

FOR IMMEDIATE RELEASE



Contact: Clarisse Hart, Harvard Forest Outreach Manager
978-756-6157 (9a-5p); hart3@fas.harvard.edu

Jane Salerno, Clark University Media Relations
508-793-7554; jsalerno@clarku.edu

Study: Forest Clearcuts Show Sustained Losses of Carbon, Surprising Trends in Water

PETERSHAM, Mass.—A new study out of the Harvard Forest, released today in the journal *Global Change Biology*, is the first detailed account of how carbon, water, and energy balances shift in the three years following the clearcut of a deciduous forest. The study, conducted by [Clark University](#) Professor [Christopher Williams](#) and colleagues in a 20-acre clearcut in Petersham, Mass., reveals a steady loss of carbon dioxide to the atmosphere, despite rapid recovery of plant growth.

Clearcutting, an extreme approach to forest harvesting in which all trees are cut and removed from a sizable area, comprises only a fraction of harvests in Massachusetts but could become more widespread as invasive insects and other forest threats expand in the region.

Williams, lead author of the study, explains, “Forest harvest alters a host of processes important to the local and global climate system, such as carbon storage and uptake, water use, and absorption of solar radiation.”

Carbon was a major focus of the study because of its important role in controlling the climate. In stark contrast to a clearcut area, intact forests are able to pull carbon dioxide from the atmosphere and store it in trees, creating a carbon “sink” that helps to offset greenhouse gas emissions released by fossil fuel combustion and other sources. The clearcut area studied gave off more carbon dioxide than it stored, with nearly half of the CO₂ rising from exposed, disturbed soils and an additional 18 percent from decomposing wood. Williams adds, “The cleared area will only become a significant sink for atmospheric carbon after a decade or more, and full recovery of forest carbon stocks requires many decades of regrowth.”

Meanwhile, the picture on the ground is one of very rapid recovery of vegetation. The team tracked plant regeneration, documenting the rapid growth of many native species, including ferns, sedges, blackberry, starflower, red maple, and pin cherry. This surge in plant growth, says Williams, provides valuable habitat and food for wildlife.

After forest harvest, water runoff is a chief concern for land managers. Although there was an immediate increase in moisture on the site due to the decline in water released by trees, the study revealed a surprise. Vigorously growing plants in the clearcut quickly recovered the rate of ecosystem water use through evaporation, thereby allowing only a modest, short-lived increase in the amount of water that runs off to lakes, streams, and rivers. According to Williams, “By the second and third years

of forest recovery, the amount of water released to the atmosphere by evaporation in the clearcut was similar to that of neighboring hemlock and red oak forests.”

David Foster, director of the Harvard Forest, adds, “Overall, the study demonstrates the remarkable ability of a forest to recover after even severe disruption.”

The study required intensive effort by a host of graduate and undergraduate students from Clark University, with funding from NASA, the National Science Foundation’s Long-Term Ecological Research Program, and student support through the Harvard Forest Summer Research Program.

The study’s findings are expected to increase accuracy in future models of climate and global change.

###

The Harvard Forest, founded in 1907 and located in Petersham, Mass., is Harvard University's outdoor laboratory and classroom for ecology and conservation, and a Long-Term Ecological Research (LTER) site funded by the National Science Foundation. Its 3,700 acre property is one of the oldest and most intensively studied research forests in the U.S. Open to the public year-round, the site includes educational and research facilities, a museum, and recreational trails. More information can be found at <http://harvardforest.fas.harvard.edu/>.

For more information or an interview with Professor Williams, contact Clarisse Hart at Harvard Forest (978-756-6157) or Jane Salerno at Clark University (508-793-7554). Photos and the original scientific paper are available at: <http://harvardforest.fas.harvard.edu/press-resources-clearcut-forest-impacts-1018>.