

Emerald Ash Borer and the Private Woodland Owner

Emerald Ash Borer (*Agrilus planipennis*) is an exotic pest native to Asia. Experts believe it arrived in the United States in solid wood packaging materials. The Emerald Ash Borer (EAB) was first identified in Michigan in 2002 and was found the same year in nursery stock in Charles County, Maryland.

Despite implementation of eradication programs around the source nursery and quarantines on the movement of timber and firewood, EAB has spread to nearly all counties west of the Chesapeake Bay (figure 1).

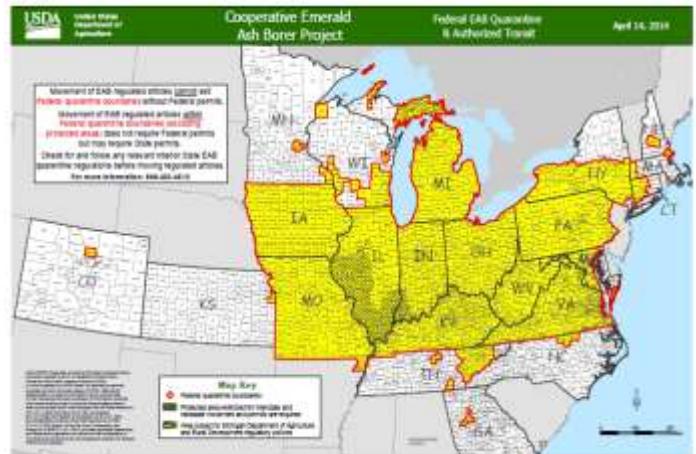
Figure 1. Despite precautions, EAB positive sites increased from 2008 to 2014, but remain west of the Chesapeake Bay



EAB in MD available at: <http://mda.maryland.gov/plants-pests/Pages/eab.aspx>

Quarantines may help stop the movement of EAB to the Eastern Shore. Given the past experience of its spread across the northeast (figure 2), however, these efforts may not be successful. Individual citizens and landowners can minimize the spread of EAB by following the law banning transportation of firewood or ash tree material outside of the quarantine area.

Figure 2. EBA quarantine areas in U.S. as of April 2014 cover about half of native range of ash species



EAB Will Infest and Kill All Ash Trees (*Fraxinus* spp.) Regardless of Age, Size or Vigor

There are small areas of ash trees surviving in Ohio and Michigan but the reasons are not well understood and should not be expected to occur elsewhere. A large percentage of trees in urban and suburban areas are ash and the impact of EAB on

communities can be costly both in dollars and environmental impacts.

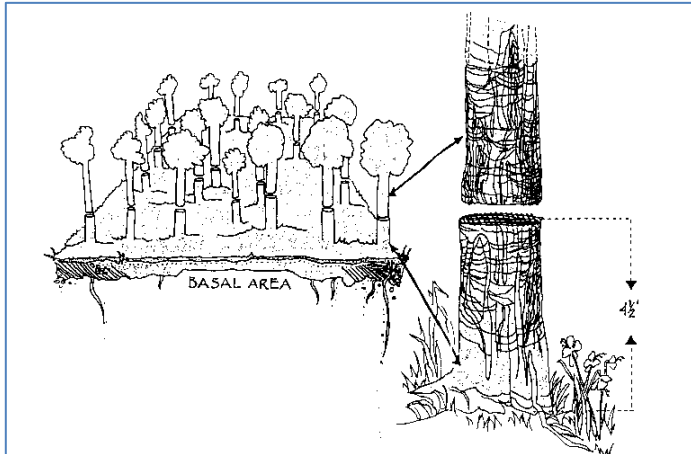
This publication will help private woodland owners in rural and suburban areas understand the seriousness of EAB, how it may impact their property management and goals, and the strategies they can use to address the problem.

Maryland landowners and managers can benefit from the experience of other states that have seen large scale mortality of ash trees in rural woodlands by implementing their best strategies.

How Many Ash Trees are in Maryland Woodlands?

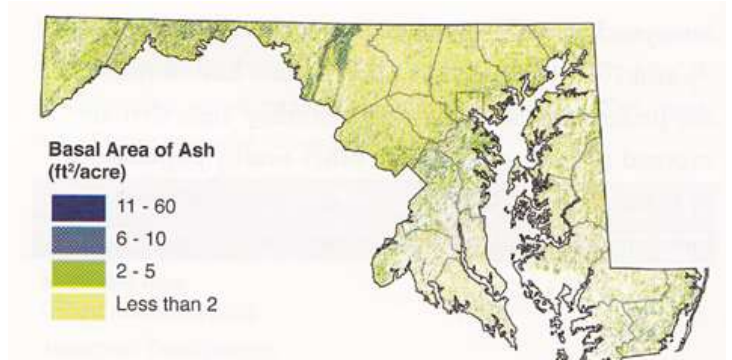
The number of ash trees in Maryland woodlands is, on average, lower than in other states. However, depending on the location, ash trees may be a major component of a particular woodland area.

Figure 3. Basal area is measured at breast height and expressed as per unit of land area



We can determine the stocking of trees in a woodland using a measure called basal area, which is the cross-sectional area taken up by trees (figure 3). Basal area is usually expressed as a per-acre amount. For example, a woodland may have 80 square feet of basal area per acre, but it might consist of a lot of small trees in a young woodland or a few larger trees in a mature woodland.

Figure 4. Ash species represent 4% of the woodlands, or about 81,000 acres



The amount of basal area comprised of ash species can indicate the potential impact of EAB and the resulting ash tree mortality on the woodland. For example, if ash only makes up 5% of the basal area of the woodland, the surrounding trees will probably fill in the gaps left when ash trees are killed by EAB. As the percentage of basal area increases, there may not be enough trees to fill in the space left vacant. If the basal area of ash makes up more than 10 to 25 percent of the woodland, it would be advisable to reduce the amount of ash through harvesting or thinning. Since the trees that are infested with EAB will die anyway, harvesting or thinning will give the landowner options on which species will make up the future woodland.

In Maryland, ash species include mostly white and green ash, and they are present on 4% of the woodlands, or about 81,000 acres. Forest statistics indicate ash trees generally represents far less than 25% of basal area in Maryland (figure 4), so many woodlands may not be seriously impacted if ash trees dies.

However, the economic value of large diameter ash trees would make a harvest advisable before the infested trees are killed by EAB. Ash trees produce seeds that may remain viable in the soil for 3-4 years. Even if the trees die, there will be a pool of regeneration (seeds) in the soil and in seedlings found in the woodland understory.

Since the mid-1990's, Maryland has implemented a program to plant trees as forested buffers. These

help protect water quality and offer other woodland benefits. Ash trees were a favorite species to plant in central and western Maryland because of its good growth, high survival rates, and utility. In many cases, ash trees made up more than 50 % of the seedlings planted.

As EAB starts to cause more mortality, many buffer plantings may be compromised. In a 2001 survey of riparian forest buffer success in Maryland, ash trees made up 25% of the stocking in buffer plantations in western Maryland, and 14% in central Maryland. This indicates that many of the planted ash seedlings have already been replaced by other species overall. This may minimize the overall number of sites that still have a very high ash tree component.

Figure 5a. EAB adult is a green beetle native to Asia and Eastern Russia



Smith, K. and R. Heiligmann. 2010. Management Options for Minimizing Emerald Ash Borer Impact in Ohio Woodlands. F-59-Rev10. Ohio State University Extension.

Figure 5b. After hatching, larvae chew through the bark where they feed and develop.



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How Do I Know EAB Is On My Property?

The EAB lifecycle starts with the overwintering of the larvae under the bark. The adults emerge in mid-to-late May – early June when the black locust trees bloom (figure 5). They feed, mate, fly, and lay eggs. The eggs hatch and the larvae enter the tree and feed over the winter on the cambium, phloem, and sapwood when temperatures are above 50 degrees F. The larval feeding girdles the tree so water and nutrients can no longer move up and down, leading to the rapid death of the tree.

The most obvious sign of EAB damage is crown dieback and thinning of canopy followed by the death of the trees. Increased woodpecker activity may be an early warning sign that EAB larvae are in the trees and mortality has occurred or will soon follow.

Careful observation of ash trees in your woodland will indicate if EAB is active. One of the most obvious signs is the D-shaped borer hole in the bark (figure 6). As activity increases and the tree dies, the bark may show signs of splitting followed by falling off, exposing the larva galleries that girdle the tree.

Figure 6. A D-shaped hole shows where adult has emerged ...



... and the loss of bark reveals larva galleries



What Happens When Ash Trees Die?

Ash trees killed by EAB decompose very quickly and become real hazards. The dead trees are not salvageable for forest products unless harvested immediately. The wood turns spongy and within a few months, large branches fall and can become hazardous. Tree service workers have been injured and died taking down dead residential ash trees when large limbs failed unexpectedly. Within a year of tree death, “ash snap” may occur, when wind or weather cause the tree to snap off above the ground (figure 7).

Figure 7. "Ash snap" is common within a year of tree death after EAB infestation

In



contrast, oak trees killed by gypsy moths can be harvested for timber or firewood for at least a few years after infestation. If you have ash trees that are highly valued for forest products, harvesting must occur before the trees die to maximize the value. If you allow them to die in the woods, be aware of the possible hazards.

You Can Minimize the Potential Impact of EAB

There are several important factors you need to understand to guide your decision to protect your woodlands.

- EAB cannot be eradicated or controlled, so while we continue to learn more about it, you can assume it will not go away. You should assume that as the insect population reaches levels that cause mortality, all trees within the quarantine will be killed.

- Reduce the number of ash trees on your property to minimize EAB impacts. This may give you more time to implement some necessary management practices.
- Even though the Eastern Shore is not yet in quarantine, it would be wise to assume EAB will arrive at some point. Landowners should take advantage of the time they have to make proactive management decisions to prepare for the likely arrival of the pest.
- EAB is a concern for anyone in the quarantine area, even if you are not near an area that has experienced mortality.
- If ash trees are in areas where falling branches or whole trees may be hazardous to people or structures, cut them down before or immediately after they die.
- Landowners should seek the assistance of a licensed professional forester to evaluate and select effective management strategies. You can enlist the services of a forester with the Department of Natural Resources Forest Service or a private consulting or industrial forester.

Figure 8. Forest buffer planting with a mix of ash and black walnut in Washington County. Ash trees are dying from EAB



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Strategies for Existing Woodlands that Contain Ash Trees

If ash trees are less than 1.5-2” diameter breast height (dbh), no action is usually required. Ash trees have not been used in forest buffer plantings since 2012, so recently planted buffers will not be affected by EAB (figure 8). However, older plantings that contain ash trees that are less than 2” dbh have developed enough that for supplemental planting with additional seedlings to be successful, a woodland owner will likely have to remove some undesirable trees and ground vegetation prior to planting.

Figure 9. EAB infestation in mixed hardwood woodlands with Ash trees less than 12 inches dbh may result in growth of undesirable trees or invasive species



Strategies for when the Dominant Trees are Less than 12 Inches DBH and Contain Ash

Landowners may decide to thin or crop tree release if the woodland has an adequate number and distribution of non-ash species to develop into an adequately stocked stand of trees (figure 9). The non-ash trees can be felled or they can be harvested and used for firewood or other purposes.

If the woodland does not contain an adequate number or distribution of non-ash species, the landowner is left with a difficult situation. For example, thinning or a crop tree release (where crowns of individual trees are released from competing trees) will shift the species composition and growth to undesirable trees or open large holes in the canopy that often are filled with invasive species. An EAB attack would have the same impact.

In this case, the landowner should reassess their management objectives for the area and get professional forestry assistance to gauge the various options. The potential impact of invasive species filling the gaps should be a key concern.

Strategies for When the Dominant Trees are Greater than 12 Inches DBH and Contain Ash Trees

Landowners with larger-diameter, marketable ash trees have the option of getting price estimates from buyers and selling the trees (figure 10). If you wait until mortality is occurring in your area, your options will be more limited and the prices from the harvest will be lower. The rapid decomposition of the trees may make a timely salvage harvest impossible if mortality has already occurred.

If you have marketable trees, work with a professional forester since decisions about timber sales can be complicated. Consulting foresters can help you identify the available markets in your area. Another option might be to partner with or hire a portable or custom sawmill to saw ash boards for your own use or for sale.

If possible, time the harvest between September and March to prevent moving the live adult EAB. This will allow more time for the bark and cambium remnants to decompose on the forest floor, which will kill many life stages of EAB in the infested wood.

You may want to work with neighboring landowners facing a similar situation. This will help reduce the per-acre cost of negotiating a timber sale and increase the chances of attracting a buyer,

Figure 10. Mixed hardwood with high basal area in quality ash trees that could be sold before EAB mortality occurs in the area



especially if the sale volume is marginal. In that case, neighboring properties selling together could

offer enough marketable ash trees to attract a buyer.

Most woodlands will benefit from a well-planned, sustainable harvest in which ash tree reduction is only one of the landowner objectives. The sale of other species may help to accomplish needed thinning or timber stand improvement in other parts of the woodlot, while increasing the attractiveness and profitability of the sale. It is important to work with a professional forester to ensure the productivity and health of the woodland will be enhanced by the harvest.

Resources:

- Emerald Ash Borer website with current updates on quarantines and other information: www.emeraldashborer.info
 - Maryland Woodland Stewardship Education Program – www.extension.umd.edu/woodland. Includes many resources for woodland owners, including: [Forest Thinning: A Landowner's Tool for Healthy Woods](#) - University of Maryland Extension Bulletin #407

- [Marketing Forest Products: Understanding the Sales Process](#) - University of Maryland Extension Bulletin #367
- [Status of EAB in Maryland](#) – webinar May 12, 2014 with MD experts.
- [Maryland Consulting & Industrial Foresters](#) – MD DNR Forest Service. Includes all private and consulting foresters in the state.
- [Small Acreage Foresters directory](#) - University of Maryland Extension Woodland Stewardship Education program. Includes private and consulting foresters willing to work on woodlands less than 10 acres in size.
- [Maryland DNR Service Foresters](#) – Maryland The MD DNR has service foresters in each county that can provide assistance.
- [Woodland Management: Developing a Forest Stewardship Plan -- The Key to Forest Management](#) - University of Maryland Extension Fact Sheet #625

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