John Osland Nature Reserve Management Plan

Lasqueti Island, British Columbia

Prepared for:

ISLANDS TRUST FUND

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REPORT TO

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FOR

John Osland Nature Reserve Management Plan

SUBMITTED

April 2012

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Executive Summary

The John Osland Nature Reserve was established by the Islands Trust Fund in 2012 following the donation of the property by John Osland, a long-time resident of Lasqueti Island. As Islands Trust Fund policy requires a management plan to be created for each property, EBB Environmental Consulting Inc. was retained in February 2012 to develop a management plan for the newly acquired property.

The objective of the management plan is to provide long-term guidance and direction for the property. The recommendations and action items developed are based upon site history, ecological features, community consultation, and ITF policy and objectives for the Nature Reserve. Objectives for the property are as follows:

- To conserve and protect the ecological and natural values of the property;
- To allow natural ecological processes of the reserve to function without interference, and;
- To manage the property in accordance to Island Trusts policies, goals, and objectives.

The John Osland Nature Reserve is a 63.5 ha property located centrally within Lasqueti Island. The site is primarily Douglas-fir – Shore Pine – Arbutus woodland forest (Red- listed), however local valley topography results in diverse vegetation types; a wetland pond occurs near the center of the site, with several small streams and seepages nearby, and rocky outcrops with abundant moss and lichen communities occur at crests. The property also holds several unique or uncommon features adding to its conservation value:

- Numerous large veteran trees occur as a result of limited logging, particularly within the southern portion of the property;
- Sensitive ecosystems - woodland forests, a wetland pond, and rocky outcrops - with potential to support rare and threatened species;
- Recent transition of a wetland from a cultivated field. Continued development of wetland vegetation is expected to further enhance wildlife value; and,
- Historical value and legacy of homesteader John Osland.

Recommendations for property management are focused upon the following issues:

- Site access and use of trails;
- Invasive and exotic species - plants and feral sheep;
- Installation of signage, and;
- Site monitoring.

Action items were developed and prioritized for immediate, short-term, and long-term implementation. High priority action items include:

- Consider restricting vehicle access to the property by possibly installing a gate, log or rock barrier or deactivation;
- Removal of debris pile within site;
- Removal of high priority invasive species; and,
- Installation of signage for site identification, and to commemorate the legacy provided by John Osland.

Acknowledgements

We would like to express our gratitude and thanks to the many contributors to this management plan. Comments and discussion provided by community response to questionnaires and consultation sessions were invaluable in the management planning process and we greatly appreciate the warm welcome and contributions. Many thanks to the Islands Trust Fund and Lasqueti Island Local Trustees, Susan Morrison and Peter Johnston. We would also like to express our appreciation to John Osland, for his generous donation of his property and care and appreciation for nature.

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1 Introduction

EBB Environmental Consulting Inc. (EBB) was retained by Islands Trust Fund (ITF) to develop a management plan for the John Osland Nature Reserve, located on Lasqueti Island, British Columbia. This document is designed to fulfill the ITF operating procedure TFB 98002 to develop management plans for each Nature Reserve or Sanctuary within one year of property acquisition and to provide management goals and objectives.

The ITF was established in 1990 as a regional conservation land trust for the Islands Trust area. The ITF currently owns and manages 21 nature reserves and holds over 60 conservation covenants, permanently protecting over 1,000 hectares of land in the Gulf and Howe Sound Islands.

The ITF "*envisions the islands and waters of the Strait of Georgia and Howe Sound as a vibrant tapestry of culture and ecology where humans live and work in harmony with the natural world. This special place has a network of protected areas that preserve in perpetuity the native species and natural systems of the islands. Engaged residents and conservation partners work together to protect large natural areas and key wildlife habitat*." (ITF 2010).

The administration of the Islands Trust Fund is provided by the Islands Trust. The Islands Trust is a unique federation of independent local governments, including Bowen Island Municipality, which plans land use and regulates development in the trust area. The object of the Islands Trust is "*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 Act*).

1.1 Islands Trust Fund Management Plans

It is the policy of the ITF to develop management plans for all its properties (ITFB 2008). The purpose of these management plans is to provide long-term direction and guidance for the protection of its Nature Reserves and Sanctuaries. In general, these management plans serve to:

- Outline conservation goals and objectives for the property;
- Document the property's ecological and social values and features;
- Identify site specific issues, and;
- Provide management recommendations on issues such as invasive species, sensitive and at risk species and ecological communities, public access and safety, educational and research opportunities, and signage.

1.2 Purpose of the John Osland Nature Reserve

The purpose of establishing the John Osland Nature Reserve is as follows:

- To conserve and protect the ecological and natural values of the property;
- To allow natural ecological processes of the reserve to function without interference, and;
- To manage the property in accordance with ITF policies, goals, and objectives.

1.3 Objectives of the John Osland Nature Reserve

The overarching ITF conservation goals applicable to the John Osland Nature Reserve are:

- To secure conservation areas through acquisition, bequest, donation or conservation covenant, at least 500 hectares within the timeframe of the 2011-2015 Regional Conservation Plan, and;

- Monitor and manage existing conservation areas to maintain and enhance existing biodiversity and cultural features.

2011 – 2015 Regional Conservation Plan (ITFB 2010)

2 Property Information

2.1 Location and Legal Description

The Osland Nature Reserve is a 63.5 ha property located near Ogden Lake on Lasqueti Island, British Columbia. The coordinates of the property center are UTM Zone 10U 408603E 5480726N. The Osland Nature Reserve can be accessed from Lake Rd, a public access road located off of Main Rd. Access to the John Osland Nature Reserve does require crossing over private land; the Islands Trust Fund hopes to work with the adjacent landowners to secure a legal easement.

The legal description of the property is as follows: the south east 1/4 of section 15, Lasqueti Island, Nanaimo District. The PID is 009-720-472.

Figure 1: Location of the John Osland Nature Reserve on Lasqueti Island.

2.2 Local and Regional Context

Archeological artifacts show a rich history of First Nations settlement on Lasqueti Island dating back thousands of years (Lasqueti Island Internet Access Society 2012). Early inhabitants of Lasqueti Island are believed to include the Pentlatch Band of the Coast Salish (Mason 1976). Use of the island included permanent longhouse settlements along shorelines and bays, as well as hunting and gathering of inland resources (Lasqueti Island Internet Access Society 2012). The John Osland Nature Reserve site is situated nearby an estuary bay (Boat Cove) and freshwater lakes, and was likely used by First Nations for the harvesting of resources.

Although European settlement of the Island did not begin until the 1860's, Spanish explorers visited Lasqueti Island decades earlier in 1791, and are attributed to naming the island (Walbran 1971). European settlers came to the island as sheep farmers, leaving a legacy of feral sheep which continue to be present on the island (Mason 1976). The rural lifestyle established during early settlement is still active, and raising livestock and other farming activity is common on the island.

In addition to farming, early industry on Lasqueti Island included mining and timber extraction (Mason, 1976). Logging operations on Lasqueti Island reached a peak in the 1950's during a

timber boom, and commercial logging on crown land continued until the 1970's. Since the 1970's commercial logging operations on crown land have been limited.

Although logging has occurred across much of Lasqueti Island, the forests within the John Osland Nature Reserve have had limited logging due to early management; John Osland had acquired the property in 1948 as a homestead, and after two years of logging, he ended the contract to preserve the remaining old growth forests within the property (Gordon 2011). John Osland resided on Lasqueti for 62 years, as an active member of the community, boat-builder, and island historian. Upon his passing in 2010, the property was donated to the ITF, as per the terms of his will. The property was certified as an Ecological Gift through Environment Canada's Ecological Gifts Program. Volunteer efforts to restore the property to its natural state were completed in the fall of 2011, prior to the transfer of the land to the ITF. Volunteers carefully removed the old homestead building and filled in drainage ditches to help restore natural drainage patterns (Islands Trust Fund 2012).

2.3 Adjacent Land Use and Connectivity

The John Osland Nature Reserve shares its southern boundary with Provincial Crown land that provides undeveloped and uninterrupted connectivity to the southern shoreline which abuts a Rockfish Conservation Area. While the remaining boundaries of the property are shared with private landowners, the surrounding land is not currently undergoing resource extraction and development is limited to rural homes. The John Osland Nature Reserve is also in close proximity to the ITF-owned Mount Trematon Nature Reserve (57 ha) and the Lasqueti Island Ecological Reserve (217 ha), which are to the west.

Minimal development and ecosystem conversion has occurred on Lasqueti Island. Residential development, agriculture and other natural habitat conversion amounts to only 5.9% of the land base (ITFB 2010). The low overall level of ecosystem conversion currently permits a high degree of habitat connectivity across the island regardless of protected status. While this connectivity is not certain into the future, it is currently beneficial to the ecosystems and species on the John Osland Nature Reserve.

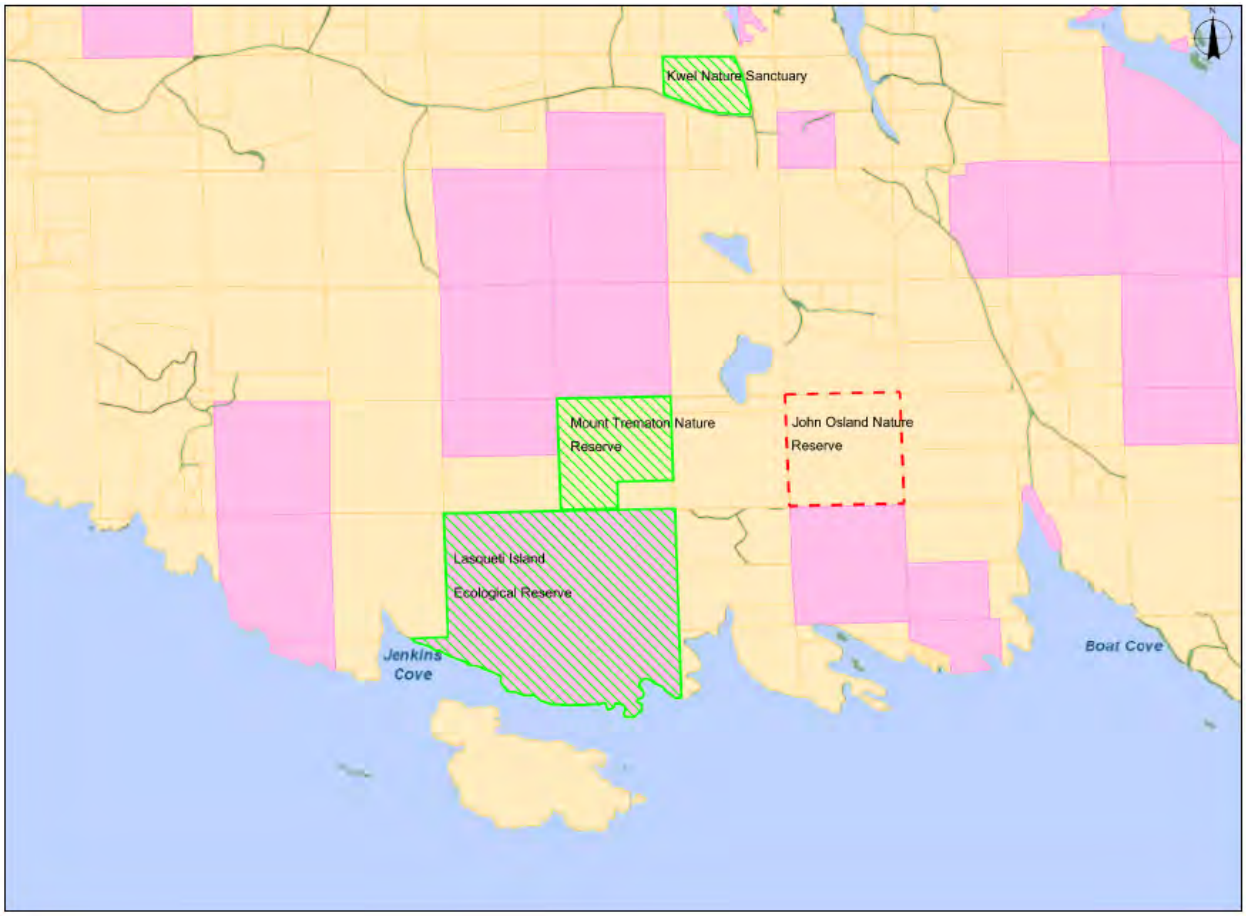

Figure 2: Location of the John Osland Nature Reserve (red), and adjacent land uses. Green polygons indicates existing protected areas; Pink, undeveloped Crown Land; remaining properties are residential (Map: LRDW 2012).

2.4 Local Government, Zoning and Planning

Local land use planning on Lasqueti Island is governed by the Lasqueti Island Local Trust Committee, a group of two locally elected officials and one Islands Trust Executive Committee Member. Community goals, objectives, and policies regarding future land use and development are presented in the Lasqueti Island Official Community Plan (Islands Trust, 2011). The John Osland Nature Reserve is currently designated as Land Based (LB) in the Lasqueti Island Official Community Plan No. 77 (OCP) and is zoned Land Based (LB) in the Lasqueti Island Land Use Bylaw No. 78 (LUB). This existing designation allows for the following applicable uses; residential, agriculture, forestry, and home enterprise. Buildings and other structures are permitted under the Land Based designation. Based on defined land use and zoning categories in the OCP and LUB, a designation of Watershed Protection 1 (WP1) is a more applicable zoning and land use category for the John Osland Nature Reserve, and the ITF may wish to consider rezoning the property.

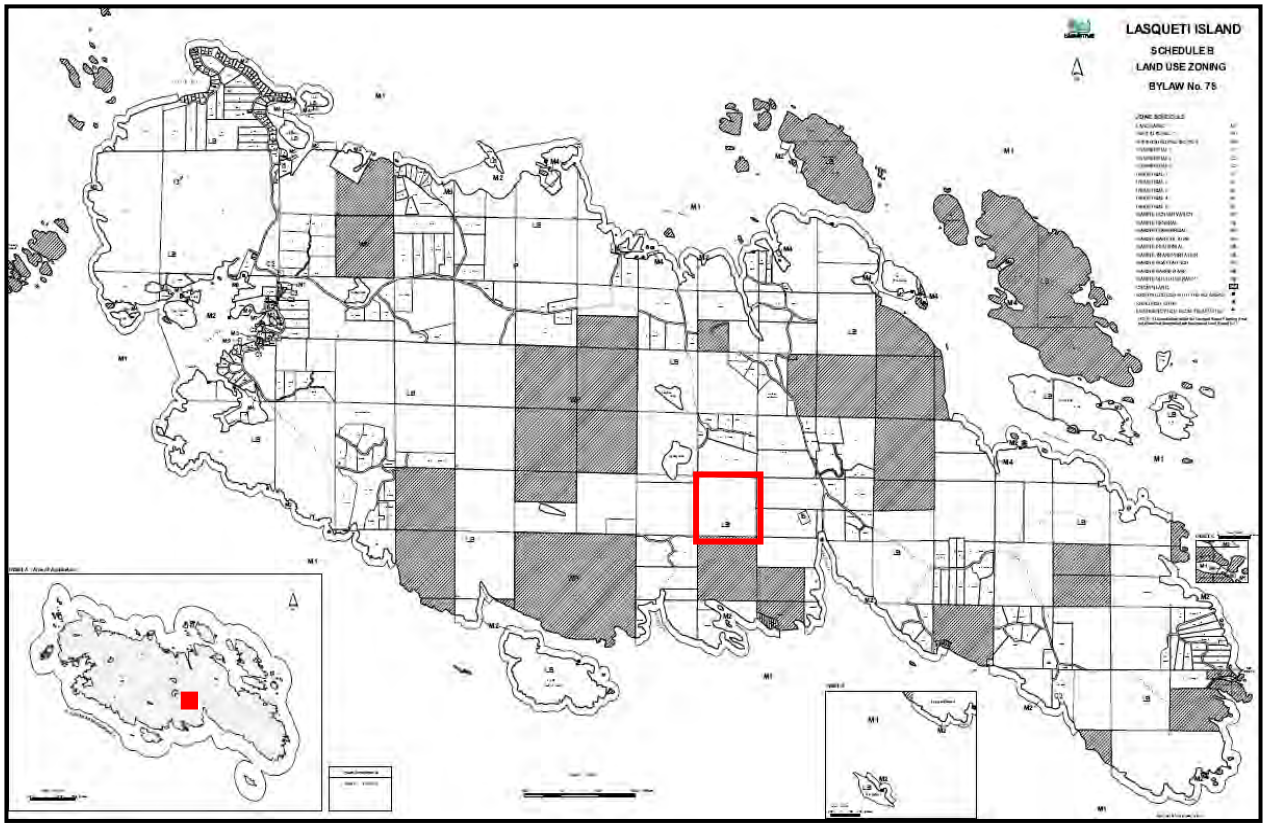

Figure 3: Lasqueti Island Land Use Zoning, John Osland Nature Reserve highlighted in red (Islands Trust 2010).

3 Ecological Background

3.1 Overview

The property is unique as much of its old growth forest has been protected from logging, resulting in numerous veteran trees throughout the property. The property retains many high value features that do not commonly occur on the Island, including small streams, a wetland, rocky outcrops and moss/lichen communities. The John Osland Nature Reserve lies within the Coastal Douglas-fir moist maritime subzone (CDFmm). This biogeoclimatic ecosystem classification (BEC) subzone is represented in only 0.25% of the provincial land base and contains a significant number of rare or uncommon species and vegetation communities BC CDC 2012).

3.2 Climate

Climate within the study area is influenced by maritime conditions and the rain shadow effect of the Vancouver Island and Olympic mountains. As a result temperatures are mild throughout the

year, with warm dry summers, and mild wet winters. Although growing seasons are long, summer droughts occur on drier sites. Total annual precipitation is 999 mm with only 212 mm falling within the summer months (May to September). Only about 5 % of annual precipitation within the region falls as snow which generally melts quickly (Nuszdorfer et al. 1991).

Climate data for the John Osland Nature Reserve was generated using Climate BC (Wang et al. 2006) that generates climate data by interpolating data from nearby weather stations and adjusting outputs based upon location elevation. Data generated is based upon records from 1971 to 2000.

Table 1: Summary of Climate Data, between 1971 and 2000, for the John Osland Nature Reserve

Summary of Climate Data for the John Osland Nature Reserve	
Mean Annual Temperature (^{o}C)	8
Mean Warmest Month Temperature (^{o}C)	16.1
Mean Coldest Month Temperature (^{o}C)	1.6
Temperature Difference Between Mean Warmest Month and Mean Coldest Month (^{o}C)	14.5
Mean Annual Precipitation (^{o}C)	999
Mean Annual Summer Precipitation (^{o}C)	212
Annual Heat: Moisture Index	18
Summer Heat: Moisture Index	76
Extreme Minimum Temperature (over 30 years)	-18.6
Precipitation as Snow (mm)	97
Degree Days > 0	58
Degree Days > 5	1606
Bud Burst for Most Plants (Date that Degree Days > 5 reaches 100)	Apr-28

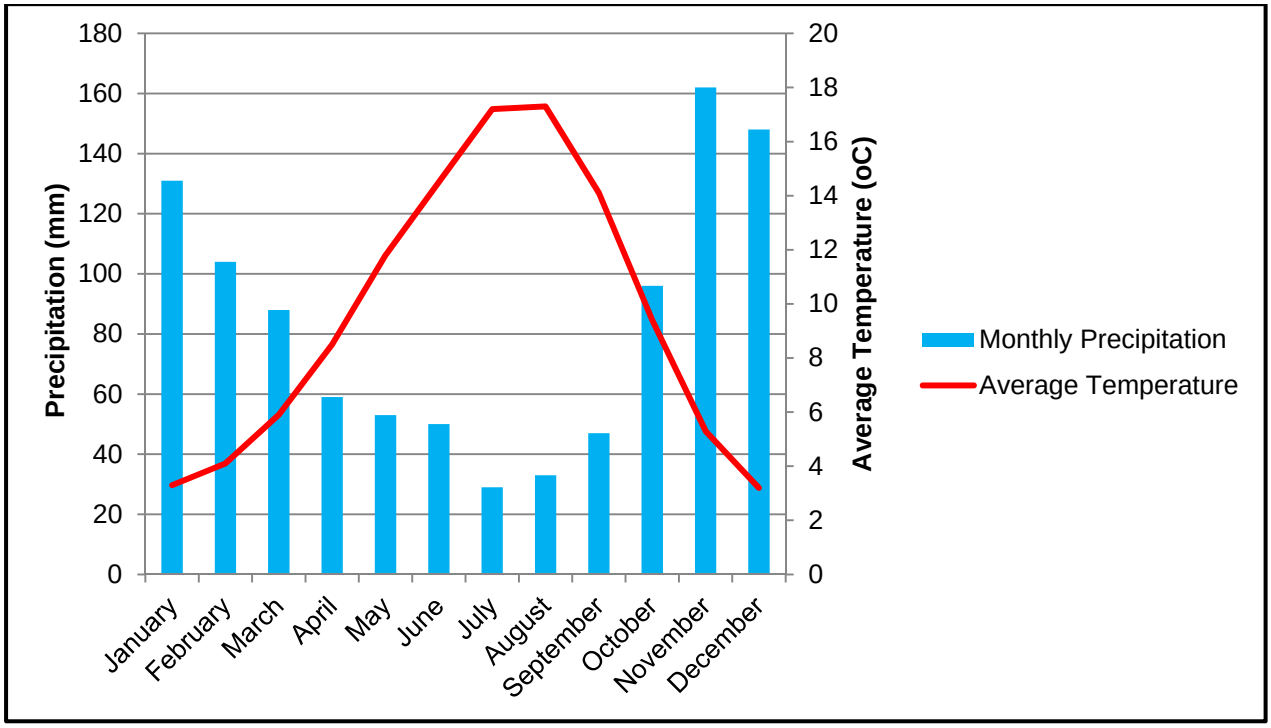

Figure 4: Monthly average temperature (°C) and total precipitation (mm) for the John Osland Nature Reserve. Climate data based on ClimateBC model (Wang et al 2006)

3.3 Geology

Much of Lasqueti Island is geologically comprised of middle to upper Triassic basaltic pillow flows typical of the Vancouver Group - Karmutsen Formation. It is believed that these formed between 245 to 200 million years ago (BC LRDW 2012a). The prevailing landforms on Lasqueti Island are that of an irregular landscape punctuated by numerous rocky slopes and narrow, steep valleys.

3.4 Hydrology

Based on provincial data, the John Osland Nature Reserve is divided into four separate watersheds (Figure 5) with the dominant watershed draining into an unnamed tributary originating within the centre of the property. This unnamed tributary flows from the property and terminates at Boat Cove, a linear distance of 1.6km (BC LRDW 2012b). Several smaller watershed units on the northern and western boundaries transport water from the John Osland Nature Reserve to adjacent watersheds, including the Lambert Lake Tributaries, the Ogden Lake Watershed, and the Trematon Creek Watershed.

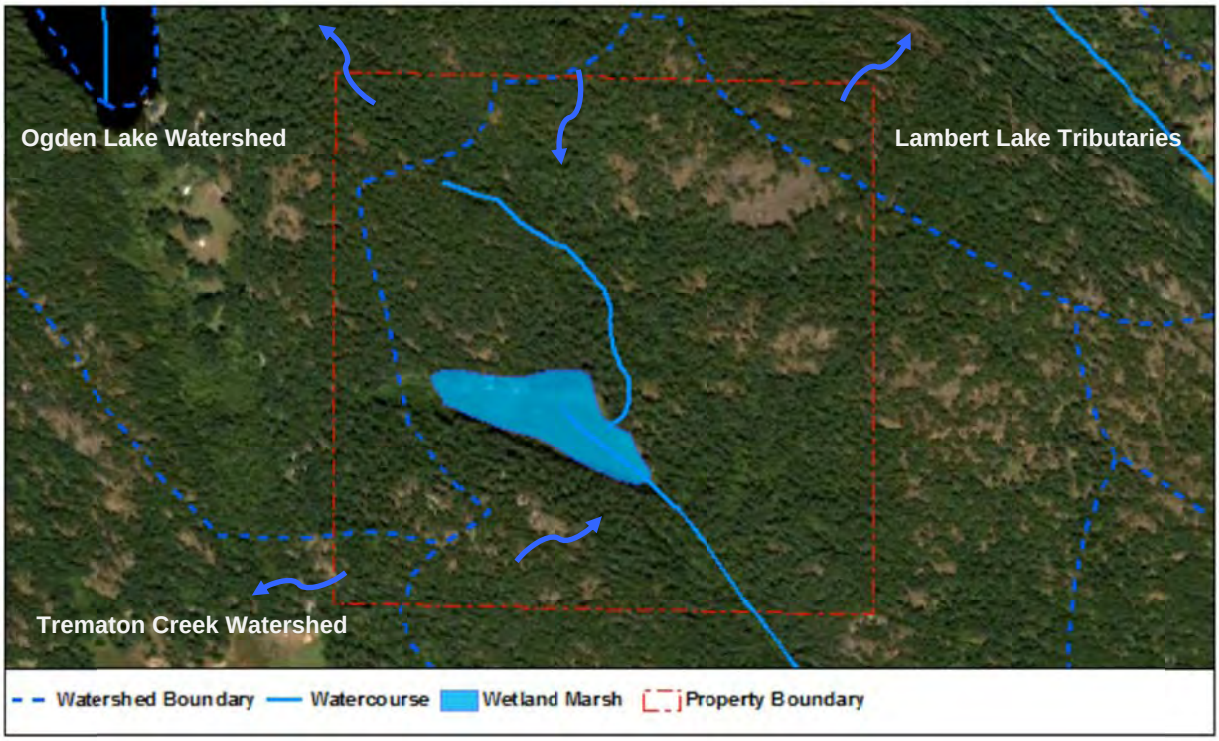

Figure 5: Local hydrological features and prevailing direction of flow.

3.5 Soils

Typical of the Gulf Islands, soils on Lasqueti Island are primarily well-drained, shallow deposits over bedrock. In some areas the limited soil development restricts the establishment of forests, resulting in rocky outcrops ecosystems. Within the John Osland Nature Reserve soils are best described by local topography. At local crests, near Mount Cook and along the southern edge of the property, landscape is dominated by rocky outcrops. Where soils do occur, site vegetation communities indicate that soils are very dry with low nutrient levels, as identified by site series classification (Green and Klinka 1994). As elevation drops, rocky outcrops are replaced by shallow pockets of rocky soils. These shallow soils are still very dry with low nutrient levels, and contain a high number of coarse rock fragments. Larger rock deposits also occur at the southern base of Mount Cook. Areas along the valley bottom of the property, near the central wetland areas, have comparably well-developed, deep soils, with richer nutrient levels and moist soil conditions, as indicated by site vegetation communities (Green and Klinka 1994).

3.6 Biogeoclimatic Classification

Lasqueti Island falls within the Coastal Douglas-fir BEC zone; only one subzone occurs within the CDF - the moist maritime subzone (CDFmm). The CDFmm has limited occurrence within

BC; the entire zone covers only 0.25 % of the province and is found only on the east coast of Vancouver Island, Gulf Islands, and in small areas along the Sunshine Coast and on the Mainland (Ward et al. 1998). The CDF zone is also greatly under-represented in amount of protected areas. Only 6.6 % of this zone is within protected areas, compared with a provincial target of 12 % (BC Parks 2011).

Urban expansion is one of the largest threats to the remaining habitat over much of the CDF zone. As an area with desirable climate, proximity to urban centers, and natural beauty, Vancouver Island and the Gulf Islands have some of the highest population growth rates within the province (Ward et al. 1998). As a rural community with unpaved roads and a passenger-only ferry, Lasqueti is comparably undeveloped to other Gulf Islands; however, the 2011 census results show a growth rate of 18.7% between 2006 and 2011, from 359 to 426 residents (Island Tides 2012). Development pressure not only results in direct habitat loss, but can also degrade remaining habitat by increasing fragmentation, affecting hydrology processes, and create vectors for the spread of invasive plants.

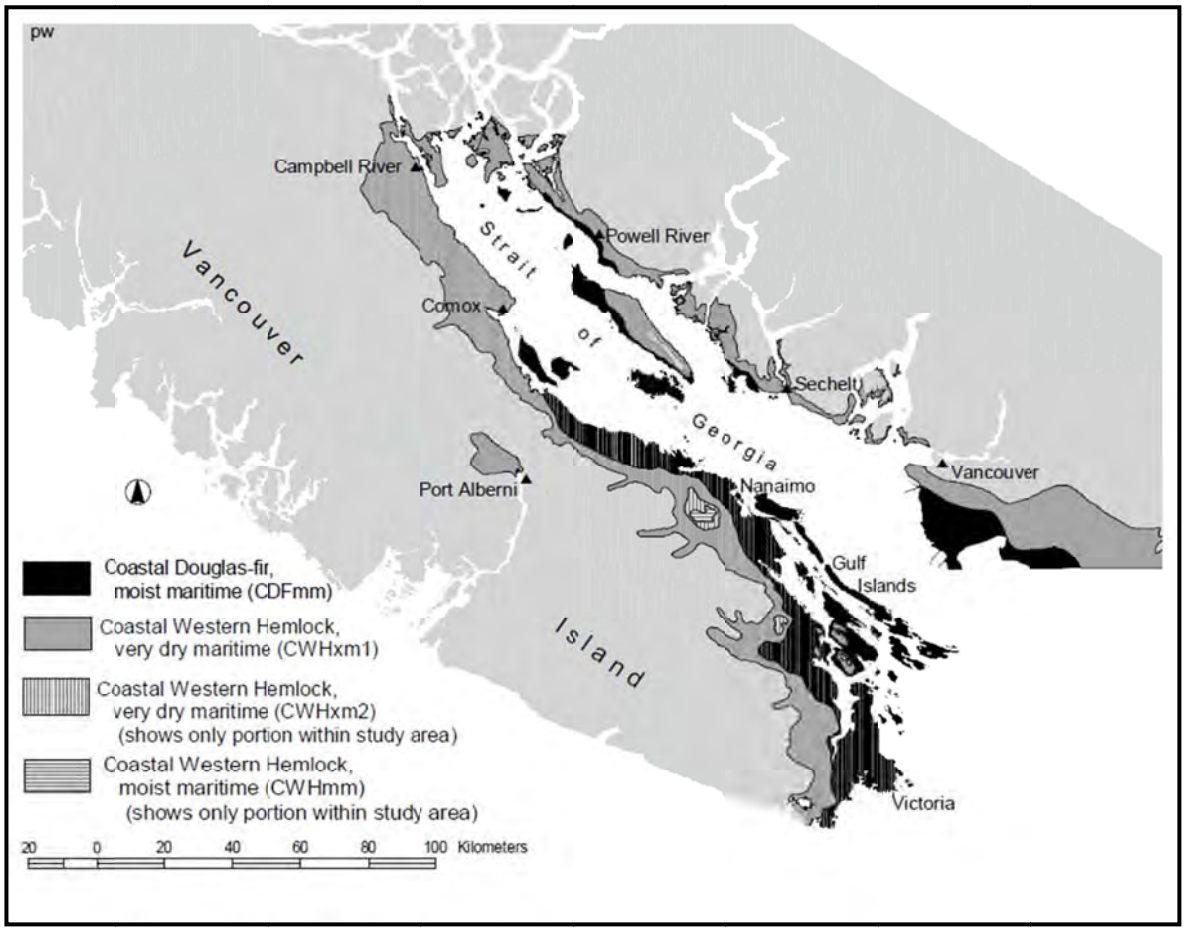

Figure 6: Distribution of the CDFmm BEC zone within the Georgia Depression Ecosection (Ward et al. 1998)

3.7 Ecoregion

The study area can be described in several levels of Ecoregion classifications. The classifications are based upon the physiology and climate characteristics of the region. On the largest scale, Vancouver Island, the Gulf Islands, and the Fraser Valley are classified as the Georgia Depression (GED) Ecoprovince. Within this classification, the Gulf Islands and Strait of Georgia lie within the Georgia-Puget Basin (GPB) Ecoregion, and on the next level of classification Lasqueti Island lies within the Strait of Georgia (SOG) Marine Ecosection (Demarchi 1996).

3.8 Vegetation Types

The delineation of vegetation types within the Osland Nature Reserve is based upon Terrestrial Ecosystem Mapping (TEM) of the region, completed 2007-2008 by Madrone Environmental Services Ltd. for the Integrated Land Management Bureau. In this project, ecosystem types were identified using aerial photo analysis, and verified with field sampling (Madrone Environmental Services Ltd. 2008). Ecosystems classifications include sensitive and non-sensitive ecosystems. TEM has identified nine vegetation types in the John Osland Nature Reserve including several ecosystems classified as sensitive:

- **Sparsely Vegetated (SV) communities** – within the Nature Reserve this ecosystem type is restricted to rocky outcrops within dry Douglas-fir –Shore pine - Arbutus forests;
- **Wetland (WN)** – a wetland area occurs near the center of the site. Several small streams run into the wetland from the north, and a ditched channel runs out from the wetland to the southeast;
- **Woodland (WD)** – Douglas-fir – Shore pine - Arbutus woodland forests occur throughout the Nature Reserve

Vegetation types identified in the TEM were verified and described in detail on field surveys completed March 10 and 11, 2012 by EBB. Vegetation types described by the TEM were found to be accurate at delineating vegetation types; however, variances in forest age were noted for several vegetation types and are identified in the detailed descriptions. Vegetation variances did not differ substantially from the overall ecosystem classification and subsequently were not mapped. Site series and vegetation associations are described based upon Ministry of Forests' *A Field Guide for Site Identification and Interpretation for the Vancouver Forest Region* (Green and Klinka, 1994); complete vegetation associations and edatopic grids for the CDFmm subzone are displayed in Appendix III.

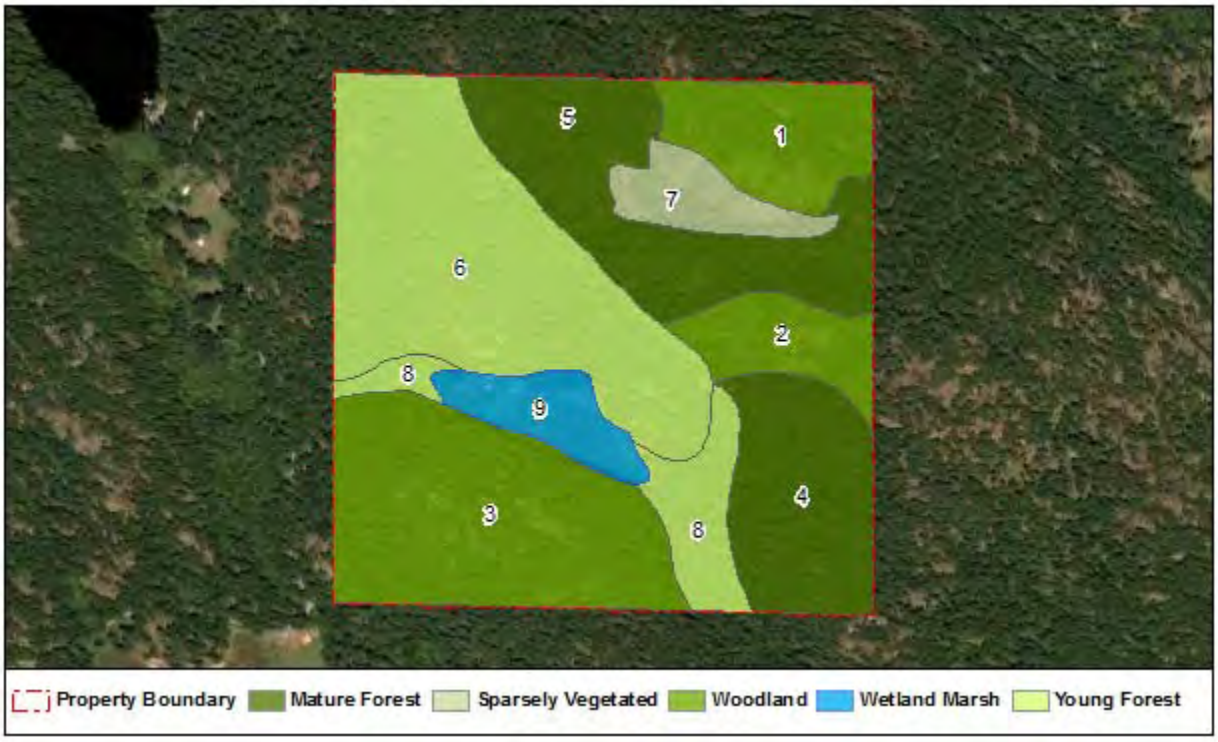

Figure 7: Delineation of Vegetation types within the John Osland Nature Reserve (Polygons derived from existing TEM data [Madrone Environmental Services Ltd.).

Table 2: Summary of Vegetation Type Classification within the John Osland Nature Reserve

Ecosystem Type	Description	Site Series
1	Dry Sites near Crest of Site: Douglas-fir – Shore-pine – Arbutus	02, Ws50
2	Mature Forest: Douglas-fir- Salal	02, 01
3	Dry Sites with Undisturbed Forest and Rocky Outcrops: Douglas-fir – Shore-pine – Arbutus Forest	02, 01
4	Moist Sites with Intermittent Streams, Mature Forest: Western redcedar – Grand fir – Foamflower	01, 02*
5	Mature Forest: Douglas-fir – Salal	01, 02
6	Young Forest: Douglas-fir – Salal	01, 02
7	Rocky Outcrops: Douglas-fir – Shore-pine – Arbutus Forest	02
8	Wet sites with Mature Forest: Western redcedar – Grandfir – Foamflower	06, 13
9	Wetland Pond	Ws50

* See note below Ecosystem 4.

Table 3: Detailed Descriptions of Vegetation Types

Ecosystem Type 1	Dry Sites near Crest of Site: Douglas-fir – Shore-pine – Arbutus

Terrestrial Ecosystem Mapping	Coverage	Site Association
Mature forest	80	Douglas-fir – Shore-pine – Arbutus
Wetland	10	Hardhack (pink spirea) – Sitka sedge swamp
Sparsely Vegetated	10	Rock outcrop
Vegetation Description		
Main Canopy	Mature Forest and Woodland; Douglas-fir (*Psuedotsuga mensiezii*), Western Hemlock (*Tsuga heterophylla*)	
Secondary Canopy	Shore-pine (*Pinus contorta*), Arbutus (*Arbutus mensiezii*), Western Hemlock (*Tsuga heterophylla*)	
Under story	Open understory with patches of Salal (*Gaultheria shallon*); 10% cover	
Forb layer	Forbs: Deer fern (*Blechnum spicant*), sword fern (*Polystichum munitum*); < 5 % cover; Moss: Step moss (*Hylocomium splendens*); 80% cover	
Rare / Locally Uncommon Species	None observed. Potential habitat for: Apple Moss, Hairy Gumweed, rare wildflower species	
Habitat Features	Rocky outcrops, coarse woody debris, large wildlife trees	
Site Series	02, Ws50;	
Site Description		

Disturbance History	Windthrow evident with debris across understory. Fire scars are present on larger trees, likely from historical fire in mid 1800's.
Expected Changes	Windthrow is expected to continue to thin the stand, opening up to more rocky outcrops as very little understory tree regeneration was observed.

Ecosystem Type 2 Mature Forest: Douglas-fir- Salal

Terrestrial Ecosystem Mapping	Coverage	Site Association
Woodland	50	Douglas-fir– Shore-pine – Arbutus
Sparsely Vegetated	30	Rock outcrop
Mature Forest	20	Douglas-fir-Salal
Vegetation Description		
Main Canopy	Mature Forest and Woodland; Douglas-fir, and Western redcedar canopy with canopy cover of 30-40%.	
Secondary Canopy	Grand fir (*Abies grandis*) and Western redcedar (*Thuja plicata*).	
Under story	Shrubs: Salal, Falsebox (*Pahistima myrsinites*); 10% cover	
Forb layer	Forbs: none observed – likely limited due to timing of field survey (March) Moss: sparse under conifers, Oregon Beaked Moss (*Eurhynchium oreganum*), Step Moss; 50% cover	
Rare / Locally Uncommon Species	None observed. Potential habitat for: Apple Moss, Hairy Gumweed, rare wildflower species	
Habitat Features	Limited Coarse Woody Debris, rocks and coarse fragments on forest floor.	

Site Series	02, 01
Site Description	
Disturbance History	Logging approximately 1950. Fire scars are present on larger trees, likely from historical fire in mid 1800's.
Expected Changes	Processes of natural succession will continue to create a multi-aged forest with the advancement of regenerating Western red cedar and Grand fir. Veteran trees and large snags suitable for wildlife are expected to develop.

Ecosystem Type 3	Dry Sites with Undisturbed Forest and Rocky Outcrops: Douglas-fir – Shore-pine – Arbutus Forest

Terrestrial Ecosystem Mapping	Coverage	Site Association
Woodland	60	Douglas-fir – Shore-pine – Arbutus
Mature Forest	30	Douglas-fir-Salal
Sparsely Vegetated	10	Rock outcrop
Vegetation Description		
Main Canopy	Mature Forest; Douglas-fir; approximately 10% canopy cover	
Secondary Canopy	Arbutus and Shore pine	
Under story	Open rocky outcrops; no shrub species	
Forb layer	Forbs: none observed Moss: abundant mosses and shrub lichens, Step moss, Oregon Beaked moss and Coastal Reindeer lichen (*Cladina portentosa*)	
Rare / Locally Uncommon Species	Potential habitat for: Apple Moss, Hairy Gumweed, rare wildflower species	
Habitat Features	Several large veteran trees suitable as wildlife trees.	
Site Series	02, 01; steep north-facing slope	
Site Description		
Disturbance History		

	Very little disturbance. No logging has occurred within this portion of the property. Wind throw disturbance evident.
Expected Changes	Wind throw disturbance and limited forest development due to shallow soils is expected to maintain rocky outcrop openings.

Ecosystem Type 4	Moist Sites with Intermittent Streams, Mature Forest: Western redcedar – Grand fir – Foamflower*

Terrestrial Ecosystem Mapping	Coverage	Site Association
Mature forest	60	Douglas-fir-Salal
Woodland	30	Douglas-fir – Shore-pine – Arbutus
Sparsely Vegetated	10	Rock outcrop

Vegetation Description	
Main Canopy	Mature Forest; Western redcedar, Douglas-fir, Grand fir; canopy cover 30-40%
Secondary Canopy	Red alder
Under story	Shrubs: Salal primarily occurring on nurse logs; few Red huckleberry (*Vaccinium parviflorum*); < 5% cover
Forb layer	Forbs: Deer fern; < 5% cover Moss: mosses primarily on logs and other substrate; step moss; 50% cover
Rare / Locally Uncommon Species	None observed. Higher diversity of forbs and shrubs; potential habitat for Red-legged Frog
Habitat Features	Severally seasonal watercourses and spring seeps
Site Series	01, 02

Site Description	
Disturbance History	Logging approximately 1950. Fire scars are present on larger trees, likely from historical fire in mid 1800's.
Expected Changes	Secondary canopy of red alder in wetted areas expected to mature and decay, providing nesting habitat for cavity nesting birds and greater diversity in stand structure.

*On the ground observations for Ecosystem Type 4 differed from those described in the Terrestrial Ecosystem Mapping (TEM) done for the Coastal Douglas-fir Biogeoclimatic Zone. While the TEM may be accurate for areas of the TEM polygon found outside of the John Osland Nature Reserve, the vegetation within the Nature Reserve is more accurately described as Western redcedar – Grand Fir – Foamflower according to the vegetation description accompanying Ecosystem Type 4.

Ecosystem Type 5 Mature Forest: Douglas-fir- Salal

Terrestrial Ecosystem Mapping	Coverage	Site Association
Mature forest	70	Douglas-fir-Salal
Woodland	30	Douglas-fir – Shore-pine – Arbutus
Vegetation Description		
Main Canopy	Young Forest and Woodland; Douglas-fir, Western hemlock, Western redcedar; canopy cover 20%	
Secondary Canopy	Grand fir and Western hemlock	
Under story	Shrubs: Oceanspray (*Holodiscus discolor*); 5% cover Western red cedar and Grand fir saplings	
Forb layer	Forbs: Dull Oregon-grape (*Mahonia nervosa*); 1% cover Moss: Step moss, Lanky moss (*Rytidiadelpus loreus*), Oregon Beaked moss	
Rare / Locally Uncommon Species	n/a	
Habitat Features	Veteran trees as wildlife habitat.	
Site Series	01, 02	
Site Description		

Disturbance History	Logging approximately 1950. Fire scars are present on larger trees, likely from historical fire in mid 1800's.
Expected Changes	The stand is expected to mature to a multi-aged stand with an increase in young Western redcedar and Grand fir, with veteran Douglas-fir remaining.

Ecosystem Type 6 Young Forest: Douglas-fir- Salal

Terrestrial Ecosystem Mapping	Coverage	Site Association
Young forest	60	Douglas-fir-Salal
Mature forest	30	Douglas-fir – Shore-pine – Arbutus
Non-sensitive Ecosystem	10	Rural Residential *neighboring residences-not within property
Vegetation Description		
Main Canopy	Young Forest and Woodland; Douglas-fir	
Secondary Canopy	Arbutus, Shore Pine	
Under story	Open understory; no shrubs observed	
Forb layer	Forbs: few forbs observed, Dull Oregon-grape, Rattlesnake plantain (*Goodyera oblongifolia*); < 5% cover Moss: moss layer well developed, Step moss, Lanky moss, Coastal Reindeer lichen	
Rare / Locally Uncommon Species	Potential to contain wildflowers species, Apple Moss, Hairy Gumweed	
Habitat Features		

	Tree snags broken from windthrow
Site Series	01, 02
Site Description	
Disturbance History	Logging approximately 1950; cat trail is present through this area of property – largely overgrown. Fire scars are present on larger trees, likely from historical fire in mid 1800's.
Expected Changes	Expected to remain as an open rocky habitat as very little regenerating trees were observed. Mature trees are likely to add value for wildlife as veteran trees and snags are formed.

Ecosystem Type 7 Rocky Outcrop with Douglas-fir – Shore-pine – Arbutus

Terrestrial Ecosystem Mapping	Coverage	Site Association
Woodland	60	Douglas-fir- - Shore pine - Arbutus
Sparsely Vegetated	50	Rock outcrop
Vegetation Description		
Main Canopy	Sparse Forest of Low ridge-top trees; Douglas-fir, Shore Pine, and Arbutus; open canopy	
Secondary Canopy	n/a	
Under story	Rocky opening, few occurrences of Dull Oregon-grape; < 1% cover	
Forb layer	Forbs: single instances of Foxglove (*Digitalis purpurea*) Moss: diverse moss and lichen species including Juniper Haircap moss (*Polystrichum juniperum*) and Coastal Reindeer lichen	
Rare / Locally Uncommon Species	Potential habitat for: Apple Moss, Hairy Gumweed, wildflower species	
Habitat Features	Uncommon habitat, open rocky outcrops, may support rare species.	
Site Series	02	
Site Description		

Disturbance History	Windthrow evident from broken branches and snags.
Expected Changes	Rocky outcrop is expected to be maintained as forest growth is likely to be slow in dry conditions and no new tree saplings were observed.

Ecosystem Type 8	Wet sites with Mature Forest: Western redcedar – Grand fir – Foamflower

Terrestrial Ecosystem Mapping	Coverage	Site Association
Young forest	40	Western redcedar – Grand fir - Foamflower
Seasonally Flooded Field	30	Cultivated Field
Wetland	30	Western redcedar – Indian Plum
Vegetation Description		
Main Canopy	Mature forest; Western redcedar and Douglas-fir	
Secondary Canopy	Red Alder, few Bigleaf Maple (*Acer macrophyllum*)	
Under story	Understory bare, no shrubs observed.	
Forb layer	No forbs observed – likely due to timing of field survey (March) Moss: Step moss, Oregon Beaked moss; 10% cover	
Rare / Locally Uncommon Species	Close proximity to wetland, may be used by amphibians such as Red-legged Frog or Western Toad	
Habitat Features	Close proximity to wetland.	
Site Series	06, 13	
Site Description		

Disturbance History	Removal of CWD for firewood is likely as habitat in close proximity to homestead.
Expected Changes	Understory complexity is expected to develop slowly as mature trees age and die back, creating gaps within the stand and contributing to CWD development along the forest floor.

Ecosystem Type 9 Wetland Marsh

Terrestrial Ecosystem Mapping	Coverage	Site Association
Wetland	80	Hardhack (pink spirea) – Sitka sedge swamp
Non-sensitive Ecosystem	20	Rural Residential *removed fall 2011
Vegetation Description		
Main Canopy	n/a; Red Alder present at west end of wetland	
Secondary Canopy	n/a	
Under story	Shrubs within pond, Himalayan blackberry (*Rubus discolor*) at pond edges	
Forb layer	Forbs: Common rush (*Juncus effuses*) and sedge sp. along shoreline (*Carex* sp.) <10% cover Limited shoreline vegetation along north side, primarily cultivated grasses	
Rare / Locally Uncommon Species	Reported observations (personal communications) of Red-legged Frog; potential breeding habitat for Western Toad and Western Painted Turtle. Potential habitat for uncommon wetland birds such as Olive-sided Flycatcher and Great Blue Heron.	
Habitat Features	Marsh. Limited emergent vegetation occurs along shoreline.	
Site Series	Ws50	
Site Description		

Disturbance History	Original wetland drained to facilitate agricultural activities in the early 1900's; ditching was recently refilled (fall 2010) to restore natural hydrology. John Osland's homestead was situated on the north side of the wetland habitat, although buildings have been removed; a clearing of cultivated grasses and orchard trees remain at the homestead site.
Expected Changes	As area has been recently re-flooded, wetland succession is expected to occur. Some initial shock and die back may occur to conifers along south shoreline, and to young stand of Red alder in flooded western area of wetland creating snags and perching habitat for birds. Sedges and rushes along shoreline of wetland are expected to continue to develop, enhancing habitat for aquatic species, however development of shoreline vegetation may be restricted due to grazing of deer and sheep.

3.9 Wildlife and Habitat

Similar to other areas in the Gulf Islands, Black-tailed deer can be found in high abundance on Lasqueti Island. Another species occurring locally are feral sheep which have been established on the island. Large predators are absent from Lasqueti Island as no wolves, coyotes, bears, or cougars currently reside on the island. Other mammals found on Lasqueti Island include raccoons, beavers, mink, river otter, ermine, and small-mammals including numerous species of shrews, mice, and voles. Several introduced species common on the mainland and Vancouver Island, such as Eastern cottontail and grey squirrel have not been recorded on Lasqueti Island (E-Fauna 2012).

Lasqueti Island supports a diversity of bird species including migratory and resident species. An average of 55 species has been recorded on annual Christmas Bird Counts (Audubon 2012), and additional species occur as seasonal migrants. Habitat within the John Osland Nature Reserve is expected to support common forest birds such as Black-capped Chickadee, Pacific Wren, Golden-crowned Kinglet, and Pine Siskin. Resident bird species includes several woodpecker species, which are important as cavity excavators to create nesting habitat for other species.

Several of British Columbia's reptile species may be found on Lasqueti Island including, Northern Alligator Lizard, Northwestern Garter Snake, and Common Garter Snake. These species benefit from crevices within rocky outcrops as sources of shelter. Western Painted Turtle, an endangered, pond-associated reptile, may be found on Lasqueti Island, however occurrences of this rare species have not been recorded. Dry conditions within the CDF zone limit the occurrence of amphibians to wetlands, ponds, and streams, however species such as Red-legged Frog (blue listed) and Western Toad (blue listed) may be locally abundant.

Habitat features and their potential to support wildlife within the John Osland Nature Reserve are described below.

Table 4: Habitat Features and Potential Wildlife Use.

Habitat Type	Feature	Species and Potential Use
Wetland	Marsh	Wetlands are an uncommon ecosystem within the region. This limited habitat feature has potential to support a variety of wildlife species as productive foraging and breeding habitat. Shallow water and emergent vegetation create habitat for pond-breeding amphibians such as Pacific Chorus Frog, Red-legged Frog, Northwestern Salamander, Rough-skinned Newt, and Long-toed Salamander. Wetlands also support abundant insect populations, which provide foraging opportunities for many birds, including swallows, flycatchers, and other marsh species.
Rocky Outcrops		Rocky outcrops within the CDF support a unique compilation of plants and wildlife species that depend on them, including several rare butterfly species and wildflowers. Open habitat also provides nesting habitat for ground-nesting birds such as the Common Nighthawk, a summer migrant to the region.
Forested Sites	Woody Debris	Woody debris is an important habitat component as a source of cover for small mammals, amphibians, and invertebrates. This feature is often a limited component in open, dry forests within the CDF, and although it is not abundant in John Osland Nature Reserve, woody debris does occur throughout the property from windthrow disturbance, as well as disease and fungal infections and natural tree death.
	Wildlife Trees	As only limited logging has occurred within the John Osland Nature Reserve, many veteran trees remain throughout the property. These large trees reach above the main canopy and create essential nesting habitat and perches for raptors. As well, crevices and natural features may be used by cavity nesting birds such as owls, woodpeckers, and chickadees. Suitable nesting habitat is often a limiting habitat feature for cavity-nesting species, particularly in second-growth forests. Veteran trees also support bat populations by providing roosting sites within crevices and peeling bark. Windthrow disturbance also adds forest complexity and potential wildlife use; broken branches or crowns from trees can create crevices used by wildlife. As well, exposed root wads from wind thrown trees are a network of crevices and suitable nesting habitat for forest birds.
	Intermittent Streams	A small intermittent stream flows into the wetland area from the northern slope. This watercourse is likely seasonal, occurring only in wet winter and spring months, however it supports a diversity of species year-round. Trees associated with wet soils, such as red alder, can provide suitable habitat for cavity nesting birds. As well, wetted areas provide habitat for amphibians, and foraging sites for birds and other wildlife.

Table 5: Species observed during March 10 and 11 Site Visits

Species Observed March 10 and 11 Site Visits			
Species		**Habitat Type**	**Observation**
Common Name	*Scientific Name*		
Black-tailed Deer	*Odocoileus hemionus*	Throughout Property	Sign (Droppings, prints, rut marking on trees)
Feral Sheep	*Ovis aries*	Throughout Property	Sign (Droppings)
Red Squirrel	*Tamiasciurus hudsonicus*	Mature Forest	Visual / Audio
Varied Thrush	*Ixoreus naevius*	Mature Forest	Visual / Audio
Black-capped Chickadee	*Poecile atricapillus*	Mature Forest	Visual / Audio
American Robin	*Turdus migratorius*	Mature Forest	Audio
Northwestern Crow	*Corvus caurinus*	Mature Forest	Audio
Pacific Wren	*Troglodytes pacificus*	Mature Forest	Audio
Dark-eyed Junco	*Junco hyemalis*	Rocky outcrops; open forest	Visual / Audio
Common Raven	*Corvus corax*	Mature Forest	Visual / Audio
Bald Eagle	*Haliaeetus leucocephalus)*	Mature Forest	Visual
Hairy Woodpecker	*Picoides villosus*	Mature Forest – Wet Sites	Audio
Red-breasted Sapsucker	*Sphyrapicus ruber*	Homestead (orchard trees)	Sign (sapsucker holes)
Pacific Chorus Frog	*Pseudacris regilla*	Wetland	Audio

3.10 Rare and At Risk Species and Ecological Communities

At risk species and ecological communities are generally defined as species that are in danger of becoming extinct or extirpated (*Species at Risk Act, SARA [2002])*. Species and ecological communities are often designated as at risk due to environmental or anthropogenic induced changes directly on the species or to their habitat on a local, regional or global scale. Rare species and ecological communities are generally defined as those that occur in low number or that inhabit restricted areas (*SARA*). Being defined as a rare species or ecological community does not necessarily mean that the species/community is subsequently defined as at risk. In BC and Canada, several legal definitions have been created to label at risk species based on the severity of risk. BC lists species under the colour-coding system, and includes red-listed, blue-listed and yellow-listed species (BC Conservation Data Centre). These species may also be listed under the Federal *Species at Risk Act,* which lists species as endangered, threatened, or of special concern. Consideration and provisions must be made for species that have been listed in either the Provincial or Federal lists. Severity of risk ranges from high (endangered, red-listed) to low (special concern, blue-listed) and apparently provincially secure/not at risk (yellow-listed).

Several occurrences of at risk species and ecological communities have been recorded on Lasqueti Island, however observations have not been recorded within the John Osland Nature Reserve. Inventory surveys of species at risk within the Nature Reserve have not been undertaken, and it is possible that species at risk may occur.

3.10.1 Listed Species

Four species of plants were identified to have historical records of occurrence on Lasqueti Island (Table 6), none of which have been documented to occur within the John Osland Nature Reserve. Database queries of the BC CDC returned a resulting list of thirty-three (33) species with potential to occur within the John Osland Nature Reserve (Table 7).

Table 6: Recorded occurrences of at risk species known to occur on Lasqueti Island.

Recorded Occurrences of at Risk Species				
Species		**Habitat Description**	**Location**	**BC Status**
Common Name	*Scientific Name*			
Plants				
Hairy Gumweed	*Grindelia hirsutula* var. *hirsutula*	Rock outcrops	Trematon Mountain	Red
Apple Moss	*Bartramia stricta*	Rock outcrops with freshwater seeps	Jenkins Cove	Red
Giant chain fern	*Woodwardia fimbriata*	Coniferous forest, coastal bluffs	Lasqueti Island Ecological Reserve, Power Cage Cove	Blue
Poison Oak	*Toxicodendron diversilobum*	Dry Coniferous forest (Douglas-fir and Arbutus stand)	Lasqueti Island Ecological Reserve,	Blue

Table 7: Species at risk with potential to occur within the John Osland Nature Reserve.

Potentially Occurring at Risk Species			
Species		**Red / Blue List Status**	**Habitat Type**
Common Name	*Scientific Name*		
Plants			
slimleaf onion	*Allium amplectens*	Blue	TERRESTRIAL
chaffweed	*Anagallis minima*	Blue	ESTUARINE;PALUSTRINE;TERRESTRIAL
least moonwort	*Botrychium simplex*	Blue	PALUSTRINE;RIVERINE;TERRESTRIAL
green-sheathed sedge	*Carex feta*	Red	PALUSTRINE;RIVERINE;TERRESTRIAL
pointed broom sedge	*Carex scoparia*	Blue	LACUSTRINE;PALUSTRINE; TERRESTRIAL
hairy gumweed	*Grindelia hirsutula* var. *Hirsutula*	Red	TERRESTRIAL
heterocodon	*Heterocodon rariflorum*	Blue	PALUSTRINE;RIVERINE;TERRESTRIAL
Nuttall's quillwort	*Isoetes nuttallii*	Blue	PALUSTRINE;RIVERINE;TERRESTRIAL
white adder's-mouth orchid	*Malaxis brachypoda*	Blue	ESTUARINE;LACUSTRINE;PALUSTRINE;RIVERINE;TERRESTRIAL
Texas toadflax	*Nuttallanthus texanus*	Blue	TERRESTRIAL
northern adder's-tongue	*Ophioglossum pusillum*	Blue	LACUSTRINE;PALUSTRINE;RIVERINE;TERRESTRIAL
Macoun's groundsel	*Packera macounii*	Blue	ESTUARINE;TERRESTRIAL

Potentially Occurring at Risk Species			
Species		**Red / Blue List Status**	**Habitat Type**
Common Name	*Scientific Name*		
snow bramble	*Rubus nivalis*	Blue	TERRESTRIAL
poison oak	*Toxicodendron diversilobum*	Blue	TERRESTRIAL
giant chain fern	*Woodwardia fimbriata*	Blue	PALUSTRINE;RIVERINE;TERRESTRIAL
Birds			
Northern Goshawk, *laingi* subspecies	*Accipiter gentilis laingi*	Red	TERRESTRIAL
Great Blue Heron, *fannini* subspecies	*Ardea herodias fannini*	Blue	ESTUARINE;LACUSTRINE;PALUSTRINE;RIVERINE;TERRESTRIAL
Marbled Murrelet	*Brachyramphus marmoratus*	Blue	ESTUARINE;LACUSTRINE;MARINE;TERRESTRIAL
Green Heron	*Butorides virescens*	Blue	ESTUARINE;LACUSTRINE;PALUSTRINE;RIVERINE
Olive-sided Flycatcher	*Contopus cooperi*	Blue	PALUSTRINE;TERRESTRIAL
Barn Swallow	*Hirundo rustica*	Blue	ESTUARINE;LACUSTRINE;PALUSTRINE;RIVERINE;TERRESTRIAL
Western Screech-Owl, *kennicottii* subspecies	*Megascops kennicottii kennicottii*	Blue	PALUSTRINE;TERRESTRIAL
Band-tailed Pigeon	*Patagioenas fasciata*	Blue	PALUSTRINE;TERRESTRIAL
Purple Martin	*Progne subis*	Blue	ESTUARINE;LACUSTRINE;PALUSTRINE; TERRESTRIAL
Invertebrates			
Western Pine Elfin, *sheltonensis* subspecies	*Callophrys eryphon sheltonensis*	Blue	TERRESTRIAL
Common Wood-nymph, *incana* subspecies	*Cercyonis pegala incana*	Red	TERRESTRIAL
Monarch	*Danaus plexippus*	Blue	PALUSTRINE;TERRESTRIAL
Dun Skipper	*Euphyes vestries*	Blue	PALUSTRINE;TERRESTRIAL
Western Thorn	*Carychium occidentale*	Blue	TERRESTRIAL
Pacific Sideband	*Monadenia fidelis*	Blue	TERRESTRIAL
Reptiles			
Western Painted Turtle - Pacific Coast Population	*Chrysemys picta pop. 1*	Red	LACUSTRINE;PALUSTRINE;RIVERINE
Fish			
Cutthroat Trout, *clarkii* subspecies	*Oncorhynchus clarkii clarkia*	Blue	ESTUARINE;LACUSTRINE;MARINE;RIVERINE
Dolly Varden	*Salvelinus malma*	Blue	ESTUARINE;LACUSTRINE;MARINE;RIVERINE

3.10.2 Listed Ecological Communities

A review of the provincial data on listed ecological communities resulted in the identification of two at risk ecological communities that are spread throughout Lasqueti Island (Table 8). Queries of the BC CDC database resulted in the identification of twenty-seven ecological communities with a potential to occur within the John Osland Nature Reserve (Table 9).

Table 8: Recorded occurrences of at risk ecological communities occurring within and surrounding the John Osland Nature Reserve.

Recorded Occurrences of at Risk Ecological Communities				
Species		**Habitat Description**	**Location**	**BC Status**
Common Name	*Scientific Name*			
Ecological Communities				
Douglas-fir/ dull Oregon-grape	*Pseudotsuga menziesii / Mahonia nervosa*	Within forests at young, mature, or old structural stage. Often with shallow soils.	Throughout Lasqueti Island	Red
Douglas-fir – arbutus	*Pseudotsuga menziesii – Arbutus menziesii*	Rocky south and east facing slopes, on exposed hilltops, steep slopes, and shorelines.	Throughout Lasqueti Island	Red

Table 9: At risk ecological communities with potential to occur within the John Osland Nature Reserve.

Potentially Occurring at Risk Ecological Communities			
Species		**Red / Blue List Status**	**Habitat Type**
Common Name	*Scientific Name*		
Ecological Communities			
grand fir / dull Oregon-grape	*Abies grandis / Mahonia nervosa*	Red	Forest
grand fir / three-leaved foamflower	*Abies grandis / Tiarella trifoliate*	Red	Forest
red alder / slough sedge [black cottonwood]	*Alnus rubra / Carex obnupta* [*Populus balsamifera* ssp. *trichocarpa*]	Red	Wetland, Forest
red alder / skunk cabbage	*Alnus rubra / Lysichiton americanus*	Red	Forest, Wetland
arbutus / hairy manzanita	*Arbutus menziesii / Arctostaphylos columbiana*	Red	Woodland, Forest
northern wormwood - red fescue / grey rock-moss	*Artemisia campestris - Festuca rubra / Racomitrium canescens*	Red	Sparsely Vegetated, Herbaceous
slender sedge - white beak-rush	*Carex lasiocarpa - Rhynchospora alba*	Red	Wetland, Herbaceous

Potentially Occurring at Risk Ecological Communities			
Species		**Red / Blue List Status**	**Habitat Type**
Common Name	*Scientific Name*		
Lyngbye's sedge herbaceous vegetation	*Carex lyngbyei Herbaceous Vegetation*	Blue	Estuarine, Herbaceous, Wetland
large-headed sedge Herbaceous Vegetation	*Carex macrocephala* Herbaceous Vegetation	Red	Sparsely Vegetated, Herbaceous
tufted hairgrass - Douglas' aster	*Deschampsia cespitosa ssp. beringensis - Aster subspicatus*	Blue	Estuarine, Herbaceous, Wetland
tufted hairgrass - meadow barley	*Deschampsia cespitosa* ssp. *beringensis - Hordeum brachyantherum*	Blue	Estuarine, Herbaceous, Wetland
three-way sedge	*Dulichium arundinaceum* Herbaceous Vegetation	Red	Wetland, Herbaceous
common spike-rush Herbaceous Vegetation	*Eleocharis palustris* Herbaceous Vegetation	Blue	Wetland, Herbaceous
arctic rush - Alaska plantain	*Juncus arcticus - Plantago macrocarpa*	Red	Estuarine, Herbaceous, Wetland
buckbean - slender sedge	*Menyanthes trifoliata - Carex lasiocarpa*	Blue	Wetland, Herbaceous
sweet gale / Sitka sedge	*Myrica gale / Carex sitchensis*	Red	Wetland, Shrub, Herbaceous
lodgepole pine / peat-mosses CDFmm	*Pinus contorta / Sphagnum* spp. CDFmm	Red	Forest, Wetland
Douglas-fir - arbutus	*Pseudotsuga menziesii - Arbutus menziesii*	Red	Woodland, Forest
Douglas-fir / dull Oregon-grape	*Pseudotsuga menziesii / Mahonia nervosa*	Red	Forest
beaked ditch-grass Herbaceous Vegetation	*Ruppia maritima Herbaceous Vegetation*	Red	Estuarine, Herbaceous, Wetland
Sitka willow - Pacific willow / skunk cabbage	*Salix sitchensis - Salix lucida ssp. lasiandra / Lysichiton americanus*	Red	Wetland, Shrub, Riparian
western redcedar / vanilla-leaf	*Thuja plicata / Achlys triphylla*	Red	Forest
western redcedar / Indian-plum	*Thuja plicata / Oemleria cerasiformis*	Red	Forest
western redcedar - Douglas-fir / Oregon beaked-moss	*Thuja plicata - Pseudotsuga menziesii / Eurhynchium oreganum*	Red	Forest
western redcedar / common snowberry	*Thuja plicata / Symphoricarpos albus*	Red	Riparian, Forest
common cattail Marsh	*Typha latifolia* Marsh	Blue	Wetland, Herbaceous
grand fir / dull Oregon-grape	*Abies grandis / Mahonia nervosa*	Red	Forest

3.11 Non-Native and Invasive Species

Invasive species are species with the ability to spread aggressively, often outcompeting or displacing other species. Many invasive species have potential to cause significant negative impacts within an environment, resulting in the classification of invasive species as the second leading cause of biodiversity loss worldwide (Wilcove et al 1998). Typically, invasive species are also non-native species in that have been introduced to an area they would not naturally inhabit. Many invasive species within the Pacific Northwest were intentionally introduced from Europe and Asia for use in horticulture, resource harvesting, such as farming, hunting, or fishing, general aesthetics, as well as other purposes, such as soil stabilization. Ecosystems within the Gulf Islands and Coastal Douglas-fir zone are impacted by numerous non-native and invasive species.

3.11.1 Vegetation

Non-native plant species on Lasqueti Island include several highly invasive species, such as Scotch Broom (*Cytisus scoparius*), English Holly (*Ilex aquilfolium*), English Ivy (*Hedera helix*), Knotweed sp. (*Fallopia* sp.), Himalayan Blackberry (*Rubus discolor*), among many others. Within the John Osland Nature Reserve, several invasive plant infestations were observed and are listed in Table 10. Many of the observations were of limited extent and occurred as only a single instance or small patch. As well, several highly invasive species that occur throughout the Gulf Islands, such as Scotch Broom and English Ivy, were absent from the property. Management recommendations for invasive species are described within Section 5.3 Exotic and Invasive Species.

Table 10: Invasive Plant Observations within John Osland Nature Reserve

Invasive Plant Species Observed March 10 and 11 Site Visits						
Instance Location ID	**Species**		**UTM**			**Observation**
	Common Name	*Scientific Name*	Zone	Easting	Northing	
1	English Holly	*Ilex aquilfolium*	10	408859	5480650	Several plants over a 10 m^2 area within forest
2	Fox glove	*Digitalis purpurea*	n/a	n/a	n/a	Single instances throughout property; primarily within open habitats such as rocky outcrops and at homestead
2	Himalayan Blackberry	*Rubus discolor*	10	408588	5480660	Several plants over a 10 m^2 area; nearby homestead
2	Bull Thistle	*Cirsium vulgare*	10	408588	5480660	Several patches of plants along north shoreline of wetland
2	Mullein	*Verbascum thapsus*	10	408588	5480660	Few single instances along north shoreline of wetland

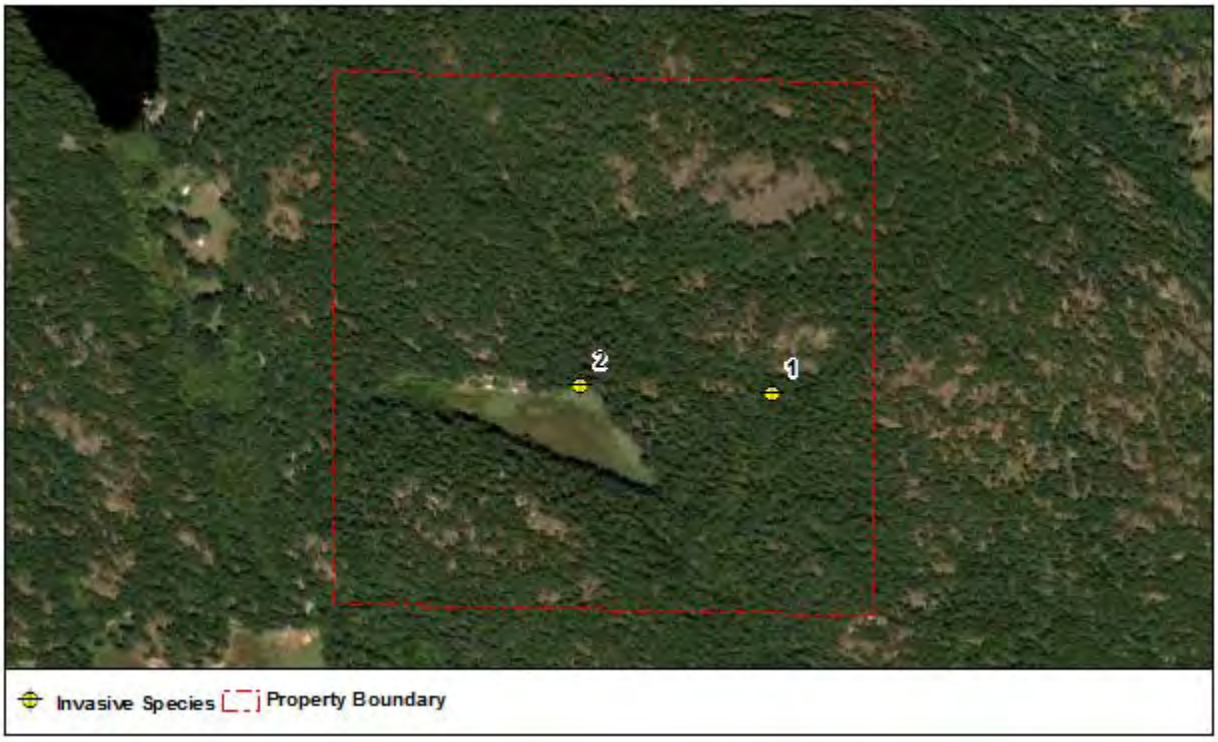

Figure 8: Locations of identified invasive plant species (labelled with instance location ID).

3.11.2 Feral Sheep

Feral sheep populations are present throughout Lasqueti Island and have likely been established since early European settlement. A population of feral cows was also reported to reside on the island, however remaining individuals are believed to have perished. Signs of feral sheep were noted throughout the John Osland Nature Reserve, including droppings, trails, and browse damage to vegetation. Heavy browse damage from deer and sheep was observed on sedges along the shoreline of the wetland, as well as on ferns within forested areas. Growth of these species as well as other forbs may be restricted due to grazing. Sheep and deer trails were also prevalent throughout the nature reserve and apart from direct vegetation loss and soil compaction, the creation of trails also encourages further trail braiding by visitors to the nature reserve.

4 Community Consultation and Cultural Significance

Following ITF policies and procedures for the development of nature reserve management plans, a community consultation process was initiated to engage Lasqueti Island residents in identifying values and management directions for the John Osland Nature Reserve.

4.1 Adjacent Landowners

Several of the adjacent landowners were contacted during the consultation process to provide an opportunity for input on the reserve and the proposed uses of the reserve. This directed consultation occurred during the property visit March 10 and 11, 2012.

4.2 First Nations Communications

The Islands Trust Fund sent a letter inviting the Sliammon and Nanoose First Nations to provide comment or participate in the management planning process. No response was received by the time of publication. However, the Islands Trust Fund remains open to discussion with First Nations of issues related to management of the nature reserve.

4.3 Community Members

In order to provide opportunities for permanent and seasonal residents to comment on the values of the John Osland Nature Reserve, two opportunities were provided, through a directed questionnaire and an hour-long community open house.

In order to engage the greatest number of residents, a questionnaire (see Appendix I) was developed and distributed digitally through the www.lasqueti.ca website and in print in the *Our Isle & Times* monthly newsletter. This provided an opportunity for seasonal residents and off-island property owners to provide input into the development of the management plan.

A public open house was held on March 10, 2012 and was attended by 13 islanders. The general objective of the open house was to engage the community in defining management objectives, identifying management issues (e.g. invasive species, property access, signage), and proposing management strategies for consideration and inclusion into the management plan.

Key Issues discussed during the open house included:

- Feral sheep and impacts to native vegetation;
- Historical values and legacy of John Osland;
- Trail existence and appropriateness of development;
- Public access restrictions;
- Signage and site commemoration;
- Site restoration and protection of valued ecological features, and;
- Cultural values.

4.4 Cultural Significance

The community consultation process defined several areas within the John Osland Nature Reserve that are culturally significant to the community. The first and foremost area that was identified as significant to the community was the location of the old homestead, and the remnant features that persist on the site. Within the homestead site, significant features consist of several apple trees and a rock wall bordering the northern boundary of the homestead. Along the western property line, the frame of a steam donkey (historical logging equipment) was identified as a special feature of the site.

Beyond the historical evidence of human presence within the property, several ecological features within the reserve have significance, notably the pond feature that has begun to develop within the former homestead field. This feature has the potential to support several species at risk and provide opportunities for bird watching.

5 Management Plan

The John Osland Nature Reserve Management Plan is designed to integrate the key values and direction provided by the Lasqueti community, with the ITF management policies, best management practices and ecological values. This holistic integration of various values provides a clearer direction for property managers and decision makers.

5.1 Homestead Legacy

A key item discussed during the consultation process was the desire of the community to commemorate John Osland for the gift of the property to the ITF and to retain a sense of the historical use of the property as a type of memorial. Specific desires identified during consultations included retaining homestead features, signage with locally painted murals, and imagery of the homestead.

While the original homestead buildings have been removed, several remnants of the homestead persist. These include the remnants of a steam donkey along the access road at the western property boundary, rock retaining walls surrounding the northern boundary of the homestead footprint, and several apple trees. Members of the community expressed strong desires to retain these features as a legacy of John Osland.

Figure 9: Remant orchard trees and retaining walls, at photo left, at homestead site.

While numerous positive homestead features exist within the property, several others exist that should be removed from the property, particularly several piles of organic material (piled tree limbs, fence posts) and garbage piles located throughout the property.

Management Recommendations

- Retain homestead rock walls and apple trees;

- Engage local artists and community members to develop commemorative signage identifying the reserve and describing the historical significance of the property. If possible and practical, utilize existing features (e.g. steam donkey) to mount signage, and;

- Identify and engage volunteers to remove remaining garbage piles (plastics, oil and paint cans, etc.) from the reserve.

Table 10: Recommended management action items for the homestead legacy.

Action Items
Immediate (< 1 year)
• Engage local volunteers to assist in removing remaining garbage from the site.
Short-Term (1 to 5 years)
• Engage local artists and community members to develop a commemorative information sign.

5.2 Hiking Trails

Currently, no defined or maintained trails exist within the John Osland Nature Reserve. Numerous game trails are evident throughout and are most likely the traditional routes walked within the reserve. Historically the reserve has not been subject to substantial hiking/walking pressures because it was privately owned; as the reserve has now shifted out of private ownership, there is potential for an increase in the number of island residents visiting the reserve.

Community consultations identified hiking trails as an area of specific management concern. Concern arose over the lack of a properly defined trail that could lead to trail-braiding and environmental degradation through the increase in foot traffic within the reserve. While the property is unlikely to see a substantial increase in foot traffic, there is the risk of hiking causing long-term impacts to vegetation and soils through “off-trail” usage. This effect can be far more significant within the sensitive habitats that occur throughout the property, including several seeps, watercourses, wetland and moss/lichen covered rocky outcrops. While the development of defined trails is inconsistent with the Islands Trust management objectives, the overarching potential for environmental impacts may necessitate facilitating limited trail development. A suggested trail route is illustrated in Figure 10.

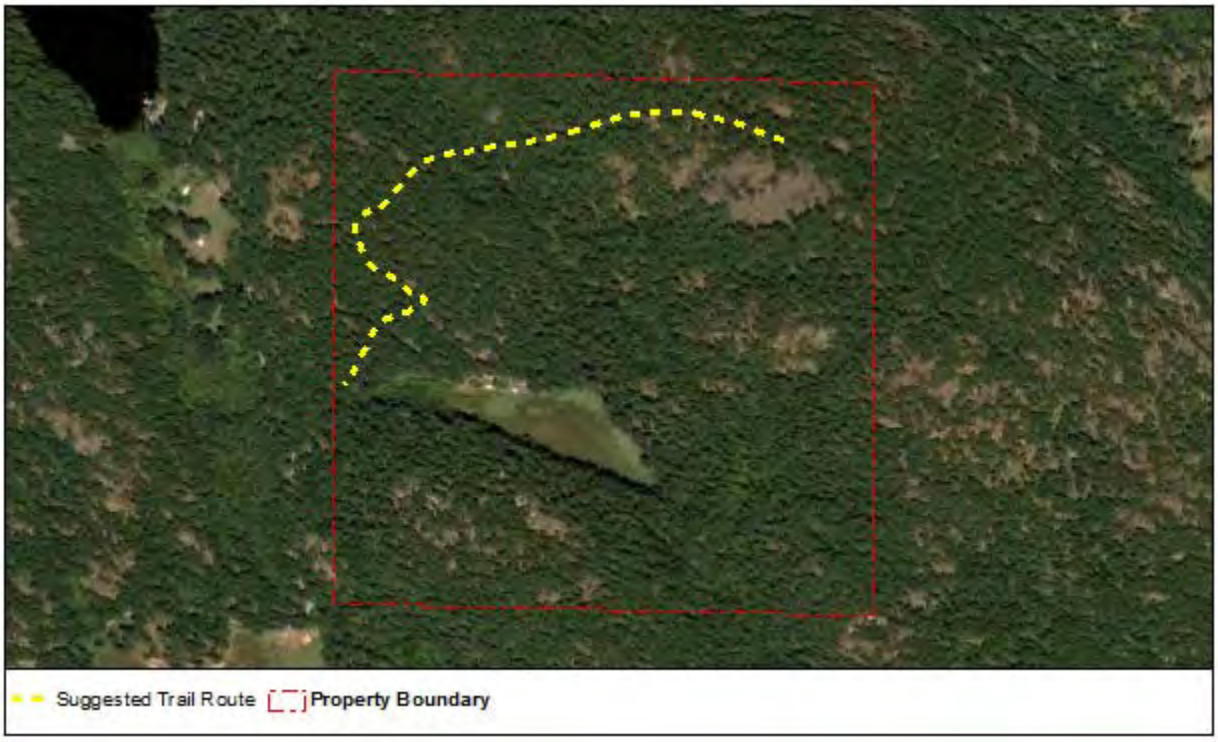

Figure 10: Suggested trail route.

Management Recommendations

- Suitable trail corridors within the recommended route should be defined in order to clearly identify areas where limited trail development may be permitted and subsequently identify areas within the nature reserve that are highly sensitive to disturbance and must be avoided;

- Local organizations should be consulted about the location, design and maintenance of the trail.

- Annually monitor the reserve for use impacts, particularly in sensitive habitats;

- Should substantial impacts be identified during the course of annual monitoring, trail delineation and spur trail deactivation should be implemented, and;

- Trail development and maintenance should be restricted, except under special circumstances, to only permit hand clearing of downed materials within the defined corridor and only permit the development of structures where trails cross, or have the potential for crossing sensitive habitats (e.g. watercourses).

Table 11: Identified management action items for hiking trails.

Action Items
Immediate (< 1 year) • In consultation with local organizations, identify and mark suitable trail corridors within the suggested route, and; • Delineate sensitive habitat occurring within the suggested trail route, and determine appropriate protection measures (e.g. rerouting, elevated platforms, stepping stones). **Short-Term (1 to 5 years)** • Construct trail protection measures where impacts, or potential for impacts have been identified by the monitor. High priority areas include watercourses, wetlands, seepage areas, and rocky outcrops. **Annual** • Conduct annual monitoring of the property to identify any signs of environmental degradation as a result non-designated trails

5.3 Exotic and Invasive Species

Exotic and invasive species observed within the John Osland Nature Reserve includes several small infestations of invasive plants, and feral sheep present throughout the island. As invasive plants have inherent abilities to spread quickly and create a persistent seed bank, an "early detection/rapid response" approach to invasive plant management is recommended. Annual monitoring of the property should be undertaken to detect invasive plants, and removal efforts should be completed with prioritization of species based upon "invasiveness" of the species as well as feasibility of removal.

Feral sheep occur throughout the island; the impact of feral sheep on native vegetation is an issue on all Lasqueti Island protected areas. Browse damage was noted throughout the property and exclusion fencing is recommended to protect sensitive areas within the property.

Management Recommendations

- Removal of "high-priority" invasive plants within the property, with prioritization based upon species invasiveness and feasibility of removal. At this time, "high-priority" plants should include: patches of English Holly within forest and patches of Himalayan Blackberry at wetland shoreline. Instances of thistle at the wetland shoreline should also

be considered for removal as resources are available. Instances of foxglove are recommended to be addressed as a low-priority for removal as this species is already widespread within the property and is also less likely to spread further or have large negative impacts to native species.

- Annual monitoring of invasive species to detect infestations early. A monitoring route should be established throughout the property to monitor sensitive areas within the property including wetland shoreline, streams, and rocky outcrops. A suggested monitoring route is shown in Figure 11.

- Possible installation of exclusion fencing to prevent browse damage to sensitive areas including wetland shoreline, streams, and rocky outcrops. Browse damage was most prevalent at the wetland shoreline, and as this area is of high ecological importance, should be placed at higher priority for possible fencing.

Table 12: Recommended action items for invasive plant management.

Action Items
Immediate (< 1 year)
• Removal of "high-priority" invasive plants including English Holly and Himalayan Blackberry.
Short-Term (1 to 5 years)
• Consider installation of exclusion fencing to prevent browse damage to sensitive areas (i.e. wetland shoreline, streams, and rocky outcrops), with priority on protecting wetland shoreline.
Annual
• Annual monitoring and establishment of a monitoring route to detect invasive plant infestations early. Suggested monitoring should include: the extent of observed invasive plant infestations (i.e. at the homestead, wetland shoreline, and holly patches within forest), and also monitor areas of likely disturbance such as the property entrance and exposed soils at the homestead site. See Figure 11.

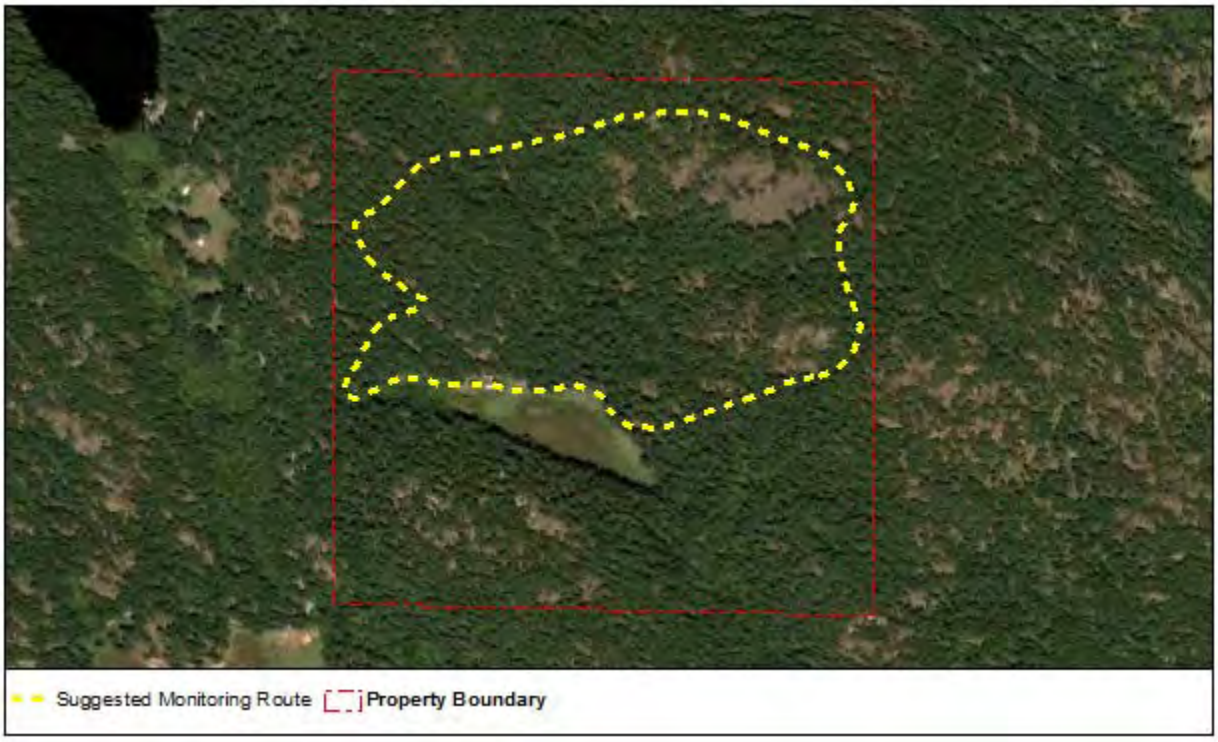

Figure 11: Location of suggested monitoring route.

5.4 Ecological Restoration

Although little disturbance has occurred on the John Osland Nature Reserve property, opportunities for ecological restoration do exist. Several restoration works were initiated prior to the transfer of the property to the Islands Trust Fund, including the removal of the homestead buildings, and infilling of ditches to begin to restore natural hydrology. Further works to restore the homestead area should attempt to retain historical features wherever possible as these features hold significant value to the community. Specific recommendations and action items are detailed below.

Ecological restoration and enhancement of vegetation communities are recommended including the removal of invasive plants and replanting native species within areas of disturbed soils and browse damage. Management of feral sheep and deer is recommended prior to any replanting works and is discussed in further detail in Section 5.3. Target areas for vegetation restoration include the shoreline of the newly created wetland, and streamside riparian areas located north of the wetland. These areas have high potential to support wildlife, however cover of forbs and shrubs is limited and significant browse damage was observed during field surveys.

Community members showed support for the reintroduction of historically present species, such as skunk cabbage (*Lystichum americanus*) alongside streams and in wetland areas. Baseline

vegetation inventories and further assessment should be undertaken prior to introducing species not presently occurring within the John Osland Nature Reserve.

Management Recommendations

- Continue restoration of homestead site, while retaining historical features such as orchard trees, rock retaining walls, and homestead footprint. Areas of open soils at the homestead site should be re-seeded with a native grass seed mix to prevent establishment of invasive species and to limit soil erosion. During field surveys, debris items were noted in a garbage pile within the property. Removal of these items is recommended, however items of historical significance, such as the steam donkey alongside the main entrance, should be retained as a legacy to past use of the property.

- Restoration of native vegetation alongside streams and wetland shoreline to restore vegetation damaged by soil disturbance and browse damage. Management of feral sheep and deer, such as exclusion fencing, should be undertaken prior to or in conjunction with replanting works.

- Further baseline vegetation assessments to determine whether reintroduction of historically present species should occur.

Table 13: Identified management action items for protection of sensitive ecosystems and species at risk.

Action Items
Immediate (< 1 year)
• Revegetate disturbed soils at homestead area and removal of debris within property.
Short-Term (1 to 5 years)
• Restore vegetation alongside streams and wetland shoreline including management of feral sheep and deer to limit browse damage
Annual
• Conduct monitoring of the water levels in the wetland area as appropriate

5.5 Protection of Sensitive Ecosystems And Species At Risk

Sensitive ecosystems are defined as uncommon or rare habitat types that are easily impacted by human activities (Ward et al. 1998). As these habitat types are uncommon, they also support higher numbers of rare and at risk wildlife and plant species. Within the John Osland Nature Reserve, several sensitive ecosystems have been identified, including wetland, seepage

areas, rocky outcrops, and open woodland. Rocky outcrops south of the pond area are particularly high value as these areas have not been logged and host numerous wildlife trees and diverse moss and lichen communities.

Management recommendations for the protection of these areas are detailed below. Protection of sensitive ecosystems is a central focus of the John Osland Nature Reserve Management Plan and is also discussed in the management plan sections detailing trail use, exotic and invasive species control, and research and education.

Management Recommendations

- Conduct detailed surveys to provide a record of species at risk occurring on the property, and to document current habitat conditions. These surveys can be used to better prioritize management items, and provide a measure for monitoring property conditions over time. Species with potential to occur on Lasqueti Island are listed in Table 6-8. Priority should be placed on species with higher likelihood of occurrence based upon habitat features and previous records of occurrence on Lasqueti Island. Surveys are recommended for poison oak, hairy gumweed, apple moss, as these species have been recorded on Lasqueti Island, and for red-legged frog and western toad as these species are associated with pond features.

- Record locations of veteran trees and previously unmapped streams networks to allow for monitoring of these features.

- Limit public access to protect sensitive ecosystems. This can be achieved by planning trail networks to avoid sensitive ecosystems wherever possible. Management recommendations regarding trail use are provided in Section 5.2.

- Prevent over-grazing and soil disturbance from deer and feral sheep. This may be achieved by establishing fenced exclosures around sensitive habitats, as well as participating in island-wide management. Specific measures are further discussed in Section 5.3.

Figure 12: Identified zones of sensitivity within the John Osland Nature Reserve.

Table 14: Identified management action items for protection of sensitive ecosystems and species at risk.

Action Items
Short-Term (1 to 5 years)
• Definitively map locations of streams, veteran trees. • Consider conducting detailed surveys to provide a record of species at risk occurring on the property, and to document current habitat conditions. • Apply measures to restrict grazing damage feral sheep and deer. • Monitor sensitive ecosystems and habitat areas for species at risk for off-trail use, grazing damage, and other potential harm to these areas.

5.6 Public Access

Currently, access to the reserve is unrestricted, both to foot traffic and vehicles. Off road vehicle use (i.e. ATV's) has become an issue in other island protected areas. Unrestricted access, particularly by vehicles, has the potential to substantially impact the reserve, particularly with the

western edge of the wetland encroaching onto the existing access road. Vehicular access within the site should be limited to only emergency personnel in order to reduce the likelihood of impact on the wetland habitat. Several options were put forward during public consultations and ranged from installing a lockable gate to laying logs across the access road. Options for restricting access are noted below.

Management Recommendations

- Install a natural barrier (e.g. sufficiently sized rocks and logs), along the western boundary to restrict access into the property. The ITF should consult with the Lasqueti Island Fire Department to determine emergency access requirements.

OR

- Should a natural barrier prove ineffective then, the ITF should restrict access to the property by means of a lockable gate. Key distribution should be limited to the Lasqueti Island Fire Department and ITF Staff.

OR

- If vehicle access to the property is not necessary for emergency services the ITF should consider permanently deactivating the road into the property. Road deactivation would consist of cross-ditching and berming excavated materials at a depth and height sufficient to prevent vehicle access. The ditch and berm could subsequently be replanted with native vegetation.

Table 15: Identified management action items for public access.

Action Items
Immediate (> 1 year) • Consult with the Lasqueti Island Fire Department to determine emergency services access requirement. • Determine method for restricting access to property based on access requirements. **Short-Term (1 to 5 years)** • Install barrier across the access road on the western boundary of the property as needed. **Annual** • Conduct annual monitoring of the access to inspect for signs of damage.

5.7 Signage

Signage on the property is to be placed in accordance with the general guidelines provided in the Islands Trust Fund Sign Policy (TFB 96011). Islands Trust Sign Policies dictate that, at a minimum, a site identification sign is to be placed at the point(s) of access to the property and that signage must be kept to a minimum. Three sign types are permitted on Islands Trust property, and include management signs, safety signs and information signs.

Furthermore, as identified in Section 5.1, the community has indicated a desire to post signage in order to commemorate the legacy of John Osland, and the gift of the property. The purpose of the signage would not necessarily be to identify unacceptable uses of the property, but to describe the history of the property, to describe John Osland, and to provide context to the historical features on the property. The preferred location for any commemorative sign would be within the former homestead site as it best utilizes the landscape features for historical context.

Based on the input from the consultation process, it would be preferable for any signage developed for the property to incorporate original and existing work by local artists. Suggested sign locations are shown in Figure 13.

Management Recommendations

- Install a site identification sign at the point of entry and, if possible, utilize local artists to develop portions of the sign, and;

- Consider installing a commemorative sign (see Section 5.1), within the vicinity of the homestead site to provide information on the history and cultural significance of the site.

Table 16: Identified management action items for signage.

Action Items
Short-Term (1 to 5 years) • Design and install a property identification sign at the western boundary access road, and; • Consider designing and installing a commemorative sign within the former homestead. **Annual** • Conduct annual monitoring of the signs to inspect for damage.

Figure 13: Suggested locations for sign installations.

5.8 Scientific Research/Education

As scientific research and education is not the primary purpose of the John Osland Nature Reserve, any ventures of this nature should be reviewed and approved by the ITF to ensure no damage to the ecological and cultural heritage of the property. Research opportunities do exist to enhance the understanding of the ecological values of the property, including full ecological assessments of species at risk and vegetation communities. Generally research of this nature is supported by the Islands Trust Fund, however must follow policy guidelines provided in Islands Trust Fund *Research Policy (TFB 02009)*.

Research and education on grazing damage was suggested and supported by community members during consultation process. The method suggested was to install fencing to exclude portions of sensitive habitats from sheep/deer grazing, to function as an experiment and demonstration on the impacts of grazing, and to provide scientific support for decisions regarding the management of sheep and deer within the property.

Additional education opportunities were suggested during community consultations. Strong support was expressed to provide signage regarding the legacy of the property donor John Osland, as well as display information regarding the wetland transformation from agricultural field.

Management Recommendations

- Consider installing and monitoring exclosures from feral sheep and deer as an educational opportunity to demonstrate impacts of browse

- Consider installing signage at the homestead site of John Osland and recreated wetland as an education feature on the property history and the ecological transformation of the wetland

Table 17: Identified management action items for scientific research and education.

Action Items
Short-Term (1 to 5 years)
• Consider installing signage regarding site history at the homestead site of John Osland in conjunction with the commemorative signage (information posted on the same sign, see Section 5.7)
• Consider installing signage at the wetland as an educational feature with information regarding the wetland transformation from agricultural field

5.9 Summary of Recommended Management Action Items

Table 18: Summary of all recommended management action items.

Summary of Recommended Action Items

Immediate (< 1 year)

- Engage local volunteers to assist in removing remaining garbage from the site;
- In consultation with local organizations, identify and mark suitable trail corridors within the suggested route;
- Delineate sensitive habitat occurring within the suggested trail route, and determine appropriate protection measures (e.g. rerouting, elevated platforms, stepping stones);
- Removal of “high-priority” invasive plants including English Holly and Himalayan Blackberry;
- Consult with the Lasqueti Island Fire Department to determine emergency services access requirement, and;
- Determine method for restricting access to the property based on access requirements.

Short-Term (1 to 5 years)

- Engage local artists and community members to develop a commemorative information sign;
- Construct trail protection measures where impacts, or potential for impacts have been identified by the monitor. High priority areas include watercourses, wetlands, seepage areas, and rocky outcrops;
- Consider installation of exclusion fencing to prevent browse damage to sensitive areas (i.e. wetland shoreline, streams, and rocky outcrops), with priority on protecting wetland shoreline;
- Revegetate disturbed soils at homestead area and removal of debris within property;
- Definitively map locations of streams, veteran trees;
- Consider conducting detailed surveys to provide a record of species at risk occurring on the property, and to document current habitat conditions.
- Apply measures to restrict grazing damage feral sheep and deer;
- Monitor sensitive ecosystems and habitat areas for species at risk for off-trail use, grazing damage, and other potential harm to these areas;
- Install barrier across the access road on the western boundary of the property as needed;
- Design and install a property identification sign at the western boundary access road;
- Consider designing and installing a commemorative sign within the former homestead;
- Consider installing signage regarding site history at the homestead site of John Osland, and;
- Consider installing signage at the wetland as an educational feature with information regarding the wetland transformation from agricultural field.
- Conduct monitoring of the water levels in the wetland area, as appropriate.

Annual

- Conduct annual monitoring of the property to identify any signs of environmental degradation as a result non-designated trails;

Summary of Recommended Action Items

- Annual monitoring and establishment of a monitoring route to detect invasive plant infestations early. Suggested monitoring should include: the extent of observed invasive plant infestations (i.e. at the homestead, wetland shoreline, and holly patches within forest), and also monitor areas of likely disturbance such as the property entrance and exposed soils at the homestead site;
- Conduct annual monitoring of the access to inspect for signs of damage, and;
- Conduct annual monitoring of the signs to inspect for damage.

6 Use of This Document

This document was prepared exclusively for the Islands Trust Fund and is specifically designed for the John Osland Nature Reserve. The findings, conclusions, and recommendations in this document are based on the expertise and experience of the EBB personnel and the information available at the time of preparation, and the data supplied by outside sources.

Respectfully submitted,

EBB Environmental Consulting Inc.

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APPENDIX I

Consultation Questionnaire and Summary of Responses

OSLAND NATURE RESERVE
MANAGEMENT PLAN QUESTIONNAIRE

The Islands Trust Fund, with the assistance of EBB Environmental Consulting Inc., is developing a plan for the long-term maintenance of the natural resources in the Osland Nature Reserve. John Osland bequeathed the Osland Nature Reserve to the Islands Trust Fund to ensure its natural features were protected for the future.

Please help us by commenting on the value and future use of the Osland Nature Reserve. Your input can be anonymous, or you can include your name and contact information so that we can contact you if we have further questions or opportunity for input. Please also join us for a public open house, on March 10, at 2:00 pm at the Lasqueti Community Hall, followed by a walk of the property.

AREA USE

1) Are you familiar with the new Osland Nature Reserve property? Yes ○ No ○

2) What activities do you or would you do while visiting the Nature Reserve?

3) What activities would you consider as an unacceptable use of the property?

NATURAL RESOURCES

4) What features of the Osland Nature Reserve are most important to you (e.g. Old-growth forest, streams, historical features)?

5) What plants or wildlife have you observed (a) in the Osland Nature Reserve and (b) on Lasqueti Island? Are there any species of special significance to the Island or Nature Reserve?

6) Have you observed any negative impacts or threats to special features or wildlife within the Nature Reserve (e.g. damages from recreation use, vandalism, invasive plants)?

I would like to receive more information about the Islands Trust Fund and/or the Osland Nature Reserve.
(Please provide your contact information below)

Name: _____

Phone: _____ **Email:** _____

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE

Please drop-off completed questionnaires by **March 10** to the Lasqueti Post Office
Alternatively, completed questionnaires may be dropped off at the public open house or emailed to gsmart@ebbconsulting.ca

Response No.	Q1 - Familiarity with Property	Q2 - Acceptable Activities	Q3 - Unacceptable Activities	Q4 - Important Features	Q5 - Observed plants, wildlife and significant features	Q6 - Observed negative impacts
1	Yes	I treasure the walks I had with John over his property. He was very proud of his property and the older trees he still had. John's memory of local logging history was invaluable for me. His stories of his property helped explain the history of other areas of logging on the island. I wish I knew what I now understand about pre-contact woodland conditions in the CDF and on the island to relate it to John's woods as we looked at his trees. John was a great studier and keeper of history. I remember the old admiralty charts he had with line drawings of the silhouettes views of the entrances to the inlets in the margins of each chart.	Just letting it follow natural processes, without considering wildfire risk and pre-contact management.	John's property contains much evidence of the last regional wildfire (probably 1864) along with the NE , section 16 to the south. His fields were probably always part of pre-contact prairie/savannah to open woods condition. The densification of CDF forests both by crown closure and regeneration after this wildfire (post contact fire suppression) is very evident in the area. This is also collaborated by air photos of this property that I have which were taken in 1968 and 1999. John's fields and surrounding woods may contain remnants plants or seeds from pre-contact management by aboriginals. Fencing an enclosure and controlled burns, might be a way to reveal this.	Not Answered	I think the hardest problem facing preservation/conservation properties in the CDF/Islands Trust area will be maintaining them sustainably in the face of fire suppression since the late 1800's and the increasing wildfire danger. After >140 years of wildfire suppression, the likely hood of stand replacing wildfires has increased tremendously. Neither a catastrophic wildfire nor leaving it to nature will ever return these areas to pre-contact (old-growth) like conditions. John's property probably also has good evidence of pre-contact fire intervals, because only part of it was logged in the mid 1900's. These logged areas have regenerated much more densely than they were originally. I am unaware of the restrictions of John's endowment, but wonder if this property could be a demonstration to show pre-contact CDF woodlands.
2	Yes	Passive uses such as walking; bird watching; spiritual renewal.	Motorized vehicle activities. Not sure if non-motorized wheeled vehicles (bikes) should be allowed or horse trails.	Multi aged forest growing to towards old-growth; herbaceous plants; wetlands and riparian areas.	Because of the feral sheep there is very little evidence of herbaceous plants except for cliff faces.	Feral sheep. There is also a lot of foxglove growing in open areas because the sheep don't eat them.
3	Somewhat	Walking, picnic, explore the forest, watch birds	Camping and Fires	Old-growth forests, streams, historical features	On Lasqueti in general: Douglas-fir forests, wetlands	No.
4	I am familiar with trees	I would walk and look at the trees	Leaving garbage around	Old growth trees, then streams, then wild flowers and bushes	Anything the sheep, deer and goats can't get to	Not Answered

APPENDIX II

Mapped Distribution of Recorded Occurrences of at Risk Species and Ecological Communities

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FOR INSERTING PDF COPIES OF MAPS

APPENDIX III

CDFmm Vegetation Associations

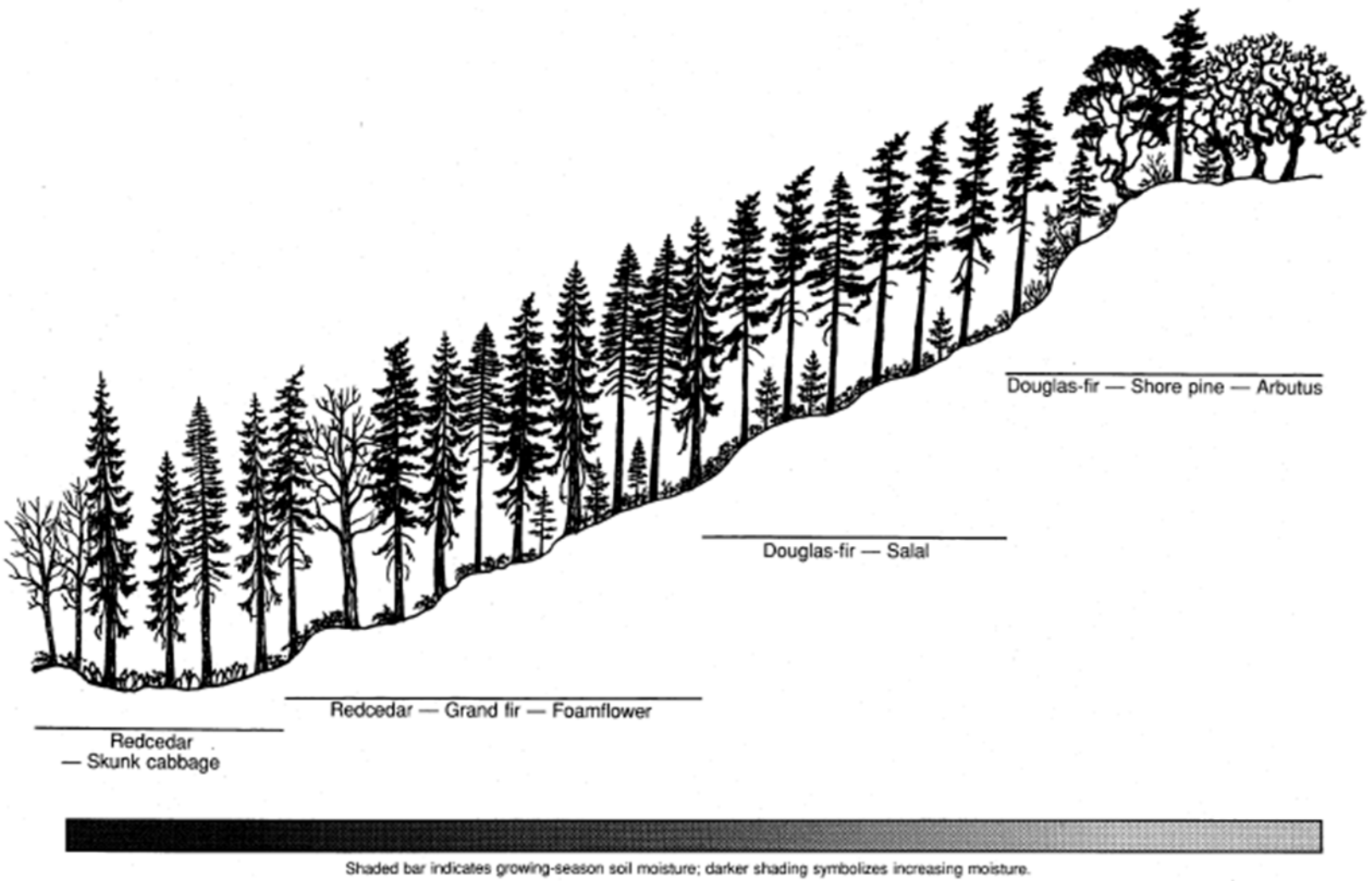

Figure AIII-1. Topographic relationship between several vegetation associations within the CDFmm (Nuszdorfer et al. 1991)

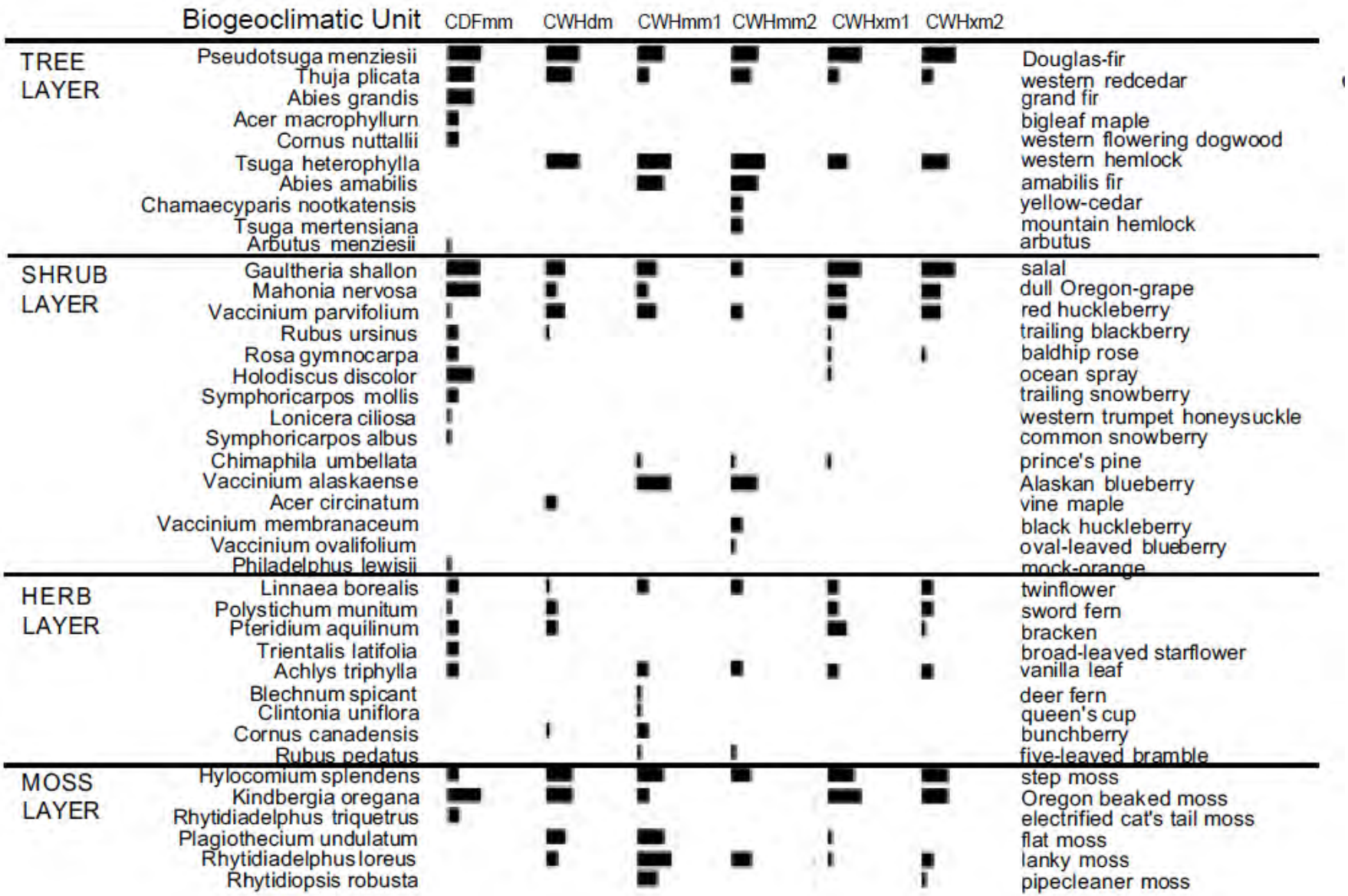

Figure AIII-2. Vegetation table for zonal sites for CDFmm and other Biogeoclimatic zones (Green and Klinka, 1994)

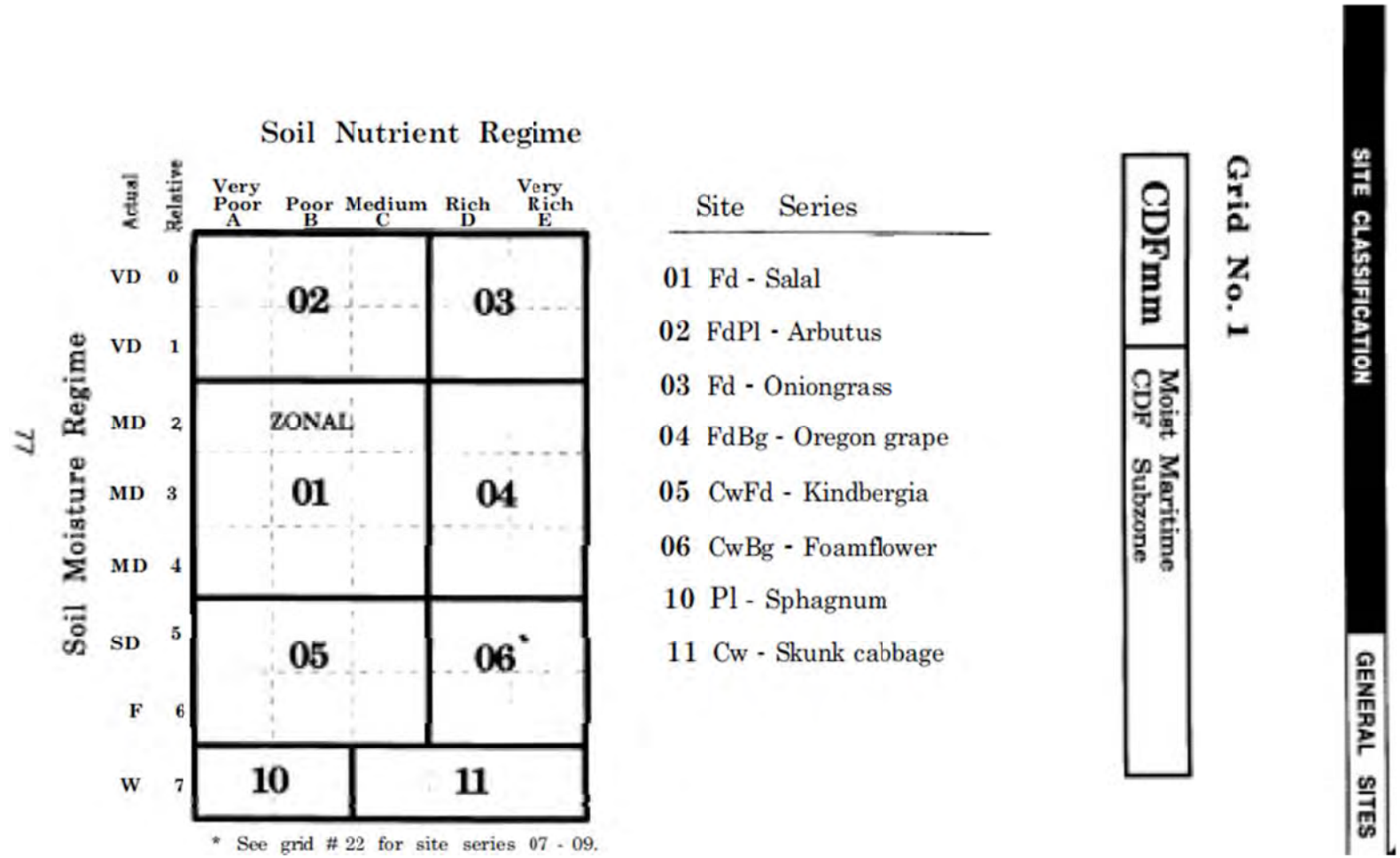

Figure AIII-3. Site series diagram for CDFmm biogeoclimate zone (Green and Klinka 1994)