



# Extension FactSheet

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## Management Options for Minimizing Emerald Ash Borer Impact on Ohio Woodlands

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**E**merald ash borer (EAB) is a non-native insect that is currently attacking ash trees in Michigan, Ohio, and Indiana. First identified in southeastern Michigan in 2002, emerald ash borer has already killed more than 10 million ash trees in the cities and forests of that state. It has now spread into northwest Ohio and northeast Indiana. Unless some means is found to eradicate it, emerald ash borer has the potential to kill literally all of the ash in this part of the country. For that reason, rural and urban Ohio landowners are becoming increasingly concerned about the risk that emerald ash borer poses to their ash trees and woodlands, and asking what they can do to address that risk.

Emerald ash borer is a selective pest; it attacks only ash trees, members of the genus *Fraxinus*. However, it attacks all of our native ashes—black, blue, green, pumpkin, and white<sup>1</sup>. To learn more about emerald ash borer, including how to identify the insect and its damage; to learn to identify ash trees; or to obtain a diagnostic checklist to help determine if your trees or woodland are infested with emerald ash borer, visit Ohio State University Extension's emerald ash borer web site at <http://ashalert.osu.edu>.

This fact sheet presents alternative management strategies to minimize the impact of EAB on woodlands and existing or planned reforestation plantings, and identifies the consequences of adopting those strategies. Extensive efforts are currently underway to contain and eradicate EAB in the United States, but the success of these efforts will not be known for several years. For many landowners, however, the effectiveness of implementing a woodland management strategy to minimize EAB impact depends



on getting started in the very near future, long before the success or failure of the eradication efforts is known.

Decisions concerning whether or not to act and what action to take will, in some instances, be guided by how close your land is to the current infestation and any potential quarantine or mandatory ash eradication area. That information will most likely dictate the urgency of any action you may decide to take. There are numerous places where this information is available: OSU Extension's web site at <http://ashalert.osu.edu>, Ohio Division of Forestry's web site <http://www.ohiodnr.com/forestry/Health/Health.htm>, Ohio Department of Agriculture's web site at <http://www.ohioagriculture.gov/eab> or by phone at 1-888-OHIO-EAB. Any one of these sources provides up-to-date information on current infestation areas and any quarantine that may currently be in place.

It is crucial for woodland owners in northwest Ohio to address methods for minimizing the potential impact of EAB and associated activities (e.g., ash eradication areas) on their woodlands. It is equally important for woodland owners in other parts of Ohio to evaluate the potential impact EAB could have on their woodlands and develop appropriate strategies to minimize that impact. If EAB is

not controlled or eradicated, stand management activities initiated now could be critical in reducing the impact of EAB in the future as it moves through the state. This will be particularly true for stands with a relatively high ash composition.

## Ash in Ohio

Ashes are important tree species in the natural forests of Ohio, and have been planted extensively throughout the state for reforestation. Over the state as a whole, ash species occupy about 12 percent of the total forest land<sup>2</sup>. However, the species distribution and amount of ash in Ohio's forests is not at all uniform, but varies dramatically from stands containing no ash to stands composed entirely of ash. White ash is found throughout the state, and typically grows on deep, fertile upland soils. Green ash is also found growing throughout the state, but is typically found on moist bottomland soils and along streams. However, green ash has been heavily planted on a wide variety of sites because it adapts well to a broad range of site conditions. Black ash, less common than white or green ash, is found growing throughout the northern two-thirds of the state in low, moist areas, often on poorly drained soils. Blue ash, less common than black, is most likely to be found on dry limestone uplands in the western half of the state. Pumpkin ash, a rarely seen species similar to green ash, is found in swampy woodlands in western Ohio. Numerous ash trees, both native and non-native, also make up a significant portion of Ohio's urban forests, including street and landscape plantings.



## Background Considerations

As you evaluate management strategies to minimize the potential impact of EAB in your woodland, there are several important facts that should influence your decision to act or not, and what action to take.

- There are no assurances that EAB will be controlled or eradicated.
- Because EAB is a relatively new, exotic pest, our knowledge about the insect, its habits, and its management or control are constantly evolving and expanding.

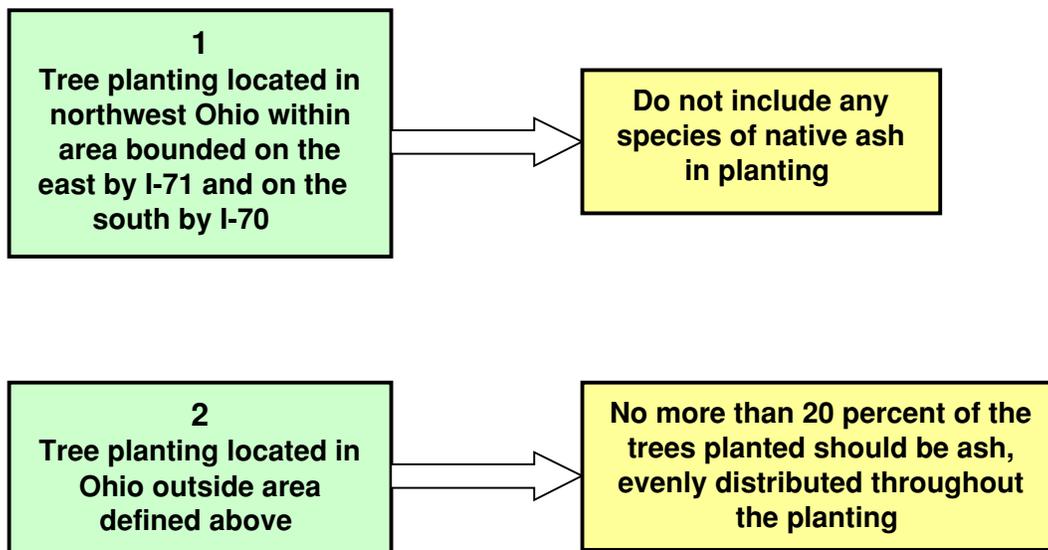
- It would be a serious error to assume that EAB is a concern only for woodland owners near current EAB infestations, currently northwest Ohio. EAB is a concern for woodland owners throughout Ohio.
- Due to the time constraints on contractors working to eradicate ash trees within an eradication zone, a woodland could sustain considerable “collateral damage” to the stand of trees left behind. This damage may consist of deep ruts throughout the woods and damaged non-ash trees that will impact the future of the stand.
- Proactive landowners will have greater control over their woodland resources, both in terms of minimizing possible collateral damage from short-term eradication efforts should they occur on the property and in minimizing the long-term impact of EAB if it is not eradicated.
- Owner-initiated management activities involving the appropriate reduction or elimination of ash trees may contribute to the overall effort to eradicate EAB when accomplished on forest land near EAB infestations.
- A variety of factors enter into evaluating and selecting the management strategy appropriate for a specific woodland, and for this reason the best management decisions will always be made in consultation with a professional forester.

The remainder of this fact sheet is designed to guide woodland owners through an evaluation of alternative management strategies to address four situations:

- A tree planting (reforestation, windbreak, etc.) where, if it were not for EAB, ash would be a species included in the planting.
- An existing tree planting (plantation) containing ash, in which the trees are less than 2 inches dbh<sup>3</sup>.
- An existing forest stand containing ash in which the dominant trees are less than 12 inches dbh.
- An existing forest stand containing ash in which the dominant trees are greater than 12 inches dbh.

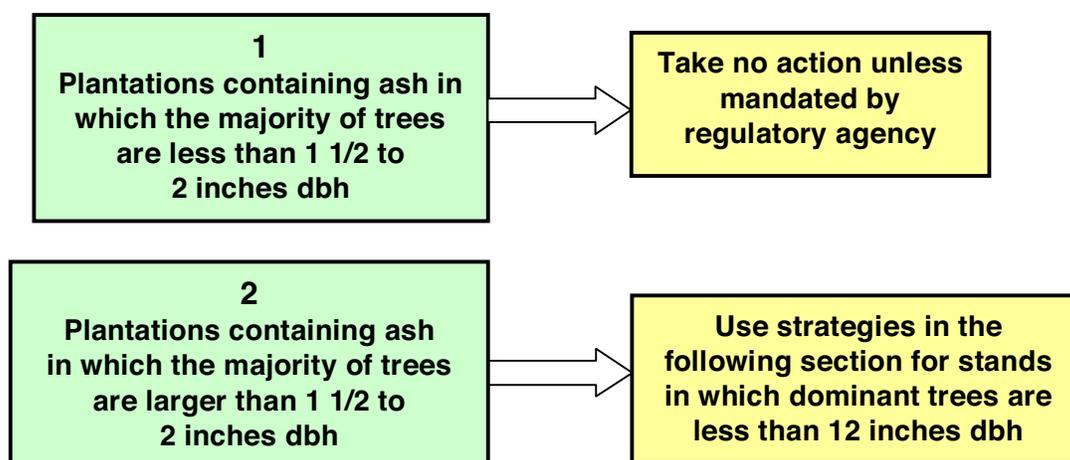
The presentation that follows is divided into the four situations identified above along with alternative management strategies for each. There is a diagram for each situation where the situation is defined in a green box with the alternative management strategies being outlined in a yellow box. The diagrams are then followed up by a more detailed discussion identifying the effects on and benefits to the woodland for each strategy. Each alternative management strategy is described for the three possible outcomes of the EAB eradication effort: (1) EAB is not eradicated and is allowed to naturally progress across the state and ultimately infests the woodland, (2) the planting or stand falls within a future ash eradication zone, and (3) EAB is eradicated and never infests the woodland.

## Strategies for Tree Planting



1. In northwest Ohio, within the area bounded on the east by I-71 and on the south by I-70, the risks of a planting becoming infested with EAB or being included in an ash eradication zone are considered too high to include any species of native ash in a planting. If the planting is infested with EAB, all of the ash will be lost; if it is included in an ash eradication zone, all of the ash will be destroyed in an attempt to eradicate EAB.
2. In the remainder of Ohio no more than 20 percent of the trees planted should be native ash, the planting should be at a spacing of 9 X 9 feet or closer, and the ash should be distributed evenly throughout the planting (i.e., if 20 percent ash, every fifth tree planted should be an ash).
  - a. If **EAB infests** the planting, killing all the ash, the planting will still be at an acceptable stocking level. Other than the loss of ash as a species in the planting, the overall impact of losing the planted ash will be negligible.
  - b. If the **planting falls within a future ash eradication zone**, the removal of the ash at that time will have a negligible impact on the planting. If this happens, it is suggested that landowners perform the required eradication themselves whenever possible to minimize collateral damage.
  - c. If **EAB doesn't infest** the planting, ash remains a viable component of the planting unless removed in the future for non-EAB reasons.

## Strategies for Existing Tree Plantings (Plantations) That Contain Ash Trees



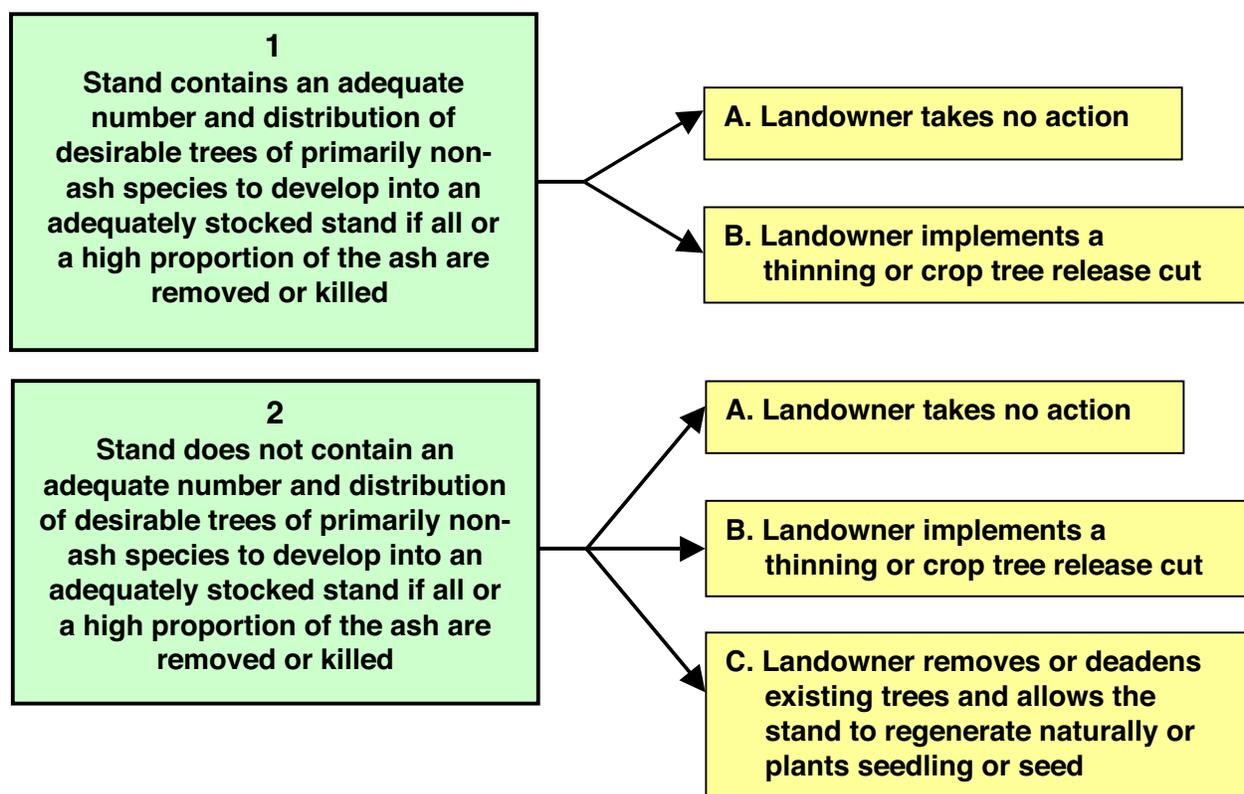
1. Take no action in plantations containing ash in which the majority of trees are less than 1½ to 2 inches dbh unless mandated to remove the ash by a regulatory agency. At commonly used planting spacings, competition among trees would not yet be excessive, and non-ash species would benefit little, if at all, from the removal of the ash (which would essentially be an early thinning).

- a. If **EAB infests**, the ash in the plantation will be killed, including any volunteers. The impact on the plantation will depend on the species composition of the plantation—the greater the proportion of ash, the greater the potential impact.
- b. If the **plantation falls within a future ash eradication zone**, all of the ash within the stand will

be destroyed as directed by regulatory action. The impact on the plantation at that time will depend on the species composition of the plantation—the greater the proportion of ash, the greater the potential impact. If this happens, it is suggested that landowners perform the required eradication themselves whenever possible to minimize collateral damage.

- c. If **EAB doesn't infest** the plantation, ash remains a viable component of the plantation unless removed in the future for non-EAB reasons.
2. For plantations containing ash in which the majority of trees are larger than 1½ to 2 inches dbh, use the strategies outlined in the following section for stands in which the dominant trees are less than 12 inches in diameter at breast height.

## Strategies for Stands in Which the Dominant Trees Are Less Than 12 Inches dbh and That Contain Ash Trees



1. Stand contains an adequate number and distribution of non-ash species to develop into an adequately stocked stand if all or a high proportion of the ash are removed or killed.

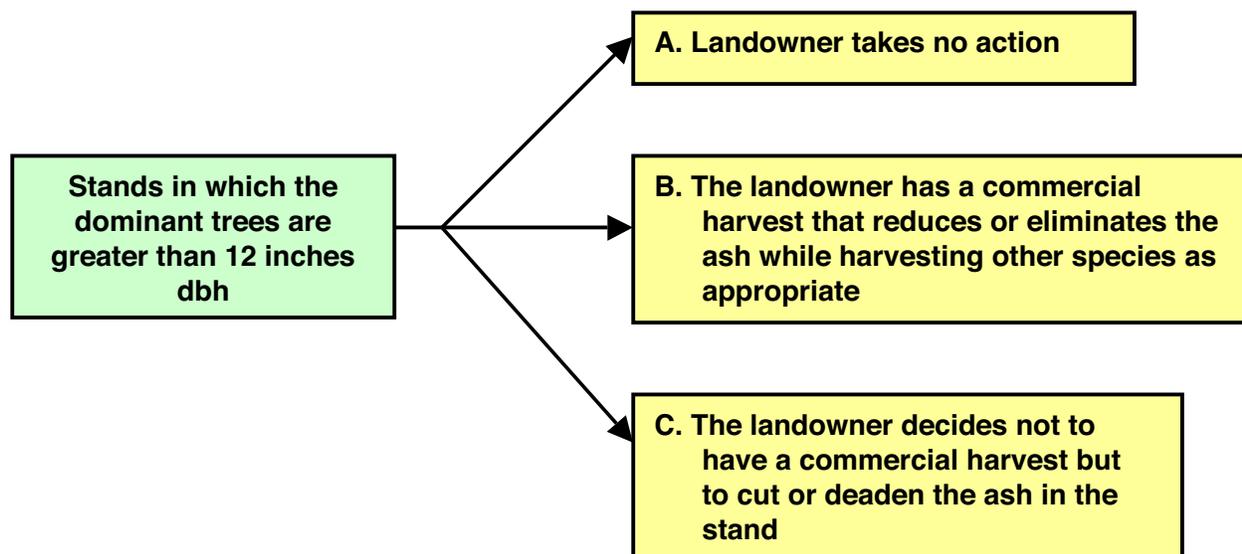
- A. Landowner decides to take no action.
- If **EAB infests**, all ash trees are killed and the opportunity has been lost to reduce the potential impact of EAB by reducing the proportion of ash in the stand and shifting some or all of the stand growth to non-ash species through thinning or a crop tree release cut.
  - If the stand **falls within a future ash eradication zone**, all of the ash within the stand will be

destroyed as directed by regulatory action. If this happens, it is suggested that landowners perform the eradication themselves whenever possible to minimize collateral damage.

- c. If **EAB doesn't infest**, the stand composition is unaltered by EAB.
- B. Landowner decides to implement a thinning or crop tree release cut in the stand<sup>4</sup>.
- If **EAB infests**, many or most of the ash trees that were in the stand will have been removed; those remaining will be killed. Some or all of the stand growth will have been shifted to non-ash species, and the impact of EAB will have been reduced.

- b. If the stand **falls within a future ash eradication zone**, at that time any remaining ash will be destroyed by regulatory action. For this reason, when thinning or carrying out a crop tree release, it may be advisable to substantially reduce or eliminate ash from stands at high risk close to the EAB infestation. If the stand falls within a future ash eradication zone, it is suggested that landowners perform the required eradication themselves whenever possible to minimize collateral damage.
  - c. If **EAB doesn't infest**, some or all of the ash trees in the stand will have been removed and some or all of the growing capacity of the stand shifted to non-ash species.
2. Stand does not contain an adequate number and distribution of non-ash species to develop into an adequately stocked stand if all or a high proportion of the ash are removed or killed. This type of stand is particularly difficult to address because by definition there are insufficient non-ash trees to develop into a desirable woodland. A thinning or crop tree release cut, therefore, would accomplish the less-than-desirable objective of shifting the species composition and growth to undesirable species. Landowners with such stands must very carefully examine (and perhaps reaffirm) their ownership goals and objectives for each stand and which species will satisfy those goals before choosing any management strategy.
- A. Landowner decides to take no action.
    - a. If **EAB infests**, the ash trees in the stand will be killed and there will be too few trees of desirable species left to develop the area into a stand satisfying the ownership objectives.
    - b. If the stand **falls within a future ash eradication zone**, at that time the ash will be destroyed as directed by regulatory action and there will be too few ash remaining to develop the area into a stand satisfying the ownership objectives.
    - c. If **EAB doesn't infest**, the stand composition is unaltered by EAB, with ash remaining as a potentially important component of the stand's future composition.
  - B. Landowner decides to implement a thinning or crop tree release cut on the existing stand<sup>4</sup>.
    - a. If **EAB infests**, the remaining ash trees in the stand will be killed and there will be too few trees of desirable species left to develop the area into a stand satisfying the ownership objectives.
    - b. If the stand **falls within a future ash eradication zone**, the remaining ash will be destroyed as directed by regulatory action, there is the risk of collateral damage to the stand or site, and there will be too few ash remaining to develop the area into a stand satisfying the ownership objectives.
    - c. If **EAB doesn't infest**, the stand composition will shift in response to the selection criteria used in determining which trees are retained, and the growth rate of the released trees will increase. Stand growth will be shifted to the desirable ash and non-ash species retained, and ash remains as an important species component of the future stand.
  - C. Landowner removes (harvests if there is a market) or deadens the existing stand and allows it to regenerate naturally or plants seedlings or seed. This alternative will be viewed as extreme by most landowners, increasingly so the older the stand. It is a land management option, particularly for young stands, when the species composition or stocking of the stand does not meet and cannot effectively be altered to meet ownership objectives. It is obviously an extreme and initially disruptive strategy, and for that reason it is critically important that ownership objectives for the stand be carefully reviewed and confirmed. When faced with this alternative, many woodland owners will decide that it is more desirable to alter the management objectives for a particular stand than undertake such a disruptive strategy; others with less flexible management goals will pursue the strategy. If reducing the potential impact of EAB on the stand is an objective, some effort will be needed in most stands to reduce or eliminate ash sprouting and natural regeneration.
    - a. If **EAB infests**, the impact on the stand will be minimized to the extent that the strategy was successful in producing an adequate number of non-ash trees to develop into a stand that satisfies the ownership objectives. Any ash trees present in the stand will be killed.
    - b. If the stand **falls within a future ash eradication zone**, any ash present will be destroyed as directed by regulatory action, and there is the risk of collateral damage to the stand or site. If this happens, it is suggested that landowners perform the ash eradication themselves whenever possible to minimize damage.
    - c. If **EAB doesn't infest**, to the extent that the strategy was successful, the landowner will have a young stand that more effectively satisfies ownership goals and objectives than the one that previously occupied the site. While the percentage of ash in the stand may have been substantially reduced, the ash present may be retained as part of the future stand.

## Strategies for Stands in Which the Dominant Trees Are Greater Than 12 Inches dbh and That Contain Ash Trees



A. The landowner decides to take no action.

- a. If **EAB infests**, all of the ash trees will be killed, any monetary value of the ash will be lost unless salvaged, future management options for the stand may be reduced, and there will be standing dead trees that can provide important wildlife habitat needs, but which will be a safety hazard.
- b. If the stand **falls within a future ash eradication zone**, all of the ash within the stand will be destroyed as directed by regulatory action, any monetary value

of the ash will be lost unless salvaged, and future management options for the stand may be reduced. If this happens, it is suggested that landowners perform the eradication themselves whenever possible to minimize collateral damage.

- c. If **EAB doesn't infest**, the stand composition will be unaltered by EAB.
- B. The landowner decides to have a commercial harvest that reduces or eliminates the ash component of the woodland while harvesting other species as appropri-

ate. Irrespective of EAB activity, as a result of the commercial harvest:

- The landowner will have received income from the harvest.
  - The character of the woodland will be altered.
  - The landowner will have the opportunity to establish long-range goals for the stand and implement a management plan to accomplish those goals.
- a. If **EAB infests**, the impact of emerald ash borer will be reduced or completely eliminated, depending on how completely ash was removed from the stand (some ash may be intentionally retained and some natural ash reproduction may have occurred). Any remaining ash will be killed by EAB.
  - b. If the stand **falls within a future ash eradication zone**, all of the ash remaining in the stand will be destroyed as directed by regulatory action. If this happens, it is suggested that landowners perform the eradication themselves whenever possible to minimize collateral damage.
  - c. If **EAB doesn't infest**, the composition of the stand will be unaltered by EAB. However, as a result of the harvest, ash will make up a substantially smaller proportion of the trees in the stand or will be absent entirely.
- C. The landowner decides not to have a commercial harvest but cuts or deadens the ash in the stand. Irrespective of EAB activity, as a result of this activity:
- Ash in the stand will have either been removed or will be standing dead.
  - Unless the ash is cut and sold or utilized (e.g., firewood), any monetary value of the ash will be lost.
  - The growing capacity of the stand will be shifted to non-ash species.
- a. If **EAB infests**, the impact of emerald ash borer will be reduced or completely eliminated, depending on how completely ash was removed from the stand (some ash may be intentionally retained and some natural ash reproduction may have occurred). Any remaining ash will be killed by EAB.
  - b. If the stand **falls within a future ash eradication zone**, all of the ash remaining in the stand will be

destroyed as directed by regulatory action. If this happens, it is suggested that landowners perform the eradication themselves whenever possible to minimize collateral damage.

- c. If **EAB doesn't infest**, the composition of the stand will be unaltered by EAB. However, as a result of the selective reduction or elimination of ash, it will make up a substantially smaller proportion of the trees in the stand or will be absent entirely.

## A Final Thought

There is no single “right” management strategy for minimizing the potential impact of emerald ash borer that is appropriate for all stands. Selecting the appropriate strategy for a particular stand involves carefully evaluating a variety of factors including ownership objectives, stand characteristics, proximity to active EAB infestations, and location in the state. It is highly recommended that woodland owners seek the assistance of a professional forester in evaluating their options. Direct assistance is available from Ohio Department of Natural Resources Division of Forestry Service Foresters or consulting foresters. Contact your local office of OSU Extension for individuals responsible in a particular county, or consult the ODNR Division of Forestry's Landowners Assistance web site for a complete directory of service and consulting foresters. That web site address is <http://www.ohiodnr.com/forestry/Landownerasst/ladirectory1.htm>.

## Notes

<sup>1</sup> Note that mountain ash is not a true ash, and is not affected by emerald ash borer.

<sup>2</sup> Forest Statistics for Ohio. 1991. USDA-NEFES Res. Bull. NE-128.

<sup>3</sup> dbh is an abbreviation standing for diameter breast height, the diameter of the tree measured 4.5 feet above ground level.

<sup>4</sup> The amount of ash retained will be strongly influenced by the location of the stand relative to the EAB infestation and the amount of ash in the stand. In high risk areas near the infestation it may be desirable to substantially reduce or eliminate ash from many stands. In other parts of the state, in stands with more than one-third the stocking in ash, the percentage of ash stocking should be reduced to one-third or less if possible. Only ash trees with good form and vigor should be retained.

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