| UC Berkeley researchers find forests are becoming younger, smaller

A recent review study that included campus researchers found that shifting dynamics within the forest community have led to global forests becoming younger and smaller.

The review study's primary finding was that global forests are decreasing in terms of tree size due to increased mortality of large trees, according to co-author and UC Berkeley graduate student Adam Hanbury-Brown. He added that the study found smaller trees cannot store as much carbon as bigger trees, which leads to a reduction in the amount of carbon that forests can store.

"This is occuring in response to anthropogenic land use change, increasing frequency and severity of disturbances (such as drought, wildfire, and insect outbreaks), and climate change," Hanbury-Brown said in an email.

The researchers compiled, integrated and interpreted vast amounts of information from published studies for this review study, according to co-author and forest ecologist Kristina Anderson-Teixeira, who also leads the ForestGEO Ecosystems and Climate Program.

The author list includes many top experts in the field, each of whom contributed content in their specific area of expertise, Anderson-Teixeira added.

According to Matteo Garbelotto, a campus professor and principal investigator for the UC Berkeley Forest Pathology and Mycology Lab, about 80% of Earth's biodiversity is found in forests — with a significant portion of that residing in what is defined as old-growth forests.

Garbelotto added that a significant consequence of the study's findings is that some, if not all, of the biodiversity associated with larger trees will be lost.

"The impacts will be global given the critical role forests play in sustaining the biosphere," said campus forestry professor John Battles in an email.

Anderson-Teixeira added that the study demonstrates that human activities, notably deforestation, logging and climate change, are also reducing the amount of carbon stored in forests.

Battles pointed to how, even in Berkeley, "major threats" the city faces are associated with human decisions.

"We are experiencing larger and more severe fires than in the pre-settlement era," Battles said in the email.

Hanbury-Brown also emphasized that the global trends in forest dynamics illuminated by this study affect all people, because as forests change, so do the essential ecosystem services they provide. Such services may include regulating water runoff, terrestrial carbon storage and supplying sustainable timber, according to Hanbury-Brown.

Battles noted, however, that it will be the nearby communities who depend on forests for their livelihoods that will be the most impacted by this loss of function.

Looking ahead, Anderson-Teixeira warns that the positive feedback between forests and climate heightens the urgency of mitigating climate change.

She outlined effective mechanisms for climate change mitigation, which include conserving, restoring and managing forests to reduce the risk of catastrophic disturbances.

“Not only have our past activities been influential, but the future trajectory of forest dynamics is largely in human hands,” Anderson-Teixeira said in an email.

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