

# EVALUATING THE IMPACT OF INVASIVE SPECIES IN FOREST LANDSCAPES: THE SOUTHERN PINE BEETLE AND THE HEMLOCK WOOLY ADELGID

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## ABSTRACT

The southern pine beetle (SPB) (*Dendroctonus frontalis*) (Zimm) (Coleoptera: Curculionidae) is an indigenous invasive species that infests and kills pines (*Pinus* spp.) throughout the southern U.S. The hemlock woolly adelgid (HWA) (*Adelges tsugae* (Annand) (Homoptera: Adelgidae) is a non-indigenous invasive species that infests and kills eastern hemlock (*Tsuga canadensis*) and Carolina hemlock (*T. caroliniana*) throughout their range in eastern North America. These species occur in the southern Appalachians. Herbivory by both species is of concern to forest managers, but for different reasons. In the case of the SPB, emphasis centers on forest restoration strategies, and in the case of the HWA, the concern is on predicting the impact of removing

hemlock from the forest environment. Both of these issues can be investigated using a landscape simulation modeling approach. LANDIS II is a simulation modeling environment developed to predict forest landscape change over time. It is a modular, spatially explicit, landscape-scale ecological simulation model that incorporates disturbance by fire, wind, insects and pathogens, and harvesting. Because of its modular design, it has the capacity to allow for future disturbance components such as ice storms. Herein, we present a framework for using LANDIS II to evaluate the impact of herbivory by the SPB and HWA on forest landscapes in the southern Appalachians.