Resource Brief

National Park Service
U.S. Department of the Interior

National Capital Region Network
Inventory & Monitoring Division

Ash Tree Update - 2016

Summary

- The invasive emerald ash borer beetle is present in National Capital Region (NCR) parks
- It is nearly 100% fatal to ash trees
- White ash is a very common tree in NCR forests
- Ash tree mortality is rising
- Parks are managing hazard and special value trees

Background

Emerald ash borer (EAB; *Agrilus planipennis*) is an invasive Asian beetle that targets ash tree species. It kills trees by destroying tissues that transport water and sugar within the tree. EAB is nearly 100% fatal. In a forest stand, most ash trees succumb to the effects of the beetle within 3-6 years.

We are now more than ten years into the emerald ash borer invasion of the National Capital Region (NCR). Ash trees are beginning to die off, with striking declines in some areas.

Ash trees are very common in the NCR. White ash (*Fraxinus americana*) was the tenth most common tree species in the region based on 2006-2009 data[1]. Green ash (*F. pennsylvanica*), pumpkin ash (*F. profunda*), and black ash (*F. nigra*) are also present in NCR parks. The destructive nature of EAB means that we should expect significant changes to NCR forests as ash trees die off in the coming years.





Photos, Left: NPS, Right: Kenneth R. Law

Left: Damage on an emerald ash borer-afflicted tree. Ash trees branches are directly across or "opposite" each other.
Right: Bark damage called "blonding" created when woodpeckers search under bark for emerald ash borer larva.

1 Forest vegetation data collected by the National Capital Region Inventory & Monitoring Network (NCRN I&M)

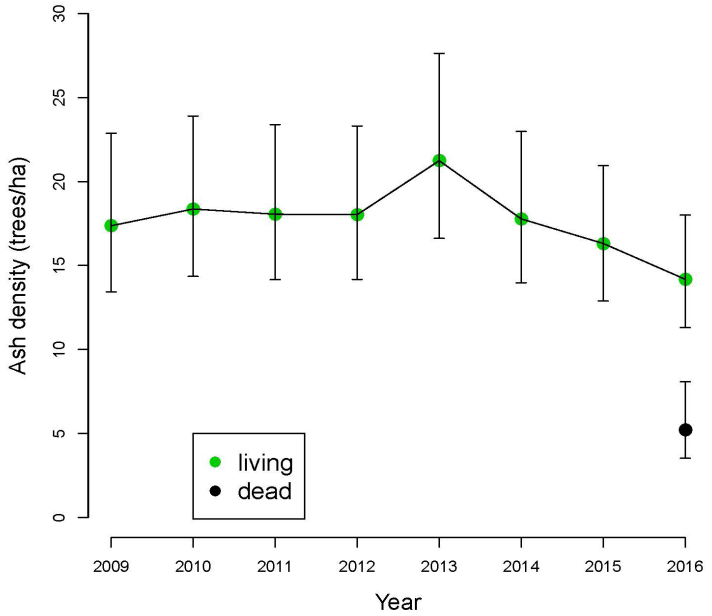


Figure 1. Ash tree density in rolling four year periods labelled by ending year (i.e., the 2009 data point shows average ash density for the 2006-2009). Green represents living tree density. Black represents dead tree density. Vertical lines show estimated error.

Ash Trees in 2016

Density of ash (number of trees per hectare or ~2.47 acres) between 2006 and 2016 is shown in Figure 1. Living tree density was fairly consistent through 2014, after which it began to drop.

Dead tree density is only available for one full four-year period that ended in 2016. However, we expect dead tree density to increase quickly in the next few years before tapering off as a large proportion of EAB-killed ash trees initially left standing in place gradually fall. These downed ash trees will in turn create a temporary increase in dead wood on the forest floor.

Forest Management Implications

In locations where dead trees could be a threat to people or property, hazard tree maintenance will continue to be a safety issue. Especially valuable trees (showcase or historically significant trees) will require ongoing treatment with insecticide to maintain resistance to EAB.

In natural areas, the loss of ash from the forest canopy (the top layer of forest) will have cascading ecological effects as light penetrates deeper into previously shaded habitat. These effects may range from increased growth of tree species that once competed with ash to increases in species that capitalize

on insect booms and dead trees (e.g., woodpeckers and wood rotting fungi). Where missing ash create large canopy gaps, species that flourish in sunny, edge habitats may also benefit. The exact effects will likely vary among the habitats where ash is common. As examples, we explore ash populations along the Potomac and at Catoctin Mountain Park.

Pumpkin Ash at Piscataway and Dyke Marsh

Pumpkin ash is normally a dominant tree in freshwater, tidal wetlands like those along the Potomac River. At Dyke Marsh Wildlife Preserve (part of George Washington Memorial Parkway) on the Potomac's west bank and Piscataway Park (part of National Capital Parks - East) on the east bank, pumpkin ash, along with green ash, can account for 50% or more of the total number of trees (Figure 2).

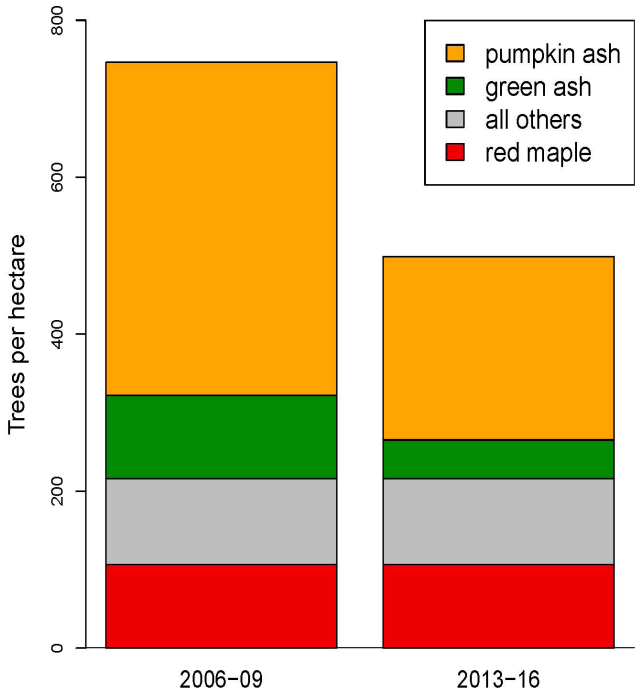


Figure 2. Change in tree species at Dyke Marsh and Piscataway Park.

With EAB in the picture, we expect both the total number of trees in these swampy areas will decrease in the short-term. Pumpkin ash trees have decreased by about half (Figure 2) since 2006-2009. The loss of the tallest (canopy) trees may increase erosion, since tree roots play a vital role in holding wetland soils in place. New tree gaps will also open the door to invasion by non-native species.

Over time, growth rates of the remaining tree species, like red maple, may increase. Eventually these species may replace some of the lost ash, as long as the wetland habitat is still intact. We expect these ecological changes to be most dramatic where ash species were most abundant. So far we have seen little evidence of ash trees being replaced by other species, but this may not be apparent for many more years.

White Ash at Catoctin

At Catoctin Mountain Park, white ash trees are in decline. The average number of white ash trees per hectare decreased by a quarter, from 24 to 18, from the 4-year period ending 2009 to the period ending 2016 (Figure 3). In contrast, the density of ash seedlings increased sharply over this period, likely fueled by an unusually prolific seed production year (mast year) and reduced damage by hungry deer (as a result of deer management in the park). An uptick in seedling density may also be a signal of stressed trees in decline—revealing a last gasp of activity and a rush to reproduce before the tree dies.

Will this boom of seedlings make up for the loss of canopy ash trees? It's impossible to know for sure. Most researchers believe that EAB will survive long after most ash trees have died, limiting the potential for seedlings to grow into trees.

Even if the seedlings observed at Catoctin do survive and grow to tree-size, there will be a period of time where ash will be absent from the tree canopy, since there are currently few to no saplings available (Figure 3). The sapling cohort of ash trees is missing primarily as a result of years of intense deer browse (in fact, sapling density of all species is low at Catoctin for this reason). Luckily, deer management has allowed a burst of seedlings, representing both ash and other tree species, that has the potential to one day replace dying canopy trees.

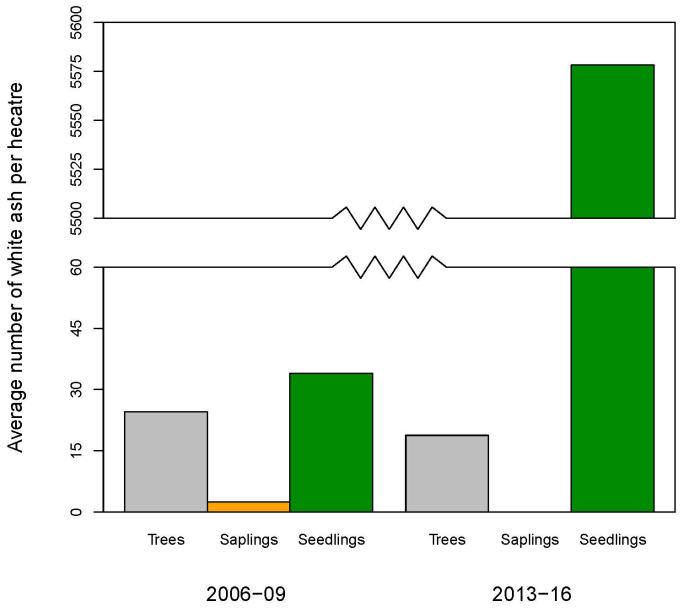


Figure 3. Changes in white ash numbers at Catoctin Mountain Park. The Y axis is broken to accomodate large number of seedlings during 2013-2016.

More Information

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