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Shenandoah: The hemlock's last stand

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Shenandoah National Park's hemlocks are dying as an insect originally from Japan starves the trees.

Story highlights

- Some 95% of eastern hemlocks are now dead in Shenandoah National Park
- National Park Service using imported predatory beetles to combat HWA pests

Shenandoah National Park, Virginia (CNN)
Shenandoah is haunted by ghosts.

Just 15 years ago, the eastern hemlock tree, the mighty Redwood of the East, was a scenic highlight of Virginia's Skyline Drive, creating the shady groves that put Shenandoah National Park on the conservation map.

Now 95% of them are dead, rotting on the forest floor or still standing above the canopy as gray ghosts, with a few scattered survivors living on borrowed time as their attackers literally suck the life out of them. Some of these trees were up to 500 years old.

A century ago, local legend holds, a particularly beautiful grove of old-growth trees was saved from loggers when George Freeman Pollock and his wife, Addie, owners of Skyland Resort, paid them $10 per tree to leave the hemlocks alone. When President Herbert Hoover and his wife, Lou Henry, needed a place to escape Washington during the Great Depression, they picked a spot in a hemlock grove along the trout-filled headwaters of the Rapidan River. Workers building the President's cabin were explicitly ordered to incorporate an old hemlock rather than chop it down.

"Where you found hemlocks, you found particularly beautiful areas with unique ecosystems, shaded streams with brook trout and specific songbirds that needed that habitat," says Rolf Gubler, Shenandoah's biologist and forest pest manager. Hemlocks' deep shade can cool stream water as much as 7 degrees Fahrenheit, ideal for brook trout. Migrating songbirds such as the Blackburnian

Warbler, Black-throated Green Warbler, Wood Thrush and Blue-headed Vireo seek out hemlocks almost exclusively. But as the hemlocks have gone, so have the trout and songbirds.

For a decade, Gubler has been on desperate mission to try to save the trees, an effort that often seems more of a lost cause than the Army of Northern Virginia's last desperate battles of 1865. Instead of Five Forks and Appomattox, Gubler had the battles of Hemlock Springs, Rapidan Camp and Limberlost. Limberlost, saved by the Pollocks 100 years ago, had the oldest stand of old-growth hemlocks in the park, which now lie rotting on the ground. "Those are our heartbreak areas," Gubler admits. "You simply can't replace old growth."

Hemlock wooly adelgids, the white clumps on this branch, are attacking eastern hemlocks.

The enemy

The vicious attacker destroying this national natural treasure is no bigger than a speck of dust, which explains part of the difficulty in combating the threat. The hemlock woolly adelgid (Adelges tsugae if you like Latin; HWA for our purposes) is an aphid-like insect that takes its name from its sole prey and a protective white fluff it secretes to protect its eggs. Twice a year, the HWA lays between 50 and 300 eggs; the young bite into the base of a hemlock needle and suck out sap, disrupting the flow of nutrients. With no natural predators in the United States, before long natural reproduction leads to thousands of the insects slowly starving the tree to death. Once a hemlock is infested, its death sentence is three to 10 years.

HWA first arrived in the Pacific Northwest from Japan in the 1920s and spread to Washington, D.C., and Richmond, Virginia, by the 1950s, likely through infected nursery plants. From there the adelgid has moved about 20 miles a year. It was first spotted in Shenandoah in 1988, the year Gubler started working here. Within a few years, the trees started dying, first at warmer low elevations, then spreading rapidly throughout the park, exacerbated by gypsy moth infestation and drought. "By 2002, we saw upwards of 95% mortality in all our hemlock stands," Gubler laments. Treatments were long on effort and short on results.

Park officials started in 1997 with insecticidal soaps and oils, then pesticides, but were limited by the immense cost and logistical difficulties of reaching trees scattered throughout a mountainous forest to

spray twice a year. They've had the most success with imidacloprid, a neurotoxin injected into the soil and absorbed by the hemlocks, which kills the adelgids for as long as seven years.

But for almost all of the trees, it was too late. "If we'd gotten imidacloprid in '97, we could have saved a lot more hemlocks," Gubler says. And this effort is just a stopgap. Around the Skylands parking area or at the beginning of the nearby Limberlost Trail, you can see a handful of the 2,500 hemlocks that Gubler's team have saved and are continuously treating. However, the rest of Limberlost is a beautiful but sobering short walk through a graveyard: rotting hemlock trunks piled on top of each other, along with the occasional gray ghost standing barren above a thick undergrowth of black birch saplings taking over. "If you think you can kill enough to control the problem," Gubler says, "you're fooling yourself."

Gray ghosts of hemlock trees, foreground, are evidence of the tree's demise.

Introducing the beetles

Improbably, Gubler says, "I'm optimistic about the long-term health of hemlocks." The reason is no bigger than a grain of rice: what the National Park Service calls a "biocontrol," or what some would call fighting fire with fire -- the laricobius beetle, an imported natural predator that controls HWA in its native Japan. "Long-term, effective host-specific biocontrols are the best option for control," Gubler says. As importing insects can sometimes have unintended consequences, the National Park Service and U.S. Forest Service are taking it slow, with pilot releases of different species and careful quarantines.

So far, results have been promising, but it will be a decade before the beetles' population increases enough to have a measurable impact on HWA infestation. While it's too late to save more than a few specimen hemlocks in Shenandoah, the park is serving as a canary in the coal mine for others. HWA has also spread to the Great Smoky Mountains National Park, where they have a whopping 18,000 acres of hemlock-dominated forest, but its later start there allowed rangers to learn what worked and didn't work in Shenandoah.

A similar insecticide-based control program in the Smokies, started in 2002, is treating upward of 250,000 hemlock trees until the beetles are ready to take over. Gubler is optimistic this combination of treatments and biocontrols may present an ongoing solution. "In 20 to 40 years, we could turn a corner and see hemlocks start to rebound," he says. That may feel like a long time for humans, but not so bad when you're trying to save a 500-year-old tree.