

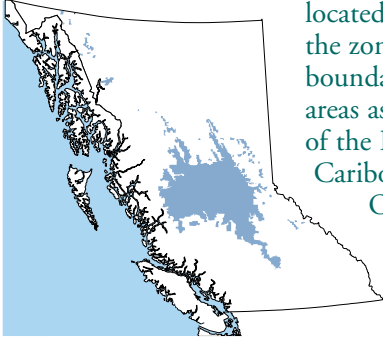
The Ecology of the Sub-Boreal Spruce Zone

The Sub-Boreal Spruce Zone satisfies a familiar image of interior British Columbia as a place of cold winters and warm summers, deep snow cover and dense forests, varied wildlife, and clear lakes and rivers. Outdoor activities such as fishing, hunting, and cross-country skiing flourish here, alongside lowland cattle ranching and intensive logging in upland areas.



Location

The Sub-Boreal Spruce Zone occupies the gently rolling terrain of BC's vast interior plateau. Like a huge, tentacled ink blot, the zone spreads out across the highlands of the Nechako and Quesnel plateaus and the Fraser Basin, sending long, forested fingers into the valley bottoms of mountainous areas to the north, east, and west. With Vanderhoof and Prince George



located close to its centre, the zone's irregular boundaries take in such areas as the lower slopes of the Rocky and Caribou Mountains;

Ootsa and Eutsuk lakes on the west; Quesnel, Horsefly, Machete

Lake, and Lac des Roches in the south; and Babine, Takla, and Williston lakes in the north. The area contains several major rivers, including the Skeena, Bulkley, Fraser, Babine, and Nechako and numerous large lakes, including Stuart, Francois, Burns, Trembleur, and the Nation Lakes.



Climate

Because of its northern interior location, the Sub-Boreal Spruce Zone has a continental climate with characteristic extremes of temperature. Summers are short but warm and moist, with daytime temperatures that occasionally reach into the 30s. Winters can be severe, with extended periods below -10°C and extremes that can reach -40°C or colder. Though drier than the coast, the Sub-Boreal Spruce Zone is wetter than areas such as Williams Lake to the south. Most of the zone is under snow for four to five months, from November to March. In summer, frequent thunderstorms sweep through the area, creating a fire hazard which is somewhat moderated by the moist climate.

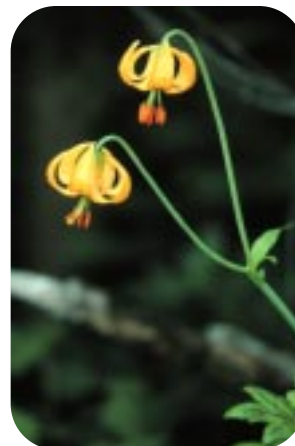


Ecosystems

Seen from an air-plane, the terrain in the Sub-Boreal Spruce Zone appears as a vast, rolling landscape covered with dense coniferous forests. The upland forests of the Sub-Boreal Spruce Zone contain a distinctive combination of tree species. Here, the dominant coniferous species are hybrid white spruce, sub-alpine fir, and occasionally, black spruce, along with lodgepole pine, a pioneer species in the drier parts of the zone. Douglas-fir also occurs on dry, warm, rich sites. Together with the moist climate, deep snows, and heavier precipitation, this combination of species results in a highly productive forest with a distinctive understorey that includes abundant lilies, ferns, blueberries, and Devil's club.



Bunchberry
Cornus canadensis
Robert Norton



Tiger lily
Lilium columbianum
Lloyd Sutton

A hybrid of Engelmann spruce and white spruce, hybrid white spruce is a particularly productive species because it combines the straight, clean-growing habit of the white spruce with the hardier qualities of the Engelmann spruce. Because of frequent fires and disturbance from logging, many forests in this zone are of developing forests of mixed ages.



Trembling aspen, which regenerates primarily from underground roots, is a common pioneer deciduous species on moist to dry upland sites. Paper birch is another pioneer species on moist, rich sites. Forests of black cottonwood with small numbers of spruce occur occasionally on active floodplains of major streams and rivers.

On moist, moderately well-drained sites, the shrub layer includes black huckleberry, thimbleberry, high-bush-cranberry, and Sitka alder under spruce and sub-alpine fir forests. Spruce and fir also appear as shrubs under lodgepole pine. Black huckleberry, velvet-leaved blueberry, and kinnikinnick

frequent many drier sites under lodgepole pine. Black gooseberry, black twinberry, bunchberry, thimbleberry, Devil's club, oak fern, and Queen's cup are among the shrubs and herbs that occur in wetter areas, usually under a canopy of spruce and sub-alpine fir.



Oak fern
Gymnocarpium dryopteris



Black twinberry
Lonicera involucrata



Wild rose and aspen stand



Queen's cup
Clintonia uniflora

Fire and Forest Succession

Fire is an important aid to natural regeneration of the forest. When fires break out, usually as a result of a lightning strike, they trigger a process of forest succession. If the fire is not too severe, deciduous trees can sprout from underground roots (aspen) or the base of the trunk (birch), or from seeds that survive in the soil.

Depending on seeds in the area, the first plants to grow back are often herbs such as fireweed and shrubs such as willows and thimbleberry. Deciduous trees may dominate the region for a long time, but conifers eventually overtake them. The frequent fires in upland forests leave irregular patches that grow back at different rates, creating a mosaic of forests of various types and ages.



Thimbleberry
Rubus parviflorus



In some places, a pioneer species such as lodgepole pine may reseed and dominate an area directly after a fire, bypassing the deciduous stage.

Lodgepole pine is particularly adapted to survive in a fire zone.

When fires sweep through the forest, the heat causes the pine cones to open, making it possible for the seeds to drop on the forest floor. Under the right nutrient and moisture conditions, the pine seeds sprout, and this begins the process of succession that leads ultimately to a mature forest.



Hybrid white spruce, aspen, and fireweed

Wetlands

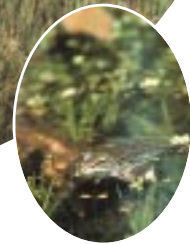
The flat plateaus in this zone are dotted with a variety of glacial meltwater channels, kettle depressions, river oxbows, and lakes that harbour wetland ecosystems. Wetland ecosystems include marshes, fens, and swamps.

In the Sub-Boreal Spruce Zone, fens are the most common type of wetland ecosystem. Vegetation is made up of sedges, scrub birch, and willows, with hybrid white spruce and black spruce on treed sites. In a few fens and swamps of the Nechako, Chilako, and Blackwater drainages, there are rare stands of tamarack. Occasionally, in the colder parts of the zone, there are patterned fens with a fascinating “rib-pool” topography. A good example is the Blackwater Fen adjacent to Williston reservoir. Forested black spruce bogs (and less commonly lodgepole pine) occur in association with fens in places where the peat surface rises above the water table. These sites have the classic bog community of acid-tolerant plants such as Labrador tea, bog cranberry, bog laurel, and peat mosses.

Because the rivers and streams that drain this landscape have a low gradient, floodplains are another common feature. Around small creeks, beaver dams create dynamic wetland complexes of shallow water, sedge marsh, and willow swamp which are exceptionally important for wildlife. Marshes occur around lakes and streams, usually with horsetails and sedges, but also with stands of cattail, bulrush, and spikerush in the warmer parts of the zone.



MOF



Spotted frog
Rana pretiosa
Bill Swan

Swamps with trees and tall shrubs occur mostly along stream courses or the edges of lakes. Reedgrass and horsetails are common, along with interior spruce and shrubs such as tall Bebb’s, MacKenzie’s, or Barclay’s willows.

Wetlands provide excellent breeding and feeding environments for mosquitoes. Throughout history, visitors to this region have complained bitterly about the number of mosquitoes and their aggressive habits. British Columbia is home to approximately 50 different species of mosquito. Many of these species are specifically adapted to a particular wetland environment such as ponds or the shallow, still-water pools formed by melting snow.



Tom Gore



MOF

Oxbows on Peter Alec Creek, south of Houston

Wildlife

Abundant forage, dense forests on gently rolling hills, and numerous small wetlands provide habitat for a range of cold-hardy wildlife in the Sub-Boreal Spruce Zone. Moose — the most common large ungulate — are well adapted to survive the zone's severe winters. With their long legs, they can move around easily in deep snow, and their large bodies are efficient at making and conserving heat. In fact, the Sub-Boreal Spruce Zone is home to a greater concentration of moose than anywhere else in the province. Smaller mammals survive



Moose
Alces alces
Ken Bowen

the cold winter and deep snow by building burrows under the snow pack. Others, like the snowshoe hare, get around by travelling on top of the snow. Mature coniferous forests in this zone provide shelter and prey for predators such as gray wolves, fisher, ermine, and marten, which are particularly abundant in this zone.

The seeds and foliage of mature coniferous forests provide food for birds such as the Pine Siskin, Pine Grosbeak, and Golden-

crowned Kinglet. The Pine Siskin, Magnolia Warbler, and Yellow-rumped Warbler also prefer them for nesting sites. Although most birds in this zone migrate in winter, a few, such as the Pine Grosbeak and Red Crossbill, remain year-round, along with the predatory Great Gray Owl and Great Horned Owl.



Barrow's Goldeneye
Bucephala islandica
Ken Bowen

The many wetlands in this zone support a wide variety of waterfowl and are the most important breeding centre in the world for Barrow's Goldeneye. Lakes, streams, rivers, floodplains, and wetland areas such as swamps also provide abundant wildlife habitat. Moose forage on aquatic vegetation in shallow lakes and swamps and on the early successional shrubs of active floodplains. Grizzly bears thrive on roots, shoots, and small mammals in a variety of wetland and riparian habitats.



Marten
Martes americana
Mark Nyhof

Resources

Since the 1970s, forest harvesting has become the primary resource in the Sub-Boreal Spruce Zone, which abounds in large tracts of mature, productive forests. The presence of a variety of wildlife, particularly fur-bearing animals, make hunting and trapping significant resources, in addition to logging.

Agricultural activity in the zone is limited both by the cold climate and the terrain, which is often either hilly, stony, or poorly drained. A few dairy and cattle operations find forage at lower elevations along the major rivers, and cereal and grain crops also grow on more propitious, warmer sites.



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Agricultural lands in the Bulkley Valley, north of Smithers. MOF

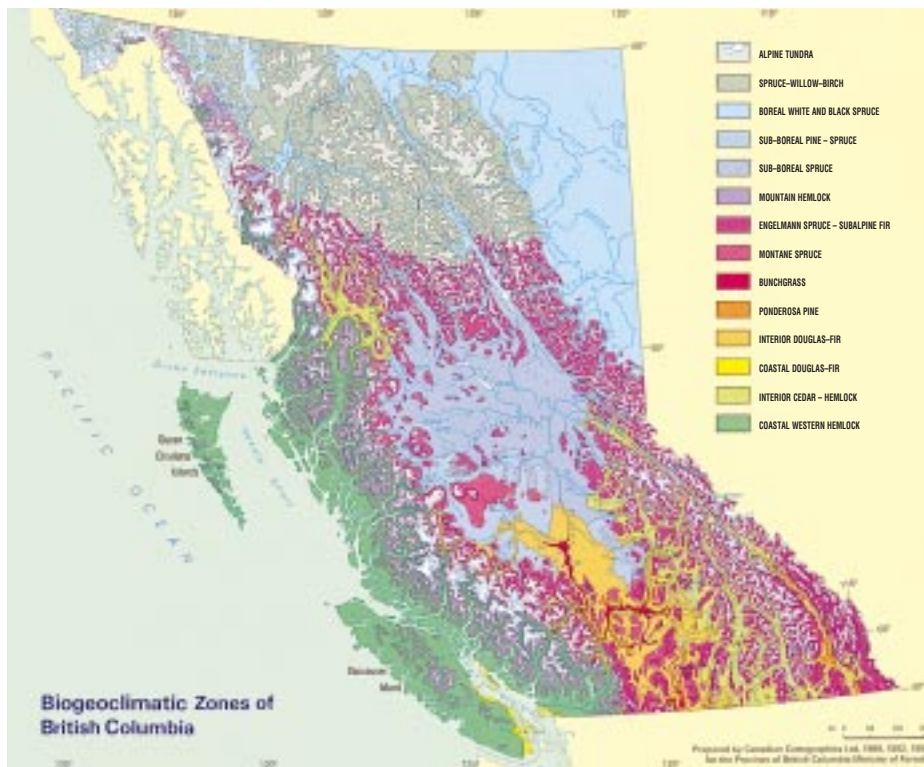
For people who enjoy outdoor recreational activities, the Sub-Boreal Spruce Zone offers unique opportunities. Large natural lakes occur along the upper reaches of many rivers that have never been dammed. Nowhere else in the world has an intact river system of this size.

Because of its large lakes and rivers rich with rainbow trout, steelhead, and salmon; its snowy, hilly

terrain; and its abundant cover for wildlife, this zone is prime country for fishing, camping, hunting, cross-country skiing, and snowmobiling.



Ken Bowen



The Sub-Boreal Spruce Zone is one of 14 biogeoclimatic or ecological zones within British Columbia. These zones are large geographic areas that share a similar climate within the province. Brochures in this series explore each zone.



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