
Impacts of the Emerald Ash Borer Infestation on Michigan Trunkline Rights Of Way



Maintenance Support Area
January 2006

INTRODUCTION

Trees along the highways are of great aesthetic, as well as functional, value. Trees offer a degree of safety for the traveler as their presence provides a visual break from the flat projection of the road surface. Trees provide direction to the motorist by distinguishing curves and turns in the road ahead, reducing headlight glare and providing wind breaks where drifting snow is a problem. Their root systems also help to stabilize soils and steep slopes and reduce/filter storm water runoff. Trees also provide a habitat for birds and wildlife.

In 2002 an exotic beetle was discovered in southeastern Michigan near Detroit. The insect had never been detected anywhere in North America prior to this time. The beetle, Emerald Ash Borer (EAB) only attacks varieties of ash trees. The EAB does most of its damage during the larval stage as it feeds under the bark of ash trees. The larvae (immature stage) feed on the inner bark disrupting the tree's ability to transport water and nutrients. Most infested trees die within two years. Some of the symptoms exhibited by infested trees are:

- Initial thinning and yellowing of foliage
- A proliferation of suckers may develop from the trunk area
- Woodpecker injury to the trunk is evident
- S-shaped tunneling can be seen beneath the bark
- D-shaped emergence holes on the trunk. The more severely affected the tree, the greater the number of emergence holes. The holes can be difficult to see.

There are over 700 million ash trees in Michigan. Since the discovery, 15 million trees located in twenty counties are estimated to be infested or dead. Although no one knows exactly how long the insect has been in Michigan it is theorized that it came from Asia in wood packing materials a minimum of five years prior to its discovery. Although the beetle doesn't appear to fly great distances, it can spread more than one half mile per year. The spread of the insect appears to be attributed to the movement of ash logs, firewood and nursery stock from infested locations to other areas of the state. Whether the spread of the pest can be contained or at least slowed, is still open for debate.

PURPOSE

Michigan's highway system consisting of nearly 10,000 miles of roads, is the thread that ties both large and small communities together within the state. The highways provide not only the means to move manufacturing and agricultural goods to markets throughout the state and country but also serve as vital links for the recreational and tourism industries.

The roadside environment plays an important role in the aesthetic quality that an individual experiences while driving or riding in vehicles. Trees and other types of vegetation along the roads help blend the paved road surface in with adjoining communities and the rural landscape.

The purpose of this report is to determine the impacts of the Emerald Ash Borer on ash trees located within the state highway right-of-way within Michigan. Information within the report discusses the location of ash trees within the state, areas infested with EAB to date, MDOT's remediation efforts and the actual and projected costs of remediation.

The Michigan Department of Transportation (MDOT) is committed to providing a highway system that is functional, safe, aesthetically pleasing and well maintained. The infestation and spread of the EAB poses one more challenge to the ever changing world of managing roadside vegetation.

AREA IMPACTED

Figure 1 illustrates the distribution of ash trees in Michigan. Every county within the state contains at least one or more varieties of ash species. The white, green and black ash is the predominant varieties that are impacted. Mountain ash is not a true ash tree and is not impacted by the EAB.

Michigan's roadsides are very conducive to the establishment and development of ash trees. Thousands of ash trees have been planted on MDOT's roadsides since the early 1970's. The species has proven over time to be one of the few trees that can withstand the harsh roadside environment. Ash trees have done well in poor soil situations characterized by wide fluctuations in moisture levels and low nutrient levels. While MDOT has traditionally planted a wide variety of tree species on roadside landscape projects, the Green and White ash varieties have withstood the elements where others could not, at least until now.

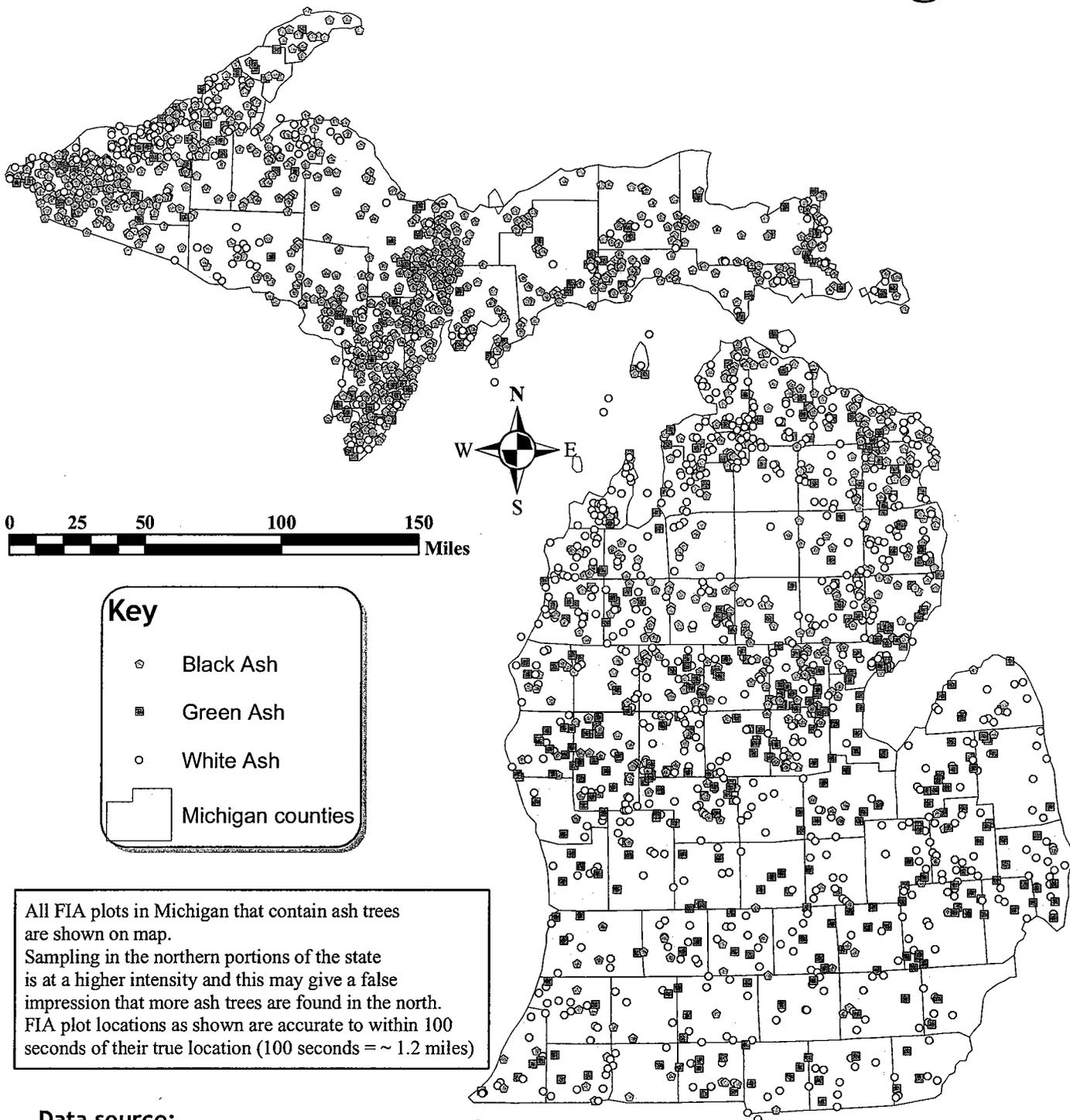
In addition to the thousands of ash trees that have been planted, millions have voluntarily established within the roadside right-of-way from seed. Current estimates place the number of ash trees within the MDOT right-of-way at over 20 million statewide. The map on page 4 illustrates the areas currently impacted by the EAB as of December 5, 2005. MDOT has already begun removing dead Ash trees along the roadsides within the Detroit Metropolitan area.

REMEDICATION EFFORTS

MDOT's goal is to provide the traveling public with a safe and quality driving experience while using the state highways. A dead tree removal program has been part of the routine highway maintenance responsibilities for over 40 years. Dead trees that could fall into the road, or pose a danger to pedestrians and motorists, are removed on an annual basis, typically during the winter months. This activity is especially important on the "M" and "US" designated roads in urban as well as rural areas where the right-of-way is narrow and trees are generally located closer to the road.

Figure 1

Distribution of Ash Trees in Michigan



Key

- ◇ Black Ash
- Green Ash
- White Ash
- Michigan counties

All FIA plots in Michigan that contain ash trees are shown on map. Sampling in the northern portions of the state is at a higher intensity and this may give a false impression that more ash trees are found in the north. FIA plot locations as shown are accurate to within 100 seconds of their true location (100 seconds = ~ 1.2 miles)

Data source:
U.S. Forest Service
Forest Inventory and Analysis
(FIA) data for Michigan, 1993



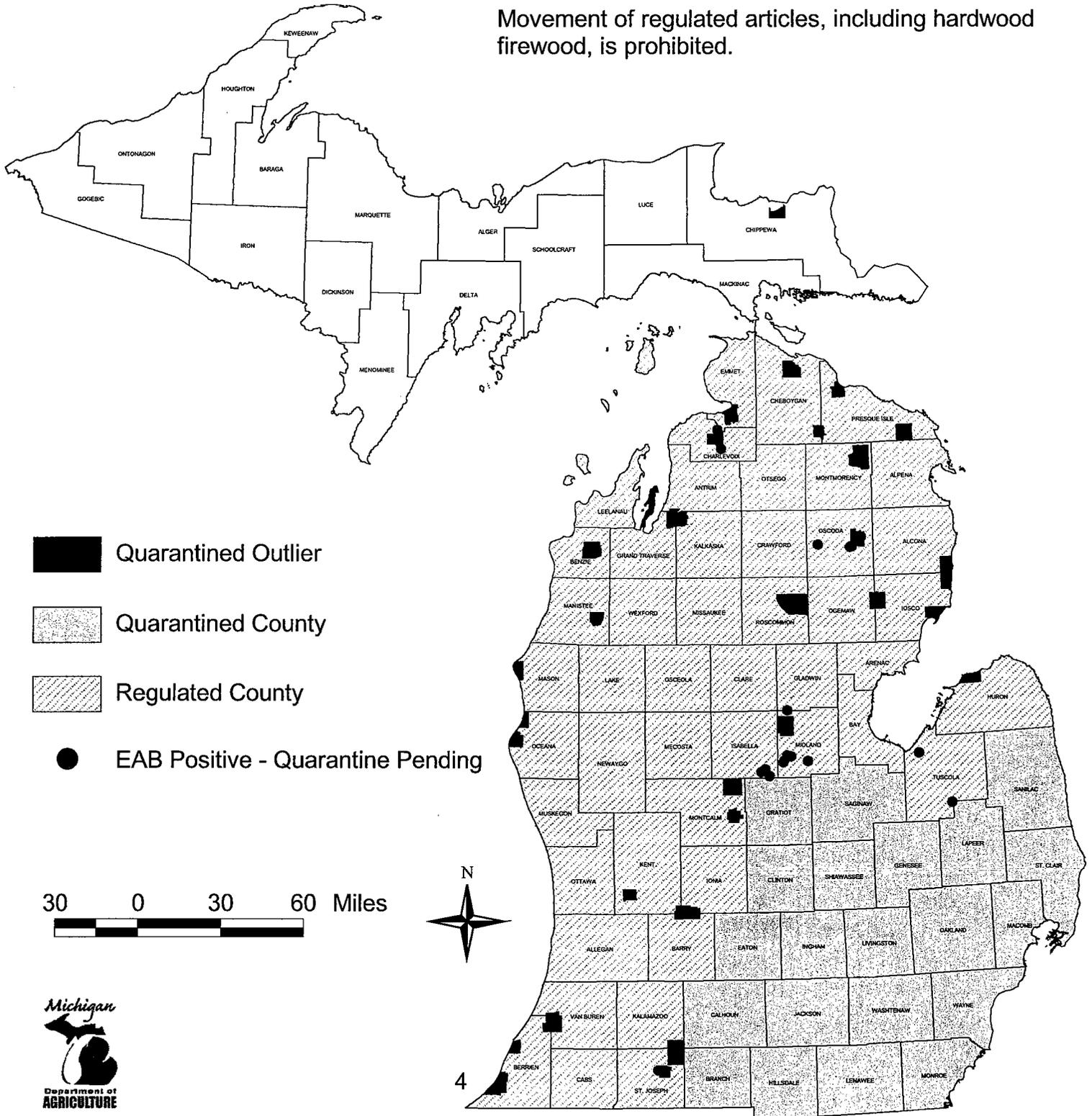
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Emerald Ash Borer Regulated Areas, Quarantined Areas, and Recent Detections in Michigan - December 5, 2005 -



Quarantine pending around identified EAB positives.

Movement of regulated articles, including hardwood firewood, is prohibited.



On easement right-of-way where MDOT does not own the property, past practice has been to give the property owner the larger pieces of wood once the dead tree has been cut. The smaller portions of the tree are run through a chipper and hauled away. If the property owner does not want the wood it must be hauled away to another location for disposal. Hauling of the wood has been very minimal in the past, usually just occurring at removal locations within cities or densely populated urban areas. Transporting and off site disposal adds greatly to the cost of removing dead trees. Wherever possible the wood is left on site, within the right-of-way, away from the road where it poses no safety concerns.

Over the past five years MDOT has spent about \$1 million annually removing an estimated 4,000 dead trees statewide. This cost is expected to increase drastically as the EAB spreads and the ash trees die and must be removed. Not only will the cost increase because of the increased number of dead trees that will need to be removed but also because of the number that will need to be transported for proper disposal. Cut wood left along side the road is tempting for anyone that is heating with wood, particularly now with the rising fuel costs. Motorists stopping along the road to load wood pose a safety concern to not only to themselves but other motorists as well. Coupled with the fact that the EAB is spread by the movement of firewood, MDOT believes that most of the ash wood will need to be transported to marshalling yards or other locations for proper disposal.

Table 1 illustrates the current MDOT average tree removal contract costs based on tree diameter at breast height (DBH):

Tree DBH	0-12"	13-18"	19-24"	25-30"	31-36"	37-42"	43"+
Cost*	\$55.00	\$250.00	\$360.00	\$425.00	\$525.00	\$900.00	\$1,350.00

*Price does not include stump removal or transporting wood for disposal.

Table 1

Table 2 illustrates current Michigan Department of Agriculture (MDA) contract Ash tree removal costs that are available to municipalities and private landowners within the quarantine counties:

Tree DBH	1-10"	11-17"	18-24"	25-30"	31-39"	40"+
Municipal Trees	\$60.00	\$150.00	\$300.00	\$500.00	\$750.00	\$1000.00
Private Trees						
Front Yard	\$72.00	\$180.00	\$360.00	\$600.00	\$900.00	\$1,200.00
Back Yard	\$90.00	\$225.00	\$450.00	\$750.00	\$1,125.00	\$1,500.00
Transportation Cost*	\$0.40	\$0.50	\$0.60	\$0.70	\$0.80	\$0.90

*Price per mile-per tree size from removal site to nearest marshalling yard, one way.

Table 2

The MDA and MDOT contract removal costs are very similar in most of the size ranges except the MDOT 13-18" (\$250.00) and MDA 11-17" (\$150.00) range where the MDOT cost is about \$100.00 per tree more. It should be noted that the MDA contract prices for removal and disposal are not available to MDOT at this time. One could assume that MDOT transportation costs from the removal site to the disposal locations would be very similar to the MDA contract cost.

Based on sample surveys, it is estimated that the majority of the ash trees that will need to be removed within the right-of-way fall into the 13-18" size range. MDOT is currently advertising for bids to award a contract to inventory all of the ash trees in the Metro Region (Wayne, Oakland, Macomb and St Clair counties). The inventory will determine the location, size and condition of ash trees in the urban/suburban landscape. The inventory should be completed in 2006.

As more and more ash tree become infested with the EAB the numbers of dead trees that will need to be removed will also increase each year. At this time it is estimated that MDOT will need to remove a minimum of 12,000 ash trees per year over the next 10 years. The removal cost alone is estimated to be approximately \$3 million annually. A conservative estimate of transporting an average 13-18" tree 50 miles one way for disposal will add an additional \$25.00/per tree. The marshaling yards also charge a nominal fee for disposal of the ash wood, typically about \$8.00/cubic yard. The transportation charges alone will increase the total annual tree removal cost to over \$3.3 million annually.

MDOT is currently focusing attention on the removal of the dead ash trees. Because of the impact the removal of the ash trees will have on local communities and the adjacent landscape, particularly in the urban and suburban areas, a tree replanting program will need to be implemented at some point in time. The current MDOT estimated per unit cost to plant, and water/maintain for two years, a 2-2 1/2" tree is about \$500.000. To plant 2,000 trees annually along the roadsides would cost an estimated \$1 million per year.

According to the experts there are some insecticide treatments which may help prevent further decline of the ash trees or aid in the recovery of those trees that are not severely affected. Research is currently underway to help determine what products, methods and rates are most promising at controlling the EAB. At this point insecticide treatments appear to be a costly option (approx. \$5 per inch caliper) where there are large numbers of ash trees. The treatments are best suited where there are individual trees, such as a homeowner's front lawn, in front of a commercial establishment on designated routes or specimen trees within a tourist facility. The trees would also need to be treated annually. With the number of ash trees located within the highway right-of-way, insecticide treatment does not appear to be a viable option.

SUMMARY

With an estimated 20 million ash trees within the MDOT right-of-ways the department is faced with an enormous task of removing those that pose a danger to the traveling public as they die over the next ten years. Not only do the dead trees pose a danger but they also detract from the attractive roadside landscaping that many communities have groomed and taken pride in for years. An estimated \$3.3 million is needed annually over the next ten years to begin to address the dead ash tree removal problem along our roadsides. While this amount will not cover the removal costs of all the dead ash trees, it will address those that are located within critical areas.

Because of the cost of insecticide treatments, and the vast numbers of ash trees that would need to be treated, this does not appear to be a viable alternative to removal for trees located within the highway right-of-way at this time. The fact that each tree would need to be treated annually makes this option very impractical. MDOT will monitor the research efforts currently underway and may consider this option in the future, on a limited basis, for high profile/impact areas.

Although the removal of the dead ash trees is the priority, a tree planting program needs to be implemented to begin to re-landscape those roadsides that have been hardest hit by the EAB. Starting in the Southeastern portion of the state MDOT recommends an annual \$1 million replanting effort on the states roadsides. The \$1 million would replant approximately 2,000 trees each year, starting with those areas that suffered the greatest losses. Planting a mix of trees that have preformed well on the roadsides will help insure that trees will line the streets of Michigan for many years to come.