

MODELING POTENTIAL EMERALD ASH BORER SPREAD THROUGH GIS/CELL-BASED/GRAVITY MODELS WITH DATA BOLSTERED BY WEB-BASED INPUTS

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ABSTRACT

As everyone knows at this conference, enormous economic and ecologic consequences across North America are at stake due to the introduction of the emerald ash borer. We present two aspects of work related to assessing the potential and actual spread of this organism. First, we model the susceptibility and potential spread of the organism across the eastern United States and especially through Michigan and Ohio using Forest Inventory and Analysis (FIA) data to account for ash distribution and abundance at a 20 x 20 km resolution (Prasad and Iverson, ongoing). This effort produced a general map of relative importance of rural ash to the emerald ash borer. When combined with maps of percent forest cover, we were able to estimate the availability of the ash resource to the invasive species. These maps show a high level of ash availability in the zones surrounding the borer's current range. We are also developing a cell-based model for the potential spread of the organism. This model is primarily based on a modification of an earlier model we developed to assess migration of tree species under climate change (Schwartz 1993, Iverson et al. 1999, Schwartz et al. 2001). A series of 'what if' scenarios are being developed to assess potential spread ranges. In addition, we are using a gravity model approach (Bossenbroek et al. 2001) to predict long-distance dispersal events based on human movement patterns.

The second aspect of our work involves acquiring current data on the location of the organism. Besides acquiring field data ourselves and from other agencies, we have developed a Web-based tool for public agencies and private individuals to enter the locations of their ash trees that have (or have not yet) been infested by the organism, which will support es-

timates of the rate of spread. To serve maps on the Web, we used a public domain software developed by the University of Minnesota called MapServer. People can enter their ash tree information at this site (eabserver.osu.edu) by street, administrative boundary, quadrangle, digital orthophoto, or GPS coordinates. In addition to the flash tutorial on the website to educate users on the proper use of the web-based map server, detailed instructions for use have been published (Sydnor et al. 2005). Using these data and GIS tools, we hope that the EAB community will better understand the current and potential rate of spread, which will guide management decisions to help contain this destructive pest.

If you have access to ash tree data and their condition, we'd love to work with you to help populate this wide-access database!

CITED LITERATURE

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