

# Upper Midwest forests are losing diversity, complexity

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Forests in the nation's Upper Midwest have changed greatly since the time of the early settlers. And more changes may be coming.

That's according to research done by Lisa A. Schulte, assistant professor in Iowa State University's department of Natural Resource Ecology and Management and her team of researchers.

"There's been a shift in the entire ecosystem," said Schulte, whose research has recently been published in the journal *Landscape Ecology*.

For the study, Schulte, along with Laura Merrick of Iowa State; David Mladenoff of the University of Wisconsin, Madison; and Thomas Crow and David Cleland of the U.S. Forest Service, took forest composition information as described in the Public Land Survey from the mid-1800s and compared it with today's forests.

She found that none of the areas surveyed \_ from Minnesota to Wisconsin to Michigan \_ have the same tree species makeup as they did 200 years ago.

"This system was made up of largely conifers with some deciduous trees, and now we have the opposite," she said.

Conifers -- mostly pines and other evergreens -- have gotten more scarce while deciduous trees such as aspen, birch and maple have taken their place. Trees in today's forests also tend to be smaller.

"Our analysis shows a distinct and rapid trajectory of vegetation change toward historically unprecedented and simplified conditions," Schulte's published paper says.

"In addition to overall loss of forestland, current forests are marked by lower species diversity,

functional diversity and structural complexity compared with pre-Euro-American forests."

The changes have come from several stresses on the ecosystem including pests, diseases, timber harvest and high populations of white-tailed deer, which feed on young trees, according to Schulte.

The effect of humans may be the most important factor in the shift.

"Human land use of forested regions has intensified worldwide in recent decades, threatening long-term sustainability," the report says.

"Primary effects include conversion of land cover or reversion to an earlier stage of successional development. Both types of change can have cascading effects through ecosystems; however, the long-term effects where forests are allowed to regrow are poorly understood."

What is understood, says Schulte, are the stresses the forest changes are having on wildlife, including birds. Schulte has looked at several species of warblers that have historically inhabited the area. According to her findings, the outlook for them doesn't look good.

"These birds don't have much habitat at present, compared to historical times," she said.

They are also an important and beautiful element of biodiversity, she said. They perform an important function in these forests by eating insects that can become forest pests.

Among natural resource professionals, the forests in the Upper Midwest had been suspected to be changing for some time, according to Schulte, but now there is evidence to support the theories.

"We knew that these kinds of changes had happened," she said. "But this is the first paper to

really quantitatively look at it across the entire region. So, anytime you can quantitatively show something, it has a lot more power than simple conjecture."

Source: Iowa State University

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