Pacific Maritime Rainforest

General Description

The *Pacific Maritime Rainforest* zone covers an area of almost 88,000 km² at low to mid-elevations of the southern and central British Columbia (BC) coast, as well as Vancouver Island and Haida Gwaii. This zone represents the central portion of North American Pacific coastal rainforests, extending from Alaska to northern California. The maritime climate is cool and wet. Landcover is dominated by evergreen coniferous forests.

Vegetation

Upland vegetation is dominated by temperate rainforests characterized by tall, long-lived evergreen coniferous trees in stands that may persist for centuries. Stand structure is typically multi-storied, but can be single-storied after stand-replacing disturbance. Cold-deciduous broad-leaved tree species are sometimes present following disturbance. Understory structure varies from dense to sparse, and is usually dominated by cold-deciduous and evergreen broad-leaved shrubs, conifer regeneration and ferns. The moss layer is typically well developed.

Wildfires, windthrow, slope failures, pathogens and insect infestations are the most widespread forms of natural disturbance throughout the zone. Forest harvesting, roadbuilding, agricultural conversion and settlement clearance, urban development, and industrial and recreational activities are also significant disturbance factors in some areas. In general, stand-replacing fire plays a relatively minor role in the disturbance regime. However, fire becomes an increasingly important factor in forest dynamics where climatic conditions are drier, primarily in the more southern and eastern portions of the zone. Otherwise, gap replacement of single or small groups of trees is the common regeneration process.

Western hemlock (*Tsuga heterophylla*) is the characteristic tree species. Western red cedar (*Thuja plicata*) is the most common canopy associate, except at the northern edge of the zone where it occurs less frequently. Other common trees include Pacific silver fir (*Abies amabilis*), coast Douglas-fir (*Pseudotsuga menziesii* var. *menziesii*), Sitka spruce (*Picea sitchensis*), yellow-cypress (*Callitropsis nootkatensis*), grand fir (*Abies grandis*), red alder (*Alnus rubra*) and big-leaved maple (*Acer macrophyllum*). Shore pine (*Pinus contorta* var. *contorta*) is dominant on some very dry sites, as well as in treed coastal bogs. Western white pine (*Pinus monticola*) and mountain hemlock (*Tsuga mertensiana*) occur occasionally. Alluvial forests dominated by western hemlock, western red cedar, Sitka spruce, red alder and black cottonwood (*Populus trichocarpa*) occur on stable floodplain terraces.

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Common upland shrubs include oval-leaved blueberry (*Vaccinium ovalifolium*), red huckleberry (*V. parvifolium*), salal (*Gaultheria shallon*), false azalea (*Menziesia ferruginea*) and, in drier climates, Cascade barberry (*Berberis nervosa*). Deer fern (*Blechnum spicant*) is the most widespread herb, but three-leaved foamflower (*Tiarella trifoliata*) and western sword fern (*Polystichum munitum*) are also common. Lanky moss (*Rhytidiadelphus loreus*), stairstep moss (*Hylocomium splendens*) and Oregon beaked moss (*Kindbergia oregana*) predominate in the moss layer.

Coastal treed swamps usually include red alder, western red cedar, western hemlock, big-leaved maple and yellow-cypress in the tree stratum, with yellow skunk cabbage (*Lysichiton americanus*), salmonberry (*Rubus spectabilis*) and ferns in the understory.

Non-treed or sparsely vegetated communities occur frequently on a variety of site conditions. These include wetlands, estuaries, shallow soils, rocky shorelines and beach/dune systems, avalanche tracks, talus slopes and cliffs.

Extensive "blanket mire complexes" occur in outer coastal areas. These complexes typically include both treed and non-treed bogs, dominated by shore pine, yellow-cypress, common juniper (*Juniperus communis*), common Labrador tea (*Rhododendron groenlandicum*), black crowberry (*Empetrum nigrum*), tufted clubrush (*Trichophorum cespitosum*), narrow-leaved cottongrass (*Eriophorum angustifolium*) or peat mosses (*Sphagnum* spp.).

Shallow marshes and wetter fens usually are dominated by Sitka sedge (*Carex aquatilis* var. *dives*), woolly-fruit sedge (*C. lasiocarpa*), three-way sedge (*Dulichium arundinaceum*), sweet gale (*Myrica gale*) or white beakrush (*Rhynchospora alba*). Sitka willow *(Salix sitchensis*), shining willow (*Salix lucida*), mountain alder (*Alnus incana* ssp. *tenuifolia*) or Douglas' meadowsweet (*Spiraea douglasii*) dominate shrub swamps and annually active floodplains.

Coastal estuaries and intertidal zones have marshes and wet meadows dominated by Lyngbye's sedge (*Carex lyngbyei*), Pacific silverweed (*Potentilla anserina* ssp. *pacifica*), Beringian hairgrass (*Deschampsia cespitosa* ssp. *beringensis*), seaside plantain (*Plantago maritima*), Virginia glasswort (*Salicornia depressa*), saltgrass (*Distichlis spicata*), sea milkwort (*Lysimachia maritima*) or sea ditchgrass (*Ruppia maritima*). Sparsely vegetated rocky shorelines and beaches/dunes occur in coastal areas.

Climate

Moderate temperatures and high precipitation characterize the climate of the *Pacific Maritime Rainforest* zone. In general, the macroclimate is maritime temperate, with cool summers, mild winters and high annual precipitation, the majority of which falls in winter as rain. Local climatic variation influences vegetation patterns. Areas with lower precipitation have an increased frequency of fire. In the hypermaritime zone along the immediate coast, frequent fog and low clouds during warmer months produce a uniformly wet and mild climate, with fog drip often contributing significant additional site moisture. Inland, the climate is still relatively mild but typically with lower overall precipitation and greater temperature extremes.

Mean annual precipitation is generally high, averaging >3000 mm (varying between approximately 1500 and 5300 mm). The majority of total precipitation falls as rain; snow is only a minor proportion, occurring mostly in northern, montane and submaritime areas, and "rain-on-snow" events are common wherever snowpack accumulates. Rain shadow effects from the Queen Charlotte Ranges, the Vancouver Island Ranges, the Olympic Mountains and, in some places, the Coast Mountains create the largest variability in precipitation patterns across the zone, accounting for the lower values in the continuum. Mean annual temperatures vary from approximately 3°C to 10° C, depending mostly on latitude and elevation. Growing degree days above 5°C vary between approximately 1000 and 2200 throughout the zone. Frozen soils are uncommon in winter, which is important for the survival of many of the coastal plant species.

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Physiography, Geology, Topography and Soils

This zone occurs in the westernmost Cordillera of Canada, occupying the windward portions of the Coast Mountains in BC, including the Pacific Ranges, the Kitimat Ranges and some lower valleys in the Boundary Ranges. It also occurs in the insular mountains of Vancouver Island and Haida Gwaii, as well as their adjoining coastal lowlands. A minor portion of the zone occurs in the Cascade Mountains of southwestern BC and the St. Elias Mountains of northwestern BC. The zone occurs at sea level over most of its area and extends up to about 900 mASL in southern BC and to 450 mASL in northern BC on windward slopes. On leeward slopes in the eastern part of the zone, the upper elevation can reach 1000 mASL.

The Coast, Cascade and St. Elias Mountains are primarily crystalline igneous and metamorphic rocks. The Vancouver Island and Queen Charlotte Ranges, as well as the coastal lowlands, comprise mostly folded and faulted volcanic and sedimentary Tertiary rocks. The terrain is a complex of high mountains (some >4000 mASL), valleys and rugged coastlines.

All of the zone has been glaciated numerous times and the most prevalent parent material is glacial till. Colluvium is also common because of steep mountain slopes, often with bedrock exposures. Several large rivers terminate at the Pacific Ocean, creating riparian and estuarine benches, beaches and deltas of alluvial materials. Parent material textures vary considerably but are mostly coarse to medium-textured with moderate to high coarse fragment content. Although geologically young, the soils are generally well developed. Organic matter tends to accumulate in the wet, cool climate. Mineral soils are mostly Podzols, with some Folisols; Gleysols occur locally on moist, poorly drained sites. Peatlands dominated by Organic soils are extensive in some locations.

Notes

At low elevations, the *Pacific Maritime Rainforest* zone usually extends to sea level, except in the Georgia Depression where it adjoins the *Pacific Dry Forest*. At higher elevations, it is bounded by the *Pacific Montane Forest*. To the south and north, it continues into the United States.

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