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Researchers Show That Climate Change in Future Likely to Produce Novel Plant Communities

The forests we see today may not exist in the future, if the past is any guide. Composition of forests likely will change in the future, as they have in the past, according to research into the fossil record, published by University of California, Santa Barbara post-doctoral fellow John W. Williams and co-authors in a recent edition of the journal Ecology.

Research shows that climate change over the past 25,000 years was responsible for vastly different and constantly changing assemblages of types of trees, said lead author Williams, based at the National Center for Ecological Analysis and Synthesis (NCEAS) at UC Santa Barbara.

"A lot of trees are dying right now oaks in California, chestnut, elm and spruce in the East and while the direct causes are pests and fungal attacks, the indirect cause could be climate change, making the trees more stressed out," said Williams. "It becomes harder for them to defend against other causes of mortality."

In developing his report, Williams and co-authors did not look at a single tree, twig, or leaf. Instead, they analyzed data from computerized data sets accessible by the Internet. Using the North American Pollen Database, a collection of fossil pollen records collected from lake sediments over the past 30 years, and climate model

simulations, the authors were able to independently track vegetation change and climate change in Eastern North America during the past 25,000 years.

From this sediment scientists have been able to match up the assemblages of trees that were present during a variety of climatic periods. The results showed short lag times and large changes in vegetation in response to rapid climate change. Plant communities that are unlike any today grew under climates also unlike any today, suggesting that future climate change may also produce novel plant communities.

The authors note that vegetation composition has changed rapidly in the past 100 to 200 years (the life span of a single tree) and may change similarly rapidly in the future. "There is the potential for very rapid changes in forest composition," said Williams. The Intergovernmental Panel on Climate Change projects a rise in temperature of 2.7 to 9.9 degrees Fahrenheit over the next century which would cause major changes in trees and other vegetation. "The implications of change are large," said Williams. "They include things like water availability, habitat for endangered species and use of recreational areas."

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