

Harvard study urges Mass. to embrace 'forests as infrastructure'

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A new Harvard study urges Massachusetts to optimize its forests' ability to store carbon and maintain water quality as part of its future climate adaptation and mitigation goals.

Additionally, the study's authors modeled a scenario where these goals could be met while still increasing the amount of timber harvesting taking place on the state's 3 million acres of forested land.

And as policymakers appear ready to update the state's zoning laws, the authors also encourage more concentrated development to reduce conflict between future community growth and woodlands.

"Our ability to be resilient to climate change is linked to how much forest we retain on the landscape," said Jonathan Thompson, senior ecologist with the Harvard Forest program at Harvard University in Cambridge, Mass. "Conservation matters, so we need to redouble our efforts."

With this study, "we've shown the benefits of growing smart as opposed to growing dispersed and that forests are generally underutilized as a source of local wood and local fuel," Thompson said.

Balancing more timber harvesting with less water runoff

Harvard Forest and the Smithsonian Institution worked with the Massachusetts government and local environmental groups to develop four forest management scenarios for the study.

The researchers then modeled the impacts and benefits of these scenarios over the next half-century, assuming that climate change will cause a total temperature increase of 4 degrees Fahrenheit and between a 5 and 7 percent increase in yearly precipitation in the state.

They concluded that one scenario, dubbed "Forests as Infrastructure," provided the maximum benefit for both people and the environment.

This scenario envisions policymakers and private landowners assuming more aggressive forest management practices, protecting about 15,000 acres of woodlands per year and designating

two-thirds of this new area as "priority habitat." The scenario also has cities and towns prioritizing "clustered development" while still growing as projected, the executive summary states.

To optimize carbon sequestration, older and bigger trees like oaks and white pines would be preserved, Thompson said, while younger trees like red maples, which weren't as historically dominant in the state, could be harvested more. In fact, this scenario includes a 70 percent increase in timber harvesting in the state.

Compared with a scenario that continues Massachusetts' forest management trends between 1999 and 2005, during which time about 10,000 acres of land was conserved each year, the Forests as Infrastructure scenario sequestered about 4 percent less carbon.

But the Forests as Infrastructure scenario more effectively prevented increases in water runoff that are projected to take place in Massachusetts as climate change brings heavier precipitation, Thompson said, making it better at mitigating the state's future flood risk.

If recent forest management trends continue, models projected that six of Massachusetts' 27 major watersheds would see a 10 percent increase in runoff. With the Forests as Infrastructure scenario, only one of Massachusetts' watersheds saw the same water runoff increase.

Also, Thompson argued, "you can imagine there are a lot of carbon benefits from harvesting your wood and fuel locally."

Report used to encourage Mass. zoning reform

The report is meant to guide upcoming forest management policy decisions in Massachusetts. For example, local environmental groups are using its findings to promote the passage of the state's first zoning reform legislation in 35 years, [H.B. 1859](#), which encourages more concentrated development and increased protections for natural resources.

"This report isn't a silver bullet that will bring the zoning bill across the finish line, but it's an excellent arrow in the quiver," said Steve Long, director of government relations with the Massachusetts Nature Conservancy.

The Nature Conservancy contributed some of its own findings on climate-resilient forests to the report. When considering how to cut future climate risks, policymakers must also "think about protecting the most resilient places that include biodiversity that can withstand the impacts of harsher weather and of more invasive species ... that will come with climate change," Long said.

That the Forests as Infrastructure scenario showed that an increase in timber harvesting could improve forest resiliency was "a very interesting finding to us," said Stephanie Cooper, assistant secretary for land and forest conservation with the state's Office of Energy and Environmental Affairs.

Cooper also said the study underscored forests' role in mitigating the impacts of increased precipitation, noting that the state currently faces a cost of about \$18 billion to address future stormwater issues.

"Forest conservation and relying on this green infrastructure is a low-cost option in terms of dealing with these issues," she said.