Popular wilderness area requires intensive management to remain natural

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Recreation ecologist Jeff Marion revisited dozens of campsites in Minnesota's Boundary Waters that he had surveyed for his doctoral research in 1982.

Some 250,000 annual visitors to Minnesota's Boundary Waters have a significant impact on the campsites along the area's 1,000 lakes in America's most visited wilderness area.

But while tree loss at campsites is huge, the news is not all bad, a Virginia Tech expert on the impacts of recreation on natural resources reported at the National Wilderness Conference in Albuquerque being held through Oct. 19.

In 1982, Jeff Marion, now an adjunct professor in the College of Natural Resources and Environment and a recreation ecologist with the U.S. Geological Survey, surveyed 96 of the 2,200 campsites in the Boundary Waters Canoe Area Wilderness for his doctoral research.

With funding from his agency and the U.S. Forest Service, which manages the wilderness area, he returned in July 2014 to document the impact of continued use on those sites and to measure recovery on 10 sites that had been closed.

He was assisted by Holly Eagleston of Wenatchee, Washington, and Jeff Feldhaus of Omaha, Nebraska, doctoral students in the Department of Forest Resources and Environmental Conservation, and field assistant Claire Underwood.

"In addition to documenting over three decades of camping impacts, this study is focused on helping managers make recreational visitation more sustainable," said Marion.

An important finding of the 1982 survey is that the impact of site use levels off. The impact on campsites receiving less than a dozen nights of use each year is two-thirds of that on sites receiving 60 or more visits. "Thus it's better to have a small number of well-used campsites than to disperse use and impact across a large number of sites," said Marion.

In 1982, researchers found tree damage at almost every site, root exposure at 84 percent of the sites, virtually no seedlings or saplings, and the replacement of native broad-leafed herbs by grasses and some

nonnative plants.

In 2014, the researchers made the same 94 measurements at each site. They measured soil loss, root exposure, tree damage, canopy cover, and vegetation cover for each plant species, comparing the campsites to adjacent undisturbed control sites.

"It took 45 minutes per site and we did five or six per day, canoeing in between," Marion said. "When a site was occupied, we asked permission. It was pretty cool to hear people tell stories about their experiences and about the importance of the Boundary Waters wilderness."

The researchers documented 34 percent fewer trees on campsites than in 1982 and damage to 44 percent of the remaining trees "despite three decades of Leave No Trace instruction," said Marion, who was a founding board member of the Leave No Trace education program.

In some cases, the Forest Service had removed potentially hazardous trees, a few sites had been reached by forest fires, and some suffered wind damage, "so we can't say that trees are missing just because of recreational use," Marion said. "But visitors continue to cut trees and strip birch bark to start fires, which essentially girdles the trees and can kill them."

"We found 384 stumps on campsites, and 1,054 stumps were visible from campsite boundaries," he continued. "That's an avoidable impact because you can get firewood from fallen trees."

Site use compacts and erodes the soil, which is one of the impacts that does not level off. The 81 sites measured this year have lost an estimated 194 dump truck loads of soil, or 1,935 cubic yards, Marion reported. "It's a small amount each year, but cumulative."

But there was also good news. Nonnative plants, such as dandelions and chickweed, were confined to campsites. The researchers did not find the invasive plant goutweed, which can out-compete native plants and was seen in 1982. The grasses that have spread across the sunnier campsites, a result of tree loss, are effectively reducing erosion.

And the closed sites can recover fully. While noting that impact is rapid and recovery slow, Marion reported that in three cases they were not able to pick the closed sites out of the wilderness. "That is wonderful news," he said.

He estimated that 15 years is enough time for a site to largely recover. "Bark will even grow over ax scars on trees."

Designated a protected wilderness area in 1964, the 109.5-million-acre Boundary Waters is among the country's best-managed wilderness areas, Marion said. "They are leaders in wilderness management. In 1983 I assisted Forest Service staff with a new effort to have their trail maintenance crew work on campsites. We developed site management actions that would prevent or reduce camping impacts."

Federal budget cuts over the past decade, however, have limited management efforts, according to Marion.

"If you have high visitation you have to pair it with intense management, but you have to do it in a natural way," he added. The philosophy of wilderness management is for impacts and management to remain "substantially unnoticeable," according to the Wilderness Act.

As Marion reported at the National Wilderness Conference, which observed the 50th anniversary of the Wilderness Act, suggestions for preserving wilderness areas include closing less sustainable campsites and selecting, constructing, and maintaining more resistant sites. Best

management practices include selecting sites that have bedrock in the sloping areas and limited amounts of flat terrain.

"And there must be visitor education, including improved Leave No Trace guidance and better communication," he said.

Provided by Virginia Tech