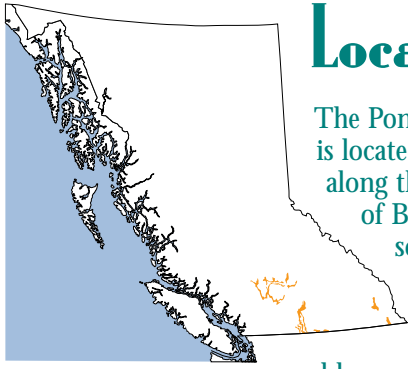


The Ecology of the Ponderosa Pine Zone

The Ponderosa Pine Zone takes its name from the ponderosa pine forests that typify the area. The majestic ponderosa pine can be found in closed to open forests and savanna. This is a hot, dry zone, although not as hot and dry as the Bunchgrass Zone. The Ponderosa Pine Zone occupies low elevations in the dry valleys of the southern Interior Plateau and East Kootenays and consists of a visually satisfying mosaic of forests, grasslands, and wetlands. This zone is home to a wide variety of birds, mammals, reptiles, and amphibians, some of which are relatively rare or threatened by extirpation.





Location

The Ponderosa Pine Zone is located at low elevations along the very dry valleys of British Columbia's southern interior.

The zone occupies a narrow band along the bottoms and lower side walls of a number of major river valleys, including the Fraser (in the Lytton-Lillooet area), lower Thompson, Nicola, Similkameen, and lower Kettle. It also occurs in areas adjacent to Okanagan Lake and in southeastern British Columbia near Cranbrook and Lake Kookanusa. The Ponderosa Pine Zone extends south into the United States where it is much more widespread than in Canada.



Alex Inshberg

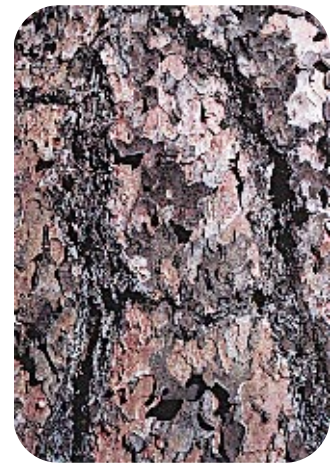
Ponderosa pine stand

Ecosystems

The vegetation in this zone often consists of a mosaic of forests and grassland. Ponderosa pine, which dominates most forests in this zone, is also called yellow pine and is best known for its characteristic vanilla-scented, cinnamon-coloured bark made up of jigsaw-puzzle-shaped scales.

The thick bark helps make the tree resistant to surface fires. Stands are often open and park-like, with a ponderosa pine canopy and an understory of blue-

bunch wheatgrass, rough fescue, and arrow-leaved balsamroot. Other dominant species in this landscape include saskatoon, pasture sage, lemonweed, and yarrow. Tree regeneration, in natural conditions, is uncommon in the understory, and there are few, if any, shrubs. Additional plant species can include silky lupine, orange arnica, rosy pussytoes, Rocky Mountain fescue, Idaho fescue, slender hawksbeard, timber milk-vetch, junegrass, and cheatgrass.



Evelyn Hamilton

Ponderosa pine bark



Bill Swan

Similkameen Valley

Climate

The Ponderosa Pine Zone is the driest of the forested zones in British Columbia, and in summer it is also one of the warmest.

In July, mean temperatures range from 17 to 22° C. The low precipitation of 250–450 mm per year is a result of the strong rain-shadow cast over this area by the Coast and Purcell Mountains.

Most precipitation falls in winter, with December and January being the wettest months. Winters are cool, with a light, intermittent snow cover.

The snowpack varies from 0 to up to 50 cm and may come and go throughout the winter. The growing season is relatively long, with a continuous frost-free period of 125–175 days. This makes the area suitable for agricultural purposes, provided there is water for irrigation.



MaF

Arrow-leaved balsamroot
Balsamorhiza sagittata



Bob Norton

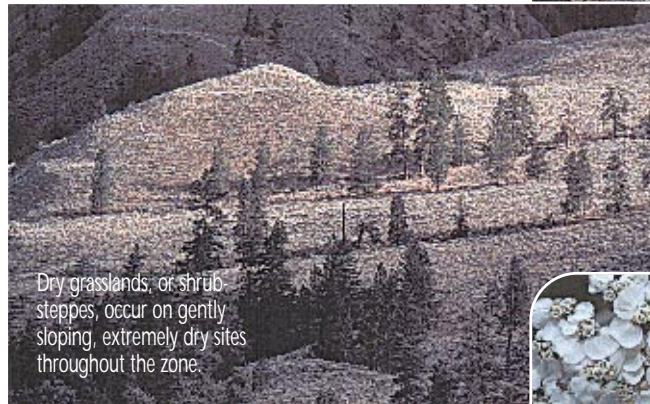
Rosy pussytoes
Antennaria rosea

Due to cutting and fire suppression, many sites that previously supported open stands now contain dense young thickets or, alternatively, grasslands on sites where regeneration of trees has been poor. Dry grasslands, or shrub-steppes, occur on gently sloping, extremely dry sites throughout the zone and often extend into the lower-elevation Bunchgrass Zone.

Shrubs, like big sagebrush or rabbit-brush, are found in combination with bluebunch wheatgrass, pasture sage, yarrow, and fescues on grasslands that are in good condition. On heavily grazed sites, big sagebrush or rabbit-brush increase in abundance and other species like, bluegrasses, cheatgrass, and knapweed are found.

The driest forested sites in this zone are found on south-facing rocky outcrops and steep escarpments. Here ponderosa pine dominates the open forest canopy, and herbs include yarrow, compact selaginella, and red three-awn. On drier sites in the northern part of the zone, Douglas-fir occurs as a minor species mixed with the ponderosa pine.

Dense stands of Douglas-fir grow on moist sites such as gullies, draws, and streambanks, and on steep northerly aspects. Throughout the zone, trembling aspen is a common species in dense stands on sites kept wet by seepage. Water-loving black cottonwood is the main species on floodplains. The shrubby understory includes water birch, along with common snowberry, roses, red-osier dogwood, Douglas maple, and tall Oregon-grape.



Dry grasslands, or shrub-steppes, occur on gently sloping, extremely dry sites throughout the zone.

Alex Inselberg



The driest forested sites in this zone are found on south-facing rocky outcrops and steep escarpments.

Alex Inselberg



Common rabbit-brush
Chrysothamnus nauseosus

Mof



Yarrow
Achillea millefolium

Bob Norton



Trembling aspen
Populus tremuloides

Mof

Fire History

As a result of lightning strikes and a general lack of moisture in this zone, wildfires occur here perhaps as often as every 15–25 years. Because of their frequency, fires have played an important role in the ecology of this zone. Mature ponderosa pine trees have a thick bark and a self-pruning habit that prevents most fires from spreading upward to the crown. However, as fires speed through the understory, they burn off grasses and new growth, leaving behind a relatively bare forest floor and restricting regeneration of new trees. Historically, this pattern resulted in a mosaic of grasslands and open stands of pine. In recent times, as a result of fire suppression, dense stands of pines have replaced some of the more open stands, as well as some grasslands. These dense stands contain “ladder” fuels that will result in hotter and more abundant crown fires in the future. Because there is much housing in the Ponderosa Pine Zone, many private residences are at risk from wildfires or fires caused by humans.



Mof

Wildlife

Because of the short, relatively snow-free winters, the Ponderosa Pine Zone is an important environment for many kinds of wildlife. Mule deer, white-tailed deer, bighorn sheep, and Rocky Mountain elk migrate long distances to winter here, and resident birds tend to form bigger, more visible flocks in the winter months.

The large number of wildlife species here is related to this zone's location between the Great Basin to the south and the boreal forests to the north. Northern species such as the Snowy Owl and Gyrfalcon find the southern limit of their range here, and southern species such as Canyon Wren and spotted bat are near the northern limit of their range.

Of equal importance is the rich variety of food available in the mixture of grasslands and dry forest, wetlands and dry shrub-steppe, and rugged cliffs and broken rock. Ponderosa pine parklands provide habitat for species such as Clark's Nutcracker, White-breasted Nuthatch, and yellow-pine chipmunk that feed on large conifer seeds. Birds such as the Northern Flicker and White-headed Woodpecker eat insects that live in the bark of pine trees. Others, such as the Common Poorwill, feed on flying insects. In winter, ungulates such as Rocky Mountain elk, mule deer, and white-tailed deer eat the shrubs that grow under the open-canopied forests. Denser stands of Douglas-fir and ponderosa pine provide winter cover for ungulates and abundant seeds and insects for a variety of birds (the Mountain Chickadee for example) and small mammals such as the little brown myotis, California myotis, red squirrel, northwestern chipmunk, and longtailed vole.

Shrub-steppes provide winter and spring grass forage for California bighorn sheep and Rocky Mountain elk, shrub forage for mule deer and white-tailed deer, and breeding habitat for birds such as the Sage Thrasher and Brewer's Sparrow that have adapted to the sagebrush environment.

White-breasted Nuthatch
Sitta carolinensis



Illustration: Mark Nyhof



Mark Nyhof

Yellow-pine chipmunk
Tamias amoenus



Rocky Mountain elk
Cervus elaphus nelsoni
MoF



Mark Nyhof

Mountain Chickadee
Parus gambeli



Mark Nyhof

Painted turtle
Chrysemys picta



Coyote
Canis latrans

Ken Bowen

Although dry forests dominate this zone, it also includes some wetland meadows and moist, shady draws.

These are home to a variety of reptiles and amphibians such as the common garter snake, tiger salamander, and northern leopard frog. Lakes and potholes provide breeding grounds for Canada Goose and various dabbling and diving ducks, and year-round habitat for the painted turtle and tiger salamander.

Other species such as coyote, black bear, cougar, badger, beaver, muskrat, and yellow-bellied marmot also inhabit the forests and

wetlands of this zone. Some species of wildlife benefit from the change in vegetation associated with agriculture: for example, the coyote, American Kestrel, Western Bluebird, and Lewis' Woodpecker. Non-native bird species, such as California Quail, Ring-necked Pheasant, and European Starling, occur here as a result of direct or indirect introductions from elsewhere.



Western Bluebird
Sialia mexicana

Mark Nyhof

Endangered Species

Rugged cliffs and talus slopes provide breeding habitat for rare bat species such as spotted bat and pallid bat, as well as less abundant birds and reptiles such as Canyon Wren and western rattlesnake.

Threatened species in this zone include Townsend's big-eared bat, fringed myotis, western small-footed myotis, western long-eared myotis, Flammulated Owl, Common Poorwill, Burrowing Owl, tiger salamander, Anatum Peregrine Falcon, White-headed Woodpecker, and White-throated Swift. Several species, including Sage Grouse, white-tailed jackrabbit, short-horned lizard, and Nuttall's cottontail, once occurred in this zone but are now considered extirpated in British Columbia.



Mark Nyhof

Common Poorwill
Phalaenoptilus nuttallii

Alkaline Ponds

Although wetlands and ponds are not a common feature in the dry Ponderosa Pine Zone, alkaline ponds can occur in depressions or basins with restricted drainage. These ponds, which dry out by the end of summer, are fringed by wetlands that contain several kinds of plants, including alkali saltgrass, rushes, and bulrushes. Wetlands such as these, even when they are limited in extent, represent the greatest source of key habitat for many rare and endangered species. Because water is so scarce in the zone, even small amounts are important to the survival of many wildlife species.



Da Weinger

Alkaline pond

Resources

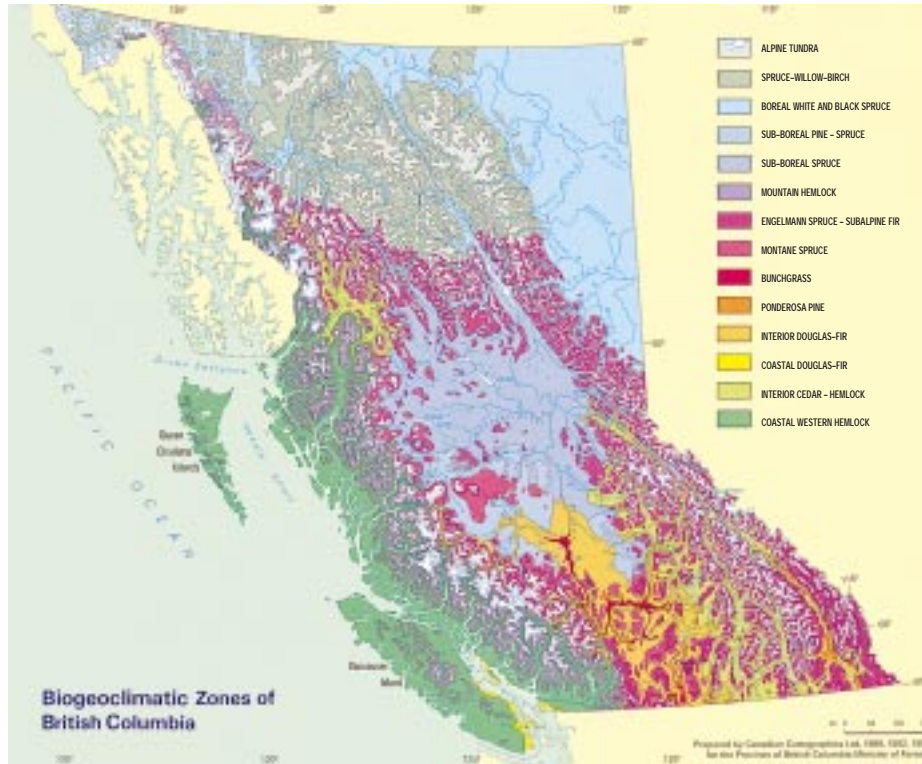
Although the Ponderosa Pine Zone has many forested areas, the productivity of ponderosa pine and Douglas-fir is poor on most sites. Because of the prominence of grasslands, cattle grazing is the primary form of agriculture in this zone. The ponderosa Pine and Bunchgrass zones are particularly important for early spring range for cattle. Most flat areas are irrigated for the production of hay. In the Okanagan Valley, irrigation also makes orchards and vineyards possible in some areas. Much of the Ponderosa Pine Zone occupies slopes that are too steep for agricultural purposes. However, because of their ideal climate and views, these same sites provide excellent locations for housing.



Mof

Landscapes in lower Deadman River Valley

Recreational uses include hiking, cycling, horseback riding, nature study, hunting, fishing, and dirt bike riding. The larger lakes and their beaches are significant tourist attractions. Some recreational activities such as the use of all-terrain vehicles and mountain bikes, which have become quite common in this zone, can present environmental hazards. These activities often bring in weed seed. They also compact the soil surface and make it more susceptible to erosion. Because of the competing demands of agriculture, forestry, urban and industrial development, recreation, biodiversity, and wildlife habitat, land-use conflicts are common in the Ponderosa Pine Zone. Integrated land-use planning can be an important tool for resolving these conflicts.



The Ponderosa Pine 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.



Ministry of Forests
October 1998

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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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Technical Editors: Dennis Lloyd and Del Meidinger
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Design and Layout: Soren Henrich
Series Design Concept: Susan Fergusson



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