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# Climate Models Project New England Fall Foliage Losing Brilliance

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DURHAM, N.H. -- Every autumn around New England, scenic drives become packed with tourists enjoying the vibrant fall foliage. But a new report, commissioned by Congress and recently released by the University of New Hampshire's Institute for the Study of Earth, Oceans, and Space, predicts a less colorful picture of fall due to continuing climate change.

The New England Regional Assessment (NERA) report, "Preparing for a Changing Climate," projects a warming of 6 to 10° F over the next century and increases in precipitation from 10 to 30 percent for New England and upstate New York if carbon dioxide continues to accumulate in the atmosphere. Two respected climate models, the Hadley Model and the Canadian Model, were used in the assessment.

"Under either model, we would lose the kind of weather that makes for spectacular fall colors," says UNH Professor of Forest Resources Barrett Rock, the report's lead author.

Researchers note a changing climate can play a significant role in determining foliage brilliance. Since climate change involves changes in both physical climate (temperature, precipitation) and chemical climate (air quality and acidic precipitation) it is likely to have profound impacts on forests in many ways.

According to Shannon Spencer, UNH research scientist, "An increase in temperature due to climate change can push back early frosts from mid-October to December. There are already signs of that; we've seen an increase

in the growing season of eight to 10 days. Cold days and October frosts play a key role in the color display of fall foliage, when plants begin to break down their chlorophyll to conserve nutrients for the following spring."

Tree species migration may be the most devastating impact on regional forests. The climate models suggest that by the year 2100, the major species of New England forests will be oak and hickory. The reds, oranges and yellows of the maples, birches and beeches may be replaced in the landscape by the browns and dull greens of oaks.

"One of the dramatic pieces of this report is a forest cover analysis using climate models projecting how species might migrate," says Spencer. "It showed that maple trees are near their ecological boundary, and a little bit of climate change could push them over their threshold."

Evidence of what may be coming can be found in foliage records from the year 1998, the warmest year on record. Delayed killing frosts in November and December led to trees keeping their leaves longer than usual, and the colors were delayed and muted in many parts of the region.

The abundance of maple trees is part of what makes New England such a popular destination for fall tourists. Tourism employs 250,000 New Englanders and another 106,000 upstate New Yorkers, paying wages of more than \$6 billion. According to the state office of tourism, fall foliage-related tourism accounts for approximately 20 to 25 percent of total annual tourism in Vermont and Maine.

The report concludes that high levels of uncertainty still exist regarding the full impact of climate change on fall tourism. George Hurtt, research assistant professor in UNH's Complex Systems Research Center, cautions that the scientists are not making predictions, but are rather projecting the future based on current trends and the best global computer models available today. He and Rock emphasize that data is based on one scenario which doesn't take into consideration how humans may alter their behavior in the future to mitigate the problem. Both say action must be taken to reduce CO2

emission and increase energy efficiency.

The NERA report is posted on the Internet at <http://www.necci.sr.unh.edu/reports.html>. For more information, contact Hurtt or Spencer at (603) 862-1792.

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