



# A Sensitive Ecosystem Guide

for Islands Trust Area Property Owners



The islands in the Strait of Georgia and Howe Sound (the Islands Trust Area) hold a diversity of plants and animals—many of them rare. This diversity once created a rich mosaic of ecosystems, but is now threatened by human activities. Today, the remaining ecosystem fragments, acting as strongholds for rare species, are called sensitive ecosystems.

As a property owner, you play an important role in the stewardship of these unique areas. The Islands Trust Fund developed this brochure to introduce you to where sensitive ecosystems exist, how you can recognize them, and what simple steps you can take to ensure these fragile areas survive and even thrive in the future.



# Islands Trust

## Sensitive Ecosystem Mapping

### What are Sensitive Ecosystem Maps?

- Maps that identify the location and range of sensitive ecosystems
- The maps are available at [www.islandstrust.bc.ca](http://www.islandstrust.bc.ca)

### How were the Sensitive Ecosystem Maps created?

- Mappers reviewed aerial photographs to interpret and categorize different types of natural landscapes at a scale of 1 : 16,000
- Ecologists visited the mapped areas to verify aerial photograph interpretations and collect ecological information
- Staff consulted experts and island residents to get feedback on the mapping

### Why were the Sensitive Ecosystem Maps created?

- To provide information for decision-makers to improve land-use planning in and around sensitive areas
- To create a coordinated plan for conservation organizations to protect those ecosystems under greatest threat

# Woodland Ecosystems

## SUPPORTING DIVERSITY ON DRY SOILS

### What are Woodland Ecosystems?

Woodland ecosystems are dry and open forests dominated by a mix of deciduous and coniferous tree species. Arbutus, Douglas-fir and Garry oak dominated woodlands are among the most sensitive and biologically diverse woodland ecosystems in the islands Trust Area.

### Where are Woodland Ecosystems located?

Woodland ecosystems are generally restricted to south-facing slopes and ridges with shallow soils and bedrock outcroppings. Woodland ecosystems exist in areas with dry conditions that prevent the development of dense forests.

### Why are Woodland Ecosystems important?

Woodland ecosystems provide habitat for a wide variety of plants, insects, reptiles and birds. Garry oak woodlands, for example, support the highest plant species diversity of any terrestrial ecosystem in British Columbia. Woodland ecosystems commonly occur with herbaceous and cliff ecosystems, thus enriching the diversity of an entire area and increasing connectivity between these other sensitive ecosystems. Ecologists hypothesize that woodland ecosystems are likely to survive as our climate changes, due to this ecosystem's ability to exist in dry conditions. Retaining woodlands is important for the survival of many species during this climatic transition period.





### How can we protect Woodland Ecosystems?

Woodland ecosystems are fragmented and rare, nationally, provincially and regionally. Because they support a high number of at-risk species, the loss of each woodland ecosystem has devastating effects on the Province's biodiversity and may affect the ability of our area to adapt to climate change.

- Limit access and avoid development to prevent vegetation damage
- Actively control invasive species to reduce competition with rare native species
- Prevent livestock grazing to avoid soil compaction and erosion
- Consider re-introducing managed fire to the ecosystem to reduce non-native species

# Cliff Ecosystems

## DYNAMIC VERTICAL SYSTEMS

### What are Cliff Ecosystems?

Cliff ecosystems are steep slopes, often with exposed bedrock. Very little soil accumulates in these ecosystems and only exceptionally hardy trees and plants maintain a precarious grip.

### Where are Cliff Ecosystems located?

Cliff ecosystems are regionally rare, making up less than 0.1% of the landscape in the Islands Trust Area. Cliff ecosystems occur both inland and along coastal areas. Inland cliffs occur where mass erosion events have taken place, often where soil drainage is rapid. Coastal cliffs occur near shorelines with powerful wind, heat and wave influences.

### Why are Cliff Ecosystems important?

Cliff ledges and fissures offer isolated habitat protected from predators, making cliffs choice nesting sites for a variety of birds. Crevices are used by roosting bats, while deeper crevices serve as shelter and overwintering areas for snakes and lizards. Cliffs contribute to the scenic beauty of the Islands Trust Area, attracting visitors and boaters who may contribute to local economies. Cliffs also offer spectacular waterfront views, creating recreational opportunities on land, often leading to their degradation by development, trails and introduced species.





## How can we protect Cliff Ecosystems?

Cliff ecosystems and the rare habitat they support need protection from soil compaction and erosion.

- Prevent disturbance of nesting or breeding areas—especially from March to August. Loud noises or venturing too close to nesting locations can cause birds to abandon eggs
- Control invasive species such as Scotch broom, while limiting disturbance to soil by leaving root systems
- Create a barrier or vegetated buffer around cliffs to limit human and domestic animal access

# Wetland Ecosystems

## VITAL NATURAL SERVICES

### What are Wetland Ecosystems?

Wetland ecosystems feature moisture-dependent plants that thrive in an environment where water remains at or above the surface of the soil during most of the year. The type of wetland can vary between bog, fen, marsh, swamp and estuarine wetland (where fresh and salt water mix) and can be flooded year-round or seasonally. Wetlands rely on a delicate balance between water and plant life.

### Where are Wetland Ecosystems found?

Wetland ecosystems occur in areas of flooding, fluctuating water tables, poor drainage or tidal influences, including agricultural lands that flood seasonally.

### Why are Wetland Ecosystems important?

There are very few wetlands in the islands and they are precious. They serve as water filtration systems, removing toxins and sediments from run-off. They capture and store water, aiding in ground water recharge and flood control. Wetland ecosystems provide key breeding and feeding areas for birds, insects and amphibians and exhibit high rates of biodiversity. Seasonally flooded agricultural fields are vital additions to dwindling natural wetland and riparian habitats and play a critical role as wintering stopover areas for migratory birds.





## How can we protect Wetland Ecosystems?

Healthy wetlands provide clean, filtered water, flood control and wildlife habitat.

- Avoid infilling, draining or ditching wetlands
- Create and retain a vegetated buffer around wetlands and associated riparian ecosystems to protect hydrology systems
- Prevent disturbance of nesting or breeding areas by humans, livestock or pets, especially between March and August
- Restrict nearby pesticide, fertilizer or other chemical use

# Herbaceous Ecosystems

## THIN SOILS, RICH DIVERSITY

### What are Herbaceous Ecosystems?

Herbaceous ecosystems are natural grasslands, open meadows and sparsely vegetated hilltops. The shallow soils, characteristic of herbaceous ecosystems, support low-growing vegetation, such as grasses, forbs (low, broad-leaved plants) and colourful arrays of wildflowers, mosses and ancient lichens. Few trees and shrubs survive on these sites due to the shallow, fast-drying nature of the exposed soils.

### Where are Herbaceous Ecosystems found?

Herbaceous ecosystems are found on bedrock outcroppings, hilltops, dunes and spits and in large openings within forested areas. These fragile ecosystems are found in small patches throughout the Islands Trust Area.

### Why are Herbaceous Ecosystems important?

Due to their occurrence on highly exposed areas, herbaceous ecosystems provide extremely specialized micro-habitats for many species of rare butterflies, wildflowers and lichens. The lifecycles of certain rare species depend entirely on the specific conditions found within extremely small locations (some with an area of a few square centimetres) of herbaceous ecosystems.





### How can we protect Herbaceous Ecosystems?

The thin soils of herbaceous ecosystems are especially vulnerable to disturbance. Once plants are removed, the thin soil cover is stripped by rain and wind making it extremely hard for plants to re-establish on exposed bed-rock.

- Limit access and avoid any type of development to prevent soil and vegetation damage
- Create a vegetation buffer using native species to slow invasion by non-native species
- Actively control invasive species to reduce competition with rare native species
- Prevent disturbance of nesting or breeding areas by humans, livestock or pets, especially between March and August
- Allow natural seasonal moisture variations to continue by restricting human inputs such as septic discharge and garden watering

# Freshwater Ecosystems

## WATER FOR LIFE

### What are Freshwater Ecosystems?

Freshwater ecosystems include lakes and ponds. They generally have areas with little or no floating vegetation and are deeper than two metres. Freshwater ecosystems form complex relationships with the riparian ecosystems found along their shorelines.

### Where are Freshwater Ecosystems located?

Freshwater ecosystems are not specific to terrain or elevation and are found in various environments throughout the Islands Trust Area. The water levels of freshwater ecosystems can be influenced by groundwater, precipitation, stream flow and evaporation.

### Why are Freshwater Ecosystems important?

Freshwater ecosystems serve a vital role in the lives of humans and animals as a source of drinking water. They also provide breeding habitat for insects, amphibians, fish, and invertebrates. These ecosystems serve as a rich source of nutrients for aquatic and terrestrial inhabitants alike.





## How can we protect Freshwater Ecosystems?

Protecting the quality and quantity of water feeding into freshwater ecosystems means protecting drinking water and habitat for humans and other species.

- Restrict nearby pesticide, fertilizer or manure use to decrease algae blooms
- Create and retain a vegetated buffer around water bodies to prevent erosion and filter run-off
- Restrict recreational, livestock and pet access to limit water contamination and habitat destruction
- Limit human impacts on the watersheds feeding freshwater ecosystems

# Riparian Ecosystems

## DYNAMIC SYSTEMS ON THE EDGE

### What are Riparian Ecosystems?

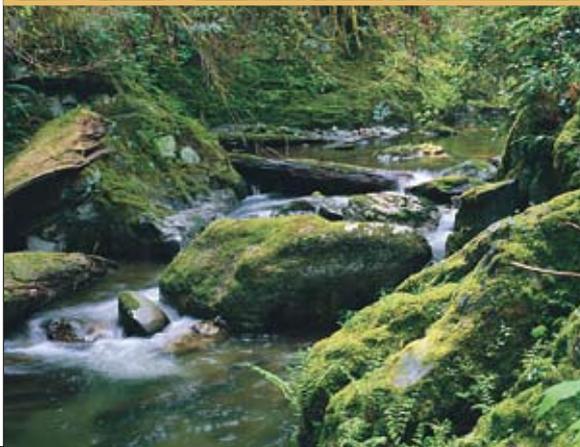
Riparian ecosystems occur along the edges of water bodies. The moist soils found in riparian ecosystems support plant communities distinct from those of surrounding upland areas. Riparian ecosystems vary in size, terrain and vegetation, ranging from gravel bars to old growth forest ravines. Due to seasonal changes in water levels, riparian ecosystems are highly dynamic.

### Where are Riparian Ecosystems found?

Riparian ecosystems occur along the margins of streams, rivers, ponds, marshes and lakes. Though large water bodies have extensive riparian ecosystems, the relatively dry climate of the Gulf Islands has resulted in smaller stream systems with narrower riparian ecosystems.

### Why are Riparian Ecosystems important?

Despite their small size, riparian ecosystems support an exceptionally high number of species because they include three critical habitat components needed by wildlife—water, shelter and food. Riparian ecosystems form valuable corridors for wildlife and humans alike, with many trail systems following these areas of remnant vegetation. Riparian ecosystems serve as natural water filtration systems and help regulate the flow of water—a function vital to the islands' sometimes dry climate.





### How can we protect Riparian Ecosystems?

Protecting riparian ecosystems from increased run-off, sediment loading and contaminants prevents erosion, flashfloods and maintains habitat and the quality of adjoining freshwater ecosystems.

- Create and maintain a vegetated buffer to protect against outside disturbance
- Limit human and domestic animal access to reduce damage to riparian soils and vegetation
- Retain features such as snags, logs and downed trees
- Allow natural disturbances to occur, such as flooding and channel changes, and restrict human interferences such as hard bank reinforcements and infilling
- Restrict nearby pesticide, fertilizer or other chemical use

# Old Forest Ecosystems

## PAST, PRESENT AND FUTURE

### What are Old Forest Ecosystems?

Old forest ecosystems are conifer-dominated tree stands that are generally older than 250 years. Old forests contain large mature trees, standing dead trees and fallen logs and support a large number of plant and animal species. Also important are mature forest ecosystems (80–250 years) and young forest ecosystems (40–80 years).

### Where are Old Forest Ecosystems located?

Old forest ecosystems are not specific to terrain or elevation and are found in various environments throughout the islands. Existing in areas with historically little to no human disturbance, old forests are scarce in the Islands Trust Area—less than 1% remains. Today, small patches of old forest ecosystems are scattered across the islands, fragmented by roads, logging and development.

### Why are Old Forest Ecosystems important?

Old forest ecosystems are vital in the world's fight to combat air pollution and climate change: absorbing carbon dioxide, releasing oxygen and cleaning the air. Current research shows that coastal forests in British Columbia store between 600 and 1,300 tonnes of carbon per hectare, with more captured each year. Old forest ecosystems represent an important and dwindling piece of our natural and cultural heritage.





In addition to supporting high levels of biodiversity and vital habitat, old forest ecosystems provide important economic benefits through recreation and the harvesting of non-timber forest products such as wild mushrooms and salal.

#### How can we protect Old Forest Ecosystems?

Many species dependent on old forest ecosystems require large, undisturbed areas for survival.

- Maintain the largest possible patches of old forest to minimize further fragmentation
- Allow natural succession, natural disturbance and plant decay to occur
- Restrict access by vehicles and livestock to prevent vegetation damage and soil compaction
- Maintain a vegetated buffer by limiting adjacent development

# Mature Forest Ecosystems

## OUR FUTURE OLD FORESTS

### OTHER IMPORTANT ECOSYSTEMS

#### What are Mature Forest Ecosystems?

Mature forest ecosystems are conifer-dominated dry to moist forest stands, usually 80 to 250 years old. Some stands may include deciduous tree species making up 25% of the canopy cover.

#### Where are Mature Forest Ecosystems located?

Mature forest ecosystems are often found in areas surrounding or bordering other sensitive ecosystems such as old forests and wetlands. Mature forests serve as buffers for these sensitive ecosystems while providing habitat for a variety of plant and animal species.

#### Why are Mature Forest Ecosystems important?

The biodiversity values of the mature forest ecosystem type increase with age, meaning that a forest will be able to sustain a greater variety and number of plants and animals as time progresses. In addition, mature forest stands serve as buffers and corridors between different sensitive ecosystems, protect micro-habitats, and allow forest dwelling species to move freely and safely between the various habitats. They also play an important role in the capture and storage of carbon dioxide and the fight against climate change.

#### How can we protect Mature Forest Ecosystems?

If conserved, mature forest ecosystems have the potential to become the old forest ecosystems of the future.

- Maintain the largest possible patches of mature forest
- Allow succession, natural disturbance and decay to occur
- Restrict access by vehicles and livestock
- Control invasive species





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