir, western redcedar, foamflowers,
				AFj3b	salmonberry, Alaskan blueberry, western hemlock, amabilis fir, western redcedar, foamflowers, lady fern
				AFsw3a	salmonberry, Alaskan blueberry, western hemlock, amabilis fir, western redcedar, foamflowers, lady fern
BS	CWHvm1/32	Beaked sedge - Sphagnum	Poor fen located on level, water collecting sites with organic soils; subhygric, mesotrophic. Also occurs on shallow organic veneers.	BS2, BSs2	swamp laurel, beaked sedge, Sitka sedge, skunk cabbage, lady fern, great burnet, buckbean
HD	CWHvm1/06	HwBa - Deer fern	Typic is deep soils, on steep slopes with seepage. Subhygric, mesotrophic sites. Also occurs on Folisols (lithic sites), shallow soils on steep sites, and gently sloping areas.	HDk7, HDw7, HDsw7, HDks7, HDbk7, HDbw7, HDjs7, HDj7	western hemlock, western redcedar, amabilis fir, salal, deer fern, fern-leaved goldthread
				HDks6, HDbk6, HDjs6	western hemlock, western redcedar, amabilis fir, salal, deer fern, fern-leaved goldthread
				HDj5	red alder, western hemlock, western redcedar, salmonberry, salal, deer fern
				HDj3a	salmonberry, western hemlock, western redcedar, salal, deer fern

Map Symbol	Site Series	Name	Description	Site Modifiers & Structural Stage	Dominant Plants
HF	CWHvm1/00	Hardhack fen	Shrubby fen located in level, water collecting sites; subhydic, permesotrophic. Organic soils.	HF3a	hardhack, sweet gale, highbush cranberry, beaked sedge, skunk cabbage
HS	CWHvm1/03	HwCw - Salal	Typic is shallow mineral soil over rock on gentle upper slope/crest position. Xeric, submesotrophic sites. Also occurs on Folisols, very shallow soils and steep slopes.	HSv7, HSkv7, HShv7, HSbk7, HSbh7, HSbw7, HSrv7	western redcedar, western hemlock, salal, deer fern bunchberry
				HSkv5	western redcedar, western hemlock, salal, deer fern, bunchberry
LC	CWHvm1/02	HwPI - Cladina	Typic is gentle slopes, with shallow mineral soils and organic veneers over rock; very xeric, oligotrophic. Tall shrub structure (3b) is equivalent in age to stage 7.	LCb7	shore pine, western redcedar, western hemlock, salal, rock mosses, reindeer lichens
				LCb3b	shore pine, western redcedar, western hemlock, salal, rock mosses, reindeer lichens
LS	CWHvm1/13	Pl - Sphagnum	Typic is bog woodland with poorly drained, organic soils. Subhydic, oligotrophic. Forests are sparse and scrubby.	LS3b, LSs3b	shore pine, western redcedar, yellow-cedar, salal, Labrador tea, fern-leaved goldthread, skunk cabbage
RC	CWHvm1/14	CwSs - Skunk cabbage	Typic is deep, wet, mineral soils, level sites; subhydic, permesotrophic sites. Also found on wet organic soils.	RC7, RCp7	western hemlock, western hemlock, red alder, Sitka spruce, salal, salmonberry, foamflowers, lady fern, skunk cabbage
SA	CWHvm1/51	Sitka alder avalanche track	Typic is steeply sloping avalanche track; subhygric, permesotrophic sites.	SAk3a, SAw3a, SASw3a, SAKs3a	Sitka alder, salmonberry, stink currant, cow parsnip, lady fern, Oak fern, bluejoint, hairy wildrye
SC	CWHvm1/00	Ss - Pacific crabapple	Typic is deep soils, estuarine location; subhygric, permesotrophic sites.	SC7	Sitka spruce, Pacific crabapple, Nootka rose, beach lovage, false lily-of-the-valley, Pacific reed grass,
SS	CWHvm1/09	Ss - Salmonberry	Floodplain - high fluvial bench; subhygric-hygric, permesotrophic sites. Deep soils. Also mapped on organic veneers over fluvial deposits. Productive forests.	SS7, SSP7	western hemlock, amabilis fir, Sitka spruce, Devil's club, salmonberry, foamflowers, lady fern
TS	CWHvm1/31	Tufted clubrush - Sphagnum	Typic is non-forested bog on deep, organic soils; subhydic, oligotrophic sites. Also occurs on shallow soils. Herb or low shrub structure.	TS3a, TSs3a	shore pine yellow-cedar, tufted clubrush, beak-sedge, narrow-leaved cottongrass, sphagnum
				TS2, TSs2, TSv2	shore pine yellow-cedar, tufted clubrush, white-beak rush, sedges, sphagnum
YG	CWHvm1/12	CwYc - Goldthread	Typic is bog forest, on poorly drained, organic soils. Hygric, submesotrophic sites. Also occurs on shallow soils (mineral and organic veneers), and steep slopes.	YG7, YGs7, YGv7, YGb7, YGbh7, YGks7, YGsw7	western hemlock, western redcedar, yellow-cedar, Alaskan blueberry, fern-leaved goldthread, bunchberry, common green sphagnum
CWHvm2					
AB	CWHvm2/01	HwBa - Blueberry	Typic is deep, medium-textured soil on gentle slopes. Mesic, mesotrophic sites.	ABs7, ABks7, ABsw7, ABkv7, ABvw7, ABbk7, ABbw7	western hemlock, amabilis fir, Alaskan & oval-leaved blueberry, five-leaved bramble

Map Symbol	Site Series	Name	Description	Site Modifiers & Structural Stage	Dominant Plants
			More commonly occurs on organic veneers (Folisols), shallow soils, and steep slopes in project area.	ABsw6, ABks6, ABkv6, ABvw6, ABbk6, ABbw6	western hemlock, amabilis fir, Alaskan & oval-leaved blueberry, five-leaved bramble
				ABks5, ABkv5, ABbw5	western hemlock, amabilis fir, Alaskan & oval-leaved blueberry, five-leaved bramble
				ABsw4, ABks4	western hemlock, amabilis fir, five-leaved bramble
				ABks3b, ABkv3b, ABvw3b, ABbw3b, ABbk3b	western hemlock, amabilis fir, Alaskan blueberry, fireweed
				ABks3a, ABsw3a, ABkv3a	Alaskan blueberry, salmonberry, western hemlock, amabilis fir, fireweed
AD	CWHvm2/08	BaSs - Devil's club	Typic is deep soils, on gently sloping, water receiving sites. Subhygric, permesotrophic sites. Mapped on steep, lower slopes.	ADw7, ADk7	western hemlock, amabilis fir, Sitka spruce, Devil's club, salmonberry, foamflowers, ferns
AF	CWHvm2/05	BaCw - Foamflower	Typic is deep soils on steep slopes; submesic-mesic, permesotrophic sites. Also occurs on shallow soils and gentle slopes.	AFk7, AFsw7, AFks7, AFvw7, AFj7	western hemlock, amabilis fir, western redcedar, Sitka spruce, Alaskan & oval-leaved blueberry, foamflowers, oak fern, spiny wood fern
				AFks6, AFsw6, AFj6	western hemlock, amabilis fir, western redcedar, Sitka spruce, Alaskan & oval-leaved blueberry, foamflowers, oak fern, spiny wood fern
				AFks5	red alder, western hemlock, western redcedar, Alaskan & oval-leaved blueberry, foamflowers, spiny wood fern
				AFsw4	western hemlock, western redcedar, Alaskan & oval-leaved blueberry, foamflowers, spiny wood fern
BS	CWHvm2/32	Beaked sedge - Sphagnum	Poor fen with organic soils; subhygric, mesotrophic, water collecting sites. Localized in valley bottoms.	BS2	swamp laurel, beaked sedge, buckbean, skunk cabbage, great burnet
HD	CWHvm2/06	HwBa - Deer fern	Typic is deep soils on steep slopes with seepage; subhygric, mesotrophic sites. Also occurs on shallow soils and organic veneers (Folisols).	HDw7, HDk7, HDsw7, HDbw7, HDbk7	western hemlock, western redcedar, yellow-cedar, amabilis fir, salal, deer fern, fern-leaved goldthread
				HDk6, HDsw6	western hemlock, western redcedar, yellow-cedar, amabilis fir, salal, deer fern, fern-leaved goldthread
LC	CWhvm2/02	HwPl - Cladina	Stunted, open forests on gently sloping ridge crests, upper slopes with shallow soils. Very shallow mineral and organic (Folisols) soils. Very xeric, submesotrophic sites. Also occurs on steep slopes and hummocky terrain. Tall shrub structure is equivalent to structural stage 7.	LCb7, LCbw7, LCbk7, LCbh7, LCv7, LCvw7	shore pine, yellow-cedar, mountain hemlock, mountain-heathers, reindeer lichens,
				LCb3b, LCv3b, LCbw3b, LCbk3b, LCbh3b	shore pine, yellow-cedar, mountain hemlock, mountain-heathers, reindeer lichens,

Map Symbol	Site Series	Name	Description	Site Modifiers & Structural Stage	Dominant Plants
MK	CWHvm2/00	Mountain hemlock krummholz	Very shallow mineral soils or Folisols on upper slopes and crests; subxeric-submesic, submesotrophic sites. Also on steep slopes. Occurs at upper elevations of the subzone. Conifers are dwarfed.	MKb3a, MKv3a, MKbw3a, MKbk3a	yellow-cedar, swamp-laurel, dwarf blueberry, bog blueberry, crowberry, deer cabbage.
RC	CWHvm2/11	CwYc - Skunk cabbage	Swamp forest. Typic is deep soils on level to gently sloping areas. Subhydic, permesotrophic sites. Also occurs on organic soils.	RC7, RCp7	western hemlock, western redcedar, yellow-cedar, salmonberry, foamflowers, skunk cabbage
SA	CWHvm2/51	Sitka alder avalanche track	Steeply sloping avalanche track; subhygric-hygric, permesotrophic sites. Also occurs on very shallow to shallow soils and gentle slopes.	SAk3a, SAw3a, SASw3a, SAKs3a, SAVw3a, SAKv3a, SAj3a	Sitka alder, salmonberry, oak fern, lady fern, foamflowers
TS	CWHvm2/31	Tufted clubrush - Sphagnum	Typic is non - forested bog on organic soils; subhydic, submesotrophic sites. Also occurs on very shallow to shallow soils. Low shrub or herb structural stages.	TS3a, TSs3a, TSv3a,	yellow-cedar, mountain hemlock, deer cabbage, tufted clubrush, narrow-leaved cottongrass
				TS2, TSs2, TSv2	deer cabbage, tufted clubrush, narrow-leaved cottongrass, sedges
YG	CWhvm2/09	CwYc - Goldthread	Bog forests . Typic is deep, organic soil occurring on valley bottoms; hygric, submesotrophic sites. Also occurs on shallow soils and steep slopes.	YG7, YGs7, YGsw7	yellow-cedar, western hemlock, mountain hemlock, Alaskan & oval-leaved blueberry, fern-leaved goldthread, skunk cabbage
MHwh1					
HM	MHwh1/00	Heather meadow	Typic is ridge crests and upper slopes on organic veneers; xeric-mesic, submesotrophic sites. Also occurs on shallow mineral soils and steep slopes	HMb2, HMBk2, HMBw2, HMks2, HMsW2, HMkv2	pink mountain-heather, white mountain-heather, crowberry, dwarf blueberry, bog blueberry, partridgefoot
MB	MHwh1/01	HmSs - Blueberry	Typically found on steep, colluvial slopes; submesic, submesotrophic sites. Also occurs on shallow - very shallow soil.	MBsw7, MBvw7, MBkv7, HMks7	yellow-cedar, mountain hemlock, western hemlock, Alaskan and oval-leaved blueberry, fern-leaved goldthread
MK	MHwh1/00	Mountain hemlock krummholz	Exposed ridge crests and upper slopes with shallow, organic (Folisol) soils. Xeric-subxeric, submesotrophic sites. Also occurs on steep slopes and very shallow mineral soils.	MKb3a, MKbk3a, MKbw3a, MKvw3a, MKbh3a	mountain hemlock, yellow-cedar, white mountain-heather, crowberry, dwarf blueberry, bog blueberry, tufted clubrush
MM	MHwh1/02	HmYc - Mountain-heather	Exposed sites, on steep, upper slopes, and ridge crests with shallow soil. Very xeric-xeric, submesotrophic sites. Folisols or very shallow, coarse mineral soils. Tall shrub structure is equivalent to structural stage 7.	MMbk7, MMbw7, MMkv7, MMvw7	mountain hemlock, yellow-cedar, western redcedar, Alaskan & oval-leaved blueberry, mountain-heathers, Pacific reedgrass
				MMbk3b, MMbw3b, MMbh3a, MMb3b	mountain hemlock, yellow-cedar, western redcedar, Alaskan & oval-leaved blueberry, mountain-heathers, Pacific reedgrass
YG	MHwh1/04	HmYc - Goldthread	Typic is shallow soil on steep slopes with seepage; subhygric, submesotrophic. Also occurs on organic veneers (Folisols) or very shallow mineral soils.	YGsw7, YGks7, YGbk7, YGbw7, YGkv7, YGvw7	mountain hemlock, yellow-cedar, Alaskan & oval-leaved blueberry, five-leaved bramble, fern-leaved goldthread

Map Symbol	Site Series	Name	Description	Site Modifiers & Structural Stage	Dominant Plants
SA	MHwh1/51	Sitka alder avalanche	Steeply sloping avalanche tracks with shallow soils. Subhygric-hygric, permesotrophic sites.	SAks3a, SASw3a, SAKv3a, Savw3a	Sitka alder, salmonberry, lady fern, oak fern, hairy wildrye
MHmm1					
AB	MHmm1/04	HmBa - Bramble	Typic is deep, colluvial soils on steep slopes with seepage; subhygric, mesotrophic sites. Mapped on shallow to very shallow soils.	ABsw7, ABks7, ABvw7	mountain hemlock, amabilis fir, Alaskan & oval-leaved blueberry, copperbush, five-leaved bramble, twistedstalks
HM	MHmm1/00	Heather meadow	Typic is upper slopes and ridge crests with very shallow soils (Folisols or mineral). Very xeric - submesic, oligotrophic sites. Also occurs on steep slopes.	HMb2, HMBw2, HMBk2, HMBh2, HMks2, HMsw2, HMvw2	mountain-heathers, crowberry, bog blueberry, deer cabbage, black alpine sedge, tufted hairgrass
MB	MHmm1/01	HmBa - Blueberry	Typic is deep soils (colluvium) on steep slopes; subxeric-mesic, mesotrophic sites. Also occurs on organic veneers (Folisols) and shallow soils.	MBsw7, MBks7, MBvw7, MBkv7, MBbw7, MBbk7	mountain hemlock, amabilis fir, Alaskan & oval-leaved blueberry, five-leaved bramble
				MBks3b, MBbh3b	mountain hemlock, amabilis fir, Alaskan & oval-leaved blueberry, five-leaved bramble
MK	MHmm1/00	Mountain hemlock krummholz	Typic is very shallow soils on exposed upper slopes and crests; xeric - submesic, oligotrophic sites. Occurs on organic veneers (Folisols) and very shallow mineral soils. Also occurs on steep slopes.	MKb3a, MKbk3a, MKbw3a, MKbh3a, MKvw3a, MKkv3a	mountain hemlock, yellow-cedar, bog blueberry, dwarf blueberry, crowberry, deer cabbage, reindeer lichens
MM	MHmm1/02	HmBa - Mountain-heather	Exposed sites; steep slopes with shallow organic soils (Folisols). Very xeric - xeric, submesotrophic sites. Also occurs on hummocky terrain.	MMbk7, MMbw7, MMbh7	yellow-cedar, mountain hemlock, copperbush, Alaskan & oval-leaved blueberry, mountain-heathers, deer cabbage
				MMbk3b, MMbw3b,	yellow-cedar, mountain hemlock, copperbush, Alaskan & oval-leaved blueberry, mountain-heathers, deer cabbage
MO	MHmm1/03	BaHm - Oak fern	Typic is deep soils on steep, colluvial slopes; subxeric - mesic, permesotrophic sites. Mapped on very shallow and shallow soils.	MOsw7, MOks7, MOkv7, MOvw7	mountain hemlock, amabilis fir, Alaskan blueberry, Sitka alder, five-leaved bramble, ferns
SA	MHmm1/51	Sitka alder avalanche track	Steeply sloping avalanche track; subhygric - hygric, permesotrophic sites.	SAks3a, SAVw3a	Sitka alder, salmonberry, Sitka valerian, lady fern, twistedstalks
All BGC Zones					
RO		Rock outcrop	steep rock outcrop; sparsely vegetated	j, k, w	

APPENDIX A
TERRAIN MAP LEGEND

APPENDIX B
ECOSYSTEM MAP LEGEND

APPENDIX C

ANNOTATED LIST OF WILDLIFE

PRINCESS ROYAL ISLAND: AUGUST-SEPTEMBER 1995

ANNOTATED LIST OF BIRDS

LOONS

Red-throated Loon

A total of 17 individuals observed. Most birds seen in pairs, calling and flying overhead. Breeding suspected on freshwater lakes throughout island.

Pacific Loon

Two birds seen on two occasions at mouth of Chapple Inlet.

Common Loon

Total of six birds seen on both fresh and saltwater habitats.

GREBES

Red-necked Grebe

One observed on two occasions at mouth of Chapple Inlet.

Horned Grebe

Single observation on a high elevation lake (~ 2200 feet).

HERONS

Great Blue Heron

Single birds seen on three occasions.

one along shoreline of Chapple Inlet, 27 Aug 95 (Map 14)

a) one on flats of Cornwall Estuary, 15 Sept 95 (Map 5)

b) one seen along unnamed creek between Butedale and Whalen Lakes, 15 Sep 95 (Map 6)

c) one seen at mouth of Cornwall Inlet - Aug 95 (Map 1)

GEESE

Canada Goose

More than one hundred birds seen in flocks ranging to 30 individuals. Birds observed at close range are darker overall than other races and are thought to be of the '*fulva*' subspecies. Birds observed feeding in estuarine habitats, upland open water bogs and blanket bogs, and high elevation heather/vaccinium habitats. Some birds observed feeding on crowberries at high elevation.

DUCKS

Green-winged Teal

Total of 59 birds seen, one flock of approximately 50 birds at Cornwall Estuary in September.

Northern Shoveler

Flock of 14 birds observed on lake at 2200 feet just north of headwaters of Tyler Creek (September).

Mallard

Three observed feeding in freshwater pond.

American Wigeon

A flock of approximately 20 seen with green-winged teal at Cornwall Estuary in September.

Surf Scoter

Two flocks (i.e., 7 and 2 individuals) observed at mouth of Chapple Inlet.

White-winged Scoter

One individual observed at mouth of Chapple Inlet.

Common Goldeneye

Two birds seen on high elevation lake.

Common Merganser

Commonly seen primarily in estuarine and coastal habitats. Flocks to 11 individuals.

Hooded Merganser

A single immature male observed at head of Chapple Inlet.

HAWKS & EAGLES

Osprey

Two birds observed on 19 September 1995, circling on thermal at the southwest end of the island, presumably on their southern migration.

Bald Eagle

More than 40 individuals observed including both adults, immature and juvenile birds. Seen most frequently in coastal areas where they appear to be quite regularly distributed, but some seen in inland areas. Eagles observed feeding on salmon carcasses along several of the creeks on the island. No nest surveys conducted. No nest sites documented.

2 ad. and 2 juv. observed at mouth of Barnard Creek (nest suspected in area), Aug 95 (Map 9)

Sharp-shinned Hawk

A total of six birds seen during August. None observed during the September survey period.

Northern Goshawk

One immature bird observed near Butedale Lake.

one immature observed on forested south facing slope south of Butedale Lake, 17 Aug 95
(Map 6)

Field Notes: large accipiter, long tail, rapid wingbeat and flight, brown striations on chest appearing more distinct towards tail, white underside leg feathers, brown back and head (tail feathers in flight looked darker than back), tail more squared off than COHA, possible lighter marking around eye, very yellow legs, calling continuously (screeching call, descending and quite short)

Red-tailed Hawk

Six observed over the course of the study. Appear to be regular but sparsely distributed.

GROUSE, PTARMIGAN

Blue Grouse

Seen commonly in mid to low elevations. Regularly observed in scrub and open habitats of the Hecate Lowlands.

Willow Ptarmigan

Commonly encountered in open subalpine and krummholz areas. One family group observed.

CRANES

Sandhill Crane

A total of 10 birds observed or heard calling during the course of the study. Many tracks seen and measured (i.e., middle toe) in lowland wetland bog habitats.

Two calling from south side of Racey Inlet, 27 Aug 95 (Map 14)

- a) One track (not measured) along wet depression in Hecate Lowlands, 06 Sep 95 (Map 18)
- b) Two calling, 06 Sep 95, (Map 18)
- c) Three tracks measured along perimeter of small lake (103, 101 and 98 mm), 06 Sep 95 (Map 18)
- d) Four observed flying south at west end of Helmcken Lake, 06 Sep 95 (Map 19)
- e) Four tracks measured in wet grassland/ sedge meadow (102-photo, 98, 108 and 106 mm), 10 Sep 95 (Map 19)
- f) Two observed flying from lake edge, 10 Sep 95 (Map 22)
- g) Two tracks measured in sloping bog/wetland (106 and 110 mm), 16 Sep 95 (Map 10)
- h) Two tracks measured along small lake at 1800 feet (105 and 107 mm), 16 Sep 95 (Map 10)

- i) One track measured along Pyne Creek (106 mm), 19 Sep 95 (Map 16)
- j) Two tracks measured in open bog wetland (113 and 102 mm), 19 Sep 95 (Map 23)

SANDPIPERS

Greater Yellowlegs

One observed at Chapple Inlet.

Spotted Sandpiper

One observed.

Baird's Sandpiper

One observed at Chapple Inlet.

Red-necked Phalarope

Flocks to 15 individuals observed in Surf Inlet. Total of 45 birds seen.

GULLS

Bonaparte's Gull

Several flocks seen in coastal areas.

Mew Gull

Occurred commonly in coastal and especially estuarine habitats.

California Gull

Commonly encountered in coastal areas.

Herring Gull

Regularly observed in coastal areas.

DOVES

Band-tailed Pigeon

One sighting of four individuals in the Hecate Lowlands on 06 September 1995.

OWLS

Northern Pygmy Owl

Males calling at Cornwall Creek and near the mouth of Pyne Creek. Likely distributed in suitable habitats throughout the island.

SWIFTS

Black Swift

One observed over a high elevation lake.

Vaux's Swift

Several small flocks observed primarily over riparian and alluvial habitats at low elevations.

HUMMINGBIRDS

Rufous Hummingbird

One female observed on 16 August 1995.

KINGFISHERS

Belted Kingfisher

Seen commonly in coastal areas and along creeks with resident fish populations.

WOODPECKERS

Red-breasted Sapsucker

Numerous sapsucker workings seen primarily on western hemlock throughout most habitats. Sitka spruce, amabilis fir and mountain hemlock also utilized. Individuals commonly heard or observed.

Downy Woodpecker

Seen on only three occasions during the study, primarily in mixed species flocks.

Hairy Woodpecker

The second most commonly encountered woodpecker after red-breasted sapsucker. Total of 26 individuals observed during course of the study. Mature forests with numerous snags and large diameter timber preferred.

Northern Flicker

Also commonly encountered in a wide variety of habitats. Total of 21 sightings.

FLYCATCHERS

Pacific-slope Flycatcher

Seven individuals observed primarily during the August survey period.

Empidonax spp.

Three individuals observed.

SWALLOWS

Barn Swallow

Nesting at Chapple Inlet logging camp and one immature individual observed feeding at the mouth of a creek draining into Surf Inlet.

Violet-green Swallow

Four individuals observed feeding over clearcut areas near Kingcome Point at the northeast end of the island.

JAYS & CROWS

Steller's Jay

Common throughout. Total of 29 sightings.

Northwestern Crow

Uncommonly observed. Only two sightings.

Common Raven

Commonly observed throughout. Total of 31 sightings.

CHICKADEES, NUTHATCHES, CREEPERS

Chestnut-backed Chickadee

The most commonly encountered bird species with more than 120 records. Observed in most habitats available on the island from coastal forest to high elevation krummholz habitats.

Red-breasted Nuthatch

Uncommonly encountered with a total of 10 sightings.

Brown Creeper

Fairly commonly encountered (i.e., 18 records) in suitable forests comprised primarily of large diameter trees and numerous snags.

WRENS, DIPPERS

Winter Wren

Common throughout with 34 records.

American Dipper

One individual, apparently juvenile, at the mouth of Nias Creek, Laredo Inlet.

KINGLETS, THRUSHES

Golden-crowned Kinglet

Second most commonly encountered bird on the island with 67 records.

Ruby-crowned Kinglet

Fourteen individuals recorded, most often in mixed species flocks of chickadees, juncos, warblers and vireos.

Hermit Thrush

One individual observed feeding on red huckleberries.

Swainson's Thrush

One bird heard in mid-August. Expect Swainson's thrushes to be relatively common breeders during the summer.

American Robin

Only 10 records. Not as commonly encountered as expected.

Varied Thrush

Fairly common throughout, especially in more mature forests. Eighteen records.

PIPITS, WAXWINGS

American Pipit

One record of three individuals in subalpine habitats in mid-September.

Cedar Waxwing

Infrequently encountered (5 records).

VIREOS

Warbling Vireo

One individual in mixed species flock of chestnut-backed chickadee, brown creeper, ruby-crowned kinglet, dark-eyed junco, yellow warbler, Townsend's warbler, yellow-rumped warbler and downy woodpecker.

WOOD WARBLERS

Orange-crowned Warbler

Four records, most of individuals in mixed species flocks. Last record 19 September 95.

Yellow Warbler

One record on 06 September 1995 in mixed species flock of warbling vireo, chestnut-backed chickadee, brown creeper, ruby-crowned kinglet, dark-eyed junco, Townsend's and yellow-rumped warbler, and downy woodpecker.

Yellow-rumped Warbler

Total of seven birds recorded with last record on 14 September 1995.

Townsend's Warbler

Total of nine records with last record on 14 September 1995. All birds encountered in mixed species

flocks.

MacGillivray's Warbler

One individual singing from a recent clearcut in August.

Common Yellowthroat

Individuals recorded on four occasions with the last record on 15 September 1995.

Wilson's Warbler

One encountered in a mixed species flock.

SPARROWS

Fox Sparrow

One observed feeding in a clearcut.

Song Sparrow

Only three records over the course of the field study. Apparently only present in shrubby areas adjacent to aquatic habitats.

Lincoln's Sparrow

Low numbers observed. Habitat suitable for nesting available in several areas.

Golden-crowned Sparrow

Two observed in subalpine krummholz habitats (mid-September).

Dark-eyed Junco

Commonly recorded in most habitats. Forty-six records.

FINCHES

Pine Grosbeak

Uncommonly encountered with a total of 14 individuals observed on six occasions.

3 ind. observed (M & F) in open forested habitats adjacent to bog wetland, 21 Aug 95 (Map 15)

a) 2 ind. observed in mountain forest, 22 Aug 95 (Map 15)

b) 1 calling from forested ridge, 27 Aug 95 (Map 14)

c) 2 calling from forested ridge above lake (~2700'), 08 Sep 95 (Map 15)

d) 4 observed in forest along Ahlston Cove and Blee Creek, 09 Sep 95 (Map 20)

e) 2 calling from pine/cedar forest on ridge crest, 14 Sep 95 (Map 17)

Red Crossbill

Several moderate sized flocks observed.

Pine Siskin

Several small flocks observed.

ANNOTATED LIST OF MAMMALS**Shrew spp.**

Two unidentified individuals observed in one of the forested plots.

Bats

Several observed at mouth of Arnoup Creek at dusk. Not identified.

Red Squirrel

Common in most coniferous forested habitats of the island.

Beaver

Common in creeks and wetlands associated with the larger drainages.

Mink

Observed on several occasions in coastal areas.

Marten

No positive sign or individuals observed. Have been reported as occurring by native trappers and residents.

River Otter

Observed on several occasions in coastal and marine habitats.

Gray Wolf

Tracks and scat commonly encountered throughout. Wolves heard howling at Lomax Lakes and Chapple Inlet. Recent deer kill site on Bear Lake. Pack observed at mouth of Barnard Creek by other observers.

Black Bear

Relatively common on the island with sign recorded in most habitats from coastal estuarine areas to high elevation subalpine areas. Eight 'black' individuals and one 'kermode' observed over the course of the study. Two of the 'black' individuals were observed swimming across inlets. Kermode observed fishing along one of more important salmon streams on the island.

Harbour Seal

Common in coastal areas. Several haul out areas, one in Racey Inlet, another near the mouth of Chapple Inlet.

Blacktail Deer

Abundant on the island. Sign and individuals observed in all habitats of the island. Many, especially bucks,

observed feeding in subalpine habitats. All wolf scats containing remnants (i.e., bones and hair) of deer.

Mountain Goat

None observed on numerous surveys and fly-bys of high elevation areas. A single goat reported by Shaun Sharp at mid-elevation just west of the Pyne Creek mouth. No viable breeding population.

NOTE A: Many habitats were visited during the 31 days (12 hours/day) field program on Princess Royal Island. Although habitats appear suitable for other mammal species such as porcupine, pika, snowshoe hare, marmot, chipmunk, coyote or red fox, none were recorded during the field work.

NOTE B: Conversations with people with local knowledge (i.e., PRI Fisheries Officer and Wayne McCrory), suggest that cougar and grizzly bear may be of occasional occurrence on the island.

ANNOTATED LIST OF AMPHIBIANS

Rough-skinned Newt

The most commonly encountered amphibian on the island. Many higher elevation ponds with standing water year-round containing newts.

Northwestern Salamander

One adult observed at 625 m in the Mountain Hemlock biogeoclimatic zone.

Tailed Frog

No individuals observed, however, an adult was reported and photographed by Tony Hamilton.

Western Toad

Several juveniles observed in wetland habitats of the island.

APPENDIX D
PLANT SPECIES LIST

Scientific Names	Common Names
TREE LAYER	
<i>Abies amabilis</i>	Amabilis Fir
<i>Alnus rubra</i>	Red alder
<i>Chamaecyparis nootkatensis</i>	Yellow-cedar
<i>Picea sitchensis</i>	Sitka spruce
<i>Pinus contorta</i> var. <i>contorta</i>	Lodgepole pine
<i>Taxus brevifolia</i>	Western yew
<i>Thuja plicata</i>	Western redcedar
<i>Tsuga heterophylla</i>	Western hemlock
<i>Tsuga mertensiana</i>	Mountain hemlock
SHRUB LAYER	
<i>Alnus crispa</i> ssp. <i>sinauta</i>	Sitka alder
<i>Cladothamnus pyroliflorus</i>	Copperbush
<i>Empetrum nigrum</i>	Crowberry
<i>Gaultheria shallon</i>	Salal
<i>Juniperus communis</i>	Common juniper
<i>Kalmia microphylla</i> spp. <i>occidentalis</i>	Western bog-laurel
<i>Ledum groenlandicum</i>	Labrador tea
<i>Malus fusca</i>	Pacific crabapple
<i>Menziesia ferruginea</i>	False azalea
<i>Myrica gale</i>	Sweet gale
<i>Oplopanax horridus</i>	Devil's club
<i>Ribes bracteosum</i>	Stink currant
<i>Ribes laxiflorum</i>	Trailing black currant
<i>Ribes</i> sp.	Currant
<i>Rosa nutkana</i>	Nootka rose
<i>Rubus parviflorus</i>	Thimbleberry
<i>Rubus spectabilis</i>	Salmonberry
<i>Sambucus racemosa</i> ssp. <i>pubens</i>	Red elderberry

<i>Sorbus sitchensis</i>	Stika mountain-ash
<i>Spiraea douglasii</i> ssp. <i>douglasii</i>	Hardhack
<i>Vaccinium ovalifolium</i>	Oval-leaved blueberry
<i>Vaccinium alaskaense</i>	Alaskan blueberry
<i>Vaccinium parvifolium</i>	Red huckleberry
<i>Viburnum edule</i>	Highbush cranberry
HERB LAYER	
Dwarf Shrubs (recorded in herb layer)	
<i>Andromeda polifolia</i>	Bog-rosemary
<i>Cassiope mertensiana</i> var. <i>mertensiana</i>	White mountain-heather
<i>Cassiope stelleriana</i>	Alaskan mountain-heather
<i>Gaultheria ovatifolia</i>	Western teaberry
<i>Loiseleuria procumbens</i>	Alpine azalea
<i>Oxycoccus oxycoccus</i>	Bog cranberry
<i>Phyllodoce empetriformis</i>	Pink mountain-heather
<i>Rubus chamaemorus</i>	Cloudberry
<i>Vaccinium caespitosum</i>	Dwarf blueberry
<i>Vaccinium uliginosum</i>	Bog blueberry
<i>Vaccinium vitis-idaea</i>	Lingonberry
Herbs	
<i>Achillea millefolium</i>	Yarrow
<i>Anemone</i> sp.	Anemone
<i>Arnica latifolia</i>	Mountain arnica
<i>Aruncus dioicus</i>	Goatsbeard
<i>Aster subspicatus</i>	Douglas' aster
<i>Circaea alpina</i>	Enchanter's-nightshade
<i>Coptis asplenifolia</i>	Fern-leaved goldthread
<i>Coptis trifolia</i> spp. <i>trifolia</i>	Three-leaved goldthread
<i>Cornus canadensis</i>	Bunchberry
<i>Dodecatheon jeffreyi</i>	Tall-mountain shootingstar
<i>Drosera anglica</i>	Great sundew
<i>Drosera rotundifolia</i>	Round-leaved sundew

<i>Epilobium angustifolium</i>	Fireweed
<i>Fauria crista-galli</i>	Deer cabbage
<i>Fragaria sp.</i>	Strawberry
<i>Galium triflorum</i>	Sweet-scented bedstraw
<i>Gentiana douglasiana</i>	Swamp gentian
<i>Gentiana platypetala</i>	Broad-petalled gentian
<i>Gentina sp.</i>	Gentian
<i>Heracleum lanatum</i>	Cow parsnip
<i>Huperzia sp. (Lycopodium selago)</i>	Fir clubmoss
<i>Leptarrhena pyrolifolia</i>	Leatherleaf saxifrage
<i>Ligusticum calderi</i>	Calder's lovage
<i>Ligusticum scoticum</i>	Beach lovage
<i>Linnaea borealis</i>	Twinflower
<i>Listera cordata</i>	Heart-leaved twayblade
<i>Luetkea pectinata</i>	Partidge foot
<i>Lupinus arcticus</i>	Arctic lupine
<i>Lycopodium annotinum</i>	Stiff clubmoss
<i>Lycopodium clavatum</i>	Running clubmoss
<i>Lycopodium dendroideum</i>	Groundpine
<i>Lycopodium sitchease</i>	Sitka clubmoss
<i>Lysichiton americanum</i>	Skunk cabbage
<i>Maianthemum dilatatum</i>	False lily-of-the-valley
<i>Mentha arvensis</i>	Field mint
<i>Menyanthes trifoliata</i>	Buckbean
<i>Microseris borealis</i>	Apargidium
<i>Moneses uniflora</i>	Single delight
<i>Nuphar polysepalum</i>	Spatterdock
<i>Osmorhiza purpurea</i>	Purple sweet-cicely
<i>Osmosphiza chilensis</i>	Mountain sweet-cicely
<i>Pedicularis ornithorhyncha</i>	Birds-beak lousewort
<i>Pinguicula vulgaris</i>	Common butterwort
<i>Plantago macrocarpa</i>	Alaska plantain
<i>Platanthera dilatata</i>	White bog (rein) orchid
<i>Potamogeton sp.</i>	Pondweed

<i>Potentilla anserian ssp. pacifica</i>	Silverweed
<i>Prunella vulgaris</i>	Selfheal
<i>Sanguisorba officinalis ssp. microcephala</i>	Great burnet
<i>Senecio traingularis</i>	Arrow-leaved groundsel
<i>Sparganium angustifolium</i>	Narrow-leaved burreed
<i>Spiranthes romanzoffiana</i>	Ladies tresses
<i>Streptopus amplexifolius</i>	Clasping twistedstalk
<i>Streptopus roseus</i>	Rosy twistedstalk
<i>Tellima grandiflora</i>	Fringe cup
<i>Tiarella trifoliata var. trifoliata</i>	Three-leaved foamflower
<i>Tiarella trifoliata var. unifoliata</i>	One-leaved foamflower
<i>Tofieldia glutinosa</i>	Sticky false asphodel
<i>Trientalis europaea</i>	Northern starflower
<i>Valeriana sitchensis</i>	Sitka valerian
<i>Veratrum viride</i>	Indian hellebore
<i>Viola palustris</i>	Marsh violet
Grasses/Sedges/Rushes	
<i>Agrostis aequivalvis</i>	Alaskan bentgrass
<i>Agrostis sp.</i>	Bentgrass
<i>Bromus stichensis</i>	Alaska brome
<i>Calagamoitis canadensis</i>	Bluejoint
<i>Calamagrotis nutkaensis</i>	Pacific reedgrass
<i>Danthonia spicata</i>	Povery out-grass
<i>Deschampsia cespitosa ssp. beringensis</i>	Tufted hairgrass
<i>Elymus glaucus</i>	Blue wildrye
<i>Elymus hirsutus</i>	Hairy wildrye
<i>Hordeum brachyantherum</i>	Meadow barley
<i>Panicum occidentale</i>	Western panicum
<i>Trisetum cernuum</i>	Nodding trisetum
<i>Carex anthoxanthea</i>	Yellow-flowered sedge
<i>Carex deweyana</i>	Dewey's sedge
<i>Carex laeviculmis</i>	Smooth-stemmed sedge

<i>Carex limosa</i>	Shore sedge
<i>Carex macrochaeta</i>	Large-awned sedge
<i>Carex pauciflora</i>	Few-flowered sedge
<i>Carex stichensis</i>	Sitka sedge
<i>Carex utriculata</i> (<i>C. rostrata</i>)	Beaked sedge
<i>Dulichium arundinaceum</i>	Three-way sedge
<i>Eriophorum angustifolium</i>	Narrow-leaved cotton-grass
<i>Rhynchospora alba</i>	White beak-rush
<i>Trichophorum cespitosum</i>	Tufted clubrush
<i>Juncus effusus</i> var. <i>gracilis</i>	Common rush
<i>Juncus ensifolius</i>	Dagger-leaved rush
<i>Juncus supiniformis</i>	Spreading rush
Ferns	
<i>Adiantum aleuticum</i> (<i>A. pedatum</i>)	Maidenhair fern
<i>Athyrium filix-femina</i>	Lady fern
<i>Blechnum spicant</i>	Deer fern
<i>Dryopteris expansa</i>	Spiny wood fern
<i>Gymnocarpium dryopteris</i>	Oak fern
<i>Phegopteris connectilis</i>	Narrow beech fern
<i>Polystichum braunii</i>	Braun's holly fern
<i>Polystichum munitum</i>	Sword fern
<i>Pteridium aquilinum</i>	Bracken
MOSS LAYER	
<i>Dicranum</i> spp.	Heron's-bill moss
<i>Hylocomium splendens</i>	Step moss
<i>Leucolepis acanthoneuron</i>	Palm tree moss
<i>Mnium</i> spp.	Leafy mosses
<i>Plagiothecium undulatum</i>	Flat moss
<i>Pleurozium schreberi</i>	Red-stem feathermoss
<i>Polytrichum</i> sp.	Haircap moss
<i>Racomitrium lanuginosum</i>	Hoary rock moss

<i>Rhizomnium glabrescens</i>	Large leafy moss
<i>Rhytidiadelphus loreus</i>	Lanky moss
<i>Rhytidiopsis robusta</i>	Pipcleaner moss
<i>Sphagnum capilaceum</i>	Common red sphagnum
<i>Sphagnum fuscum</i>	Common brown sphagnum
<i>Sphagnum girgensohnii</i>	Common green sphagnum
<i>Sphagnum spp.</i>	Sphagnum
<i>Conocephalum conicum</i>	Snake liverwort
<i>Diplophyllum albicans</i>	Common fold-leaf liverwort
<i>Herbertus aduncus</i>	Golden leafy liverwort
<i>Lepidozia reptans</i>	Little hands liverwort
<i>Pellia sp.</i>	Shiny liverwort
<i>Pleurozia pururea</i>	Purple-worm liverwort
<i>Scapania bolanderi</i>	Scapania
<i>Cladina spp.</i>	Reindeer lichens
<i>Siphula ceratites</i>	Waterworm
Common Names	Scientific Names
TREE LAYER	
Amabilis Fir	<i>Abies amabilis</i>
Lodgepole pine	<i>Pinus contorta var. contorta</i>
Mountain hemlock	<i>Tsuga mertensiana</i>
Red alder	<i>Alnus rubra</i>
Sitka spruce	<i>Picea sitchensis</i>
Western hemlock	<i>Tsuga heterophylla</i>
Western redcedar	<i>Thuja plicata</i>
Western yew	<i>Taxus brevifolia</i>
Yellow-cedar	<i>Chamaecyparis nootkatensis</i>
SHRUB LAYER	
Alaskan blueberry	<i>Vaccinium alaskaense</i>
Common juniper	<i>Juniperus communis</i>
Copperbush	<i>Cladothamnus pyroliflorus</i>

Crowberry	<i>Empetrum nigrum</i>
Currant	<i>Ribes sp.</i>
Devil's club	<i>Oplopanax horridus</i>
False azalea	<i>Menziesia ferruginea</i>
Hardhack	<i>Spiraea douglasii ssp. douglasii</i>
Highbush cranberry	<i>Viburnum edule</i>
Labrador tea	<i>Ledum groenlandicum</i>
Nootka rose	<i>Rosa nutkana</i>
Oval-leaved blueberry	<i>Vaccinaium ovalifolium</i>
Pacific crabapple	<i>Malus fusca</i>
Red elderberry	<i>Sambucus racemosa ssp. pubens</i>
Red huckleberry	<i>Vaccinium parvifolium</i>
Salal	<i>Gaultheria shallon</i>
Salmonberry	<i>Rubus spectabilis</i>
Sitka alder	<i>Alnus crispa ssp. sinauta</i>
Stika mountain-ash	<i>Sorbus sitchensis</i>
Stink currant	<i>Ribes bracteosum</i>
Sweet gale	<i>Myrica gale</i>
Thimbleberry	<i>Rubus parviflorus</i>
Trailing black currant	<i>Ribes laxiflorum</i>
Western bog-laurel	<i>Kalmia microphylla spp. occidentalis</i>
HERB LAYER	
Dwarf Shrubs (recorded in herb layer)	
Alaskan mountain-heather	<i>Cassiope stelleriana</i>
Alpine azalea	<i>Loiseleuria procumbens</i>
Bog blueberry	<i>Vaccinium uliginosum</i>
Bog cranberry	<i>Oxycoccus oxycoccos</i>
Bog-rosemary	<i>Andromeda polifolia</i>
Cloudberry	<i>Rubus chamaemorus</i>
Dwarf blueberry	<i>Vaccinium caespitosum</i>
Lingonberry	<i>Vaccinium vitis-idaea</i>
Pink mountain-heather	<i>Phyllodoce empetriformis</i>
Western teaberry	<i>Gaultheria ovatifolia</i>

White mountain-heather	<i>Cassiope mertensiana var. mertensiana</i>
Herbs	
Alaska plantain	<i>Plantago macrocarpa</i>
Anemone	<i>Anemone sp.</i>
Apargidium	<i>Microseris borealis</i>
Arctic lupine	<i>Lupinus arcticus</i>
Arrow-leaved groundsel	<i>Senecio traingularis</i>
Beach lovage	<i>Ligusticum scoticum</i>
Birds-beak lousewort	<i>Pedicularis ornithorhyncha</i>
Broad-petalled gentian	<i>Gentiana platypetala</i>
Buckbean	<i>Menyanthes trifoliata</i>
Bunchberry	<i>Cornus canadensis</i>
Calder's lovage	<i>Ligusticum calderi</i>
Clasping twistedstalk	<i>Streptopus amplexifolius</i>
Common butterwort	<i>Pinguicula vulgaris</i>
Cow parsnip	<i>Heracleum lanatum</i>
Deer cabbage	<i>Fauria crista-galli</i>
Douglas' aster	<i>Aster subspicatus</i>
Enchanter's-nightshade	<i>Circaea alpina</i>
False lily-of-the-valley	<i>Maianthemum dilatatum</i>
Fern-leaved goldthread	<i>Coptis asplenifolia</i>
Field mint	<i>Mentha arvensis</i>
Fir clubmoss	<i>Huperzia sp. (Lycopodium selago)</i>
Fireweed	<i>Epilobium angustifolium</i>
Fringe cup	<i>Tellima grandiflora</i>
Gentian	<i>Gentiana sp.</i>
Goatsbeard	<i>Aruncus dioicus</i>
Great burnet	<i>Sanguisorba officinalis spp. microcephala</i>
Great sundew	<i>Drosera anglica</i>
Groundpine	<i>Lycopodium dendroideum</i>
Heart-leaved twayblade	<i>Listera cordata</i>
Indian hellebore	<i>Veratrum viride</i>
Ladies tresses	<i>Spiranthes romanzoffiana</i>

Leatherleaf saxifrage	<i>Leptarrhena pyrolifolia</i>
Marsh violet	<i>Viola palustris</i>
Mountain arnica	<i>Arnica latifolia</i>
Mountain sweet-cicely	<i>Osmosphiza chilensis</i>
Narrow-leaved burreed	<i>Sparganium angustifolium</i>
Northern starflower	<i>Trientalis europaea</i>
One-leaved foamflower	<i>Tiarella trifoliata</i> var. <i>unifoliata</i>
Partidge foot	<i>Luetkea pectinata</i>
Pondweed	<i>Potamogeton</i> sp.
Purple sweet-cicely	<i>Osmorhiza purpurea</i>
Rosy twistedstalk	<i>Streptopus roseus</i>
Round-leaved sundew	<i>Drosera rotundifolia</i>
Running clubmoss	<i>Lycopodium clavatum</i>
Selfheal	<i>Prunella vulgaris</i>
Silverweed	<i>Potentilla anserian</i> ssp. <i>pacifica</i>
Single delight	<i>Moneses uniflora</i>
Sitka clubmoss	<i>Lycopodium sitchease</i>
Sitka valerian	<i>Valeriana sitchensis</i>
Skunk cabbage	<i>Lysichiton americanum</i>
Spatterdock	<i>Nuphar polysepalum</i>
Sticky false asphodel	<i>Tofieldia glutinosa</i>
Stiff clubmoss	<i>Lycopodium annotinum</i>
Strawberry	<i>Fragaria</i> sp.
Swamp gentian	<i>Gentiana douglasiana</i>
Sweet-scented bedstraw	<i>Galium triflorum</i>
Tall-mountain shootingstar	<i>Dodecatheon jeffreyi</i>
Three-leaved foamflower	<i>Tiarella trifoliata</i> var. <i>trifoliata</i>
Three-leaved goldthread	<i>Coptis trifolia</i> spp. <i>trifolia</i>
Twinflower	<i>Linnaea borealis</i>
White bog (rein) orchid	<i>Platanthera dilatata</i>
Yarrow	<i>Achillea millefolium</i>
Grasses/Sedges/Rushes	
Alaska brome	<i>Bromus stichensis</i>

Alaskan bentgrass	<i>Agrostis aequivalvis</i>
Bentgrass	<i>Agrostis sp.</i>
Blue wildrye	<i>Elymus glaucus</i>
Bluejoint	<i>Calamagrotis canadensis</i>
Hairy wildrye	<i>Elymus hirsutus</i>
Meadow barley	<i>Hordeum brachyantherum</i>
Nodding trisetum	<i>Trisetum cernuum</i>
Pacific reedgrass	<i>Calamagrotis nutkaensis</i>
Povery out-grass	<i>Danthonia spicata</i>
Tufted hairgrass	<i>Deschampsia cespitosa ssp. beringensis</i>
Western panicum	<i>Panicum occidentale</i>
Beaked sedge	<i>Carex utriculata (C. rostrata)</i>
Dewey's sedge	<i>Carex deweyana</i>
Few-flowered sedge	<i>Carex pauciflora</i>
Large-awned sedge	<i>Carex macrochaeta</i>
Narrow-leaved cotton-grass	<i>Eriophorum angustifolium</i>
Shore sedge	<i>Carex limosa</i>
Sitka sedge	<i>Carex stichensis</i>
Smooth-stemmed sedge	<i>Carex laeviculmis</i>
Three-way sedge	<i>Dulichium arundinaceum</i>
Tufted clubrush	<i>Trichophorum cespitosum</i>
White beak-rush	<i>Rhynchospora alba</i>
Yellow-flowered sedge	<i>Carex anthoxanthea</i>
Common rush	<i>Juncus effusus var. gracilis</i>
Dagger-leaved rush	<i>Juncus ensifolius</i>
Spreading rush	<i>Juncus supiniformis</i>
Ferns	
Bracken	<i>Pteridium aquilinum</i>
Braun's holly fern	<i>Polystichum braunii</i>
Deer fern	<i>Blechnum spicant</i>
Lady fern	<i>Athyrium filix-femina</i>

Maidenhair fern	<i>Adiantum aleuticum (A. pedatum)</i>
Narrow beech fern	<i>Phegopteris connectilis</i>
Oak fern	<i>Gymnocarpium dryopteris</i>
Spiny wood fern	<i>Dryopteris expansa</i>
Sword fern	<i>Polystichum munitum</i>
MOSS LAYER	
Common red sphagnum	<i>Sphagnum capilaceum</i>
Common brown sphagnum	<i>Sphagnum fuscum</i>
Common green sphagnum	<i>Sphagnum girgensohnii</i>
Flat moss	<i>Plagiothecium undulatum</i>
Haircap moss	<i>Polytrichum sp.</i>
Heron's-bill moss	<i>Dicranum spp.</i>
Hoary rock moss	<i>Racomitrium lanuginosum</i>
Lanky moss	<i>Rhytidiadelphus loreus</i>
Large leafy moss	<i>Rhizomnium glabrescens</i>
Leafy mosses	<i>Mnium spp.</i>
Palm tree moss	<i>Leucolepis acanthoneuron</i>
Pipercleaner moss	<i>Rhytidiopsis robusta</i>
Red-stem feathermoss	<i>Pleurozium schreberi</i>
Sphagnum	<i>Sphagnum spp.</i>
Step moss	<i>Hylocomium splendens</i>
Common fold-leaf liverwort	<i>Diplrophyllum albicans</i>
Golden leafy liverwort	<i>Herbertus aduncus</i>
Little hands liverwort	<i>Lepidozia reptans</i>
Purple-worm liverwort	<i>Pleurozia pururea</i>
Scapania	<i>Scapania bolanderi</i>
Shiny liverwort	<i>Pellia sp.</i>
Snake liverwort	<i>Conocephalum conicum</i>
Reindeer lichens	<i>Cladina spp.</i>
Waterworm	<i>Siphula ceratites</i>

APPENDIX E

CORRELATION OF PLOTS TO MINISTRY OF FOREST SITE SERIES

BGC Zone	Site Series	Map Symbol	Site Series Name	Ecosystem Unit	Terrain	Elev	Slope	Aspect
CWHvh2	01	HS	CwHw - Salal	HSbw7	Ov/Rhk	35	53	188
MHwh1	00	MK	Mountain hemlock krummholz	MK	Ov/Rku	720	48	264
CWHvh2	11	YG	CwYc - Goldthread	YGsw7	dsMvb/Rka	448	45	208
CWHvh2	32	TS	Tufted clubrush - Sphagnum	TSs2	sMv/Ru	420	3	280
MHwh1	00	MK	Mountain hemlock krummholz	MKb3a	Ru	850	3	999
MHwh1	00	HM	Heather meadow	HM2	xsCvb/Rks	810	70	60
MHwh1	04	YG	HmYc - Goldthread	YGsw7	Ov/xsCvks	825	72	200
CWHvh2	04	HM	HwSs - Lanky moss	HMsw7	Mv/Rks	350	67	202
CWHvh2	06	SF	CwSs - Foamflower	SFj7	dsMbj	105	15	188
MHmm1	00	MK	Mountain hemlock krummholz	MKv3a	Rju	1000		68
MHmm1	04	AB	HmBa - Bramble	ABsw7	sMv/Rka	720	42	212
CWHvm2	00	MK	Mountain hemlock krummholz	MKbk3a	Ov/Rka	670	38	320
CWHvm1	31	TS	Tufted clubrush - Sphagnum	TS3a	Ov/s\$Fj	205	8	320
CWHvm1	12	YG	CwYc - Goldthread	RG7	Ov/Ma	205	28	212
CWHvm1	08	AD	BaSs - Devil's club	ADs7	xsCwv/Raj	70	14	48
CWHvm1	51	SA	Sitka alder avalanche track	SAk3a	xsCvb/Rka	310	53	338
CWHvh2	04	HM	HwSs - Lanky moss	HMsw7	xsCv/Rks	170	58	248
CWHvh2	11	YG	CwYc - Goldthread	YG7	Ov/dsMja	95	9	338
CWHvm1	09	SS	Ss - Salmonberry	SS7	Ov/sFp	105	2	999
CWHvm1	01	AB	HwBa - Blueberry	ABk3a	dsMv/Rka	190	52	88
CWHvm1	06	HD	HwBa - Deer fern	HDj7	sWG/Mbj	75	9	290
CWHvm1	05	AF	BaCw - Foamflower	AFks5	xsMvb/Rak	120	42	90
MHmm1	00	HM	Heather meadow	HMb2	Rha	930	29	117
CWHvm2	05	AF	BaCw - Foamflower	AFsw7	xsCv/Raj	475	38	210
CWHvm2	09	YG	CwYc - Goldthread	YGs7	Mv/Ra	470	36	338
CWHvm2	01	AB	HwBa - Blueberry	ABbk7	Ov/Rks	540	48	82
CWHvm1	12	YG	CwYc - Goldthread	RGv7	Mv/Rhkr	215	22	226
CWHvm1	01	AB	HwBa - Blueberry	ABsw7	sMvb/Rka	80	54	226
CWHvh2	02	LR	PIYc - Rhacomitrium	LRv3a	sMv/Rhka	250	2	50
CWHvh2	01	HS	CwHw - Salal	HSv7	dsMv/Rha	105	32	39
CWHvh2	06	SF	CwSs - Foamflower	SFj7	dsFj	10	7	246
CWHvh2	06	SF	CwSs - Foamflower	SFk7	dsMvb/Rka	110	53	28
CWHvh2	32	TS	Tufted clubrush - Sphagnum	TSs3a	dsMv/Ruj	90	3	335
CWHvh2	01	HS	CwHw - Salal	HSbw7	Ov/Rks	500	72	139
CWHvh2	01	HS	CwHw - Salal	HSks7	xsCv/Rks	505	73	40
CWHvh2	06	SF	CwSs - Foamflower	SFk7	xsCv/Mka	185	65	336
CWHvh2	32	TS	Tufted clubrush - Sphagnum	TS3a	Ob/Ru	155	22	23
CWHvh2	12	LS	PIYc - Sphagnum	LSv3b	sMv/Ruj	70	22	330
MHmm1	02	MM	HmBa - Mountain-heather	MMbw7	Ov/Rks	720	78	246
CWHvm1	05	AF	BaCw - Foamflower	AFsw7	xsCvb/Rks	290	105	201

BGC Zone	Site Series	Map Symbol	Site Series Name	Ecosystem Unit	Terrain	Elev	Slope	Aspect
CWHvm1	06	HD	HwBa - Deer fern	HDbw7	Ov/Rka	260	49	189
CWHvm1	31	TS	Tufted clubrush - Sphagnum	TS2	Ov/dsMj	190	10	102
CWHvm1	09	SS	Ss - Salmonberry	SSp7	Ovb/sFp	35	2	271
CWHvm2	31	TS	Tufted clubrush - Sphagnum	TS2	Ovb/Rju	620	20	287
CWHvm2	01	AB	HwBa - Blueberry	ABw7	xsCvb/Rka	570	58	261
CWHvm2	09	YG	CwYc - Goldthread	YGp7	Ovb/Mj	410	18	262
CWHvm1	32	BS	Beaked sedge - Sphagnum	BS2	Ovb/Ruj	120	10	999
CWHvh2	03	RS	CwYc - Salal	RSb7	Ov/Rhj	70	3	326
CWHvm1	08	AD	BaSs - Devil's club	AD7	dsMbj	60	18	195
CWHvm1	32	HF	Hardhack fen	HF3a	Ob/sgFp	30	3	177
CWHvm2	01	AB	HwBa - Blueberry	ABws7	Ov/Rks	570	72	273
MHm1	00	MK	Mountain hemlock krummholz	MKb3a	Ov/Ru	785	8	999
CWHvm2	05	AF	BaCw - Foamflower	AFn3a	sgFb/Rja	455	22	19
CWHvm2	05	AF	BaCw - Foamflower	AFj6	xsCb/Raj	440	28	52
CWHvh2	02	LR	PIYc - Rhacomitrium	LRb3b	Ov/Rkh	30	11	225
CWHvh2	32	TS	Tufted clubrush - Sphagnum	TSb2	Ov/Rku	115	13	282
CWHvh2	02	LR	PIYc - Rhacomitrium	LRb3b	Ov/Rku	110	25	135
CWHvh2	01	HS	CwHw - Salal	HSp7	Ob/dsMj	20	15	265
CWHvh2	32	TS	Tufted clubrush - Sphagnum	TS2	Ov/dsWG	15	5	3
CWHvh2	01	HS	CwHw - Salal	HSv7	dsMv/Rhks	70	24	3
CWHvh2	01	HS	CwHw - Salal	HSkv7	dsMv/Rks	95	75	355
CWHvh2	02	LR	PIYc - Rhacomitrium	LRv3b	xsMv/Rhks	50	7	257
CWHvh2	11	YG	CwYc - Goldthread	YGs7	Ov/Rka	25	12	20
CWHvh2	04	HM	HwSs - Lanky moss	HMk7	dsMvb/Rka	65	58	0
CWHvh2	12	LS	PIYc - Sphagnum	LSs3b	dsMvb/Rhja	95	24	111
CWHvh2	09	ST	Ss - Trisetum	ST2	\$\$Fpb	55	2	999
CWHvh2	04	HM	HwSs - Lanky moss	HMsw7	skMv/Rks	90	63	217
CWHvh2	06	SF	CwSs - Foamflower	SFks7	xsCv/Rks	155	72	88
CWHvh2	05	RF	CwSs - Sword fern	RFjs7	dsMv/Rhj	50	7	69
CWHvh2	06	SF	CwSs - Foamflower	SFj7	Ov/gsfP	10	3	182
CWHvh2	12	LS	PIYc - Sphagnum	LSb7	Ov/Ruj	63	21	298
CWHvh2	04	HM	HwSs - Lanky moss	HMks7	xsCvb/Rks	230	45	58
CWHvh2	01	HS	CwHw - Salal	HS7	dsMbv	210	25	200
CWHvh2	05	RF	CwSs - Sword fern	RFb3b	Rh	30	30	210
CWHvh2	32	TS	Tufted clubrush - Sphagnum	TSs3a	dsMv/Rhu	160	25	80
CWHvh2	04	HM	HwSs - Lanky moss	HMkv7	dsMv/Rkh	90	55	25
CWHvh2	06	SF	CwSs - Foamflower	SFk7	xsCvb/Rsk	300	70	25
CWHvh2	11	YG	CwYc - Goldthread	Ygbk7	xsCvb/Rks	305	55	15
CWHvh2	03	RS	CwYc - Salal	RSbw7	Ov/Rh	35	40	275
CWHvh2	04	HM	HwSs - Lanky moss	HMj7	gsFf	4	10	210
CWHvh2	04	HM	HwSs - Lanky moss	Hmbk7	Ov/Rks	550	65	120
CWHvh2	01	HS	CwHw - Salal	HSks7	dsMv/Rk	145	58	95
CWHvm1	32	HF	Hardhack fen	HF3a	Obp	55	0	999
CWHvm2	05	AF	BaCw - Foamflower	AFk7	xsCvb/Rrs	660	65	70

BGC Zone	Site Series	Map Symbol	Site Series Name	Ecosystem Unit	Terrain	Elev	Slope	Aspect
CWHvm2	01	AB	HwBa - Blueberry	ABw7	dsMbv/Rsk	650	50	185
MHmm1	00	HM	Heather meadow	HM2	axCv/dsMvb	720	10	10
CWHvm1	01	AB	HwBa - Blueberry	ABks7	sCv/Rks	260	60	70
CWHvm1	14	RC	CwSs - Skunk cabbage	RCp7	Ovb	150	15	75
CWHvm1	31	TS	Tufted clubrush - Sphagnum	TS2	Ob	150	5	90
CWHvh2	04	HM	HwSs - Lanky moss	HMj7	dsMb	5	9	20
CWHvh2	06	SF	CwSs - Foamflower	SFj7	xCv/dsMb	225	30	330
CWHvh2	06	SF	CwSs - Foamflower	SFj7	xsCb	80	35	300
MHmm1	03	MO	BaHm - Oak fern	MOsw7	xsCvb	750	70	190
CWHvh2	51	SA	Sitka alder avalanche track	SAk3a	sxCkb	370	53	20
CWHvh2	32	TS	Tufted clubrush - Sphagnum	TS3a	Ov/dsMpb	50	1	999
CWHvh2	11	YG	CwYc - Goldthread	YGks7	dsMv/Rhk	50	45	40
CWHvh2	12	LS	PIYc - Sphagnum	LSv3a	Ov/Rav	200	15	999
CWHvh2	13	RC	CwSs - Skunk cabbage	RCp7	Ov/sFv	30	5	200
MHwh1	04	YG	HmYc - Goldthread	YGsw7	xsCv/Rks	640	75	245
CWHvh2	04	HM	HwSs - Lanky moss	HMsw7	sxCv/Rks	45	35	220
CWHvh2	10	AL	Dr- Liliy-of-the-valley	AL5	gFp	30	1	40
CWHvh2	06	SF	CwSs - Foamflower	SFj6	axsCc-Rd	50	22	195
CWHvh2	01	HS	CwHw - Salal	Hskv6	xsCv	135	40	20
CWHvm1	05	AF	BaCw - Foamflower	AFw7	xsCbv	195	55	265
CWHvm1	31	TS	Tufted clubrush - Sphagnum	TS2	Ob	150	17	265
CWHvm2	01	AB	HwBa - Blueberry	ABwv7	aCv/Rsk	555	85	220
CWHvm1	01	AB	HwBa - Blueberry	ABks7	dsMvb/Rk	290	70	15
CWHvm1	32	HF	Hardhack fen	HF3a	Op	110	0	999
CWHvm2	08	AD	BaSs - Devil's club	ADw7	sxCbv	425	40	150
CWHvm2	02	LC	HwBa - Cladina	LCb3a	Rak	580	23	235
CWHvm2	06	HD	HwBa - Deer fern	HDbw7	Ov/Rk	610	57	205
CWHvm1	06	HD	HwBa - Deer fern	HDw7	dsCbv	250	60	220
CWHvm1	14	RC	CwSs - Skunk cabbage	RCp7	Ob	70	5	220
CWHvm2	02	LC	HwBa - Cladina	LCv3b	Rvh	510	15	999
CWHvm1	03	HS	HwCw - Salal	HSs7	dsMvb	205	5	999
CWHvm1	01	AB	HwBa - Blueberry	ABbk7	Ov/Rks	235	70	320
CWHvm1	05	AF	BaCw - Foamflower	AFk7	dsMb	340	60	20
CWHvm1	09	SS	Ss - Salmonberry	SS6	\$Fp	20	0	999
CWHvm1	00	SC	Ss - Pacific crabapple	SC	sFf	2	2	290
MHmm1	02	MM	HmBa - Mountain-heather	MMbk7	Ov/Rks	840	70	110
CWHvh2	04	HM	HwSs - Lanky moss	HMk6	xsCb	295	35	40
CWHvh2	07	SD	CwSs - Devil's club	SDkv7	sxCbv	280	90	345
CWHvm1	03	HS	HwCw - Salal	HSvk7	Rks	90	90	90
CWHvh2	33	TM	Tufted hairgrass meadow	TM2	sFAv/gsFAP	1	0	999
CWHvh2	12	LS	PIYc - Sphagnum	LSs3b	Ov	20	10	190

APPENDIX F
PHOTOGRAPH LOG

Princess Royal Island Terrestrial Ecosystem Mapping Project: Photograph Log

Roll No./Photograph No.	Plot Number	Comments
1-1	1	Site
1-2	1	Soil
1-3	2	Site
1-4	-	View up slope of Plot 2
1-5	3	Soil
1-6	3	Site
1-7	-	View of Plot 4 area
1-8	4	Soil
1-9	4	Site
1-10		View northwest from Plot 5
1-11		View northeast from Plot 5
1-12	5	Gentiana sp.
1-13	5	Site
1-14	5	Soil
1-15		View to southwest - west from Plot 5
1-16	6	Site
1-17	6	Soil
1-18	7	Site
1-19	7	Soil
1-20, 1-21		Slide/failure @ 500m, below Plot 7
1-22		Water falls, below plot 7
1-23	8	Site
1-24	8	Soil
1-25	9	Site
1-26	9	Soil
1-27	10	Site
1-28	10	Soil
1-29		View of valley, slide to west
1-30		View of mountain top, and southeast down Princess Royal Channel
1-31		View of polygon east of plot 10
1-32		View of polygon west of plot 10
1-33	11	Site
1-34	11	Soil
1-35	11	Site
1-36	12	Site
2-1	12	Soil
2-2	13	Site
2-3	13	Soil
2-4	14	Site
2-5	14	Soil

Roll No./Photograph No.	Plot Number	Comments
2-6	15	Site
2-7	15	Soil
2-8	15	Site
2-9	16	Site- avalanche track
2-10	16	Soil
2-11		View from plot 16 across valley (Drake)
2-12		Rock face above plot 16
2-13		Soil profile, road cut. Drake Inlet
2-14		Clear cut, Drake Inlet
2-15	17	Soil
2-16	17	Site
2-17	18	Site
2-18	18	Soil
2-19	19	Site
2-20	19	Soil
2-21	19	Site, second view
2-22	20	Site
2-23	20	Soil
2-24		Close up of slide, east side of valley with plot 20.
2-25		View of slide from valley bottom.
2-26		Profile glacio-marine sands @ 90 m asl, Kingcombe
2-27, 28	21	Site
2-29	21	Soil
2-30	22	Site
2-31	22	Soil
2-32, 33	23	Site
2-34	23	Soil
2-35, 36		View to southwest - Otty Creek from plot 23
3-1		View to north facing slope from plot 23 area
3-2		View of valley to northeast of plot 23 (towards Graham Reach
3-3	24	Site
3-4	24	Soil
3-5	25	Site
3-6	25	Soil
3-7	26	Site
3-8	26	Soil
3-9	27	Site
3-10	27	Soil
3-11	28	Site
3-12	28	Soil
3-13, 14		Large redcedar at plot 28
3-15	29	Site
3-16	29	Soil
3-17		Between plot 29 and 30
3-18	30	Site
3-19	30	Soil
3-20	31	Site

Roll No./Photograph No.	Plot Number	Comments
3-21	31	Soil
3-22	32	Site
3-23	32	Soil
3-24		M Gebauer
3-25	33	Site
3-26	33	Soil
3-27	34	Site
3-28	34	Soil
3-29, 30, 31		Blue grouse
3-32	35	Site
3-33	35	Soil
3-34	36	Site
3-35	36	Soil
3-36		M. Gebauer
4-1	37	Site
4-2	37	Soil
4-3	38	Site
4-4	38	Soil
4-5, 6		Sphagnum sp. and Lycopodium sp. at plot 38
4-7	39	Site
4-8	39	Site
4-9	39	Soil
4-10		Colluvial boulder field near plot 40
4-11	40	Site
4-12	40	View of area
4-13	40	Soil
4-14	41	Site
4-15	41	Soil
4-16	42	Site
4-17, 18	42	Soil
4-19, 20		Field crew, plot 43
4-21, 22	43	Site
4-23	43	Soil
4-24	44	Site
4-25	44	Soil
4-26	45	Site
4-27	45	Soil
4-28	46	Site
4-29	46	Soil
4-30, 31, 32, 33		Slide at creek near plot 47, Whalen Lake
4-34	47	Site
4-35	47	Soil
5-1	48	Site
5-2	48	Soil
5-3	49	Site
5-4	49	Soil
5-5	50	Wetland at Canoona Creek/Lake junction, near plot 50
5-6	50	Site

Roll No./Photograph No.	Plot Number	Comments
5-7	50	Soil
5-8	51	Site
5-9	51	Soil
5-10	52	Site
5-11	52	Soil
5-12		Krummholz, plot 52 area
5-13		View of mountain south of plot 52
5-14		View from plot 52 south to Laredo Inlet
5-15, 16		View from plot 52 northwest to Canoona Creek
5-17, 18, 19	53	Site (fluvial cone)
5-18	53	Soil
5-19, 20	54	Site
5-21	54	Soil
5-22	55	Site
5-23	55	Soil
5-24	56	Site
5-25	56	Soil
5-26	57	Site
5-27	57	Soil
5-28		Polygon plot 56 and 57
5-29	58	Site
5-30	58	Soil
5-31	59	Site
5-32		Plot 59 - polygon
5-33	59	Soil
5-34	60	Site
5-35	60	Soil
5-36	61	Site
6-1	61	Soil
6-2	62	Site
6-3	62	Soil
6-4	63	Site
6-5	63	Soil
6-6	64	Site
6-7	64	Soil
6-8	65	Site
6-9	65	Soil
6-10	66	Site
6-11	66	Soil
6-12	67	Site
6-13	67	Understorey
6-14	67	Soil
6-15, 16		Surf Inlet from Poplar III
6-17	68	Site
6-18	68	Soil
6-19	69	Site
6-20	69	Soil
6-21&23		Main road - soil profile near camp (22 discarded)

Roll No./Photograph No.	Plot Number	Comments
6-24	70	Site
6-25	70	Soil
6-26	71	Site
6-27	71	Soil
6-28	72	Site
6-29	73	Site
6-30	74	Site - Clear cut near Chapple Inlet
6-31	75	Soil
6-32	75	Site
6-33	75	Looking downhill in polygon
6-34	76	Soil
6-35	76	Site
6-36	77	Soil
7-1	78	Soil
7-2	78	Site
7-3	79	Soil
7-4	79	Site
7-5	80	Soil
7-6	80	Site
7-7	81	Soil
7-8	81	Site
7-9, 10		Polygon on rolling bench below plot 81
7-11	82	Soil
7-12	82	Site
7-13	83	Site
7-14	83	Site (polygon)
7-15	84	Soil
7-16	84	Site
7-17	85	Soil
7-18	85	Site
7-19	86	Soil
7-20	86	Site
7-21		View from plot 86 northeast across lake
7-22		View from plot 86 up slope (south)
7-23	87	Soil
7-24, 25, 26	87	Site
7-27	88	Soil
7-28, 29	88	Site
7-30	89	Soil
7-31	89	Site
7-32	89	Site
7-33	90	Soil
7-34	90	Site
7-35	91	Soil
7-36	91	Site
8-1	92	Soil
8-2	92	Site
8-3	93	Soil

Roll No./Photograph No.	Plot Number	Comments
8-4	93	Site - opening
8-5	93	Site - forest
8-6		View from plot 93 area to southwest
8-7		View from plot 93 to south
8-8	94	Site
8-9	94	Soil
8-10	95	Site
8-11	95	Soil
8-12	96	Soil
8-13	96	Site
8-14	97	Soil
8-15	97	Soil (2nd pit)
8-16	97	Site
8-17	98	Soil
8-18, 19	98	Site
8-20, 21, 22	99	Salamander at plot 99
8-23	99	Soil
8-24	99	Site
8-25	99	Understorey
8-26	100	Soil
8-27	100	Site
8-28	101	Soil
8-29	101	Site
8-30	102	Soil
8-31	102	Site
8-32		Stream near plot 102
8-33	103	Soil
8-34	103	Site
8-35	104	Soil
8-35	104	Soil
8-36	104	Site
9-1	105	Soil
9-2	105	Site
9-3	106	Soil
9-4, 5	106	Site
9-6	107	Soil
9-7	107	Site
9-8	108	Site
9-9, 10		View from head of Surf Inlet to the southeast
9-11	109	Soil
9-12	109	Site
9-13	110	Soil
9-14	110	Site
9-15	110	Understorey
9-16	111	Soil
9-17	111	Site
9-18	112	Soil
9-19	112	Site

Roll No./Photograph No.	Plot Number	Comments
9-20	113	Soil
9-21	113	Site
9-22	114	Soil
9-23	114	Site
9-24		Ridge top vicinity of plot 114
9-25	115	Soil
9-26	115	Site
9-27	116	Soil
9-28	116	Site
9-29, 30		View of the Bay of Plenty
9-31		Rock outcrop on mountain with lake, south of Fifer Cove, southwest of Bloomfield
9-32		Krummholz on mountain south of Fifer Cove and southwest of Bloomfield
9-33		Lake on mountain, south of Fifer Cove, southwest of Bloomfield
9-34		Forest on mountain south of Fifer Cove and southwest of Bloomfield
9-35		Krummholz-heathers on mountain south of Fifer Cove and southwest of Bloomfield
9-36	117	Soil
10-1	117	Site
10-2	117	Crew
10-3, 4, 5		Colluvial area 600 m southwest of plot 117 (same valley)
10-6		Divide between Paradise Creek and Cornwall
10-7	118	Soil
10-8, 9	118	Site
10-10	119	Soil
10-11	119	Site
10-12, 13, 14		Estuary at Cornwall Inlet
10-15		Polygon near lake on Elephant Head Mountain
10-16	120	Soil
10-17	120	Site
10-18, 19		View from plot 120 south along Princess Royal Reach
10-20		View north from plot 120
10-21		Upper north facing slope, southwest corner of Anchor Lake northeast of Cougar Lake)
10-22	121	Soil
10-23	121	Site
10-24	122	Soil
10-25, 26, 27	122	Site
10-28, 29		Holes in organic material, with dead animal (deer); east side of ridge north of Mount Cardin
10-30, 31		Mount Parry
10-32, 33		Northeast side of Mount Parry
10-34	123	Soil
10-35	123	Site
10-36		Soil at slide, E-W valley off Tolmie Channel, 8.5km north of

Roll No./Photograph No.	Plot Number	Comments
		Ditmars Point
11-1		Soil at slide, E-W valley off Tolmie Channel, 8.5km north of Ditmars Point
11-2, 3, 4		Niass River mouth
11-5	124	Pyne Creek
11-6	124	Pyne Creek
11-7		View up Pyne Creek estuary from plot 124
11-8		View down Pyne Creek estuary from plot 124
11-9		Slope blanket bog
11-10	125	Soil
11-11	125	Site
11-12		Shoreline forest near plot 125
11-13		Den ? near plot 125
11-14		View of shoreline below plot 125
11-15, 16		View south along coast, near plot 125
11-17 to 21		Views of Chapple Inlet from the air