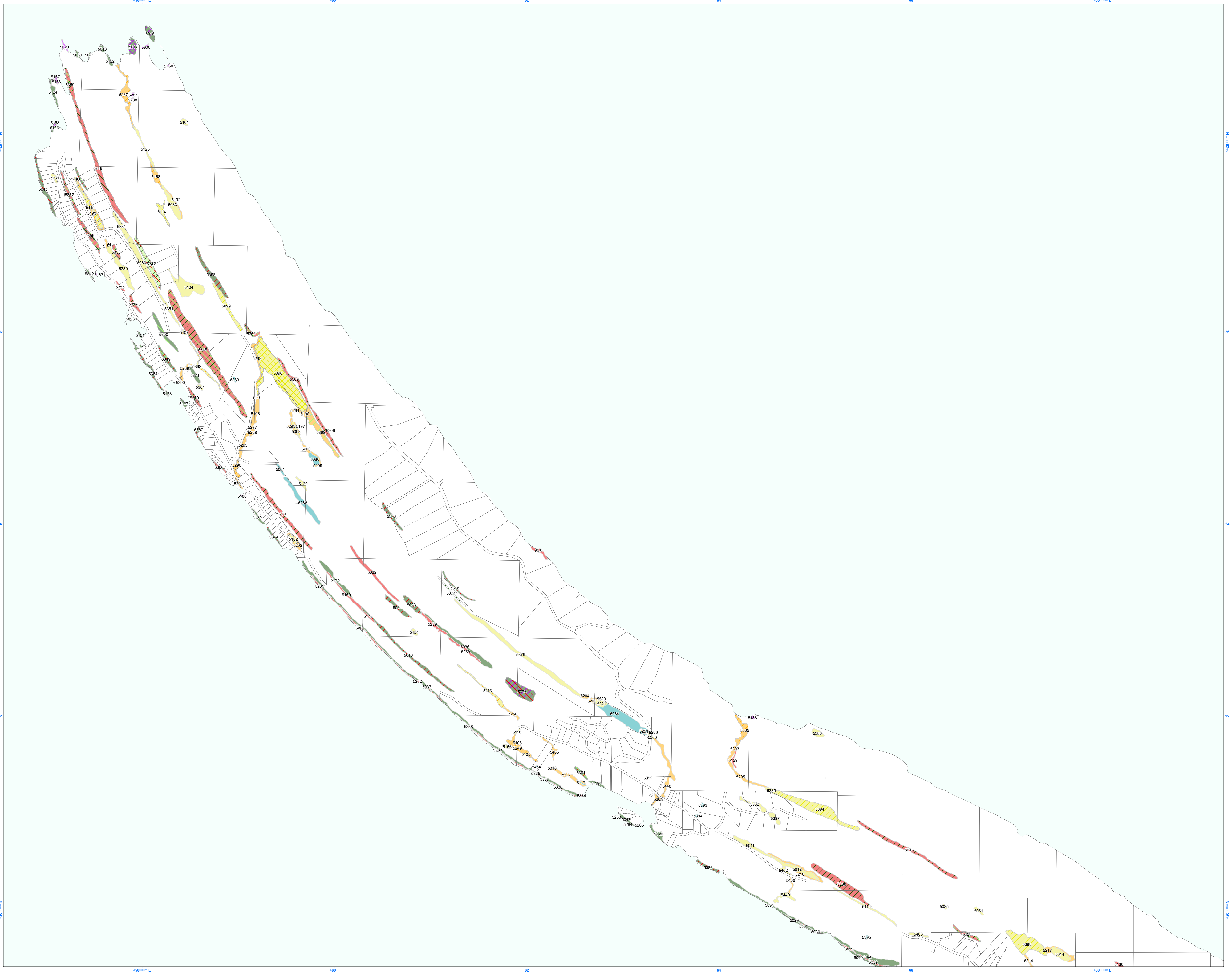


Sensitive Ecosystems Label					
5000*	5011	5012	5013*	5014*	5015
5017*	5018*	5019	5020*	5021*	5022*
5030	5031	5032	5033*	5034	5035*
5037*	5047	5048	5049	5051*	5056
5082	5083*	5084*	5093*	5098*	5099
5104	5105*	5106*	5107*	5113*	5114
5116	5117*	5118*	5119	5120	5124
5126	5127*	5128*	5129	5130	5131
5152*	5153*	5154	5155	5156	5157*
5160*	5161*	5166	5167*	5168	5169
5186	5197*	5198*	5192	5193	5194
5196*	5197*	5198*	5199	5200	5201*
5203*	5204*	5205*	5206	5216	5217
5260*	5261*	5262*	5263*	5264*	5265*
5262*	5263	5264	5265	5266	5267*
5281*	5287*	5288*	5289	5290	5291*
5293*	5294*	5295	5296	5297	5298
5300*	5301*	5302*	5303*	5314	5317
5320*	5321*	5330	5331	5332	5333*
5335*	5336*	5337*	5338*	5342*	5343*
5346	5347	5348*	5349*	5350*	5351*
5353	5354*	5355	5356	5357	5358*
5360*	5361*	5362*	5363*	5364	5366*
5368	5369	5370	5371*	5372	5374
5375	5376	5377	5378	5380	5381
5382	5383	5384*	5385*	5386	5387
5389	5392	5393	5394	5395	5402*
5443	5449*	5451	5452	5453	5454
5465	5466*				



Islands Trust  
BRITISH COLUMBIA

## Galiano Island (North) Sensitive Ecosystem Mapping Airphoto - 2009

Scale: 1:15,000  
UTM Projection Zone 10 NAD83

### Sensitive Ecosystems

Sensitive ecosystems are fragile and/or rare, or are ecologically important because of the diversity of species they support.

**Old Forest (OF)**

**Definition:** Conifer-dominated dry to moist forest types, structural stage 7, generally >250yrs.

**Importance:** Due to the lack of disturbance, old forest ecosystems are often associated with rich communities of plants and animals that may be dependent upon the unique environmental conditions created by these forests.

**Subclasses:**

- co (conifer-dominated) - greater than 75% coniferous species
- mc (mixed conifer and deciduous) - forests dominated with a mixture of coniferous and broadleaf trees (<75% coniferous and >25% broadleaf)

**Woodland (WD)**

**Definition:** Dry open forests, generally between 10 and 30% tree cover, can be conifer-dominated or mixed conifer and arbutus stands. Because of open canopy, will include non-forested openings, often with shallow soils and bedrock outcroppings.

**Importance:** Woodlands are nationally, provincially and regionally rare and highly fragmented. A rich assemblage of plants, insects, reptiles and birds are drawn to these ecosystems due to the food sources, habitat and proximity to the ocean. Many oak woodlands, for example support the highest plant species diversity of any terrestrial ecosystem in British Columbia and are especially vulnerable to rural development.

**Subclasses:**

- bd (broadleaf) - dominant broadleaf with <15% coniferous species
- mc (mixed conifer and deciduous) - mixed conifer and broadleaf with a minimum of 25% cover of either group is included in the total tree cover

**Herbaceous (HB)**

**Definition:** Non-forested ecosystems less than 10% tree cover, generally with shallow soils. They include bedrock outcroppings, large openings within forested areas, spits, dunes and shorelines vegetated with grasses and herbs.

**Importance:** Terrestrial Herbaceous ecosystems are characterized by thin soils which are easily disturbed. Herbaceous plants can be easily trampled or dislodged onto bare rock where they cannot re-establish. Thus they are highly vulnerable to a range of human disturbance factors including residential development and various recreational uses.

**Subclasses:**

- hb (meadows) - non-forested, less than 10% tree cover, generally shallow soils, often with exposed bedrock, predominantly a mix of grasses and forbs, also lichens and mosses
- ca (coastal herbaceous) - rocky shoreline or dune, influenced by the marine environment and characterized by less than 20% vegetation cover of grasses, herbs, mosses and lichens
- sp (spits) - ridge-like extension of beach, comprised of sand or gravel deposited by longshore drifting; low to moderate cover of salt tolerant grasses and herbs
- du (dunes) - ridge or hill, or beach area created by windblown sand; may be more or less vegetated depending on depositional activity, beach dunes will have low cover of salt-tolerant grasses and herbs
- sh (shrub) - >20% of total vegetation cover is shrub cover, with grasses and herbs
- rs (rocks) - rock outcrops not dominated by shrubs

**Riparian (RI)**

**Definition:** Areas adjacent to water bodies (rivers, lakes, ocean, wetlands) which are influenced by factors such as erosion, sedimentation, flooding and/or subterranean irrigation due to proximity to the water body. Structural stages 1 - 7.

**Importance:** Riparian ecosystems support a disproportionately high number of vascular plant, moss, amphibian and small mammalian species for the area they occupy.

**Subclasses:**

- fl (low bench floodplain) - flooded at least every other year for moderate periods of growing season; plant species adapted to extended flooding and abrasion, low or tall shrubs most common
- fm (medium bench floodplain) - flooded every 1-4 years for short periods (10-25 days); deciduous or mixed forest dominated by species tolerant of flooding and periodic submergence; trees occur on elevated microsites
- fh (high bench floodplain) - only periodically and briefly inundated by high waters, but largely subsurface flow in the rooting zone; typically conifer-dominated floodplains of larger coastal rivers
- fr (fringe) - narrow linear communities along with open water bodies (rivers, lakes and ponds) where there is no flooding
- gu (gully riparian) - watercourse is within a steep sided V-shaped gully
- rl (river) - watercourse is large enough to represent >10% of the polygon
- sh (shrub) - shrub-dominated floodplain or riparian

**Wetland (WN)**

**Definition:** Areas that are saturated or inundated with water for long enough periods of time to develop vegetation. This may result from flooding, fluctuating water tables, tidal influences or poor drainage.

**Importance:** Wetland ecosystems are sensitive and important because they exhibit rarity, high biodiversity, fragility, specialized habitat, specialized functions and connectivity.

**Subclasses:**

- sg (silt) - nutrient poor wetland, on organic soils (sphagnum peat), water source predominantly from precipitation; may be treed or shrub dominated
- fn (fen) - nutrient medium wetland (edge peat) where ground water inflow is the dominant water source, open water channels common; dominated by sedges, grasses and rushes
- ms (marsh) - wetland with fluctuating water table, often with shallow surface water, usually organically enriched mineral soils; dominated by rushes, reeds, grasses and sedges
- sp (spongy) - spongy very rich wetland on mineral soils or with an organic layer over mineral soil, with gently flowing or seasonally flooding water table; woody vegetation
- sw (shallow water) - standing or flowing water less than 2m deep; transitional between deep water bodies and other wetland ecosystems (i.e. bogs, swamps, fens, etc.) often with vegetation rooted below the water surface
- wl (wet meadow) - periodically saturated but not inundated with water, organically enriched mineral soils, grasses, sedges, rushes and forbs dominant

**Cliff (CL)**

**Definition:** Very steep slope, often exposed bedrock, may include steep-sided sand bluffs.

**Importance:** Open ledges and horizontal fissures on cliffs are known to provide nesting sites. Cliff crevices are used for shelter and overwintering of snakes and lizards.

**Subclasses:**

- ca (coastal cliff) - cliffs with a marine influence, generally near vertical bedrock with accumulation of soil limited to fissures and ledges
- in (inland cliff) - inland cliffs, typically formed as a result of erosion, catastrophic failures or mass wasting. Generally characterized by rapid drainage and the accumulation of soil that is limited to bedrock fissures and ledges

**Freshwater (FW)**

**Definition:** Freshwater ecosystem includes bodies of water such as lakes and ponds that usually lack floating vegetation.

**Importance:** Freshwater ecosystems are home to numerous organisms such as, fish, amphibians, aquatic plants, and invertebrates.

**Subclasses:** Lakes and ponds play a vital role in the lifecycle of many species.

- la (lake) - a naturally occurring static body of water, greater than 2m deep in some portion
- pd (pond) - a small body of water greater than 2m deep, but not large enough to be classified as a lake

### What is a Sensitive Ecosystem?

For the purpose of this study, an ecosystem is considered to be a portion of the landscape with relatively uniform dominant vegetation.

Sensitive ecosystems are those which are fragile and/or rare, or those ecosystems which are ecologically important because of the diversity of species they support.

### Sensitive Ecosystems Label

Biogeoclimatic Unit → Polygon Number → \* indicates a field sample

SE Class → 7838\* → CDFmm → 6Wd:mix → 2Mf:co → 2MF:mx

SE Subclass → Primary Ecosystem → Secondary Ecosystem → Tertiary Ecosystem

The example label above indicates the SEM attributes mapped for polygon 7838. The polygon occurs in the Coastal Douglas-fir Moist Maritime variant; 60% of the polygon is WD:mx - Woodland; mixed conifer and broadleaf (Primary Ecosystem); 20% of the polygon is WD:co - Woodland; conifer dominated (Secondary Ecosystem); and, 20% of the polygon is MF:mx - Mature Forest; mixed conifer and broadleaf (Tertiary Ecosystem)

### Rationale

Intense development pressure fueled by population and economic growth has fragmented and degraded many terrestrial ecosystems. A high proportion of these ecosystems are now designated as 'at risk' in BC. Sensitive ecosystems typically have high biological diversity and are a vital part of the landscape. They provide ecosystem services for a healthy economy and for social well being. They regulate climate, clean water, generate and clean soils, recycle nutrients and pollinate our crops. To protect these areas, sensitive ecosystems must be located, identified and mapped. From 1993 to 1999 the Provincial and Federal Governments completed a Sensitive Ecosystems Inventory of East Vancouver Island and the Gulf Islands. This mapping product is intended as an updated and improved version of that product.

### Purpose

The purpose of this Sensitive Ecosystems map is to identify the location of sensitive ecosystems. The goal of this mapping exercise is to encourage informed land use decisions that will conserve sensitive ecosystems. This map and the accompanying data provide site-specific ecological information that can be used to flag sites of conservation concern, to promote land stewardship and to prompt detailed field surveys and consideration of ecological values before changes to the land are initiated.

### Methodology

Mapping methods are based on the Standard for Mapping Ecosystems at Risk in British Columbia. An Approach to Mapping Ecosystems at Risk and Other Sensitive Ecosystems Version 1.0., Ministry of Environment Ecosystems Branch, Resources Information Standards Committee, December 5, 2006. This Sensitive Ecosystems map was themed from the Islands Trust Ecosystem Mapping (ITEM) data. ITEM was developed in 2002 with the assistance of BC Ministry of Environment and the BC Conservation Data Centre. The classification scheme was based on Sensitive Ecosystems Inventory (SEI) and Terrestrial Ecosystem Mapping (TEM) Standards. Sensitive ecosystems were identified and extracted from the ITEM dataset and updated using 2009 digital stereo imagery and the 2008 CDFmm TEM.

The Sensitive Ecosystems map is a tool to alert decision makers to the existence of sensitive ecosystems. However, when land-use changes are proposed, detailed on-the-ground site assessments are necessary. For sites that were not field checked, the accuracy of the data depends heavily on the expertise, local knowledge, and professional judgment of the mapper and the quality and quantity of available source data. Because the area is changing rapidly, reference to the data set(s) used as the information source is advised.

Due to the mapping scale of the aerial photographs, the minimum polygon size is generally 1/2 hectare. Enlargement of the data beyond the source scale may result in unacceptable distortion and faulty registration with other data sets.

### What can be done to protect the sensitive ecosystems?

Direct and indirect impacts to these ecosystems can be avoided by:

- Retaining or creating vegetated buffers around sensitive ecosystems to isolate them from outside disturbances;
- Controlling land and water access to fragile ecosystems;
- Controlling invasive species;
- Allowing natural disturbances to occur;
- Maintaining water quality

If development must occur, develop carefully!

Conduct an ecological inventory to identify the existing flora and fauna and to locate any threatened or endangered plant and animal species, plant communities, and habitat features needing protection.

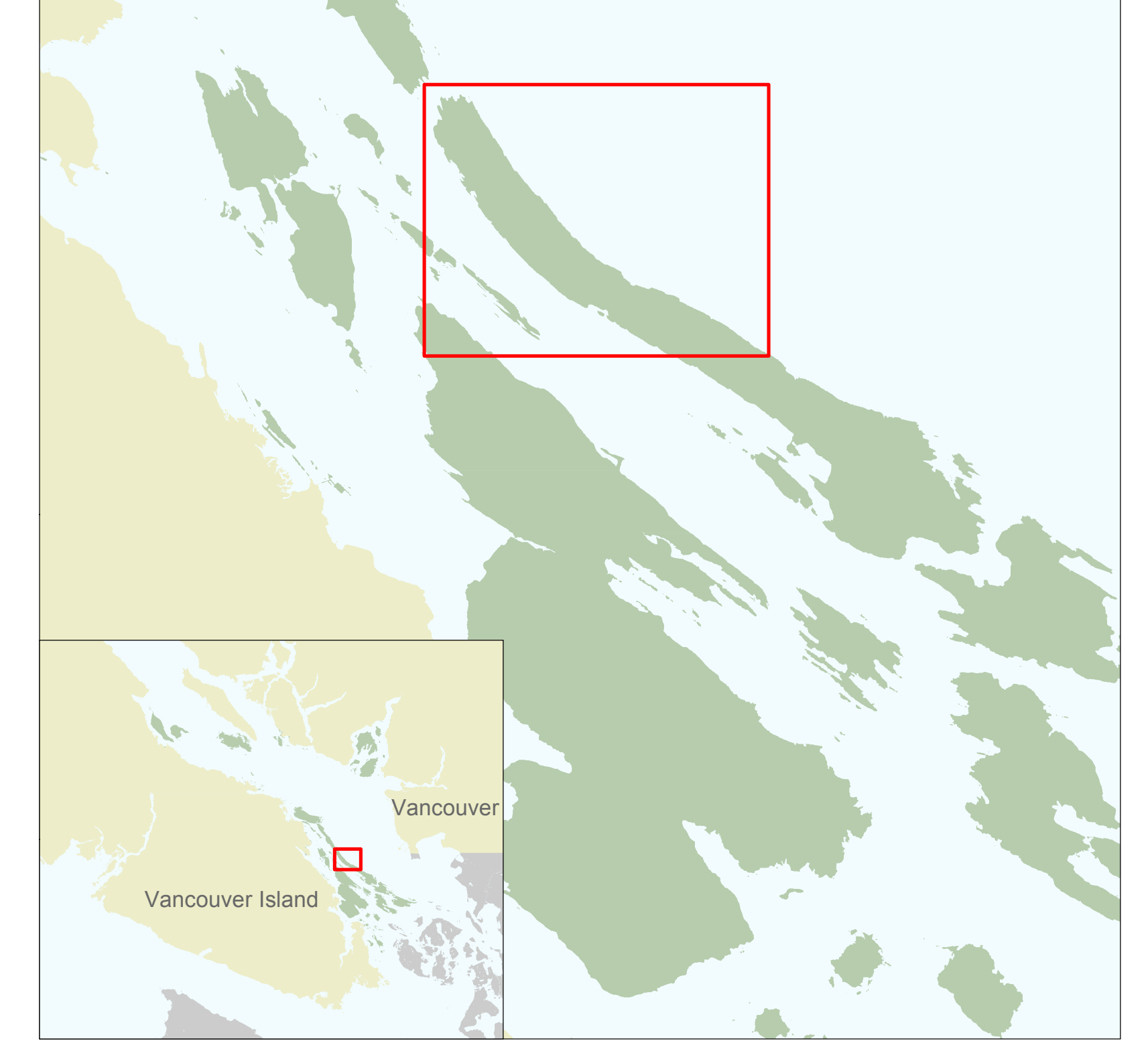
Plan and implement all development activities in a manner that will not adversely affect or disturb the sensitive ecosystem. Consult a qualified professional to interpret the ecological inventory data and work to incorporate designs that maintain the functions and values of the natural ecosystem.

### Acknowledgements:

Project Co-ordination:  
Robert Kojima - Islands Trust, Local Planning Services

Sensitive Ecosystem Mapping:  
Keith Erickson - Galiano Conservancy Association

GIS Mapping Support:  
Mark van Bakel - Islands Trust



### Other Mapped Ecosystems

**Mature Forest (MF):**  
**Definition:** Usually conifer-dominated, occasionally deciduous, dry to moist forest types, structural stage 6, generally >80yrs.

**Young Forest (YF):**  
**Definition:** Limited to areas of young forest dispersed amongst sensitive and important ecosystems. Forest is 40 - 80 yrs old consisting of sparse and ecological conditions canopy has begun to differentiate.

**Seasonally Flooded Agricultural Fields (FS):**  
**Definition:** Limited to areas of annually flooded cultivated fields or hay fields dispersed amongst sensitive and important ecosystems.

**Non-Sensitive (NA):**  
**Definition:** Limited to areas of disturbance or human impact dispersed amongst sensitive and important ecosystems.

### Ecosystem Map Symbols

Ecosystem composition is complex and often contains a dominant ecosystem with secondary and tertiary ecosystems. In this map the dominant ecosystem has a solid shading and the secondary and tertiary ecosystems are identified by cross-hatched lines.

- Example of a primary sensitive Woodland ecosystem with a secondary sensitive Herbaceous ecosystem
- Example of a secondary sensitive Herbaceous and tertiary sensitive Woodland ecosystems mixed with a non-sensitive primary ecosystem
- Sensitive ecosystems can also mix with non-sensitive ecosystems. In this map a sensitive ecosystem mixed with non-sensitive is identified by cross-hatched lines with solid green shading.
- Example of a tertiary sensitive Herbaceous ecosystem mixed with a primary important Mature Forest ecosystem