



Coastal Douglas-fir Ecosystems

*Nearly every type of
old-growth Douglas-fir
forest on British
Columbia's dry coastal
plain is now rare
or endangered.*





Why are coastal Douglas-fir ecosystems at risk?

Towering Douglas-fir forests once dominated a narrow strip of low-lying land along the southeastern coast of Vancouver Island, the Gulf Islands, and parts of the Lower Mainland and Sunshine Coast. Now only fragments of these unique ecosystems remain in an old-growth state and we are in danger of losing what is left.

Since 1848, logging has been a major industry on Vancouver Island. The easily accessible Douglas-fir forests were the first to be cut. Proximity to the ocean (for transport) and gentle topography made logging these forests relatively easy in the days of oxen and axes. At about the same time that logging began, agriculture was also becoming a major industry. Early settlers took advantage of the fertile lowland soils and cleared the land of trees so they could raise crops and livestock.

As forestry, farming, mining and fishing brought more and more people to this coast, bustling cities spread across the land where bountiful forests had once grown. This trend continues today as the mild climate attracts winter-weary Canadians from the East. Urban development has become a major threat to what remains of our old-growth coastal Douglas-fir forests.

Another modern threat to these forests is the suppression of natural forest fires. Mature Douglas-fir trees have thick bark, which protects them from the low-intensity fires that used to occur here about every 100 to 300 years. Such fires maintained the

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dominance of Douglas-fir by controlling the growth of competing trees. They also prevented tinder-dry debris from building up on the forest floor, thus reducing the risk of high-intensity fires. Now that forest fires are suppressed, the Douglas-firs are in danger of being replaced by other conifers or killed by high-intensity fires that humans will not be able to control.

The understory plants of these forests are also in danger of being overshadowed, not by natural competitors, but by invasive, non-native plants. Freed from the predators and competitors of their homelands, these plants invade forests and out-compete the native vegetation. Their names often give away their foreign

ancestry: English ivy, Scotch broom, Himalayan blackberry, and Eurasian spurge-laurel. In this area, invasive plants tend to flourish where the soil is disturbed or where there is a great deal of light available, such as on rocky outcrops under a sparse forest canopy. The seeds of some species, like English holly, are transported deep into the forests by birds. Each year sees new plants imported to this region from all over the world. Which ones

will be the next invaders?

What is their history?

British Columbia's spectacular landscape has been sculpted over the last two million years by repeated glaciations, the most recent of which occurred between about 30 000 and 10 000 years ago. The South Coast was one of the first areas to be deglaciated, and by studying accumulations of plant pollen in lake bottoms, scientists have established that forests were growing here more than 12 000 years ago.

The earliest forests after the last glaciation were dominated by pines, and included spruce, alders and ferns.

Douglas-fir and western hemlock arrived next, around 10 000 to 11 000 years ago. Yellow-cedar and western redcedar became abundant only about 6000 years ago, and with their arrival began the magnificent wood carving and architecture of the coastal First Nations.

What is their status?

Scientists recognize six distinct old-growth forest types on the low coastal plain of southern British Columbia that are either dominated or co-dominated by Douglas-fir trees. All of them are currently on the province's list of rare and endangered ecosystems. Nine other types of old-growth Douglas-fir forests, growing on dry upland sites throughout the south coastal region, are also on this list,

though they have not suffered the extreme devastation of the lowland types.

Due to a lack of ecosystem mapping, it is difficult to determine how much area these forests once covered and how much is left in an old-growth state. One 1995 study estimated that only one-half of one percent (about 1100 hectares) of the low coastal plain is covered by relatively undisturbed old forests. This is far below what scientists consider to be the

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minimum area required for the continued survival of these forest types.

Only a small proportion of what is left in an old-growth state is contained within parks. Although no logging occurs in these "protected" sites they are still being degraded by fire suppression, non-native plant invasion and, in some cases, overuse.



Active management, such as weeding and prescribed burning, will be necessary if we wish to maintain the few parks we do have in a natural state.

Unlike most of British Columbia, nearly all of the land within the south coastal region is privately owned, which makes expanding the park system expensive and difficult. Citizens' groups have had some success in raising money to buy land for conservation, and governments are taking steps to create incentives for private landowners to preserve biodiversity on their land.

Even if efforts to protect all remaining old-growth stands are successful, additional areas of older second-growth forest will have to be protected and allowed to recover to an old-growth state in order to ensure adequate representation of these forest types in the future, and to provide a continuous network of wildlife habitat. This will create a margin of safety in the system so that if one old-growth stand is degraded, there will be other healthy old-growth stands nearby to take its place.

What are they?

It is difficult to know what Douglas-fir forests along British Columbia's dry coastal plain originally looked like since there are so few areas left in their natural state, but our understanding of the ecology of

Douglas-fir can help us visualize these forests. Douglas-fir is a "keystone" species – a species that has a great influence on the whole ecosystem. When the canopy of Douglas-fir trees is removed, the understorey plants are exposed to the elements and quickly replaced by plants more suited to harsher conditions, thus changing the entire ecosystem. We know that wildfires once swept through the area on a regular basis, keeping competing trees in check and also damaging young Douglas-fir trees that had not yet built up thick, protective bark. This natural thinning of young Douglas-firs, along with the fact that this species does not grow very well in the shade, suggests that the forest canopy was relatively open. We

can also infer that these open forests were dominated by gigantic "veteran" Douglas-firs, since a typical Douglas-fir can live more than 750 years in the absence of high-intensity fires or storms, and some have been known to live well over 1000 years.

The mountains of Vancouver Island and the Olympic Peninsula create a

"rainshadow" that shields this region from incoming rain clouds and results in a dry, mild climate compared to other coastal regions. While Douglas-fir trees are tolerant of a wide range of environmental conditions and grow in many parts of the province, many of the other plant species of the coastal Douglas-fir ecosystems are more specifically adapted to the summer droughts and winter rains that characterize this climate.

In total, there are about 100 species of plants – trees, shrubs, vines, herbs and mosses – in coastal Douglas-fir forests. Trees common to wetter areas of the West Coast, especially western redcedar and grand fir, can be found in these forests. Less prevalent are Garry oak and arbutus, which grow on drier sites. Our provincial emblem, the western flowering dogwood, can also be found in these forests.

The most common shrubs are: salal, which produces delicious berries; dull Oregon-grape, which is prized by gardeners locally and abroad; and the aptly named ocean-spray (shown on cover). Although these species are usually intermixed, each

one dominates under different conditions: salal in moister sites; dull Oregon-grape in medium sites; and oceanspray in drier sites. Beautifully fragrant native roses also grow in these forests, but less abundantly. Most old-growth Douglas-fir forests have a sparse herb (non-woody plant) layer, within which sword fern and vanilla leaf are the most common species. Dry Douglas-fir–Garry oak forests are an exception to the general pattern. They grow on rocky, well-drained soils that cannot hold enough water to support shrubs

throughout the summer, but do sustain a variety of grasses and colourful wildflowers. Douglas-fir–pine–arbutus forests are somewhat intermediate, with well-developed shrub and herb layers.

Oregon beaked moss is the most common member of the well-developed moss layer in all but the driest forests. The more

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drought-tolerant electrified cat's tail moss is the dominant moss in Douglas-fir-Garry oak forests, and the two moss species are co-dominant in Douglas-fir-pine-arbutus forests. A close look at the trunk and limbs of almost any tree will reveal not only mosses, but also a bewildering and beautiful variety of slow-growing lichens. These are symbiotic (mutually beneficial or dependent) organisms made up of a photosynthetic alga surrounded by a tough, protective fungus.

Mycorrhizal fungi also form symbiotic relationships with most forest plants. These fungi grow on plant roots and absorb sugars the plant produces by photosynthesis. In return, the plant gains access to water and nutrients that the fungi absorb from the soil through a network of filaments. The fruiting bodies of some of these fungi may be familiar to you: false truffles, chanterelles, and slippery jacks are all mycorrhizal. The importance of mycorrhizae cannot be overstated – plant growth is greatly increased in the presence of these fungi, and some plants cannot grow without their fungal partner. Mycorrhizal fungi are considered to be *the* keystone of coastal Douglas-fir forests.

Why are they important?

Although old-growth Douglas-fir forests are important for many practical reasons, the most important reason is that they are an essential part of the unique biodiversity of British Columbia. The intrinsic value of a naturally diverse environment is well recognized, and protecting these forests will help maintain the habitats of many plant and animal species.

Douglas-fir forests are home to many fascinating animals, some of whom have a close, though not exclusive, relationship with Douglas-fir trees. Red Squirrels harvest huge numbers of Douglas-fir cones and store them for the winter.

They also often nest on large Douglas-fir branches or in cavities created by woodpeckers. Spaces behind the bark of large, dead and decaying Douglas-fir trees provide safe roosting places for many of the 10 species of bats in the region, while

One study of the forest canopy found approximately 400 insect species that are exclusive to coastal old-growth Douglas-fir forests.

woodpecker cavities are sometimes used as bat nurseries. Many birds, including some owls and chickadees and two species of swallows, also use woodpecker cavities for nest sites. Mature Douglas-firs are particularly important for Bald Eagles as they need large trees to support

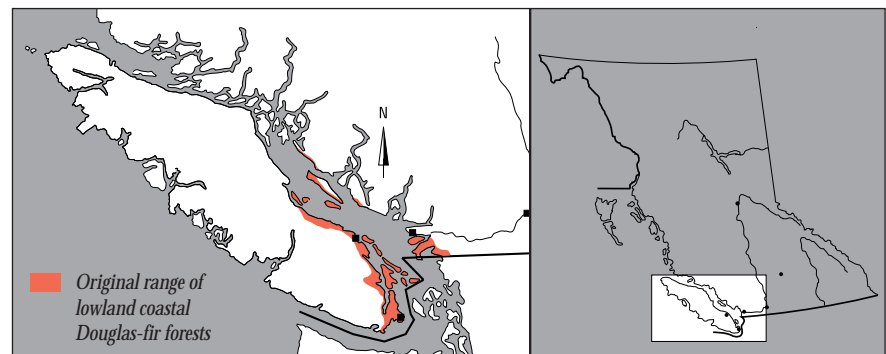
their massive nests, which can weigh up to one tonne! At the smaller end of the animal scale, numerous species of insects live high in the canopy of old-growth Douglas-fir forests. One study of the forest canopy found approximately 400 insect species, about 100 of which are exclusive to coastal old-growth Douglas-fir forests. Remarkably, about 50 of these were previously unknown to science.

Two provincially rare plant species and 10 provincially rare vertebrate animal species live in old-growth coastal Douglas-fir forests. These rare species include the rough-leaved aster, the

Marbled Murrelet and the Sharptail Snake. The Marbled Murrelet is a small seabird that nests on the very wide and mossy branches of centuries-old trees, making it dependent on old-growth for its survival. Abundant large woody debris such as fallen tree trunks, a feature of old-growth forests, is required as shelter for the Sharptail Snake. Although not much is known about the status of other inhabitants of these forests – invertebrates, lichens and fungi – it is likely that some species in these groups are also rare. Preserving a continuous network of old-growth coastal Douglas-fir forests will help prevent the extinction of these species and provide movement corridors for the animals and plants that may have to colonize new areas to survive future climatic changes.

One very common species that benefits enormously from old-growth coastal Douglas-fir forests is *Homo sapiens*. In this densely populated and, hence, polluted area, forests do us great service in filtering contaminants out of the air every day.

The material and economic benefits of healthy, natural ecosystems must also be taken into account. At a very basic level, these forests provide the necessities of life: food, both plant and animal; medicinal plants; materials for shelter; and, of course, clean air and water. All of these can be taken without harming the forest. When European settlers arrived on Vancouver Island they encountered large populations of humans who had flourished here for thousands of



years without depleting the forests that supported them.

There are opportunities for economic development in “wildcrafting:” harvesting forest products such as edible mushrooms or herbs without damaging the integrity of the forest.

Natural forests can also provide nurseries with stock for the propagation of native plants, a new and expanding industry in this province. Another benefit of preserving natural ecosystems is the preservation of traditional medicinal herbs, which are currently being invest-

igated with the aim of developing new drugs.

Natural forests are crucial for scientific research into topics such as wildlife management and forestry. They are the “benchmarks” by which environmental management practices can be judged. They are also the reference point for the exciting new industry of eco-forestry, which strives to harvest high-quality wood without damaging the ecosystems that produce it.

A large industry that could benefit from the protection of old-growth coastal Douglas-fir forests is tourism, especially eco-tourism. Every year, tourists from around the world travel to the west coast of Vancouver Island to see the old-growth rainforests. If we protect the remaining old-growth Douglas-fir forests on the east coast of the Island, their tourism potential could also be developed.

Perhaps most importantly, these forests enrich people’s personal lives. The proof of this is the ever-increasing use of local nature parks. The benefits that people derive from

visiting these parks range from getting fresh air and exercise to enjoying the beauty of plants and animals, to deriving spiritual sustenance from direct contact with Nature. Countless psychologists, biologists, writers and religious scholars have observed

old-growth Douglas-fir forests left on public lands. Support government programs that create incentives for private landowners to protect the forests on their properties. Governments can also protect the few remnants that are on public lands, improve the management of forests within parks and create new parks by buying private lands that support old-growth Douglas-fir forests.

Try to incorporate your newly acquired knowledge into your personal life. One way to do this is to pay attention to

the rules, such as “stay on the trails” and “keep dogs on a leash,” when visiting local parks. These regulations are intended not to diminish the enjoyment of visitors, but to protect the sensitive plants and animals in the parks. You can also get actively involved in protecting natural areas by participating in organized campaigns to rid your local parks of invasive non-native plants such as Scotch broom or Eurasian spurge-laurel.

Another way to make a difference is to landscape your property with native plants, which can save water and provide habitats for wildlife even in an urban setting. You can collect seeds from wild plants (leaving most of the seeds behind for reproduction) or buy native plants from specialty nurseries, but please do not collect live plants from the wild. Joining the provincial government’s Naturescape program is an easy way to get started.

If you are fortunate enough to have some old-growth Douglas-fir forest on your property, you have an opportunity to be an environmental hero and preserve a part of British



THE OLD, FIRE-SCARRED “VETERAN” IS A REMINDER THAT NATURAL WILDFIRES WOULD HAVE KEPT THIS DOUGLAS-FIR SALAL FOREST MORE OPEN IN THE PAST. *Hans Roemer photo*



DELICIOUS SALAL BERRIES ARE THE FAVOURITES OF BOTH HUMANS AND WILDLIFE. *Hans Roemer photo*

and demonstrated the benefits of contact with Nature, and those benefits are priceless.

What can we do?

There is a great deal we can do as individuals to protect old-growth coastal Douglas-fir forests. What you are doing right now is the first step: learning about old-growth coastal Douglas-fir forests and why they need our help. If you live in the region where these forests grow, you can learn more by taking a guided walk in a local park or by teaching yourself how to identify plants and animals. Public libraries, the Internet and the specialized libraries of government agencies and environmental organizations are great sources of information about these forests and related topics. Joining a local naturalist group is another excellent way to learn more about Nature.

Discuss the importance of protecting old-growth coastal Douglas-fir forests with municipal, regional, provincial and federal agencies, and ask for their help. There are not many




ALMOST ALL COASTAL LOWLAND DOUGLAS-FIR FORESTS HAVE BEEN LOGGED AND REPLACED BY YOUNGER FORESTS. *Sensitive Ecosystems Inventory*



IVY IS A MAJOR THREAT TO NATIVE ECOSYSTEMS, MAKING TREES VULNERABLE TO DISEASE AND WINDTHROW, AND SMOTHERING UNDERSTOREY PLANTS. *Hans Roemer photo*

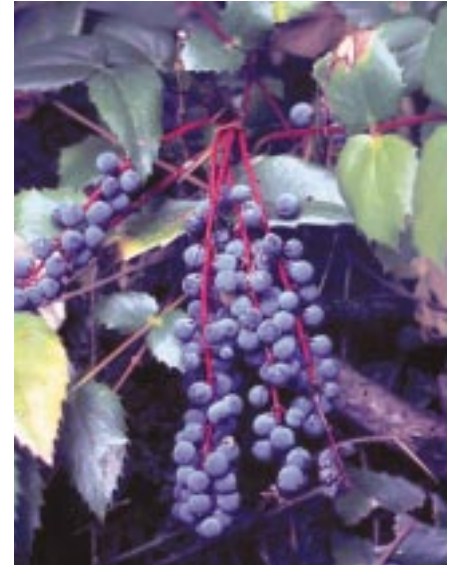
Columbia's natural heritage. Many municipalities are moving toward reducing taxes on private land that is being managed for conservation. Governments and conservation organizations are also exploring other creative ways of protecting private land with less cost to the landowner.

Finally, you can support organizations that are working to protect old-growth coastal Douglas-fir forests by doing research, educating the public, lobbying governments or directly acquiring land for preservation.

We must all take responsibility for the environment around us, and recognize that we do have the power to make a positive difference. Every contribution is needed if we are to protect these magnificent forests! 



MOISTER DOUGLAS-FIR FORESTS MAY HAVE WESTERN REDCEDAR, AND AN UNDERSTOREY DOMINATED BY DULL OREGON-GRAPE. *Hans Roemer photo*



DULL OREGON-GRAPE BERRIES ARE EDIBLE BUT NOT DELECTABLE. *Hans Roemer photo*

FOR INFORMATION ON RARE ECOSYSTEMS & SPECIES, CONTACT:

B.C. Conservation Data Centre
PO Box 9344 Stn Prov Govt
Victoria, BC V9W 9M1
cdcdata@fwhdept.env.gov.bc.ca
www.elp.gov.bc.ca/wld/cdc

FOR INFORMATION ON HABITAT ACQUISITION AND LAND STEWARDSHIP PROGRAMS, CONTACT:

Habitat Conservation Trust Fund
PO Box 9354 Stn Prov Govt
Victoria, BC V8W 9M1
www.elp.gov.bc.ca/hctf

The Nature Trust of B.C.
808-100 Part Royal South
West Vancouver, BC V7T 1A2

FOR INFORMATION ON NATIVE PLANT LANDSCAPING, CONTACT:

Naturescape British Columbia
PO Box 9354 Stn Prov Govt
Victoria, BC V8W 9M1
www.elp.gov.bc.ca/hctf/nature.htm

BROCHURE FUNDING PROVIDED BY
Forest Renewal British Columbia

ISBN 0-7726-7662-3
MELP 241536.0399
MARCH 1999

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