

The Ecology of the Spruce- Willow-Birch Zone

In the Spruce-Willow-Birch Zone, conditions are harsh, with bitterly cold, snowy winters and short cool summers. However, the pristine environment, wonderful scenery, and abundant wildlife make the zone ideal for a variety of recreational activities. Although the steep, mountainous terrain is unsuited to human habitation, resident wildlife are well adapted to its winter conditions. Forest cover is sparse and comprised mostly of coniferous species, except on warmer slopes, where trembling aspen often dominates. Other dominant vegetation in the zone includes deciduous shrubs, especially scrub birch and several species of willows and grasses, primarily Altai fescue.

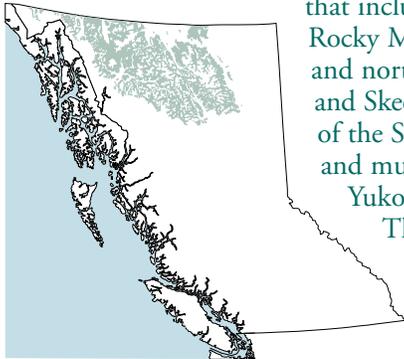


Location

The Spruce–Willow–Birch Zone occupies subalpine elevations in the northern third of the British Columbia interior. It extends north well into the Yukon and the Mackenzie District of the Northwest Territories.

This is a mountainous area that includes the northern Rocky Mountains, the Cassiar and northernmost Omineca and Skeena mountains, part of the St. Elias Mountains, and much of the Stikine, Yukon, and Liard plateaus.

There are no significant settlements in this zone, but several active mining camps are located here.



Climate

The Spruce–Willow–Birch Zone has the harshest climate of all the forested zones in British Columbia, second only to the Alpine Tundra.

Winters here are long and cold, and summers are brief and cool. The mean annual temperature ranges between -0.7°C and -3°C . Average temperatures remain above 10°C for only about a month in most parts of the zone and up to 3 months in some medium-elevation areas such as Muncho Lake in the drier, eastern portion.

Moist Pacific air frequently causes sudden, often violent, local storms during summer. The weather is more settled in winter, but chinook winds sometimes disrupt the cold spells.



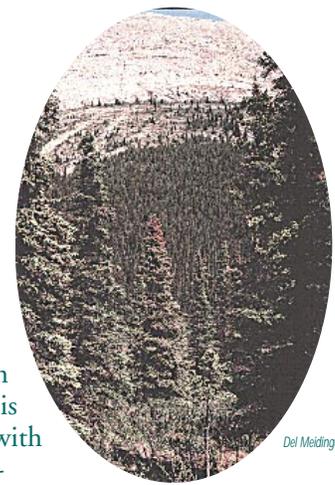
Mountains near Atlin in winter

B. Fuhr

Ecology

At lower elevations, the landscape of the Spruce–Willow–Birch Zone is mostly forested. The trees of old forests are primarily a mixture of white spruce and subalpine fir.

In many of the valleys in this zone, the forest cover is made up of white spruce with variable amounts of lodgepole pine and trembling aspen in the valley bottoms and on lower slopes. Higher on the slopes, subalpine fir dominates the forest. Subalpine fir commonly forms open forest and woodland on steep, moist, cold, middle slopes, especially on northern and eastern exposures, where it often forms nearly pure stands.



Del Meidinger

Old forest of white spruce, subalpine fir, willows and scrub birch



Del Meidinger

Open forests, typical of much of the zone



John Pammler

Prescribed burning to enhance wildlife habitat in the Tuchodi Valley

Black spruce occurs infrequently on nutrient-poor sites at lower elevations.

West of the Rocky Mountains, wildfires have had comparatively low impact in this zone. As a result, extensive seral stands of lodgepole pine are not common here, though they do occur in places such as the upper Jennings and Little Rancheria rivers. From the Rocky Mountains east, large-scale burning to enhance wildlife range has resulted in extensive young aspen stands and grasslands.

Muncho Lake

MoELP

cover photo: Jim Pojar



Balsam poplar is also uncommon throughout most of the zone, but in Alsek-Tatshenshini it is widespread and often forms the timberline. Engelmann spruce, paper birch, and tamarack are absent from the Spruce–Willow–Birch Zone.

Shrub-dominated ecosystems are widespread, ranging from swamps and fens to dry colluvial scrub. On some of the driest, poorest sites, usually rapidly drained outwash deposits, an open woodland of lodgepole pine, scrub birch, and ground lichens occurs. Aspen stands are fairly common on drier sites along the major valleys.

At upper elevations, the landscape of this zone is essentially scrub/parkland that is dominated by fairly tall (1–4 m high) deciduous shrubs. These are primarily scrub birch and willows such as grey-leaved willow, Barclay’s willow, tea-leaved willow, Barratt’s willow, Alaska willow, and woolly willow. In some areas, groves of stunted aspen and balsam poplar occur at the timberline, usually on steep south slopes. It may be that deciduous shrubs dominate in this zone because they grow quickly during the short, intense growing season, then shed their leaves in late summer, thus avoiding the killing autumn frosts.

In some of the high, wide valleys where cold air masses settle, a non-forested mosaic of shrubfields, fens, and dry to moist grassland occupies the valley floor and lowermost slopes. The lower slopes have a skirt of forest, and above the intermediate forested belts, shrubs dominate again. This “double treeline” phenomenon is particularly well developed and striking on the northern plateaus. Some of these valleys also contain permafrost, especially above 1200–1400 m. Elsewhere in the zone, pockets of permafrost occur sporadically, mainly on north slopes.

Wetlands in the Spruce–Willow–Birch Zone are usually the richer types, including white spruce and tall willow swamps, sedge fens, and sedge marshes. Acid, nutrient-poor bogs are uncommon. Although subalpine grasslands occur frequently in this zone, they are usually not extensive.



Scrub birch thickets amid grassy meadows

J. Poyler



F. Boas

Grey-leaved willow
Salix glauca



John Parmentier

Wide valley affected by cold air drainage



Jim Poyler

Altai fescue grassland in foreground, and wetland in valley, Spatzizi Plateau

Wildlife

The climate of the Spruce–Willow–Birch Zone limits the diversity of species in the zone. Although the high-elevation plateaus and valleys provide critical summer range, most species abandon these areas before the onset of winter. Only those animal species that go dormant or are capable of surviving the bitter cold remain in the zone year round.

Winter residents include mountain goats, which can survive the deep snow better than most ungulates because they retreat to steep, rocky winter ranges where snow accumulates less than elsewhere. Stone sheep inhabit areas of steep, south-facing grasslands, especially in areas where less snow falls or the snow blows away. Rocky Mountain elk and mule deer are found only in the Rocky



MoELP

Stone sheep
Ovis dalli stonoi

Mountain foothills and east slopes, where the snowfall is less than in most areas of the zone. Moose and caribou are abundant and widespread. Their best winter range is in the valley bottoms, but, because of deep snow, they often abandon the zone by mid-winter.



Jim Poyler

Moose
Alces alces



Mark Nyhof

Common Raven
Corvus corax



Ken Bowen

Grizzly bear
Ursus arctos

Open stands of lodgepole pine, such as those in the upper reaches of the Turnagain and Jennings rivers, provide important winter range for caribou, which paw or nuzzle through the snow to get at the ground lichens. Hardy birds, such as Common Raven, Gray Jay, and Boreal Chickadee eke out a winter existence by foraging seeds or carion. There are no reptiles in the zone, but a few amphibians—the western toad, wood frog, and spotted frog—survive by burrowing in the mud and hibernating away the winter.

With the coming of spring, the zone explodes with life. Because of the abundance of wildlife in summer, the Spruce–Willow–Birch Zone is often called the “Serengeti of the North.” Mountain goat, sheep, moose, caribou, and elk are all common, along with wolves and bears. Grizzly bear are more abundant than black bear in this zone.

Open coniferous forests are the most common habitat in this zone. Bird life includes Spruce Grouse, Common Raven, Gray Jay, Boreal Chickadee, Red-breasted Nuthatch, Three-toed Woodpecker, Ruby-crowned Kinglet, and Golden-crowned Kinglet. Small mammals include red squirrel, wolverine, and marten.

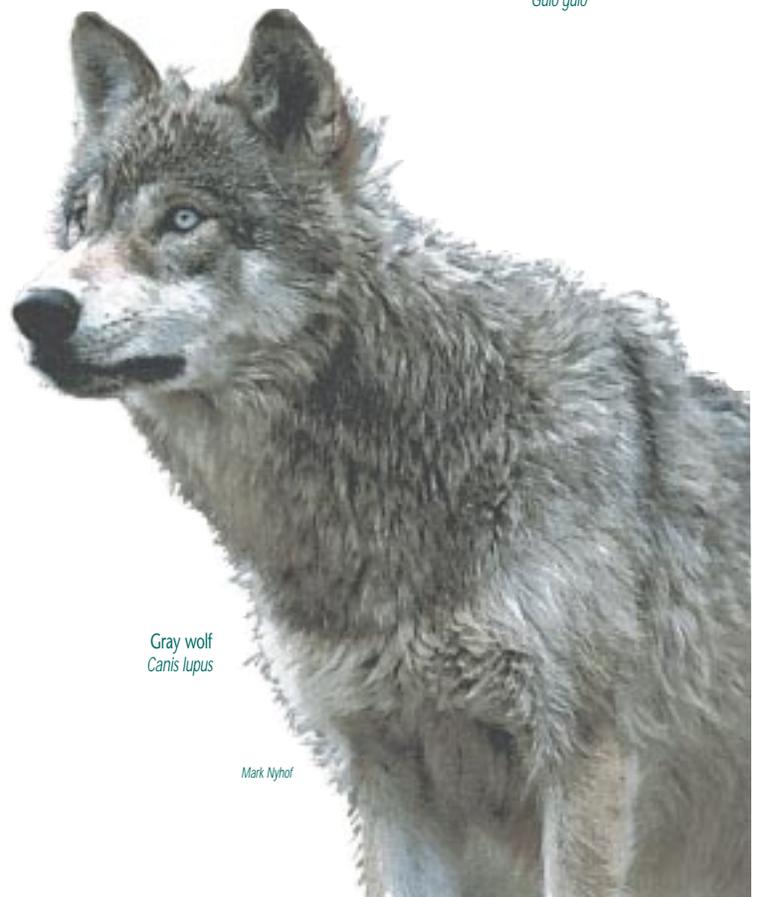
Open, shrubby and grassy valley bottoms are important summer range for moose and caribou. The Willow Ptarmigan, White-tailed Ptarmigan, Gyrfalcon, Wilson’s Warbler, and arctic ground squirrel also inhabit these sites in summer.

Beaver are common in wetlands and shallow lakes, and moose wade through these areas in summer to find aquatic vegetation and escape biting insects. Other representative species that use Spruce–Willow–Birch wetlands include the Northern Harrier, Mallard,



Illustration: Mark Nyhof

Wolverine
Gulo gulo



Gray wolf
Canis lupus

Mark Nyhof



Ken Bowen

Arctic ground squirrel
Spermophilus parryii



Mark Nyhof

Northern Pintail
Anas acuta

Northern Pintail, Bufflehead, Arctic Tern, California Gull, Red-necked Phalarope, Red-throated Loon, Yellow Warbler, and Common Yellow-throat.

South-facing slopes of younger forests and grasslands are very important habitats in the Spruce–Willow–Birch Zone. These areas have shallower snow depths and a warmer local climate and are used in early winter and spring by Stone sheep, Dall sheep, mountain goat, and moose. Other characteristic species include the

Golden Eagle, Gyrfalcon, Common Raven, Blue Grouse, Say’s Phoebe, and arctic ground squirrel.

A wide diversity of species inhabits the extensive young seral stands of this zone, including moose, snowshoe hare, lynx, porcupine, Dark-eyed Junco, American Robin, Wilson’s Warbler, Kestrel, Townsend’s Solitaire, Yellow-rumped Warbler, and Bohemian Waxwing.

Floodplains and riparian habitats are more important for moose, because they produce such good browse. Although these areas are not extensive, they also provide habitat for the Northern Waterthrush, American Redstart, and Ruffed Grouse.

The Muskwa River area has a large population of plains bison, a non-native species that was introduced here in the 1970s.



Ken Bowen

Arctic Tern
Sterna paradisaea



Mark Nyhof

Yellow Warbler
Dendroica petechia



Mark Nyhof

Dall sheep
Ovis dalli dalli

Resources

The Spruce–Willow–Birch Zone has no forest harvesting or agriculture. Most people who live here are guide outfitters who assist people from around the world to hunt big game. Many people from neighbouring zones come here for outdoor activities such as hunting, horseback riding, hiking, camping, back-country skiing, rafting, canoeing, and snowmobiling.



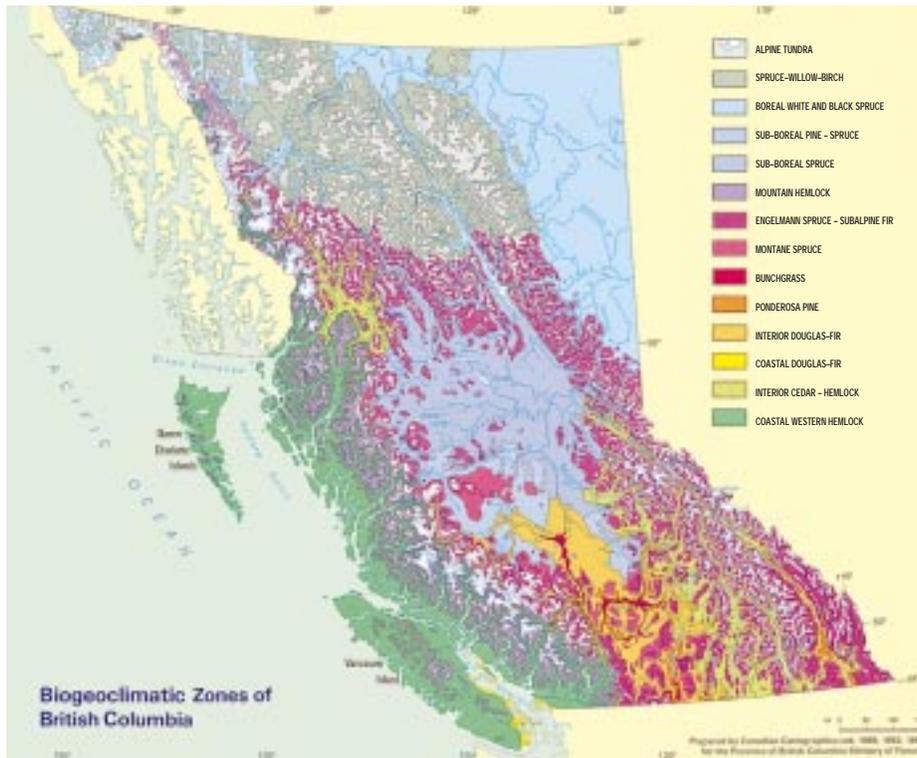
McELP

Spatzizi River



McELP

Spatzizi



The Spruce-Willow-Birch Zone is one of fourteen 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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Detail on British Columbia's Biogeoclimatic Zones
is available in:

Ecosystems of British Columbia
Special Report Series #6
D. Meidinger and J. Pojar
Ministry of Forests Research Branch, Victoria, B.C.

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