# Hemlocks still abundant despite adelgid infestations

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Hemlock woolly adelgids feed at the base of hemlock needles, depriving the tree of food and eventually killing it. Credit: USDA Forest Service

A recent analysis of two decades of USDA Forest Service Forest Inventory and Analysis (FIA) data shows the live volume of hemlocks in the eastern United States still increasing despite spreading infestations of hemlock woolly adelgid. FIA scientists from the Forest Service Southern Research Station (SRS) and Northern Research Station (NRS) published the information as an SRS e-Science Update in early August.

The FIA researchers conducted the analysis for this update on 20 years of data collected across 433 counties that stretch from southern Maine into northern Georgia. "When we started this project we really expected to see large-scale losses of hemlock at the landscape scale," says Sonja

Oswalt, SRS forester and one of four co-authors. "We were surprised to find that, at the broad scale, hemlock loss is nowhere near as dire as expected."

The researchers actually found an overall increase in live-tree hemlock basal area in both counties infested with hemlock woolly adelgid and those without infestations.

"Even though this is unexpectedly good news about hemlock survival on the larger landscape, we don't want to downplay the localized effects that many people are aware of," says Oswalt. "In eastern forests where hemlocks are often the keystone species they can support over 1,000 species birds, animals, and insects. The loss of hemlock stands in many of these areas is nothing less than devastating."

Two native species of hemlock—eastern and Carolina—grow in the eastern United States. Though a minor component in most of the forests of the eastern United States, high densities of eastern hemlock are found in New England and the mountains of the Southeast and Mid-Atlantic. The Carolina hemlock, similar in appearance to the eastern hemlock, is found only on rocky mountain slopes in the Southern Appalachian region. Stands of hemlocks across the ranges of both species have been decimated by infestations of the hemlock woolly adelgid.

A tiny insect introduced into the United States from East Asia, the hemlock woolly adelgid feeds at the base of hemlock needles, defoliating and eventually killing trees. Since the insect was first noticed in the 1950s, it has expanded its range at between 4.7 and 12.7 miles a year and currently infests about 45 percent of the range of hemlocks in the United States and 41 percent of all hemlock trees.

"The analysis also showed that the general regional trend in the East over the past 50 years has been one of increasing hemlock volume, even with

infestation by the hemlock woolly adelgid," says Randall Morin, NRS FIA research forester and primary author of the update. "Even though the insect has caused substantial negative impacts on hemlock at local scales, analysis of FIA data suggests that infestations have not yet reduced the overall abundance of hemlock, even in states where hemlock woolly adelgid has been active for decades."

The authors caution that the trend of increasing hemlock volume may not last much longer.

"Despite increasing hemlock volume over the last four decades across most of the eastern United States, the regions with long-established populations of hemlock woolly adelgid are also the regions where hemlock is accumulating slowest," says Morin. "Net growth rates decrease as years of infestation increase and mortality rates increase, with mortality starting to equal net growth in areas where hemlock woolly adelgid has been present for 10 to 20 years." As time goes on, the trend of increasing abundance may begin to reverse.

**More information:** Access the Science Update: www.srs.fs.usda.gov/pubs/38492

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