Salt Spring Island (South) Sensitive Ecosystem Mapping Airphoto - 2005

Islands Trust

British Columbia

Scale: 1:20,000
UTM Projection Zone 10 NAD83

0 0.15 0.3 0.6 0.9 1.2 Kilometers

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 | Secondary | Tertiary

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
mx (mixed conifer and deciduous) - forests dominated with a mixture of coniferous and broadleaf trees (<75% coniferous and >25% broadleaf)

Woodland (WD):

Primary Ecosystem | Secondary | Tertiary

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. Garry 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
mx (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 | Secondary | Tertiary

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 (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
cs (coastal herbaceous) - rocky shoreline or islet, influenced by the marine environment and characterized by less than 20% vegetation cover of grasses herbs, mosses and lichens.
sp (spit) - finger-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
ro (rock) - rock outcrops not dominated by shrubs

Riparian (RI):

Primary Ecosystem | Secondary | Tertiary

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 shrubs most common
fm (medium bench floodplain) - flooded every 1-6 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
ff (fringe) - 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
rv (river) - watercourse is large enough to represent > 10% of the polygon
sh (shrub) - shrub-dominated floodplain or lakeshore

Wetland (WN):

Primary Ecosystem | Secondary | Tertiary

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, specialized functions and connectivity.

Subclasses:

bg (bog) - nutrient poor wetland, on organic soils (sphagnum peat), water source predominantly from precipitation; may be treed or shrub dominated
fn (fen) - nutrient medium wetland (sedge 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
sp (swamp) - poor to 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, transition 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 dominate

Cliff (CL):

Primary Ecosystem | Secondary | Tertiary

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 roosting bats while deep crevices are used for shelter and overwintering of snakes and lizards.

Subclasses:

cc (coastal cliffs) - cliffs with a marine influence, generally near vertical bedrock with accumulation of soil limited to fissures and ledges.
ic (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 | Secondary | Tertiary

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

Subclasses:

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

Other Important Ecosystems

Other important ecosystems have high biodiversity values.

Mature Forest (MF):

Primary Ecosystem | Secondary | Tertiary

Definition: Usually conifer-dominated, occasionally deciduous, dry to moist forest types, structural stage 6, generally >80yrs.

Importance: ***Future older forests*** Within 20 years, many Mature Forests that were logged early this century will become Older Forests. The biodiversity values of Mature Forests generally become higher with age. This means it will be able to sustain more and larger species of plants and animals.

Landscape connectivity Mature Forest stands provide connections between other natural areas that promote the movement and dispersal of many forest-dwelling species across the landscape.

Buffers Mature Forest can minimize disturbance to sensitive ecosystems that occur within or adjacent to the forest patch. Where they border or surround wetlands, patches of older forest or other sensitive ecosystems, the Mature Forest area serves an important role in buffering the adjacent sensitive areas.

Subclasses:

co (conifer dominated) - greater than 75% coniferous species
mx (mixed conifer and deciduous) - a minimum of 25% cover of either group is included in the total tree cover
bd (broadleaf) - greater than 75% broadleaf species

Other Mapped Ecosystems

Young Forest (YF):

Definition: Limited to areas of young forest dispersed amongst sensitive and important ecosystems.

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

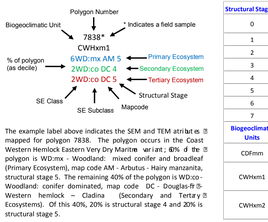
Occasionally sensitive ecosystems will mix with non-sensitive ecosystems. In this map a sensitive ecosystems mixed with non-sensitive is identified by cross-hatched lines with solid white shading.

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

Sensitive and Terrestrial Ecosystems Label



The example label above indicates the SEM and TEM attributes mapped for polygon 7838. The polygon occurs in the Coastal Western Hemlock Eastern Very Dry Maritime variant; 60% of the polygon is WD:mx - Woodland: mixed conifer and broadleaf (Primary Ecosystem), map code AM - Arbutus - Hairy manzanita, structural stage 5. The remaining 40% of the polygon is WD:co - Woodland: conifer dominated, map code DC - Douglas-fir - Western hemlock – Cladina (Secondary and Tertiary Ecosystems). Of this 40%, 20% is structural stage 4 and 20% is structural stage 5.

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 fuelled 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 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 an updated 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 Resource Information Standards Committee (RISC) Standard for Terrestrial Ecosystem Mapping (TEM) in BC. This Sensitive Ecosystems map was themed from TEM data using the RISC Standard for Mapping Ecosystems at Risk in BC. Field survey protocols followed Describing Terrestrial Ecosystems in the Field (RISC 1998).

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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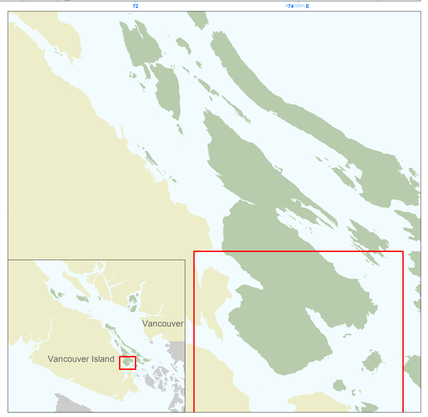
Structural Stage & Biogeoclimatic Units

Structural Stage	Description
0	No Structural Stage (usually rock or open water)
1	Sparse/bryoid
2	Herb
3	Shrub/Herb
4	Pole/Sapling
5	Young Forest
6	Mature Forest
7	Old Forest

Biogeoclimatic Units	Description
CDFmm	Coastal Douglas-fir Maritime Subzone
CWHxm1	Coastal Western-Hemlock Eastern Very Dry Maritime Variant
CWHxm2	Coastal Western Hemlock Western Very Dry Maritime Variant

Terrestrial Ecosystem Map Codes and Site Unit Names

Map Code	Site Unit Name	Map Code	Site Unit Name	Map Code	Site Unit Name	Map Code	Site Unit Name	Map Code	Site Unit Name
CDFmm - Forested		CDFmm - Non-Forested		CWHxm - Forested		CWHxm - Non-Forested		Anthropogenic	
AS	Aspen Swamp (seral wetland)	BE	Beach	CS	Western redcedar - Slough sedge	AM	Arbutus - Hairy manzanita	CF	Cultivated field
CS	Western redcedar - Slough sedge	CL	Cliff	CW	Black cottonwood - willow	CL	Cliff	CO	Cultivated orchard
CW	Black cottonwood - willow	Em02	Glasswort - Sea-milkwort estuary	DC	Douglas-fir - Western hemlock - Cladina	FC	Fescue - Camas	ES	Exposed soil
DA	Douglas-fir - Shore Pine - Arbutus	FC	Fescue - Camas	DF	Douglas-fir - Sword fern	HL	Hardhack - Labrador tea	GC	Golf course
DG	Douglas-fir - Grand Fir - Oregon Grape	HL	Hardhack - Labrador tea	DS	Douglas-fir - Western hemlock - Salal	RO	Rock outcrop	GP	Gravel pit
DO	Douglas-fir - Onion grass	OM	Garry oak - moss	HD	Western hemlock - Western redcedar - Deer fern	SC	Cladina - Wallace's selaginella	RW	Rural residential
DS	Douglas-fir - Salal	OR	Oceanspray - rose	HK	Western hemlock - Douglas-fir - Oregon beaked moss	SW	Sedge wetland	RZ	Road surface
GO	Garry oak - Oceanspray	QB	Garry oak - Brome (or mixed graminoids)	RB	Western redcedar - Salmonberry	Wb50	Labrador tea - Bog laurel - Peat-moss	UR	Urban
RC	Western redcedar - Skunk cabbage	RO	Rock outcrop	RC	Western redcedar - Sitka spruce - Skunk cabbage	Ws50	Spirea - Sitka sedge swamp		
RF	Western redcedar - Grand fir - Foamflower	SC	Cladina - Wallace's selaginella	RF	Western redcedar - Foamflower	Water Bodies			
RK	Western redcedar - Douglas-fir - Oregon beaked moss	SL	Sedge - Western lilaeopsis	RS	Western redcedar - Swordfern	LA	Lake		
RP	Western redcedar - Indian-plum	SS	Spirea - Sedge wetland	RT	Western redcedar - Black twinberry	OW	Open water (< 2m deep)		
RS	Western redcedar - Snowberry	Wf53	Slender sedge - White beak-rush fen	SS	Sitka spruce - Salmonberry	PD	Pond (> 2m deep)		
RV	Western redcedar - Vanilla-leaf	Ws50	Spirea - Sitka sedge swamp