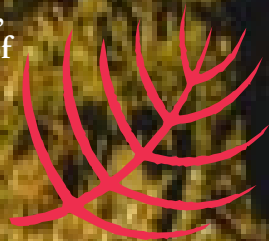
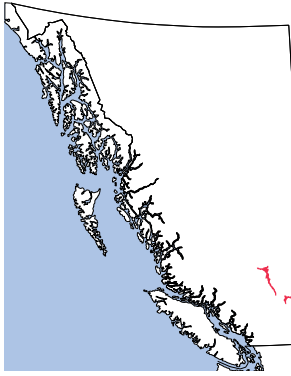


# The Ecology of the Bunchgrass Zone

The Bunchgrass Zone covers less than one percent of the total area of British Columbia. In spite of its small size, the zone supports a rich diversity of ecosystems and a wide variety of plants and wildlife, including many rare and endangered species. The dry and relatively mild low-elevation climate of the Bunchgrass Zone, together with an abundance of productive agricultural land, makes this one of the most populated and most developed areas in the British Columbia interior.



# Location



The Bunchgrass Zone consists mostly of narrow fingers of land centred on the major river valleys of the Okanagan, Thompson, and Fraser river basins. These include the Okanagan Valley from Summerland south to the United States border, the Thompson River Valley from Kamloops to Spences Bridge, the Nicola River Valley, and the Fraser and Chilcotin river valleys south of Riske Creek

to north of Lillooet. In these locations, the zone occurs from the valley bottom up to elevations of approximately 900 m on the valley slopes.



Fraser River near Dog Creek  
Peter Tasker

# Ecosystems

On most upland sites, summer droughts are too severe for trees to become established. As a consequence, grasses form the dominant vegetation cover.

Drought-tolerant shrubs and forbs are also common. Widely spaced bunchgrasses, particularly bluebunch wheatgrass, are characteristic of the native, undisturbed vegetation. Other common grasses include needle-and-thread grass, junegrass, and Sandberg's bluegrass. Big sagebrush ecosystems (also called shrub-steppes) often dominate in the lower elevations of the zone. Rabbitbrush is also common in the zone but is seldom dominant. Many of the plants that occur here are typical of the Great Basin region of the western United States and reach their northern limits in this zone. Where sites have been disturbed by overgrazing or other activities, native species such as prickly-pear cactus, low pussytoes, needle-and-thread grass, and pasture sage often become dominant.



Bluebunch wheatgrass  
*Agropyron spicatum*  
Big sagebrush  
*Artemisia tridentata*  
MOF

Non-native weedy species such as knapweed and cheatgrass often invade and dominate other disturbed sites. In this zone, differences in soil moisture largely control differences in plant communities

from one site to the next. In turn, topography, soil texture, and aspect control differences in soil moisture.



Undisturbed area in foreground  
MOF

# Climate

Situated in the rainshadow of the Coast and Cascade mountains, the Bunchgrass Zone includes some of British Columbia's warmest and driest areas. Summer temperatures range from warm to hot, becoming progressively cooler to the north and west, and winters are moderately cold. Peak periods of precipitation occur in early winter and again in June, but, overall, precipitation is low. Peak snowpack is seldom greater than 50 cm, and many sites are without snow for most of the winter, especially on southern aspects and wind-exposed sites. Soils typically regain moisture during the winter and spring when temperatures are cooler and evaporation is less intense. However, because of low precipitation and high evaporation rates during the summer, upland soils typically remain moist for only a short period during the growing season. By late June, drought conditions prevail in most of the zone's upland sites.

For example, ponderosa pine and Douglas-fir forests occur primarily on steep rocky soils, on gravelly terraces, and in cool, moist ravines. On many of these sites, gravelly and rocky soils allow moisture from precipitation to penetrate deeper into the soil where it will not evaporate as quickly and thus will be more available to tree roots. Finer soils such as silts and loams retain rainwater near the surface, where the abundant fibrous roots of bunchgrasses take it up, or else it

returns to the atmosphere through evaporation. Moist, shallow depressions and lower slopes often contain porcupine grass and Kentucky bluegrass. Giant wildrye occurs in some moist seepage areas and along streams.

Fescues often dominate steep north- and east-facing aspects, while compact selaginella is a characteristic feature of bedrock outcrops. Sand dunes, which are scattered throughout the zone, support scattered clumps of Indian ricegrass and sand dropseed.

The grasslands and shrub-steppe ecosystems in the Bunchgrass Zone display an interesting feature — a thin, fragile layer of low-growing mosses, lichens, algae, and bacteria, collectively referred to as a cryptogamic crust. This crust grows over the otherwise unvegetated areas between bunchgrasses and other vascular plants. Cryptogams are important in maintaining healthy ecosystems in this arid environment. They help to bind the soil surface and protect it from erosion. They restrict the establishment of weedy species and provide nitrogen and other nutrients to plants. Over much of the zone, livestock trampling has damaged or destroyed the cryptogamic crust, which is slow to recover.

Cattails and bulrushes dominate in the marshes, which are a common form of wetland in the Bunchgrass Zone. Other wet ecosystems include: the saline meadows that occur in shallow basins



Cryptogamic crust  
MOF

and along the margins of ponds and lakes; streamside riparian communities dominated by tall shrubs and forbs; and, at upper elevations in the zone, small groves of aspen with an undergrowth of roses, western snowberry, northern bedstraw, and American vetch.

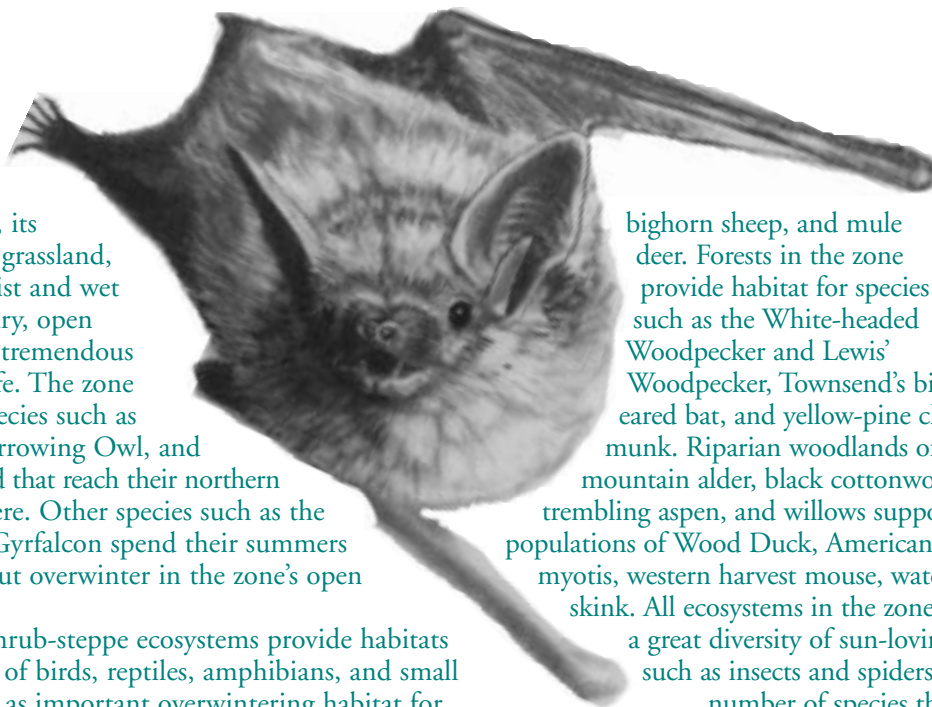


Alex Inceberg  
MOF

## Wildlife

Although the Bunchgrass Zone is one of the smallest zones in British Columbia, its unique mosaic of grassland, shrub-steppe, moist and wet ecosystems, and dry, open forests supports a tremendous diversity of wildlife. The zone contains many species such as the pallid bat, Burrowing Owl, and short-horned lizard that reach their northern breeding limits here. Other species such as the Snowy Owl and Gyrfalcon spend their summers far to the north but overwinter in the zone's open grasslands.

Grassland and shrub-steppe ecosystems provide habitats for a great variety of birds, reptiles, amphibians, and small mammals, as well as important overwintering habitat for larger mammals such as Rocky Mountain elk, California



Pallid bat  
*Antrozous pallidus*  
Illustration: Michael Hames  
From: Bats of British Columbia  
(Royal British Columbia Museum)



Lewis' Woodpecker  
*Melanerpes lewis*  
Mark Nyhof

bighorn sheep, and mule deer. Forests in the zone provide habitat for species such as the White-headed Woodpecker and Lewis' Woodpecker, Townsend's big-eared bat, and yellow-pine chipmunk. Riparian woodlands of mountain alder, black cottonwood, trembling aspen, and willows support populations of Wood Duck, American Kestrel, California myotis, western harvest mouse, water shrew, and water skink. All ecosystems in the zone provide habitat for a great diversity of sun-loving invertebrates such as insects and spiders, including a large number of species that occur nowhere else in the province.



California bighorn sheep  
*Ovis canadensis californiana*  
MOF

Because lakes and streams in the Bunchgrass Zone either remain open year-round or are the first to be ice-free in the spring, they provide important staging and stopover areas for migrating waterfowl. Marshes, lakeshores, shallow ponds, and streams provide important habitat for muskrats and for many reptiles and amphibians. These are also important habitats for birds such as the Marsh Wren, Red-winged Blackbird, Sora, Yellow-headed Blackbird, and American Bittern.



Yellow-headed Blackbird  
*Xanthocephalus xanthocephalus*  
Mark Nyhof



Burrowing Owl  
*Athene cucularia*  
Mark Nyhof



## Rare and Endangered Species

Human activities threaten many of the plants, animals, and ecosystems of the Bunchgrass Zone. Livestock grazing, both past and present, has altered the natural state of much of this landscape. Because cattle favour bluebunch wheatgrass and fescues as forage, these are the first to decline with excessive grazing. Other less palatable and often weedy species increase or invade the site at the expense of native species. Rapidly expanding agricultural and urban developments have permanently eliminated fertile terrace and valley bottom ecosystems. At one time, ecosystems dominated by antelope-brush occupied many of the arid benchlands of the south Okanagan that are now largely cultivated. These are now considered one of Canada's most endangered ecosystems. The most threatened wildlife in this zone are the badger, the western rattlesnake (the only poisonous snake in British Columbia), the Burrowing Owl (once extirpated and now being reintroduced), and the Sage



Peter Tasker

Thrasher, which depends on big sagebrush ecosystems for its principal habitat. Other species considered at risk include the Great Basin spadefoot toad, tiger salamander, White-throated Swift, Upland Sandpiper, and several invertebrates such as the vivid damselfly, sun scorpion, ground mantid, robber

fly, scollid wasp, and Mormon metal-mark butterfly. The Sage Grouse, viceroy butterfly, and short-horned lizard have already been extirpated from British Columbia. The white-tailed jackrabbit is also believed to be near extirpation in the province.



Badger  
*Taxidea taxus*  
Mark Nyhof

The highly specialized environment of this zone gives rise to rare forms of life, including 23 species of invertebrates that are restricted to the south Okanagan and lower Similkameen valleys and another 75 invertebrates that occur nowhere else in Canada. Lakes ringed white with drying carbonate and sulphate salts occupy some of the sagebrush basins. These alkaline flats are home to tiny ground beetles and brilliantly coloured tiger beetles that hunt in and around the mud cracks.



Tiger beetle  
*Cicindela purpurea*  
R.A. Cummings & M.B. Cooke



Western rattlesnake  
*Crotalus viridis*  
Tom Hall

Alkaline lake  
MOF



# Resources

The fertile valley bottoms and terraces, long, warm growing season, and good sources of water for irrigation in much of the Bunchgrass Zone provide ideal conditions for many agricultural crops, especially in the southern half of the zone where winters are less severe. The most common crops include tree fruits,

grapes, alfalfa, and ginseng. The grasslands, shrub-steppe, and dry forests in the zone provide critical early spring and late fall forage for livestock on many of the ranches in the zone. These ecosystems also provide critical winter forage and browse for wildlife species such as California bighorn sheep and mule

deer that winter in the zone. With its warm, dry climate and large lakes and rivers, the Bunchgrass Zone provides opportunities for many outdoor recreational activities, such as water sports, wildlife viewing, and hiking.



Vineyards  
Peter Tasker



Gang Ranch  
Alex Inselberg

Arrow-leaved balsamroot  
*Balsamorhiza sagittata*  
Peter Tasker

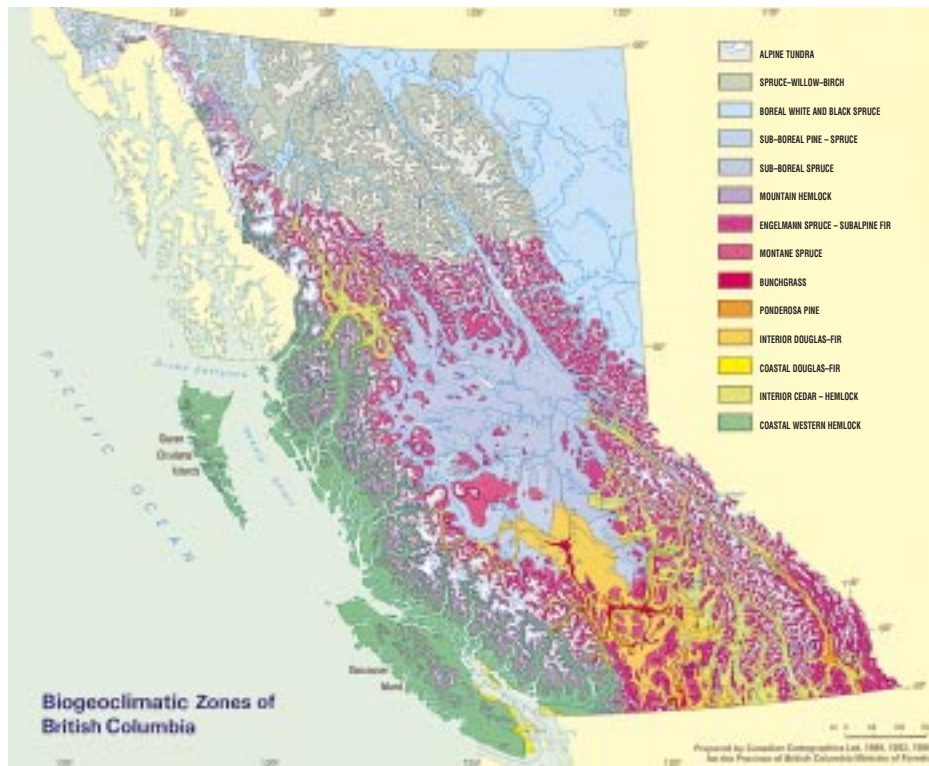
## Aboriginal Uses

Aboriginal peoples built their winter villages on terraces along many of the major rivers in the Bunchgrass Zone. They selected these sites because of a favourable climate, good drinking water, and an abundance of salmon. Natural vegetation in the Bunchgrass Zone also supplied many native food plants, including mariposa lily, yellow bell, nodding onion, prickly-pear cactus, bitterroot, silverweed, and large-fruited desert-parsley. At the forest/grassland boundary and at higher elevations in the zone, food plants such as saskatoon and arrow-leaved balsamroot



were often abundant. Aboriginal peoples used spreading dogbane and hemp dogbane, which they commonly collected from draws and exposed banks in the zone, as fibre for fish nets and the like. Wetlands and riparian areas provided cattails, great bulrush, and willows, which were important in the construction of tools and shelter.

Aboriginal peoples in the southern interior used big sagebrush in a number of ways. They burned the leaves to fumigate their dwellings and made a tea for treating colds from the leaves and branches. They also used sagebrush tea for soaking sore feet and wove the bark of big sagebrush into cloth for mats, bags, and clothing.



The Bunchgrass 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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