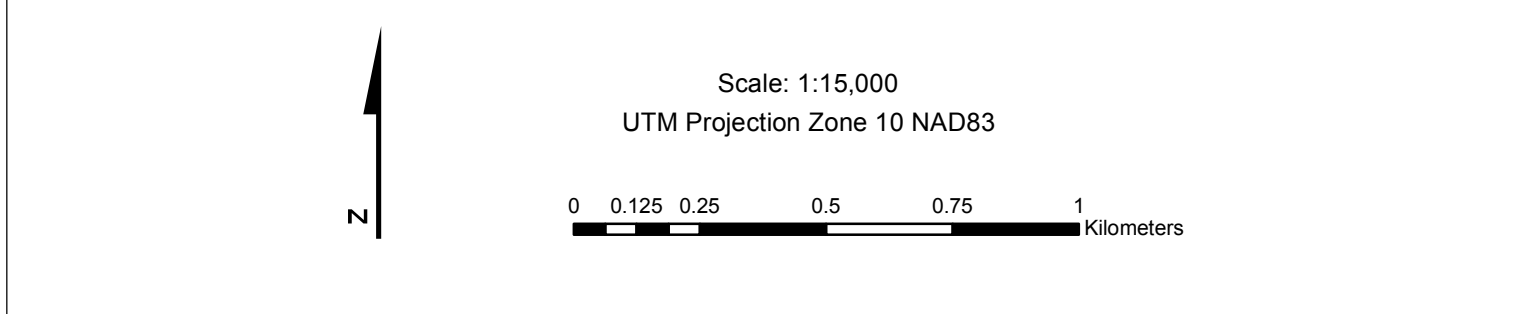


Sensitive Ecosystems Label						
5001*	5002*	5003*	5004*	5005	5006	5007*
5008	5009	5010	5012	5014*	5015	5022*
5023	5024	5025	5026*	5027*	5028*	5029
5030	5031	5032*	5048	5049	5050	5051*
5052*	5053	5054	5055*	5056*	5057	5058
5059	5060	5061	5062	5063	5064	5065
5066	5067*	5068	5069*	5070	5071	5072*
5073*	5074*	5075*	5076*	5077*	5078*	5079*
5085*	5086*	5087	5088*	5089*	5090*	5091*
5092*	5094	5095*	5096*	5097*	5100*	5101*
5103	5108*	5109*	5110*	5111*	5112*	5116
5119	5121	5122	5123	5130	5132	5133
5134	5135	5136	5137	5138	5139	5140
5141	5142	5143*	5144	5145	5146	5147
5148	5149	5150	5158	5162*	5163*	5164*
5165*	5171*	5172*	5173*	5174*	5175	5176
5177	5178	5179	5180	5181	5182	5183
5184	5185	5189	5190	5191	5207	5208*
5209*	5210*	5211*	5212	5213	5214	5215
5216	5217	5218*	5219*	5220	5221	5222
5223	5224	5225	5227*	5228	5229	5230
5231	5232	5233	5234*	5235*	5236	5237
5238	5239	5240	5241*	5242*	5243	5244
5245*	5246*	5247*	5248*	5252*	5254	5255
5256	5257	5258*	5259*	5270	5271	5272
5273*	5274*	5275*	5276*	5277*	5278*	5279*
5282*	5283*	5284*	5285*	5286	5304	5305
5306	5307	5308	5309	5310	5311	5312
5313	5314	5315	5316	5319	5322	5323
5324	5325	5326	5327*	5328*	5329	5331
5332	5339	5340	5341*	5343*	5358	5359
5390	5391	5395	5396	5397	5398	5399
5400	5401	5402*	5403*	5404*	5405*	5406
5407	5408	5409	5410	5411	5412	5413
5414	5415	5416	5417	5418	5419	5421
5422	5423	5424	5425	5426	5427*	5428
5429*	5430	5431	5432	5433	5434	5435
5436	5437	5438	5439	5440	5441	5442
5443	5444	5445	5446	5447	5448*	5450
5453	5454*	5455*	5456*	5457	5458	5459
5460	5461	5462	5466*	5467	5468	5469



Islands Trust
BRITISH COLUMBIA

Galiano Island (South) Sensitive Ecosystem Mapping Airphoto - 2009



Sensitive Ecosystems

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

Old Forest (OF) Primary Ecosystem

Definition: Conifer-dominated dry to moist forest types, structural stage 7, generally >250yr.
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
me (mixed conifer and deciduous) - forests dominated with a mixture of coniferous and broadleaf trees (>75% coniferous and >25% broadleaf)

Woodland (WD) Primary Ecosystem

Definition: Dry open forests, generally between 10 and 30% tree cover, can be conifer-dominated or mixed conifer and arbutus stands. Includes open parkland, with or without 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 resources, habitat and proximity to the ocean. Carry 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
me (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) Primary Ecosystem

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 agricultural uses.

Subclasses:
hb (herbaceous) - 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
co (coastal herbaceous) - rocky exposure or dune, influenced by the marine environment and characterized by less than 20% vegetation cover of grasses, forbs, mosses and lichens
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
re (rock) - rock outcrops not dominated by shrubs

Riparian (RI) Primary Ecosystem

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 mammal 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 shrub and conifers
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 sedimentation; trees occur on elevated microsites
fh (high bench floodplain) - only periodically and briefly inundated by high waters, but lengthy subsurface flow in the rooting zone; typically conifer-dominated floodplains of larger coastal rivers
fr (ridge) - narrow linear communities along with open water bodies (rivers, lakes and ponds) where there is no floodplain; irregular 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 lakeshore

Wetland (WN) Primary Ecosystem

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 conditions.

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

Subclasses:
bg (bog) - nutrient poor wetland, on organic soils (sphagnum peat), water source predominantly from precipitation; may be broad or shrub dominated
fb (fen) - nutrient medium wetland (edge peat) where ground water inflow is the dominant water source, open water channels common; dominated by sedges, grasses and mosses
ms (marsh) - wetland with fluctuating water table, often with shallow surface water, usually organically enriched mineral soils; dominated by rushes, reeds, grasses and sedges
sw (swamp) - peaty or very rich wetland on mineral soils or with an organic layer over mineral soil, with gently flowing or seasonally flooding water table; woody vegetation
w (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
wm (wet meadow) - periodically saturated but not inundated with water; organically enriched mineral soils; grasses, sedges, rushes and forbs dominant

Cliff (CL) Primary Ecosystem

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 bees and bumblebees.

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

Freshwater (FW) Primary Ecosystem

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:
l (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

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 best dispersed amongst sensitive and important ecosystems. Forest is 40 - 80 yrs old depending on site conditions and site characteristics. Forest types are differentiated.

Seasonally Flooded Agricultural Fields (FS)
Definition: Limited to areas of seasonally 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.

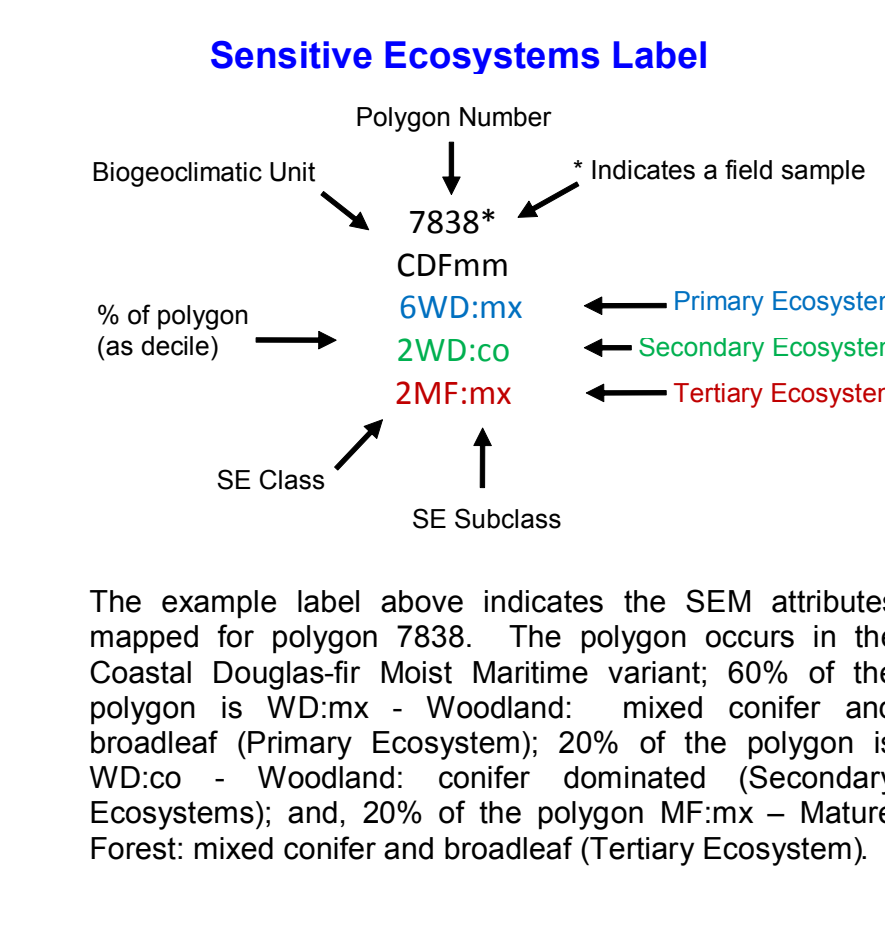
Example of a primary sensitive Woodland ecosystem with a secondary sensitive Herbaceous ecosystem

Example of a secondary sensitive Herbaceous and tertiary sensitive Woodland ecosystems mixed with a non-sensitive primary ecosystem

Sensitive ecosystems can also mix with important ecosystems. In this map a sensitive ecosystem mixed with an important ecosystem 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

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.



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 project 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, 2005. 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.

Data Limitations
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 ½ 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.

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