CLIMATE CHANGE POSES ADDITIONAL THREAT TO THE FUTURE OF ASH RESOURCES IN THE EASTERN UNITED STATES

Anantha Prasad, Louis Iverson, Stephen Matthews, and Matthew Peters

U.S. Forest Service, Northern Research Station (AP, LI, SM, MP), Delaware, OH; The Ohio State University (SM), Columbus, OH
AP and LI are corresponding authors;
to contact, call (740) 368-0097
or email at aprasad@fs.fed.us or liverson@fs.fed.us.

It is becoming increasingly clear that climate change has the potential to alter the distribution of plant species all over the world. In the United States, ash (*Fraxinus* spp.) is encountering the double threat of short-term emerald ash borer (EAB) infestation, which could decimate ash throughout the country, and longer term perturbations due to climate change. We have modeled the change in potential suitable habitats of numerous tree species in the eastern United States by relating the abundances of tree species according to U.S. Forest Service Forest Inventory and Analysis data to 38 climate, soil, and landscape predictors using decision-tree based ensemble statistical techniques (DISTRIB). We alter the climate variables in the ensemble and predict abundances according to two carbon emission scenarios (high and low) and three Global Circulation Models (GCMs). In addition to the DISTRIB model, we assess how landscape fragmentation is affecting the colonization potential of the tree species, using a spatially explicit cellular model (SHIFT). The outputs of DISTRIB and SHIFT provide a fairly reasonable assessment of the potential habitat changes that can be expected due to future climate changes predicted by GCMs. However, these models do not include biological and disturbance factors that may influence species' response to climate change. To address some of these uncertainties, we take into account 9 biological and 12 disturbance-related factors by synthesizing the literature and scoring the factors by order of importance.

Here we assess the impact of climate change on ash species according to our habitat change models and combine these results with a "risk of spread model" that we have developed by modifying the SHIFT model (to determine the risk of human-mediated long-range dispersal of EAB). We will then paint a picture of the future of ash species in the eastern United States.