City of Bentwood

Department of Parks and Recreation

Emerald Ash Borer Plan

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Executive Summary:
The City of Brentwood has been working on a plan to reduce the impact of the Emerald Ash Borer (EAB). With 260 Ash trees, over 8% of the City's Urban Forest, the EAB will have a devastating impact on the City of Brentwood. The City's EAB Plan proactively uses resources to manage this invasive pest while analyzing the impact on the tree canopy and ensuring public safety. The EAB Plan addresses the public environmental and economic needs and seeks to distribute the costs associated with the loss of tree canopy over a manageable time.

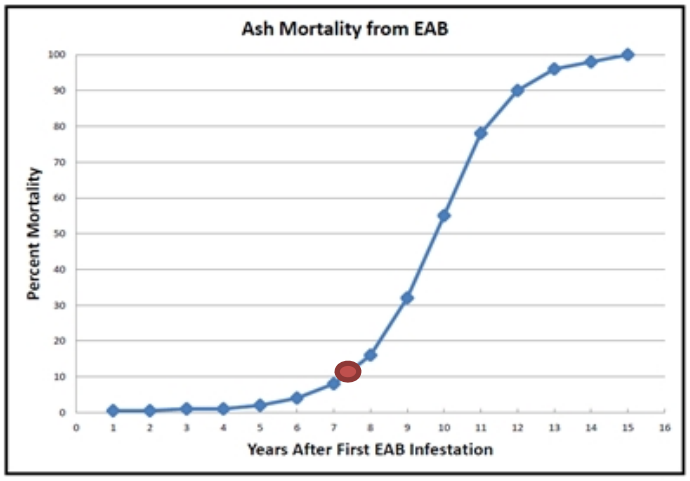
The Emerald Ash Borer (Agrilus planipennis), is an insect native to Asia. It was first discovered in North America in 2002 near Detroit, Michigan. It is believed to have been accidentally introduced to America in wooden shipping materials. In the following years it proceeded to decimate Ash populations in the Great Lakes region. In subsequent years infestations have spread into 30 states and two Canadian provinces, killing tens of millions of ash trees throughout the eastern United States.

Emerald Ash Borer was first discovered in Missouri in 2015 in St. Charles County. The pest was discovered in St. Louis by a utility contract crew working for Ameren in the area near Calvary Cemetery on May 6, 2015. It has been estimated that by 2025 – 2030 the Ash tree mortality rate in our region will approach 100%. Certainly by that time, the local Ash tree population will be in a state of hazardous decline. A chart showing the Missouri counties known to be infested with the Emerald Ash Borer has been added to the appendix.

The manner in which EAB moves through an area once it is established has been found to be extremely predictable. Typically, EAB is not detected until infestations have been present for 5 – 8 years, sometimes with symptoms not becoming evident until there is a high EAB population present and/or sometime and entire-tree infestation.

As the graph to the right indicates, the St. Louis area could potentially be within a few years of a rapid increase in ash mortality rates, which is why it is so important to prepare now to avoid the possibility of being overwhelmed with large numbers of affected ash trees.

Municipalities in the areas first infested by EAB have experienced severe problems relating to the loss of their Ash populations. Forestry departments have been unable to keep up with the rising mortality rates in terms of both labor and budget. The result has been massive canopy loss, hazardous trees left standing and no funds to replant.



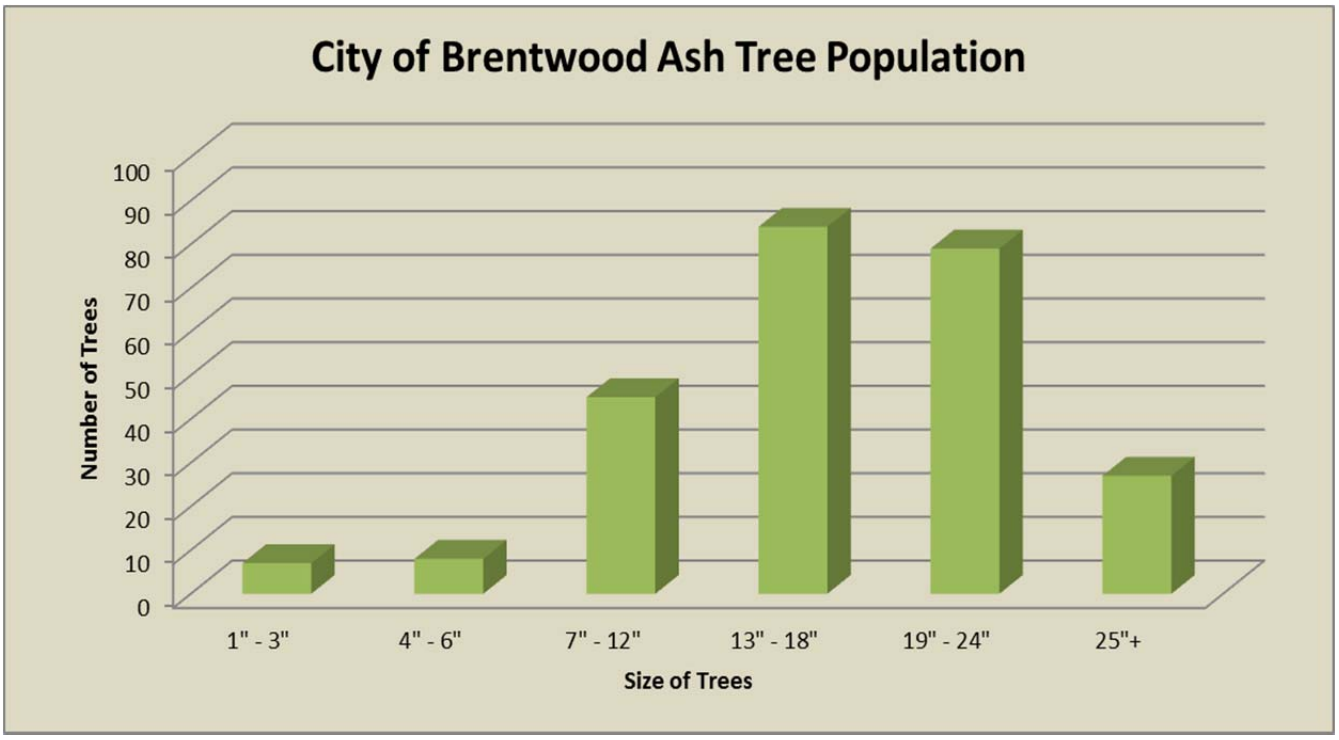
The red dot is where most experts agree the St. Louis region is currently on the Ash Mortality scale.

Background on the Emerald Ash Borer (EAB)
The EAB is an exotic pest from Asia that has already been responsible for the death of over 100 million ash trees in the United States and Canada. The adult beetles nibble on ash foliage but cause little damage (see picture below). The larvae (the immature stage) feed in the vascular tissue of ash trees, disrupting the tree's ability to transport water and nutrients (see picture below). Unlike other trees like oak or elm trees, which remain relatively stable after they die, ash trees lose moisture internally very quickly and begin to fall apart soon after they die. A map of the Emerald Ash detection in North America has been added to the Appendix.

The adult EAB is about ½ inches long and metallic green in color. During the summer and fall the EAB larvae life stage feeds and develops in the cambium region, the layer within the bark where sap moves, thereby disrupting the tree's ability to transport water and nutrients. All native ash trees are affected by EAB.

Infestations can spread by moving infested ash tree nursery stock, logs and firewood into un-infested areas. Shipments of ash nursery trees and ash logs with bark are now regulated, but the transport of infested firewood remains a problem. EAB populations initially build very slowly, but later increase rapidly as more trees become infested. As EAB populations reach their peak, many trees decline and die within one or two years.

Current Inventory:
The City of Brentwood recently finished a re-inventory of the city's Urban Forest. The 2017 inventory showed the City currently owns 250 Ash trees, comprising of just over 8% of the total urban forest. The vast majority of the Ash trees (93%) are in either fair or poor condition. The chart below shows the size class distribution is heavily weighted in the 13" – 18" and 19" to 24" diameter categories, which can be expected from an established forest.



The Ash tree population seems to be evenly distributed between the four wards in the City of Brentwood, although there is a large row of Ash trees on Wrenwood Lane. In addition, there is a cluster of Ash Trees on Yorkshire Lane Court. A screenshot from the City's tree inventory depicting the Ash tree distribution in the City of Brentwood has been added to the Appendix.

Recommendation:
Ash trees killed by the Emerald Ash Borer quickly become brittle and fall apart, creating potential hazards to public safety. At this time there are two options:

- Treat Ash trees with a systematic chemical treatment that kill the larvae. This chemical treatment must be consistently until the all the Emerald Ash Borers have passed through the region. Even after the initial wave, the trees might still need treatment as there is no guarantee that every EAB will have left the region.
- Remove every Ash tree.

Most municipalities are using chemical treatments for three reasons:

- Protect any historic tree in their city.
- Protect large healthy ash trees in Excellent or Very Good condition.
- To prolong the life of certain Ash trees in their community in order to extend the removal period and spread out the cost over a longer period of time.

The City of Brentwood has decided against chemical treatments for the following reasons:

- The City currently does not have any tree listed as a historical tree.
- None of the Ash trees are listed in Excellent or Very Good condition therefore would not be a good candidate for the treatment.
- The City can complete the removal process in a five year period and does not need to extend the life of any Ash tree.

The Parks & Recreation Department's recommendation is to remove every publicly owned Ash tree in the City of Brentwood by the end of 2022. This should put the City ahead of the mortality curve and allow staff flexibility for unforeseen setbacks. The plan prioritizes public safety first and the loss of tree canopy second.

Staff will begin by removing all the Ash trees with a condition rating of poor. After the trees with a poor condition rating have been removed, staff will focus on removing all trees greater than 24" in diameter, regardless of condition, as these pose the next greatest risk to public safety. As these largest trees are being removed crews will also remove any remaining 7" size class tree or smaller. After these are removed, the remaining Ash trees will be removed in order to mitigate the impact of concentrated canopy loss. Trees will be scheduled for removal taking into the following considerations:

- Areas with an abundant existing canopy will experience less impact and will be targeted first.
- Areas with less tree canopy will be prioritized for replanting and targeted for removals last.
- Areas with unusually high proportions of Ash canopy will be targeted in a staggered fashion. For example on streets with long rows of Ash trees, such as Wrenwood Lane, every third tree will be removed and a new tree replanted in Year 1, the middle set of trees in Year 2 and the third in the line in Year 3.
- Ash tree removals will be spread out across the four wards of Brentwood as much as possible.

Tree Reforestation and Schedule:
The scope of this project will be immense. Reforestation will achieve complete replacement of all Ash trees removed. Once reforestation begins, the City's Urban Forester will focus on a biologically diverse plating schedule. Focus will be placed on maintaining biological diversity to reduce future impacts from invasive species in all replacement locations. When replanting, staff will concentrate on the following:

- Areas with good remaining canopy will be replanted according to normal procedures.
- Areas where Ash tree removals have a drastic effect on canopy will be replanted with an emphasis on trees with a faster growth rate. These species will be inter-planted with slower growing trees such as Oak, Beech and Dogwood.

Budget Considerations:
The total budget for the City of Brentwood Emerald Ash Borer Plan is estimated to be:

Ash Tree Removal	- $365,200.00
Reforestation	- $150,000.00
Total	**$515,200.00**

The breakdown of cost per year is included in the chart below.

	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Number of trees	67	50	45	45	43
Removal Cost	$95,720.00	$65,150.00	$65,050.00	$68,920.00	$70,360.00
Reforestation	$40,200.00	$30,000.00	$27,000.00	$27,000.00	$25,800.00
Total Expenditures	**$135,920.00**	**$95,150.00**	**$92,050.00**	**$95,920.00**	**$96,160.00**

Estimated cost based on 2016 cost removal and reforestation prices.

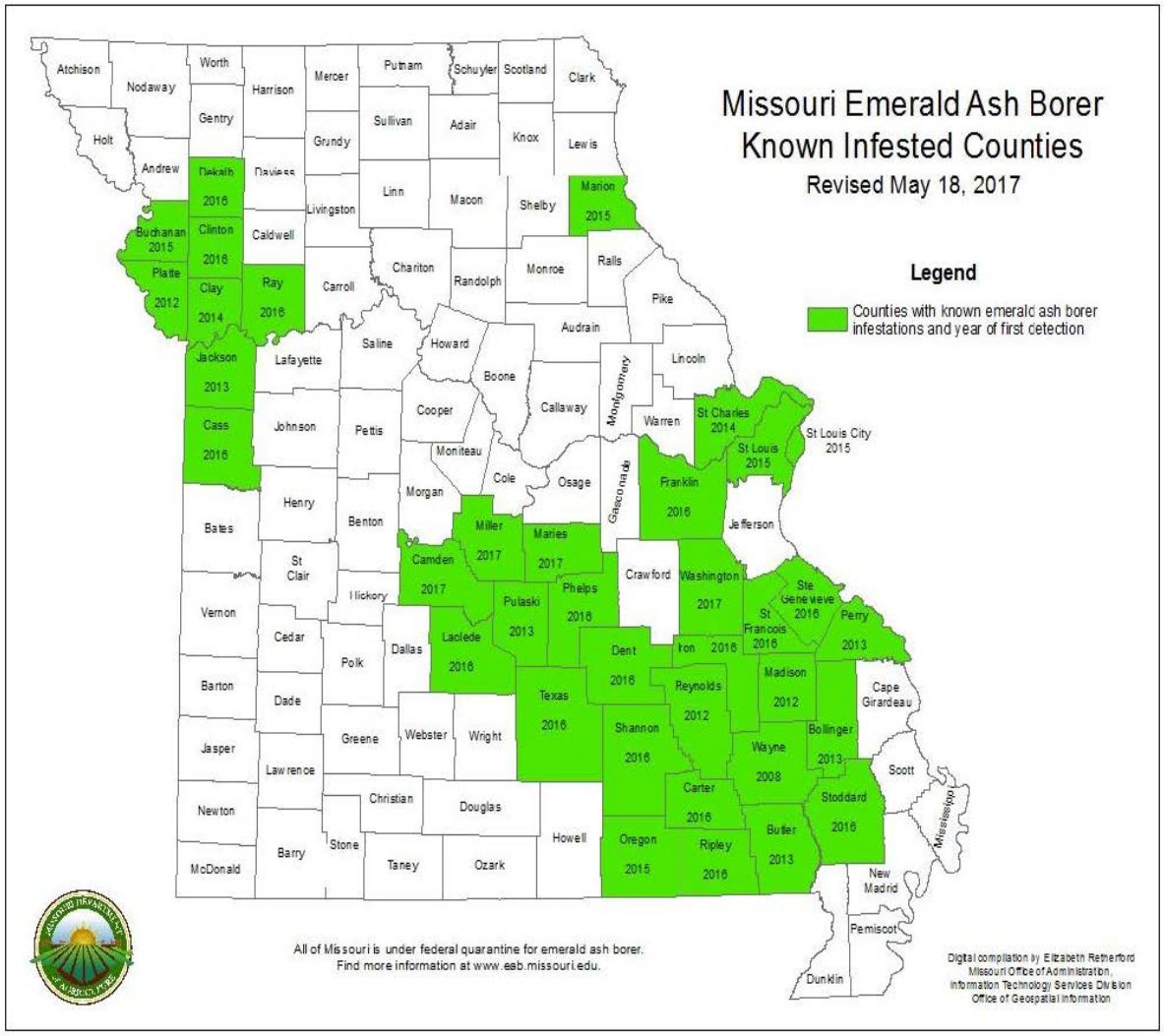
The budget expenditures listed above are just the estimates for removing and replanting the Ash trees. These estimates do not include any staff administration costs to oversee the project or any utilities, such as watering the new trees, or staff and associated equipment cost for the maintenance of the newly planted trees.

Summary:
The Parks & Recreation Department is aware of the considerable impact the proposed Emerald Ash Borer Plan has to the overall cost and staff resources of the City of Brentwood. More importantly, staff is well aware of the devastating effect the EAB will have on the City's urban canopy. But the reality is that the City of Brentwood and every other community will face this problem in the upcoming years.

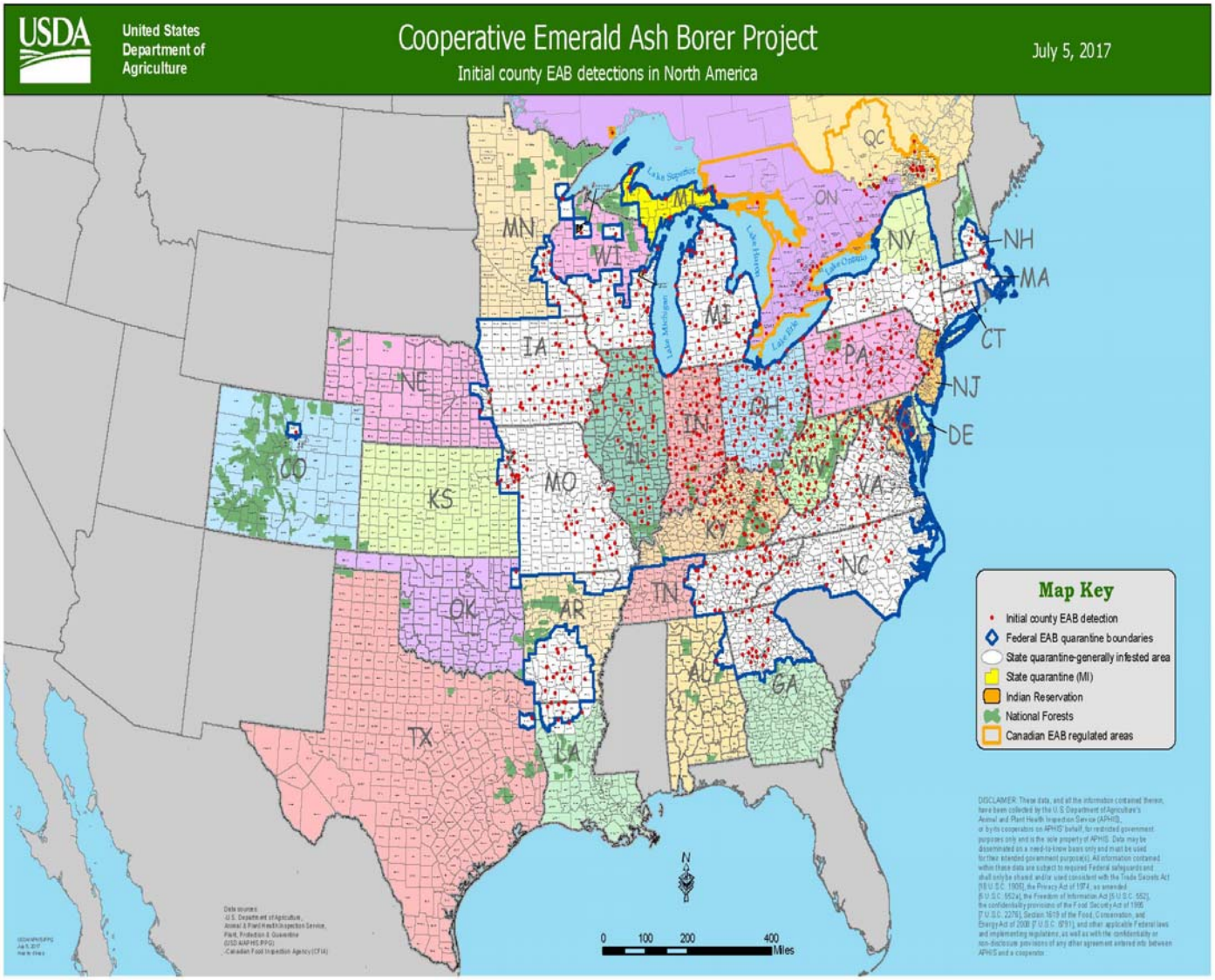
To that end, the department has been proactive in staying current on research and updates related to EAB. Staff has been researching cost-effective measures that can be taken to minimize the results from EAB and then to restore diversity in the city's tree canopy. Staff has attended workshops and seminars presented by the Missouri Department of Conservation, the Davey Resource Consulting Group, the International Society of Arboriculture and other consulting organizations.

The Parks & Recreation Department feels that the recommendations outlined in this document are the most cost and time effective plan in addressing the Emerald Ash Borer and its impact to the City of Brentwood.

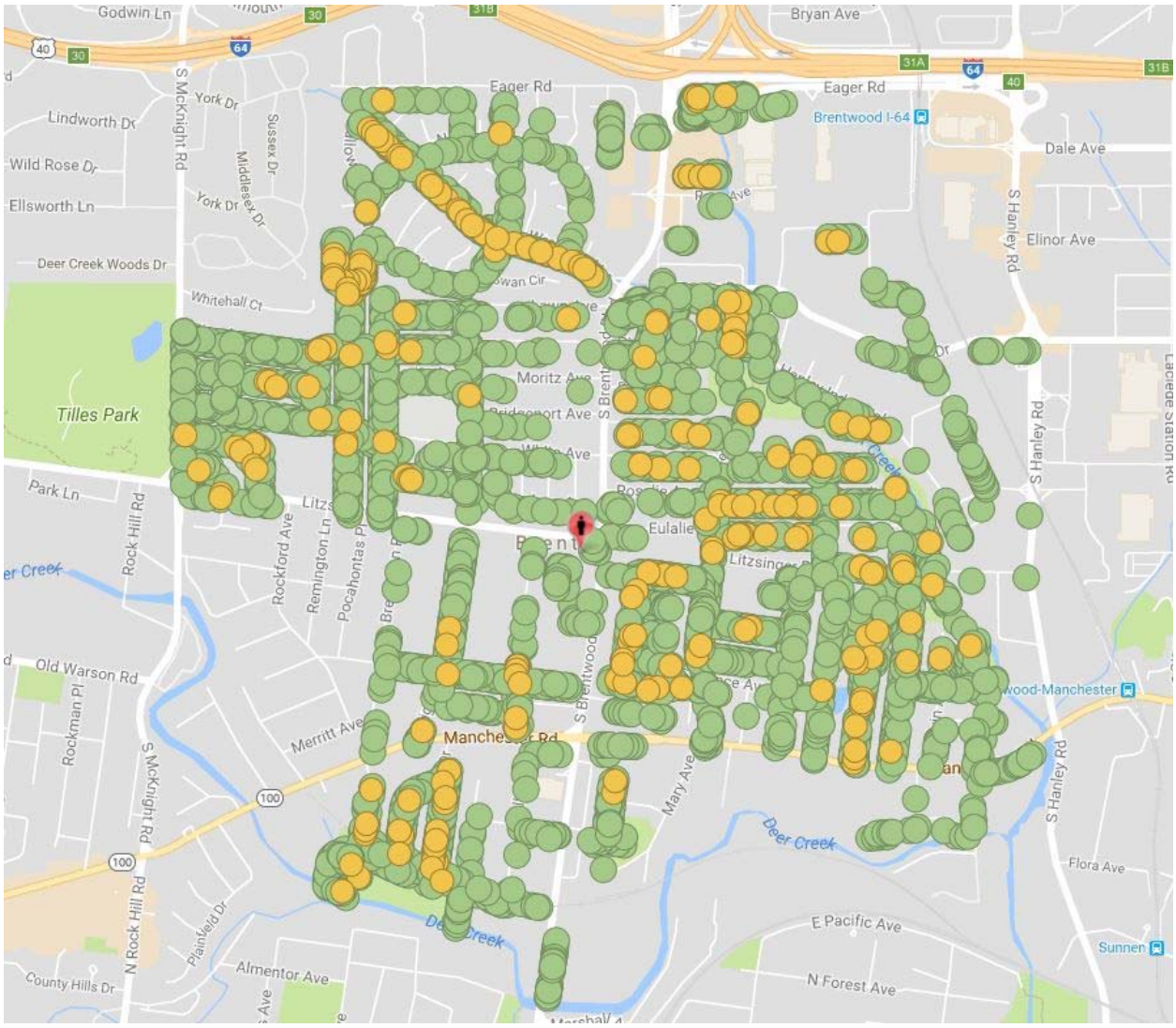
Appendix A
Missouri Counties Infested with the Emerald Ash Borer



Appendix B
Emerald Ash Borer Detection in North America



Appendix C
City of Brentwood – Ash Tree Distribution



Ash Trees are indicated by yellow circles