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PACIFIC RIM  
NATIONAL PARK RESERVE OF CANADA

# The Shorepine Bog Trail



# The Bog within the Temperate Rainforest

This national park protects a portion of temperate rainforest as an example of Canada's Pacific Coast Mountain Region. The temperate rainforest is a mosaic of different forest habitats. The shorepine bog is one forest type you will find here.

Have you spotted a bog while driving along the highway in the national park? Numerous small bogs make up about five percent of the Long Beach Unit of the national park. Canada has more bog land than any other country; those adjacent to Hudson's Bay are several times larger than Vancouver Island!

## The Bog: Myths and Reality

The word "bog" brings to mind a smelly, uninviting quagmire swarming with hungry mosquitoes. A walk along this trail will easily dispel such myths and instead reveal bogs as fascinating places to explore.

Bogs are found in cool, moist regions once covered by glaciers. They are characterized by poor drainage, acidic soils and a thick build up of sphagnum (pronounced sfag-num) moss, a multi-coloured carpet that forms the bog surface. Although a bog is soggy, the wetness is not odorous. The sphagnum moss converts rainwater into an acid, discouraging mosquitoes from breeding here. But that's not all the acidic waters do! Unravel the mysteries of the bog as you walk, read and explore this trail.

## For Your Interest

- The boardwalk trail rests upon the bog surface, no supporting posts were driven into the sphagnum.
- Numbered stops along the trail are keyed to this booklet.
- Many people will stroll this 800 m boardwalk loop in about 20 to 30 minutes.

## A Word about Conservation

In this delicate environment, five minutes of carelessness can undo 25 years of bog development. Please stay on the boardwalk, refrain from picking flowers or ripping up the sphagnum moss, and keep pets on a leash and children close at hand.

# 1. The Gigantic Broccoli Forest

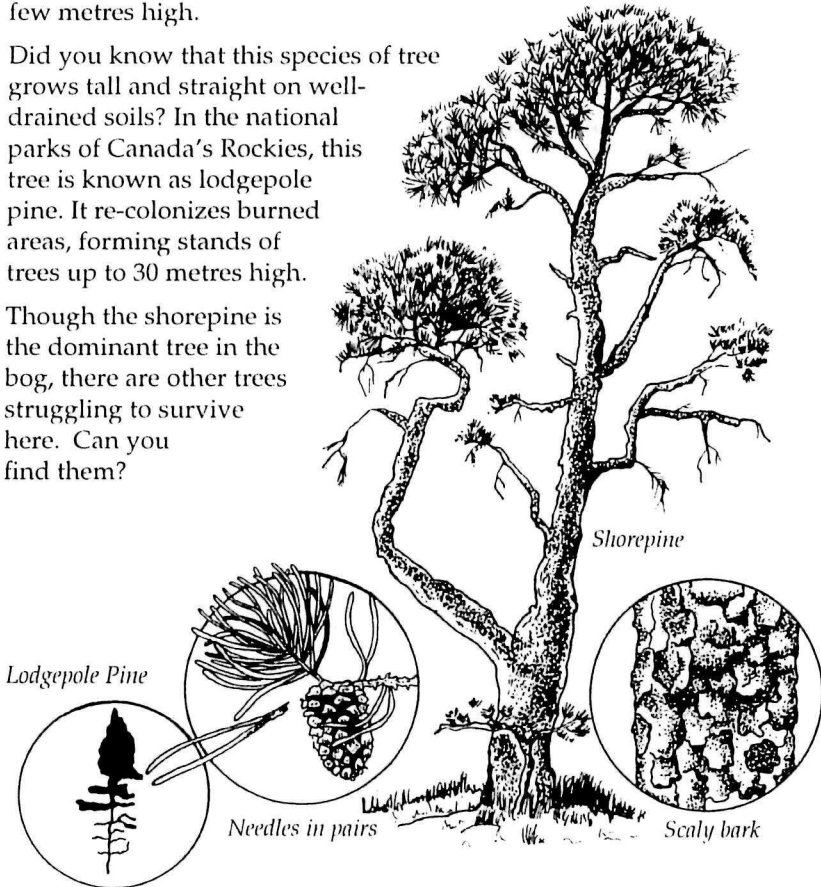
What a strange forest! Stunted, gnarled trees rise from soggy ground with twisted limbs pointing skyward. What bizarre force has been at work in the bog?

Trees, deprived of adequate nutrition, may suffer stunted growth and malformed limbs. Shorepine (*Pinus contorta*) roots struggle to absorb the few nutrients and minerals available in the acidic, waterlogged soil. It is thought that a lack of the mineral phosphorous inhibits upward growth of the tree-tip, causing it to branch sideways—a kind of chemical pruning. The resulting tree often resembles a gigantic broccoli.

In West Coast terms, the shorepine hardly ranks as a tree, yet one has to admire its tenacity. Slow to grow, slow to die, some of these trees are more than 300 years old but remain only a few metres high.

Did you know that this species of tree grows tall and straight on well-drained soils? In the national parks of Canada's Rockies, this tree is known as lodgepole pine. It re-colonizes burned areas, forming stands of trees up to 30 metres high.

Though the shorepine is the dominant tree in the bog, there are other trees struggling to survive here. Can you find them?



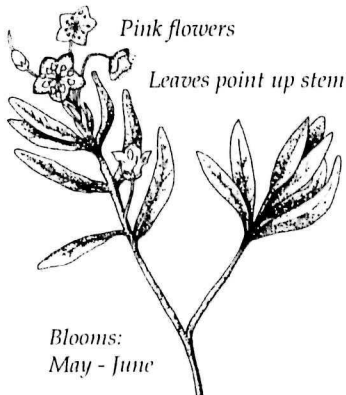
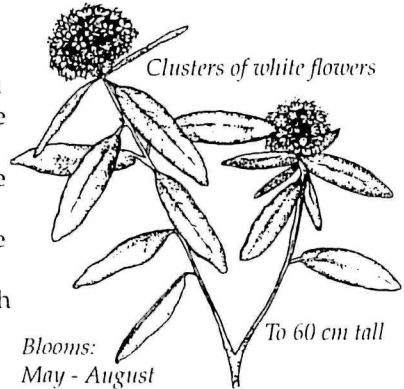
## 2. Dwarf shrubs

These three shrubs are members of the heather family, a group that also includes blueberries, salal and rhododendrons.

### LABRADOR TEA

(*Ledum groenlandicum*)

Labrador tea is often mistaken for a small rhododendron. The leaves are dull green above and covered with a rust-colored fuzz underneath. The first explorers found the local First Nations were making a tea from the dried and crushed leaves. They in turn began to mix Labrador tea with their own limited supplies of tea.



### BOG LAUREL

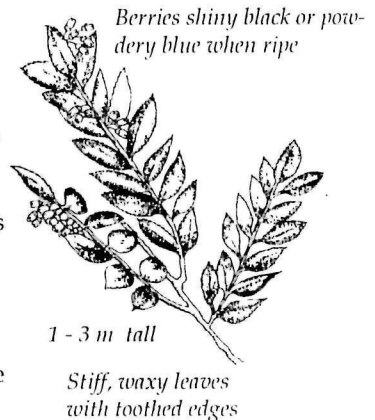
(*Kalmia polifolia*)

Unlike the white blossoms of Labrador tea, the pink bog laurel flowers will not last all summer. Each cup-shaped bloom contains 10 filaments which spring outward to dust intruding insects with pollen. They also contain a strong poison which can be fatal to grazing animals.

### EVERGREEN HUCKLEBERRY

(*Vaccinium ovatum*)

You may have seen branches of this shrub in commercial floral arrangements. The shiny leaves of this plant can be green, red, or even purple. The dark berries ripen in late summer or early fall. Historically they provided the Nuu-chah-nulth First Nations of this area with fruit long after most other berries had disappeared for the season. Here in the bog, this shrub is restricted to a foothold on old stumps and fallen trees but watch for more robust specimens in the muskeg forest ahead.





To 30 cm tall

Short, "fat" needles

## CROWBERRY

(*Empetrum nigrum*)

Crowberry prefers the drier conditions of small mounds or hummocks. Resembling tiny fir-needles, its leaves remain on the wiry stems throughout the year. The First Nations of British Columbia ate them fresh but in small quantities.

## YELLOW CEDAR

(*Chamaecyparis nootkatensis*)

Like western redcedar, it has scale-like leaves or foliage, but its foliage "weeps" from upswept branches and often develops a flat crown. This is no ordinary shrub, but a tree doing so poorly that it attains a height of only one metre in a century. What do you think might cause this?



## Location is Everything

It's tough living in a bog! Just ask the shrubs, which like the shorepine, are found beside the boardwalk.

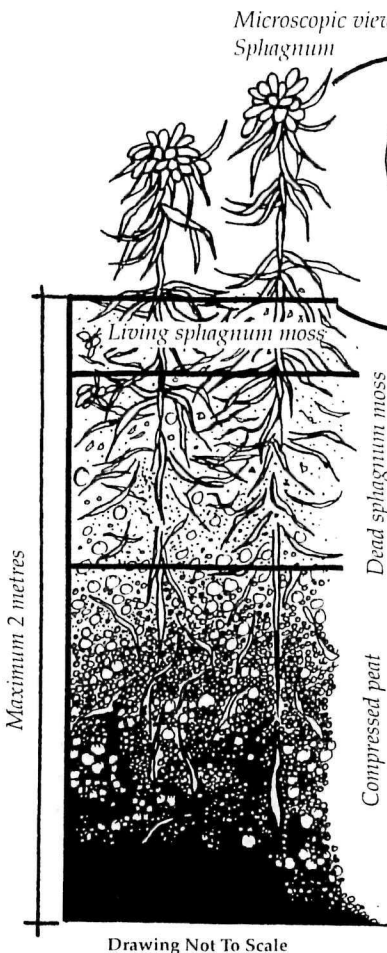
Many of these plants also grow in the snowy sub-alpine, another harsh environment. In this flat region, the wetness of the bog comes directly from precipitation (mostly rain and fog) rather than from inflowing streams. Raindrops contain few nutrients (minerals and organic material) and the organic material that is in the bog is not readily available to the plants. Read on to find out why.

### 3. A Slice of the Bog

The soft carpet of green, red, and brown sphagnum moss plays a key role in the bog story. The carpet may be one to two metres thick and close to 400 years old at the bottom. In other forests, dead material is incorporated into soil by bacteria and fungi. However, sphagnum releases organic acids (such as brown-coloured tannic acid) which inhibit bacteria. Without bacteria the dead plants do not break down so their nutrients do not become available to future generations of plants. The environment becomes nutrient deficient.

The intact dead moss gradually builds. The living sphagnum surface gradually rises up on the remains of previous generations. As the older layers die they accumulate and

compress, forming peat.



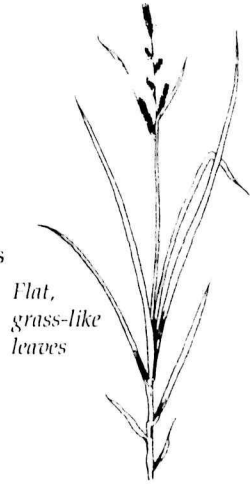
A look at sphagnum under the microscope reveals why the bog is so spongy. A network of large and small cells gives the plant a water-holding capacity of 16 to 18 times its weight, more than twice the absorbency

of cotton. This characteristic allows sphagnum to draw the water table up as it grows. The water-holding capacity and its resistance to bacteria growth make it a useful material. In World War I, sphagnum was substituted for cotton as a surgical dressing.

Imagine the surprise of two peat diggers when they discovered a man's body near the bottom of a bog in Denmark. The body was later determined by scientists to be 2,000 years old! The body and even a leather cap and belt were well preserved in the dark brown acidic water due to the absence of oxygen and bacteria.

## SEDGE (*Carex*)

Plants poking through the mossy carpet must be acid-tolerant. Most of the plants that resemble grasses are in fact, sedges; the half dozen or so species distribute themselves at different elevations on the undulating sphagnum carpet. Sedge roots penetrate deep into the peat and circulate the sparse nutrients up through the bog layers. When sedges die, they too become part of the peat layer. Fine baskets are still woven by local First Nations using some of the sedges found in bogs. Before the weaving is started, the sedges are often dyed.



Flat,  
grass-like  
leaves

## SKUNK CABBAGE

(*Lysichiton americanum*)

Harbinger of spring, skunk cabbage displays its yellow “torch” in March and April. The yellow hood shrouding the flowering spike conserves warmth generated by the plant’s tissues. This heat dissipates a distinctive odour, which attracts pollinating insects and has led to its common name. As the flower disappears, the large broad leaves develop. Can you see pockets in the sphagnum carpet where the skunk cabbage leaves have shaded and killed the moss?



Leaves 60 - 100 cm long

Flowers: March - May

## BOG DANDELION

(*Apargidium boreale*)

From May through August, the yellow blossoms of this plant dominate the bog. Although it resembles the lawn dandelion, the two are only distantly related. Bog dandelion is native to bogs of the Pacific Northwest, whereas the common dandelion has wide distribution in drier environments disturbed by human activities.



Inconspicuous  
leaves

# 4. The Bog Story

Now you have arrived at the heart of the bog. Looking at the stunted gnarled trees, it's hard to believe a full-sized forest once grew here. To understand the origins of the bog story it's necessary to go back 20,000 years.

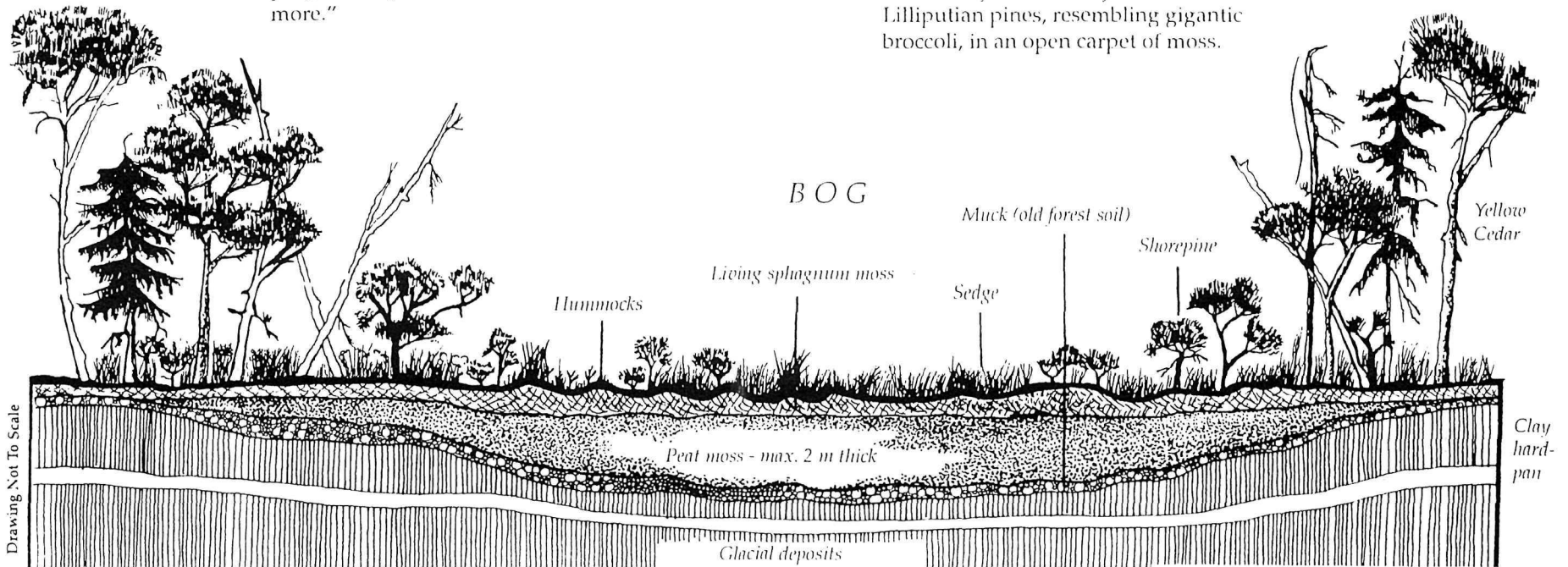
## The Ice

The Long Beach area was then covered with a sheet of ice 300 m thick. About 12,000 years ago the glaciers began to melt.

## The Forest

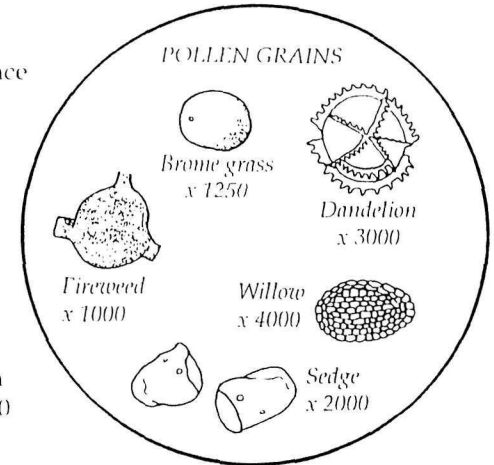
As the ice retreated, it left behind huge quantities of clay, sand and gravel. Hardy pioneer plants such as moss, sedge and willow managed to colonize this sterile surface. Eventually trees took root when an organic soil developed. The most common tree along the edge of the ocean 9,000 years ago was Sitka spruce, much the same as today. Over time, minerals and decaying matter from the forest combined with clay particles to form a "hard pan" or cemented layer that impeded water drainage. Rainwater collecting in slight depressions on that "hard pan" progressively saturated the soil even more."

MUSKEG FOREST



## The Living Museum

How do we know a forest once covered this area? Scientists who probed the layers of sphagnum for tiny pollen grains preserved by the sterile conditions, pieced together the history of the bog. For example, they discovered that this bog developed only 400 years ago, whereas some in eastern Canada may be at least 10,000 years old.



## Under The Microscope

## The Bog

About 400 years ago sphagnum moss invaded this area. The original forest gradually succumbed to the moss and the rising water table. Acidity increased and eventually rainwater became the only source of nutrients. The rest of the story lies before you – a forest of Lilliputian pines, resembling gigantic broccoli, in an open carpet of moss.

MUSKEG FOREST



## 5. Bog Miniatures

On the open bog, things appear to have shrunk and we may feel disproportionately large. Plants that grow as trees or shrubs in the fringing forests are mere dwarves on the open bog. Sweet gale, less than 30 cm tall here, grows several times that height around lake shores. Kneel on the boardwalk and search the sphagnum mat for other bog miniatures.

**SUNDEW** (*Drosera rotundifolia*) are visible June through August. The glistening but sticky droplets on the leaves of this carnivorous plant are a fatal lure to flies, mosquitoes and ants. As the victim struggles, more and more droplets snare the prey. The leaf curls slowly around the insect, trapping it, while the plant secretes enzymes that digest the animal tissue. This adaptation provides the sundew with a source of nitrogen in a nutrient poor environment.

### **BOG CRANBERRY** (*Vaccinium oxycoccos*)

The over-sized berries on this tiny creeper stay hard and green throughout the summer, then soften and turn red after the first frost. The Nuu-chah-nulth First Nations picked the green berries and stored them raw in damp moss or steam-cooked them until red and soft.

### **SWEET GALE** (*Myrica gale*)

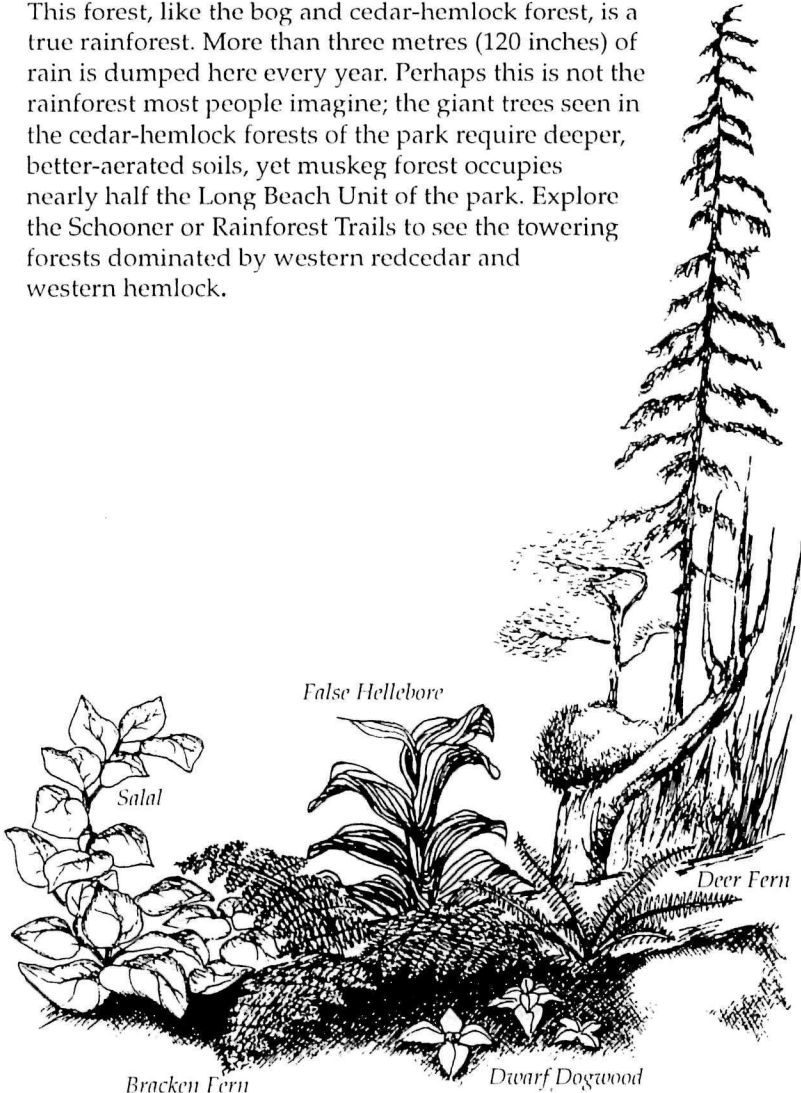
The leaves of sweet gale are covered by a fragrant yellow wax, which releases its scent when lightly brushed. The word Myrica comes from the Greek Myrike, "to perfume". Instead of flowers, this plant bears catkins ("pussy willows") in the spring.



# 6. Muskeg Forest

A few short steps bring us from open bog to muskeg forest. What a difference! While few plants are able to cope with the harshness of bog life, here the number of species explode in a profusion of growth. Since this ground is slightly higher than the bog, rainwater drains away, soil accumulates, and bacteria and fungi flourish.

This forest, like the bog and cedar-hemlock forest, is a true rainforest. More than three metres (120 inches) of rain is dumped here every year. Perhaps this is not the rainforest most people imagine; the giant trees seen in the cedar-hemlock forests of the park require deeper, better-aerated soils, yet muskeg forest occupies nearly half the Long Beach Unit of the park. Explore the Schooner or Rainforest Trails to see the towering forests dominated by western redcedar and western hemlock.



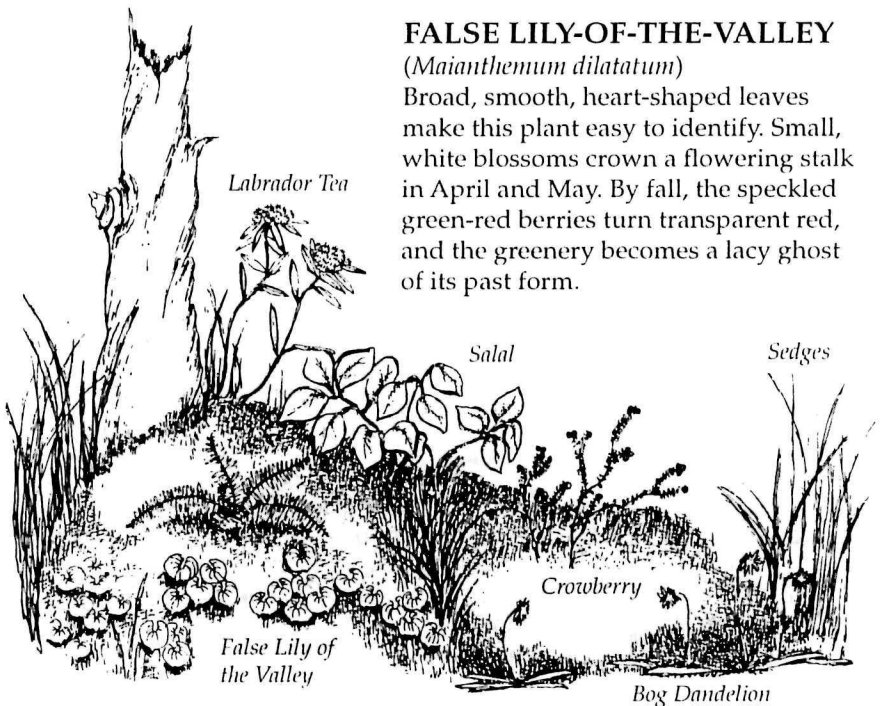
## 7. Hummocks

Looking like islands in a sea of bog, hummocks form when sphagnum moss piles up around the base of a tree or stump. Here, uplifted from their sodden surroundings, a variety of plants flourish. Forest species, such as salal and dwarf dogwood, for example, are able to take root in these slightly drier areas.

Compare plants growing on these hummocks with those of the surrounding bog. Notice that even the mosses are different. By carefully observing how and where plants grow, it's possible to learn a lot about bogs.

With time, each hummock will slowly build up, then eventually collapse. If this bog could be filmed over the years, and the film viewed at high speed, a heaving, rippling sea of moss would be observed.

Please remain on the boardwalk; it takes years for a disturbed bog to re-establish its plant life.



## 9. Where are all the animals?

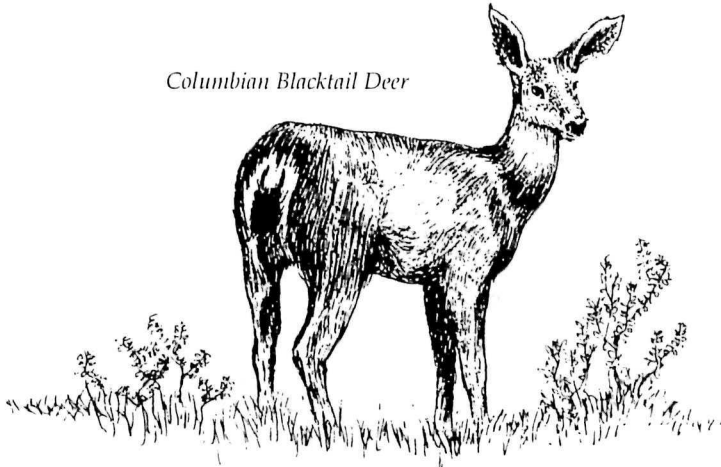
Steller's  
Jay



American robins (*Turdus migratorius*) and Steller's jays (*Cyanocitta stelleri*) are two of the few living creatures that can live on the open bog where there's little food or cover. However, deer, cougars, wolves and bears use the bog as a corridor to feeding areas in the surrounding forest. Please keep pets and children close at hand. Examine the sphagnum carpet; you may be able to find signs of their presence.

Can you spot the narrow, muddy trails in the moss? Sometimes a footprint or scat (feces) can be found. Columbia blacktailed deer (*Odocoileus hemionus columbianus*) will stop and graze on some of the sedges, shrubs or tree shoots. Although Labrador tea and bog laurels contain distasteful toxins, others such as sweet gale are more appealing. In spring, black bears (*Ursus americanus*) consume skunk cabbage, then forage for sedges or berries during summer.

Columbian Blacktail Deer



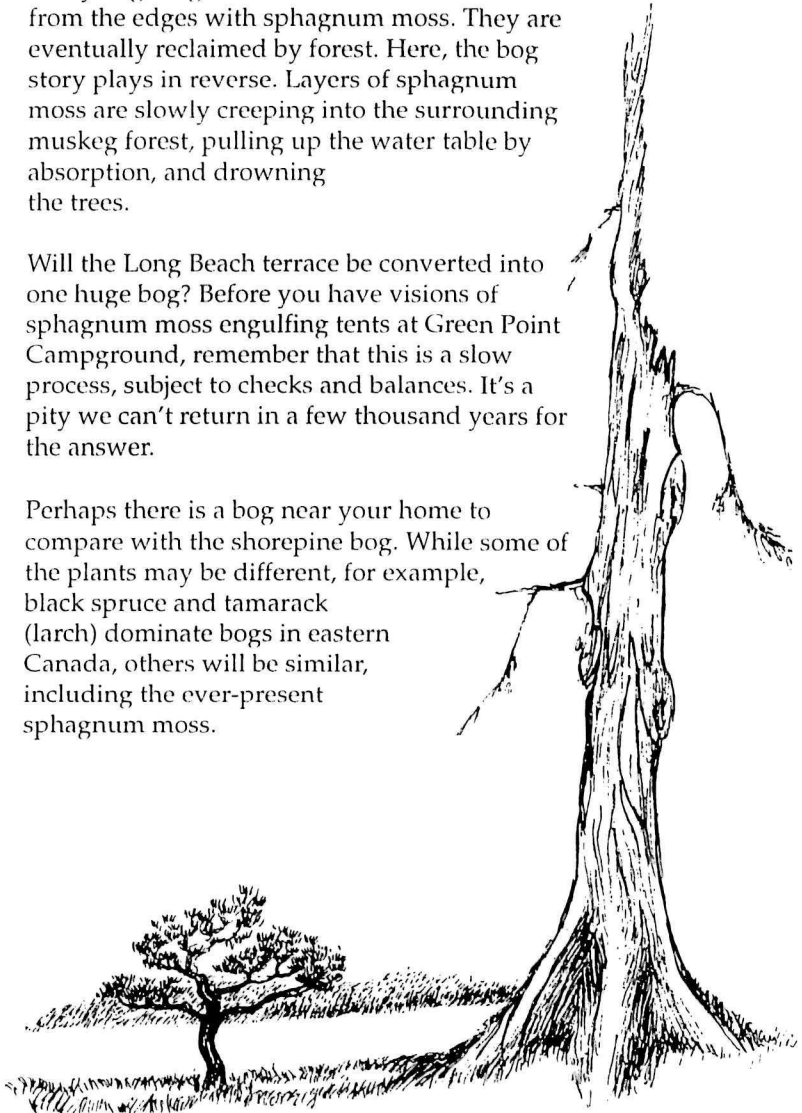
## 10. The Advancing Bog

At the bog margins, numerous dying trees and old snags suggest that life here isn't what it used to be.

Many bogs begin when shallow lakes fill in from the edges with sphagnum moss. They are eventually reclaimed by forest. Here, the bog story plays in reverse. Layers of sphagnum moss are slowly creeping into the surrounding muskeg forest, pulling up the water table by absorption, and drowning the trees.

Will the Long Beach terrace be converted into one huge bog? Before you have visions of sphagnum moss engulfing tents at Green Point Campground, remember that this is a slow process, subject to checks and balances. It's a pity we can't return in a few thousand years for the answer.

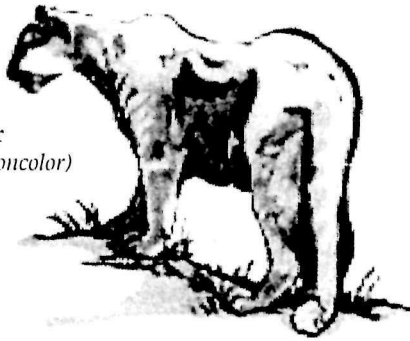
Perhaps there is a bog near your home to compare with the shorepine bog. While some of the plants may be different, for example, black spruce and tamarack (larch) dominate bogs in eastern Canada, others will be similar, including the ever-present sphagnum moss.



Pacific Rim National Park Reserve of Canada conserves an example of Canada's Pacific Coast Mountain Region. The temperate rainforests of this region are a patchwork of forest types that make up one component of Canada's diversity. Another forest type to explore in this region is:

**Rainforest Trail** – 3.5 km south of Green Point Campground on Highway 4. Two separate trail loops, each one kilometre long, penetrate an example of the region's climax rainforest. Large western redcedar, western hemlock and amabilis fir can be seen. Multiple flights of stairs make this trail unsuitable for wheelchairs.

**Cougar**  
(*Puma concolor*)



### Living With Wildlife

- Keep your children close to you, and pets leashed for their own safety.
- If you encounter a predator, pick up small children. Face the animal and retreat slowly. **Do not run or play dead.**
- If attacked: shout, wave a stick, or throw rocks.
- Never leave food or garbage unattended - it attracts wildlife.

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*We hope that you have enjoyed your journey through the bog. If you do not wish to keep this pamphlet, please return it to the box at the trailhead for others to use.*

1. The Shorepine Bog Trail.  
R63-293/2003E  
0-662-34148-1  
2008 edition