

# Vanilla Leaf Land Nature Reserve (DL 58) Galiano Island Management Plan

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Prepared by the



ISLANDS TRUST FUND

Approved by  
the Trust Fund Board, July 25, 2013,  
the Galiano Conservancy Association, June 22, 2013, and  
the Nature Conservancy of Canada, July 22, 2013

## Executive Summary

District Lot 58 Nature Reserve is a 40.5 hectare (100 acre) piece of land that is part of a continuous protected area of more than 500 hectares (1,200 acres) known as the Mid-Galiano Conservation Network. The network connects: *Trincomali Nature Sanctuary, Galiano Restorative Learning Centre (District Lot 57), District Lot 58 Nature Reserve, Great Beaver Swamp Nature Reserve, Pebble Beach Nature Reserve, Laughlin Lake Nature Reserve and Bodega Ridge Provincial Park.*

The reserve protects the remaining portion of the Great Beaver Swamp (approximately 1.5 hectares of the 6 hectare wetland), and provincially listed ecological communities and species-at-risk, including: waterfowl, songbirds and many other species associated with freshwater systems.

The Islands Trust Fund manages Nature Reserves to ensure that ecological communities and native species are protected in perpetuity. The main purpose of the reserve is to provide a protected habitat for species and ecosystems to prosper with minimal human interference.

The DL 58 Nature Reserve management plan provides details on the history, property information, maps, photos, ecological inventory and recommended action items. The management plan process also provided the opportunity for community consultation. Islands Trust Fund staff evaluated community concerns and best management practices to develop the following management action items:

1. Communicate and consult with First Nations
2. Negotiate a management agreement with the Galiano Conservancy Association (GCA)
3. Work with GCA to develop main trail
4. Create and install signage at Nature Reserve boundary points
5. Develop a service contract to remove garbage from the reserve
6. Contact staff at Galiano Community School to find out if students would be interested in assisting in naming the reserve
7. Install an interpretive sign near the wetland area
8. Set up an ecological monitoring program to measure changes in hydrology for the wetland area
9. Rezone from F1 Forestry to NP Nature Protection when the opportunity arises

The action items will be addressed in priority sequence by Islands Trust Fund staff as resources permit. The DL 58 Nature reserve will be protected and managed in perpetuity to ensure that natural processes are allowed to flourish with minimal human intervention.

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## Acknowledgements

The Islands Trust Fund would like to thank everyone who helped with the acquisition of 40.5 hectares of DL 58 and acknowledge those who brought the Mid-Galiano Conservation Network to reality:

- Ken Millard and the Galiano Conservancy Association (GCA) for envisioning a network of protected lands across the island and initiating the land transfer of DL 58 as well as raising funds;
- the Nature Conservancy of Canada for joining the partnership and supporting it through the Natural Areas Conservation Program; the Government of Canada for establishing a Natural Areas Conservation Program to support land trusts in acquiring land;
- Keith Erickson (GCA), for providing the ecological inventory section, data and mapping for the management plan.
- the previous landowners for their vision for the land and their patience with the land acquisition process; and,
- finally, the members of the Galiano Island community and supporters of the GCA for their generous donations that have led to the protection of DL 58 and Mid-Galiano Conservation Network for future generations.



Photo 2 - Ken Millard and Keith Erickson (GCA) at DL 58 Nature Reserve



Photo 3 - Great Beaver Swamp 1

## 1.0 Introduction

The Great Beaver Swamp is one of the most ecologically significant areas found on Galiano Island. The majority of the wetland is located within the boundary of the Great Beaver Swamp Nature Reserve owned by the Galiano Conservancy Association (GCA) and covenanted by the Trust Fund Board (TFB) and the Habitat Acquisition Trust (HAT). In 2013 the Islands Trust Fund, Galiano Conservancy Association (GCA) and the Nature Conservancy of Canada (NCC) worked cooperatively to secure the rest of the wetland in the acquisition of a 40.5 hectare (100 acre) portion of District Lot 58. The land was purchased through generous donations from the members and supporters of the GCA and matching funds from the Government of Canada's Natural Areas Conservation Program, administered by the NCC.

District Lot 58 Nature Reserve becomes part of a continuous protected area of more than 500 hectares (1,200 acres) known as the Mid-Galiano Conservation Network. The network connects the Trincomali Nature Sanctuary (TFB), Galiano Restorative Learning Centre – DL 57 (GCA), District Lot 58 Nature Reserve (TFB), Pebble Beach Nature Reserve (GCA), Laughlin Lake Nature Reserve (GCA & TFB) and Bodega Ridge Provincial Park (BC Parks).

The Islands Trust Fund requires that management plans be produced for all of its nature reserves and sanctuaries within the first year of their acquisition. Islands Trust Fund

management plans provide direction and guidance for the management, maintenance, and protection of its nature reserves and sanctuaries. The following document is the management plan for the DL 58 Nature Reserve.

### 1.1 Islands Trust Fund and the Trust Fund Board

In 1974 the Province of British Columbia recognized the islands between Vancouver Island and the mainland as a special place within the province where the unique beauty, rural character and diverse ecosystems should be protected for future generations. Through the *Islands Trust Act*, the province established the Islands Trust, a local government, with the following mandate (known as the Object of the Islands Trust):

*To preserve and protect the trust area and its unique amenities and environment for the benefit of the residents of the trust area and of British Columbia generally, in cooperation with municipalities, regional districts, improvement districts, other persons and organizations and the government of British Columbia. (Islands Trust, 2013)*

In 1990, through the enactment of a section of *Islands Trust Act*, the Islands Trust Fund was established as a conservation land trust to assist in carrying out the “preserve and protect” mandate. Part 6 of the *Islands Trust Act* establishes the corporate status, responsibilities, and governance structure of the Trust Fund Board. The Trust Fund Board is one of fifteen corporate entities\* charged to uphold the Object of the Islands Trust. It is responsible for the actions of the Islands Trust Fund and since 1990 has protected over 1,139 hectares (2815 acres) of land as nature reserves, nature sanctuaries or conservation covenants.

The vision of the Islands Trust Fund is that the islands and waters of the Strait of Georgia and Howe Sound will be a vibrant tapestry of culture and ecology where humans live and work in harmony with the natural world. This special place will have a network of protected areas that preserve in perpetuity the native species and natural systems of the islands. Engaged residents and conservation partners will work together to protect large natural areas and key wildlife habitat. Viable ecosystems will flourish alongside healthy island communities.

The mission of the Islands Trust Fund is to protect special places by encouraging, undertaking, and assisting in voluntary conservation initiatives within the Islands Trust Area.

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\* The Corporate entities charged to uphold the Object of the Islands Trust include the Trust Council, twelve local trust committees, one island municipality and the Trust Fund Board.

Islands Trust Fund Nature Reserves are managed to maintain, preserve and protect the natural features and values of ecosystems. This level of protection is similar to the International Union for Conservation of Nature (IUCN) protected area category: Category Ib: Wilderness area

*“large area of unmodified or slightly modified land and/or sea; retaining its natural character and influence, without permanent or significant habitation, which is protected and managed in order to preserve its natural condition”* (Lockwood, 2006).

## 1.2 Islands Trust Fund Management Plans

Islands Trust Fund management plans:

- Provide general and descriptive information on the property, including location, history, and land use;
- Set out the conservation goals and objectives for the property;
- Identify the property's ecological and/or cultural values and features;
- Describe the management issues associated with the property; and,
- Provide short, medium and long-term management recommendations (action items or tasks) on issues such as: invasive species management; species at risk protection; public access and safety; educational and research opportunities; and signage needs.

Once the DL 58 Nature Reserve management plan process is complete, the Islands Trust Fund will work with the Galiano Conservancy Association to carry out the management actions or strategies identified in the plan as resources allow. As a general practice, the Islands Trust Fund aims to update each management plan every ten years. However, as part of the DL 58 funding agreement, revisions to the plan are required every five years.

## 1.3 Nature Reserve Purpose

The Purpose of establishing the DL 58 Nature Reserve is to:

- Preserve and protect the natural values of forest, Great Beaver Swamp and its watershed;
- Maintain an integral part of the Mid-Galiano Conservation Network;
- Allow natural succession of the Reserve's ecosystems to occur unimpeded; and
- Protect the site in accordance with the objectives of the Islands Trust, Islands Trust Fund and covenant holders, Galiano Conservancy Association and Nature Conservancy of Canada.

## 1.4 Nature Reserve Objectives

The Islands Trust Fund objectives for the management of DL58 Nature Reserve are to:

- preserve the natural features and functions of the site;
- protect and, where necessary, restore the plant and animal communities and ecological processes at the site;

- accommodate the continued low-impact use of the Reserve for pedestrian visitation, nature appreciation, education and scientific research;
- permit only uses that do not significantly impair the natural condition of the Reserve or its special features; and,
- allow the natural ecological processes and functions to proceed without human intervention, except in the case of wildfire or other exceptional situations where remediation is considered imperative.

## 2.0 Property Information

### 2.1 Location

DL 58 Nature Reserve is located mid-island approximately 15.5 km from the Sturdies Bay ferry terminal on Galiano Island. To get to the reserve from the Studies Bay ferry terminal, travel north along Sturdies Bay Road for approximately 3 km and turn right onto Porlier Pass Road. Travel approximately 12.5 km northwest on Porlier Pass Road. Turn right on McCoskrie and head north for 300m and turn right on Melissa Road. Travel approximately 1 km until the end of the road. The Reserve can be accessed on foot through the Great Beaver Swamp owned by the Galiano Conservancy Association and covenanted by the Islands Trust Fund.

### 2.2 Legal Description

Parcel Identifier No. 029-056-543

Lot 1, District Lot 58 Galiano Island, Cowichan District Plan EPP 26544 (*See Figure 1*)

### 2.3 Site History

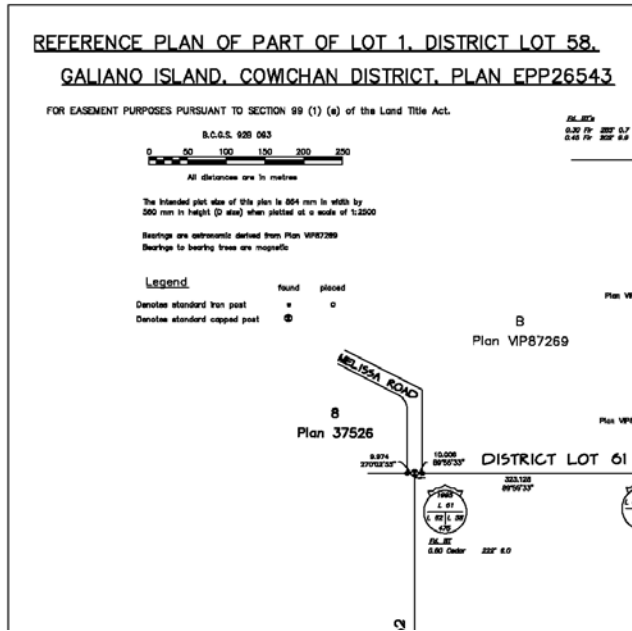
#### 2.3.1 Pre-Contact

The pre-contact history of District Lot 58 is unknown. There is evidence that a trail to the west of the property was used for centuries by First Nations (Millard, 2013). Further research is needed to determine if there was any traditional use of the nature reserve area and eastern portion of the Great Beaver Swamp.

#### 2.3.2 Great Beaver Swamp

One of the earliest written records of the area is found in a survey conducted by William Ralph in 1888. In his survey of the Great Beaver Swamp he described a six-hectare wetland (approximately) similar to the size of the area in 2013. In the 1950s the beaver dam was breached and the area was drained and used as pasture land. Historically and presently, beavers are the main architects and managers of the wetland.

Figure 1 - Survey Plan of DL 58 Nature Reserve



### 2.3.3 Forestry

After European settlement, the land has experienced a series of forest extraction events. The majority of the land was clear-cut logged during two major entries – in the late 1940's and mid 1980's. A small area along the top of the main central ridge was excluded from these cuts but appears to have been high grade logged in the early 1960's. A network of skid trails and roads on the land were created in association with the logging. The East Side Haul Road, as it suggests, was a major route for transporting timber to the log dump at the south end of Galiano up until the mid-1990's. It now provides access for large forest zoned lots to the southeast of the land although the portion crossing the land is not official (i.e. there is no easement). Portions of the land have also been used for grazing goats.

### 2.4.4 Previous Landowners

MacMillan Bloedel owned the property prior to the last landowners. The property was purchased by Dr. James Cupples, Dr. Frances Jang and Dr. D.H. Erwin Inc. in 1993. The parcel was acquired by the Trust Fund Board using Section 99 of the *Land Title Act* in April, 2013.

### 2.5 Undersurface Rights

Undersurface rights for DL 58 are currently held in favour of Her Majesty the Queen in Right of the Province of British Columbia.

### 2.6. Conservation Covenant

The DL 58 Nature Reserve has a Section 219 Conservation Covenant and Section 218 Statutory Right of Way held by the Galiano Conservancy Association. Section 4.2 of the Conservation Covenant lists several restrictions that must be followed to uphold the covenant:

“Without restricting the generality of section 4.1, the Owner must not, except with the prior written approval of the Covenant Holder, in its sole discretion:

- (a) *use or permit the use of the Land for an activity or use which:*
  - (i) causes or allows silts, leachates, fills or other deleterious substances to be released into any watercourse on the Land;
  - (ii) causes the erosion of the Land to occur;
  - (iii) causes or facilitates the loss of soil on the Land;
  - (iv) alters or interferes with the hydrology of the Land, including by the diversion of natural drainage or flow of water in, on or through the Land;
  - (v) causes or allows fill, rubbish, ashes, garbage, waste or other material foreign to the Land to be deposited in, on or under the Land;
  - (vi) causes or allows any component of the Land, including soil, gravel or rock, to be disturbed, explored for, moved, removed from or deposited in or on the Land;
  - (vii) causes or allows pesticides, including but not limited to herbicides, insecticides or fungicides to be applied to or introduced onto the Land; or

- (viii) causes or allows any indigenous flora on the Land to be cut down, removed, defoliated or in any way tampered with;
- (b) use or permit the use of the Land for hunting or grazing of domestic animals;
- (c) construct, build, affix or place on the Land any buildings, structures, fixtures or improvements of any kind;
- (d) allow the Land to be subdivided;
- (e) lay out or construct any new roads on the Land; and
- (f) subject to section 4.5, lease or license the Land or any part thereof unless the lease or license is expressly made subject to the provisions of this Agreement and any right of first refusal granted in favour of NCC and expressly entitles the Owner to terminate the lease or license if the tenant or licensee materially breaches any of the provisions of this Agreement” (Galiano Conservancy Association, 2013).

The Islands Trust Fund is allowed in to perform the following activities if they are captured and agreed upon by the covenant holder in the management plan:

“As an exception to section 4.2, the Owner may, in accordance with the Management Plan:

- (a) install, maintain or replace a reasonable number of signs for the purposes of public safety or informing the public about the Land and the Amenities;
- (b) develop and maintain new trails to connect the Land with adjacent protected land; and
- (c) maintain, replace or restore the trails existing on the Land at the time of registration of this Agreement (the location of which are identified in the Report), so long as the location of each trail remains the same and the size is the same or smaller” (Galiano Conservancy Association, 2013).

## 2.7 Official Community Plan

### 2.7.1 Zoning

In the Galiano Island Official Community Plan Bylaw No. 108 (Islands Trust, 2011) DL 58 is zoned as F1 or Forestry 1. The forestry zoning designation is intended for active forestry activities: timber production, and harvesting. Sawmilling and growing seedlings in nurseries is also a permitted use. A non-residential building is allowed on the lot as long as its primary use is forestry related.

The Islands Trust Fund does not permit active forestry on its nature reserves and a zoning of NP Nature Protection would be more appropriate for the land.

### 2.7.2 Emergency Road Network

Schedule “C” of the Galiano Official Community Plan, Road Network Plan (RNP) Map identifies an old logging road as a suggested emergency road access. The suggested route, which is coarsely mapped in the RNP, follows an old logging road that is partially on the DL 58 Nature Reserve. At present, emergency road access is not a contemplated use of the Reserve.

### **2.7.3 Parks and Trail Network**

In the Parks and Trails Network map identified in Schedule “E” of the Galiano Official Community Plan, a trail is highlighted along the southern boundary of reserve and another is featured at the tip of northeast corner of the reserve.

## **2.8 Adjacent Land Use and Connectivity**

The DL 58 Nature Reserve is surrounded by private land along the northern and eastern boundaries; District Lot 57 (GCA) along the southern boundary; the remainder of DL 58 (private land) along the southwest boundary; and by the Great Beaver Swamp Nature Reserve (GCA) along the western boundary.

### **2.8.1 Mid-Galiano Conservation Network**

The Mid-Galiano Conservation Network (*See Figure 2*) 500 hectare protected area will feature a trail system that connects the DL 57 (Galiano Restorative Learning Centre – GCA) to the DL 58 Nature Reserve, Great Beaver Swamp Nature Reserve, Cable Bay Nature Reserve, Laughlin Lake Nature Reserve and Bodega Ridge Provincial Park. A trail could potentially connect all of the conservation properties and provide people with the ability to travel, on foot, from one side of the island to the other, through a wide array of ecosystem types.

## **3.0 Ecological Inventory**

### **3.1 Ecological Significance**

The land builds upon and connects an existing but disjointed collection of conservation areas in the mid-Galiano Island area. Its protection resulted in the creation of a contiguous protected network just over 500 hectares (1,235 acres) in size.

Galiano is bound by the Strait of Georgia to the Northeast and Trincomali Channel to the Southwest. The completed conservation network extends from the Trincomali across to the Georgia Strait and back again. It protects a significant portion of the Island’s topographic variation and associated ecological diversity, securing valuable pathways for plant and animal migration within and between two major watersheds, as well as from sea level to Galiano’s highest ridgeline. The large area and connectivity secured by the network ensures that a diverse mosaic of adjacent natural habitats can function to provide for seasonal and life stage requirements of many species. Connections between protected areas and among patches of natural habitat are particularly critical for ecological resiliency to climate change, as organisms will have to move with shifting habitat conditions if they are to survive.

Figure 2 - Mid-Galiano Conservation Network Map



The land includes threatened inland bluffs with the endangered Garry oak – grey rock moss / Wallace’s *selaginella* plant association (CDFmm/00 Qgrm). It also includes the southeast end of the Great Beaver Swamp, approximately 1.5 hectares of the 6 hectare wetland complex. This area includes marsh, shallow water and swamp wetland types. Also protected is the associated riparian forest and much of the upland forest.

The land supports numerous waterfowl, songbirds and many other species associated with freshwater systems. Observed species at risk include:

- Band-tailed Pigeon (*Patagioenas fasciata*; G4; Special Concern; Blue listed),
- Great Blue Heron (*Ardea herodias fannini*; G5T4; Special concern; Blue listed),
- Olive-sided Flycatcher (*Contopus cooperi*; G4; Threatened; Blue listed),
- Red-legged Frog (*Rana aurora*; G4; Special Concern; Blue listed).

The land also provides habitat for the following provincially listed species:

- Blue Dasher (*Pachydiplax longipennis*; S3S4; Blue listed), and
- Western Pondhawk (*Erythemis collocata*; S3; Blue listed).
- Pacific Sideband snail (*Monadenia fidelis*; S3S4: Blue listed)

Additionally the following provincially-listed Ecological Communities are found on the land:

- Douglas-fir / arbutus (CDFmm/02) (red listed, GNR): Polygon 12
- Douglas-fir / dull Oregon-grape (CDFmm/01) (S2, Red, GNR): Polygons 02, 10
- Red alder / skunk cabbage (CDFmm/Ws52) (red listed, GNR) (\*possibly early successional community of CDFmm/ Ws53 ecosystem): Polygons 05, 06
- Western redcedar / sword fern – skunk cabbage (CDFmm/11) (blue listed, GNR): Polygons 04, 05

### 3.2 Climate

The rainshadow effect of the Olympic and Vancouver Island mountains and the moderating effects of the ocean are the dominant influences on the climate of Galiano Island. Galiano exhibits a pattern of warm dry summers and mild wet winters with an average of approximately 1,900 to 2,000 hours of sunshine and 254 frost free days per annum. The average annual rainfall recorded at the North Galiano Atmospheric Environment Service station is 920 mm (from 1977 to 1988). Annual rainfall ranges from 597.3 mm to 1152.6 mm. Over 75% of the total annual precipitation falls during the winter months (November through February), with less than 10% falling as snow.

The months of January and February produce the coldest mean temperatures of 4° to 5° Celsius, while July and August are the warmest months with mean temperatures of 17° to 19° Celsius. The combined effects of low precipitation, warm temperatures, and high number of sunshine hours often result in an annual moisture deficit on Galiano Island from mid-June to early October. This deficit can often reach drought conditions in areas of recent clearcuts, such as District Lot 63, and can result in an extreme forest fire hazard (Erickson, Pebble Beach Nature Reserve Management Plan, 1998).

### 3.3 Geology and Landforms

Galiano Island lies within the Nanaimo Basin, a large depression at the southern end of the Georgia Strait. It is part of the Northeastern edge of the Trincomali Anticline. The Islands strata form a simple homocline that dips northeast into the Georgia Basin. Eleven sedimentary rock formations dominate the Basin stratigraphy, termed the Nanaimo group. Three of the Nanaimo group's sedimentary clastic rock formations form the bedrock of Galiano Island. These formations date to the Upper Cretaceous (65-100 million years ago) and, along with Tertiary sediments, form the fill of the Georgia Basin.

The Gabriola formation is the name of the surface layer of the Nanaimo group. This stratigraphic layer is over 500m deep and occupies 75% of Galiano Island, including the study area. Provenance for Gabriola sandstone particles points to the Coast Range mountains as well as the Eastern Cordillera via a Fraser River scale fluvial system. The Gabriola formation is over 90% arkosic arenite sandstone ranging in texture from medium to coarse grained. This young sandstone is hard and has a relative resistance to weathering. Thin layers of shale stone co-form the Gabriola formation. Galiano Island's valleys have been carved out of these softer, more erosive sedimentary layers.

Landform expression on Galiano Island is a result of late Cretaceous and subsequent Tertiary differential uplift of Vancouver Island and the concurrent depression of the Georgia Basin. These historic shifts gave Galiano Island its backbone, the vertebrae being ridges and cuestas running northwest-southeast paralleling the Georgia Strait. Three successive glacial events have altered the surface expression within the Nanaimo Basin, the most recent, the Fraser glaciation, occurred between 10 and 15,000 years ago. Glaciers advanced on the region, first from Vancouver Island via the Cowichan Ice tongue, and second, from the Georgia strait lobe. The weight of the ice depressed the land 75-90 m relative to the ocean. Depressed land and encroaching seas indicate that all low land in the Georgia Basin was submerged, following glacial retreat. Marine deposits found on the valley floors of the island confirm this aspect of the Island's history. Isostatic rebound following the Fraser Glaciation continues to this day (Gaylor, Scholz, & Erickson, 2002).

### 3.4 Hydrology

The property falls within the Central Georgia Strait Groundwater Region, with a surface flow that empties into the Georgia Strait. Approximately 50 percent of the property (the southern half) drains into the Great Beaver Swamp and out through the Beaver Creek drainage. The other 50 percent sheds roughly to the north as sub-surface flow with no observed above ground drainage channels.

There is a small, seasonal stream running across the southern portion of the property, roughly from east to west at the base of the inland cliff and into the Great Beaver Swamp. This water flows through the swamp and out into Beaver Creek which winds down through neighbouring District Lots 60 and 63 and into Cable Bay on the Georgia Strait. The stream was not flowing during the timeframe of this study in late May and early June. However, infrequent small pools were observed, and the water table was generally close to the surface of the creek bed.

A significant network of rough logging skid roads were built in the 1980's primarily on the northern portion of the property and may be impacting hydrology, though no evidence of above ground water flow diversion or alteration was observed. An older, primary logging / access road in the western portion of the property snakes southward from the northern boundary and has been built up to provide a crossing across the eastern end of the shallow water wetland (Great Beaver Swamp). It is currently helping to define the boundary of the wetland to the west. Recent beaver activity has blocked the culvert under the road crossing and is raising water levels to the east, resulting in the creation of additional swamp and marsh ecological communities.

### 3.5 Soils

According to the Agriculture Canada report, *Soils of the Gulf Islands of British Columbia Volume 3* (British Columbia Soil Survey, 1989), the property is characterized by five different soil types as follows:

1. **Saturna:** Saturna is the dominant soil type on the properties and covers the majority of the gently to moderately sloping, northeast facing areas. Saturna soils are well-drained and have developed on shallow deposits of channery, sandy loam to channery, loamy sand textured, colluvial and glacial drift materials over sandstone bedrock within 100cm of the surface. Coarse fragment content varies between 20 and 50%.
2. **Rock:** Rock consists of undifferentiated consolidated bedrock exposed or covered by mineral soil less than 10cm thick over consolidated bedrock. It is also called rockland or rock outcrop.
3. **Metchosin (shallow organic soils):** Metchosin soils are very poorly drained Organic soils that have developed on deep (>160cm) deposits of black, humic, well decomposed peat materials, composed mainly of sedge and woody plant remains. The soil is stone free. The Metchosin soils mapped on the property were shallow (40-160cm to mineral soil)

4. Fairbridge: Fairbridge soils are imperfectly drained soils that have developed on deep (>100cm), silt loam to loam over silty clay loam to clay loam marine deposits that are usually stone free. Concretions of iron oxide may be present throughout the profile.
5. Trincomali (imperfectly drained): Trincomali soils are moderately well-drained soils that have developed on shallow (30-100cm) 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 100cm of the surface.

### 3.7 Ecological Designation

**Ecoprovince:** Georgia Depression

**Biogeoclimatic Unit:** Coastal Douglas-fir zone, Moist Maritime subzone (CDF/mm)

**Natural Area Conservation Plan (Nature Conservancy of Canada):** Salish Sea Natural Area Conservation Plan

### 3.8 Inventory of Biological Features

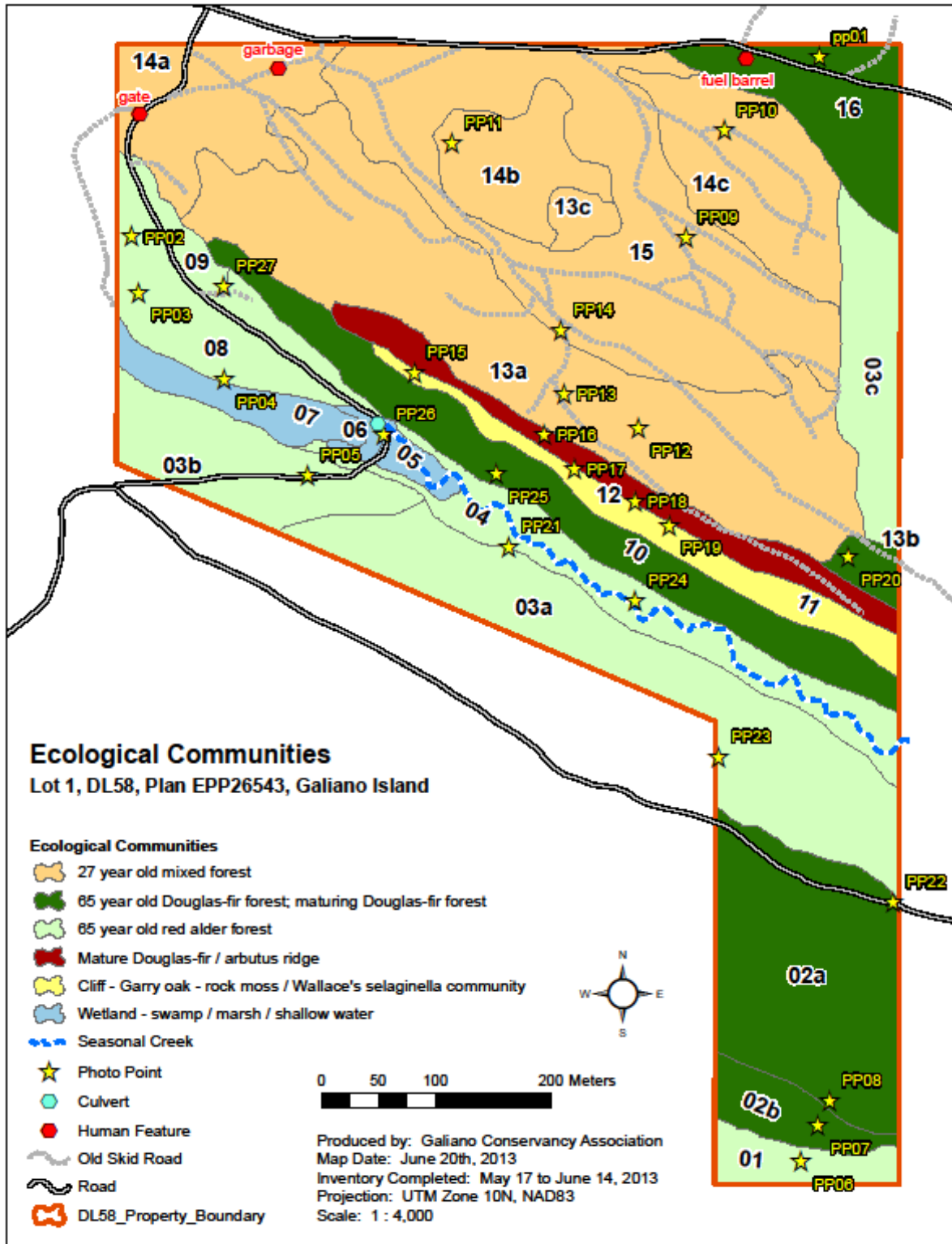
An inventory of the biological features of the Property was conducted between May 17<sup>th</sup> and June 14<sup>th</sup>, 2013. A total of 16 different ecological communities were identified on the property. These ecological communities are described below and are spatially represented on the Ecological Communities map (See Figure 3). Representative photographs of each community and detailed site forms can be found in the report titled, *Ecological Inventory: Lot 1, District Lot 58, Plan EPP26543, Galiano Island, Cowichan District* (Erickson, 2013). A complete vegetation and wildlife species list can be found in Appendix A (Vegetation) and B (Wildlife).

The format for the description of ecosystem types has been adapted from the *Field Manual for Describing Terrestrial Ecosystems - Site and Vegetation forms* (Ministry of Environment, Lands, and Parks and BC Ministry of Forests, 2008). Vegetation types found in the Nature Reserve are as follows:

#### 3.8.1 Ecological Community 01

**Description:** Young (65 years old) red alder (*Alnus rubra*) / Douglas-fir (*Pseudotsuga menziesii*) dominated, (CDFmm01) upper slope forest with a southerly aspect. The polygon is patchy and variable in canopy composition and understory with a red alder – stinging nettle (*Urtica dioica*) dominated patch in its western portion, transitioning to a mixed Douglas-fir / red alder – salal (*Gaultheria shallon*) / Oregon beaked moss (*Kindbergia oregana*) area, transitioning again to a large laminated root-rot (*Phelinus weirii*) gap dominated by oceanspray (*Holodiscus discolor*) to the east.

Figure 3 - Ecological Communities Map



**Soils:** Sandy loam with 10-35% coarse fragments and morder humus form with thin Ah.

**Wildlife and Wildlife Habitat:** Observed during data collection: Red legged frog (*Rana aurora*), Pacific sideband (*Monadinia fidelis*), Black-tailed deer (*Odocoileus hemionus columbianus*) scat

**Habitat:** large diameter Douglas-fir snags with feeding and nesting cavities.

**Disturbance History:** Logged in 1948 and natural regeneration. Root rot and windthrow gaps are present.

**Succession:** Red alder – stinging nettle dominated area will slowly transition to Douglas-fir / Western hemlock (*Tsuga heterophylla*) over the next several decades with an increase in shrub cover and decrease in herbaceous species.

### 3.8.2 Ecological Community 02

**Description:** Young (65 years old) Douglas-fir dominated, north facing, single storied forest. The ecological community is predominately on the mid slope but includes the upper slope and crest areas. Soil becomes slightly shallower, drier and poorer towards the crest of the slope and while vegetation species assemblages remain similar, their distribution and cover shift. Generally, shrub cover and tree diameters increase towards the bottom of the slope. The understory is dominated by Oregon beaked moss with significant patches of electrified cat's tail moss (*Rhytidiadelphus triquetrus*) and stair step moss (*Hylocomium splendens*) mixed throughout. Salal and dull Oregon grape (*Mahonia nervosa*) are the most dominant shrub with individuals and patches of oceanspray and scattered throughout. The crest area is topographically variable and includes a small slightly moisture receiving micro-valley or depression between two gentle crests. The stand includes a few moderately sized root-rot gaps characterized by dense oceanspray and salal cover with a few scattered sapling Douglas-firs. Also present are a few moss dominated shallow soil / exposed bedrock areas. The 'easement' road also bisects the polygon near its northern boundary with Polgyon 03a.

**Soils:** Dark reddish brown sandy loam to loamy sand with 35-50% coarse fragments and a mor humus form. Fungal mycelia present.

**Wildlife and Wildlife Habitat:** Observed during data collection: Red legged frog, Black-tailed deer, Banana slug (*Ariolimax columbianus*), woodpecker feeding.

**Disturbance History:** Logged – clearcut in 1948 with natural regeneration. A few root-rot/wind throw gaps. Logging slash left on site and evidence of burn after logging. Main 'easement' road bisects the lower portion of the polygon near its boundary with Polygon 3a.

**Succession:** Douglas-fir will self-thin for several decades leaving many small diameter snags in the sub-canopy. Canopy density may increase in the short-term, resulting in some loss of understorey cover.

### 3.8.3 Ecological Community 03

**Description:** Young (65 year old) red alder – stinging nettle dominated mid to lower north facing slope with a large volume of coarse woody debris on the forest floor. Moisture increases towards the lower slope position and begins to transition to a CDF/mm06 ecosystem along the boundary of Polygon 04. In Polygon 3b, roughly west of the main road, the understorey shifts from stinging nettle dominated to sword fern (*Polystichum munitum*) and vanilla leaf (*Achlys triphylla*) dominated. There are also a few scattered dominant western redcedar (*Thuja plicata*) trees in this area.

**Soils:** Dark silty to sandy loam with 10-35% coarse fragments over a yellowish brown loamy sand. Moder humus form with variable Ah. Coarse fragments are mostly soft sandstone that is easily chipped and fragmented. Some iron (red) mottles present. Imperfectly drained.

**Wildlife and Wildlife Habitat:** Observed during data collection: Red legged frog, Pacific sideband, Black-tailed deer scat.

**Habitat:** Large diameter western redcedar snags with feeding and nesting cavities

**Disturbance History:** Logged in 1948 and natural regeneration. Red alder is beginning to show signs of mortality and windthrow. Main road bisects Polygon 3b.

**Succession:** Red alder – stinging nettle dominated area will slowly transition to Douglas-fir / grand fir (*Abies grandis*) / western hemlock over the next several decades with an increase in shrub cover and decrease in stinging nettle and other herbaceous species.

### 3.8.4 Ecological Community 04

**Description:** Young (65 year old) red alder dominated lower slope and minor depression with western hemlock, western redcedar, grand fir and douglas-fir scattered in the sub-canopy. The Polygon also includes the odd big-leaf maple (*Acer macrophyllum*) in the main canopy as it transitions to the mid-slope of Polygon 10 to the North. The understorey is a rich mix of sword fern, vanilla leaf, stinging nettle, Dewey's sedge (*Carex deweyana*) and robust patches of various mosses. The occasional salal or red huckleberry (*Vaccinium parvifolium*) bush are scattered throughout, usually growing on old western redcedar stumps. The Polygon includes the slightly steeper and drier sword fern dominated south facing, lower talus slope transitioning into Polygon 10. The Polygon also includes a small seasonal to intermittent creek and

associated deeper organic / clay soils. Vegetation in the moist creek bed includes enchanter's nightshade (*Circaea alpina*) and slough sedge (*Carex obnupta*).

**Soils:** Mor-moder to moder humus form with variable Ah. Medium brown loamy sand with approximately 10% coarse fragments over top of lighter brown (slight gleying) loamy sand at 30 – 70 cm. Soils transitioning to Polygon 5 and in streambed CDFmm/II areas have deep organic and Ah layers over top of clay loam.

**Wildlife and Wildlife Habitat:** Observed during data collection: Deer tracks, Red-legged Frog, Rufous Hummingbird (*Selasphorus rufus*), pacific sideband.

**Habitat:** Red alder and western redcedar snags with abundant feeding cavities.

**Disturbance History:** Polygon was clear cut logged in 1948. The red alder dominated canopy is a response to this disturbance.

**Succession:** Red alder is approaching its natural life span and will begin to thin over the next couple of decades. Conifers in the sub-canopy will be released and will take over to become a mixed conifer main canopy with a red alder / big leaf maple sub-canopy. Stinging nettle and other herbs will likely decrease in cover, while shrubby species increase.

### 3.8.5 Ecological Community 05

**Description:** Young (65 year old) red alder dominated swamp wetland (Ws53) with slightly drier raised micro-sites scattered throughout. The understorey is patchy with moister sitka sedge – skunk cabbage dominated wet areas mixed with Dewey's sedge – grass patches in slightly drier areas where red alder are growing. The red alder dominance is symptomatic of the polygon's history of logging. The vegetation community is also adjusting to a recently elevated water table caused by two small beaver dams in its northwestern corner adjacent to the road.

**Soils:** Organic horizon (5-10cm) with mottled clay Ah to 40+cm. Less than 1% coarse fragments. Water table is at the surface in the sitka sedge / skunk cabbage community and is approximately 40cm deep in the Dewey's sedge community.

**Wildlife and Wildlife Habitat:** Observed during data collection: Deer tracks, red legged frog, beaver dam and recently chewed/felled red alder stems.

**Habitat:** Proximity to wetland and surface water in early summer.

**Disturbance History:** Polygon was logged in 1948 and the moist, sensitive soils were disturbed. The red alder dominated canopy is a response to this disturbance. Recent beaver activity has

raised the water level slightly (more dramatically in winter months). Beaver have blocked the culvert that connects to Polygon 06 and have built an additional dam. Canopy die-back in several of the red alder trees was observed.

**Succession:** Red alder appears to be slowly dying back due to water table impacts from beaver dams. This will lead to a more open stand for several decades until additional red alder stems and conifer stems slowly re-establish on drier raised micro-sites. Understory species will continue to adapt to the new water table, slowly shifting to a higher density of moisture tolerant shrub species and generally increasing in diversity.

### 3.8.6 Ecological Community 06

**Description:** Small-flowered bulrush (*Scirpus microcarpus*), Sitka sedge (*Carex sitchensis*), skunk cabbage (*Lysichiton americanum*) dominated marsh / swamp complex transitioning from shallow water wetland (Polygon 05) to the road and slightly drier swamp ecosystem in Polygon 07. The community is fringed by red alder forest. It includes a large volume of coarse woody debris that has fallen since the water level was raised by beaver 10 to 15 years ago. The polygon is a mosaic of deeper shallow water “puddles” mixed with partially submerged skunk cabbage / sitka sedge marsh and raised grass, moss and herb dominated areas.

**Soils:** Thin organic horizon over clay loam.

**Wildlife and Wildlife Habitat:** Observed during data collection: rufous hummingbird

**Habitat:** Abundant cavities in red alder snags and woody debris. Shallow water mixed with aquatic vegetation and forested fringe provide exceptional habitat for insects, amphibians and related birds, etc. in the food chain. Biodiversity hotspot.

**Disturbance History:** The polygon was flooded within the last 15 years, undergoing the transformation from a moist forest with swampy depressions to the present wetland mosaic. Vegetation communities are only just stabilizing. The rising water table has killed most trees in the Polygon – responsible for the high density of coarse woody debris.

**Succession:** The marsh / swamp community will continue to develop, increasing in vegetation diversity over time. Western redcedar and red alder will emerge on raised micro-sites (seedlings already observed) providing limited tree cover into the future.

### 3.8.7 Ecological Community 07

**Description:** Open shallow water wetland dominated by duckweed (*Lemna sp.*) with patches of yellow pond lily (*Nuphar polysepalum*) and floating-leaved pondweed (*Potamogeton natens*). Coarse woody debris is abundant throughout the wetland due to tree mortality associated with the rise in water level over past 20 years after the re-establishment of the ‘Great Beaver Dam’.

The shallow water system is fringed by a narrow riparian band characterized by sedges and herbs typical of a marsh (Wm50) ecosystem. The riparian band is narrow due to the moderate slope that enters into the shallow water and has only started to establish over the past couple of decades. There are a few scattered red alder and western redcedar on raised mounds in the riparian, and a continuous red alder canopy overhangs the area from upslope. The southern bank has scattered skunk cabbage (*Lysichiton americanum*) (20%), mixed with sitka (*Carex sitchensis*) sedge. The northern bank is dominated by small flowered bulrush (*Scirpus microcarpus*) (50%) mixed with sitka and slough sedge and only the odd individual skunk cabbage. The marsh riparian community is similar to that described in Ecological Community 06.

**Soils:** Deep organic horizon (40+ cm), under water.

**Wildlife and Wildlife Habitat:** Observed during data collection: Piliated Woodpecker (*Dryocopus pileatus*), Bald Eagle (*Haliaeetus leucocephalus*), Canada Goose (*Branta canadensis*), Pacific Chorus Frog (*Pseudacris regilla*), at least 3 species of dragonfly, Hairy Woodpecker (*Picoides villosus*), Beaver (*Castor canadensis*), Red Legged frog.

**Habitat:** A few remaining well used snags. High volume of submerged and emergent CWD in shallow water wetland and extending into riparian and forest.

**Disturbance History:** The swamp was drained (1900's) and has be brought back to its original (pre-1880's) size within past 15 years. Riparian forest logged roughly 65 years ago. Evidence of old and fresh beaver damage to riparian trees (red alder, western redcedar) and many old beaver stumps.

**Succession:** The canopy providing partial cover of the riparian marsh will move from red alder dominated towards a western redcedar dominated stand. The succession of shallow water and riparian marsh areas will depend on water level fluctuations resulting from active or inactive beaver populations – the level appears to be stable at the moment with a healthy riparian marsh species assemblage beginning to establish.

### 3.8.8 Ecological Community 08

**Description:** Young (60-65 year old) red alder dominated, gently sloped, southwest facing forest stand with well-spaced western redcedar and Douglas-fir in the sub-canopy. Big-leaf maple is scattered throughout in the main canopy. The understory is dominated by stinging nettle intermixed with cleavers (*Galium aparine*), grasses and lush patches of moss.

**Soils:** Mor-moder humus form with Ah present, mineral soil is a sandy loam with 25-50% coarse fragments, appears well drained despite lower slope position.

**Wildlife and Wildlife Habitat:** Observed during data collection: Piliated Woodpecker, Bald Eagle, Red Winged Blackbird (*Agelaius phoeniceus*) heard in swamp, deer scat, Pacific sideband, Red-legged frog, Canada Goose (H), Piliated Woodpecker, Red-breasted Nuthatch (*Sitta canadensis*), Banana slug.

**Disturbance History:** Logged ~65 years ago – clear cut. Evidence of old gravel extraction along the western boundary of the Polygon and property, near the wetland. The main road runs along the northeastern boundary of polygon.

**Succession:** Red alder will die off over the next decade or two and will slowly be replaced by Douglas-fir, western redcedar and western hemlock. Potential for partial red alder regeneration due to low density of conifers in sub canopy. Stinging nettle will decline and shrubs will increase as conifers become dominant.

### 3.8.9 Ecological Community 09

**Description:** Young (30-35 year old) red alder dominated, heavily disturbed area, historically used for gravel and rock extraction. The Polygon includes a 5 to 10 meter deep, now re-vegetated gravel pit with an exposed, moss covered bedrock face on its north slope. Within the gravel pit, red alder is dominant. On its southwestern lip, a dense patch of 20-25 year old Douglas-fir poles is slowly growing under the red alder canopy. The understory is sparse with Oregon beaked moss and sword fern providing the dominant cover. The less disturbed margins of the Polygon transition to a red alder – stinging nettle / cleavers community with much lower density of Douglas-fir in the sub-canopy.

**Soils:** Soils are highly disturbed with very poorly developed humus and a direct transition to the mineral horizon. The B layer is a medium coloured loamy sand with high coarse fragment content (35-70%).

**Disturbance History:** The polygon has been impacted by extensive soil and rock extraction prior to the late 1970's. The polygon was also clear-cut logged in 1948 and is flanked by the main road and two access roads on three of its sides.

**Succession:** Natural successional processes are inhibited due to underdeveloped humus layers, compaction and mineral soil extraction. Red alder will persist for many decades, slowly replenishing organic content, decompacting and building nutrient levels in the soil. Douglas-fir will eventually take over as red alder dies off and will become the dominant canopy. Trees morphology will indicate poor and damaged soils.

### 3.8.10 Ecological Community 10

**Description:** Steep, south facing mature Douglas-fir dominated (CDFmm/01) mid-slope with bigleaf maple scattered throughout the sub-canopy. Exposed moss covered boulder talus (*Kindbergia oregana* and *Rhytidiadelphus triquetrus* dominated) constitutes the dominant ground cover, with patches of dull Oregon grape in loose soils scattered throughout. Mature Douglas-fir trees in the dominant canopy are scattered amongst the more common 50-60 year-old stems in the main canopy.

**Soils:** Sandy loam with 35-70% coarse fragments and mor humus form with abundant fungal mycelia. Shallow soil in pockets around boulders. Mainly colluvial, dark brown in colour.

**Wildlife and Wildlife Habitat:** Observed during data collection: Red-tailed Hawk (*Buteo jamaicensis*), Red-legged Frog, Pacific sideband, Black-tailed deer scat.

**Disturbance History:** High-grade logged in the early 1960's and left to naturally regenerate with smaller Douglas-fir at the time now representing the mature trees in the stand. Burn scars observed on mature Douglas-fir indicate a fire that may have been associated with logging. Rockfall from the cliff above, including a major recent slide event, is a major disturbance in the stand. Soil slumping down the steep slope is also evident.

**Succession:** The stand will self-thin over the next several decades in areas where the 50 – 60 year old main Douglas-fir canopy is dense. Understory composition and diversity will not significantly change in the near future. Bigleaf maple will persist in the stand but will likely decrease in density over time as conifers take over in the depression below.

### 3.8.11 Ecological Community 11

**Description:** Very steep, south to southwest facing exposed cliff. Vegetation on the cliff is patchy in nature with large patches of exposed grey rock moss (*Racomitrium canescens*) and lichen covered rock and frequent shelf / benches with deeper soils where more diverse herbaceous and shrub-tree communities have developed. The community includes scattered big leaf maple, arbutus, Douglas-fir and a few Garry oak (*Quercus garryana*) generally in shrub form due to soil conditions. The Polygon also includes some small Douglas-fir dominated patches (CDFmm/02) in gulleys where the slope is reduced, the soils are slightly deeper and the moisture regime is slightly increased.

**Soils:** Very shallow, 0 to 10cm in the majority of the polygon, and less than 30cm in deep pocket areas. Ah layer present sporadically.

**Wildlife and Wildlife Habitat:** Observed during data collection: Red-tailed Hawk (pair), Rufous Hummingbird.

**Disturbance History:** Logging below and above the Polygon roughly 50 yrs ago. Relatively recent rock slide in middle where successional processes are slowly moving forward – mostly remains exposed rock with lichen. Boulder talus in Polygon 10 below suggests frequent rockfall and loss of soil.

**Succession:** Cliff will remain moss/grass/herb dominated due to exposure and steep slope.

### 3.8.12 Ecological Community 12

**Description:** South to southwest facing young Douglas-fir dominated dry forest with scattered arbutus (*Arbutus menziesii*) and mature trees throughout. Mature Douglas-fir and arbutus are primarily located along the edge of the cliff with a mixed moss / grass / dull-Oregon grape understory characteristic of a CDFmm/02 ecosystem. A young Douglas-fir – salal (CDFmm/01) ecosystem runs along the cliff edge in the western portion of the Polygon and then shifts back from the cliff and broadens to include a relatively flat bench along the crest. This ecosystem is naturally regenerated with a main canopy that is ~30-40 years old and includes dense (“dog hair”) patches along with sparse salal dominated gaps.

**Soils:** Matted mor humus form with abundant fungal mycelia. Medium yellowish brown loamy sand with 25-70% coarse fragments.

**Wildlife and Wildlife Habitat:** Observed during data collection: Barred Owl (*Strix varia*)-habitat, Turkey Vulture (*Cathartes aura*), woodpecker feeding on snags/CWD mature broken top perching sites.

**Disturbance History:** Logged roughly 50 years ago with mature trees on cliff edge left alone. Broken tops and windthrow observed in Douglas-fir due to exposure.

**Succession:** Dense patches of Douglas-fir will self-thin over the next several decades, though many of the sub-dominant stems will persist in the sub-canopy due to additional light exposure from the ridge. Understorey diversity will increase as the stand ages.

### 3.8.13 Ecological Community 13

**Description:** Young (27 yr old) Douglas-fir mixed stand with patches of bigleaf maple and red alder throughout. The understory is patchy with sparsely vegetated, primarily Oregon beaked moss areas under dense Douglas-fir canopy mixed with stinging nettle / cleavers dominated areas under red alder and bigleaf maple canopy. The stand also includes numerous scattered, small, salal dominated root-rot (*P. Weirii*) / windthrow gaps as well as several shallow soil / steep sloped openings characterized by electrified cat’s tail, Oregon beaked moss, salal, grass species and scattered dull Oregon grape. The Polygon exhibits a wide range of topographic variation including slightly moister micro-depression or gully areas generally associated with

old skid roads, slightly drier gently convex crest areas and exposed moss covered bedrock micro-ridge sites. Polygon 13b includes scattered maturing (60 to 70 year old) conifers that were not cut in the 1986 logging event.

**Soils:** Mormoder humus form with thin transitional Ah. Charcoal found in humus layer. Dark reddish brown loamy sand with 30-50% coarse fragments.

**Wildlife and Wildlife Habitat:** Observed during data collection: Northern Flicker (*Colaptes auratus*) Habitat: Large snags and maturing trees in Polygon 13b – woodpecker nesting.

**Disturbance History:** Clear-cut logged in 1948 and again in 1986. Skidder trails and evidence of disturbed soils were observed throughout the Polygons. Scattered windthrow / root-rot gaps were also observed throughout.

**Succession:** Stem exclusion is currently initiating and will last for the next half century. Red alder and bigleaf maple cover will decrease substantially over time and stinging nettle will also diminish in the understorey. The understorey will remain sparse until the stand matures, developing a more patchy character as larger windthrow / root-rot gaps begin to form.

#### 3.8.14 Ecological Community 14

**Description:** Young (27 year old) big leaf maple dominated (CDFmm/04) stand on a gentle north facing slope. Small patches of red alder and scattered individuals are also included in the Polygon, mainly along the boundary of Polygon 15. Douglas-fir, western redcedar and grand fir poles and saplings are scattered throughout in the sub-canopy. Terrain is variable ranging from moderately sloped areas to gentle benches to micro crests flanked by sloped draws or gulleys. There is evidence of extensive (logging related) soil disturbance throughout the Polygon including a dense network of old skid roads and associated general scraping and clearing. Polygons 14a and 14c are more gently sloped (10%) while Polygon 14b has a much steeper slope (35%).

**Soils:** Moder humus form with variable Ah layer below. Sandy loam (medium reddish brown) with 35-70% coarse fragments and some iron mottles to ~50+cm in depth. Fine, light yellowish reddish brown loamy sand below with low (10-30%) coarser fragment content. Charcoal evident between duff and mineral soil.

**Wildlife and Wildlife Habitat:** Observed during data collection: Douglas Squirrel (*Tamiasciurus douglasii*) (s), Turkey Vulture(s), Downy or Hairy Woodpecker feeding on coarse woody debris.

**Disturbance History:** After clear-cut logging in 1948 the stand regenerated naturally to red alder. The red alder stand was clear-cut again in 1986. Soils appear scraped and lightly disturbed. Charcoal in soil indicated site was burned though coarser woody debris in all decay classes remains scattered throughout the Polygons. Garbage/refuse – old tires, oil containers, plastic were found (see GPS point) in Polygon 14a.

**Succession:** Bigleaf maple dominance and the associated sparse understory may persist for several decades or longer with sub-canopy conifers unable to break through. Bigleaf maple is likely a natural response to clearing and heavy soil disturbance on moister richer (CDFmm/04-06) soils.

### 3.8.15 Ecological Community 15

**Description:** Young red alder (27 yr old) dominated stand on mid north facing slope with a stinging nettle, cleavers and Oregon beaked moss dominated understory. Bigleaf maple is scattered throughout with a higher density towards the lower slope as it transitions to the gentler sloped Polygons 14a and 14c. Douglas-fir, western redcedar, western hemlock and grand fir poles and saplings are scattered throughout in the sub-canopy. Denser conifer sub-canopy patches with the occasional main canopy Douglas-fir are found in transition areas to Polygon 13 and around canopy gaps.

**Soils:** Moder humus form with modest Ah. Sandy loam with iron mottles present and 20-30% coarser fragments. Medium, yellow reddish brown colour.

**Wildlife and Wildlife Habitat:** Observed during data collection: Dark-eyed Junco (*Junco hyemalis*) (s)

**Disturbance History:** After clear-cut logging in 1948 the stand regenerated naturally to red alder. The red alder stand was clear-cut again in 1986. Soils appear less disturbed than those in Polygons 14a, b and c.

**Succession:** Red alder – stinging nettle / cleavers will likely persist for 50-80 years before the red alder starts to thin out and the mix of conifer species are released from the sub-canopy.

### 3.8.16 Ecological Community 16

**Description:** Young (45-50 year old) Douglas-fir – salal (CDFmm01) dominated gentle north facing slope with a more recently logged, 27 year old Douglas-fir / red alder / bigleaf maple patch in the northeastern corner of the Polygon along an old road. The regularly used East-side Haul Road bisects the Polygon. The understory includes large swaths of Oregon beaked moss mixed with patches of salal. Slightly older (larger diameter) Douglas-fir (80-90 years old) are scattered throughout the stand.

**Soils:** Mor moder humus form. Sandy loam with 30-50% coarse fragments. Medium, yellow reddish brown colour.

**Wildlife and Wildlife Habitat:** Observed during data collection: Piliated Woodpecker (H), deer scat, Pacific Sideband. Habitat: woodpecker feeding holes on downed wood

**Disturbance History:** Partially logged in 1948. A patch in the northeastern corner of the Polygon was logged in 1986. The area was likely also high-grade logged roughly 80-90 years ago. The East-side Haul road fragments the Polygon and allows additional light into the understorey. There is also a spur road into the more recently cut patch in the northeastern corner of the Polygon. Evidence of root-rot / windthrow gaps scattered throughout.

**Succession:** Stem exclusion will continue over the next several decades, with root rot gaps possibly expanding but red alder, bigleaf maple and Scouler's willow (*Salix scouleriana*) presence likely declining. The understory will remain patchy.



Photo 4 - Douglas-fir forest north of easement

## 4.0 Community Consultation

The Islands Trust Fund offered two venues for community consultation. A community consultation session was held at the Galiano Community Hall on June 7, 2013. Fourteen Galiano community members attended the session hosted by Jeff Ralph (ITF) and Keith Erickson (GCA). The history, ecological significance and possible management issues of the reserve were presented in an attempt to gather feedback. Questionnaires (*See Appendix C*) were also made available to attendees and seven were completed.

An online questionnaire was developed and accessible through the Islands Trust Fund website [www.islandstrustfund.bc.ca](http://www.islandstrustfund.bc.ca). Fifteen online questionnaires were completed online.

The questionnaires asked respondents what the top three “most important values nature reserves offer the Galiano community”, the results were:

1. Protection of habitat for at-risk species
2. Conservation for the sake of the intrinsic value of nature
3. Ecosystem services (e.g. clean water and air, erosion control, groundwater recharge, etc.)

The consultation process revealed that the community in general were concerned about the following management issues:

- Fire
- Motorized vehicles
- Bicycles
- Camping
- Horseback riding
- Signage
- Trails
- Over-management
- Emergency Road Access



Photo 5 - Community Consultation

The issues identified by the community will be addressed and recommendations are presented in the management section of this plan.

### 4.1 First Nations Communications

The DL 58 Nature Reserve management plan timeline did not allow for adequate consultation and communication with First Nations who may have interest in nature reserve area.

## 5.0 Management Plan

### 5.1 Vision

*That generation after generation will allow nature to function unimpeded; a place where the beavers can be beavers, and people are the observers of the wonders of nature.*



Photo 6 - Beaver activity

### 5.2 Discussion

Islands Trust Fund nature reserves are sanctuaries for all species. The purpose and objective of the DL 58 Nature Reserve is to be a place where natural processes are allowed to flourish with minimal human intervention. In order to ensure that ecosystems and species continue to remain protected from adverse human caused events, ongoing monitoring and management is required. In this section several key areas of the management plan process are identified and recommendations are formulated to achieve the vision, purpose and objectives of DL 58 Nature Reserve.

### 5.3 Management

The management of the Nature Reserve will depend on a collaborative effort between the Islands Trust Fund and Galiano Conservancy Association (GCA), who hold the conservation covenant on the land. The original conservation proposal identified GCA as the appropriate management group for the Reserve. ITF holds management agreements with local conservation groups for several nature reserves. The GCA will play an important part in the future management of the reserve as neighbours of the property and the local resource for any activities that may impact the reserve. Several of the recommendations promoted in this report will require assistance and ongoing monitoring by the GCA.

#### **Recommendation**

*That the Islands Trust Fund sign a Management Agreement with the Galiano Conservancy Association for the DL 58 Nature Reserve.*

### 5.4 First Nations

First Nations were not contacted or adequately consulted during the management planning process due to the tight timeframe. It is recommended that First Nations who historically and

currently hold interest in the area of the nature reserve be contacted to express interest or concerns about the management of the reserve. Inclusion of First Nations values, history and perspective should be a priority in the revision of this management plan in 2018.

**Recommendation:**

*That the Islands Trust Fund/Galiano Conservancy Association consult/communicate with First Nations who have historical and current interest in the nature reserve area.*

**5.5 Trails**

Previous logging activity created an extensive road network in the DL 58 Nature Reserve. Most of these roads should be left to recover naturally and not used for trail purposes. Islands Trust Fund Nature Reserve trails are not maintained exclusively for recreational purposes, as reducing ecosystem degradation and



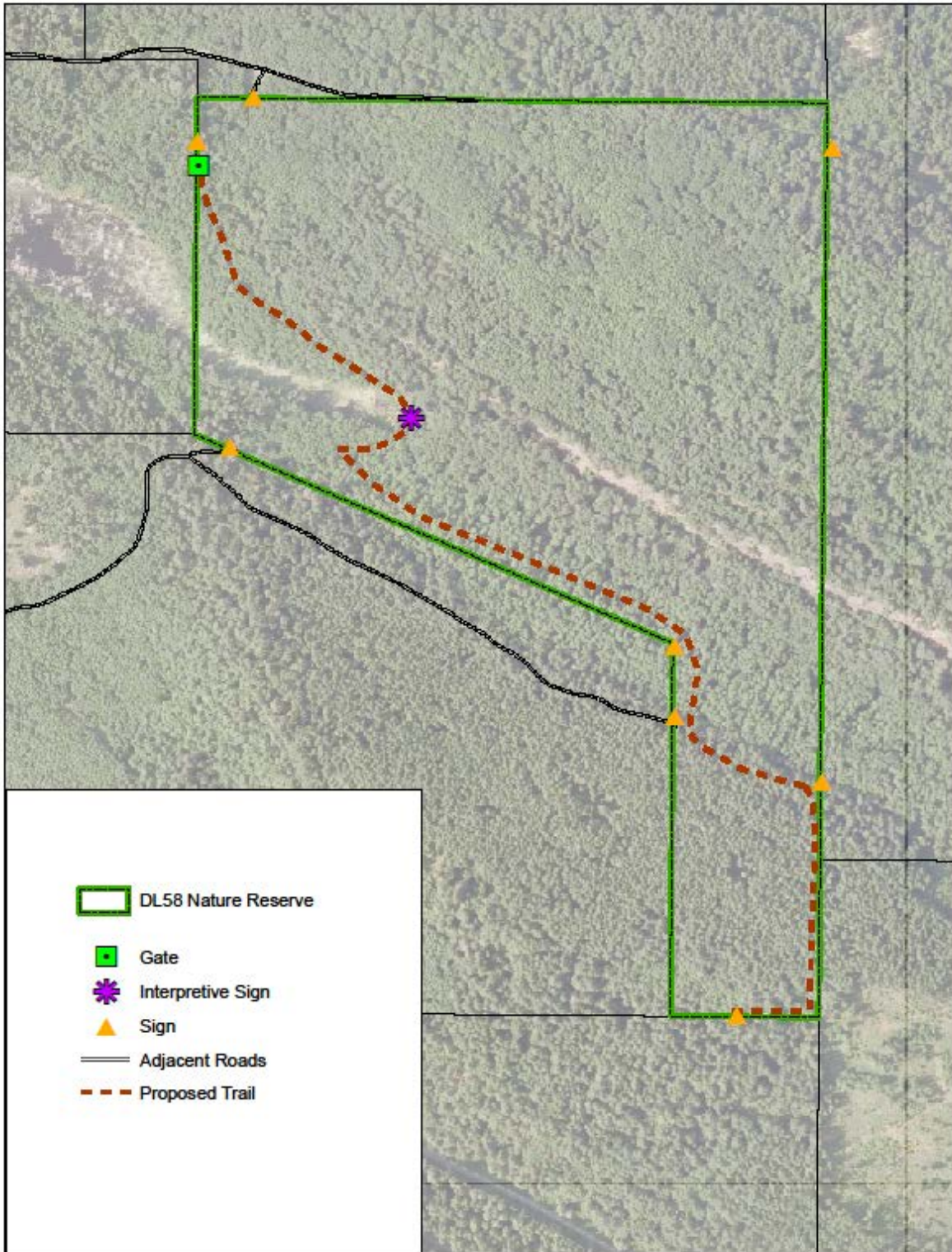
Photo 7 - Old logging road adjacent to Great Beaver Swamp

fragmentation are given higher priority. Hiking is permitted on ITF nature reserve trails but motorized vehicles, motor/dirt bikes, bicycles, and horses are prohibited in an attempt to reduce adverse ecological impacts and construction of unofficial trails.

The DL 58 Nature Reserve will include a trail that connects the Great Beaver Swamp to DL 57 as part of the larger Mid-Galiano Conservation Network. There is currently an old logging road that is passable that travels along the edge of the Great Beaver Swamp but does not continue south to DL 57. There is evidence of beaver activity along this road and as a result a potential for part of the road/trail to be submersed in water thus making it impassable. A boardwalk or platform would be an elaborate endeavor and prove to be costly. It may be necessary to close the trail at this juncture if deemed impassable. Alternative routes could be investigated.

From the swamp the road heads southwest towards the remainder of DL 58 that is privately owned. A trail will have to be developed to detour visitors from trespassing on to private property. The trail should be built to accommodate hiking only, no greater than 1m in width and follow any pre-existing deer or historical trails. A suggested route can be found on the Trail and Signage Map (See Figure 4). The Islands Trust Fund and GCA will work together to develop a trail that is built with minimal ecological impact while providing a valuable connection in the conservation network.

Figure 4 - Trail and Signage Map



Along one of the old logging roads/trails in the nature reserve there are a series of garbage piles. The garbage should be removed to allow natural processes to occur. Also, there is a gate on the portion of the suggested trail route. It is recommended that the gate remain. Removal of the gate would cause soil erosion, and landscape change which is contrary to the covenant.

### **Recommendations**

*That the Islands Trust Fund and Galiano Conservancy Association work together to develop a trail to connect the Great Beaver Swamp to District Lot 57.*

*That the Islands Trust Fund and Galiano Conservancy Association monitor the trail near the Great Beaver Swamp, and close the trail if deemed impassable and consider alternative routes.*

*That the Islands Trust Fund arrange removal of garbage from the reserve area.*

## **5.6 Signage**

The DL 58 Nature Reserve will require signage to identify reserve boundaries in order to prevent trespassing onto private land. “Nature Reserve Boundary” signs should be placed at the eight points identified on the Trail and Signage Map (See Figure 4). Further signage may be needed in response to inform the public of the prohibited activities (See Section 5.7).

In the future when the DL 58 Nature Reserve is renamed (See Section 5.9) signage may also be placed welcoming visitors to the Nature Reserve. Also, if funding permits it would be a great educational opportunity to place an interpretive sign at the southeastern tip of the Great Beaver Swamp. The sign could inform visitors about the history of beaver activity in the area, the beaver’s life cycle and management activities, the importance of wetlands, etc.

Trail closed signs may also be needed as well if beaver activity causes flooding across the trail.

### **Recommendations**

*That the Islands Trust Fund and Galiano Conservancy Association work together to install Nature Reserve Boundary signs as referred to in Trail and Signage Map.*

*That the Islands Trust Fund and Galiano Conservancy Association work together to create and install an interpretive sign at the Great Beaver Swamp when funding permits.*

## **5.7 Prohibited Uses**

Nature reserves are “reserved” for nature. Humans are part of nature, but some human activities have a detrimental impact on sensitive ecological communities. For this reason, human activities in nature reserves need to be managed and some activities prohibited. Based on previous management experience, research and community consultation, the following activities are prohibited on the DL 58 Nature Reserve:

- Motorized vehicles
- Bicycles
- Camping
- Horseback riding
- Fires
- Forestry

Neighbours, community members and the Galiano Conservancy Association play a pivotal role in the management of prohibited activities. Any observed prohibited activity should be reported to Islands Trust Fund (ITF) staff. ITF staff will investigate and utilize any means possible to remedy the situation.

**Recommendation**

*That the Islands Trust Fund ask community members to report any prohibited activities observed in the reserve area to the Islands Trust Fund.*

**5.8 Fire Management**

The land is largely forested and susceptible to the threat of catastrophic wildfire resulting from fuel build up due to fire suppression. This is a Galiano Island-wide threat. Fire in the DL 58 Nature Reserve will most likely be fought by both land and air. A natural fire created by a lightning strike would be in line with allowing natural processes to continue without impediment. However, considering the wide-ranging impact and the difficulty of keeping a wildfire within the reserve boundaries it is recommended that fires be extinguished on the reserve in a manner that minimizes ecological damage to the reserve. (e.g. use of fresh water instead of salt water or fire-retardant, consideration of the location of firebreaks, etc.).

**Recommendation**

*That the Islands Trust Fund support the extinguishment of fires on the DL 58 Nature Reserve and work with the Galiano Fire Department/BC Forest Service to incorporate consideration of the sensitive ecology of the Nature Reserve into fire management plans.*

**5.9 DL 58 Nature Reserve Name**

The name DL 58 Nature Reserve is based on the legal property description of the parent parcel. Islands Trust Fund properties are usually named after a significant natural feature, place name, First Nations reference or based on a donor’s request. A number of name options were suggested during the consultation process. Students at the Galiano Community School may enjoy the opportunity to suggest suitable names possibly after a site visit to the nature reserve. Another option is to hold a contest or survey on the Islands Trust Fund website to determine a name. The Islands Trust Fund may also wish to consult First Nations regarding a traditional First Nations name for the nature reserve.

## Recommendation

*That the Islands Trust Fund contact the Galiano Community School to find out if the students would be interested in helping name the reserve. If not, then consult First Nations to determine if they would like to suggest a traditional name for the nature reserve.*

## 5.10 Scientific Research/Education

Scientific research plays a critical role in understanding natural processes. Educational activities have the potential to demonstrate the importance of land conservation. The DL 58 Nature Reserve could be a suitable venue for field study/visits by students/visitors to learn the latest science about wetlands, beavers, forest succession, land conservation, etc. Any scientific research or study must have approval by the Islands Trust Fund, and may also need approval by the covenant holder (GCA).

## Recommendation

*That the Islands Trust Fund allow scientific research and education in DL 58 Nature Reserve as appropriate and subject to approval of the Trust Fund Board and GCA.*

## 5.11 Ecological Restoration

The Society for Ecological Restoration's definition of ecological restoration is "the process of assisting the recovery of an ecosystem that has been damaged, degraded or destroyed" (Society for Ecological Restoration, 2004). Damaging and degrading events (e.g. clear-cut logging, road building, etc.) have occurred at DL 58 but the



Photo 8 - red alder forest

forest continues to function and follow natural successional

processes. The forest could be altered through restoration techniques to represent a more natural state. The GCA conducts experimental forest restoration projects on a nearby reserve. The labour intensive practice of restoring the DL 58 forest portions to a representative ecosystem could potentially mimic and increase the speed of the forest succession. However, if left to naturally succeed after the disturbance the Reserve can be studied as a "control" site that is left "as is" with no human interference to compare to other forest restoration projects. It is also consistent with the Nature Reserve objectives and conservation covenant to follow a "less is more" approach to human intervention. A more reactive ecological restoration approach of removing of invasive species to allow natural systems function is consistent with the vision of the nature reserve. Annual monitoring of the property will include surveying for

invasive species and management contracts will address invasive species removal as resources permit.

**Recommendation**

*That ecological restoration is limited to invasive species removal.*

**5.12 Zoning**

The Nature Reserve is currently zoned Forestry 1. Islands Trust Fund nature reserves do not have active forestry permitted on them. There are other zoning designations in the Galiano OCP that may be better suited to the DL 58 Nature Reserve. For example, the Trincomali Nature Sanctuary located to the southeast of the reserve is designated as Nature Protection. The Nature Protection objective is to:

- 1) preserve natural values,
- 2) create connections establishing a network of protected areas, and
- 3) protect and enhance the island’s capacity for carbon storage.

**Recommendation:**

*That the Islands Trust Fund request rezoning of the DL 58 Nature Reserve from F1 Forestry to NP Nature Protection at an appropriate time (e.g. during an Official Community Plan review).*

**5.13 Emergency Road Access**

The proposed emergency access road, as identified in Schedule C, of the Galiano Island Official Community Plan, appears to go through the toe of the Great Beaver Swamp. Beaver activity and fluctuating water levels will result in the seasonal flooding of this area, which makes the area unsuitable for a road. An existing logging road across the panhandle of the Reserve may provide a suitable alternative route if adjacent landowners granted emergency-only access across their lands (*refer to Figure 1 for easement location*). The section of logging road on the nature reserve has been recently surveyed, as a 50 year easement has been granted to the owners of the remainder property.

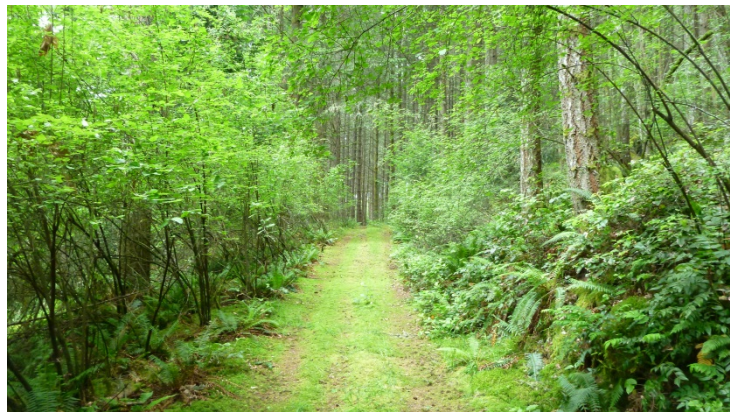


Photo 9 - Easement Road

**Recommendation:** *That the Islands Trust Fund consult its conservation partners and seek approval for granting access for emergency-only purposes across the existing easement at a time when similar access is granted over the remainder of DL 58 and DL 55.*

### 5.14 Monitoring

All Islands Trust Fund nature reserves, sanctuaries and covenants are monitored regularly. Property monitors conduct site visits and update ITF staff of any management concerns. The DL 58 Nature Reserve will be added to ITF's monitoring program to identify any management issues.

An ecological monitoring program could also be set up to monitor the wetland area in relation to beaver activity. This program could measure landscape change by utilizing monitoring techniques such as physical measurements, photo point monitoring, etc.

### Recommendation

*That the Islands Trust Fund add the DL 58 Nature Reserve to its annual monitoring program.*

*That the Islands Trust Fund establishes an Ecological Monitoring program for the wetland portion of the reserve.*

## 6.0 Action Items

Management Plan action items are measurable and achievable tasks that the Islands Trust Fund staff and partners can complete to ensure that the Nature Reserve is managed to the best of our ability. The following management action items are based on the recommendations made in this management plan and listed in priority sequence.

### 6.1 Immediate Actions (0-2 years)

1. Communicate and consult with First Nations.
2. Negotiate a management agreement with the Galiano Conservancy Association
3. Work with GCA to develop main trail
4. Create and install signage at Nature Reserve boundary points
5. Develop a service contract to remove garbage from the Reserve
6. Contact staff at Galiano Community School to find out if students would be interested in assisting in naming the Reserve



Photo 10 - western coralroot

## 6.2 Short term Actions (2-5 years)

7. Install an interpretive sign near the wetland area
8. Set up an ecological monitoring program to measure changes in hydrology for the wetland area.

## 6.3 Long term Actions (5 years +)

9. Rezone from F1 Forestry to NP Nature Protection when the opportunity arises

## 6.4 Ongoing Action Items

- Perform annual monitoring to identify management concerns
- Remove invasive species

## 7.0 Conclusion

The DL 58 Nature Reserve is an important piece of much larger conservation success story. The Mid-Galiano Conservation Network will provide islanders and visitors with a unique island experience through a myriad of ecosystems. The Islands Trust Fund will act on the management action items identified in this plan to achieve the vision, objectives and purpose of the DL 58 Nature Reserve. Future management issues may lead to further action items that will be captured in the 2018 revision of this plan. The DL 58 Nature Reserve is a special place and the landscape may be very different in the future; it all depends on how busy the beavers want to be.



Photo 11 - Great Beaver Swamp 2

## 8.0 References

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## 9.0 Appendices

### Appendix A – Species List (Vegetation)

<b>Trees</b>	
<b>Common Name</b>	<b>Latin Name</b>
grand fir	<i>Abies grandis</i>
bigleaf maple	<i>Acer macrophyllum</i>
red alder	<i>Alnus rubra</i>
bitter cherry	<i>Prunus emarginata</i>
Douglas-fir	<i>Pseudotsuga menziesii</i>
Garry oak	<i>Quercus garryana</i>
western redcedar	<i>Thuja plicata</i>
western hemlock	<i>Tsuga heterophylla</i>
<b>Shrubs</b>	
<b>Common Name</b>	<b>Latin Name</b>
Saskatoon berry	<i>Amelanchier alnifolia</i>
Scotch broom	<i>Cytisus scoparius**</i>
salal	<i>Gaultheria shallon</i>
ocean spray	<i>Holodiscus discolor</i>
holly	<i>Ilex aquifolium**</i>
orange honeysuckle	<i>Lonicera ciliosa</i>
hairy honeysuckle	<i>Lonicera hispidula</i>
tall Oregon grape	<i>Mahonia aquifolia</i>
dull Oregon grape	<i>Mahonia nervosa</i>
devil's club	<i>Oplopanax horridus</i>
falsebox	<i>Paxistima myrsinites</i>
baldhip rose	<i>Rosa gymnocarpa</i>
evergreen blackberry	<i>Rubus laciniatus**</i>
salmon berry	<i>Rubus spectabilis</i>
trailing blackberry	<i>Rubus ursinus</i>
Scouler's willow	<i>Salix scouleriana</i>
red elderberry	<i>Sambucus racemosa</i>
red huckleberry	<i>Vaccinium parvifolium</i>
<b>Herbs</b>	
<b>Common Name</b>	<b>Latin Name</b>
yarrow	<i>Achillea millefolium</i>
vanilla leaf	<i>Achlys triphylla</i>
pathfinder	<i>Adenoclon bicolor</i>
common burdock	<i>Arctium minus**</i>
great camas	<i>Camassia leichtlinii</i>
few-seeded bittercress	<i>Cardimine oligosperma</i>
common red paintbrush	<i>Castilleja miniata</i>
field chickweed	<i>Cerastium arvense</i>
enchanter's-nightshade	<i>Circaea alpina</i>
Siberian miners lettuce	<i>Claytonia sibirica</i>
small-flowered blue-eyed Mary	<i>Collinsia parviflora</i>
variable leaf collomia	<i>Collomia heterophylla</i>
spotted coralroot	<i>Corallorhiza maculata ssp. maculata</i>

western coralroot	<i>Corallorhiza maculata ssp. mertensiana</i>
common foxglove	<i>Digitalis purpurea</i> *
broad-leaved shootingstar	<i>Dodecatheon hendersonii</i>
common horsetail	<i>Equisetum arvense</i>
woodland strawberry	<i>Fragaria vesca</i>
cleavers	<i>Galium aparine</i>
small bedstraw	<i>Galium trifidum</i>
sweet-scented bedstraw	<i>Galium triflorum</i>
dovesfoot	<i>Geranium molle</i> *
rattlesnake plantain	<i>Goodyera pubescens</i>
wall lettuce	<i>Lactuca muralis</i>
common duckweed	<i>Lemna minor</i>
twinflower	<i>Linnaea borealis</i>
skunk cabbage	<i>Lysichiton americanum</i>
black medic	<i>Medicago lupulina</i> *
small flowered nemophila	<i>Nemophila parviflora</i>
yellow pond lily	<i>Nuphar polysepalum</i>
mountain sweet-cicely	<i>Ozmorhiza chilensis</i>
rein orchid	<i>Piperia sp</i>
floating leaved pondweed	<i>Potamogeton natans</i>
western buttercup	<i>Ranunculus occidentalis</i>
curled dock	<i>Rumex crispus</i>
western dock	<i>Rumex occidentalis</i>
Pacific sanicle	<i>Sanicula crassicaulis</i>
small-flowered bullrush	<i>Scirpus microcarpus</i>
broad-leaved stonecrop	<i>Sedum spathulifolium</i>
Wallace's selaginella	<i>Selaginella wallacei</i>
Mexican hedge-nettle	<i>Stachys mexicana</i>
northern starwort	<i>Stellaria calycantha</i>
Simcoe starwort	<i>Stellaria simcoei</i>
fringecup	<i>Tellima grandiflora</i>
foamflower	<i>Tiarella trifoliata</i>
clover	<i>Trifolium sp. (repens)</i>
western starflower	<i>Trientalis latifolia</i>
stinging nettle	<i>Urtica dioica</i>
American brooklime	<i>Veronica beccabunga ssp. americana</i>
meadow death-camas	<i>Zygadenus venenosus</i>
<b>Grasses, Rushes and Sedges</b>	
<b>Common Name</b>	<b>Latin Name</b>
bentgrass	<i>Agrostis sp. *</i>
brome	<i>Bromus sp.</i>
grey sedge	<i>Carex canescens</i>
Dewey's sedge	<i>Carex deweyana</i>
slough sedge	<i>Carex obnupta</i>
Sitka sedge	<i>Carex sitchensis</i>
hedgehog dogtail	<i>Cynosorus echinatus</i>
orchard grass	<i>Dactylis glomerata **</i>
spike rush	<i>Eleocharis sp.</i>
blue wild rye	<i>Elymus glaucus</i>

tall mannagrass	<i>Glyceria elata</i>
common velvet-grass	<i>Holcus lanatus</i> **
common rush	<i>Juncus effusus</i>
many-flowered woodrush	<i>Luzula campestris</i>
<b>Ferns</b>	
<b>Common Name</b>	<b>Latin Name</b>
lady fern	<i>Athyrium filix-femina</i>
deer fern	<i>Blechnum spicant</i>
spiny wood fern	<i>Dryopteris expansa</i>
goldenback fern	<i>Pentagramma triangularis</i>
sword fern	<i>Polystichum munitum</i>
bracken fern	<i>Pteridium aquilinum</i>
<b>Mosses, Clubmosses and Liverworts</b>	
<b>Common Name</b>	<b>Latin Name</b>
lipstick cladonia	<i>Cladonia macilenta</i>
broom moss	<i>Dicranum scoparium</i>
hanging millipede liverwort	<i>Frullania nisquallensis</i>
common scissor-leaf liverwort	<i>Herbetus aduncus</i>
	<i>Homalothecium sp.</i>
stair-step moss	<i>Hylocomium splendens</i>
cat-tail moss	<i>Isothecium stoloniferum</i>
Oregon beaked moss	<i>Kindbergia oregana</i>
common feather moss	<i>Kindbergia praelonga</i>
Menzies' tree moss	<i>Leucolepis menziesii</i>
Badge moss	<i>Plagiomnium insigne</i>
wavy-leaved cotton moss	<i>Plagiothecium undulatum</i>
tree ruffle liverwort	<i>Porella navicularis</i>
juniper haircap moss	<i>Polytrichum juniperinum</i>
grey rock moss	<i>Racomitrium canescens</i>
lanky moss	<i>Rhytidiadelphus loreus</i>
electrified cat's tail	<i>Rhytidiadelphus triquetrus</i>
fan moss	<i>Rhyzomnium glabrescens</i>
yellow-ladle liverwort	<i>Scapania bolanderi</i>
<b>*Non-native    ** Invasive</b>	

## Appendix B - Species List (Wildlife)

<b>Amphibians</b>	
<b>Common Name</b>	<b>Latin Name</b>
Pacific Chorus Frog	<i>Pseudacris regilla</i>
Red-legged Frog	<i>Rana aurora</i>
<b>Birds</b>	
<b>Common Name</b>	<b>Latin Name</b>
Red Winged Blackbird	<i>Agelaius phoeniceus</i>
Great Blue Heron	<i>Ardea herodias fannini</i>
Canada Goose	<i>Branta canadensis</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>
Turkey Vulture	<i>Cathartes aura</i>
Northern Flicker	<i>Colaptes auratus</i>
Olive-sided Flycatcher	<i>Contopus cooperi</i>
Piliated Woodpecker	<i>Dryocopus pileatus</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Dark-eyed Junco	<i>Junco hyemalis</i>
Band-tailed Pigeon	<i>Patagioenas fasciata</i>
Hairy Woodpecker	<i>Picoides villosus</i>
Rufous Hummingbird	<i>Selasphorus rufus</i>
Red-breasted Nuthatch	<i>Sitta canadensis</i>
Barred Owl	<i>Strix varia</i>
<b>Gastropods</b>	
<b>Common Name</b>	<b>Latin Name</b>
Pacific Sideband	<i>Monadina fidelis</i>
<b>Mammals</b>	
<b>Common Name</b>	<b>Latin Name</b>
Beaver	<i>Castor canadensis</i>
Black-tailed Deer	<i>Odocoileus hemionus columbianus</i>
Red Squirrel	<i>Tamiasciurus hudsonicus</i>
<b>Mollusks</b>	
<b>Common Name</b>	<b>Latin Name</b>
Banana Slug	<i>Ariolimax columbianus</i>

## Appendix C - DL 58 Nature Reserve Questionnaire

DL 58 is situated within the Mid Galiano Conservation Network, a network of protected properties stretching across Galiano Island, protecting more than 500 hectares of sensitive ecosystems and wildlife habitat. The property sits between the Great Beaver Swamp and the Galiano Learning Centre (DL 57). Our primary goal is to protect and nurture the sensitive ecosystems on this land. To do that, we are creating a plan that will guide how we manage the property and its features. We're asking the Galiano community, and all those interested in conservation in the islands, to help us develop this plan. Please share your thoughts on the protection and long-term management of the property.

**1. Please provide your suggestion for a new name for this nature reserve. If possible, please let us know why you suggest this name.**

**2. Where do you live?**

- North Galiano
- Central Galiano
- South Galiano
- Off-island

**3. How often do you visit any of the protected properties within the Mid-Galiano Conservation Network (Bodega Ridge Provincial Park, Laughlin Lake Nature Reserve, Pebble Beach or Cable Bay Nature Reserve, Great Beaver Swamp, or the Galiano Learning Centre)?**

- Once a week or more
- Once a month
- Several times per year
- Once a year or less
- Never

**4. What activities do you and/or your family enjoy when visiting the protected properties in the Mid-Galiano Conservation Network?**

- Hiking/walking
- Dog walking
- Cycling/mountain biking
- Other (please list)

**5. Please list wildlife and unique plant species you have seen close to the new DL 58 Nature Reserve (DL 58) is between the Great Beaver Swamp and the Galiano Learning Centre (DL57)**

**6. What do you believe to be the most important values nature reserves offer the Galiano community (choose your top three choices)**

- Protection of habitat for at-risk species
- Ecosystem services (e.g. clean water and air, erosion control, groundwater recharge, etc)
- Recreational opportunities
- Education and research opportunities
- Tourism
- Aesthetic appeal
- Conservation for the sake of the intrinsic value of nature

**7. What activities do you believe are incompatible with the protection of natural features, and should not be allowed within the new DL 58 Nature Reserve?**

**8. What do you feel could be the greatest threat to the health of this nature reserve, and should be the highest management priority for the Islands Trust Fund?**

**9. Please provide any other relevant information that will help us make the best management decisions for DL 58.**

**10. Please share with us any history you know about this property (or mid-Galiano) or any knowledge you have about unique cultural or other special features on the property.**

**11. If you would like to receive updates from the Islands Trust Fund on this, and other conservation projects on the islands, please provide your name and email address:**

*Thank you for your time helping us plan the future of Galiano's newest nature reserve*