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Scientists plan a comeback for Ukraine's war-ravaged forests

Destruction could open the door to management reforms

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Ukrainian tanks take cover in a pine plantation near Kreminna in February. SCOTT PETERSON/GETTY IMAGES

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In addition to its horrific human toll, the war in Ukraine has inflicted widespread damage on the nation's forests. Bombs and missiles have sparked thousands of fires, and "artillery breaks trees in half—it basically mows the forest," says Brian Milakovsky, a U.S.-born forest ecologist who lived in eastern Ukraine before fleeing the country.



Ironically, some forestry experts say the destruction could lead to a major overhaul of how Ukraine manages its forests, changes they say will help ensure these landscapes can better cope with climate change, support biodiversity, and protect water quality. Optimistic that Ukraine will prevail in the war, the researchers are already planning for this greener postwar future. Milakovsky and Sergiy Zibtsev, a forest scientist at the National University of Life and Environmental Sciences of Ukraine, shared their vision during a webinar held last week by the Yale School of the Environment.

“We need to look at solutions that lead to different forest landscapes,” says Milakovsky, who continues to work on Ukraine forest issues from his new home in Latvia. “Because the status quo just is really struggling under climate change and war.”

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Even before the current war, Ukraine’s forests were considered some of the world’s most damaged. The expansion of agriculture in this major food exporter had vastly reduced forest cover; [nearly half of Ukraine is now cropland](#). In many of the forests that remained, open stands of fire-adapted Scots pine had been replaced by crowded, more fire-prone plantations. The dense stands were encouraged by Soviet-era policies that aimed to “pack as much wood as you can on every hectare,” Milakovsky says. But if “fire gets in, it just is death.”

Plantations are common in eastern Ukraine, where much of the fiercest fighting is now taking place. Since the Russian invasion began in February 2022, almost 20,000 fires have burned across 755,638 hectares, according to remote sensing data. Farmers accidentally started some fires when they burned fields to clear them, but weaponry ignited many others. Forests also have been damaged by the construction of trenches, bunkers, and roads. Some of the worst damage is along rivers, such as the Siverskyi Donets, that have become crucial lines of defense, Milakovsky says.

Ukrainian law encourages foresters to replant plantations whenever an area is logged or burned. To try a different management regime, they have to get special permission, and few seek it. “Economics, legislation, and habit” enable plantations to persist, Milakovsky said, despite increasing concerns that the monocultures do relatively little to support native species and can suck up scarce water.

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Researchers say the war damage presents an opportunity for a long overdue policy shift. The blazes and military activities are breaking up some plantations, for example, opening the door to creating more diverse mosaics of forest types, managed for a mix of restoration and logging, Milakovsky said. That will require political will but could result in more resilient woodlands. Forests with mixed species and well-spaced trees of varying ages would be less susceptible to intense fires and the droughts that are expected to become more common as the region’s climate warms, Milakovsky says. “Ukraine is pretty dry, and it’s getting drier.”

This year, a rainy winter has encouraged growth, priming forests for big burns, says Petro Testov, an ecologist with the Ukrainian Nature Conservation Group. “If next year will be dry, we could see very huge forest fires like in 2020,” he says, when blazes tore through pine forests around Luhansk, killing 17 people.

The researchers also hope to build groundwater protection into forest management. Sandy landscapes like those in southeastern Ukraine allow water to soak into the ground and replenish aquifers, but plantations can interfere. When fires thin them, wetlands often reappear and groundwater levels rebound. Shrinking plantations could avoid the “repeated depletion” of these water resources, Milakovsky said.

Zibtsev is planning to soon convene Ukrainian forest scientists—many of whom have relocated to other nations—to discuss how to advance these and other reforms and improve collaboration. Once the conflict ends, he and Milakovsky also hope to resume work the two began before the war with local foresters around the city of Kreminna—now one of the hottest combat zones. The local partners agreed to test alternative management methods, such as allowing low-value areas to naturally regenerate. “They liked those [sustainable forestry] ideas,” Zibtsev says, but worried about running afoul of government regulations. “All of them were just like: ‘Help us get some kind of [legal] protection.’”



In a statement, the State Forest Resources Agency of Ukraine said that it is “moving towards the trend of creating mixed forests, i.e. coniferous with deciduous, as well as the planting of additional shrubs.” But it also noted that the war has meant that “access is temporarily restricted to a significant area of forests. As of today, approximately 776.6 thousand hectares of forests ... are under Russian occupation or affected by hostilities.”

Even as Ukraine’s forest scientists look to the future, the war’s continuing toll on the forests they have worked in for years is never far from their minds. Copernicus, the European Union’s satellite monitoring system, [shows constellations of fires](#) across eastern Ukraine, particularly between the cities of Kharkiv and Luhansk.

Still, Zibtsev has little doubt that his vision of a conflict-free Ukraine, rich in sustainably managed forests, will be realized. “We expect within the next 20 years, there will be quite radical changes,” he says. “We’re in a position to push this agenda. And we already have some progress.”

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