

# Vascular Plant Propagule Banks of Six Eastern Hemlock Stands and Potential Response to the Hemlock Woolly Adelgid in the Catskill Mountains of New York

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We examined propagule banks in six eastern hemlock (*Tsuga canadensis* (L.) Carriere) stands in the Catskill Mountains of New York. These stands are at risk of mortality due to the hemlock woolly adelgid (*Adelges tsugae* Annand), but potential effects of mortality on species composition are uncertain. Our objectives were to determine species composition and densities of propagule banks and predict early stand development after hemlock mortality. Aboveground vegetation was characterized using point samples for woody stems and 1-m<sup>2</sup> plots for understory vegetation. Soil samples were collected in June 1997 and kept in a glasshouse for 12 months as germinants were identified, counted, and removed. Hemlock was the dominant tree species in all stands, with minor abundances of red maple (*Acer rubrum* L.), yellow birch (*Betula alleghaniensis* Britton), and/or American beech (*Fagus*

*grandifolia* Ehrh.). Striped maple (*A. pensylvanicum* L.), red maple, yellow birch, evergreen woodfern (*Dryopteris intermedia* (Muhl.) A. Gray), shining clubmoss (*Lycopodium lucidulum* Michx.), and common wood sorrel (*Oxalis acetosella* L.) occurred in understories of most or all stands. Yellow birch seeds, evergreen woodfern spores, and hay-scented fern (*Dennstaedtia punctilobula* (Michx.) Moore) spores germinated in abundance from the propagule banks (means of 722, 2858, and 296 m<sup>-2</sup>, respectively). Hay-scented fern spores and red-berried elder (*Sambucus pubens* Michx.) seeds were present in propagule banks despite occurring in aboveground vegetation of only one and zero stands, respectively. Seed densities were intermediate and overall propagule species richness was low compared to other studies of eastern US forests. Understory vegetation and propagule banks indicated potential stand replacement by evergreen woodfern and, eventually, yellow birch after mortality (Fig. 1). Hay-scented fern could dominate if woody species are over-browsed by white-tailed deer (*Odocoileus virginianus* Zimmerman).

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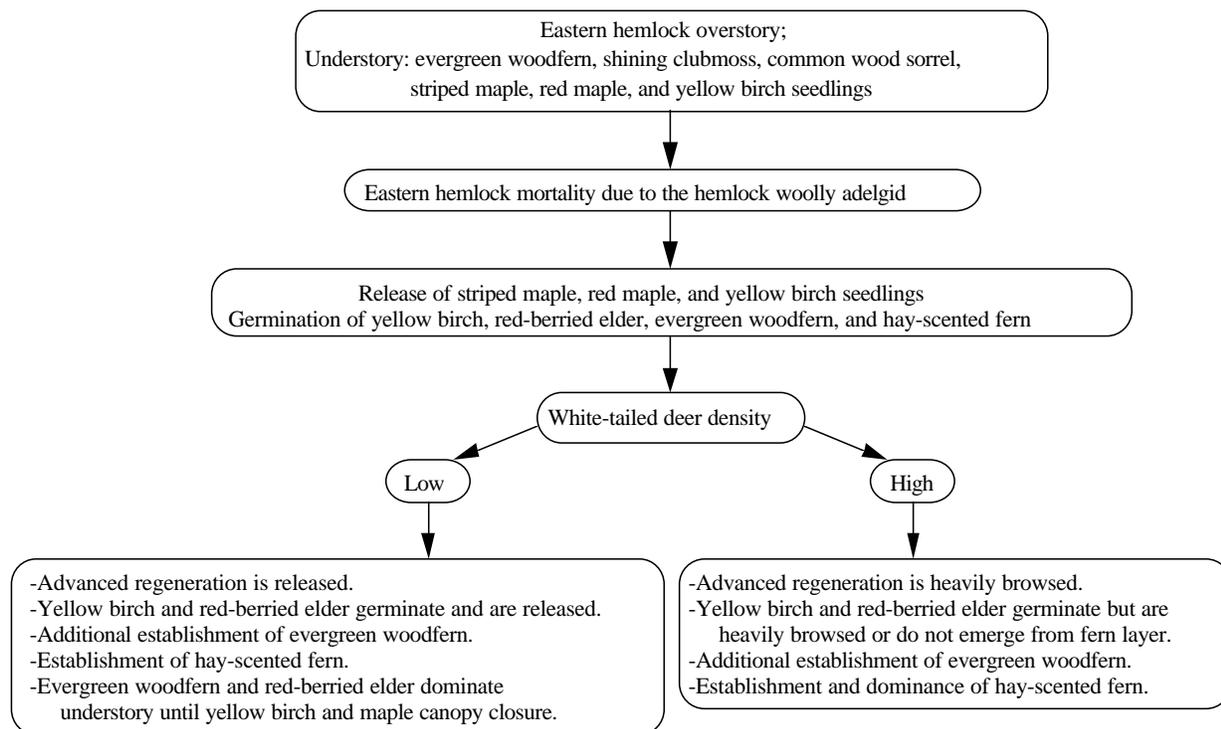


Figure 1.—Potential stand development of six eastern hemlock stands after mortality due to the hemlock woolly adelgid in the Catskill Mountains of New York.