EMERALD ASH BORER AFTERMATH FORESTS: THE DYNAMICS OF ASH MORTALITY AND THE RESPONSES OF OTHER PLANT SPECIES

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The effects of emerald ash borer (EAB) (*Agrilus planipennis*) on forest ecosystems are being studied through a collaborative research program involving the U.S. Forest Service's Northern Research Station and The Ohio State University. We are monitoring the decline and mortality of >4,500 ash trees and saplings, EAB population density, changes in understory light availability, responses of both native and invasive plant species, changes in species composition and forest structure, and effects on other organisms and ecosystem processes in more than 250 monitoring plots (and subsets thereof) in forests in Ohio, Michigan, and Pennsylvania along a gradient of EAB-infestation duration. The plots are located in forest stands representing different ages and habitat types to include all five ash tree species native to the region (*Fraxinus americana, F. pennsylvanica, F. nigra, F. profunda,* and *F. quadrangulata*). Yearly monitoring began in 2004 and is continuing.

Our results suggest a dismal future for ash in these ecosystems. Pre-EAB patterns of ash canopy health are functions of landscape position and nutrient availability. With the arrival of EAB, however, ash mortality in all areas reaches nearly 100 percent--regardless of initial ash density, size, habitat, or diversity. A forest stand can progress from nearly all healthy trees to nearly all dead ash trees within 6 years. EAB populations increase rapidly, peak, and then decline as the infestation progresses through the landscape. They then persist at low densities and kill small ash saplings as they reach susceptible size (3-cm diameter at breast height). Invasive plant species are present in these ecosystems and have the potential to increase as canopy gaps open, and distributions of both invasive plants and ash species depend on land use history and habitat. Indirect impacts of EAB on other organisms are likely.