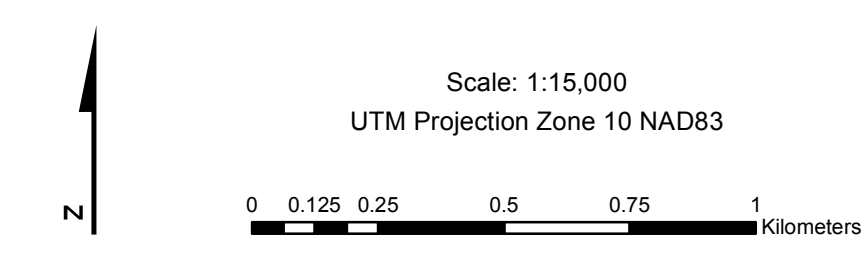


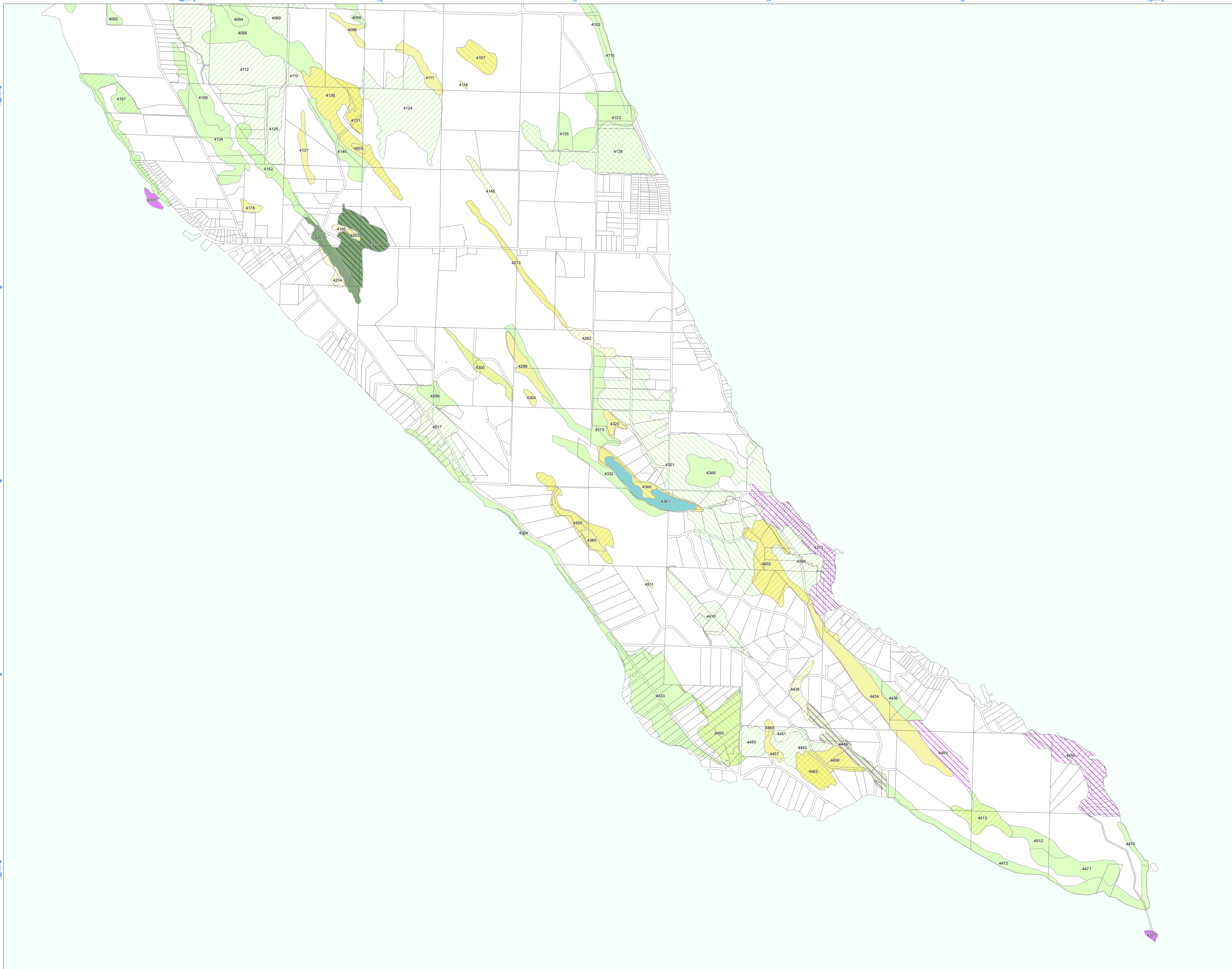
# Denman Island (South)

## Sensitive Ecosystem Mapping

### Airphoto - 2001



<b>4059</b> CDFmm 10MNP co DS 6	<b>4089</b> CDFmm BYF DS 5 2MNP co DS 6	<b>4092*</b> CDFmm 10MNP co DS 6	<b>4094</b> CDFmm 10MNP co RF 6	<b>4096</b> CDFmm 10MNP WWS1 3	<b>4098</b> CDFmm AMF co RF 6 4YF DS 5 2NA RF 3	<b>4102</b> CDFmm 10MNP co DS 6
<b>4107</b> CDFmm 6MNP WWS3 2NA DS 3 2MNP RF 3	<b>4109</b> CDFmm 7MNP co DS 6 2YF DS 5	<b>4110</b> CDFmm 8NA DS 3 2MNP co DS 6	<b>4111*</b> CDFmm 10MNP WWS3	<b>4112</b> CDFmm 7YF DS 5 3MNP co DS 6	<b>4114</b> CDFmm 10MNP WWS1 3	<b>4115</b> CDFmm 10MNP co DS 6
<b>4123</b> CDFmm 7MNP co DS 6 3NA RF 0	<b>4124</b> CDFmm 8YF DS 5 2MNP co RF 6 2YF DS 5	<b>4125</b> CDFmm 7NA DS 3 3MNP co DS 6	<b>4131</b> CDFmm 6MNP WWS3 4MNP RF 4 2MNP WWS3	<b>4134</b> CDFmm 6MNP co RF 6 4NA RF 0	<b>4135</b> CDFmm 10MNP co DS 6	<b>4136</b> CDFmm 6MNP WWS3 5MNP co DS 6
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<b>4195</b> CDFmm 7YF DS 2 3MNP WWS3	<b>4201</b> CDFmm 7MNP WWS3 3YF DS 5	<b>4202</b> CDFmm 10MNP WWS3	<b>4213</b> CDFmm 6MNP WWS3 2YF RF 6 2MNP WWS3	<b>4214*</b> CDFmm 6MNP WWS3 3NA RF 0 2MNP WWS3	<b>4234</b> CDFmm 4YF RF 5 4MNP WWS3	<b>4262</b> CDFmm 4YF RF 5 3MNP WWS3
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<b>4332</b> CDFmm 10MNP co DS 6	<b>4340</b> CDFmm 6MNP WWS3 3NA RF 1 1MNP WWS3	<b>4349</b> CDFmm 8MNP co DS 6 1NA RF 0	<b>4361</b> CDFmm 10MNP WWS3	<b>4373</b> CDFmm 6MNP WWS3 3YF DS 5 1NA RF 0	<b>4385</b> CDFmm 10MNP WWS3	<b>4394</b> CDFmm 8MNP co DS 6 2NA RF 0
<b>4396</b> CDFmm 8YF DS 5 2MNP co RF 6	<b>4402</b> CDFmm 7MNP WWS3 3MNP WWS3	<b>4410</b> CDFmm 8MNP co DS 6 1NA RF 0	<b>4433</b> CDFmm 10MNP WWS3	<b>4434</b> CDFmm 10MNP WWS3	<b>4436</b> CDFmm 10MNP WWS3	<b>4438</b> CDFmm 3MNP WWS3
<b>4446</b> CDFmm 8MNP co DS 6 4NA DS 4 1MNP WWS3	<b>4449</b> CDFmm 10MNP WWS3	<b>4450</b> CDFmm 8MNP co DS 6 1NA RF 0	<b>4451</b> CDFmm 8MNP co DS 6 2MNP co DS 6	<b>4452</b> CDFmm 2MNP co DS 6	<b>4455</b> CDFmm 8MNP co DS 6	<b>4456</b> CDFmm 3MNP WWS3
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<b>4517</b> CDFmm 8MNP co DS 6						



### 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 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 and 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 derived 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, 1996).

### Data Limitations

The Sensitive Ecosystems map is a tool to alert decision makers to the existence of sensitive ecosystems. However, when landscape 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 sets is used as the information source is advised.

### 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.

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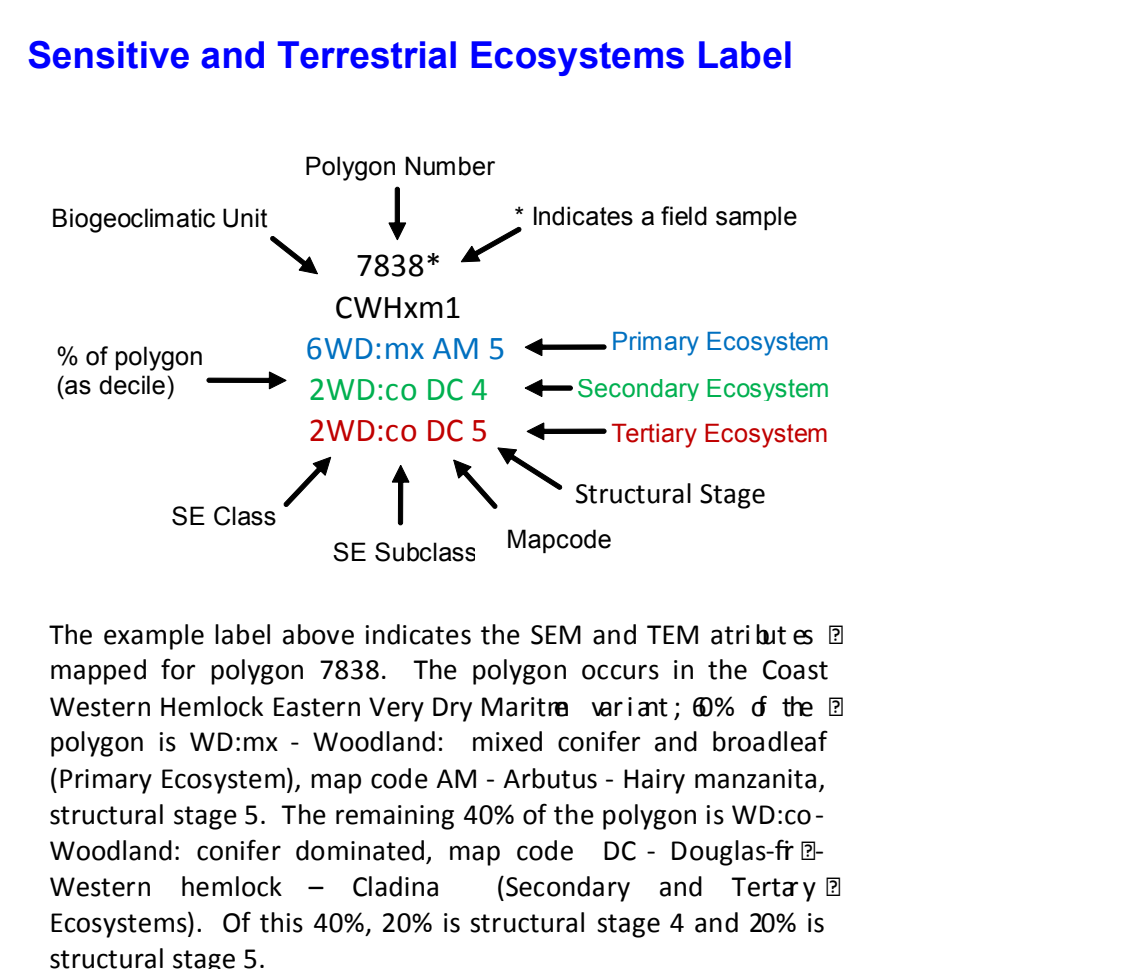
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### Structural Stage & Biogeoclimatic Units

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

### 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
CDFmm - Forested		CDFmm - Non-Forested					
AS	Aspen - Slough sedge	E01	Tuffed hairgrass - Meadow barley estuarine meadow	W01	Sitka sedge - Peat moss fen	RE	Reservoir
CS	Western meadow - Slough sedge	E02	Glasswort - Sea-milkwort estuarine marsh	W02	Sweet gale - Sitka sedge fen	RW	Rural residential
CW	Black cottonwood - willow	E03	Sea purslane	W03	Slender sedge - White oak rush fen	RZ	Road surface
DA	Douglas-fir - Shore Pine - Arbutus	E05	Lingy's sedge estuarine marsh	W05	Cattail marsh	UR	Urban
DD	Douglas-fir - Grand Fir - Oregon Grape	FC	Fescue - Canas	W06	Sitka sedge - Hemlock-parsecy marsh		
DO	Douglas-fir - Oregon Grass	HL	Hardwood - Labrador tea	W09	Pink sphaeria - Sitka sedge swamp		
DS	Douglas-fir - Saur	LM	Douglas-fir - Heath pea	W10	Sitka willow - Pacific willow - Sitka cabbage swamp		
GO	Garry oak - Ocean spray	OM	Garry oak - moss				
LS	Shore pine - Sphagnum	OR	Ocean spray - rose				
RC	Western meadow - Saur cabbage	OB	Garry oak - thyme (or mixed grasses)	OC	Cultivated field	MU	Municipal
RF	Western meadow - Grand Fir - Foamflower	RA	Nootka rose - Pacific crab apple	OO	Cultivated orchard	MO	Open water (< 2m deep)
RF	Western meadow - Douglas-fir - Foamflower	RB	Nootka rose - Pacific crab apple	OC	Cultivated orchard	PD	Pond (> 2m deep)
RP	Western meadow - Indian plum	SC	Cladonia - Wall's sea lettuce	ES	Exposed soil	RI	River
RS	Western meadow - Snowberry	SL	Sedge - Western sea purslane	GC	Golf course	RO	Rock outcrop
RV	Western meadow - Vanilla leaf	W05	Labrador tea - Bog laurel - Peat moss bog	IN	Industrial		



### 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  
 mo (mixed conifer and deciduous) - forests dominated with a mixture of coniferous and broadleaf trees (>15% 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. 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  
 mo (mixed conifer and deciduous) - moist 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, silt, dunes and erodible vegetated with grasses and forbs.

**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  
 co (coastal herbaceous) - rocky shoreline or silt, 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

#### Wetland (WN):

**Primary Ecosystem**      **Secondary**      **Tertiary**

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

**Importance:** Wetland ecosystems are sensitive and important because they exhibit rarely, 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 tree 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  
 me (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 dominant

#### Cliff (CL):

**Primary Ecosystem**      **Secondary**      **Tertiary**

**Definition:** Very steep slopes, often exposed bedrock, may include steep-sided sand banks.

**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 wasting. 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.

**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

### Rare 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.

**Landscap connectivity:** Mature Forest stands provide connections between other natural areas that provide 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 path. Where they border or surround wetlands, patches of other 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  
 mo (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. Forest is 40 - 80 yrs old depending on species and ecological conditions, canopy has begun to differentiate.

#### Seasonally Flooded Agricultural Fields (SF):

**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.

