

A GIS-BASED RISK ASSESSMENT FOR HEMLOCK WOOLLY ADELGID IN SOUTHERN VERMONT

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ABSTRACT

A pilot-phase geographic information system (GIS)-based risk assessment was developed for southern Vermont as part of a coordinated effort to reduce the spread of hemlock woolly adelgid. The model incorporated a literature search, interviews, and historical documentation in identifying: 1) factors associated with the risk of HWA introduction and establishment (“susceptibility”), and 2) potential impact of HWA infestations (“vulnerability/ resistance”).

Results indicated that although cold temperatures may currently be a limiting factor for northward spread of HWA, cold hardiness zones in which the pest is already established extend well into Vermont. Hemlock is ubiquitous in the state, presenting ample opportunity for natural spread, and historical introductions of the insect highlight risk factors such as nurseries and seasonal residences in conjunction with potential movement corridors. In addition to compilation of these susceptibility factors in a GIS database, a spatially referenced resistance index was created based on soil moisture, slope aspect, and site productivity.

The resulting pest risk assessment model can help focus prevention, monitoring, early detection and rapid response efforts. Susceptibility factors are being used to help prioritize surveying efforts and incorporating the results of those efforts. Results obtained for the vulnerability/resistance index are untested for generality and require application to a more extensive area for validation, but information garnered offers a means for quantification through statistical correlation with field data. The model is easily modified and will continue to incorporate advances in research, with a goal of closing the loop between research and application by making the results accessible to land managers and forestry practitioners.