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Researchers Find Tree-Killing Hurricanes Could Contribute To Global Warming

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DURHAM, N.H. - In the first long-term study of hurricane impact on U.S. trees, researchers show that hurricane damage can diminish a forest's ability to absorb carbon dioxide, a major contributor to global warming, from the atmosphere. The results will be published in an upcoming issue of the Proceedings of the National Academy of Sciences.

The study, led by researchers from Tulane University and including the University of New Hampshire, examined the impact of tropical cyclones on U.S. forests from 1851-2000 and found an average of 97 million trees have been affected each year for the past 150 years over the entire United States, resulting in a 53-million-ton annual biomass loss and an average carbon release of 25 million tons.

"Disturbances such as hurricanes have a large influence on forest dynamics and carbon storage of ecosystems," says UNH ecologist and co-author George Hurtt.

Trees absorb carbon dioxide as they grow, and release it when they die - either from old age or from trauma such as that caused by hurricanes. When trees are destroyed en masse by hurricanes, not only will there be fewer trees in the forest to absorb greenhouse gases but forests could eventually become emitters of carbon dioxide, warming the climate.

The study, which was led by Tulane postdoctoral research associate Hongcheng Zeng, establishes an important baseline to evaluate changes in the frequency and intensity of future landfalling hurricanes.

"If landfalling hurricanes become more intense or more frequent in the future, tree mortality and damage exceeding 50 million tons of tree biomass per year would result in a net carbon loss from U.S. forest ecosystems," says Tulane ecologist and co-author Jeff Chambers.

Chambers compares the data from this research to a 2007 study that showed a single storm - Hurricane Katrina - destroyed nearly 320 million trees with a total biomass loss equivalent to 50-140 percent of the net annual U.S. carbon sink in forest trees.

Computer modeling studies are underway now at UNH to assess the effects of potential future hurricane disturbances on forest carbon balance. "If future carbon losses due to increased hurricane intensity and/or numbers outpace future forest regrowth rates, then these systems will lose carbon to the atmosphere and add to global warming," notes Hurtt.

Adds Chambers, "The bottom line is that any sustained increase in hurricane tree biomass loss above 50 million tons would potentially undermine our efforts to reduce human fossil fuel carbon emissions."

The study used field measurements, satellite image analyses, and empirical models to evaluate forest and carbon cycle impacts. Forest impacts were primarily located in Gulf Coast

areas, particularly southern Texas and Louisiana and south Florida, while significant impacts also occurred in eastern North Carolina.

Study contributors also included Tulane lab researchers Robinson Negró-Juárez and David Baker, and Mark Powell at the Hurricane Research Division, National Oceanic and Atmospheric Administration.

The University of New Hampshire, founded in 1866, is a world-class public research university with the feel of a New England liberal arts college. A land, sea and space-grant university, UNH is the state's flagship public institution, enrolling 11,800 undergraduate and 2,400 graduate students.

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