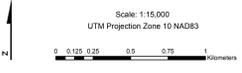


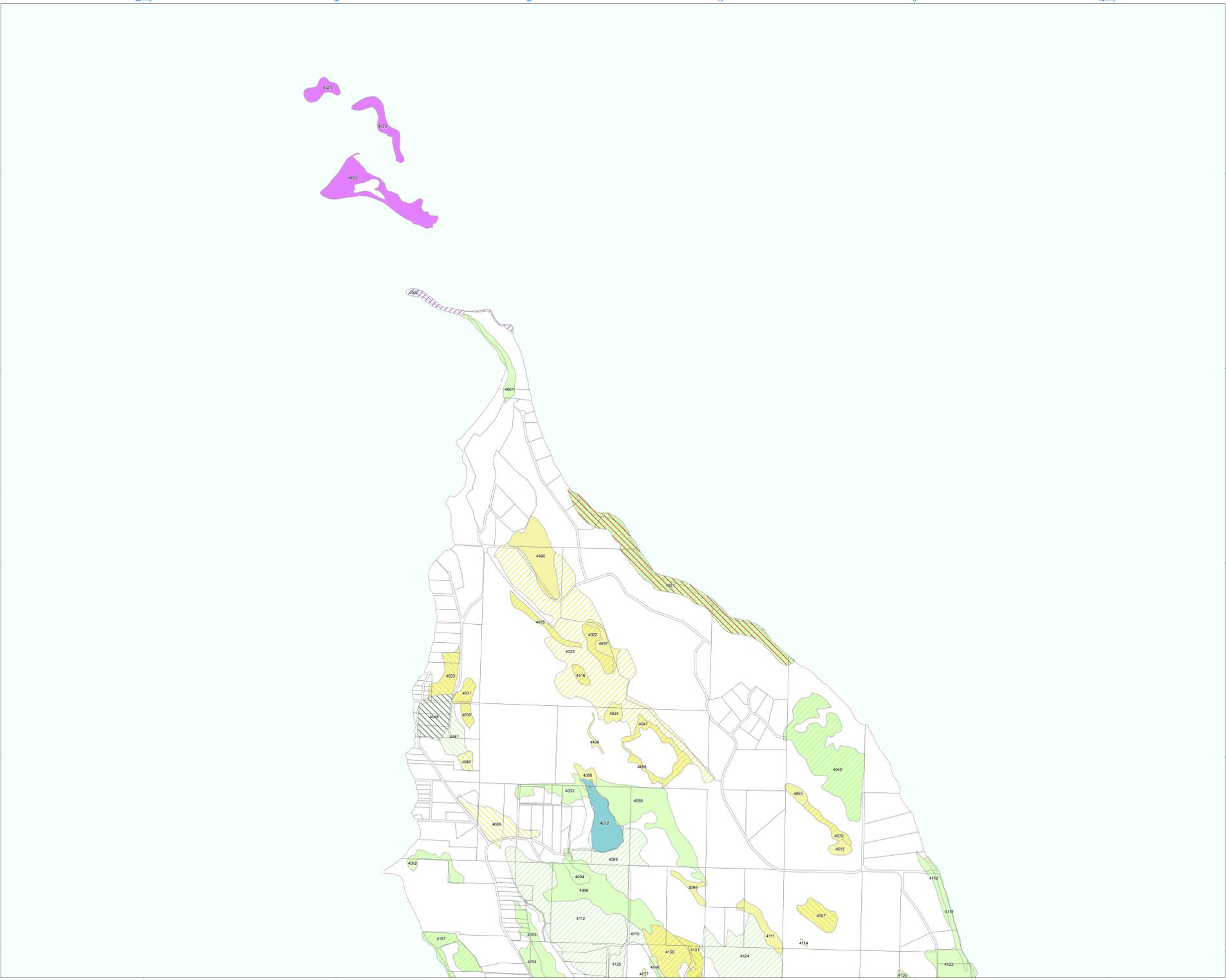
Denman Island (North)

Sensitive Ecosystem Mapping

Airphoto - 2001



Sensitive and Terrestrial Ecosystems Label						
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88F/05/06	88A/05/1	88V/05/03	88F/05/04	88V/05/03	88A/05/03	88V/05/03
2YF/05/5	48B/04/LM2	88V/05/03	88F/05/04	88V/05/03	88A/05/03	88V/05/03
4031	4034	4035	4036*	4046	4047	4048
CDfmm	CDfmm	CDfmm	CDfmm	CDfmm	CDfmm	CDfmm
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20N/05/RC3	20N/05/RC3	20N/05/RC3	20N/05/RC3	20N/05/RC3	20N/05/RC3	20N/05/RC3
2N/05/05	2N/05/05	2N/05/05	2N/05/05	2N/05/05	2N/05/05	2N/05/05
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2YF/05/5	2YF/05/5	2YF/05/5	2YF/05/5	2YF/05/5	2YF/05/5	2YF/05/5
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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

Human 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 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 the 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 areas 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 1986).

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 data 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 sheets 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.

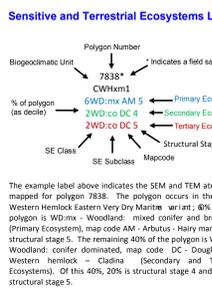
If development must occur, develop carefully!

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.

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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
Sbz	one

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	CDfmm - Non-Forested	Antropogenic				
AS	Aspen - Slough sedge	ED1	Tufted harrgrass - Meadow barley estuarine meadow	WB1	Sitka sedge - Peat moss fen	RE	Reservoir
CS	Western redcedar - Slough sedge	EN2	Claswort - Sea-milwort estuarine marsh	WB2	Sweet gale - Sitka sedge fen	RW	Rural residential
CV	Black cottonwood - willow	EN3	Saltwort saltgrass	WB3	Slender sedge - White oak-cash fen	RZ	Road surface
DA	Douglas-fir - Shrub Pine - Arbutus	EN4	Lupinus sedge estuarine marsh	WB4	Catal marsh	UR	Urban
DC	Douglas-fir - Grand Fir - Oregon Grape	FC	Fescue - Carex	WB5	Sitka sedge - Hemlock-parsley marsh		
DD	Douglas-fir - Oregonaspen	HL	Hardhack - Labrador tea	WB6	Pink sedge - Sitka sedge swamp		
DO	Douglas-fir - Star	LM	Dunegrass - Beach pea	WB7	Sitka willow - Pacific willow - Skunk cabbage swamp		
GO	Garry oak - Oceanospry	OM	Garry oak - moss				
LS	Shore pine - Sparganium	OR	Oceanospry - rose				
RC	Western redcedar - Skunk cabbage	OB	Garry oak - birch (or mixed grasses)	CF	Cultivated field	MU	Mudflat
RW	Western redcedar - Grand Fir - Foamflower	RA	Nootka rose - Pacific crab apple	CO	Cultivated orchard	OW	Open water (< 2m deep)
RK	Western redcedar - Douglas-fir - Oregon beaked moss	SC	Cladonia - Wallacia setagnella	ES	Exposed soil	PD	Pond (> 2m deep)
RP	Western redcedar - Indian plum	SL	Sedge - Western ilaeopsis	OC	Golf course	R	River
RS	Western redcedar - Snowberry	SS	Sedge - Sedge wetland	GP	Gravel pit	RO	Rock outcrop
RV	Western redcedar - Vanilla leaf	W600	Labrador tea - Bog laurel - Peat-moss bog	N	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:

- oo (conifer dominated) - greater than 75% coniferous species
- oa (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. Includes 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:

- od (broadleaf) - dominant broadleaf with <15% coniferous species
- oe (mixed conifer and deciduous) - 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, soils, dunes and shrublands 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 (thermophilous) - 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
- hc (coastal herbaceous) - rocky alpine or alid, influenced by the marine environment and characterized by less than 20% vegetation cover of grasses herbs, mosses and lichens.
- hd (silt) - finger like extension of beach, comprised of sand or gravel deposited by longshore drifting, low to moderate cover of salt-tolerant grasses and herbs
- he (dune) - ridge or hill, or beach area created by windblown sand; may be more or less vegetated depending on depositional activity, dunes will have low cover of salt-tolerant grasses and herbs
- hf (shrub) - >20% of total vegetation cover is shrub cover, with grasses and herbs
- hg (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 levels or poor drainage conditions.

Importance: Wetland ecosystems are sensitive and important because they exhibit rarely, high biodiversity, fragile, 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
- bn (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
- bc (marsh) - wetland with fluctuating water table, often with shallow surface water, usually organically enriched mineral soils, dominated by rushes, reeds, grasses and sedges
- bw (swamp) - poor to very rich wetland on mineral soils or with an organic layer over mineral soil, with gently forming or seasonally flooding water table, woody vegetation
- bs (shallow water) - standing or flowing water less than 2m deep, transition between deep water bodies and other wetland ecosystems (e.g. bogs, swamps, bays, etc.) often with vegetation rooted below the water surface
- bt (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 features 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 cliff) - cliffs with a marine influence, generally near vertical bedrock with accumulation of soil limited to features and ledges
- cl (mixed cliff) - inland cliffs, typically formed as a result of erosion, catastrophic failure or mass wasting. Generally characterized by rapid drainage and the accumulation of soil that is limited to bedrock features and ledges

Freshwater (FW):

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

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

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

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

Classes:

- la (lake) - a naturally occurring stable body of water, greater than 2m deep in some portion
- pl (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.

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:

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

Other Mapped Ecosystems

Young Forest (YF):

Definition: Usually conifer-dominated, occasionally deciduous, dry to moist forest types, structural stage 4-6, generally 40-80 yrs old depending on species and local conditions, canopy has begun to differentiate.

Seasonally Flooded Agricultural Fields (F):

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.

