Long-term study reveals one invasive insect can change a forest bird community

May 23 2018

Acadian Flycatcher in a hemlock forest. Credit: D Williams

Eastern hemlock forests have been declining due to a non-native insect

pest, the hemlock woolly adelgid. A new study from *The Condor: Ornithological Applications* presents some of the best long-term data showing how the decline of a single tree species (eastern hemlock) leads to the disappearance of birds specialized to those trees. The data also indicate birds associated with non-hemlock habitat features (deciduous forest, woodland edge, and shrubs) are spreading into former hemlock forests. A single insect species has led to a less diverse bird community across this landscape.

Pennsylvania State University's Matthew Toenies and colleagues analyzed a long-term response to the decline of eastern hemlocks using vegetation and bird abundance surveys. The researchers took advantage of surveys they had conducted in 2000 before adelgids had caused hemlock decline and compared those data to new data from the same forests in 2015-16, after decline. They then analyzed how both individual bird species and groups of species responded to this habitat change.

The data showed that as hemlocks became less abundant in the forest, the bird species most associated with these trees also disappeared. As the hemlock-specific birds left, birds that are normally found in more general hardwood forests replaced them. Thus, biodiversity was reduced with the decline of hemlocks as well and the composition of the landscape became more similar over a larger area.

"Invasive species, climate change, and land-use change are all similar in that they make our world a less diverse place, and this study helps greatly in understanding how the loss of the eastern hemlock plays its own role in the degradation of biodiversity," adds University of Connecticut Professor Morgan Tingley, a community ecologist who was not involved in this research.

Lead author Matthew Toenies says, "To sum up, to people who are

saddened by the loss of hemlocks and the birds that rely on them, I would say one thing: We cannot turn back the clock—we cannot un-introduce the hemlock woolly adelgid; but we absolutely possess the power to prevent this story from repeating itself."

More information: Shifts in vegetation and avian community structure following the decline of a foundational forest species, the eastern hemlock, *The Condor: Ornithological Applications*, www.bioone.org/doi/full/10.1650/CONDOR-17-204.1

Provided by American Ornithological Society