

Boreal Region

Potential impacts of climate change on forest goods and services

Climate characteristics

The region has a cool-temperate and moist climate. The most significant climatic factor for forest productivity is the length of the growing season ranging from 100 to 200 days. Average annual temperatures are low; varying from less than 4.8°C in the south to less than 3.8°C in the north of the region. Annual rainfall varies between 500 and 800 mm per year, which is much less than in the temperate oceanic zone.

Key climate change trends

Temperatures are projected to increase by 3.5 °C; with a higher increase during winter than in summer. Significant increases in yearly rainfall (up to 40%) are predicted.

Sensitivity to climate change

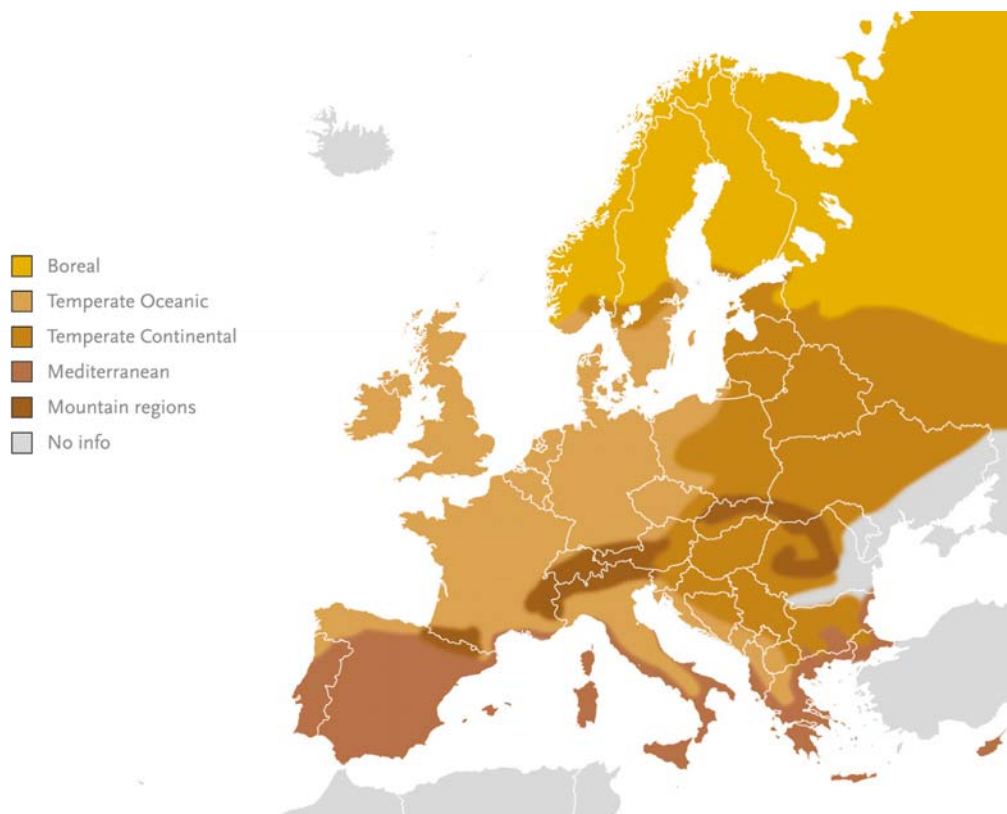
Higher air temperature will lead to earlier and more rapid ability of plants to photosynthesise in spring and a prolonged growing season in the autumn.

Precipitation (rainfall) is expected to increase in North Europe especially during winter and spring.



Boreal forest is characterized by coniferous forest. Photo: M. Kolström

Changes in temperature and precipitation will lead to changes in **species distribution**. Woody boreal vegetation is expected to spread into tundra at higher latitudes and higher elevations. Broadleaved deciduous trees (e.g. maple, oaks, elm, aspen) could migrate to boreal forests under climate change.



Projected climate change impacts vary in different bioclimatic regions.

Sensitivity to climate change

Abiotic risks (non-living factors which affect ecosystems, like wind patterns, precipitation, temperature). Increased soil waterlogging and winter floods could increase the susceptibility of trees to being uprooted or broken by the wind, because waterlogged soil gives less support to the roots. Forest damage by wind and snow is projected to increase. Climate change will also shorten the period with frozen soils and snow cover, negatively affecting forest management operations e.g. by limiting the accessibility of forest on wet organic soils.

Biotic disturbances (changes in living organisms). A rise in minimum temperature in the boreal zone is likely to promote outbreaks of insects due to an increased rate of egg survival.

Potential impacts on forest goods and services

Wood production. Gradual increases in temperature and precipitation with a concurrent elevation in CO₂ will enhance tree growth and timber yield.

Non-wood forest products (e.g. mushrooms, berries, nuts). The autumn fruiting of mushrooms has been delayed, and the delay coincides with the extension of growing season caused by climate change. Other non-wood forest products are also likely to be affected by climate change.



Storm damage in the boreal forest. Photo: M. Kolström



Heavy snow load in boreal forest. Photo: M. Kolström

Adaptation options

- Keep forests in good condition, so they can better recover from biotic or abiotic damage.
- Maintain biodiversity of forests; it will improve ability of forests to adapt to changes in climate.
- Use better harvesting techniques for non-frozen soils to avoid damage to the soil during harvesting operations.
- Select well-adapted tree species or new plants that are genetically similar to those that might have grown in the area previously, and favour them at the tending and thinning stages.

The project **MOdels for AdapTIVE forest management (MOTIVE)** is a large-scale integrated project (project number 226544) in the 7th Framework Programme of the EU that develops tools to support decision-making in forestry in response to climate and land use change. It encompasses 20 partners from 14 European countries. It has an overall budget of almost 9 million euros, from which 7 million will be paid as EU contribution. The project is coordinated by the Forest Research Institute of Baden-Württemberg with duration of 4 years. More information: www.motive-project.net.