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Park Service works to change the future of failing forests

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Crews assess the health of forests on National Park Service lands, where a diversity of plants in the understory is a good sign of future forest health. (Courtesy of National Park Service)

What makes it hardest for forested parks to thrive, especially near urban and suburban areas? The answer is often too many deer — and not enough plant diversity.

These were among the findings of a **2023 study** conducted by the U.S. National Park Service. Researchers looked at what was causing a large number of forested parks in the Northeast and Mid-Atlantic to be facing “imminent” or “probable” failure. Forest failure can occur after a wooded landscape’s composition and diversity have declined so much that its trees and shrubs are no longer regenerating quickly enough to replace themselves over time.

The Park Service study examined 39 national parks of varying sizes in the eastern U.S., from Virginia to Maine, and placed each into one of four categories of health: imminent failure, probable failure, insecure and secure. Twenty-

seven, or 70%, of those forested parks were diagnosed as facing either imminent or probable failure.

The forests of the Chesapeake and Ohio Canal National Historical Park and of George Washington Memorial Parkway, two DC-area parks popular with cyclists and runners, were both judged to be at risk of imminent failure. The forests of several historic battlefields, including Gettysburg National Military Park and Antietam and Monocacy national battlefields, fell into the probable failure category.

The study found that the greatest commonality among parks struggling with forest health was an overabundance of deer, which eat saplings and undermine a forest's ability to regenerate, causing noticeable gaps in the understory.

"Forest failure has a lot of causes, so you have to look at it on a park-by-park basis," said John Paul Schmit, a quantitative ecologist in the Park Service's National Capital Region Network. "[But] in our area, deer tend to be the worst problem. That's the first one to deal with."

A U.S. Forest Service study in 1993 found that forests could support the eating habits of up to 20 deer per square mile and remain healthy. Some of the national parks with at-risk forests see two or three times as many deer.

The solutions typically start with deer management. Several national parks in the Mid-Atlantic and Northeast now regularly cull deer to help keep their population at a manageable level. In the national parks of the nation's capital, deer culling is conducted with the help of nighttime sharpshooters about once a year. The deer meat is then tested for disease and donated to local food banks when possible.

Overly abundant deer and invasive species can contribute to forest failure in eastern national parks. (Courtesy of National Park Service)

Schmit said smaller parks are experimenting with fences to keep deer out of vulnerable forests. But even for small areas, fencing is not a perfect solution. They can be difficult and expensive to maintain, and determined deer find ways through or around them.

Still, less than two years after the study was released, parks that are actively managing deer are seeing forest improvements, staff say.

“The ones that have deer management are turning around,” said Kate Miller, a quantitative ecologist for the Park Service’s Northeast Temperate Network and Mid-Atlantic Network. “The ones that [without deer management] are either the same or getting worse.”

After a forest’s understory has reprieve from the deer, it can begin to sprout seedlings that turn into saplings for tomorrow’s trees — though it takes decades for deer management to result in more tree canopy and a healthier forest.

And that’s if it isn’t stymied by invasive species, another major contributor to forest failure in eastern national parks. Plants such as Japanese barberry, bittersweet and mile-a-minute weed can outcompete native species on forest floors where deer have wiped out saplings. The loss of natives can quickly upset the delicate balance of species that sustain the forest.

Strategies for removing and managing invasive species typically include applying herbicides and physically removing the plants. To be truly effective, the invasives must be quickly replaced by natives that once thrived there.

“If you treat invasives and there’s nothing native to grow in their place, they’ll just come back,” Schmit said.

Catoctin Mountain Park in Frederick County, MD, was one of the forests identified in the study as near failure. But it’s also a place where a combination of deer management, begun 15 years ago, and invasive plant controls are beginning to improve the forest’s health.

People who live near national parks often don’t realize that the nonnatives they plant in their yards often find their way to park woodlands, Miller said. Many landscaping plants, while advertised as “deer resistant,” are invasives that can spread quickly into adjacent forests. A prime example is the fast-growing shrub *Euonymus alatus*, also called burning bush or winged burning bush — an Asian native that “escaped cultivation” in North America more than a century ago and now plagues many forests.

A National Park Service staff member measures the growth of saplings in the understory of national park forests to predict future forest health. (Courtesy of National Park Service)

Deer and invasive species can chip away at a forest's health enough to make its trees more **susceptible to pests and diseases** too. That has been the case with the emerald ash borer, an Asian beetle that began to show up in eastern national parks about 15 years ago and has since wreaked havoc on native ash trees. The National Capital Region Network's monitoring **data** shows that ash trees in the region declined from an estimated 300,000 trees in 2009 to about 42,000 living ash trees by 2023.

Schmit said park staff are now monitoring the spread of beech leaf disease, another presumed invader, in Virginia's Prince William Forest Park, where it has been detected throughout the beech-dominant landscape as an emerging threat. Several other parks in the region are rife with beech trees, and treatment options for the disease are still in development.

Still, several parks that had been facing imminent forest failure are now seeing improvements, particularly through sustained deer and invasive management programs. A recent influx of federal funding for such programs has helped, Miller said.

Because "we're literally waiting for trees to grow," Schmit said, it will be a long time —measured in decades, not years — until there's any hope of saying, "We're done."

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