

# Emerald Ash Borer Management Plan City of Reading, Pennsylvania



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DEPARTMENT OF CONSERVATION  
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## Administration

The City of Reading Emerald Ash Borer Management Plan is administrated by the City EAB Manager. The EAB Manager reports to the City Council on this plan. City residents are encouraged to contact the City EAB Manager for any questions or concerns related to this plan.

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## **Executive Summary**

The City of Reading recognizes the benefits of the urban trees to the quality of life, air pollution reduction, energy conservation, storm water mitigation, and property value for its residents. Ash is an important part (502) of our City's tree population all found along our streets. These trees provide nearly \$ 83,000 annually to the City. Unfortunately, the emerald ash borer (EAB) threatens the future of ash trees in the City. EAB is now located in 57 counties, with the closets municipality being Bernville, Pa.

To manage the ash trees population and to mitigate potential damage, we have adopted an aggressive management approach towards the management of this invasive pest over the next 10 years (2016-2025). A total of 232 ash trees on public streets will be protected using systemic insecticide called Tree-äge. The remaining 270 street trees will be removed and replaced with non-host tree species.

The total cost of this project estimated at over 10 years is \$632,000, with a yearly cost ranging from \$28,930 – \$140,500. Awards and grants from the federal, state, and local agencies, organizations, and institutions will be actively sought by the City to offset a portion of the cost for this program.

Ash trees on private properties, contained within their respective yards, shall be the responsibility of the property owner.

The program will be administrated by the City Arborist who also serves as the EAB Plan Manager. Annual auditing of the program will be conducted by the Shade Tree Administrator and the Shade Tree Commission who will report all progress to City Council. Necessary adjustments will be recommended each year based on progress reports on the status of conditions within the City.

Activities of community outreach will be carried out throughout the program period as public support is the key to the success of this kind of program. The City will inform the public about the progress of the program on a timely fashion. Recommendations and suggestions on how to deal with this natural disaster of the ash forests are welcome. Furthermore, city residents are encouraged to be part of this program through cooperation and volunteering and other types of involvement.

All data for this report was collected by Albright College Interns and all decisions as to treatments or removals will be made by the City EAB Plan Manager.

## Authority

The Shade Tree Commission and The City Arborist are given authority to work together on management of the street trees as outlined in [The City of Reading Code Ordinance Chapter 555](#).

1. **Declaration of policy.** The health of the ash trees in the city is threatened by the emerald ash borer. Damages to those trees will have negative impact on the public safety and the quality of life for the residents. Federal and state regulations provide local authority to manage this pest and mitigate its damage in Pennsylvania.
2. **Jurisdiction.** The City shall have control of all street trees, shrubs, and other plantings now or here-after in any street, public right-of-away or easement, or other public place within the city limits, and shall have the power to remove, and replace such trees. Private trees may fall under city jurisdiction when they become concerns of public safety.
3. **Abatement of Nuisance.** If the City upon inspection or examination determines that any public nuisance as herein defined exists in or upon any public street, alley, park, or other public place; and that the danger to public safety is imminent, shall;
  - Immediately cause it to be treated or removed
  - Otherwise abate the nuisance in such a manner as to destroy/prevent the spread of this pest.
4. **Cost of Abatement.** The cost of abatement of public nuisance (street tree) may be chargeable and assessed against the parcel or property which such tree stands as per the City of Reading Codified Ordinance.
5. **Transporting of Wood Prohibited.** No person, firm, corporation shall transport within the City any infested materials without first securing the written permission of the City EAB Plan Manager.

## Introduction

Trees are an integral part of the City's infrastructure and identity. A recent tree inventory indicates there are more than 6,856 trees along city streets. Including 502 ash trees

The emerald ash borer (EAB), *Agrilus planipennis* Fairmaire (Coleoptera: Buprestidae), a woodborer from northeast Asia, was first discovered attacking ash trees in Michigan in 2002. Since then, it has been found in 23 additional states and two Canadian provinces across. It has been found in 55 counties in PA including Berks County (Appendix 1). The closest finding to the City of Reading was in Bernville, PA off of I-78 in 2014.

Adult females lay their eggs under the bark where they hatch. Larvae feeding in the cambial region disrupt water and nutrient transport inside the tree, resulting in 99% tree mortality within 4-5 years after initial attack. An estimated 20 to 55 million ash trees have been killed by this pest so far. The potential economic damage may exceed \$10 billion in 25 states expected to be affected within the next 10 years. (Kovacs et al. 2010)

Managing this pest in North America has been confounded by difficulties in early detection, limitation in control options, and scarcity in available resources. Tree removal is the only option for sick & dying trees, whereas chemical control can be effective on high-value ash trees.

The City of Reading is committed to preserve its urban forest resources as a designated community "Tree City USA for the last 30 Years". The *Emerald Ash Management Plan* is to serve as the master plan for the City to manage its urban ash trees on streets over the next 10 years. Property owners are encouraged to manage their ash trees according to the guidelines set by this document.

There are three goals for this plan:

- Protect high value ash trees for its social and environmental benefits;
- Minimize public safety and liability risk from EAB infestation within the community;
- Replace canopy cover that will be lost to EAB infestation

The following actions will be carried out in the next 10 years:

- Maintain an updated ash inventory within the City and monitor for EAB infestation on City trees yearly;
- Remove dead or dying ash trees from roadways and public areas;
- Treat valuable ash trees with an insecticide;
- Replant non-host tree species at locations where ash trees were removed;
- Conduct outreach and public education and involve private property owners.

**The Ash Resource**

An ash inventory was conducted by students at Albright College (Interns) in the summer of 2014. A total of 502 ash trees are recorded from City streets and range in diameter from 3 to 50 inches at breast height (Table 1). Ninety three percent of the trees are less than 25 inches in diameter, while 7% are between 26-50 inches. The City has no ash trees in excellent condition, 23% are good, 41% in fair, 34% in poor and the remaining 2% are dead.

Ash trees make up 7.3% of the City of Reading total street trees.

<b>Table 1. Diameter and Condition of Street Trees</b>							
<b>Tree Conditions</b>	<b>Diameter Class (inches)</b>					<b>Total</b>	
	0<10	11-25	26 - 35	36 - 50	>50		
Excellent	0	0	0	0	0	0	
Good	54	55	5	2	0	116	23%
Fair	86	110	9	3	0	208	41%
Poor	43	116	14	0	0	173	34%
Dead	0	5	0	0	0	5	2%
<b>Total</b>	183	286	28	5		502	
	36%	57%	5%	2%			

There are probably another couple hundred trees within the City parks. This inventory of those areas is incomplete. However there are possibly hundred of ash trees on private properties in which the property owners are strongly encouraged to identify and take action.

## Management Options

Trees are considered to be a valuable natural resource with compensatory values on shade, air quality, storm water discharge, heating / cooling costs, and aesthetic or property value. With the arrival of EAB, all communities will be forced to respond to the infestations in some degree, regardless of the strategies they choose to adopt. Dead trees on streets present a real threat to public safety. Removing ash from the local ecosystem will permanently alter the natural habitats for related species. Sudden changes in the canopy cover may result in negative impacts to the City. Addressing some or all of these concerns requires a well conceived management plan with specific goals and implementable mechanisms.

There are four management options a community can choose from, each with its own pros and cons:

**Option A. No Action.** This result will be that most ash trees will be killed by the end of the infestation.

**Option B. Selective Management:** In this option, high-value ash trees in selected areas (streets, landmarks, historic sites, popular parks, important ecological sites, etc.) within the community will be managed actively, whereas those in other areas (e.g. woodlots) will be left alone. Ash trees will be monitored for their health and levels of EAB infestation. Chemical control and tree removal will be applied wherever appropriate in a cost-effective manner. Tree replacement will be prioritized towards community needs. As a result, most ash trees in the natural areas will be killed by the end of the infestation, whereas a great portion of high-value ash trees are protected for future generations to enjoy. In addition, dead or dying ash trees in streets and parks will be replaced with non-host species to prevent major canopy gaps in neighborhoods. Annual cost for this option is moderate to the community, with minimal disturbance to the urban forests. Habitat change in untreated natural areas is expected.

**Option C. Preemptive Management:** In this option, ash trees in urban areas (streets, parks, golf courses etc.) will be removed preemptively and replaced with non-host species, whereas those in natural areas (e.g. woodlands) will be left alone. No EAB survey activity will be conducted. As a result, treatment areas will contain no ash trees, with no concerns over EAB in the future either. The initial cost of this option could be very high because of expenses associated with tree removal and replacement. Neighborhoods also need to deal with major canopy gaps temporarily at the beginning before replacement trees become well established. However, no annual cost will be incurred after the completion of the project. Habitat change in untreated natural areas is still expected.

**Option D. Aggressive Management:** In this option, all ash trees in the community will be managed actively with all available management tools. EAB survey activities will be carried out on both roadways and woodlands. Information from the surveys will be used to determine proper management actions across different landscapes. Chemical control will be actively pursued to protect the maximum portion of ash trees and their canopy. Only dead or dying ash trees will be replaced with non-host species. Biological control is also considered for ash resources in the natural areas. As a result, most high value ash trees in the streets and parks will be saved from EAB damage, whereas a small portion will be replaced with non-host species. In addition, ash resources in natural areas may have a chance to survive in the long term when effects of introduced natural enemies are realized. Community suffers the least socially and environmentally from the infestation, with less risk of losing urban canopy cover. However, annual cost to the community is the highest among all options.

The City of Reading has selected this last option. The Aggressive Management option is to begin as soon as possible.



## **EAB Infestation**

EAB has not been found in the City of Reading. Once the EAB is discovered in or immediately adjacent to the City, then all ash trees will be intensively surveyed and monitored. A pest status component will be added to routine maintenance and sanitation operations for the Department of Public Works.

Private Citizens will be encouraged to report suspicious pest activities on their ash trees to the City Arborist (610) 655-6035 and or the Pennsylvania Department of Agriculture (866) 253-7189.

## **Management Approaches**

Chemical treatment, tree removal, and replacement of ash trees will begin in 2016.

### **Chemical Treatment**

High-value ash trees within the City will be treated with Tree-äge. This pesticide provides excellent protection against EAB larva development for 2-3 years with a single application. The method of treatment consists of a series of injection points into the trunk, negating the need to do traditional aerial spraying. Trees in good condition are considered for this treatment since they are better positioned to survive the pest onslaught. Large diameter trees are favored over small diameter trees as they typically have higher value and provide more benefits to the community. Other factors such as cost, location, logistics, and local support are also considered during the process. A total of 232 trees were selected to receive these treatments over the next 10 years.

The chemical treatment approach for EAB Management will included a chemical called TREE-äge. Tree-äge is considered to be 99% effective against EAB larvae and only needs to be applied once every two years. A total of seven treatments are needed for the project period since Tree-äge is effective against EAB larvae for at least two years (up to three). The total cost for chemical treatment is estimated at \$218,000. Due to its cost and projected survival rates, only healthy trees should be considered for this treatment. It is a tree injection-based approach used for addressing invasive pests. Its active ingredient is emamectin benzoate, which has been approved by the EPA for treating pest. Emamectin benzoate is injected into a tree's vascular system. It is not sprayed on the bark or leaves. Animals (e.g. birds, chipmunks) and other insects (e.g. butterflies) that simply land on a treated tree but do not feed on the tree will not be affected by the insecticide. One liter treats approximately 35 trees, with an average diameter of 10". Only a licensed pesticide applicators may administer this insecticide.

<b>Table 2. Cost of Chemical Treatment for Ash Trees over 10 Years (2016-2025)</b>				
Years	No. of Trees	* Chemical + Application	Injection System	Total (US Dollars)
2016	116	28,358	1,800	30,158
2017	116	28,926		28,926
2018				
2019	116	30,095		30,095
2020	116	30,697		30,697
2021				
2022	116	31,938		31,938
2023	116	32,577		32,577
2024				
2025	116	33,894		33,894
<b>Total</b>				<b>218,285</b>

\* Numbers equal a 2% annual increase

### **Tree Removal**

EAB kills 99% of ash trees after several years of infestation. Assuming all untreated ash trees in the City will be dead or dying within the next decade, a total of (270) remaining tree on streets will need to be removed to protect public safety and reduce liability. To accomplish this goal, trees will be removed over the next 10 years. However, preemptive removal of healthy trees is not recommended by this plan. Trees that are dead, or in poor or fair condition will be selected for removal. Removal of other trees that are currently in good condition in the following years will be determined by the City staff based on the progression of the infestation at the beginning of the year. Priorities are given to the trees in the areas where trees with potential high hazards, and trees with small diameters. Through a rigorous monitoring system, this portion of the plan will be adapted as conditions warrant.

### **Tree Removal and Replanting**

A total of 270 ash trees will be removed and replaced over the next 10 years (2016-2025) at a cost of about \$414,000. This number is dependent upon the health and condition of the remaining ash trees after chemical treatment. The first 270 ash trees will be removed by using a selective removal process by removing trees that are considered to be hazardous, dead, or in poor or fair condition. This approach will be carefully monitored with ongoing attention being paid to the health of the City’s tree canopy in order to protect the safety of the City residents. This is an environmentally and aesthetically pleasing method. It will be more economically exhausting on the City than some of the other options, but there will be cost saving measures taken when it comes to all or most of the replanting since this will occur by City staff

and or volunteers organized by the City of Reading Shade Tree Commission. This may bring forth questions of the accuracy of the tables. To clarify, these numbers have been calculated utilizing the Cost Recommendation from DCNR and the cost therefore being spread out over a time period to lessen the financial strain on the City. With that being said, the time frames and relative numbers for comparison purposes can be changed to meet the needs of the City of Reading.

<b>Table 3. Cost of Ash Tree Removal &amp; Replant for 10 Years (2016-2025)</b>			
<b>Years</b>	<b>No. of Trees</b>	<b>* Unit Price</b>	<b>Total (US Dollars)</b>
2016	90	1,500	135,000
2017	90	1,530	137,700
2018	90	1,561	140,490
2019	TBD		
2020	TBD		
2021	TBD		
2022	TBD		
2023	TBD		
2024	TBD		
2025	TBD		
<b>Total</b>	<b>270</b>		<b>413,190</b>

\* Numbers equal a 2% annual increase

TBD = To Be Determined after effectiveness of Chemical Treatment

**Replanting**

All removed ash trees will be replaced for canopy cover in the community. Temporary reduction of canopy cover is expected in affected streets as replacement trees are usually small and not guaranteed at 100% survival rate. The City will work with the Arbor Day Foundation, Tree Vitalize, Master Gardeners, International Society of Arboriculture, Society of Municipal Arborist, and other nonprofit organizations, and private citizens for the planting efforts.

## **Community Outreach**

Information about EAB, ash trees, quarantine regulations, tree removal, chemical control, replanting, and other program activities will be disseminated through news conferences, seminars, public hearing, trainings, demonstrations, community events, neighborhood meetings, and awareness campaigns throughout the program period. Interested individuals are encouraged to contact the City Arborist or other administrators for more information.

Ash trees on private properties are the responsibility of the property owners. It's up to the property owner to decide whether he / she want to treat his / her ash trees, or to remove and replace their hazardous tree. However, PA Cooperative Extension will make the technical staff available to assist property owners on EAB and ash related problems. Contact the PA Department of Conservation and Natural Resources (DCNR) (717) 787-2869.

## **Cost/Benefit Analysis**

The total cost for this program is estimated at \$632,000 over 10 years. It is assumed that all management activities will be conducted by both City staff and contracted commercial companies under the City supervision including \$218,000 for chemical treatment, \$414,000 for tree removal, and replanting. The City can choose to pull all its resources together and train its staff to carry out all tasks to save money. However, this may result in added cost from new hiring and delay or cancellation of other tasks previously assigned to City workers.

## **Fiscal Planning**

To support the EAB management plan, the City of Reading will be using its Shade Tree Budget for this program. The City will aggressively explore potential cost saving measures such as in house absorption and service, volunteering, etc. to lower the fiscal burden. In addition, the City will work diligently with federal, state, and local government agencies, organizations, and institutions to secure awards and grants to fund a portion or an entire project in chemical treatment, tree removal, or replanting.

## **Time Table**

A 10-year time table has been developed to specify program objectives and procedures for each year. Activities such as tree inventory, EAB monitoring, chemical treatment, tree removal, replanting, efficacy evaluation, etc. will be included. Necessary adjustments will be made at the beginning of each year to reflect the changes or the field situation.

## **Data Collection & Reporting**

All data from the program are collected according to established guidelines and entered electronically into a centralized database. Status reports are required for all aspects of the program. An annual report is used to summarize the progress of the program for the current year as well as a means of comparison and efficacy to previous years. A final report will be issued at the end of the program.

## **Contacts and Information**

Pennsylvania Department of Conservation and Natural Resources

(<http://www.dcnr.state.pa.us/forestry/index.aspx>)

Pennsylvania Department of Agriculture EAB hotline: 1-866-253-7189 or [Badbug@state.pa.us](mailto:Badbug@state.pa.us)

Pennsylvania State University Extension (<http://ento.psu.edu/extension/trees-shrubs/emerald-ash-borer>)

Emerald Ash Borer ([www.emeraldashborer.info](http://www.emeraldashborer.info))

I-Tree – Tools for Assessing and Managing Community Forests (<http://www.itreetools.org>)

## **Acknowledgment**

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Promoting Emerald Ash Borer Management Plans in Pennsylvania

Pennsylvania Urban & Community Forestry Council

Students of Albright College, for their participation in the Summer Internship Program to conduct the City of Reading Tree Inventory

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## **References**

Kovacs, K.F., Height, R.G., McCullough, D.G., Mercader, R.J., Siegert, N.W., and Liebhold, A.M. 2010. Cost of potential emerald ash borer damage in U. S. communities, 2009-2019. *Ecological Economics* 69: 569-578.

## Appendix

### 1 – Emerald Ash Borer Distribution Map in Pennsylvania (May 2015)

