

# Old growth forests are valuable carbon sinks

September 10 2008

---

Contrary to 40 years of conventional wisdom, a new analysis to be published Friday in the journal *Nature* suggests that old growth forests are usually "carbon sinks" - they continue to absorb carbon dioxide from the atmosphere and mitigate climate change for centuries.

However, these old growth forests around the world are not protected by international treaties and have been considered of no significance in the national "carbon budgets" as outlined in the Kyoto Protocol. That perspective was largely based on findings of a single study from the late 1960s which had become accepted theory, and scientists now say it needs to be changed.

"Carbon accounting rules for forests should give credit for leaving old growth forest intact," researchers from Oregon State University and several other institutions concluded in their report. "Much of this carbon, even soil carbon, will move back to the atmosphere if these forests are disturbed."

The analysis of 519 different plot studies found that about 15 percent of the forest land in the Northern Hemisphere is unmanaged primary forests with large amounts of old growth, and that rather than being irrelevant to the Earth's carbon budget, they may account for as much as 10 percent of the global net uptake of carbon dioxide.

In forests anywhere between 15 and 800 years of age, the study said, the net carbon balance of the forest and soils is usually positive – meaning they absorb more carbon dioxide than they release.

"If you are concerned about offsetting greenhouse gas emissions and look at old forests from nothing more than a carbon perspective, the best thing to do is leave them alone," said Beverly Law, professor of forest science at OSU and director of the AmeriFlux network, a group of 90 research sites in North and Central America that helps to monitor the current global "budget" of carbon dioxide.

Forests use carbon dioxide as building blocks for organic molecules and store it in woody tissues, but that process is not indefinite. In the 1960s, a study using 10 years worth of data from a single plantation suggested that forests 150 or more years old give off as much carbon as they take up from the atmosphere, and are thus "carbon neutral."

"That's the story that we all learned for decades in ecology classes," Law said. "But it was just based on observations in a single study of one type of forest, and it simply doesn't apply in all cases. The current data now makes it clear that carbon accumulation can continue in forests that are centuries old."

When an old growth forest is harvested, Law said, studies show that there's a new input of carbon to the atmosphere for about 5-20 years, before the growing young trees begin to absorb and sequester more carbon than they give off. The creation of new forests, whether naturally or by humans, is often associated with disturbance to soil and the previous vegetation, resulting in decomposition that exceeds for some period the net primary productivity of re-growth.

Old growth forests, the study said, continue to sequester carbon for many centuries. And when individual trees die due to lightning, insects, fungal attack or other causes, there is generally a second canopy layer waiting in the shade to take over and maintain productivity.

One implication of the study, Law said, is that nations with significant

amounts of old forests may find it somewhat easier to offset greenhouse gas emissions if those forests are left intact. It will also be necessary, she said, for land surface models that attempt to define carbon balance to better characterize function of old forests.

Many of the conclusions from the study were based on data acquired from the AmeriFlux and CarboEurope programs, researchers said. Multiple funding sources included the U.S. Department of Energy, CarboEurope, the European Union, and others. Authors were from institutions in the U.S., Belgium, Germany, Switzerland, France and the United Kingdom.

Source: Oregon State University

Citation: Old growth forests are valuable carbon sinks (2008, September 10) retrieved 18 April 2024 from <https://phys.org/news/2008-09-growth-forests-valuable-carbon.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.