MAPPING EASTERN HEMLOCK (*TSUGA CANADENSIS*) IN SOUTHEASTERN KENTUCKY USING REMOTE SENSING AND A CLASSIFICATION MODEL

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Abstract

The Hemlock Woolly Adelgid (HWA), *Adelges tsugae*, has been spreading throughout the eastern United States since its introduction in the 1950s. The resulting damage to eastern hemlock trees (*Tsuga canadensis*) has been devastating. The first observed infestation of hemlock woolly adelgid in the state of Kentucky occurred in late 2006, and state officials and researchers soon focused much attention toward controlling the spread of the insect. In order to make those efforts as productive as possible, a current mapping of eastern hemlock in Kentucky forests needs to be produced. In this project, we mapped eastern hemlock stands in Bell County,

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KY, which currently has infestations of HWA. Bell County is located in southern Kentucky and shares borders with Tennessee to the south and Virginia to the east. Both Landsat and ASTER satellite images were used to create a masked summer-time image showing areas of evergreen / conifer stands. To overcome radiance variation due to topographic relief, a C correction was applied. The resultant image was then analyzed to delineate eastern hemlocks from other evergreen and coniferous tree species. This was done using the Normalized Difference Vegetation Index (NDVI) and also with a classification workflow model built using ArcGIS. This model takes into account the various abiotic factors (such as moisture, slope, aspect, elevation, and soil type) which define the fundamental niche of eastern hemlock. These techniques produced an acceptably accurate map of current eastern hemlock stands in Bell County, KY.

[Abstract Only]