



## Boreal Forests

- Coniferous forests are mainly found in broad circumpolar belt across the northern hemisphere and on mountain ranges where low temperatures limit the growing season to a few months each year - thus too unfavorable for most hardwoods




Boreal, Canadian Rockies, Alberta




Taiga, Siberia

## Boreal Forests

- Average daily temperature of 10°C is found in fewer than 120 days and cold seasons last 6 months. Tundra will form at the northern edge when there are 30 days only of average daily temperature of 10°C and cold season lasts up to 8 months



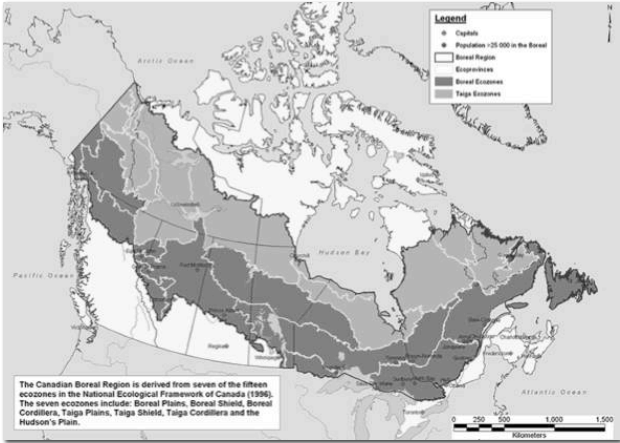
Boreal, Canadian Rockies, Alberta



Taiga, Siberia

## Boreal Forests

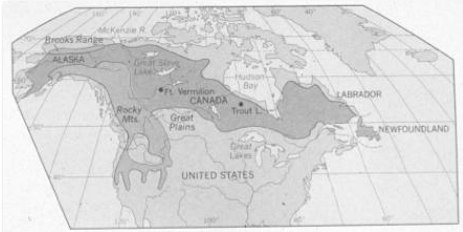
- The terms boreal and taiga are also used in more specialized sense - species diversity gradient from boreal to taiga to tundra



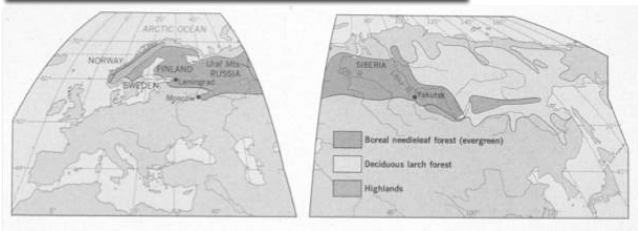
The Canadian Boreal Region is derived from seven of the fifteen ecoregions in the National Ecological Framework of Canada (1996). The seven ecoregions include: Boreal Plains, Boreal Shield, Boreal Cordillera, Taiga Plains, Taiga Shield, Taiga Cordillera and the Hudson's Plain.

## Boreal Forests

- Extends from Alaska to New Foundland. Furthest north extension at 69° in NW Canada.

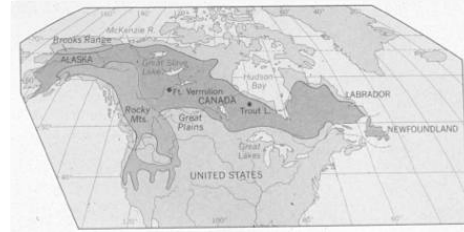


- Extends from eastern Scandinavia across northern Asia to the Pacific Ocean. Furthest north extension at 72° in Siberia.

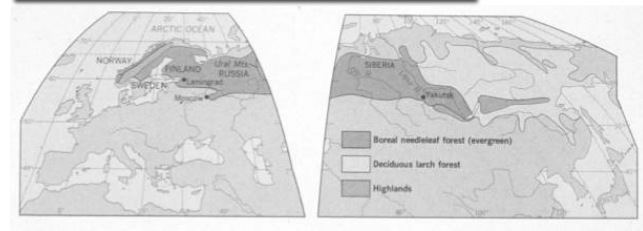


## Boreal Forests

- The distribution of the biome (and thus individual species) is often called circumboreal

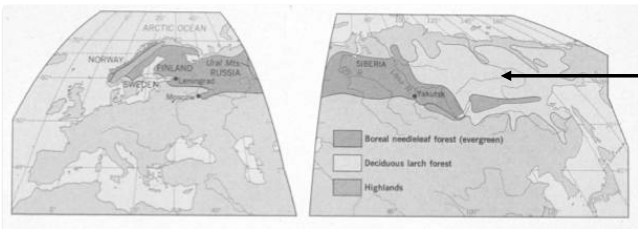


- The placement of southern continents precludes boreal formations in the southern hemisphere



## Boreal Forests

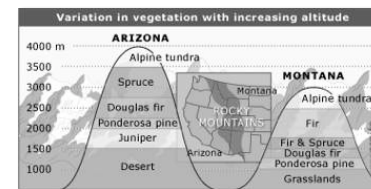
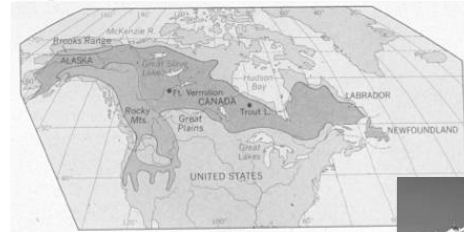
- Almost all the gymnosperms are evergreen, except *Larix* (larch)



Deciduous forest!

## Boreal Forests

- The circumboreal biome is closely linked (vegetation and flora) to temperate montane forests



## Boreal Forests

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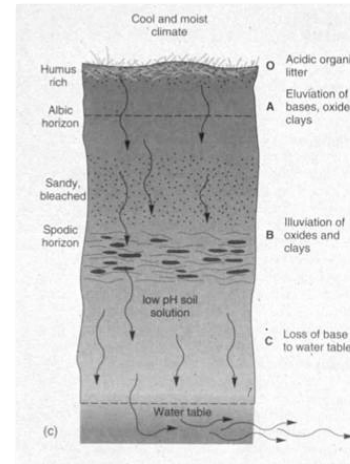
Ponderosa pine, Mammoth, CA

Bristlecone pine, Great Basin Natl Park, Nevada



## Boreal Forests

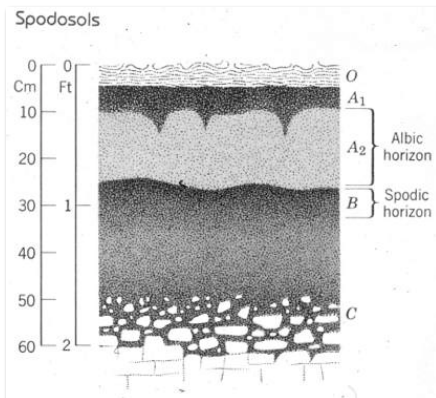
- Soil is 'spodosol' [podzol], heavily leached and acidic - infertile!



- Gymnosperm evergreen leaves are heavily protected by tannins, terpenes, and other acids

## Boreal Forests

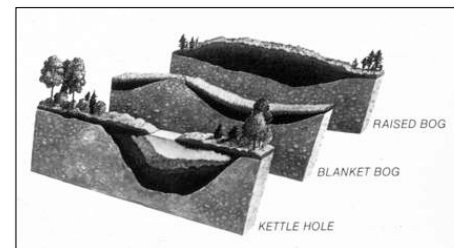
- Soil is 'spodosol' [podzol], heavily leached and acidic - infertile!



- A horizon is largely leached and ash-colored due to quartz sand (from glacial scouring)

## Boreal Forests

- Landscape is young due to Pleistocene glacial activity which is reflected in poorly drained water systems - forms complex interactions of forests and various wetlands of fens and bogs



Canadian Shield fens

## Boreal Forests

- Boreal forests and fire are closely linked

Hiawatha Natl Forest,  
U.P. Michigan

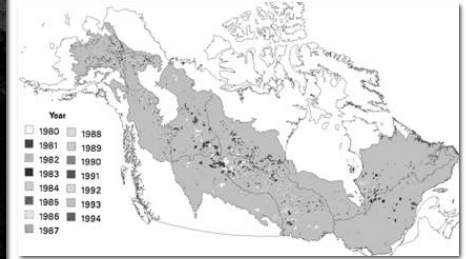


Northwest Territories, Canada



## Boreal Forests

- Boreal forests and fire are closely linked - fire frequency is high!



Fire history in North American boreal forests

## Boreal Forests

- Jack pine (serotinous cones), jack pine budworm, hymenopteran parasites, and fire - complex interactions



## Boreal Forests

- North American floristics: gymnosperms and few angiosperm hardwoods



Fairbanks, Alaska

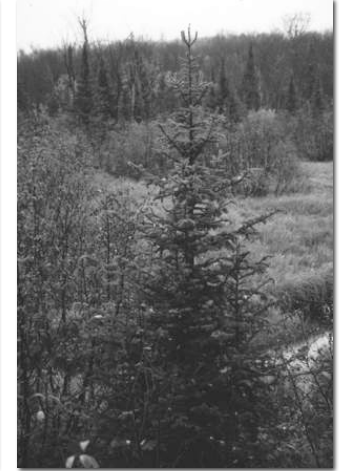
## Boreal Forests

- North American floristics: white spruce most widespread N Am tree



## Boreal Forests

- North American floristics: black spruce more specialized on poor soil



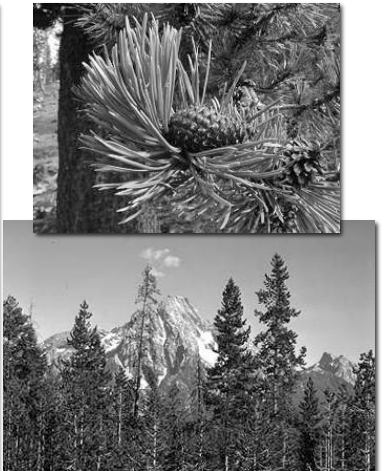
## Boreal Forests

- North American floristics: balsam fir



## Boreal Forests

- North American floristics: lodgepole pine



## Boreal Forests

- North American floristics: jack pine



## Boreal Forests

- North American floristics: tamarack, larch



## Boreal Forests

- North American floristics: white cedar, arbor vitae



## Boreal Forests

- North American floristics: white birch - widespread angiosperm



## Boreal Forests

- North American floristics: trembling aspen - widespread angiosperm



## Boreal Forests

- North American floristics: ferns diverse



*Pteridium aquilinum* - bracken fern

## Boreal Forests

- North American floristics: subshrubs - woody plants low to ground, often with mycorrhizal relationships (e.g., Ericaceae)



*Linnaea borealis* (Caprifoliaceae) - twin flower



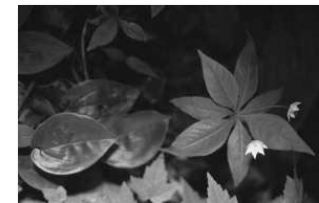
*Vaccinium vitis-idaea* (Ericaceae) - mountain cranberry

## Boreal Forests

- North American floristics: herbs



*Lycopodium obscurum* - ground pine



*Trientalis borealis* - starflower



*Maianthemum canadense* - Canada mayflower

## Boreal Forests

- North American floristics: mycorrhizal parasites



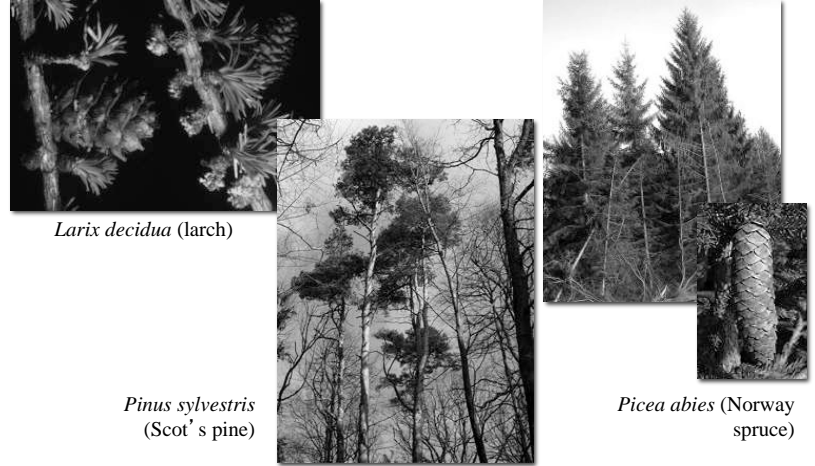
*Pyrola* (shinleaf)  
Ericaceae

*Monotropa* (Indian-pipe)  
Ericaceae

*Corallorhiza* (coral root)  
Orchidaceae

## Boreal Forests

- Eurasian floristics: significantly less diverse, three dominant trees



*Larix decidua* (larch)

*Pinus sylvestris*  
(Scot' s pine)

*Picea abies* (Norway  
spruce)