

Not out of the Woods

A hotter, dryer climate spells an uncertain future for Michigan's forests.

STORY & PHOTOGRAPHS BY
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Top left: A hilltop view near Grayling, where the vastness of Michigan's forest resources is clear. **Top right:** Climate change could cause bogs like this one in Roscommon County to dry up, leaving them more susceptible to wildfires.

On a drive into northern Michigan, the traffic dwindles, the farms and radio stations grow sparse and the view soon opens out to a great sea of leaves. Approximately 53 percent of Michigan—some 19.3 million acres—is covered in forests, according to the U.S. Department of Agriculture's Forest Service division. But the climate that supports such vast forests is changing, and the warmer, dryer times ahead may have significant effects on Michigan's woodlands.

"We are seeing warmer temperatures; it's hard to dispute that," said Richard Kobe, an associate professor of forest ecology at Michigan State University. Warmer temperatures will alter rain and snow patterns and dry out soils and vegetation. They may also prompt larger populations of insects and limit some tree species, especially moisture-dependent species like yellow birch and eastern hemlock, Kobe

said. It may be especially difficult for these trees to grow in the Lower Peninsula, where greater solar radiation dries up the wet areas they seek. Though loss of species diversity is important, researchers say other climate change effects are more troubling.

Fire is one example.

The damp lowlands of northern Michigan are thickly tangled with moisture-dependent trees that "like to live with their feet wet," said Marvin Roberson, forest policy specialist at the Sierra Club's Mackinac chapter.

But as temperatures rise, lower precipitation could make forests more flammable, said Kobe.

Lower water levels and more drought-stressed trees in the wetlands of the Upper Peninsula are already apparent, according to Roberson. Increasingly dry summers may increase the frequency and intensity of forest fires—a possibility that was already manifested this summer as more than

18,000 acres of U.P. forest burned in the Sleeper Lake fire. The fire was the third largest in the state's history, according to The Nature Conservancy.

Yet the flames themselves are not as troubling as their unseen effect—the release of carbon dioxide stored inside the trees. Such greenhouse gases cause more heat to be trapped in the atmosphere and increase temperatures and aridity. That can cause more fires and the release of yet more carbon dioxide—a process known as a positive feedback loop.

The problem doesn't stop at the trunk of the tree, however. The organic soil in which the trees grow is also damaged and creates problems.

According to a report published in *Geophysical Research Letters* in 2006, Alaskan peat bogs—wet marshes with layers of moss and soils that are rich with organic matter—have been drying up, leading to

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more frequent fires. The unsettling result is that centuries worth of mercury, which has been stored in the peat where it is relatively harmless, can be released by a single blaze.

Merritt Turetsky, an assistant professor of plant biology at Michigan State University and co-author of the report, said that though the organic layers of Michigan's soils aren't as thick or widespread as those in Alaska, there are areas with thick ground layers of moss.

Such areas were burned in the Sleeper Lake fire, according to Jack McGowan-Stinski, the Nature Conservancy's Michigan fire manager. He reported that the peat—or organic soil—that is normally saturated to the point that it will seldom ignite, was burning 2 feet to 3 feet or more below the surface.

The mercury released by fire can either stay in the atmosphere for as much as a year, or fall to the ground locally. Either way, it may be ingested by organisms at the bottom of the food chain, and become more concentrated as it works its way to the top—humans.

Exposure to mercury can permanently damage the brain, kidneys and developing fetus, according to the Agency for Toxic Substances and Disease Registry, a division of the U.S. Department of Health and Human Services. It may also cause tremors, changes in vision or hearing and memory problems. Short-term exposure can lead to lung damage, nausea, vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes and eye irritation.

Since auto plants, factories and coal-burning power plants release

mercury daily, deposits in Michigan's richly organic lowlands could be significant. A 2002 inventory by the Michigan Department of Environmental Quality found that the state's coal-fired electric utilities alone emit an estimated 2,488 pounds of mercury each year.

Despite the negative implications, there is good reason to be hopeful about mercury levels in Michigan. In 2006, Gov. Jennifer Granholm announced plans to slash mercury emissions from the state's power plants 90 percent by 2015. Though reducing mercury emissions won't stop forest fires, it will reduce the mercury released when fires occur.

Many researchers emphasize that the processes of climate change are exquisitely complex and interwoven, and that nobody can predict the future with certainty. In fact, some say that a warmer planet may not be all that bad for Michigan's forests.

Though the future of a changing planet is fraught with uncertainty, Kobe advises reason and ingenuity over panic. "I don't think we're going to get to a point where things are irrecoverable," he said. "As a bottom-line assessment, I don't think the world is going up in flames." 🌍

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