

Baseline Report

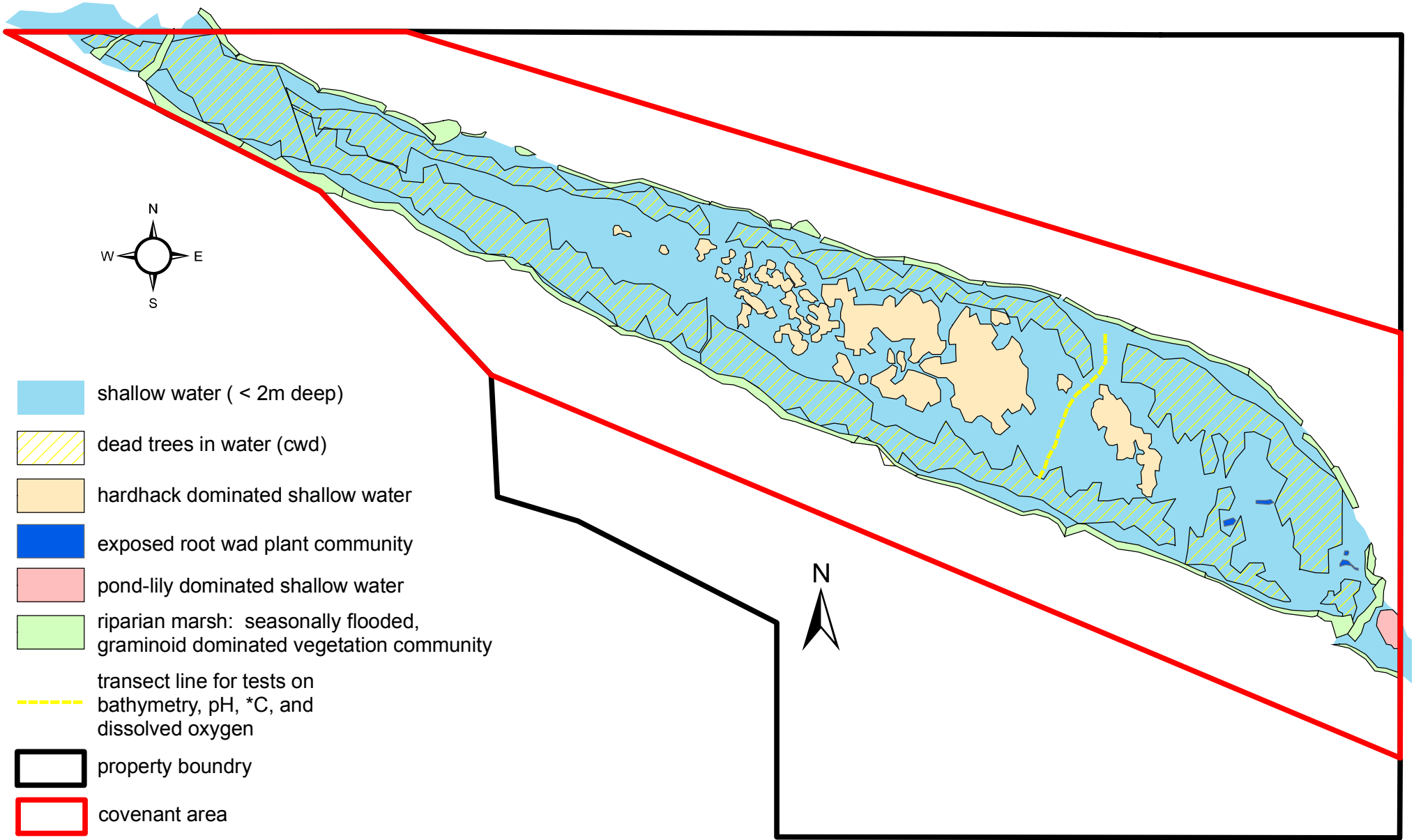
Great Beaver Swamp










Prepared for the Galiano Conservancy Association by Sabine Lüning*
Galiano Island, B.C.
September – December 2006



Groundtruthed and Updated – March 2011
by Marc Verbenkov & Pauline Brest van Kempen

Great Beaver Swamp Wetland Types



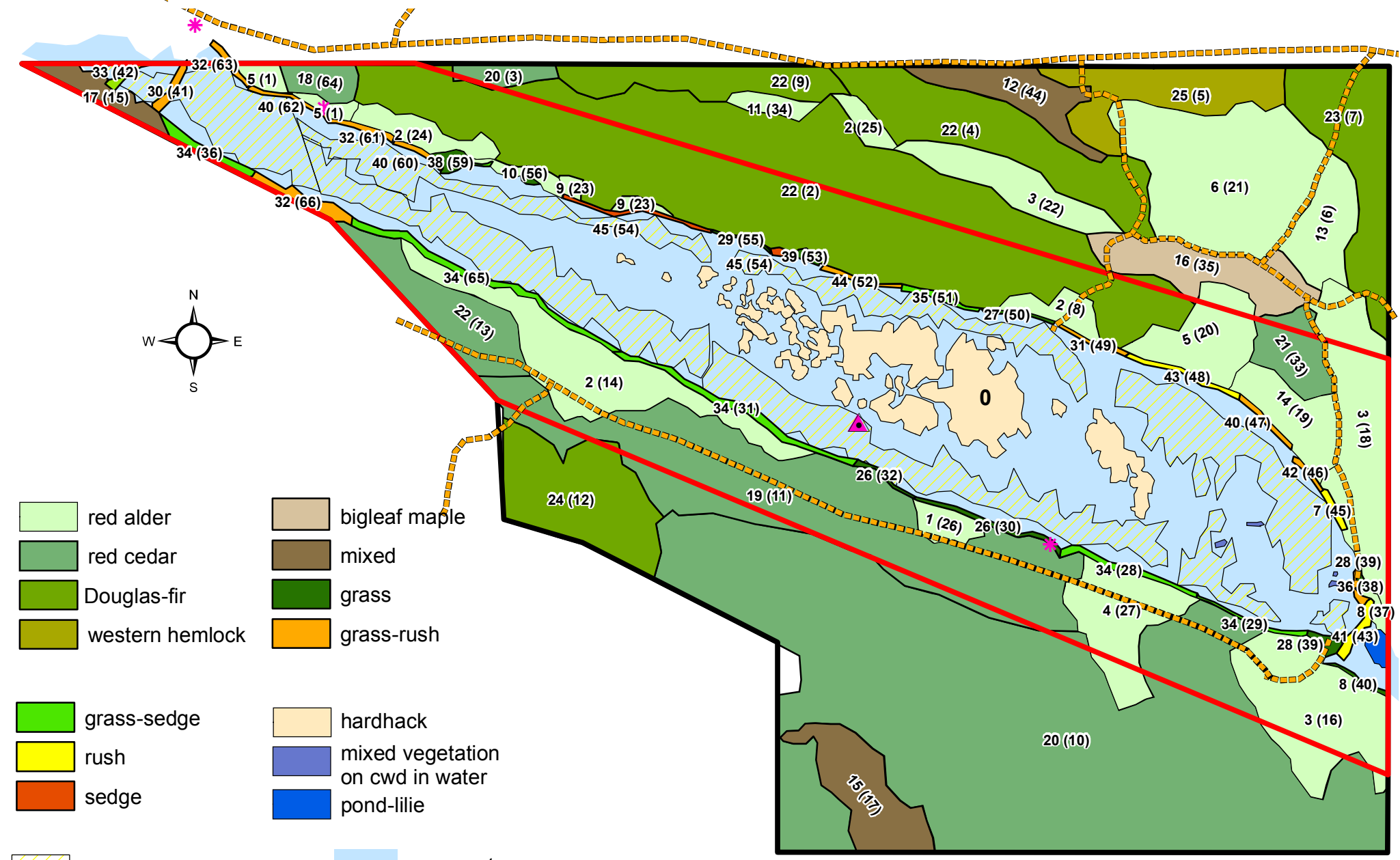
-  shallow water (< 2m deep)
-  dead trees in water (cwd)
-  hardhack dominated shallow water
-  exposed root wad plant community
-  pond-lily dominated shallow water
-  riparian marsh: seasonally flooded, graminoid dominated vegetation community
-  transect line for tests on bathymetry, pH, *C, and dissolved oxygen
-  property boundry
-  covenant area

0 20 40 80 120 160 Meters








Produced by: Galiano Conservancy Association
Map Date: November 2006, updated March 2011
Projection: UTM Zone 10, NAD83
Scale: 1 : 2,650

Great Beaver Swamp Vegetation Communities by Dominant Species

MAP 2



- | | |
|--|--|
|  red alder |  bigleaf maple |
|  red cedar |  mixed |
|  Douglas-fir |  grass |
|  western hemlock |  grass-rush |
|  grass-sedge |  hardhack |
|  rush |  mixed vegetation on cwd in water |
|  sedge |  pond-lilie |

- | | |
|--|---|
|  dead trees in water (cwd) |  open water |
|  property boundary |  beaverlodge |
|  covenant area boundary |  holly |
| |  trails |

Labels indicate the Vegetation Community and the Polygon Number. Veg Com (Poly #)
 The plant community of each Polygon is described in section 7.8 of the baseline report.

0 20 40 80 120 160
 Meters

Produced by: Galiano Conservancy Association
 Map Date: November 2006, updated March 2011
 Projection: UTM Zone 10, NAD 83
 Scale: 1 : 2,650

Table of Contents

1. Acknowledgement.....	4
2. Property Location and Description.....	4
2.1 Location.....	4
2.2 Legal description, size	4
2.3 Access	4
2.4 Land Use designation	4
3. Significance of the Land and Amenities	5
4. The Management Vision	6
5. Site History	6
5.1 Ownership	6
5.2 Natural History	8
6. List of Buildings, Structures and other Improvements	8
7. Biological and Geographical Inventory	9
7.1 Topography	9
7.2 Climate	9
7.3 Hydrology	9
7.4 Soils	10
7.5 Wildlife	13
7.5.1 Birds	13
7.5.2 Other fauna	14
7.6 Ecosystem Types	15
7.6.1 Forest	15
7.6.2 Wetland	16
7.7 Vegetation Community Mapping	17
7.7.1 Invasive species	18
7.7.2 Species at risk	18
7.8 Tables of mapped vegetation community-polygons	19
7.8.1 Red alder – Sword fern - Salal dominated Young forest	19
7.8.2 Red alder – Salal dominated Young forest	20
7.8.3 Red alder - Salal dominated Young forest	21
7.8.4 Red alder – Salal dominated Young forest	22
7.8.5 Red alder - Salal dominated Young forest	23
7.8.6 Red alder – Sword fern dominated young forest.....	24

7.8.7	Red alder – Sword fern dominated Young forest	25
7.8.8	Red alder – Sword fern dominated Young forest	26
7.8.9	Red alder – Sword fern - Salmonberry dom. Young Forest	27
7.8.10	Red alder – Salal –sword fern dominated Young forest	28
7.8.11	Red alder – Salal - sword fern dominated Young forest	29
7.8.12	Red alder – Sword fern dominated Young forest	30
7.8.13	Small-flowered bulrush – Juncus dominated Riparian	31
7.8.14	Red alder - Colonial Bentgrass dominated forest edge	32
7.8.15	Seasonal flooded Bentgrass - sedge Riparian	33
7.8.16	Red alder – Salal - Slough sedge dominated Young forest	34
7.8.17	Slough sedge – Red alder dominated Riparian	35
7.8.18	Red alder – Douglas-fir - Salal dominated Young forest	36
7.8.19	Red alder - Salal dominated Young forest	37
7.8.20	Red alder – big leaf maple dominated Young forest with coniferous regeneration	38
7.8.21	Red alder – Red cedar - Sword fern dominated Young forest	39
7.8.22	Red alder – Red cedar - Salal dominated Young forest	40
7.8.23	Big leaf Maple –cedar – Douglas-fir dominated Young forest.	41
7.8.24	Red cedar – Red alder –Salal dominated young forest	42
7.8.25	Red cedar – Salal dominated Young forest	43
7.8.26	Red cedar dominated Young forest	44
7.8.27	Red cedar – Douglas-fir - Salal dominated young forest	45
7.8.28	Red cedar – Douglas-fir - huckleberry dom. Young Forest.....	46
7.8.29	Red cedar – Douglas-fir – Salal dominated young forest.....	47
7.8.30	Western hemlock – Sword fern dominated Young forest	48
7.8.31	Douglas-fir – Red Cedar – Salal dominated young forest	49
7.8.32	Douglas-fir – Red cedar – Salal dominated young forest	50
7.8.33	Douglas-fir - Red cedar – Salal dominated young forest	51
7.8.34	Douglas-fir – Grand fir dominated young forest	52
7.8.35	Dense Douglas-fir young forest	53
7.8.36	Western hemlock – Douglas-fir - Salal dom. Young forest.....	54
7.8.37	Creeping Bentgrass dominated Riparian	55
7.8.38	Creeping Bentgrass dominated Riparian	56
7.8.39	seasonal flooded Bentgrass dominated Riparian	57
7.8.40	Colonial Bentgrass – Velvet grass - Salal dominated Riparian	58

7.8.41	Bentgrass dominated Riparian	59
7.8.42	Bentgrass – forget-me-not dominated Riparian	60
7.8.43	Juncus effusus – Velvet grass dominated beaver dam.....	61
7.8.44	Colonial Bentgrass dominated Riparian	62
7.8.45	Creeping Bentgrass - juncus effusus dominated Riparian	63
7.8.46	Colonial Bentgrass – Juncus effusus dominated Riparian	64
7.8.47	Creeping Bentgrass – Juncus effusus dominated Riparian	65
7.8.48	Bentgrass – sedges dominated beaver dam Riparian	66
7.8.49	Creeping Bentgrass – Slough sedge dominated Riparian	67
7.8.50	Shady Creeping Bentgrass dominated Riparian	68
7.8.51	Creeping Bentgrass – Slough sedge dominated Riparian	69
7.8.52	Bentgrass – Slough sedge dominated Riparian	70
7.8.53	Creeping Bentgrass – slough sedge dominated Riparian	71
7.8.54	Bentgrass – Velvet grass – Slough sedge dominated Riparian	72
7.8.55	Colonial Bentgrass- Common rush dominated disturbed site...	73
7.8.56	Bentgrass – Juncus effusus dominated Riparian	74
7.8.57	Blue wildrye - Bentgrass dominated Riparian	75
7.8.58	Velvet grass – blue wildrye dominated Riparian	76
7.8.59	Juncus effusus – Creeping Bentgrass dominated Riparian	77
7.8.60	Juncus effusus - Bentgrass dominated Riparian	78
7.8.61	Juncus - Small-flowered bulrush dominated Beaver-dam	79
7.8.62	Juncus effusus - Bentgrass dominated Riparian	80
7.8.63	Juncus effusus - Bentgrass dominated Riparian	81
7.8.64	Juncus effusus – Velvet grass dominated Riparian	82
7.8.65	Slough sedge – Red alder dominated Riparian	83
7.8.66	Salal – Slough sedge dominated Riparian	84
7.8.67	Roads and trails.....	85
7.8.68	Vegetation on up turned tree bases, surrounded by water.....	86
7.9	Vegetation Communities by dominant species.....	87
7.10	Test on dissolved oxygen, temperature, pH and depths of the water.	89
8.	Photos of each Vegetation Community	91
8.1	Photos of Beaver activities	104
9.	References	105

Baseline report

“Great Beaver Swamp”, District Lot 61/7

1. Acknowledgement

The owner hereby acknowledges and agrees that the following is an accurate description of the property, as of the reference date of this agreement.

Thanks to Ken Millard for the opportunity of this work experience and a general guidance through this project, Keith Erickson for hints in mapping and GPS, Odin Scholz for assistance in Vegetation mapping, Patti Pringle for assistance in water quality tests, Mike Hoebel as an expert for bird species and to all of the Galiano Conservancy Staff and Board members for a friendly general support.

2. Property Location and Description

- 2.1 The property is located on Galiano Island, one of the southern Gulf Islands in the Strait of Georgia, British Columbia.
- 2.2 The property with 18.12 ha in size is legally described as: Lot B, District Lot 61, Galiano Island, Cowichan District, Plan VIP87269. The covenant area is 10.2 hectares in size and is shown on MAP 1 and MAP 2.
- 2.3 Access to the property is possible by Porlier pass Rd, McCoskrie Rd to the Parking lot of Pebble Beach Reserve (and then right on a gravel road by foot) or via Melissa Rd from the south. It is located approximately 14 km by road from the Sturdies Bay Ferry Terminal.
- 2.4 The property has a current Land Use designation in the Galiano Island Official Community Plan of “Rural”. This area is intended to allow for larger lot developments to provide opportunities for a variety of rural activities without impinging on neighbors.

Rural policies are:

- a) The principal use shall be residential.
- b) One dwelling unit shall be permitted per lot and one additional dwelling shall be permitted for every 4 hectares of lot area over 4 hectares.
- c) On lots 0.4 ha or more, one cottage shall be permitted per dwelling unit permitted.
- d) The average lot size for subdivision of rural land shall be at least 4 ha.
- e) Within this designation a number of different zones may be applied allowing differing levels of uses accessory to residential uses.

The property has a current zoning designation of "Rural 2 Zone (R2)" under Galiano Land Use Bylaw No. 127.

Under Galiano Land Use Bylaw No. 127, Section 5.5, the following uses are permitted, all other uses are prohibited.

Permitted Uses

1. dwellings
2. cottages
3. home occupations
4. farm use

Permitted Density

1. One dwelling is permitted on each lot, and one additional dwelling is permitted in respect of each 4 hectares of lot area over 4 ha, except that:
 - 1.1 On land, legally described as Lot 7 District Lot 61 Galiano Island Cowichan District Plan 37526 only one dwelling and one cottage are permitted.

3. Significance of the Land and Amenities

The property is located within the Coastal Douglas-fir biogeoclimatic zone. Within British Columbia this zone is described as an "ecosystem at risk".

The main amenity of the property is the "Great beaver Swamp" itself which is a recovering wetland, caused through beavers, building several dams and flooding the wetland area again. Through this, a number of trees died of a rising water table and are now important feeding and breeding habitats for birds, like woodpeckers, and lots of different species of insects.

Wetlands in general are hosts for several special plants which are water tolerant – known as *hydrophytes*. Wetlands have significant functions of freshwater filtration and purification as well as they store water. Their soils can bind toxic and chemical materials which will be absorbed by wetland plants to non-toxic materials.

The riparian is a dynamic ecosystem with its transitional zone between aquatic and upland habitats and changing water levels, which provide primary food sources as well as sites for nesting, breeding and cover for a variety of species of both zones.

The surrounding young forests have certain functions as buffer zones for the wetland and are retreat areas and wildlife habitats for a number of wildlife species.

4. The Management Vision

The Management Vision for the property is mainly to protect the wetland as an important wildlife habitat and to conserve the site in a natural state.

Environmental education is a goal as well as monitoring the recreational process of the "Great Beaver Swamp".

5. Site History

5.1 Ownership:

The history of ownership dates back to 1883 when William Weston claimed the District Lot 61. In William Ralph's land survey in 1888 the beaver swamp was first mentioned and showed in a map.

According to an article of AGNES LAMBE (1982), James Warnock registered his claim on Lot 61 in a pre-emption record, no.249, on February 20th 1890.

In the same year of 1890 he abandoned it to Walter A. Beall (pre-emption record no.336/ October 1890). He registered his

certificate of Improvements to the value of \$ 2.50 an acre on October 3rd 1894. Then he passed the land on to Edward McCoskrie.

On October 17th 1894, Edward McCoskrie got his pre-emption certificate (no.1246) for the District Lot 61 and settled with his family soon after. He purchased the 160 acres site in May 1922 for 160\$ from the Province of B.C. In June 1922 it became crown granted.

Various members of the family McCoskrie held District Lot 61 for 85 years: Edward McCoskrie had three children with his first wife Achsah. The Road from Porlier Pass Rd. into Lot 61 is named after the family, and Melissa Road is named after a daughter of them, Anne Melissa.

After Edward McCoskrie died in 1925, the Lot 61 was probably owned by his son William McCoskrie who worked all his life on the Lot and passed it on to Melissa's husband, two years before his death.

Anne Melissa McCoskrie was married to the fisherman Darwin Horatio Robertson. He held the land since the 15th October 1952.

Sixteen years later, on June 19th 1968, Darwin Robertson was retired and passed the land to $\frac{3}{4}$ on to his children Agnes Marjorie Lambe, Violet Robertson and Dorothy Robertson.

On October 17th 1980, the owning members of the Robertson family, who meanwhile made their lives in Vancouver, sold District Lot 61 to N. TWA Equipment Ltd., Ganges and J. Langdon Logging Ltd., Victoria.

1982, Remnant District Lot 61 was sold and subdivided into 13 lots.

Before Galiano Conservancy purchased the property lot 7 of District Lot 61, in June 2003, last owners were Ronald Pither and Martin Frost who used it partly as a mating yard for bees.

In 2006 there has been started a boundary adjustment between the Galiano Conservancy Association and Willow Jewel and Jordan Hartman, the owners of the neighbor property, lot 6. The result of this change of land is for the advantage of both parties. Thereafter, the conservancy owns the whole wetland, inclusive the main beaver dam, and Willow and Jordan extent their property to the wooded east. This adjustment is not yet settled officially, but it is expected to be so in early 2007. This baseline report is done under consideration of the new borders between lot 6 and lot 7. The new and old boundaries of lot 6 and 7 are shown in map II

5.2 Natural History:

Several aerial photographic records show the states of the Great Beaver Swamp and its surrounding forests. In 1930 it was a wetland with open water and the forests look closed and untouched by heavy human impacts. In 1950 a logging road was established and the forest north of the swamp was logged. In the following years the forest was recovering and the swamp didn't change in its scale or state. Obviously beaver were present and held the dams intact.

1975 a physical inventory of Galiano Island indicated the wetland as a fen, described as: "Areas with organic substrate covered by minerotrophic (mineral-rich, groundwater-fed) sedges. Water table reaches up to the surface at some part of the year."

In 1985 the photo shows a change of the site. The water was gone and the site was drained for farming.

Melissa road was developed and the northern forest was logged again. Only at the edges of the wetland, trees were left. The southern forest also shows gaps of logging activities.

Until the year 1998 the beaver didn't come back and the swamp remained dry. Higher plants like shrubs succeeded in the middle of the swamp area and the surroundings were recovered by young forests. In 2000 large parts of the swamp were covered by pond-lily and skunk cabbage. Beavers came back and rebuilt the dams so that the swamp was flooded again and several trees died of permanent high water level. Currently the beaver swamp is in a recovering state and the activities of beavers are highly present.

6. List of Buildings, Structures and other Improvements

There are no buildings located on the property.

7. Biological and Geographical Inventory

7.1 Topography

The southern border of the property, close to Melissa Road, builds the highest elevation of the property with 80 meters above sea level. The wetland is on the lowest elevation, close to 42 meters. The north part is an irregular shaped terrain which drops, less steep than on the other side, down to the bottom wetland-valley as well as down to the north border to the gravel road. It has its highest elevation at about 60 meters.

7.2 Climate

The southern Gulf Island's Climate is described as "West coast summer dry". Therefore, summers are dry and warm, and winters cool, mild and wet.

75% of the annual precipitation occurs between October and March, with a total of approximately 920 mm rain in a year.

There is an annual sunshine of 2000 hours at sea level.

The average Temperatures in January are between 3.5°C and 7°C. Freezing happens only occasionally, around -3.5°C in average. In July, temperatures range from 17 to 22°C.

7.3 Hydrology

The property lies in the groundwater Region no. 8, "Central Georgia Strait". Its groundwater flow is directed to the northeast coast of Galiano Island, the Pebble Beach/Cable Bay area.

The area of the wetland is an important groundwater discharge zone, the wooded slopes around are within recharge zones.

This groundwater Region has a very low to low density of wells. (0.008 wells/acre)

The current wetland-form is a result of extinctive beaver activities. There are two intact dams on the west side of the wetland, which holds back water. This creates two ponds with open waters as well as coarse woody debris of flooded trees. The larger pond has partly covers of hardhack.

In the southeastern area of the swamp is another dam, which is actually not yet closed so that the water levels on both sides are equal.

The water level depends on rain, sources, runoffs and seepage from surrounding sloped forests and finally on the activities of beavers.

It has an outflow at the western side forming the Beaver creek which runs through the Pebble Beach Reserve into Cable Bay.

Impacts on soils and hydrology occurred during the drained period in the 80ies, and through the use of machines on the logging road as well as in the forests.

There have been carried out measurements in a transect line, testing on bathymetry, pH, temperature and dissolved oxygen of the stagnant open water body. Its results are described in 7.10

7.4 Soils

According to the Agriculture Canada report, *Soils of the Gulf Islands of British Columbia Volume 3*, the property is characterized by five different types of soils:

Saturna

Saturna soil is the most dominant soil type of the property. It covers the wooded areas, north and south of the wetland.

Saturna soils are well-drained soils that have developed on shallow deposits of channery, sandy loam to channery, loam sand textured, colluvial and glacial drift materials over sandstone bedrock within 100 cm of the surface. Coarse fragment content varies between 20 and 50%.

They are moist throughout the late fall to spring but are droughty during summer. During and shortly after wet periods, water may flow laterally through the saturated subsoil on top of sloping bedrock.

The natural vegetation consists of coast Douglas fir, scattered Pacific madrone, and some grand fir, with an understory of salal, western bracken and dull Oregon-grape.

Metchosin

The majority of the wetland area in the bottom land is covered by Metchosin soil.

This is a very poorly drained Organic soil that has developed on deep (>160 cm) deposits of black, humic, well-decomposed peat materials, composed mainly of sedge and woody plant remains. The soil is stone-free.

The water table remains at, or close to, the surface for most of the year, dropping to below 50 cm from the surface only during late summer. Because of their position in depressional landscapes, Metchosin soils receive large amounts of runoff and seepage water from surrounding areas.

The natural vegetation consists of sedges, grasses, rushes, scattered willows and hardhack.

Brigantine

A small area of the property at the western end of the wetland is covered by Brigantine soils.

Brigantine soils are imperfectly drained soils that have between 30 and 100 cm of a loamy sand to sandy loam of marine or fluvial origin overlying deep (>100 cm), silty clay loam to silty clay marine deposits that are usually stone-free. They are saturated to about 60 cm from the surface during the winter. Water seepage maintains the subsoil in a moist condition throughout the rest of the year.

The natural vegetation consists of western red cedar, red alder and coast Douglas fir. The understory includes western sword fern, salal and western bracken.

Trincomali

Trincomali soils occur within the property in a small scale south of the wetlands east end.

Trincomali soils are moderately well-drained soils that have developed on shallow (30-100 cm) deposits of gravelly sandy loam to gravelly loamy sand textured, marine, fluvial or glaciofluvial materials (15-50% gravels) over gravelly sandy loam to gravelly loam textured, compact, unweathered till within 100 cm of the surface.

After prolonged wetting, perched water table conditions are common on top of the compact till for short periods. Consequently, faint mottling is commonly found in the lower part of the soil profile directly above the till. During dry periods in summer the soil is very droughty.

The natural vegetation consists of coast Douglas fir with some grand fir and scattered Pacific madrone. The understory consists of salal, western bracken and dull Oregon-grape.

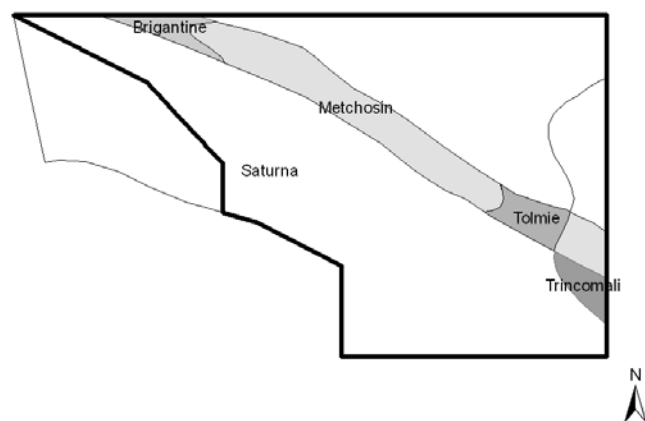
Tolmie

A short part of the wetland, south-east of the property is covered by Tolmie soils.

Tolmie soils are poorly drained soils that have developed on deep (>100 cm), loam to silty clay loam, marine deposits that are usually stone-free. Sandy, loamy sand, and gravelly materials occur in pockets or in thin layers throughout the soil profile.

Tolmie soils have mottles within 50 cm of the surface. They are wet for long periods throughout the year with water tables within 30 cm of the surface from late November to early March. In the spring, water tables drop quickly and remain below 50 cm from May to October. Water tables fluctuate rapidly in response to wetness and dryness. The Tolmie soils receive runoff water from the surrounding landscape.

The natural vegetation on Tolmie soils consists of western red cedar, red alder and bigleaf maple. The understory includes salmonberry, western sword fern, sedges, common horsetail, western bracken and in the wettest landscape positions, commonly American skunk-cabbage.



7.5 Wildlife

7.5.1 Birds

The Great Beaver Swamp is a significant habitat for several kinds of birds like woodpeckers, song birds and water fowl. However the list doesn't show a lot of species, caused by the season, in late fall, when naturally there are less birds around. The only closer look on the present bird species was made in late September with Mike Hoebel.

Wood-peckers

Pileated woodpecker
Hairy woodpecker
Northern Flicker
Downy woodpecker
Red-breasted Sapsucker

Perching birds

Song Sparrow
Robin
Varied Thrush
Red winged blackbird
Red-tailed Hawk

Ravens and Crows

Common Raven

Jays

Steller's Jay

Kingfishers

Belted Kingfisher

Hérons

Great blue Heron

Waterfowl

Mallard
Bufflehead
American coot

Great horned Owl
Bald eagle

Wren
Brown creeper

7.5.2 Other fauna

The most obvious and significant fauna in this area is the beaver. However it is not known how many individuals are currently living at the beaver pond.

Beaver activities as dragging paths and logged trees are abundant and found at all areas around the swamp. The majority of cut down trees are red alders. There are cuttings from recent beaver activities as well as some of older days. There are three dams within the property; one of them is not completed.

The beaver lodge is located in the middle part of the wetland between dead flooded trees, about 5 meters to the southern shoreline. (Map I, symbol ^)

Photos of beaver activities are shown in 7.10

The wooded area is much used by black tailed deer.

There are many deer traces in the mudflats at the shoreline, and several deer trails in the surrounding forests.

Standing tree snags, covered with holes of cavity nesters and woodpecker uses are found in several places in the forests as well as around and in the water.

List of fauna observed (except birds):

- Black-tailed deer
- Racoons
- Red Squirrels
- Frogs (pacific tree frog / Red-legged frog)
- Dragonflies (Western pond hawk, Blue dasher)
- Damselflies

Larvae of insects as Mayfly, Dragonfly in the water close to the shore.

7.6 Ecosystem Types

There are three different natural ecosystem types within the property, which are Young forest, riparian marsh and shallow water wetland.

The majority is wooded land with coniferous or broadleaf dominated plant communities. Then, there is an extensive depression with open water and wetland plant-communities on and around the the margins of the flooded area.

7.6.1 Forest

The forests are all young forests with some older trees which could be mature. The tree canopy is dominated by coniferous, broadleaf or a mix of both types. Most of the coniferous young forests have Western Red Cedar and Douglas-fir as dominant species in the main tree canopy. The understory is highly dominated by salal, followed by sword fern. Most of these forests have visible traces of former logging activities, such as huge cedar stumps, snags and coarse woody debris on the ground floor.

The species of the broadleaf forest-type is always red alder, except in one plant community where bigleaf maple is the dominant species. The understory is mostly dominated by salal or sword fern. Red Alder dominated young forests occur in depressions and in light sites where coniferous trees have been logged, as well as close to the riparian area of the water body. Red alder also covered most of the large depression which is called the Great beaver Swamp, while the area was drained. Now, those trees are flooded and dead alder snags still remain in the water.

7.6.2 Wetland

Because of the beaver activities, as building a dam and rise the water level, the Great beaver Swamp didn't remain as a swamp, but developed to shallow water with a graminoid lacustrine marsh at its shoreline.

Riparian Marsh

According to the Canadian wetland classification system the riparian plant-communities around the water body indicate a wetland class of seasonal marsh, and its wetland form is a lacustrine marsh. This lacustrine marsh occurs in a thin line between 0.5 and 3 meters wide, along the shoreline. Its plant community consists of graminoid plants like grasses, sedges and rush. Along the shoreline the distribution of these plant types vary frequently. A seasonal marsh has a dynamic vegetation community and can change in composition over a short time. Due to the low water level during summer months the shoreline drew down and left a mudflat which was colonized by pioneer plants like forget-me-not, duckweed and grasses. In early November, rainfalls raised the water level and the mudflats and parts of grassy riparian were flooded.

Shallow water

Because of the beaver dam, the swamp has developed to a pond with a stagnant open water body. According to the Canadian wetland classification system it is Shallow water in a 'basin water' form with a depth of less than 2m.

There are also three different plant communities that occur within the matrix of the shallow water wetland. These are described below, their locations are shown on MAP 1: Wetland Types.

- Hardhack (*Spireae douglasii*) covers large parts of the pond. It was growing before the water level raised and still lives with its roots in the soil.
- Pond lily (*nuphar polysepalum*) covers most of the middle water surface in the area east of the uncompleted dam.
- There are several up turned tree bases emerging out of the water surface and building small 'islands', colonized by different plant species. For a list of these species, see 7.8.68

Along the shoreline, the water is more or less covered with common duckweed and there are small patches of Floating-

leaved pondweed (*Potamogeton natans*). Its extent is changing quickly, due to temperature, wind, waterfowl etc.

A transect survey measuring dissolved oxygen, water temperature, pH and depth was completed along a cross section of the swamp. The results are located in Section 7.10 of this report. The location of the transect line is shown on MAP 1: Wetland Types.

7.7 Vegetation Community Mapping

Vegetation communities were mapped and described in November 2006. Each of the identified polygons and vegetation communities were then groundtruthed and updated in March 2011. The vegetation communities and corresponding polygons are shown on *MAP 2: Great Beaver Swamp Vegetation Communities by Dominant Species*.

In the process of mapping, the property of district lot 61/lot 7 was split into 46 different vegetation communities, of which 35 are completely or partially contained within the covenant area. Vegetation communities 6, 11, 12, 13, 15, 22, 23, and 25 are not found within the covenant area. A number of vegetation communities included variation, having very similar or the same species composition but different coverage for certain species. This variation was accounted for by dividing the vegetation communities into several polygon components where appropriate. A total of 66 polygons were mapped of which 55 are completely or partially within the Covenant Area. Polygons 4, 5, 6, 7, 9, 17, 21, 22, 25, 34, and 44 are not found within the covenant area. Section 7.9 (page 87) of this document is a table that lists the Vegetation Community number, the 3 dominant species that defines the community, and the list of polygons that are associated with each community.

In addition, each individual polygon has been described in Section 7.8 according to the species of vegetation found within them, species approximated %-covers, slope (slope % is only estimated and often averaged), slope position, and notes about character, wildlife and succession. Each polygon has also been photographed. Photos are shown in Section 8.

The format for the description was mainly taken, in a simplified way, from the field manual for describing terrestrial ecosystems/ B.C. Ministry of Environment.

Because of the time of year, the survey was made; there might be a lack of several, especially herbaceous, plants which were already gone or in an unidentifiable state. It could be useful to have a closer look on those plants during spring or early summer times.

7.7.1 Invasive species

- Scotch broom *Cytisus scoparius*
- English holly *ilex aquifolium**
- Evergreen blackberry *rubus laciniatus*

* Locations marked in map I

7.7.2 Species at risk

(Within the Coastal Douglas-fir biogeoclimatic zone)

Great blue Heron <i>Fannini</i> subspecies	blue
Red-legged Frog <i>Rana aurora</i>	blue
Western pondhawk <i>Erythemis collocata</i>	Blue
Blue Dasher <i>Pachydiplax longipennis</i>	blue

7.8 Tables of mapped vegetation community-polygons

7.8.1

Red alder – Sword fern - Salal dominated young forest

Polygon ID:	26	Slope:	35 %	V.com.	1
Structural Stage:	YFbl	Slope Position:	Low to Mid	Photo-no.	1603

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		20						Red alder
<i>Thuja plicata</i>		10		8	2			Western red cedar
<i>Abies grandes</i>					1			Grand fir
<i>Gaultheria shallon</i>					60			Salal
<i>Rubus spectabilis</i>				5				Salmonberry
<i>Vaccinium parvifolium*</i>					5			red huckleberry*
<i>Rubus ursinus</i>					1			Trailing blackberry
<i>Rubus laciniatus</i>					1			Evergreen blackberry
<i>Carex obnupta</i>						3		Slough Sedge
<i>Polystichum munitum</i>						28		Sword fern
<i>Elymus glaucus</i>						2		Blue wildrye
<i>Agrostis stolonifera</i>						5		Creeping bentgrass
<i>Agrostis oregonensis</i>						T		Oregon bentgrass
<i>Holcus lanatus</i>						T		Common velvet grass
<i>Cirsium vulgare</i>						T		Bull thistle
<i>Gallium triflorum</i>						T		Sweet-scented bedstraw
<i>Lactuca muralis</i>						T		Wall lettuce
<i>Conyza canadensis</i>						2		Horseweed
<i>Kindbergia oregana</i>							5	Oregon beaked moss
	Tree 30		Shrub 83		Herb 42	Moss 5		
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Down-sloping Red alder site with a dominant understory of salal and a scattering of sword fern.
- Less vegetation cover closer to water, here many beaver activities, as alder cuttings.
- Small rocks with moss cover, big cedar stump* with shrub cover.

Wildlife:

- Beaver activities: many paths and cuttings

7.8.2

Red alder – Salal dominated young forest

Polygon ID:	8	Slope:	10 %	V.com.	2
Structural Stage:	YFbl	Slope Position:	Low	Photo-no.	1596

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		75						Red alder
<i>Thuja plicata</i>				2				Western red cedar
<i>Pseudotsuga menziensis</i>				3				Douglas-fir
<i>Gaultheria shallon</i>					85			Salal
<i>Rubus spectabilis</i>				4	1			Salmonberry
<i>Rosa nutkana</i>				1	1			Nootka rose
<i>Rubus ursinus</i>					1			Trailing blackberry
<i>Pteridium aquilinum</i>						1		Bracken fern
<i>Polystichum munitum</i>						3		Sword fern
<i>Carex obnupta</i>						2		Slough Sedge
<i>Elymus glaucus</i>						1		Blue wildrye
<i>Holcus lanatus</i>						T		Common velvet grass
<i>Cirsium vulgare</i>						1		Bull thistle
<i>Kindbergia oregana</i>							5	Oregon beaked moss
<i>Rhytidiadelphus triquetrus</i>							3	Electr. Cat's tail moss
	Tree			Shrub		Herb	Moss	
	75			98		8	8	
Cover in % by Layer								

Notes:

- Small red alder site, close to the water with a dense understory of salal.
- Trail to the canoe runs through it.
- Some cwd with moss cover

Wildlife:

- Deer trails
- Beaver activity: alder cuttings, paths

Succession:

- Regeneration of coniferous forest in a long term

7.8.3

Red alder - Salal dominated young forest

Polygon ID:	14	Slope:	20 %	V.com.	2
Structural Stage:	YFbl	Slope Position:	Mid to low	Photo-no.	1383

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		30		1				Red alder
<i>Thuja plicata</i>		T		2				Western red cedar
<i>Pseudotsuga menziensis</i>		1		5				Douglas-fir
<i>Salix scouleriana</i>		2	T					Scouler's Willow
<i>Gaultheria shallon</i>					45			Salal
<i>Rubus spectabilis</i>				1				Salmonberry
<i>Vaccinium parvifolium</i>				1				red huckleberry
<i>Pteridium aquilinum</i>					5			Bracken fern
<i>Polystichum munitum</i>					3			Sword fern
<i>Blechnum spicant</i>					2			Deer fern
<i>Carex obnupta</i>					2			Slough Sedge
<i>Cirsium vulgare</i>						T		Bull thistle
<i>Elymus glaucus</i>						3		Blue wildrye
<i>Kindbergia oregana</i>							5	Oregon beaked moss
<i>Lonicera ciliosa</i>				T				Western trumpet honeysuckle
<i>Galium triflorum</i>						T		Sweet scented bedstraw
		Tree		Shrub		Herb	Moss	
		34		65		3	5	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Red alder site down sloping to the water with scattered coniferous trees.
- Many dead alder trees on ground
- Grasses more near the water, here more light

Wildlife:

- One black tailed deer
- Beaver activity: dragging paths and cuttings

Succession:

- Regeneration of Douglas fir and red cedars

7.8.4

Red alder – Salal dominated young forest

Polygon ID:	24	Slope:	5-10 %	V.com.	2
Structural Stage:	YFbl	Slope Position:	Mid to low	Photo-no.	1496

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		45						Red alder
<i>Thuja plicata</i>					8			Western red cedar
<i>Tsuga heterophylla</i>				1				Western hemlock
<i>Pseudotsuga menziensis</i>				18	5			Douglas-fir
<i>Gaultheria shallon</i>					65			Salal
<i>Rubus spectabilis</i>					2			Salmonberry
<i>Lonicera ciliosa</i>				1				Western trumpet honeysuckle
<i>Rubus ursinus</i>				1	2			Trailing blackberry
<i>Vaccinium ovatum</i>					1			Evergreen huckleberry
<i>Pteridium aquilinum</i>						3		Bracken fern
<i>Polystichum munitum</i>						2		Sword fern
<i>Gallium triflorum</i>						1		Sweet-scented bedstraw
<i>Carex obnupta</i>						4		Slough Sedge
<i>Cirsium vulgare</i>						2		Bull thistle
<i>Agrostis stolonifera</i>						1		Creeping Bentgrass
<i>Elymus glaucus</i>						T		Blue wildrye
<i>Agrostis oregonensis</i>						T		Oregon bentgrass
<i>Holcus lanatus</i>						T		Common velvet grass
		Tree 45		Shrub 105		Herb 14	Moss	
Cover in % by Layer								

Notes:

- Light alder site with several standing dead alders. Understory with dense salal and scattered small red cedars and young Douglas-firs.
- Slough sedge spread from shoreline into salal.

Wildlife:

- Beaver activity: only one fresh alder cutting, two dragging paths.

Succession:

- Regeneration of Douglas fir and red cedar.

7.8.5

Red alder - Salal dominated young forest

Polygon ID:	25	Slope:	3 %	V.com.	2
Structural Stage:	YFbl	Slope Position:	Mid	Photo-no.	1588

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		50						Red alder
<i>Thuja plicata</i>					3			Western red cedar
<i>Pseudotsuga menziensis</i>		4		10				Douglas-fir
<i>Gaultheria shallon</i>					80			Salal
<i>Vaccinium parvifolium</i>					1			red huckleberry
<i>Rubus ursinus</i>					1			Trailing blackberry
<i>Carex deweyana</i>						2		Dewy's Sedge
<i>Elymus glaucus</i>						2		Blue wildrye
<i>Lactuca muralis</i>						T		Wall lettuce
<i>Polystichum munitum</i>						4		Sword fern
<i>Pteridium aquilinum</i>						1		Bracken fern
<i>Kindbergia oregano*</i>							20	Oregon beaked moss*
		Tree		Shrub		Herb	Moss	
		54		95		9	20	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Light Red alder site in a linear flat depression, with a dense understory of salal and patches of grass as well as sword fern.
- *moss on cwd on the ground

Wildlife:

- Deer trail

Succession:

- Regeneration of coniferous trees, in a long term

7.8.6

Red alder – Sword fern dominated young forest

Polygon ID:	16	Slope:	25 %	V.com.	3
Structural Stage:	YFbl	Slope Position:	low	Photo-no.	1552

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		85						Red alder
<i>Thuja plicata</i>	10	1		3				Western red cedar
<i>Pseudotsuga menziensis</i>				T				Douglas-fir
<i>Gaultheria shallon</i>					4			Salal
<i>Rubus spectabilis</i>				5				salmonberry
<i>Polystichum munitum</i>						85		Sword fern
<i>Kindbergia oregana</i> *							4	Oregon beaked moss*
<i>Rhytidiadelphus triquetrus</i> *							3	Electr. Cat's-tail moss*
<i>Kindbergia praelonga</i> *							2	Slender beaked moss*
	Tree 96			Shrub 12		Herb 85	Moss 9	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Red alder young forest with dense understory of sword fern.
- Scattered salmonberry shrubs
- Several old growth red cedars.
- * moss on cwd

Wildlife:

- Deer trails

7.8.7

Red alder – Sword fern dominated young forest

Polygon ID:	18	Slope:	15 %	V.com.	3
Structural Stage:	YFbl	Slope Position:	Mid to low	Photo-no.	1416

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		83	2					Red alder
<i>Thuja plicata</i>		1	1	2				Western red cedar
<i>Pseudotsuga menziensis</i>			1					Douglas-fir
<i>Acer macrophyllum</i>		2		1				Big leaf maple
<i>Abies grandes</i>				1				Grand fir
<i>Tsuga heterophylla</i>				T				Western hemlock
<i>Gaultheria shallon</i>								Salal
<i>Urtica dioica</i>						25		Stinging nettle
<i>Polystichum munitum</i>						50		Sword fern
<i>Mahonia nervosa</i>					2			Oregon grape
<i>Sambucus racemosa</i>				2				Red elderberry
<i>Carex deweyana</i>						1		Dewy's Sedge
<i>Cirsium vulgare</i>						1		Bull thistle
<i>Rubus spectabilis</i>				4				Salmonberry
<i>rubus laciniatus</i>						T		Evergreen blackberry
<i>Rubus leucodermis</i>						T		blackcap
<i>Rosa gymnocarpa</i>						T		Baldhip rose
<i>Kindbergia oregana</i>							5	Oregon beaked moss
<i>Rhytidiadelphus triquetrus</i>							3	Electrified Cat's tail moss
<i>Galium triflorum</i>						T		Sweet scented bedstraw
		Tree		Shrub		Herb	Moss	
		89		12		76	8	
Cover in % by Layer								

Notes:

- Red alder forest with one bigleaf maple and a red cedar tree in the middle, around there, stinging nettle dominates the herb layer. Under alders, sword fern is dominant.
- Oregon grape and other herbs occur almost only near forest edge.
- Lots of cwd and old big cedar snags, left-over of former logging, covered with moss.
- Alder-trunks in average 40 cm diameter.

Wildlife:

- Several deer trails and deer-scat

Succession:

- Partly regeneration of Douglas-fir and red cedars

7.8.8

Red alder – Sword fern dominated young forest

Polygon ID:	22	Slope:	2-5 %	V.com.	3
Structural Stage:	YFbl	Slope Position:	Mid	Photo-no.	1593

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		75		4				Red alder
<i>Thuja plicata</i>		5		5				Western red cedar
<i>Acer macrophyllum</i>				3				Big leaf maple
<i>Salix scouleriana</i>		2						Scouler's willow
<i>Gaultheria shallon</i>					15			Salal
<i>Rubus spectabilis</i>				20				Salmonberry
<i>Vaccinium ovatum</i>					3			Evergreen huckleberry
<i>Rubus ursinus</i>					2			Trailing blackberry
<i>Lonicera ciliosa</i>					T			Western trumpet honeysuckle
<i>Pteridium aquilinum</i>						8		Bracken fern
<i>Polystichum munitum</i>						45		Sword fern
<i>Carex obnupta</i>						1		Slough Sedge
<i>Carex deweyana</i>						2		Dewy's Sedge
<i>Elymus glaucus</i>						4		Blue wildrye
<i>Urtica dioica</i>						2		Stinging nettle
<i>Gallium triflorum</i>						1		Sweet-scented bedstraw
<i>Kindbergia oregana</i>							20	Oregon beaked moss
<i>Rhytidiadelphus triquetrus</i>							10	Electr. Cat's tail moss
<i>Polytrichum commune</i>							4	Hairy-cap moss
		Tree		Shrub		Herb	Moss	
		82		52		63	34	
Cover in % by Layer								

Notes:

- Moist, linear Red alder site in a flat depression in mid elevation between coniferous forests.
- Understory dominated by sword fern and salmonberry.
- Partly standing water near the surface, here small sedge patches.
- Moss on cwd and at the bottom of alder stems.

Wildlife:

- Deer trails and -scat

Succession:

- Regeneration of coniferous forest (red cedar) in a long term

7.8.9

Red alder – Sword fern - Salmonberry dominated young Forest

Polygon ID:	27	Slope:	15 %	V.com.	4
Structural Stage:	YFbl	Slope Position:	Low to mid	Photo-no.	1787

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		80						Red alder
<i>Salix scouleriana</i>				T				Scouler's willow
<i>Thuja plicata</i>	3			2				Western red cedar
<i>Gaultheria shallon</i>					2			Salal
<i>Vaccinium parvifolium</i>				1				Red huckleberry
<i>Rubus ursinus</i>					T			Trailing blackberry
<i>Rubus spectabilis</i>				45				salmonberry
<i>Polystichum munitum</i>						40		Sword fern
<i>Pteridium aquilinum</i>						1		Bracken fern
<i>Equisetum arvense</i>						3		Common horsetail
<i>Carex obnuta</i>						5		Slough sedge
<i>Agrostis capillaris</i>						10		Colonial bentgrass
<i>Elymus glaucus</i>						2		Blue wildrye
<i>Holcus lanatus</i>						1		Common velvet grass
<i>Kindbergia oregana</i> *							5	Oregon beaked moss*
<i>Acer macrophyllum</i>			1					Big leaf maple
<i>Prunus emarginata</i>			1					Bitter cherry?
		Tree		Shrub		Herb	Moss	
		85		50		62	5	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Red alder young forest with dense understory of sword fern and salmonberry.
- Sedges and grasses occur near the riparian zone, where more light and several alders are were cut down by beavers.
- A huge old cedar snag lies across the old logging road which runs through the polygon. A short turn-off from the old road leads into it with a dead end.
- * moss on cwd

Wildlife:

- beaver activities: alder cuttings, food sticks
- Deer trails

7.8.10

Red alder – Salal – Sword fern dominated young forest

Polygon ID:	01	Slope:	10 %	V.com.	5
Structural Stage:	YFbl	Slope Position:	Mid to low	Photo-no.	1490

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		45		1				Red alder
<i>Thuja plicata</i>	10			3	2			Western red cedar
<i>Tsuga heterophylla</i>			1	1				Western hemlock
<i>Salix scouleriana</i>				2				Scouler's Willow
<i>Gaultheria shallon</i>					40			Salal
<i>Rubus spectabilis</i>				10				Salmonberry
<i>Vaccinium parvifolium</i>				3	T			red huckleberry
<i>Rubus ursinus</i>				4	3			Trailing blackberry
<i>Rubus parviflorus</i>					T			Thimbleberry
<i>Ilex aquifolium</i>					1			English holly (invasive)
<i>Pteridium aquilinum</i>						3		Bracken fern
<i>Polystichum munitum</i>						33		Sword fern
<i>Gallium triflorum</i>						1		Sweet-scented bedstraw
<i>Carex obnupta</i>						1		Slough Sedge
<i>Carex deweyana</i>						T		Dewy's Sedge
<i>Cirsium arvensis</i>						1		Canada thistle
<i>Cirsium vulgare</i>						3		Bull thistle
<i>Agrostis stolonifera</i>						2		Creeping Bentgrass
<i>Elymus glaucus</i>						T		Blue wildrye
<i>Agrostis oregonensis</i>						1		Oregon bentgrass
<i>Holcus lanatus</i>						1		Common velvet grass
<i>Kindbergia oregana</i>							5	Oregon beaked moss
<i>Polytrichum juniperinum</i>							T	Juniper haircap moss
<i>Rubus armeniacus</i>				4				Himalayan Blackberry
		Tree		Shrub		Herb	Moss	
		56		74		47	5	
Cover in % by Layer								

Notes:

- Light alder site with many dead alder trees, standing and on ground
- Grasses and herbs on trails made by beavers,
- Old cedar snags and cwd (logging left-over) covered with salal and salmonberry.
- One patch of invasive holly that is spreading towards the water

Wildlife:

- Beaver activity high: well formed drag paths and many mixed cuttings, Deer scat, tree frog

Succession:

- Regeneration of red cedars

7.8.11

Red alder – Salal - Sword fern dominated young forest

Polygon ID:	20	Slope:	20 %	V.com.	5
Structural Stage:	YFbl	Slope Position:	Low to Mid	Photo-no.	1672

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		75						Red alder
<i>Thuja plicata</i> *				4				Western red cedar*
<i>Pseudotsuga menziensis</i>	3			3				Douglas-fir
<i>Abies grandes</i>				3				Grand fir
<i>Tsuga heterophylla</i>				2				Western hemlock
<i>Acer macrophyllum</i>				3				Big leaf maple
<i>Gaultheria shallon</i> *					25			Salal*
<i>Rubus spectabilis</i>					3			Salmonberry
<i>Vaccinium ovatum</i>					1			Evergreen huckleberry
<i>Rubus ursinus</i>					2			Trailing blackberry
<i>Rosa nutkana</i>					T			Nootka rose
<i>Pteridium aquilinum</i>						1		Bracken fern
<i>Polystichum munitum</i>						20		Sword fern
<i>Carex obnupta</i>						1		Slough Sedge
<i>Carex deweyana</i>						4		Dewy's Sedge
<i>Elymus glaucus</i>						20		Blue wildrye
<i>Urtica dioica</i>						18		Stinging nettle
<i>Achlys triphylla</i>						T		Vanilla-leaf
<i>Kindbergia oregana</i>							5	Oregon beaked moss
<i>Polytrichum commune</i>							2	Hairy-cap moss
	Tree 78			Shrub 46		Herb 64	Moss 7	
Cover in % by Layer								

Notes:

- Light red alder site, down sloping to the water. Understory dominated by salal and sword fern, Stinging nettle occur dominant in the up-land part.
- *Several cedar stumps with cover of salal and young cedars.
- A clearing depression with many cuttings and more grass.
- Moss on cwd

Wildlife:

- Deer trails and –scat
- Wood pecker
- Beaver activity: lots of alder cuttings, paths

Succession:

- Regeneration of coniferous forest in a long term

7.8.12

Red alder – Sword fern dominated young forest

Polygon ID:	21	Slope:	2-4 %	V.com.	6
Structural Stage:	YFbl	Slope Position:	Mid	Photo-no.	1673

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		75						Red alder
<i>Thuja plicata</i>		5		5				Western red cedar
<i>Pseudotsuga menziensis</i>		2						Douglas-fir
<i>Abies grandis</i>				2				Grand fir
<i>Tsuga heterophylla</i>				2				Western hemlock
<i>Acer macrophyllum</i>		1		4				Big leaf maple
<i>Sambucus racemosa</i>				2				Red elderberry
<i>Rosa nutkana</i>					T			Nootka rose
<i>Gaultheria shallon</i>					8			Salal
<i>Rubus spectabilis</i>				30				Salmonberry
<i>Vaccinium parvifolium</i>				3				red huckleberry
<i>Rubus ursinus</i>					2			Trailing blackberry
<i>Pteridium aquilinum</i>						2		Bracken fern
<i>Polystichum munitum</i>						60		Sword fern
<i>Carex obnupta</i>						5		Slough Sedge
<i>Cirsium vulgare</i>						T		Bull thistle
<i>Achlys triphylla</i>						3		Vanilla-leaf
<i>Elymus glaucus</i>						4		Blue wildrye
<i>Achlys triphylla</i>						2		Vanilla-leaf
<i>Agrostis capillaris</i>						3		Colonial Bentgrass
<i>Kindbergia oregana</i>							25	Oregon beaked moss
<i>Lonicera ciliosa</i>					T			Western trumpet honeysuckle
		Tree		Shrub		Herb	Moss	
		83		58		79	25	
Cover in % by Layer								

Notes:

- Red alder site with a dense understory of sword fern and salmonberry. Scattered with young coniferous trees.
- One clearing with no trees, here sword fern and grasses.
- One tall standing snag, burned inside.
- Partly standing water and sedges in a small depressed area

Wildlife:

- Deer trails

Succession:

- Regeneration of coniferous forest in a long term

7.8.13

Small-flowered bulrush – Juncus dominated Riparian

Polygon ID:	45	Slope:	3 %	V.com.	45
Structural Stage:	R	Slope Position:	low	Photo- no.	1670

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		10			T			Red alder
<i>Thuja plicata</i>					1			Red cedar
<i>Gaultheria shallon</i>					5			Salal
<i>Rubus spectabilis</i>					4			Salmonberry
<i>Vaccinium parvifolium</i>					1			red huckleberry
<i>Vaccinium ovatum</i>						1		Evergreen blackberry
<i>Rubus ursinus</i>						1		Trailing blackberry
<i>Juncus effusus</i>						10		Common rush
<i>Agrostis capillaris</i>						5		Colonial Bentgrass
<i>Agrostis stolonifera</i>						3		Creeping bentgrass
<i>Scirpus microcarpus</i>						15		Small-flowered bulrush
<i>Polypodium glycyrrhiza</i>						1		Licorice fern
<i>Epilobium angustifolium</i>						T		Fireweed
<i>Polystichum munitum</i>						1		Sword fern
<i>Elymus glaucus</i>						T		Blue wildrye
<i>Holcus lanatus</i>						1		Common velvet grass
<i>Kindbergia oregana</i>							1	Oregon beaked moss
?						1		Unknown grass
<i>Aira praxox</i>						T		Early hairgrass
<i>Aira caryoptillea</i>						T		Silver hairgrass
		Tree		Shrub		Herb	Moss	
		10		12		41	1	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Riparian about one meter wide along the shoreline. Several cedar snags with salal on it.
- Several small red cedar trees and seedlings, also some of alder.
- Beaver has taken down all but 10% of Red Alder.
- March 2011. Flooded.

Wildlife:

- Beaver activities: Several dragging paths and cuttings

Succession:

- Regeneration of red cedars

7.8.14

Red alder- Colonial Bentgrass dominated forest edge

Polygon ID:	37	Slope:	1-2 %	V.com.	8
Structural Stage:	YFbl	Slope Position:	low	Photo-no.	1415

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		35						Red alder
<i>Abies grandes</i>					T			Grand fir
<i>Polystichum munitum</i>						5		Sword fern
<i>Rubus ursinus</i>						2		Trailing blackberry
<i>Rubus spectabilis</i>						1		Salmonberry
<i>Gaultheria shallon</i>					2			Salal
<i>Mahonia nervosa</i>					T			Oregon grape
<i>Cirsium arvense</i>						T		Canada thistle
<i>Agrostis capillaris</i>						20		Colonia Bentgrass
<i>Carex deweyana</i>						2		Dewey's sedge
<i>Elymus glaucus</i>						2		Blue wildrye
<i>Bromus vulgaris</i>						T		Columbia brome
<i>Trisetum cernuum</i>						1		Nodding Trisetum
<i>Holcus lanatus</i>						2		Velvet grass
<i>Thuja plicata</i>		40						Western redcedar
<i>Holcus lanatus</i>						T		Common velvet grass
<i>Rumex occidentalis</i>						T		Western dock
<i>Rubus laciniatus</i>					T			Evergreen Blackberry
		Tree		Shrub		Herb	Moss	
		75		3		38	0	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Salmonberry and trailing blackberry small but scattered.
- Disturbed site, compact soils
- Dead alder trees on ground
- Seasonal flooding.
- March 2011. Flooded.

Wildlife:

- Beaver activities: cuttings

Succession:

- Cover of shrubs and grasses

7.8.15

Seasonal flooded Bentgrass- sedge Riparian

Polygon ID:	40	Slope:	4 %	V.com.	8
Structural Stage:	R	Slope Position:	low	Photo-no.	1453

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		75						Red alder
<i>Thuja plicata</i>		15						Western red cedar
<i>Gaultheria shallon</i>					3			Salal
<i>Rubus spectabilis</i>					T			salmonberry
<i>Juncus effusus</i>						1		Common rush
<i>Carex obnuta</i>						5		Slough sedge
<i>Agrostis capillaris</i>						5		Colonial bentgrass
<i>Agrostis stolonifera</i>						40		Creeping bentgrass
<i>Polystichum munitum</i>						1		Sword fern
<i>Pteridium aquilinum</i>						1		Bracken fern
<i>Veronica beccabunga</i>						T		American brooklime
<i>Lysichiton americanum</i>						T		Skunk cabbage
<i>Kindbergia oregana</i> *							4	Oregon beaked moss*
Tree		Shrub		Herb		Moss		
90		3		54		4		
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Mudflat, grassy Riparian with small patches of sedge, about one meter wide, along the shoreline.
- Probably seasonal flooded.
- * on cwd

Wildlife:

- Deer footprints in mud

7.8.16

Red alder – Salal - Slough sedge dominated young forest

Polygon ID:	23	Slope:	10 %	V.com.	9
Structural Stage:	YFbl	Slope Position:	Low to mid	Photo-no.	1666

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		70						Red alder
<i>Tsuga heterophylla</i>					T			Western hemlock
<i>Thuja plicata</i> *				4	T			Western red cedar*
<i>Gaultheria shallon</i>					35			Salal
<i>Vaccinium parvifolium</i> *					2			Red huckleberry*
<i>Vaccinium ovatum</i>					5			Evergreen huckleberry
<i>Carex obnuta</i>						30		Slough sedge
<i>Carex deweyana</i>						2		Dewey's sedge
<i>Agrostis capillaris</i>						2		Colonial bentgrass
<i>Elymus glaucus</i>						3		Blue wildrye
<i>Holcus lanatus</i>						2		Common velvet grass
<i>Polystichum munitum</i>						5		Sword fern
<i>Pteridium aquilinum</i>						2		Bracken fern
<i>Galium trifidum</i>						T		Small bedstraw
<i>Lactuca muralis</i>						T		Wall lettuce
<i>Urtica dioica</i>						1		Stinging nettle
<i>Cirsium vulgare</i>						T		Bull thistle
<i>Kindbergia oregana</i>							5	Oregon beaked moss
<i>Rhytidiadelphus triquetrus</i>							3	Electr. Cat's-tail moss
		Tree		Shrub		Herb	Moss	
		70		46		48	8	
Cover in % by Layer								

Notes:

- Light Red alder site with an understory of salal, mixed with slough sedge, near riparian zone.
- Several rocks with moss cover, dead alder snags
- * shrubs grow on cedar stumps or cwd (partly burned)

Wildlife:

- Beaver activities: alder cuttings, paths
- Hairy woodpecker at cedar snag

7.8.17

Slough sedge – Red alder dominated Riparian

Polygon ID:	56	Slope:	2 %	V.com.	10
Structural Stage:	R	Slope Position:	low	Photo-no.	1466

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		50						Red alder
<i>Pseudotsuga menziensis</i>		5		3				Douglas-fir
<i>Thuja plicata</i> *					1			Western red cedar*
<i>Rubus ursinus</i>					1			Trailing blackberry
<i>Vaccinium ovatum</i> *					3			Evergreen huckleberry*
<i>Gaultheria shallon</i>					15			Salal
<i>Carex obnuta</i>						80		Slough sedge
<i>Elymus glaucus</i>						1		Blue wildrye
<i>Cirsium vulgare</i>						1		Bull thistle
<i>Polystichum munitum</i>						1		Sword fern
	Tree		Shrub		Herb	Moss		
	52		20		83			
	Cover in % by Layer							

Notes:

- Dense Slough sedge Riparian with a tree-layer of red alder, ~3-4m wide, along the shoreline. Salal mixed into sedge.
- * on cedar stump

Wildlife:

- Beaver activities: cuttings
- Deer trail

7.8.18

Red alder – Douglas-fir - Salal dominated Young forest

Polygon ID:	34	Slope:	3 %	V.com.	11
Structural Stage:	YFmx	Slope Position:	Mid	Photo-no.	1808

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		50						Red alder
<i>Thuja plicata</i>				20				Western red cedar
<i>Pseudotsuga menziensis</i>				30				Douglas-fir
<i>Abies grandis</i>				1				Grand fir
<i>Tsuga heterophylla</i>				2				Western hemlock
<i>Salix scouleriana</i>		2						Scouler's willow
<i>Acer macrophyllum</i>				3				Big leaf maple
<i>Gaultheria shallon</i>					50			Salal
<i>Rubus spectabilis</i>				2				Salmonberry
<i>Vaccinium parvifolium</i>					1			red huckleberry
<i>Vaccinium ovatum</i>					3			Evergreen huckleberry
<i>Polystichum munitum</i>						3		Sword fern
<i>Pteridium aquilinum</i>						2		Bracken fern
<i>Goodyera oblongifolia</i>						T		Rattlesnake-plantain
<i>Kindbergia oregano</i> *							20	Oregon beaked moss*
	Tree 52			Shrub 112		Herb 5	Moss 20	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Red alder with moist, shady, partly very dense, understory of young Douglas-firs in a tall shrub growing state and under, smaller red cedars in dense patches. Where coniferous shrubs are less, salal dominates the shrub-layer.
- Moist, linear depression between coniferous forests.

Wildlife:

- None observed

Succession:

- Regeneration of coniferous trees, most Douglas and cedar

7.8.19

Red alder - Salal dominated young forest

Polygon ID:	44	Slope:	3 %	V.com.	12
Structural Stage:	YFbl	Slope Position:	Mid	Photo-no.	1588

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		45						Red alder
<i>Thuja plicata</i>	5	8			2			Western red cedar
<i>Pseudotsuga menziensis</i>	10	15						Douglas-fir
<i>Tsuga heterophylla</i>		2						Western hemlock
<i>Abies grandes</i>				4				Grand fir
<i>Acer macrophyllum</i>		4						Big leaf maple
<i>Arbutus menziesii</i>		3		3				Arbutus
<i>Salix scouleriana</i>		5						Scouler's willow
<i>Holodiscus discolor</i>				20				Ocean spray
<i>Rubus spectabilis</i>				5				Salmonberry
<i>Gaultheria shallon</i>					30			Salal
<i>Vaccinium parvifolium</i>				2	2			red huckleberry
<i>Vaccinium ovatum</i>					1			Evergreen huckleberry
<i>Rubus ursinus</i>					1			Trailing blackberry
<i>Carex deweyana</i>						2		Dewy's Sedge
<i>Elymus glaucus</i>						4		Blue wildrye
<i>Holcus lanatus</i>						T		Common velvet grass
<i>Lactuca muralis</i>						T		Wall lettuce
<i>Polystichum munitum</i>						35		Sword fern
<i>Urtica dioica</i>						5		Stinging nettle
<i>Kindbergia oregano*</i>							20	Oregon beaked moss*
<i>Rhytidiadelphus triquetrus*</i>							25	Electr. Cat's tail moss*
<i>Polytrichum commune</i>							5	Hairy-cap moss
<i>Mahonia nervosa</i>					T			Dull oregon grape
		Tree		Shrub		Herb	Moss	
		97		70		46	45	
Cover in % by Layer								

Notes:

- Red alder site with a scattered mix of several different coniferous and broadleaf trees. Understory dominated by sword fern and salal.
- Disturbed site with a lot of moss-covered cwd logs on the ground.

Wildlife:

- Many deer trails, woodpecker

Succession:

- Regeneration of coniferous trees, in a long term

7.8.20

Red alder – Big leaf maple dominated young forest with coniferous regeneration

Polygon ID:	06	Slope:	10 %	V.com.	13
Structural Stage:	YFbl	Slope Position:	Mid	Photo-no.	1668

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		45						Red alder
<i>Thuja plicata</i>				4				Western red cedar
<i>Pseudotsuga menziensis</i>	5			15				Douglas-fir
<i>Abies grandes</i>		5		20	5			Grand fir
<i>Acer macrophyllum</i>		25		5				Big leaf maple
<i>Gaultheria shallon</i>					20			Salal
<i>Rubus spectabilis</i>				4				Salmonberry
<i>Urtica dioica</i>						10		Stinging nettle
<i>Polystichum munitum</i>						30		Sword fern
<i>Elymus glaucus</i>						1		Blue wildrye
<i>Kindbergia oregana</i>							40	Oregon beaked moss
<i>Rhytidiadelphus triquetrus</i>							10	Electrified Cat's tail moss
	Tree 80		Shrub 73		Herb 41	Moss 50		
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Red alder and bigleaf maple dominate the main tree-layer. There are several old huge Douglas-firs. Many smaller young coniferous trees dominate the tall shrub layer.
- Cwd with moss cover

Wildlife:

- None observed

Succession:

- Regeneration of coniferous forest, mostly grand fir and Douglas-fir.

7.8.21

Red alder – Red cedar - Sword fern dominated young forest

Polygon ID:	19	Slope:	30 %	V.com.	19
Structural Stage:	YFbl	Slope Position:	Low to Mid	Photo-no.	1594

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		65						Red alder
<i>Thuja plicata</i>	20			15	1			Western red cedar
<i>Pseudotsuga menziensis</i>				2				Douglas-fir
<i>Gaultheria shallon</i>					25			Salal
<i>Rubus spectabilis</i>				4				Salmonberry
<i>Vaccinium ovatum</i>					1			Evergreen huckleberry
<i>Rubus ursinus</i>					2			Trailing blackberry
<i>Pteridium aquilinum</i>						1		Bracken fern
<i>Polystichum munitum</i>						45		Sword fern
<i>Blechnum spicant</i>						1		Deer fern
<i>Carex obnupta</i>						T		Slough Sedge
<i>Carex deweyana</i>						4		Dewy's Sedge
<i>Elymus glaucus</i>						10		Blue wildrye
<i>Agrostis oregonensis</i>						T		Oregon bentgrass
<i>Holcus lanatus</i>						T		Common velvet grass
<i>Achlys triphylla</i>						T		Vanilla-leaf
<i>Cirsium vulgare</i>						T		Bull thistle
<i>Lactuca muralis</i>						T		Wall lettuce
		Tree 85		Shrub 50		Herb 62	Moss 0	
Cover in % by Layer								

Notes:

- Red alder young forest with old growth A1 red cedars as well as scattered young cedars, down sloping to the water.
- Less vegetation under shady cedars, grass on deer or beaver trails.
- One patch of dense elymus glaucus grass.
- Mostly sword fern dominant, partly also salal.
- some young cedars grow on Cedar stumps

Wildlife:

- Deer trails and –scat
- Beaver activity: alder cuttings, paths

Succession:

- Regeneration of coniferous forest (red cedar) in a long term

7.8.22

Red alder – Red cedar - Salal dominated young forest

Polygon ID:	17	Slope:	6 %	V.com.	15
Structural Stage:	YFmx	Slope Position:	Mid	Photo-no.	1602

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		65						Red alder
<i>Thuja plicata</i>	20							Western red cedar
<i>Pseudotsuga menziensis</i>				20				Douglas-fir
<i>Abies grandis</i>				5				Grand fir
<i>Tsuga heterophylla</i>		5						Western hemlock
<i>Salix scouleriana</i>		10						Scouler's willow
<i>Gaultheria shallon</i>					70			Salal
<i>Rubus spectabilis</i>				2				Salmonberry
<i>Vaccinium parvifolium</i>				T				red huckleberry
<i>Rubus ursinus</i>					T			Trailing blackberry
<i>Vaccinium ovatum</i>					3			Evergreen huckleberry
<i>Polystichum munitum</i>						4		Sword fern
<i>Pteridium aquilinum</i>						8		Bracken fern
<i>Kindbergia oregana</i>							10	Oregon beaked moss
	Tree 100			Shrub 101		Herb 12	Moss 10	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m
A3	Sub-canopy trees, >10m	C	Herb-layer
		D	Moss-layer

Notes:

- Alder dominated part of a forest, with several huge red cedars.
- Formerly, logged site with moss covered logs on the ground.
- Dense understory of salal

Wildlife:

- Flock of chickadees

Succession:

- Regeneration of coniferous trees, most Douglas and cedar

7.8.23

Big leaf Maple –Red cedar – Douglas-fir dominated young forest

Polygon ID:	35	Slope:	1-3 %	V.com.	16
Structural Stage:	YFco	Slope Position:	Mid to crest	Photo-no.	1599

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Acer macrophyllum</i>		80						Big leaf maple
<i>Alnus rubra</i>		6						Red alder
<i>Salix scouleriana</i>				3				Scouler's willow
<i>Thuja plicata</i>	5	2		15	3			Western red cedar
<i>Pseudotsuga menziensis</i>	10	3		8				Douglas-fir
<i>Tsuga heterophylla</i>				1				Western hemlock
<i>Abies grandes</i>				2				Grand fir
<i>Gaultheria shallon</i>					8			Salal
<i>Vaccinium parvifolium</i>				1	1*			Red huckleberry
<i>Mahonia nervosa</i>					2			Oregon grape
<i>Polystichum munitum</i>						5		Sword fern
<i>Pteridium aquilinum</i>								Bracken fern
?						8		grass
<i>Urtica dioica</i>						25		Stinging nettle
<i>Achlys triphylla</i>								Vanilla-leaf
<i>Carex deweyana</i>						1		Dewy's Sedge
<i>Carex obnuta</i>						1		Slough sedge
<i>Kindbergia oregana</i>							4	Oregon beaked moss
<i>Rhytidiadelphus triquetrus</i>							1	Electr. Cat's tail moss
<i>Polytrichum commune</i>							2	Hairy-cap moss
		Tree		Shrub		Herb	Moss	
		106		44		40	7	
Cover in % by Layer								

Notes:

- Dense young maple forest with partly little understory, one old huge maple-cedar-tree-mix. Several A1 cedars and Douglas-firs.
- There is a dense patch of young red cedars behind the former trailer site as well as young coniferous trees scattered in the polygon.
- Several dead alder snags
- Moss on cwd

Wildlife:

- Squirrel
- (Great horned) Owl
- Deer scat
- Snag with wildlife holes / caves

Succession:

- Regeneration of coniferous forest

7.8.24

Red cedar – Red alder –Salal dominated young forest

Polygon ID:	15	Slope:	2 %	V.com.	17
Structural Stage:	YFmx	Slope Position:	low	Photo-no.	1562

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		40						Red alder
<i>Thuja plicata</i>		50		4				Western red cedar
<i>Pseudotsuga menziensis</i>				1				Douglas-fir
<i>Holodiscus discolor</i>				3				Ocean spray
<i>Gaultheria shallon</i>					55			Salal
<i>Rubus spectabilis</i>				10				Salmonberry
<i>Juncus effusus</i>						2		Common rush
<i>Carex obnuta</i>						2		Slough sedge
<i>Carex deweyana</i>						2		Dewy's Sedge
<i>Holcus lanatus</i>						1		Common velvet grass
<i>Agrostis stolonifera</i>						10		Creeping bentgrass
<i>Agrostis oregonensis</i>						T		Oregon bentgrass
<i>Polystichum munitum</i>						10		Sword fern
<i>Pteridium aquilinum</i>						3		Bracken fern
<i>Blechnum spicant</i>						1		Deer fern
<i>Kindbergia oregana</i>							10	Oregon beaked moss
<i>Blechnum spicant</i>						3		Deer Fern
		Tree		Shrub		Herb	Moss	
		90		73		34	10	
Cover in % by Layer								

Notes:

- Mixed young forest at low elevation with a dense moist understory of mainly salal.
- Juncus and sedge in patches near the water edge, here also more grasses.
- Old cedar snags and stumps, covered with salal and small cedar.
- Standing dead alders, cwd

Wildlife:

- Beaver activities: drag channels, old and fresh cuttings, path

7.8.25

Red cedar dominated young forest

Polygon ID:	64	Slope:	25 %	V.com.	18
Structural Stage:	YFco	Slope Position:	Mid	Photo-no.	1477

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Thuja plicata</i>		90		5	10			Western red cedar
<i>Pseudotsuga menziensis</i>				3				Douglas-fir
<i>Abies grandes</i>				1				Grand fir
<i>Salix scouleriana</i>				1				Scouler's willow
<i>Vaccinium ovatum</i>					5			evergreen huckleberry
<i>Gaultheria shallon</i>					15			Salal
<i>Polystichum munitum</i>						10		Sword fern
<i>Pteridium aquilinum</i>						2		Bracken fern
<i>Kindbergia oregana</i>							1	Oregon beaked moss
<i>Achlys triphylla</i>						T		Vanilla-leaf
<i>Tsuga heterophylla</i>				1				Western hemlock
<i>Vaccinium parvifolium</i>					1			Red huckleberry
		Tree		Shrub		Herb	Moss	
		90		42		12	1	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m
A3	Sub-canopy trees, >10m	C	Herb-layer
		D	Moss-layer

Notes:

- Several older red cedars with a shaded understory of scattered sword fern and salal. More salal where more light, here also young grand firs and Douglas-firs as well as small red cedars.

Wildlife:

- deer scat

Succession:

- Regeneration of coniferous forest, dominated by red cedar.

7.8.26

Red cedar – Douglas-fir - Salal dominated young forest

Polygon ID:	11	Slope:	10-20 %	V.com.	19
Structural Stage:	YFco	Slope Position:	Mid	Photo-no.	1604

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Pseudotsuga menziesii</i>	10	28		10				Douglas-fir
<i>Thuja plicata</i>		35		6	1			Western red cedar
<i>Tsuga heterophylla</i>		5	2					Western hemlock
<i>Alnus rubra</i>			18	2				Red alder
<i>Arbutus menziesii</i>				T				Arbutus
<i>Acer macrophyllum</i>				T				Big leaf maple
<i>Salix scouleriana</i>				5				Scouler's willow
<i>Vaccinium ovatum</i>					8			evergreen huckleberry
<i>Vaccinium parvifolium</i>				1*	2			Red huckleberry
<i>Rubus ursinus</i>					T			Trailing blackberry
<i>Rosa nutkana</i>					1			Nootka rose
<i>Rubus spectabilis</i>					5			Salmonberry
<i>Gaultheria shallon</i>					65			Salal
<i>Polystichum munitum</i>						2		Sword fern
<i>Pteridium aquilinum</i>						5		Bracken fern
<i>Achlys triphylla</i>						1		Vanilla-leaf
<i>Kindbergia oregano*</i>							5	Oregon beaked moss*
<i>Hylocomium splendens*</i>							1	Step moss*
<i>Abies grandis</i>			T					Grand fir
<i>Sanicula crassicaulis</i>						T		Pacific Sanicle
<i>Mahonia nervosa</i>					1			Dull Oregon grape
<i>Linnaea borealis</i>					T			Twinsflower
<i>Lonicera ciliosa</i>					T			Western trumpet honeysuckle
		Tree		Shrub		Herb	Moss	
		98		107		8	6	
Cover in % by Layer								

Notes:

- Red Cedar and Douglas fir dominated young forest with several A1 Douglas-firs, trees have lighter openings between, here, red alders with dense understory of salal.
- Several thin alder snags, Red huckleberry partly on cedar stumps
- 'Old logging road trail' runs through it.

Wildlife:

- deer scat and -trails, old snag (~8m) with many wildlife-holes

Succession:

- Regeneration of Douglas-fir and red cedar

7.8.27

Red cedar – Douglas-fir - huckleberry dominated young Forest

Polygon ID:	3	Slope:	10-20 %	V.com.	20
Structural Stage:	YFco	Slope Position:	Mid	Photo-no.	1484

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Pseudotsuga menziensis</i>	5	30		30				Douglas-fir
<i>Thuja plicata</i>		35		15	2			Western red cedar
<i>Abies grandes</i>				3				Grand fir
<i>Tsuga heterophylla</i>		10		2				Western hemlock
<i>Salix scouleriana</i>				1				Scouler's willow
<i>Vaccinium ovatum</i>					30			evergreen huckleberry
<i>Gaultheria shallon</i>					20			Salal
<i>Polystichum munitum</i>						3		Sword fern
<i>Kindbergia oregana</i>							45	Oregon beaked moss
							5	? Moss
<i>Vaccinium parvifolium</i>					1			Red Huckleberry
Tree				Shrub		Herb	Moss	
80				104		3	50	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Dense young coniferous forest, moist and shaded, north facing slope.
- Two tall Douglas firs in A1 layer.
- Dense patches of young Douglas-firs, here scattered sword fern under. Dense young cedar stands with understory of huckleberry.
- Shrub-layer dominated by evergreen huckleberry and partly salal.
- Cwd with moss covers.

Wildlife:

- deer scat and -trails

Succession:

- Regeneration of Douglas-fir and partly red cedar

7.8.28

Western red cedar – Douglas-fir – Salal dominated young forest

Polygon ID:	10	Slope:	20-50 %	V.com.	20
Structural Stage:	YFco	Slope Position:	Mid to crest	Photo-no.	1384

Vegetation Species	Cover in % by Specie							Common name/Notes
	A1	A2	A3	B1	B2	C	D	
<i>Thuja plicata</i>		55	3	5				Western red cedar
<i>Pseudotsuga menziesii</i>	10	20		10				Douglas-fir
<i>Tsuga heterophylla</i>				3				Western hemlock
<i>Arbutus menziesii</i>				1				Arbutus
<i>Gaultheria shallon</i>					75			Salal
<i>Cytisus scoparius</i>					1			Scottch broom
<i>Vaccinium ovatum</i>					1			Evergreen huckleberry
<i>Vaccinium parvifolium</i>				1				Red huckleberry
<i>Polystichum munitum</i>						2		Sword fern
<i>Kindbergia oregana</i>							3	Oregon beaked moss
<i>Mahonia nervosa</i>					1			Dull Oregon grape
<i>Lonicera ciliosa</i>				1				Western trumpet honeysuckle
Tree				Shrub		Herb	Moss	
88				99		2	3	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Down-sloping Red cedar and Douglas-fir forest with dense understory of salal.
- Some dying red cedars / several red alder snags
- Arbutus and scotch broom close to the edge/ road

Wildlife:

- Steller's Jay
- Deer trails
- Dead Goat under a cedar tree

Succession:

- Regeneration of coniferous forest

7.8.29

Western hemlock – Sword fern dominated mixed young forest

Polygon ID:	33	Slope:	15 %	V.com.	21
Structural Stage:	YFco	Slope Position:	Mid	Photo-no.	1418

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Tsuga heterophylla</i>		30		2				Western hemlock
<i>Thuja plicata</i>		5	10	2	1			Western red cedar
<i>Pseudotsuga menziensis</i>	5	3						Douglas-fir
<i>Alnus rubra</i>		5	5					Red alder
<i>Abies grandis</i>				1				Grand fir
<i>Holodiscus discolor</i>				1				Ocean spray
<i>Rubus spectabilis</i>				T				Salmonberry
<i>Vaccinium parvifolium</i>				1	2			Red huckleberry
<i>Gaultheria shallon</i>					2			Salal
<i>Mahonia nervosa</i>					4			Oregon grape
<i>Polystichum munitum</i>						40		Sword fern
<i>Pteridium aquilinum</i>						1		Bracken fern
<i>Rubus ursinus</i>						1		Trailing blackberry
<i>Carex deweyana</i>						1		Dewy's sedge
<i>Kindbergia oregana</i>							3	Oregon beaked moss
<i>Rhytidiadelphus triquetrus</i>							2	Electr. Cat's tail moss
	Tree 63			Shrub 16		Herb 43	Moss 5	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Coniferous young forest, dominated by hemlock, with scattered red alder and a partly dense understory of sword fern.
- Light and shaded areas, mixed forest patch, more light down slope

Wildlife:

- squirrel, frog, one huge old cedar snag with wildlife traces
- deer scat and -trails

Succession:

- western hemlock and red cedar forest

7.8.30

Douglas-fir – Red Cedar – Salal dominated young forest

Polygon ID:	2	Slope:	3-20 %	V.com.	22
Structural Stage:	YFco	Slope Position:	Mid	Photo-no.	1481

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Pseudotsuga menziensis</i>		40						Douglas-fir
<i>Thuja plicata</i>		35	5	10	2			Western red cedar
<i>Abies grandes</i>				10	4			Grand fir
<i>Tsuga heterophylla</i>		2		2				Western hemlock
<i>Alnus rubra</i>				1				Red alder
<i>Arbutus menziesii</i>		1	2	3				Arbutus
<i>Salix scouleriana</i>				4				Scouler's willow
<i>Vaccinium ovatum</i>				3	8			evergreen huckleberry
<i>Gaultheria shallon</i>					60			Salal
<i>Cytisus scoparius</i>					1			scotch broom
<i>Lonicera ciliosa</i>				1	4			Western trumpet honeysuckle
<i>Mahonia nervosa</i>					5			Oregon grape
<i>Polystichum munitum</i>						5		Sword fern
<i>Pteridium aquilinum</i>						1		Bracken fern
<i>Holcus lanatus</i>						1		Common velvet grass
<i>Kindbergia oregana</i>								Oregon beaked moss
<i>Polytrichum commune</i>						1		Hairy-cap moss
<i>Linnaea borealis</i>					T			Twinflower
		Tree		Shrub		Herb	Moss	
		78		118		8	45	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m
A3	Sub-canopy trees, >10m	C	Herb-layer
		D	Moss-layer

Notes:

- Irregular dense young forest with light and shaded areas, some clearings, here drier: Scouler's willow and Arbutus.
- Dense patches of young, mostly Douglas-fir, trees.
- Shrub-layer dominated by salal

Wildlife:

- deer scat and -trails

Succession:

- Regeneration of Douglas-fir and red cedar

7.8.31

Douglas-fir – Red cedar – Salal dominated young forest

Polygon ID:	4	Slope:	25 %	V.com.	22
Structural Stage:	YFco	Slope Position:	Mid	Photo-no.	1590

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Pseudotsuga menziensis</i>		40		20				Douglas-fir
<i>Thuja plicata</i>	4			45	15			Western red cedar
<i>Abies grandes</i>		5						Grand fir
<i>Tsuga heterophylla</i>								Western hemlock
<i>Acer macrophyllum</i>		6		2				Big leaf maple
<i>Sambucus racemosa</i>				1				Red elderberry
<i>Holodiscus discolor</i>				4				Ocean spray
<i>Vaccinium ovatum</i>								evergreen huckleberry
<i>Vaccinium parvifolium</i>				T				Red huckleberry
<i>Gaultheria shallon</i>					25			Salal
<i>Rubus spectabilis</i>				T				Salmonberry
<i>rubus laciniatus</i>					T			Evergreen blackberry
<i>Mahonia nervosa</i>					1			Oregon grape
<i>Polystichum munitum</i>						5		Sword fern
<i>Pteridium aquilinum</i>						T		Bracken fern
<i>Carex deweyana</i>						T		Dewy's Sedge
<i>Elymus glaucus</i>						1		Blue wildrye
<i>Kindbergia oregana</i>							30	Oregon beaked moss
<i>Polypodium glycyrrhiza</i>						T		Licorice fern
		Tree		Shrub		Herb	Moss	
		55		114		6	30	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m
A3	Sub-canopy trees, >10m	C	Herb-layer
		D	Moss-layer

Notes:

- North sloping, moist and shady coniferous forest with trees in different growing stages. Partly dense shady patches of small cedars, under Douglas-firs which are often in a tall shrub stage.
- Low Shrub-layer dominated by salal

Wildlife:

- deer scat and -trails

Succession:

- Regeneration of Douglas-fir and red cedar

7.8.32

Douglas-fir - Red cedar – Salal dominated young forest

Polygon ID:	9	Slope:	3 %	V.com.	22
Structural Stage:	YFco	Slope Position:	Mid	Photo-no.	1624

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Pseudotsuga menziensis</i>	10	35		3				Douglas-fir
<i>Thuja plicata</i>		40	25	5				Western red cedar
<i>Salix scouleriana</i>				T				Scouler's willow
<i>Vaccinium ovatum</i>					5			evergreen huckleberry
<i>Vaccinium parvifolium</i>				1	1			Red huckleberry
<i>Gaultheria shallon</i>					85			Salal
<i>Kindbergia oregano</i>							3	Oregon beaked moss
<i>Polytrichum commune</i>							1	Hairy-cap moss
<i>Tsuga heterophylla</i>				1				Western hemlock
<i>Cytisus scoparius</i>				1				Scotch broom
		Tree		Shrub		Herb	Moss	
		110		102		0	4	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Tall red cedar and Douglas-fir young forest with dense understory of low growing salal.
- A few small clearings with only moss on the ground.

Wildlife:

- None observed

Succession:

- Regeneration of Douglas-fir and red cedar

7.8.33

Douglas-fir – Salal – Red cedar dominated young forest

Polygon ID:	13	Slope:	10 %	V.com.	22
Structural Stage:	Yfco	Slope Position:	mid to low	Photo-no.	1547

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Pseudotsuga menziensis</i>		35		10				Douglas-fir
<i>Thuja plicata</i>	20			5				Western red cedar
<i>Tsuga heterophylla</i>		20		15				Western hemlock
<i>Alnus rubra</i>				3				Red alder
<i>Gaultheria shallon</i>					80			Salal
<i>Vaccinium parvifolium</i>				3				Red huckleberry
<i>Rubus ursinus</i>					1			Trailing blackberry
<i>Polystichum munitum</i>						1		Sword fern
<i>Kindbergia oregano*</i>							10	Oregon beaked moss*
<i>Arbutus menziesii</i>			1					Arbutus
<i>Acer macrophyllum</i>			1					Big leafed maple
<i>Cytisus scoparius</i>					T			Scotch broom
<i>Lonicera ciliosa</i>				T				Western trumpet honeysuckle
		Tree		Shrub		Herb	Moss	
		87		117		1	10	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Dense young coniferous forest with a lot of hemlock and Douglas-fir-trees in a tall shrub stage.
- Understory of dense and tall-growing Salal.
- * moss on cwd

Wildlife:

- None observed

Succession:

- Regeneration of Douglas-fir and hemlock

7.8.34

Douglas-fir – Grand fir dominated young forest

Polygon ID:	7	Slope:	5 %	V.com.	23
Structural Stage:	YFco	Slope Position:	Mid	Photo-no.	1667

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Pseudotsuga menziensis</i>	15	30		10				Douglas-fir
<i>Thuja plicata</i>	5	15		12				Western red cedar
<i>Abies grandes</i>		20	8	25				Grand fir
<i>Alnus rubra</i>			3					Red alder
<i>Acer macrophyllum</i>			2	1				Big leaf maple
<i>Arbutus menziesii</i>				T				Arbutus
<i>Salix scouleriana</i>				2				Scouler's willow
<i>Vaccinium parvifolium</i>				2				Red huckleberry
<i>Gaultheria shallon</i>					20			Salal
<i>Rubus spectabilis</i>				5				Salmonberry
<i>Polystichum munitum</i>						30		Sword fern
<i>Pteridium aquilinum</i>						1		Bracken fern
<i>Lonicera ciliosa</i>						1		Western trumpet honeysuckle
<i>Elymus glaucus</i>						1		Blue wildrye
<i>Kindbergia oregana</i>							35	Oregon beaked moss
<i>Rhytidiadelphus triquetrus</i>							10	Electr. Cat's tail moss
	Tree 98			Shrub 77		Herb 33	Moss 45	
	Cover in % by Layer							

Notes:

- Coniferous forest northwest sloping with dense patches of young cedars, grand firs and Douglas-firs. Under older cedars very shaded and little understory. Several dominant Douglas-firs.
- Maple and alder in lighter clearings. One old big leaf maple.
- Shrub-layer dominated partly by salal, partly by sword fern.
- Cwd with moss covers.

Wildlife:

- deer scat and –trails
- bald eagle landing on huge Douglas-fir

Succession:

- Regeneration of coniferous trees, lots of Grand fir

7.8.35

Dense Douglas-fir young forest

Polygon ID:	12	Slope:	30 %	V.com.	24
Structural Stage:	Yfco	Slope Position:	mid to crest	Photo-no.	1544

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Pseudotsuga menziensis</i>	5	85		4				Douglas-fir
<i>Thuja plicata</i>	10	3						Western red cedar
<i>Tsuga heterophylla</i>				T				Western hemlock
<i>Gaultheria shallon</i>					5			Salal
<i>Vaccinium ovatum</i>					3			Evergreen huckleberry
<i>Vaccinium parvifolium</i>					T			Red huckleberry
<i>Mahonia nervosa</i>					3			Oregon-grape
<i>Goodyera oblongifolia</i>						T		Rattlesnake-plantain
<i>Pteridium aquilinum</i>						T		Bracken fern
<i>Kindbergia oregana</i>							25	Oregon beaked moss
<i>Rhytidiadelphus triquetrus</i>							4	Electr. Cat's-tail moss
<i>Hylocomium splendens</i>							55	Step moss
	Tree 103		Shrub 16		Herb 1	Moss 84		
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Dense, shady forest of young Douglas-firs with little understory of shrubs but a groundcover of moss.
- Several old growth red cedars scattered between.
- A small foot/deer trail runs up to Melissa Rd.

Wildlife:

- Deer trails and scat

Succession:

- Douglas-fir forest

7.8.36

Western hemlock – Douglas-fir - Salal dominated young forest

Polygon ID:	5	Slope:	3 %	V.com.	25
Structural Stage:	YFco	Slope Position:	Mid	Photo-no.	1592

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>			5					Red alder
<i>Thuja plicata</i>		10		5				Western red cedar
<i>Pseudotsuga menziesii</i>		20		10				Douglas-fir
<i>Tsuga heterophylla</i>		65		6	T			Western hemlock
<i>Abies grandes</i>				8				Grand fir
<i>Acer macrophyllum</i>				3				Big leaf maple
<i>Arbutus menziesii</i>				2				Arbutus
<i>Gaultheria shallon</i>					60			Salal
<i>Vaccinium parvifolium</i> *					1			red huckleberry*
<i>Vaccinium ovatum</i>					6			Evergreen huckleberry
<i>Polystichum munitum</i>						5		Sword fern
<i>Pteridium aquilinum</i>						3		Bracken fern
<i>Achlys triphylla</i>						1		Vanilla-leaf
<i>Kindbergia oregano</i> **							8	Oregon beaked moss**
<i>Hylocomium splendens</i>							1	Step moss
<i>Rubus ursinus</i>					T			Trailing blackberry
<i>Mahonia nervosa</i>								Dull Oregon grape
<i>Rubus spectabilis</i>				2				Salmonberry
Tree			Shrub		Herb		Moss	
100			103		9		9	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m
A3	Sub-canopy trees, >10m	C	Herb-layer
		D	Moss-layer

Notes:

- Hemlock dominated young forest with dense understory of salal.
- Main trees up to 50 cm in diameter, several young trees in tall shrub stage.
- *on cedar stump
- **on cwd on ground

Wildlife:

- None observed

Succession:

- Regeneration of coniferous forest.

7.8.37

Creeping Bentgrass dominated Riparian

Polygon ID:	30	Slope:	5 %	V.com.	26
Structural Stage:	R	Slope Position:	low	Photo-no.	1611

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		5						Red alder
<i>Rubus spectabilis</i> *					1			Salmonberry*
<i>Rubus</i> *					1			Evergreen blackberry*
<i>Rubus ursinus</i> *					2			Trailing blackberry*
<i>Vaccinium parvifolium</i> *					1			Red huckleberry*
<i>Rubus leucodermis</i> *					T			Blackcap*
<i>Ilex aquifolium</i>				3				English holly
<i>Juncus effusus</i>						2		Common rush
<i>Scirpus microcarpus</i>						T		Small-flowered bulrush
<i>Carex obnuta</i>						2		Slough sedge
<i>Carex deweyana</i>						1		Dewy's Sedge
<i>Agrostis stolonifera</i>						35		Creeping bentgrass
<i>Agrostis capillaris</i>						3		Colonial Bentgrass
<i>Agrostis oregonensis</i>						5		Oregon bentgrass
<i>Elymus glaucus</i>						2		Blue wildrye
<i>Cirsium vulgare</i>						1		Bull thistle
<i>Urtica dioica</i>						1		Stinging nettle
<i>Galium trifidum</i>						1		Small bedstraw
<i>Mentha arvensis</i>						1		Field mint
<i>Veronica beccabunga</i>						2		American brooklime
<i>Oenanthe sarmentosa</i>						T		Pacific water-parsley
<i>Myosotis</i>						4		Forget-me-not
<i>Cardamine spp.</i>						T		Bitter-cress
<i>Pteridium aquilinum</i>						T		Bracken fern*
<i>Kindbergia oregano</i> *							10	Oregon beaked moss*
<i>Rhytidiadelphus triquetrus</i> *							7	Electr. Cat's tail moss*
<i>Rhytidiadelphus loreus</i> *							1	Lanky moss*
<i>Blechnum spicant</i>						T		Deer fern
<i>Pteridium aquilinum</i>						T		Brachen fern
	Tree		Shrub		Herb	Moss		
	5		5		64	18		
	Cover in % by Layer							

Notes:

Grassy Riparian with cwd, 1-2m wide, along the shoreline, partly seasonal flooded.

- *Several old cedar stumps and logs covered with moss and shrubs
- One huge holly bush
- March 2011. Flooded.

Wildlife:

- Beaver activity: cuttings

7.8.38

Creeping Bentgrass dominated Riparian

Polygon ID:	32	Slope:	1 %	V.com.	26
Structural Stage:	R	Slope Position:	low	Photo-no.	1613

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Gaultheria shallon</i> *					1			Salal*
<i>Rubus spectabilis</i> *					1			Salmonberry*
<i>Vaccinium ovatum</i> *					T			Evergreen huckleberry*
<i>Rubus leucodermis</i> *					T			Blackcap*
<i>Rubus ursinus</i> *					1			Trailing blackberry*
<i>Juncus effusus</i>						1		Common rush
<i>Carex obnuta</i>						2		Slough sedge
<i>Carex deweyana</i>						3		Dewy's Sedge
<i>Agrostis oregonensis</i>						1		Oregon bentgrass
<i>Agrostis stolonifera</i>						35		Creeping bentgrass
<i>Agrostis scabra</i>						2		Hair bentgrass
<i>Holcus lanatus</i>						2		Common velvet grass
?						1		Grass
<i>Polystichum munitum</i>						1		Sword fern
<i>Lactuca muralis</i>						1		Wall lettuce
<i>Cirsium vulgare</i>						2		Bull thistle
<i>Urtica dioica</i>						1		Stinging nettle
<i>Myosotis spp</i>						4		Forget-me-not
<i>Stellaria crispa</i>						T		Crisp Sandwort
<i>Galium trifidum</i>						T		Small bedstraw
<i>Veronica beccabunga</i>						3		American brooklime
<i>Oenanthe sarmentosa</i>						1		Pacific water-parsley
<i>Mentha arvensis</i>						1		Field mint
<i>Cardamine spp.</i>						1		Bitter-cress
<i>Kindbergia oregana</i>							4	Oregon beaked moss*
<i>Rhytidiadelphus loreus</i>							T	Lanky moss*
<i>Leucolepis acanthoneuron</i>							T	Menzies' tree moss*
	Tree		Shrub		Herb	Moss		
	0		4		66	5		
	Cover in % by Layer							

Notes:

- Disturbed site, grassy Riparian with a lot of old cwd,
- Steel cable between the logs.
- Mudflat, partly seasonal flooded
- * shrubs and moss grow on cwd logs
- March 2011. Flooded.

Wildlife:

- Beaver activities: cuttings
- Decomposing beaver under a cedar tree

7.8.39

Seasonal flooded Bentgrass dominated Riparian

Polygon ID:	57	Slope:	4 %	V.com.	26
Structural Stage:	R	Slope Position:	low	Photo-no.	1467

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Holodiscus discolor</i>				40				Ocean spray
<i>Gaultheria shallon</i>					3			Salal*
<i>Rubus spectabilis</i> *					3			Salmonberry*
<i>Rubus ursinus</i>					2			Trailing blackberry
<i>Vaccinium parvifolium</i>					T			Red huckleberry
<i>Carex obnuta</i>						10		Slough sedge
<i>Carex deweyana</i>						4		Dewey's sedge
<i>Agrostis stolonifera</i>						25		Creeping bentgrass
<i>Agrostis oregonensis</i>						15		Oregon bentgrass
<i>Elymus glaucus</i>						3		Blue wildrye
?						15		Grass
<i>Galium trifidum</i>						1		Small bedstraw
<i>Cirsium vulgare</i>						2		Bull thistle
<i>Oenanthe sarmentosa</i>						1		Pacific water-parsley
<i>Cardamine spp.</i>						1		Bitter-cress
<i>Myosotis</i>						10		Forget-me-not
<i>Lactuca muralis</i>						1		Wall lettuce
<i>Digitalis purpurea</i>						2		Common foxglove
Tree 0				Shrub 48		Herb 90	Moss 0	
Cover in % by Layer								

Notes:

- Small grassy-herb Riparian with scattered sedge and a muddy zone, partly seasonal flooded.
- 1-2 meter wide
- * grows on cwd

Wildlife:

- Beaver activities: none

7.8.40

Colonial Bentgrass – Velvet grass - Salal dominated Riparian

Polygon ID:	50	Slope:	1 %	V.com.	27
Structural Stage:	R	Slope Position:	low	Photo-no.	1458

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Gaultheria shallon</i>					20			Salal
<i>Rubus spectabilis</i>					1			Salmonberry
<i>Rosa nutkana</i>					T			Nootka rose
<i>Rubus ursinus</i>					1			Trailing blackberry
<i>Spiraea douglasii</i>					T			hardhack
<i>Juncus effusus</i>						10		Common rush
<i>Carex obnuta</i>						5		Slough sedge
<i>Scirpus microcarpus</i>						5		Small-flowered bulrush
<i>Agrostis capillaris</i>						45		Colonial Bentgrass
<i>Holcus lanatus</i>						20		Common velvet grass
<i>Agrostis oregonensis</i>						10		Oregon bentgrass
<i>Elymus glaucus</i>						1		Blue wildrye
<i>Cirsium vulgare</i>						2		Bull thistle
<i>Urtica dioica</i>						1		Stinging nettle
<i>Galium trifidum</i>						T		Small bedstraw
<i>Gallium triflorum</i>						T		Sweet-scented bedstraw
<i>Mentha arvensis</i>						T		Field mint
						T		Fern / very small
	Tree 0			Shrub 22		Herb 101	Moss 0	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Grassy Riparian with patches of varying grasses, one meter wide, along the shoreline. Salal partly close to the shoreline.
- Much cwd. Tree layer: only dead alders and red cedars
- March 2011. Flooded.

Wildlife:

- Beaver activities: Some dragging paths, one fresh alder cutting

7.8.41

Bentgrass dominated Riparian

Polygon ID:	39	Slope:	1-15 %	V.com.	28
Structural Stage:	R	Slope Position:	low	Photo-no.	1605

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		20						Red alder
<i>Rubus spectabilis</i> *					3			Salmonberry
<i>Rubus leucodermis</i>					T			blackcap
<i>Rubus ursinus</i>					2			Trailing blackberry
<i>Juncus effusus</i>						3		Common rush
<i>Scirpus microcarpus</i>						5		Small-flowered bulrush
<i>Holcus lanatus</i>						T		Common velvet grass
<i>Agrostis stolonifera</i>						50		Creeping bentgrass
<i>Agrostis oregonensis</i>						2		Oregon bentgrass
<i>Agrostis scabra</i>						18		Hair bentgrass
<i>Elymus glaucus</i>						3		Blue wildrye
<i>Polystichum munitum</i>						8		Sword fern
<i>Pteridium aquilinum</i>						1		Bracken fern
<i>Myosotis spp</i>						4		Forget-me-not
<i>Veronica beccabunga</i>						2		American brooklime
<i>Rumex crispus</i>						2		Curled dock
<i>Mentha arvensis</i>						T		Field mint
<i>Viola glabella</i>						T		Stream violet
<i>Digitalis purpurea</i>						T		Common foxglove
<i>Rumex occidentalis</i>						T		Western dock
<i>Prunella vulgaris</i>						T		Self-heal
	Tree		Shrub		Herb	Moss		
	20		5		98			
	Cover in % by Layer							

Notes:

- Grassy Riparian partly steeper sloped, not seasonal flooded, part of former old logging road.
- Small-flowered bulrush patch near the water / beaver dam.
- Standing dead alder snags

Wildlife:

- None observed

7.8.42

Bentgrass – Forget-me-not dominated Riparian

Polygon ID:	55	Slope:	5 %	V.com.	29
Structural Stage:	R	Slope Position:	low	Photo-no.	1464

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Pseudotsuga menziensis</i>	20							Douglas fir
<i>Carex obnuta</i>						5		Slough sedge
<i>Juncus effusus</i>						3		Common rush
<i>Agrostis stolonifera</i>						45		Creeping bentgrass
<i>Elymus glaucus</i>						3		Blue wildrye
<i>Holcus lanatus</i>						5		Common velvet grass
<i>Cirsium vulgare</i>						1		Bull thistle
<i>Oenanthe sarmentosa</i>						3		Pacific water-parsley
<i>Cardamine spp.</i>						T		Bitter-cress
<i>Myosotis</i>						15		Forget-me-not
<i>Lactuca muralis</i>						2		Wall lettuce
<i>Mentha arvensis</i>						2		Field mint
	Tree 20		Shrub 0		Herb 84		Moss 0	
	Cover in % by Layer							

Notes:

- Small grassy Riparian with scattered sedge and a mudflat, partly seasonal flooded.
- 1-2 meter wide along the shoreline
- forget-me-not on mudflat
- dead, flooded salal in close water as well as cedar snags

Wildlife:

- Beaver activities: none
- Deer footprints

7.8.43

Juncus effusus – Velvet grass dominated beaver dam Riparian

Polygon ID:	41	Slope:	0-30 %	V.com.	30
Structural Stage:	dam	Slope Position:	low	Photo-no.	1623

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Thuja plicata</i>		5			T			Western red cedar
<i>Alnus rubra</i>		3						Red alder
<i>Gaultheria shallon</i> *					5			Salal*
<i>Rubus spectabilis</i> *					3			Salmonberry*
<i>Vaccinium parvifolium</i> *					1			Red huckleberry*
<i>Rubus ursinus</i>					3			Trailing blackberry
<i>Juncus effusus</i>						10		Common rush
<i>Juncus acuminatus</i>						T		Tapered rush
<i>Scirpus microcarpus</i>						6		Small-flowered bulrush
<i>Carex obnuta</i>						5		Slough sedge
<i>Agrostis stolonifera</i>						50		Creeping bentgrass
<i>Agrostis capillaris</i>						3		Colonial bentgrass
<i>Holcus lanatus</i>						1		Common velvet grass
<i>Agrostis oregonensis</i>						T		Oregon bentgrass
<i>Elymus glaucus</i>						2		Blue wildrye
<i>Urtica dioica</i>						3		Stinging nettle
<i>Cirsium vulgare</i>						8		Bull thistle
<i>Cirsium spp.</i>						T		thistle
<i>Galium trifidum</i>						1		Small bedstraw
<i>Mentha arvensis</i>						4		Field mint
<i>Veronica beccabunga</i>						1		American brooklime
<i>Cardamine spp.</i>						T		Bitter-cress
<i>Digitalis purpurea</i>						3		Common foxglove
<i>Myosotis</i>						2		Forget-me-not
<i>Polystichum munitum</i>						3		Sword fern
<i>Blechnum spicant</i>						T		Deer fern
<i>Kindbergia oregana</i> *							1	Oregon beaked moss*
		Tree		Shrub		Herb	Moss	
		8		11		103	1	
Cover in % by Layer								

Notes:

- Old beaver dam, ~2 m wide, with dense vegetation cover of grasses with sedge and rush patches. Some dead cedar and alder trees.
- * shrubs grow on cedar stumps

Wildlife:

- Beaver activities: Several dragging paths, dam building material
- Deer footprints

7.8.44

Colonial Bentgrass dominated Riparian

Polygon ID:	49	Slope:	1 %	V.com.	31
Structural Stage:	R	Slope Position:	low	Photo-no.	1457

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Gaultheria shallon</i>					5			Salal
<i>Rubus spectabilis</i>					1			Salmonberry
<i>rubus laciniatus</i>					T			Evergreen blackberry
<i>Juncus effusus</i>						18		Common rush
<i>Carex obnuta</i>						10		Slough sedge
<i>Scirpus microcarpus</i>						8		Small-flowered bulrush
<i>Agrostis capillaris</i>						30		Colonial Bentgrass
<i>Holcus lanatus</i>						15		Common velvet grass
<i>Cirsium vulgare</i>						3		Bull thistle
<i>Veronica beccabunga</i>						T		American brooklime
<i>Gallium triflorum</i>						T		Sweet-scented bedstraw
<i>Hypochaeris radicata</i>						1		Hairy cat's ear
<i>Mentha arvensis</i>						T		Field mint
	Tree		Shrub		Herb	Moss		
	0		6		66	0		
	Cover in % by Layer							

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Grassy Riparian with patches of dense rush about 1 meter wide, along the shoreline.
- Several snags with salal on top
- March 2011. Flooded.

Wildlife:

- Beaver activities: Some dragging paths and cuttings

7.8.45

Creeping Bentgrass - juncus effusus dominated Riparian

Polygon ID:	61	Slope:	3 %	V.com.	32
Structural Stage:	R	Slope Position:	low	Photo-no.	1472

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Thuja plicata</i>					2			Western red cedar
<i>Pseudotsuga menziensis</i>				3				Douglas-fir
<i>Rubus ursinus</i>					1			Trailing blackberry
<i>Gaultheria shallon</i>					1			Salal
<i>Juncus effusus</i>						20		Common rush
<i>Scirpus microcarpus</i>						3		Small-flowered bulrush
<i>Juncus acuminatus</i>						2		Tapered rush
<i>Carex obnuta</i>						3		Slough sedge
<i>Carex deweyana</i>						3		Dewy's Sedge
<i>Agrostis stolonifera</i>						45		Creeping bentgrass
<i>Agrostis capillaris</i>						2		Colonial Bentgrass
<i>Agrostis scabra</i>						8		Hair bentgrass
<i>Agrostis oregonensis</i>						2		Oregon bentgrass
<i>Elymus glaucus</i>						1		Blue wildrye
<i>Torreyochloa pauciflora</i>						T		Weak Alkali grass
<i>Holcus lanatus</i>						2		Common velvet grass
<i>Cirsium vulgare</i>						3		Bull thistle
<i>Urtica dioica</i>						T		Stinging nettle
<i>Cardamine spp.</i>						T		Bitter-cress
<i>Mentha arvensis</i>						T		Field mint
<i>Veronica beccabunga</i>						2		American brooklime
<i>Oenanthe sarmentosa</i>						1		Pacific water-parsley
<i>Myosotis</i>						2		Forget-me-not
<i>Polystichum munitum</i>						3		Sword fern
<i>Lactuca muralis</i>						1		Wall lettuce
<i>Stellaria crispa</i>						1		Crisp Sandwort
<i>Galium trifidum</i>						1		Small bedstraw
<i>Hypochaeris radicata</i>						T		Hairy cat's ear
<i>Kindbergia oregana</i>							3	Oregon beaked moss
<i>Rhytidiadelphus triquetrus</i>							1	Electr. Cat's tail moss
<i>Blechnum spicant</i>						T		Deer fern
	Tree		Shrub		Herb	Moss		
	0		7		106	4		
	Cover in % by Layer							

Notes:

- Grassy Riparian with juncus patches, ~2 m wide, along the shoreline.
- Some cwd
- Tree-layer: dead alders
- March 2011. Water is 1m into this polygon due to flooding.

Wildlife:

- Beaver activity: cuttings, paths, food sticks

7.8.46

Colonial Bentgrass – *Juncus effusus* dominated Riparian

Polygon ID:	63	Slope:	4%	V.com.	32
Structural Stage:	R	Slope Position:	low	Photo-no.	1474

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Thuja plicata</i>		5						Western red cedar
<i>Rubus spectabilis</i>					1			Salmonberry
<i>Juncus effusus</i>						7		Common rush
<i>Carex obnuta</i>						3		Slough sedge
<i>Carex deweyana</i>						6		Dewy's Sedge
<i>Agrostis stolonifera</i>						20		Creeping bentgrass
<i>Agrostis oregonensis</i>						2		Oregon bentgrass
<i>Cirsium vulgare</i>						1		Bull thistle
<i>Urtica dioica</i>						2		Stinging nettle
<i>Galium trifidum</i>						1		Small bedstraw
<i>Mentha arvensis</i>						1		Field mint
<i>Veronica beccabunga</i>						1		American brooklime
<i>Oenanthe sarmentosa</i>						3		Pacific water-parsley
<i>Myosotis</i>						1		Forget-me-not
<i>Cardamine spp.</i>						T		Bitter-cress
<i>Pteridium aquilinum</i>						T		Bracken fern
<i>Lactuca muralis</i>						T		Wall lettuce
<i>Carex spp.</i>						T		Sedge
<i>Diditalis purpurea</i>						T		Common foxglove
<i>Rubus ursinus</i>						T		Deer fern
<i>Polytrichum commune</i>						T		Sword fern
		Tree 5		Shrub 1		Herb 108	Moss	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Grassy Riparian with patches of juncus, partly seasonal flooded.
- Dead cedar trees
- March 2011. Flooded. Almost entirely underwater.

Wildlife:

- Tree frog

7.8.47

Creeping Bentgrass – *Juncus effusus* dominated Riparian

Polygon ID:	66	Slope:	1 %	V.com.	32
Structural Stage:	R	Slope Position:	low	Photo-no.	1561

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		10						Red alder
<i>Thuja plicata</i>		4		1*				Western red cedar
<i>Gaultheria shallon</i>					4			Salal*
<i>Rubus spectabilis</i>					3			Salmonberry*
<i>Juncus effusus</i>						15		Common rush
<i>Juncus acuminatus</i>						T		Tapered rush
<i>Juncus ensifolius</i>						T		Dagger-leaved rush
<i>Carex obnuta</i>						10		Slough sedge
<i>Carex deweyana</i>						1		Dewey's sedge
<i>Agrostis stolonifera</i>						30		Creeping bentgrass
<i>Agrostis oregonensis</i>						5		Oregon bentgrass
<i>Holcus lanatus</i>						3		Common velvet grass
<i>Phleum pratense</i>						T		Timothy
<i>Stellaria</i>						3		sandwort
<i>Galium trifidum</i>						1		Small bedstraw
<i>Cirsium vulgare</i>						1		Bull thistle
<i>Rumex crispus</i>						T		Curled dock
<i>Veronica beccabunga</i>						T		American brooklime
<i>Mentha arvensis</i>						1		Field mint
<i>Oenanthe sarmentosa</i>						T		Pacific water-parsley
<i>Cardamine spp.</i>						1		Bitter-cress
<i>Myosotis</i>						2		Forget-me-not
<i>Pteridium aquilinum</i>						T		Bracken fern
<i>Blechnum spicant</i>						4		Deer fern
<i>Kindbergia oregana</i> *							4	Oregon beaked moss*
<i>Rubus laciniatus</i>					1			Evergreen blackberry
		Tree		Shrub		Herb	Moss	
		14		9		78	4	
Cover in % by Layer								

Notes:

- Grassy Riparian with small scattered sedge and rush patches and mudflats between, seasonal flooded. Standing dead alder trees.
- ~ 3-5 meter wide
- *Several cedar stumps covered with salal, salmonberry and small cedars.
- March 2011. Flooded.

Wildlife:

- Beaver activities: Several dragging paths, cuttings, two small drag channels, footprints

7.8.48

Bentgrass – sedges dominated beaver dam Riparian

Polygon ID:	42	Slope:	1-50 %	V.com.	33
Structural Stage:	R dam	Slope Position:	low	Photo-no.	1370

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Gaultheria shallon</i>					1			Salal
<i>Rubus leucodermis</i>					1			Blackcap
<i>Rubus ursinus</i>					1			Trailing blackberry
<i>Juncus effusus</i>						6		Common rush
<i>Scirpus microcarpus</i>						10		Small-flowered bulrush
<i>Juncus acuminatus</i>						T		Tapered rush
<i>Carex obnuta</i>						3		Slough sedge
<i>Carex spp.</i>						T		Sedge
<i>Carex deweyana</i>						5		Dewy's Sedge
<i>Holcus lanatus</i>						10		Common velvet grass
<i>Agrostis stolonifera</i>						55		Creeping bentgrass
<i>Cirsium vulgare</i>						2		Bull thistle
<i>Polystichum munitum</i>						2		Sword fern
<i>Galium trifidum</i>						2		Small bedstraw
<i>Myosotis spp</i>						4		Forget-me-not
<i>Veronica beccabunga</i>						T		American brooklime
<i>Urtica dioica</i>						4		Stinging nettle
<i>Mentha arvensis</i>						1		Field mint
<i>Pteridium aquilinum</i>						T		Bracken fern
	Tree		Shrub		Herb	Moss		
	0		3		104	0		
	Cover in % by Layer							

Notes:

- Small beaver dam with dense vegetation cover of mainly grass and sedges.
- Dam is build with cwd and mud around two cedar snags and an alder snag. The water level is on the east side ~50cm higher than on the west side.
- Small-flowered bulrush partly gnawed by beavers

Wildlife:

- Beaver activities: paths, food sticks, scat, footprints

7.8.49

Creeping Bentgrass – Slough sedge dominated Riparian

Polygon ID:	28	Slope:	2%	V.com.	34
Structural Stage:	R	Slope Position:	low	Photo-no.	1610

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		3						Red alder
<i>Gaultheria shallon</i>					1			Salal
<i>Vaccinium parvifolium</i>					T			Red huckleberry
<i>Juncus effusus</i>						2		Common rush
<i>Carex obnuta</i>						20		Slough sedge
<i>Carex deweyana</i>						1		Dewy's Sedge
<i>Agrostis capillaris</i>						5		Colonial Bentgrass
<i>Agrostis stolonifera</i>						25		Creeping bentgrass
<i>Agrostis scabra</i>						4		Hair bentgrass
<i>Holcus lanatus</i>						4		Common velvet grass
<i>Tristum cernuum</i>						T		Nodding trisetum
<i>Elymus glaucus</i>						T		Blue wildrye
<i>Polystichum munitum</i>						1		Sword fern
<i>Blechnum spicant</i>						T		Deer fern
<i>Cirsium vulgare</i>						1		Bull thistle
<i>Urtica dioica</i>						1		Stinging nettle
<i>Myosotis spp</i>						6		Forget-me-not
<i>Equisetum arvense</i>						1		Common horsetail
<i>Galium trifidum</i>						1		Small bedstraw
<i>Veronica beccabunga</i>						2		American brooklime
<i>Oenanthe sarmentosa</i>						T		Pacific water-parsley
<i>Mentha arvensis</i>						1		Field mint
<i>Cardamine spp.</i>						T		Bitter-cress
<i>Rumex crispus</i>						T		Curled dock
<i>Kindbergia oregana</i>							4	Oregon beaked moss
<i>Rhytidiadelphus triquetrus</i>							1	Electr. Cat's tail moss
	Tree		Shrub		Herb	Moss		
	3		2		77	5		
	Cover in % by Layer							

Notes:

- Grassy Riparian with patches of Slough sedge and a mudflat, seasonal flooded.
- Less vegetation cover under shady cedar and alder snags along the shoreline.
- March 2011. Flooded.

Wildlife:

- Beaver activities: cuttings, food sticks, drag channel and paths, footprints
- Deer scat

7.8.50

Shady Creeping Bentgrass dominated Riparian

Polygon ID:	29	Slope:	1 %	V.com.	34
Structural Stage:	R	Slope Position:	low	Photo-no.	1609

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Gaultheria shallon</i> *					0			Salal*
<i>Rubus spectabilis</i> *					0			Salmonberry*
<i>Vaccinium ovatum</i> *					0			Evergreen huckleberry*
<i>Carex obnuta</i>						0		Slough sedge
<i>Agrostis stolonifera</i>						0		Creeping bentgrass
<i>Torreyochloa pauciflora</i>						0		Weak Alkali grass
<i>Festuca subulata</i>						0		Bearded fescue
<i>Elymus glaucus</i>						0		Blue wildrye
<i>Urtica dioica</i>						0		Stinging nettle*
<i>Myosotis spp</i>						0		Forget-me-not
<i>Veronica beccabunga</i>						0		American brooklime
<i>Oenanthe sarmentosa</i>						0		Pacific water-parsley
<i>Kindbergia oregana</i>							0	Oregon beaked moss*
<i>Plagiothecium undulatum</i>							0	Wavy-leaved Cotton moss
Tree		Shrub		Herb		Moss		
0		11		40		4		
Cover in % by Layer								

Notes:

- Small muddy Riparian with Slough sedge patches under shady cedar snags, seasonal flooded.
- * Shrubs and moss grow on cwd.
- March 2011. Flooded. Completely underwater. No vegetation visible

Wildlife:

- Beaver activities: cedar cuttings
- Deer scat

7.8.51

Creeping Bentgrass – Slough sedge dominated Riparian

Polygon ID:	31	Slope:	4 %	V.com.	34
Structural Stage:	R	Slope Position:	low	Photo-no.	1616

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Thuja plicata</i>					T			Western red cedar*
<i>Alnus rubra</i>					4			Red alder
<i>Gaultheria shallon</i>								Salal
<i>Carex obnuta</i>					3			Slough sedge
<i>Carex deweyana</i>								Dewy's Sedge
<i>Agrostis oregonensis</i>					2			Oregon bentgrass
<i>Agrostis stolonifera</i>					T			Creeping bentgrass
<i>Agrostis scabra</i>					1			Hair bentgrass
<i>Elymus glaucus</i>					T			Blue wildrye
<i>Aira caryophyllea</i>					T			Silver hairgrass
<i>Lactuca muralis</i>					T			Wall lettuce
<i>Cirsium vulgare</i>						5		Bull thistle
<i>Myosotis spp</i>						1		Forget-me-not
<i>Galium trifidum</i>						15		Small bedstraw
<i>Veronica beccabunga</i>						2		American brooklime
<i>Oenanthe sarmentosa</i>						5		Pacific water-parsley
<i>Mentha arvensis</i>						45		Field mint
<i>Plagiothecium undulatum</i>						2		Wavy-leaved Cotton moss
<i>Blechnum spicant</i>						T		Deer fern
<i>Rumex occidentalis</i>						T		Western dock
<i>Rubus laciniatus</i>					T			Evergreen blackberry
<i>Angleica genuflexa</i>						T		Kneeling angelica
<i>Antennaria neglecta</i>						T		Field pussytoes
<i>Lysichiton americanum</i>						T		Skunk cabbage
		Tree		Shrub		Herb	Moss	
		0		11		92	6	
Cover in % by Layer								

Notes:

- Grassy Riparian with patches of sedge, 1-2 meters wide, along the shoreline. Several cedar snags close to the shore, here less vegetation under, muddy line, seasonal flooded.
- * Shrubs and mosses grow on old cedar stumps, scattered along the shoreline.
- March 2011. Flooded.

Wildlife:

- Beaver activities: dragging paths, cuttings, footprints
- deer scat

7.8.52

Bentgrass – Slough sedge dominated Riparian

Polygon ID:	36	Slope:	2-40 %	V.com.	34
Structural Stage:	R	Slope Position:	low	Photo-no.	1621

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Thuja plicata</i>		5			2			Western red cedar
<i>Alnus rubra</i>		4						Red alder
<i>Tsuga heterophylla</i>		4			T*			Western hemlock
<i>Gaultheria shallon</i>					5			Salal
<i>Rubus spectabilis</i>				4	1			Salmonberry
<i>Rubus leucodermis</i>					T			blackcap
<i>Rubus ursinus</i>					1			Trailing blackberry
<i>Juncus effusus</i>						4		Common rush
<i>Juncus acuminatus</i>						T		Tapered rush
<i>Carex obnuta</i>						5		Slough sedge
<i>Agrostis stolonifera</i>						25		Creeping bentgrass
<i>Agrostis capillaris</i>						5		Colonial bentgrass
<i>Agrostis oregonensis</i>						2		Oregon bentgrass
<i>Holcus lanatus</i>						1		Common velvet grass
<i>Elymus glaucus</i>						2		Blue wildrye
<i>Deschampsia cespitosa</i>						T		Tufted hairgrass
<i>Urtica dioica</i>						T		Stinging nettle
<i>Cirsium vulgare</i>						2		Bull thistle
<i>Epilobium spp.</i>						T		Willowherb
<i>galium triflorum</i>						1		Sweet-scented bedstraw
<i>Mentha arvensis</i>						T		Field mint
<i>Oenanthe sarmentosa</i>						T		Pacific water-parsley
<i>Cardamine spp.</i>						T		Bitter-cress
<i>Myosotis</i>						1		Forget-me-not
<i>Anaphalis margaritacea</i>						T		Pearly everlasting
<i>Lactuca muralis</i>						1		Wall lettuce
<i>Equisetum arvense</i>						T		Common horsetail
<i>Pteridium aquilinum</i>						T		Bracken fern
<i>Polystichum munitum</i>						3		Sword fern
<i>Blechnum spicant</i>						1		Deer fern
<i>Kindbergia oregana</i> *							1	Oregon beaked moss*
		Tree		Shrub		Herb	Moss	
		13		13		49	1	
Cover in % by Layer								

Notes:

- Grassy Riparian with sedge and rush patches and a mudflat near the water, seasonal flooded. Standing dead cedars and alder trees.
- One part near the dam is artificially of higher elevation cause of dig-out material from a pond on the neighbor's property.
- March 2011. Flooded.

Wildlife:

- Beaver activities: Several dragging paths, cuttings

7.8.53

Creeping Bentgrass – Slough sedge dominated Riparian

Polygon ID:	65	Slope:	2-5%	V.com.	34
Structural Stage:	R	Slope Position:	low	Photo-no.	1617

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Thuja plicata</i> *					T			Western red cedar*
<i>Gaultheria shallon</i> *					4			Salal*
<i>Rubus spectabilis</i> *					3			Salmonberry *
<i>Rubus ursinus</i> *					2			Trailing blackberry*
<i>Rubus</i> *					T			Evergreen blackberry*
<i>Vaccinium parvifolium</i> *					1			Red huckleberry*
<i>Vaccinium ovatum</i> *					T			Evergreen huckleberry*
<i>Rubus leucodermis</i> *					T			Blackcap*
<i>Juncus effusus</i>						5		Common rush
<i>Juncus ensifolius</i>						1		Dagger-leaved rush
<i>Carex obnuta</i>						25		Slough sedge
<i>Agrostis oregonensis</i>						2		Oregon bentgrass
<i>Agrostis capillaris</i>						5		Colonial Bentgrass
<i>Agrostis stolonifera</i>						45		Creeping bentgrass
<i>Holcus lanatus</i>						2		Common velvet grass
<i>Festuca subulata</i>								Bearded fescue
<i>Torreyochloa pauciflora</i>						T		Weak Alkali grass
<i>Elymus glaucus</i>						2		Blue wildrye
<i>Urtica dioica</i>						1		Stinging nettle
<i>Polystichum munitum</i>						1		Sword fern
<i>Blechnum spicant</i>						3		Deer fern
<i>Cirsium vulgare</i>						1		Bull thistle
<i>Myosotis spp</i>						3		Forget-me-not
<i>Galium trifidum</i>						T		Small bedstraw
<i>Veronica beccabunga</i>						1		American brooklime
<i>Oenanthe sarmentosa</i>						T		Pacific water-parsley
<i>Mentha arvensis</i>						2		Field mint
<i>Stellaria calycantha</i>						2		Northern Starwort
<i>Epilobium spp.</i>						T		Willowherb
<i>Cardamine spp.</i>						T		Bitter-cress
<i>Kindbergia oregana</i>							5	Oregon beaked moss*
<i>Polytrichum commune</i>							T	Hairy-cap moss*
	Tree		Shrub		Herb	Moss		
	0		11		102	6		
	Cover in % by Layer							

Notes:

- Grassy Riparian with patches of sedge, 1-2 meters wide, along the shoreline. Several cedar snags close to the shore, here less vegetation under, muddy line, seasonal flooded.
- * Shrubs and mosses grow on cedar stumps, scattered along shoreline.
- March 2011. This ground is elevated enough that the water doesn't inundate it.

Wildlife:

- Beaver activities: dragging paths, cuttings, footprints
- deer scat

7.8.54

Bentgrass – Velvet grass – Slough sedge dominated Riparian

Polygon ID:	51	Slope:	2-5%	V.com.	35
Structural Stage:	R	Slope Position:	low	Photo-no.	1459

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Thuja plicata</i>		10						Western red cedar
<i>Gaultheria shallon</i>					3			Salal
<i>Rubus spectabilis</i>					2			Salmonberry (scattered)
<i>Rubus ursinus</i>					T			Trailing blackberry
<i>Juncus effusus</i>						15		Common rush
<i>Carex obnuta</i>						20		Slough sedge
<i>Scirpus microcarpus</i>						10		Small-flowered bulrush
<i>Juncus acuminatus</i>						T		Tapered rush
<i>Agrostis capillaris</i>						10		Colonial Bentgrass
<i>Agrostis stolonifera</i>						25		Creeping bentgrass
<i>Holcus lanatus</i>						20		Common velvet grass
<i>Agrostis exarata</i>						T		Spike Bentgrass
<i>Tristum cernuum</i>						T		Nodding trisetum
<i>Torreyochloa pauciflora</i>						T		Weak Alkali grass
<i>Cirsium vulgare</i>						2		Bull thistle
<i>Myosotis spp</i>						1		Forget-me-not
<i>Galium trifidum</i>						T		Small bedstraw
<i>Veronica beccabunga</i>						T		American brooklime
<i>Mentha arvensis</i>						1		Field mint
	Tree 10		Shrub 5		Herb 111	Moss		
	Cover in % by Layer							

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Grassy Riparian with dense patches of sedge and rush, 1-2 meters wide, along the shoreline.
- One huge red cedar near the shore
- Tree layer: only dead alders

Wildlife:

- Beaver activities: Some dragging paths and cuttings

7.8.55

Colonial Bentgrass- Common rush dominated disturbed site

Polygon ID:	38	Slope:	2 %	V.com.	36
Structural Stage:	R	Slope Position:	low	Photo-no.	1412

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Juncus effuses</i>						35		Common rush
<i>Agrostis capillaris</i>						42		Colonial Bentgrass
<i>Plantago</i>						T		Broadleaf plantane
<i>Myosotis</i>						1		forget-me-not
<i>Eleocharus ovata</i>						T		Ovoid spike-rush
<i>Tolmiea menziesii</i>						T		Piggy-back plant
<i>Veronica beccabunga</i>						T		American brooklime
<i>Rumex crispus</i>						1		Curled dock
<i>Polystichum munitum</i>						3		Sword fern
<i>Cirsium</i>						2		Bull thistle
<i>Urtica dioica</i>						3		Stinging nettle
<i>Trisetum cernuum</i>						1		Nodding tresetum
<i>Bromus vulgaris</i>						1		Columbia brome
<i>Gallium triflorum</i>						T		Sweet scented bedstraw
<i>Stalleria crispa</i>						T		Crisp sandwort
<i>Rhytidiadelphus triquetrus</i>							2	Electr. Cat's tail moss
	Tree		Shrub		Herb	Moss		
	0		0		97	2		
Cover in % by Layer								

Notes:

- Most of herbs in a small growing state, hard to identify near the water edge, end of 'old logging road'
- *Juncus effuses* in dense patches on one side and in small plants among the herbs.
- Very tiny fern plants in mud, probably sword fern
- Disturbed site, compact soils, former road, close to water

Wildlife:

- Frogs and dragonflies
- Deer trace in mud

Succession:

- Open clearing, maybe spread of *juncus effusus* or fern

7.8.56

Bentgrass – *Juncus effusus* dominated Riparian

Polygon ID:	47	Slope:	1 %	V.com.	37
Structural Stage:	R	Slope Position:	low	Photo-no.	1456

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		0						Red alder
<i>Thuja plicata</i>		2						Red cedar
<i>Gaultheria shallon</i>					3			Salal
<i>Rubus spectabilis</i>					5			Salmonberry
<i>Juncus effusus</i>						5		Common rush
<i>Agrostis capillaris</i>						33		Colonial Bentgrass
<i>Agrostis stolonifera</i>						9		Creeping bentgrass
<i>Carex obtusa</i>						3		Slough sedge
<i>Cirsium spp.</i>						1		thistle
<i>Polystichum munitum</i>						3		Sword fern
<i>Holcus lanatus</i>						5		Common velvet grass
		Tree		Shrub		Herb	Moss	
		2		8		59	0	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Grassy Riparian about 0.5 meters along the shoreline.
- Duckweed in mud
- All alder cut down and in water due to beaver.
- March 2011. Flooded.

Wildlife:

- Beaver activities: Several dragging paths and cuttings
- Scat of beaver and deer

Blue wildrye - Bentgrass dominated Riparian

Polygon ID:	59	Slope:	5 %	V.com.	38
Structural Stage:	R	Slope Position:	low	Photo-no.	1469

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		15						Red alder
<i>Rubus ursinus</i>					1			Trailing blackberry
<i>Gaultheria shallon</i>					1			Salal
<i>Juncus effusus</i>						3		Common rush
<i>Scirpus microcarpus</i>						3		Small-flowered bulrush
<i>Carex deweyana</i>						1		Dewy's Sedge
<i>Carex obnuta</i>						4		Slough sedge
<i>Agrostis stolonifera</i>						25		Creeping bentgrass
<i>Elymus glaucus</i>						45		Blue wildrye
<i>Typha latifolia</i>						4		Cattail
<i>Galium trifidum</i>						1		Small bedstraw
<i>Lactuca muralis</i>						T		Wall lettuce
<i>Mentha arvensis</i>						1		Field mint
<i>Stellaria spp.</i>						5		sandwort
<i>Veronica beccabunga</i>						1		American brooklime
<i>Epilobium spp.</i>						T		Willowherb
<i>Oenanthe sarmentosa</i>						1		Pacific water-parsley
<i>Cirsium vulgare</i>						3		Bull thistle
<i>Myosotis</i>						4		Forget-me-not
<i>Urtica dioica</i>						1		Stinging nettle
<i>Epilobium angustifolium</i>						T		Fireweed
<i>Rubus ursinus</i>					T			Trailing blackberry
	Tree 15		Shrub 2		Herb 102		Moss	
Cover in % by Layer								

Notes:

- Short Grassy Riparian with patches of Cattail and small-flowered bulrush near the water (partly eaten by beavers), 2-4 m wide, along the shoreline.
- Tree-layer with several dead alders.

Wildlife:

- Beaver activity: cuttings, paths
- Tree frog
- Small beaver lodge. Most of Red Alders cut by beaver. Large Alders cut.

7.8.58

Velvet grass – Blue wildrye dominated Riparian

Polygon ID:	53	Slope:	5-15 %	V.com.	39
Structural Stage:	R	Slope Position:	low	Photo-no.	1462

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		30						Red alder
<i>Gaultheria shallon</i>					4			Salal
<i>Rubus ursinus</i>					T			Trailing blackberry
<i>Mahonia nervosa</i>					2			Oregon-grape
<i>Carex deweyana</i>						3		Dewey's sedge
<i>Elymus glaucus</i>						20		Blue wildrye
<i>Holcus lanatus</i>						25		Common velvet grass
<i>Urtica dioica</i>						10		Stinging nettle
<i>Cirsium vulgare</i>						8		Bull thistle
<i>Stellaria spp.</i>						1		sandwort
<i>Polystichum munitum</i>						5		Sword fern
<i>Cardamine spp.</i>						T		Bitter-cress
<i>galium triflorum</i>						T		Sweet-scented bedstraw
<i>Lactuca muralis</i>						1		Wall lettuce
	Tree 30		Shrub 6		Herb 74	Moss 0		
Cover in % by Layer								

Notes:

- Riparian, grass dominated disturbed clearing with rocks and a lot of cwd and cedar stumps
- Several dead alder snags
- March 2011. Flooded.

Wildlife:

- Beaver activities: old cuttings, paths

7.8.59

Juncus effusus – Creeping Bentgrass dominated Riparian

Polygon ID:	60	Slope:	5 %	V.com.	40
Structural Stage:	R	Slope Position:	low	Photo-no.	1469

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		10						Red alder
<i>Rubus ursinus</i>					1			Trailing blackberry
<i>Gaultheria shallon</i>					1			Salal*
<i>Juncus effusus</i>						45		Common rush
<i>Scirpus microcarpus</i>						2		Small-flowered bulrush
<i>Carex deweyana</i>						2		Dewy's Sedge
<i>Carex obnuta</i>						5		Slough sedge
<i>Agrostis stolonifera</i>						25		Creeping bentgrass
<i>Elymus glaucus</i>						T		Blue wildrye
<i>Typha latifolia</i>						1		Cattail
<i>Galium trifidum</i>						T		Small bedstraw
<i>Lactuca muralis</i>								Wall lettuce
<i>Mentha arvensis</i>								Field mint
<i>Oenanthe sarmentosa</i>						1		Pacific water-parsley
<i>Cirsium vulgare</i>						2		Bull thistle
<i>Myosotis</i>						1		Forget-me-not
<i>Urtica dioica</i>						T		Stinging nettle
<i>Epilobium angustifolium</i>						T		Fireweed
		Tree		Shrub		Herb	Moss	
		10		3		103	0	
Cover in % by Layer								

Notes:

- Riparian with dense juncus patches, 1-2 m wide, along the shoreline.
- Cwd, *old cedar stumps with salal cover
- Tree-layer: dead alders
- Slough sedge spreads into upper salal

Wildlife:

- Beaver activity: cuttings

7.8.60

Juncus effusus - Bentgrass dominated Riparian

Polygon ID:	62	Slope:	2 %	V.com.	40
Structural Stage:	R	Slope Position:	low	Photo-no.	1473

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		4						Red alder
<i>Thuja plicata</i>					T			Western red cedar
<i>Rubus spectabilis</i>					1			Salmonberry
<i>Rubus ursinus</i>					T			Trailing blackberry
<i>Gaultheria shallon</i>					1			Salal
<i>Juncus effusus</i>						50		Common rush
<i>Scirpus microcarpus</i>						3		Small-flowered bulrush
<i>Juncus ensifolius</i>						T		Dagger-leaved rush
<i>Juncus acuminatus</i>						2		Tapered rush
<i>Carex obnuta</i>						4		Slough sedge
<i>Agrostis stolonifera</i>						20		Creeping bentgrass
<i>Agrostis oregonensis</i>						1		Oregon bentgrass
<i>Agrostis scabra</i>						20		Hair bentgrass
<i>Cirsium vulgare</i>						1		Bull thistle
<i>Cirsium arvensis</i>						T		Canada thistle
<i>Mentha arvensis</i>						1		Field mint
<i>Veronica beccabunga</i>						2		American brooklime
<i>Oenanthe sarmentosa</i>						1		Pacific water-parsley
<i>Myosotis</i>						2		Forget-me-not
<i>Polystichum munitum</i>						1		Sword fern
<i>Blechnum spicant</i>						T		Deer fern
<i>Epilobium spp.</i>						T		Willowherb
<i>Anaphalis margaritacea</i>						1		Pearly everlasting
<i>Gallium triflorum</i>						T		Sweet-scented bedstraw
		Tree		Shrub		Herb	Moss	
		4		2		110	0	
Cover in % by Layer								

Notes:

- Riparian with dense juncus, mixed with bentgrass, 2-3 m wide, along the shoreline.
- Some cwd
- Tree-layer: mostly dead alders

Wildlife:

- Beaver activity: cuttings, paths, food sticks

7.8.61

Juncus effusus - Small-flowered bulrush dominated Beaver-dam

Polygon ID:	43	Slope:	0 %	V.com.	41
Structural Stage:	R	Slope Position:	low	Photo-no.	1414

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Scirpus microcarpus</i>						70		Small-flowered Bulrush
<i>Juncus effusus</i>						30		Common rush
Tree 0				Shrub 0		Herb 100	Moss 0	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Beaver-dam with several alder snags in between. Dam is not complete, water level on both sides equal.
- There might be some traces of other herbs, but scirpus and juncus are the dominant species.

Wildlife:

- Several small frogs on Sedge leaves, as well as dragonflies

Succession:

- Beaver activities may increase herb layer, probably no tree growing, soil too shallow and wet.

7.8.62

Juncus effusus - Bentgrass dominated Riparian

Polygon ID:	46	Slope:	5 %	V.com.	42
Structural Stage:	R	Slope Position:	low	Photo-no.	1455

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		0						Red alder
<i>Thuja plicata</i>					2			Western Red cedar
<i>Rubus spectabilis</i>					3			Salmonberry
<i>Spiraea douglasii</i>					T			hardhack
<i>Vaccinium ovatum</i>					0			Evergreen blackberry/scattered
<i>Juncus effusus</i>						T		Common rush
<i>Agrostis capillaris</i>						10		Colonial Bentgrass
<i>Agrostis stolonifera</i>						5		Creeping Bentgrass
<i>Agrostis oregonensis</i>						5		Oregon Bentgrass
<i>Elymus glaucus</i>						2		Blue wildrye
<i>Holcus lanatus</i>						3		Common velvet grass
<i>Scirpus microcarpus</i>						2		Small-flowered bulrush
<i>Carex deweyana</i>						2		Dewy's Sedge
<i>Juncus ensifolius</i>						T		Dagger-leaved rush
<i>Polystichum munitum</i>						4		Sword fern
<i>Blechnum soicant</i>						T		Deer fern
<i>Equisetum arvense</i>						T		Common horsetail
<i>Kindbergia oregana</i>							1	Oregon beaked moss
		Tree 0		Shrub 5		Herb 35	Moss 1	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Riparian about one meter wide along the shoreline.
- Several small red cedar trees
- Moss on cwd
- March 2011. Flooded.
- Beaver cut down all Red Alders.

Wildlife:

- Beaver activities: Several dragging paths and a lot of older cuttings

7.8.63

Juncus effusus - Bentgrass dominated Riparian

Polygon ID:	48	Slope:	1 %	V.com.	43
Structural Stage:	R	Slope Position:	low	Photo-no.	1671

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		1						Red alder
<i>Gaultheria shallon</i>					40			Salal
<i>Rubus spectabilis</i>					1			Salmonberry
					T			Evergreen blackberry
<i>Juncus effusus</i>						2		Common rush
<i>Juncus acuminatus</i>						T		Tapered rush
<i>Agrostis capillaris</i>						10		Colonial Bentgrass
<i>Agrostis stolonifera</i>						10		Creeping bentgrass
<i>Agrostis oregonensis</i>						8		Oregon bentgrass
<i>Carex obnuta</i>						10		Slough sedge
<i>Carex deweyana</i>						5		Dewy's Sedge
<i>Cirsium vulgare</i>						4		Bull thistle
<i>Polystichum munitum</i>						2		Sword fern
<i>Pteridium aquilinum</i>						T		Bracken fern
<i>Holcus lanatus</i>						10		Common velvet grass
<i>Elymus glaucus</i>						8		Blue wildrye
<i>Bromus vulgaris</i>						T		Columbia Brome
<i>Veronica beccabunga</i>						1		American brooklime
		Tree		Shrub		Herb	Moss	
		1		41		70		
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Grassy Riparian with patches of dense sedge and rush about 1 meter wide, along the shoreline.
- Duckweed in mud
- Beaver has cut down all but 1% of Red Alder
- March 2011. Flooded.

Wildlife:

- Beaver activities: Several dragging paths and cuttings

7.8.64

Juncus effusus – Velvet grass dominated Riparian

Polygon ID:	52	Slope:	2-5 %	V.com.	44
Structural Stage:	R	Slope Position:	low	Photo-no.	1461

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>				1				Red alder
<i>Pseudotsuga menziensis</i>				1				Douglas-fir
<i>Arbutus menziesii</i>				1				Arbutus
<i>Gaultheria shallon</i>					3			Salal
<i>Rubus ursinus</i>						2		Trailing blackberry
<i>Juncus effusus</i>						45		Common rush
<i>Scirpus microcarpus</i>						5		Small-flowered bulrush
<i>Carex obnuta</i>						15		Slough sedge
<i>Carex spp.</i>						4		Sedge
<i>Agrostis stolonifera</i>						5		Creeping bentgrass
<i>Holcus lanatus</i>						20		Common velvet grass
<i>Elymus glaucus</i>						2		Blue wildrye
<i>Agrostis oregonensis</i>						1		Oregon bentgrass
<i>Urtica dioica</i>						1		Stinging nettle
<i>Cirsium vulgare</i>						2		Bull thistle
<i>Cirsium arvensis</i>						T		Canada thistle
<i>Galium trifidum</i>						T		Small bedstraw
<i>Mentha arvensis</i>						3		Field mint
<i>Ranunculus flamula</i>						3		Lesser Spearwort
<i>Rumex crispus</i>						T		Curled dock
<i>Lactuca muralis</i>						T		Wall lettuce
<i>Pteridium aquilinum</i>						T		Bracken fern
<i>Veronica beccabunga</i>						2		American brooklime
<i>Hypochaeris radicata</i>						1		Hairy cat's ear
<i>Potamogeton natans</i>						T		Floating-leaved pondweed
Tree				Shrub		Herb	Moss	
				6		111		
Cover in % by Layer								

Notes:

- Grassy Riparian with dense patches of juncus effusus and some slough sedge patches, about one meter wide, along the shoreline.
- March 2011. Flooded.

Wildlife:

- Beaver activities: Several dragging paths
- Deer trails and scat

7.8.65

Slough sedge – Red alder dominated Riparian

Polygon ID:	54	Slope:	3 %	V.com.	45
Structural Stage:	R	Slope Position:	low	Photo-no.	1465

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Alnus rubra</i>		55						Red alder
<i>Rubus spectabilis</i>					1			salmonberry
<i>Gaultheria shallon</i>					2			Salal
<i>Rubus ursinus</i>					1			Trailing blackberry
<i>Vaccinium ovatum</i>					1			Evergreen huckleberry
<i>Carex obnuta</i>						85		Slough sedge
<i>Agrostis stolonifera</i>						8		Creeping bentgrass
<i>Agrostis oregonensis</i>						T		Oregon bentgrass
<i>Elymus glaucus</i>						3		Blue wildrye
<i>Agrostis scabra</i>						2		hair bentgrass
<i>Polystichum munitum</i>						T		Sword fern
<i>Mentha arvensis</i>						1		Field mint
<i>Cirsium arvensis</i>						1		Canada thistle
	Tree 55		Shrub 5		Herb 101	Moss 0		
Cover in % by Layer								

Notes:

- dense Riparian of Slough sedge and with a tree-layer of red alder,
- ~2 m wide, along the shoreline.
- * Shrubs grow on cedar stumps or cwd.

Wildlife:

- Beaver activities: alder cuttings

7.8.66

Salal – Slough sedge dominated Riparian

Polygon ID:	58	Slope:	1 %	V.com.	46
Structural Stage:	R	Slope Position:	low	Photo-no.	1468

Vegetation Species	Cover in % by Specie							Common name
	A1	A2	A3	B1	B2	C	D	
<i>Gaultheria shallon</i>					45			Salal
<i>Rubus ursinus</i>					1			Trailing blackberry
<i>Juncus effusus</i>						3		Common rush
<i>Carex obnuta</i>						20		Slough sedge
<i>Polystichum munitum</i>						2		Sword fern
<i>Mentha arvensis</i>						2		Field mint
<i>Galium trifidum</i>						1		Small bedstraw
<i>Cirsium vulgare</i>						T		Bull thistle
<i>Urtica dioica</i>						3		Stinging nettle
<i>Veronica beccabunga</i>						1		American brooklime
<i>Elymus glaucus</i>						2		Blue wildrye
<i>Holcus lanatus</i>						2		Common velvet grass
<i>Agrostis stolonifera</i>						15		Creeping bentgrass
<i>Agrostis oregonensis</i>						1		Oregon bentgrass
	Tree 0		Shrub 46		Herb 52		Moss 0	
Cover in % by Layer								

A1	Dominant trees, >10m	B1	Tall Shrubs, 2-10m		
A2	Main tree canopy, >10m	B2	Low Shrubs, < 2m		
A3	Sub-canopy trees, >10m	C	Herb-layer	D	Moss-layer

Notes:

- Small Riparian with salal close to the shore, patches of slough sedge, spreading partly into upper salal.
- Tree layer: only dead alders

Wildlife:

- Beaver activities: Some cuttings, cwd of alder

Succession:

- Extension of sedge

7.8.67

Roads and trails

There are several trails through the property (see map I). The trail in the southern part, as well as the trail to the eastern beaver dam, is a former logging road. This road crosses the wetland and is there currently flooded. In the southern property the old logging road becomes smaller, along the wetland in west direction.

It follows a loose list of plants growing on the trails and the 'old logging road'. However, it can not be considered as complete and it hasn't been made an estimation of percent cover. Grasses and herbs dominate the plant community of the trails. Because of the late time in season, grasses were often not identifiable anymore.

The plants change in composition along the way, depending on surrounding plant communities.

List of plants occur on the trails

Blue wildrye	<i>Elymus glaucus</i>
Common velvet grass	<i>Holcus lanatus</i>
Creeping bentgrass	<i>Agrostis stolonifera</i>
Dewy's Sedge	<i>Carex deweyana</i>
Common rush	<i>Juncus effusus</i>
Sword fern	<i>Polystichum munitum</i>
Bracken fern	<i>Pteridium aquilinum</i>
Wall lettuce	<i>Lactuca muralis</i>
Trailing blackberry	<i>Rubus ursinus</i>
Creeping buttercup	<i>Ranunculus repens</i>
Sweet-scented bedstraw	<i>Gallium triflorum</i>
Curled dock	<i>Rumex crispus</i>
Stinging nettle	<i>Urtica dioica</i>
Oregon beaked moss	<i>Kindbergia oregana</i>

7.8.68 Vegetation on up turned tree bases, surrounded by water

This is a list of plants which grow on the root plates of several dead trees lying in the water. Those small "islands" are separated from the land and host different plant species. Most of them occur in the western part of the large pond.

Polygon 69, map I / Photo 1335

Salal	<i>Gaultheria shallon</i>
Salmonberry	<i>Rubus spectabilis</i>
Hardhack	<i>Spiraea douglasii</i>
Trailing blackberry	<i>Rubus ursinus</i>
Red elderberry	<i>Sambucus racemosa</i>
Blackcap	<i>Rubus leucodermis</i>
American brooklime	<i>Veronica beccabunga</i>
Fireweed	<i>Epilobium angustifolium</i>
Sedge	<i>Carex spp.</i>
Sweet-scented bedstraw	<i>Gallium triflorum</i>
Small bedstraw	<i>Galium trifidum</i>
Curled dock	<i>Rumex crispus</i>
Wall lettuce	<i>Lactuca muralis</i>
Dagger-leaved rush	<i>Juncus ensifolius</i>
Common rush	<i>Juncus effusus</i>
Small-flowered bulrush	<i>Scirpus microcarpus</i>
Pacific water-parsley	<i>Oenanthe sarmentosa</i>
Bull thistle	<i>Cirsium vulgare</i>
Floating-leaved pondweed	<i>Potamogeton natans</i>
Duckweed	lemna
Common velvet grass	<i>Holcus lanatus</i>
Creeping bentgrass	<i>Agrostis stolonifera</i>
Deer fern	<i>Blechnum spicant</i>
Douglas' water-hemlock	<i>Cicuta douglasii</i>
Slender beaked moss (?)	<i>Kindbergia praelonga (?)</i>

7.9 Vegetation Communities by dominant species

	Dominant Species #1	Dominant Species #2	Dominant Species #3	Polygon-no.
01	Red alder <i>Alnus rubra</i>	Sword fern <i>Polystichum munitum</i>	Salal <i>Gaultheria shallon</i>	26
02	Red alder <i>Alnus rubra</i>	Salal <i>Gaultheria shallon</i>	Douglas-fir <i>Pseudotsuga menziensis</i>	8/14/24/25
03	Red alder <i>Alnus rubra</i>	Sword fern <i>Polystichum munitum</i>		16/18/22
04	Red alder <i>Alnus rubra</i>	Salmonberry <i>Rubus spectabilis</i>	Sword fern <i>Polystichum munitum</i>	27
05	Red alder <i>Alnus rubra</i>	Salal <i>Gaultheria shallon</i>	Sword fern <i>Polystichum munitum</i>	20 / 1
06	Red alder <i>Alnus rubra</i>	Sword fern <i>Polystichum munitum</i>	Salmonberry <i>Rubus spectabilis</i>	21
07	Red alder <i>Alnus rubra</i>	Small-flowered bulrush <i>Scirpus microcarpus</i>	Common rush <i>Juncus effusus</i>	45
08	Red alder <i>Alnus rubra</i>	Creeping bentgrass <i>Agrostis stolonifera</i>		37/40
09	Red alder <i>Alnus rubra</i>	Salal <i>Gaultheria shallon</i>	Slough sedge <i>Carex obtusa</i>	23
10	Red alder <i>Alnus rubra</i>	Slough sedge <i>Carex obtusa</i>		56
11	Red alder <i>Alnus rubra</i>	Douglas-fir <i>Pseudotsuga menziensis</i>	Salal <i>Gaultheria shallon</i>	34
12	Red alder <i>Alnus rubra</i>	Douglas-fir <i>Pseudotsuga menziensis</i>	Sword fern <i>Polystichum munitum</i>	44
13	Red alder <i>Alnus rubra</i>	Big leaf maple <i>Acer macrophyllum</i>	Grand fir <i>Abies grandis</i>	6
14	Red alder <i>Alnus rubra</i>	Western red cedar <i>Thuja plicata</i>	Sword fern <i>Polystichum munitum</i>	19
15	Red alder <i>Alnus rubra</i>	Western red cedar <i>Thuja plicata</i>	Salal <i>Gaultheria shallon</i>	17
16	Big leaf maple <i>Acer macrophyllum</i>	Western red cedar <i>Thuja plicata</i>	Douglas-fir <i>Pseudotsuga menziensis</i>	35
17	Western red cedar <i>Thuja plicata</i>	Red alder <i>Alnus rubra</i>	Salal <i>Gaultheria shallon</i>	15
18	Western red cedar <i>Thuja plicata</i>	Salal <i>Gaultheria shallon</i>		64
19	Western red cedar <i>Thuja plicata</i>	Douglas-fir <i>Pseudotsuga menziensis</i>	Red alder <i>Alnus rubra</i>	11
20	Western red cedar <i>Thuja plicata</i>	Douglas-fir <i>Pseudotsuga menziensis</i>	Salal <i>Gaultheria shallon</i>	3/10
21	Western red cedar <i>Thuja plicata</i>	Western hemlock <i>Tsuga heterophylla</i>	Sword fern <i>Polystichum munitum</i>	33
22	Douglas-fir <i>Pseudotsuga menziensis</i>	Western red cedar <i>Thuja plicata</i>	Salal <i>Gaultheria shallon</i>	2/4/9/13
23	Douglas-fir <i>Pseudotsuga menziensis</i>	Grand fir <i>Abies grandis</i>	Sword fern <i>Polystichum munitum</i>	7
24	Douglas-fir <i>Pseudotsuga menziensis</i>	Western red cedar <i>Thuja plicata</i>	Step moss <i>Hylocomium splendens</i>	12

25	Western hemlock <i>Tsuga heterophylla</i>	Salal <i>Gaultheria shallon</i>	Douglas-fir <i>Pseudotsuga menziesii</i>	5
----	---	---------------------------------	--	---

26	Creeping bentgrass <i>Agrostis stolonifera</i>			30/32/57
27	Creeping bentgrass <i>Agrostis stolonifera</i>	Common velvet grass <i>Holcus lanatus</i>	Salal <i>Gaultheria shallon</i>	50
28	Creeping bentgrass <i>Agrostis stolonifera</i>	Hair bentgrass <i>Agrostis scabra</i>	Red alder <i>Alnus rubra</i>	39
29	Creeping bentgrass <i>Agrostis stolonifera</i>	Forget-me-not <i>Myosotis</i>		55
30	Creeping bentgrass <i>Agrostis stolonifera</i>	Pacific water-parsley <i>Oenanthe sarmentosa</i>	Common rush <i>Juncus effusus</i>	41
31	Creeping bentgrass <i>Agrostis stolonifera</i>	Common rush <i>Juncus effusus</i>	Common velvet grass <i>Holcus lanatus</i>	49
32	Creeping bentgrass <i>Agrostis stolonifera</i>	Common rush <i>Juncus effusus</i>		61/63/66
33	Creeping bentgrass <i>Agrostis stolonifera</i>	Small-flowered bulrush <i>Scirpus microcarpus</i>		42
34	Creeping bentgrass <i>Agrostis stolonifera</i>	Slough sedge <i>Carex obnuta</i>		28/29/31/ 36/65
35	Creeping bentgrass <i>Agrostis stolonifera</i>	Slough sedge <i>Carex obnuta</i>	Common rush <i>Juncus effusus</i>	51
36	Colonial bentgrass <i>Agrostis capillaris</i>	Common rush <i>Juncus effusus</i>		38
37	Colonial bentgrass <i>Agrostiscapillaris</i>	Creeping bentgrass <i>Agrostis stolonifera</i>	Common rush <i>Juncus effusus</i>	47
38	Blue wildrye <i>Elymus glaucus</i>	Creeping bentgrass <i>Agrostis stolonifera</i>		59
39	Common velvet grass <i>Holcus lanatus</i>	Blue wildrye <i>Elymus glaucus</i>		53

40	Common rush <i>Juncus effusus</i>	Creeping bentgrass <i>Agrostis stolonifera</i>	Hair bentgrass <i>Agrostis scabra</i>	60/62
41	Common rush <i>Juncus effusus</i>	Small-flowered bulrush <i>Scirpus microcarpus</i>		43
42	Common rush <i>Juncus effusus</i>	Red alder <i>Alnus rubra</i>	Small-flowered bulrush <i>Scirpus microcarpus</i>	46
43	Common rush <i>Juncus effusus</i>	Creeping bentgrass <i>Agrostis stolonifera</i>	Red alder <i>Alnus rubra</i>	48
44	Common rush <i>Juncus effusus</i>	Common velvet grass <i>Holcus lanatus</i>	Slough sedge <i>Carex obnuta</i>	52

45	Slough sedge <i>Carex obnuta</i>	Red alder <i>Alnus rubra</i>		54
46	Salal <i>Gaultheria shallon</i>	Slough sedge <i>Carex obnuta</i>	Creeping bentgrass <i>Agrostis stolonifera</i>	58

7.10 Test on dissolved oxygen, temperature, pH and depths of the water body in a transect line, October, 4th 2006

Those measurements were taken to get an idea of the profile of this wetland and what conditions for wildlife and plants are present.

Twenty measurements of dissolved Oxygen, water temperature, pH and depths, were taken in a line across the open water.

One measurement was taken each canoe length, approx. every 4 meters. PH tests were only taken at the start-, middle- and endpoints of the transect line.

The Transect was started at the south side of the swamp, as near as possible to the shoreline, approximately 10 meters from the land, where free open water begins.

The last measurement was taken 2 meters from the shoreline at the north side of the swamp.

(See map III)

Air-temperature: 15.0 °C, sunny, light wind

Results:

The amount of Dissolved oxygen in 0.5m depth was an average of 0.66 mg /l. In a depth of approximately one meter, the dissolved oxygen was as little as 0.48 mg/l in average. One measurement, taken close to the shore, near the water surface, (5cm depth) showed 1.7 mg/l. Here was duckweed on the water. Fish does not survive under any of these oxygen conditions.

The temperature of the water had on that day an average of 13.0°C in 0,5m depth and an average of 12.85 °C in one meter depth. Temperature falls with depth, about one degree per 0.5 meters.

There is no significant change of temperature from one side of the swamp to the other.

The pH- strips of all 3 measurements showed a similar colour close to neutral (6-7).

The depth of the water body is in this transect line between 1.05 m and 1.32 m, two meters to the north shore it is between 0.45 and 0.66 meters. The wetland ground seems not very deep and there is no deep middle point, it has on a long distance a similar depth before it goes up to the shore. The ground is probably not flat but has several pieces of old snags and logs as well as root systems of hardhack bushes on its ground.

Because of major precipitation in winter months, an increasing water table is expected.

Table of transect measurements

No.	Measure depth	Dissolved oxygen	Temperature in Celsius	pH	Total depth	
1.	0.5 m	00.7	12.9	6-7	1.30 m	
	1.0 m	00.6	12.7			
2.	0.5 m	00.6	13.0		1.28 m	
	1.0 m	00.6	12.7			
3.	0.5 m	00.9	12.8		1.28 m	
	1.0 m	00.7	12.6			
4.	0.5 m	00.9	12.6		1.32 m	
	1.0 m	00.6	12.6			
5.	0.5 m	01.0	12.9		1.28 m	
	1.0 m	00.5	12.7			
6.	0.5 m	00.8	12.9		1.32 m	
	1.0 m	00.6	12.7			
7.	0.5 m	00.8	12.9		1.30 m	
	1.0 m	00.5	12.7			
8.	0.5 m	00.7	12.9		1.28 m	
	1.0 m	00.4	12.8			
9.	0.5 m	00.6	13.0		1.28 m	
	1.0 m	00.4	12.8			
10.	0.5 m	00.6	13.2		6	1.20 m
	1.0 m	00.4	12.9			
11.	0.5 m	00.6	13.0	1.23 m		
	1.0 m	00.4	13.0			
12.	0.5 m	00.6	13.0	1.18 m		
	1.0 m	00.4	12.9			
13.	0.5 m	00.4	13.0	1.19 m		
	1.0 m	00.4	12.9			
14.	0.5 m	00.6	13.1	1.20 m		
	1.0 m	00.4	13.0			
15.	0.5 m	00.5	13.0	1.18 m		
	1.0 m	00.4	12.9			
16.	0.5 m	00.5	13.2	1.15 m		
	1.0 m	00.4	13.0			
17.	0.5 m	00.5	13.3	1.15 m		
	1.0 m	00.4	13.1			
18.	0.5 m	00.6	13.3	1.05 m		
	1.0 m	00.4	13.0			
19.	0.5 m	00.8	13.4	0.55 – 0.66 m		
	1.0 m	00.7	13.4			
20.	0.5 m	00.6	13.5	6	0.45 – 0.55 m	
	0.05 m	01.7	15.7			

8. Photos of each vegetation community

Young Forest Red alder communities



Polygon 26 / Vc 1

pict. 1603



Polygon 8 / Vc 2

pict. 1596



Polygon 18 / Vc 3

pict. 1416



Polygon 27 / Vc 4

pict. 1787



Polygon 20 / Vc 5 pict. 1672



Polygon 21 / Vc 6 pict. 1673



Polygon 45 / Vc 7 pict 1670



Polygon 37 / Vc 8 pict. 1415



Polygon 23 / Vc 9

pict. 1666



Polygon 56 / Vc 10

pict. 1466



Polygon 34 / Vc 11

pict. 1808



Polygon 44 / Vc 12

pict. 1591



Polygon 6 / Vc 13 pict. 1668



Polygon 19 / Vc 14 pict. 1594



Polygon 17 / Vc 15 pict. 1602

Bigleaf Maple



Polygon 35 / Vc 16 pict. 1599

Western Red Cedar communities



Polygon 15 / Vc 17 pict. 1562



Polygon 13 / Vc 18 pict. 1547



Polygon 11 / Vc 19 pict. 1604



Polygon 10 / Vc 20 pict. 1384



Polygon 33 / Vc 21 pict. 1418

Douglas fir communities



Polygon 9 / Vc 22 pict. 1624



Polygon 7 / Vc 23 pict. 1667

Western Hemlock community



Polygon 12 / Vc 24

pict. 1544



Polygon 5 / Vc 25

pict. 1592

Riparian Grass dominated communities



Polygon 32 / Vc 26

pict. 1613



Polygon 50 / Vc 27

pict. 1458



Polygon 39 / Vc 28 pict. 1605



Polygon 55 / Vc 29 pict. 1464



Polygon 41 / Vc 30 pict. 1810



Polygon 49 / Vc 31 pict. 1457



Polygon 61 / Vc 32

pict. 1472



Polygon 42 / Vc 33

pict. 1370



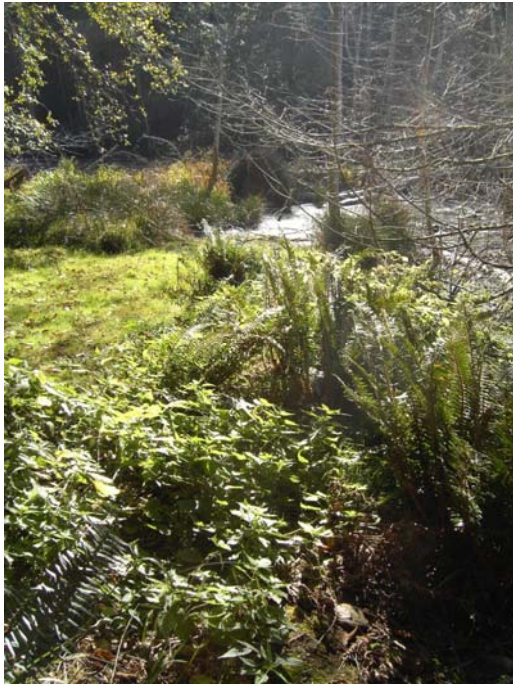
Polygon 28 / Vc 34

pict. 1610



Polygon 51 / Vc 35

pict. 1459



Polygon 38 / Vc 36 pict. 1412



Polygon 47 / Vc 37 pict. 1456



Polygon 59 / Vc 38 pict. 1469



Polygon 53 / Vc 39 pict. 1462

Rush dominated communities



Polygon 62 / Vc 40 pict. 1473



Polygon 43 / Vc 41 pict. 1414



Polygon 46 / Vc 42 pict. 1455



Polygon 48 / Vc 43 pict. 1671



Polygon 52 / Vc 44 pict. 1461

Sedge dominated communities



Polygon 54 / Vc 45 pict. 1465



polygon 58/ Vc 46 pict. 1468

Vegetation communities on the water



Polygon 67

pict. 1342



Polygon 68



Polygon 69

pict. 1336

7.11 Beaver activities (examples)

Cherry tree cutting



Oct. 3rd 2006-11



early Nov. 2006



sept. 7th 2006



sept. 12th 2006



Beaver lodge



uncompleted dam

9. References

B.C. Ministry of Environment, Lands and Parks, (1998):

Field Manual for Describing Terrestrial Ecosystems,
B.C. Ministry of Forests

British Columbia Soil Survey, (1989):

Soils of the Gulf Islands of British Columbia Volume 3,
Agriculture Canada

Coell D.R. & Associates Inc. (2002):

Appraisal of the Ronald Pither and Martin Frost Property, Melissa Road,
Galiano Island, BC

Eis S. & Craigdallie D., (1980):

Gulf Islands of British Columbia / a landscape analysis, Canadian
Forestry Service / Environment Canada

Kohut A.P. and Johanson D.A., (1998):

Assessment of Groundwater availability and Quality Galiano Island,
British Columbia,
Ministry of Environment, Lands and Parks

Lambe A. (1982):

The Naming of Roads, Article
B.C. Gulfways

National Wetland working group, (1997):

The Canadian Wetland Classification System, second edition,
B.G. Warner and C.D.A. Rubec

Pojar J. & MacKinnon A. (1994):

Plants of Coastal British Columbia including Washington, Oregon &
Alaska,
BC Forest Service, Research Program

Ralphs W. (1888):

Survey of Preemption Claims on Galiano Island,

Southam, T. and Curran, E.A. (eds) (1996):

The Wetlandkeepers Handbook: a practical guide to wetland care
B.C. Wildlife Federation, Surrey, B.C. and Environment Canada, Delta,
B.C.