

EASTERN HEMLOCK DECLINE IN RIPARIAN AREAS FROM MAINE TO ALABAMA

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Eastern hemlock (*Tsuga canadensis*) is an integral component of Appalachian forest ecosystems and is valued for its ecological functions and aesthetic qualities. It is a foundation tree species in riparian systems and is known to moderate stream temperatures and base flow. The hemlock woolly adelgid (*Adelges tsugae*) has the potential to decimate *T. canadensis* populations across its range, which may have negative impacts on ecosystem function in riparian management areas (RMAs). Research efforts addressing eastern hemlock decline have focused on local or state scale outbreaks. Wider scale regional research has been limited to *A. tsugae* trapping and mapping with little research on the condition of *T. canadensis* in RMAs across its range.

We initiated a long-term project to measure *T. canadensis* decline and stand replacement in riparian areas with permanent plots located from Maine to Alabama in the summer of 2008. Forty-nine hemlock stands were randomly located within publically owned RMAs. At each hemlock stand, we measured overstory and understory vegetation, and estimated *T. canadensis* decline. Additionally, we measured coarse woody debris (CWD) in the RMAs.

Preliminary results indicate strong gradients of eastern hemlock decline across its range with states above Massachusetts generally unaffected by *A. tsugae*. Mid-Atlantic and southern states had the highest decline levels. Virginia and North Carolina had the greatest mean decline levels, followed by New Jersey, West Virginia, and Massachusetts. Analysis will include evaluation of site and location factors that are associated with eastern hemlock decline. Additional analysis will focus on replacement of *T. canadensis* in stands with moderate to severe decline, with a focus on identifying possible conifer replacements.

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