

First-Year Research in Earth Sciences: Dunes

FYRES: Dunes Research Report: Schumerth, Noah, Kelly Adamovicz, Simon E. Detmer, David Martinez Vasquez, Jessie VandeKieft, Madelyn Vander Veen, and Catherine Worthington. 2019. "Distribution of Eastern Hemlocks and Woolly Adelgid Infestation on a Michigan Coastal Dune System." FYRES: Dunes Research Report #36. Grand Rapids (MI): Department of Geology, Geography and Environmental Studies, Calvin College. 27 p.

Abstract: Eastern Hemlock (*Tsuga canadensis*), a species of climactic vegetation found in mature forests on dune systems in Michigan, has been preyed upon by hemlock woolly adelgid (*Adelges tsugae*) since the arrival of the insect in coastal Michigan in the twenty-first century. This study investigates the distribution of hemlocks and the prevalence of hemlock woolly adelgid (HWA) on a parabolic dune system in P.J. Hoffmaster State Park. Project researchers recorded the location of individual hemlocks and concentrated hemlock stands using GPS receivers. Data was collected on tree diameter, stand density, health, and environmental characteristics. Particular attention was paid to evidence of symptoms of *Adelges tsugae* infestation throughout the dune system. Hemlocks were only found in mature forests on the arms of the parabolic dune and infrequently on the dune slipface; they were not discovered on the windward slope of the blowout or along the crest of the dune. The hemlocks were found as individual trees among other forest species or concentrated in hemlock stands. Most of the hemlocks were on north-facing slopes. Several trees exhibited symptoms of early stages of HWA infection. Widespread loss of hemlocks on Michigan dune systems could result in diminished soil stability and elevated exposure to wind erosion.