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Science and Practice
Addressing Forest Climate Change in Maine
An Interactive Webinar Series for Stakeholders and the Interested Public

An Overview of Climate Effects on Forestland Biodiversity in Maine

Compiled from *Scientific Assessment of Climate Change and Its Effects in Maine*. A Report by the Scientific and Technical Subcommittee (STS) of the Maine Climate Council (MCC). Augusta, Maine. 370 pp.

Forest Biodiversity and Species Shifts

Wednesday, January 6 at noon

Panelists

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Background

- Forests cover nearly 85% of Maine's land area.
- Forestland ranges from scrub deciduous/oak-pitch pine ecosystems in southern Maine to spruce-fir boreal forests in the north.
- Maine is home to approximately 33,000 wildlife and 1,500 vascular plant species.
- Many of the state's species are at their northern (e.g., New England cottontail, roseate tern, black racer, loggerhead sea turtle, and monarch butterfly) or southern (e.g., Canada lynx, Arctic charr, mink frog, and Atlantic puffin) limit of their ranges, amplifying climate impacts.



Climate Change Impacts on Biodiversity

- Climate-change related threats, including droughts, temperature extremes, shifting winter ice cover and less deep snow cover, severe storms and flooding, and the rapid expansion of pests are impacting Maine's plants, animals, and habitats.
- Loss of snow cover and increasing winter and spring air temperatures mean changes in soil biological processes, above- and below-ground tree health and productivity, as well as wildlife foraging, nesting, and herbivory patterns.

- Many edge-of-range species occur in Maine and widespread shifts in habitat suitability are expected with climate change.
- Species at the southern edge of their geographic range (e.g., Canada lynx, snowshoe hare, American marten) may experience reduced populations and northward range retraction with changing snow conditions.
- Northward expansion of wildlife parasites and diseases as average temperatures rise (e.g., winter tick) are likely to detrimentally affect wildlife (e.g., moose) and ecosystem health.
- Changing elevational boundaries between alpine-forest ecotones may threaten persistence of species dependent on alpine habitats (e.g., Katahdin arctic butterfly).



- ➔ Increased stream water temperature will negatively impact cold water fishery species (e.g., Eastern brook trout).
- ➔ Increased frequency of droughts and changing seasonality of spring runoff could harm aquatic freshwater communities (e.g., wetlands and vernal pools).
- ➔ Climate change is likely to exacerbate forest insect outbreaks (e.g., Hemlock Woolly Adelgid) and tree diseases (e.g., Eastern White Pine damage) in Maine.
- ➔ Mobile species in landscapes with high connectivity may be able to shift their ranges in response to changing climate conditions; however, species in fragmented landscapes or with more limited mobility (e.g., plants, amphibians) may be more vulnerable to climate change impacts, and additional conservation measures (e.g., assisted migration) may be needed to maintain these species in a warmer climate.



Adaptation and Policy Strategies

The following recommendations were proposed by the MCC STS to help conserve Maine's biodiversity in a changing climate for infrastructure resiliency, carbon sequestration and storage, and human communities.

Provide incentives to promote conservation of natural and working forests; these areas contain habitat features for a wide array of species and individuals, maintain healthier soils, store more carbon, and are more resilient to changes in tree species composition, disease, and pests.

Conserve climate resilient landscapes and strongholds, biogeographically diverse landscapes, wetlands, streams and riparian areas, and the connections among these areas so that species can move unimpeded across the landscape.

Promote aquatic, terrestrial, and riparian habitat connectivity in conservation and management.

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◆ Related Research ◆

Future Distribution and Productivity of Spruce-Fir Under Climate Change: A Comparison of the Northeast and the Lake States



The CRSF hosts the monthly webinar series [Science and Practice: Addressing Forest Climate Change in Maine](#). The series features a panel of researchers, scientists, and stakeholders focused on issues of climate change and forest health, recreational use, forest management, biodiversity and pests, as well as the role of carbon and greenhouse gases and how it is influencing Maine's forests and forest economy.