

Evaluating canopy health impacts of hemlock woolly adelgid (*Adelges tsugae*) in untreated and treated eastern hemlock stands (*Tsuga canadensis*) (2020-2025) in Kejimikujik National Park and National Historic Site, Nova Scotia.

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Hemlock woolly adelgid (*Adelges tsugae*) is an invasive insect species that has killed millions of eastern hemlock trees since first being detected in North American in the 1950s in Virginia, USA. Hemlock trees typical decline and die after 10-15 years, although mortality varies widely across the range. Once hemlock woolly adelgid (HWA) was first detected in Kejimikujik National Park and National Historic Site (KNPNHS) in 2018, Parks Canada initiated an adaptive management strategy to protect Eastern hemlock forests which includes the treatment of individual trees with imidacloprid-based pesticides. A total of 108 trees were monitored in 9 hemlock stands over 6 years (2020-2025). The same monitoring approach was applied to 36 treated hemlock trees (2022-2025) in 3 hemlock stands to evaluate the overall effectiveness of the treatment program. Trees are given a canopy health index (CHI) score out of 100 by evaluating important health characteristics including infestation level, new foliage, live crown ratio, live branches, and foliage density. We observed a consistent decrease in the CHI of untreated trees of $-29.2 \pm 2.3\%$ (standard error, SE) over a 6-year period. Treated trees exhibit a lower overall decrease in CHI of $-8.1 \pm 5.5\%$ (SE) over a 4-year period. This study provides the first results showing the impacts of HWA over time on hemlock health in the northern part of the infestation with and with out chemical treatments.

Keywords: Hemlock woolly adelgid, canopy health, hemlock, invasive species, Wabanaki-Acadian forest

Poster presentation