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Harvard Study Shows Sprawl Threatens Water Quality, Climate Protection, and Land Conservation Gains in Massachusetts

Important findings reveal promise and peril of land-use decisions

Petersham, MA - A groundbreaking study by Harvard University's Harvard Forest and the Smithsonian Institution reveals that, if left unchecked, recent trends in the loss of forests to development will undermine significant land conservation gains in Massachusetts, jeopardize water quality, and limit the natural landscape's ability to protect against climate change.

The scientists researched and analyzed four plausible scenarios for what Massachusetts could look like in the future. The scenarios were developed by a group of forestry professionals, land-use planning and water policy experts, and conservation groups. The scenarios reflect contrasting patterns and intensities of land development, wood harvesting, conservation, and agriculture. The two-year study is unique in its forward-looking approach and its use of sophisticated computer models to conduct a detailed acre-by-acre analysis of the entire forested landscape of Massachusetts over 50 years.

"What we found is that land-use decisions have immediate and dramatic impacts on many of the forest benefits people depend on," said Jonathan Thompson, Senior Ecologist at Harvard Forest and lead author of the new study. This is the first time a study of this magnitude has been conducted for an entire state. Thompson goes on to say, "Massachusetts is an important place to study land-use because it is densely populated, heavily forested, and experiencing rapid change – much like the broader forested landscape of the eastern U.S. The results of the study show that sprawl, coupled with a permanent loss of forest cover in Massachusetts, create an urgent need to address land-use choices."

"We know from decades of research that forests are more than a collection of trees, they are 'living infrastructure' that works 24-hours a day to provide climate protection, clean water, local wood products, and natural areas for people and wildlife. The results of this new study show that seemingly imperceptible changes to the land add-up in ways that can significantly enhance or erode these vital benefits, depending on the choices we all make," said David Foster, Director of the Harvard Forest and co-author of the study.

The stakes are high but there is good news in the study. "The *Forests as Infrastructure* scenario shows it's possible to protect forest benefits while also increasing local wood production and supporting economic development, by making important but achievable changes," said Thompson. *Forests as Infrastructure* clusters more of the development, implements "improvement forestry" on much of the harvested land, and increases the rate of forest conservation with a focus on priority habitat. By 2060, compared to *Recent Trends*, this scenario would:

- Limit flooding risks in virtually all of the state's major watersheds
- Protect water quality by minimizing impervious surfaces like roads and parking lots

- Grow 20% more high-value trees like large oak, sugar maple, and white pine
- Double the amount of local wood harvested
- Maintain a 35% increase in the storage of carbon that would otherwise warm the earth
- Reduce forest fragmentation by 25%
- Protect a quarter-million more acres of high-priority wildlife habitat

Kathy Fallon Lambert, Director of Science and Policy at the Harvard Forest and co-author of the study, says the timing of the study is critical for the Commonwealth. “Not only are we experiencing this historic downturn in forest cover, but the legislature is contemplating changing our zoning laws for the first time in 40 years. In addition, the environmental bond bill will set conservation funding levels for the next five years.” Lambert says the study’s findings point to three broad policy directions: recommitting to land conservation, promoting sustainable forestry in the Commonwealth, and redoubling land-use planning and smart-growth efforts.

The team has received funding from the National Science Foundation to extend the study to include the five other New England states. By using science to understand and inform land-use decisions here in Massachusetts, the researchers are building on the Commonwealth’s history as a leader in science and conservation to help shape the future of one of the most globally significant forested regions in the world.

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Download the report and the executive summary with policy addendum; watch a short video on the report; and access maps, figures, and b-roll at: http://harvardforest.fas.harvard.edu/changes-to-the-land.

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The Harvard Forest is a department of the Faculty of Arts and Sciences (FAS) of Harvard University. The research center is based in central Massachusetts and is comprised of 3,500 acres of land, research facilities, and the Fisher Museum. Since 1988, the Harvard Forest has been a Long-Term Ecological Research Site funded by the National Science Foundation to conduct integrated, long-term studies of forest dynamics.