City of Menasha
Emerald Ash Borer (EAB) Readiness Plan

December 2010

City of Menasha
Emerald Ash Borer (EAB)
Readiness Plan

Prepared for:

City of Menasha

Department of Parks, Recreation,

Forestry, & Cemeteries

Prepared by:

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Accepted by:

City of Menasha Common Council

December 20, 2010

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RESOLUTION R-24-09

A RESOLUTION SUPPORTING THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES – URBAN FORESTRY GRANT
EMERALD ASH BORER MANAGEMENT PLAN AND TREE INVENTORY.

Introduced by Mayor Merkes

WHEREAS, the Emerald Ash Borer (EAB) has been found in Wisconsin; and,

WHEREAS, the City of Menasha desires to take a proactive approach in preparing for the arrival of EAB; and,

WHEREAS, a tree inventory and EAB Management Plan will give the city the information it needs to effectively deal with the EAB; and,

WHEREAS, the City of Menasha hereby requests financial assistance under s. 20.370, Wis. Stats., Chapter NR 47, Wis. Admin. Code, for the purpose of funding urban and community forestry projects or urban forestry catastrophic storm projects specified in s. 20.370(5)(bw) and (1)(mv), Wis. Stats.;

NOW, THEREFORE, BE IT RESOLVED THAT the City of Menasha authorizes the Superintendent of Parks, Forestry and Cemeteries to act on the City's behalf to:

- Submit a grant application to the Department of Natural Resources for financial assistance under s. 20.370, Wis. Stats., Chapter NR 47, Wis. Admin. Code;
- Sign necessary documents; and
- Submit a final report.

Passed and approved this 21st day of September, 2009.

Donald Merkes, Mayor

ATTEST:

Deborah A. Galeazzi

Deborah A. Galeazzi, City Clerk

Executive Summary

The Emerald Ash Borer (EAB) is an invasive species from Asia that is thought to have arrived in the United States in wood packing material. The pest was first detected in Michigan in 2002 and has since spread to Canada and 15 other states including Wisconsin. In August of 2008, it was announced that EAB had been found in the Village of Newburg, Ozaukee County, WI. Since then, EAB has also been found in Brown, Crawford, Kenosha, Milwaukee, Vernon, and Washington Counties, causing a total of eleven counties to be quarantined statewide. Although quarantines are in place, EAB still has the potential to move long distances by hitchhiking in infested firewood, logs, and nursery stock making planning imperative for communities.

Although EAB has not been found locally, the City of Menasha Parks and Recreation Department, with the support of the City Council, took steps to plan for EAB's impending arrival in the City. In 2010, they applied for and received a WDNR Urban Forestry Grant for $7,000 to conduct a tree inventory and write an EAB readiness plan. Some elements of the plan consist of the history of EAB in North America and how to identify both EAB and an ash tree; tree inventory results; preparation, detection, and control management options; wood utilization options; outreach and education efforts; and costs/budgets. Several of these elements and their associated recommendations are highlighted below.

Urban Forest Resource

During the summer of 2010 a tree inventory was completed of the City's street, park, and other publically owned trees. The results of the inventory showed that there are 4,401 publically owned trees, and over 700 (17%) are ash trees. However, upon review of the data, EAB and the number of ash are not the only issue of concern to the City. The City also has 123 dead or critical trees (26 ash) that could potentially fail, putting the community at risk. There are also an additional 283 trees in poor condition that will need to be monitored over time.

Tree Management Considerations and Associated Costs

After careful review of the numbers and using current budget projections, a preemptive management strategy is recommended for the City of Menasha that will not only manage for EAB but will also help improve the overall well being of the City's urban forest using the current budget. The recommended management strategy for removals will follow a two phase outline, removing one-third of the ash trees in each phase.

Phase I:

- Remove and replace all trees rated as dead or critical (includes 26 ash trees).
- Remove and replace all ash trees (57) rated as poor.
- Remove and replace all ash trees (163) between 0-6" DBH.
  (Refer to Table 9)

Assuming in-house crews will conduct some of the work, contractor costs for removals and replacements will still be approximately $95,000 (refer to Table 10). If the current Forestry budget remains unchanged, it is estimated that it will take approximately seven years (2011 to 2017) to complete Phase I.

Phase II:

- Remove and replace all remaining trees (226) in poor condition.

- Remove and replace all ash trees (258) between 6 to 18” in DBH, and not under powerlines.
  (Refer to Table 9)

Assuming in-house crews will conduct some of the work, contractor costs for removals and replacements will still be approximately $125,000 (refer to Table 11). If the Forestry budget remains unchanged it is estimated that it will take approximately 10 years (2018-2027) to complete Phase II.

At this time the use of chemical treatments is not being considered as a management option. However, when EAB is found in closer proximity to the City they will be considered as a way to maintain the tree canopy in some of the parks, due to the density of ash trees, until replacement trees fill in. However, chemical treatments are not considered a long-term solution.

It is important to keep in mind that if EAB arrives sooner than later, and removals and replacements have to be conducted in an abbreviated time frame, that this will place a strain on the City budget including staff resources.

Private Trees and Community Outreach

When considering the overall health of the community’s forest, another concern is that the majority of a community’s trees are typically located on private property, not public. Although the exact number of ash trees in citizen’s yards is not known, a general rule of thumb is 10 private ash trees for every 1 ash street tree. With the potential of there being thousands of ash trees located on private property there is a possibility the City will be faced with numerous hazardous trees located on private property. And if the trees have to be removed what will be done with the wood debris. Having effective communication and outreach with citizens will be important to increase awareness of EAB, help citizens understand their options for managing ash trees in their own yards, and to increase awareness, understanding, and support for the City’s EAB Readiness Plan. The City plans on accomplishing this through several outlets starting with an open house event to be held at the public library.

Wood Utilization

When dealing with preemptive removals the City will be able to utilize current wood utilization methods. However, when EAB is found locally and the county(s) are placed under quarantine, the City will evaluate and change some of its current wood utilization and storage methods. When this occurs one major change will be that firewood will no longer be made available to residents. All wood debris will be chipped and/or composted. In the meantime, the City will explore partners and additional strategies for wood utilization options.

Conclusion

Although EAB has not been found locally, it is inevitable that it will work its way to the City of Menasha. The potential loss of ash trees, along with their aesthetic, ecological, and environmental benefits (refer to *Section III, Associated Costs and Benefits*), makes EAB the biggest threat to Menasha’s urban forest since Dutch Elm Disease. However, the City is taking a proactive approach to this serious threat through the preparation of this EAB Readiness Plan. The plan and its recommended strategies will help ensure that the City of Menasha has an effective response to EAB by reducing the associated risks and negative impacts, minimizing the effects on the budget while planning for a healthy sustainable urban forest.

City of Menasha
Emerald Ash Borer (EAB)
Readiness Plan

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I. Introduction

Purpose of Plan

By implementing the provisions in this management plan, the City is attempting to mitigate the disruption to its urban forest caused by a pending infestation of the Emerald Ash Borer (EAB). Taking a proactive approach to this infestation enables the City to address public and private needs in an efficient and effective manner. It will also allow the City to use best management practices, the most recent scientific findings, and the City's tree inventory data to minimize costs and distribute them over a manageable time period, as well as lessen the social and economic impact that such an infestation will have on the quality of life in our community.

In particular, the plan will outline the City of Menasha's objectives and the approaches that will be used to meet the current or anticipated impact of Emerald Ash Borer (EAB) on our urban forest resource. It will serve as a blueprint that city officials and residents can follow with a high degree of confidence, rationality, and order. The plan will also provide for extensive public education and communication opportunities.

The plan is based on the most recent scientific studies and recommendations from key partners and multiple state and federal agencies. As this is a living document, updates to this plan will be made as new information and recommendations are released.

Applicability

This plan applies throughout the City of Menasha on all public properties, as well as on private properties where a tree may pose a safety hazard to adjacent public right-of-ways, other public properties, and adjacent property owners.

Administration

The Superintendent of the Department of Parks, Recreation, Forestry and Cemeteries will be responsible for implementing this program and seeing that program provisions are carried out.

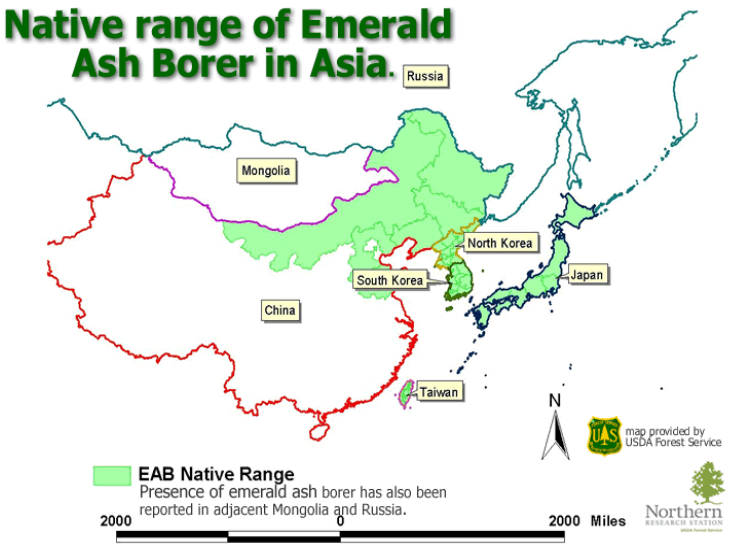
II. Emerald Ash Borer (EAB)

History

Emerald Ash Borer (*Agrilus planipennis*) is a non-native wood-boring insect that feeds on North American ash trees. EAB is native to Asia, in particular northeast China, Korea, Japan, Taiwan, and a small area in adjacent Russia and Mongolia.

Emerald Ash Borer
Source: Wisconsin

EAB is thought to have been introduced to southeastern Michigan through solid wood packing material, such as crates and pallets, originating from Asia. The insect was found in 2002, but is believed to have arrived in the early 1990's. Experts suspect that the insect was present for 12 years before it was identified.



EAB Native Range
Source: USDA Forest

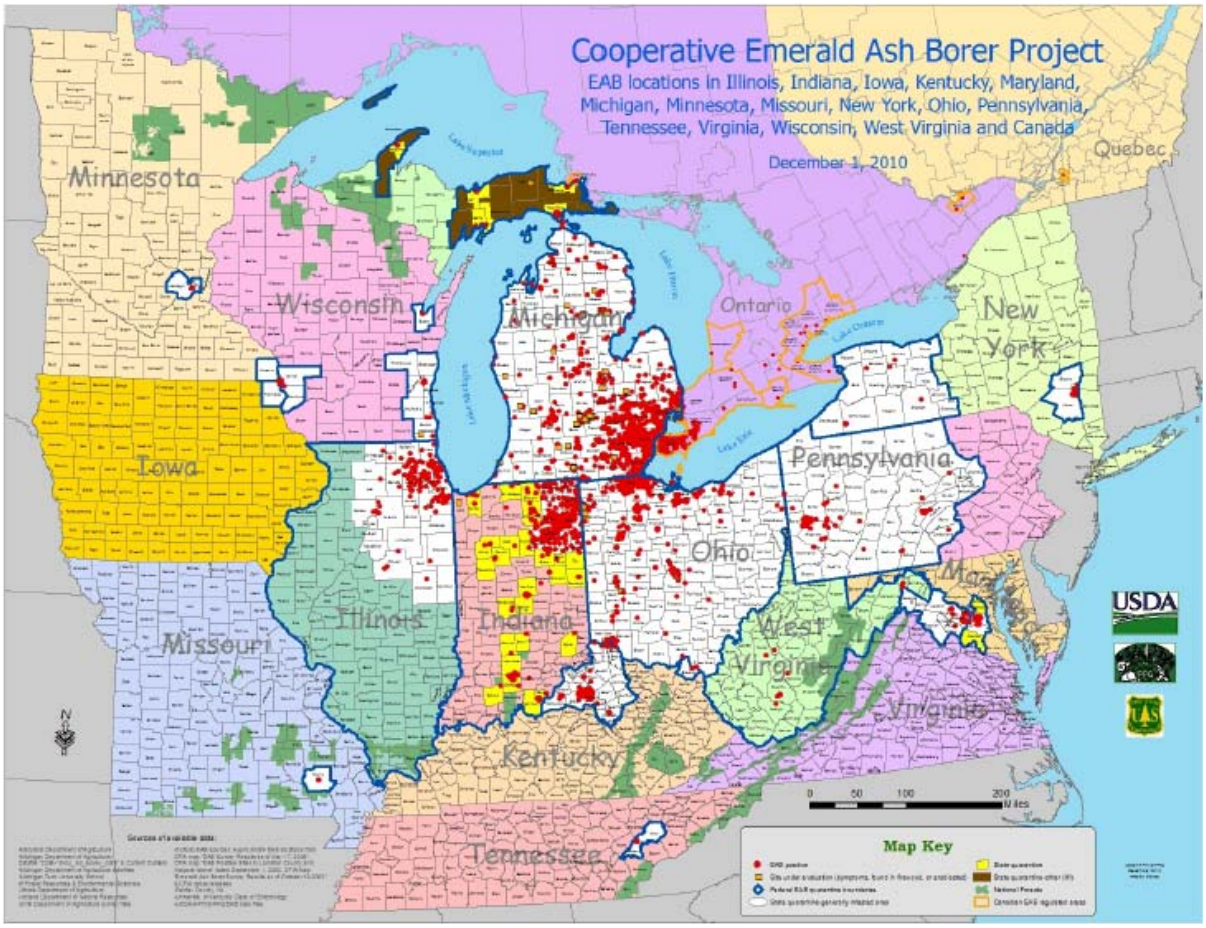
In its native range, EAB feeds on a variety of plant species and is only considered a minor pest. This is partly due to the fact that Asian ash trees have been able to develop co-evolutionary resistant to EAB attacks and populations are also kept in check by predators and pathogens. However, this is not the case in North America where ash trees have no natural resistance and EAB has few predators. In North America, woodpeckers and a native wasp have been shown to attach EAB eggs and larvae, but with little impact on populations. In addition, research is being conducted with three species of wasps from China that show some promise of control (refer to *Section V – Preparation, Detection, and Control* for more information).

In North America, EAB attacks all ash trees in the genus *Fraxinus*, including green ash (*F. pennsylvanica*), white ash (*F. americana*), black ash (*F. nigra*), pumpkin ash (*F. profunda*), blue ash (*F. quadrangulata*), and other native species in the same genus. Mountain ash (*Sorbus* spp.), not a true ash, is unaffected.

EAB is known to attack both healthy and declining ash trees and can infest branches as small as one inch in diameter. Left on its own, EAB can travel ½ mile to several miles per year during its flight period. However, due to human activities EAB has spread over much greater distances than it could have moved naturally. The number one human activity that has lead to the spread of EAB is the movement of firewood. In addition, the movement of nursery stock has also played a role in its movement.

EAB has had a devastating effect on North American forests and has been compared to the effects of chestnut blight and Dutch elm disease. To date, EAB has killed 15 million ash

trees in a 20-county area around Detroit and has been found in 15 states, and Ontario, Canada. If it is not contained or its effects mitigated, it will continue to infest and kill all species of ash tree in the genus *Fraxinus*.



Distribution Map of Emerald Ash Borer in North America as of December 1, 2010.
Source: USDA – APHIS.

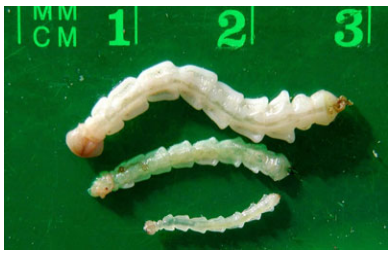
In addition, if left unchecked, EAB could result in the losses of millions of dollars to the lumber and nursery industries as well as urban communities. Preliminary findings by the USDA Forest Service estimate that EAB's potential impact to the national urban landscape is a potential loss of between 0.5 to 2 percent of the total leaf area (30-90 million trees) and a value loss of between $20-60 billion. In addition, if EAB is not contained or eradicated it could cause approximately $7 billion in additional costs to state and local governments and landowners to remove and replace dead and dying ash trees in urban and suburban areas over the next 25 years.[1]

[1] New Pest Response Guidelines, Emerald Ash Borer *Agrilus planipennis* (Fairmaire), USDA-APHIS 2008.

Identification and Lifecycle[2]

Emerald Ash Borer
Source: Wisconsin Emerald Ash Borer Information Source

Emerald ash borer adults are very small, metallic green beetles. They are only 3/8 - 1/2 inch long and 1/16 inch wide (about the size of a cooked grain of rice). Adult emerald ash borers emerge from beneath the bark of ash trees in late May through mid-July, creating a D-shaped exit hole as they chew their way out of the tree. Adult beetles are most active during the day and prefer warm, sunny weather. They never wander far from where they exit a tree (less than one mile) in search of a mate. Once they find a mate, the female will lay 60 - 90 eggs, one at a time, in the crevices of ash tree bark. The adult beetles will feed lightly on ash tree leaves, but do not cause much harm by doing so. The adult beetles live a total of three to six weeks.



Emerald Ash Borer Larvae
Source: Michigan State University

Emerald Ash Borer Galleries
Source: University of Wisconsin, Department of Entomology

Emerald ash borer eggs are very small (1 mm), difficult to find and are rarely seen. Female adult beetles deposit them in the bark crevices and as larvae hatch from the egg, they immediately chew their way into the tree.

Emerald ash borer larvae are white and slightly flattened, with a pair of brown pincher-like appendages on the last abdominal segment. Their size varies as they feed under the bark on the ash tree's tissues and grow. Full grown larvae average 1½ inches in length. They wind back and forth as they feed, creating characteristic S-shaped patterns called galleries under the bark (starting in the phloem and extending into the xylem layers). Larvae will feed under the bark for one year and often two years in healthier trees, and can survive in green wood, such as firewood, even if the tree is no longer standing.

In autumn, after feeding under the bark, larvae will create a chamber for themselves in the tree's sapwood. They stay in this chamber over winter and pupate in the spring, turning into adult beetles. The adults emerge from the pupal chamber and then emerge from the tree through D-shaped exit holes, completing the life cycle. The pupae, like the larvae, cannot be seen unless the bark is pulled away from the tree.

There are numerous metallic green insects common to Wisconsin that could easily be confused with EAB. In addition, there are several native pests other than EAB that attacks ash trees

[2] Wisconsin's Emerald Ash Borer Information Source, http://www.emeraldashborer.wi.gov/index.jsp.

Ash Tree Identification and Symptoms

Since EAB attacks only ash trees, monitoring for its presence means knowing how to identify ash. Ash trees are most easily identified by their compound leafs (leafs are composed of 5-11 leaflets) and opposite branching pattern where branches, buds, and leaves grow directly across from each other not staggered. The only other oppositely branched tree with compound leaves is boxelder (*Acer negundo*), which almost always has three to five leaflets. The bark on mature ash trees is tight with a distinct pattern of diamond-shaped ridges. On young trees, bark is relatively smooth.

Opposite branching and buds.
Source: WDNR EAB Field Guide

Green ash compound leaf
Source: WDNR EAB Field Guide

Example of diamond pattern bark typical of green and white ash.
Source: WDNR, Brian Schwingle

It is important to remember that since EAB is a wood-boring insect and spends most of its life under the bark of the tree, it is difficult to detect in ash trees. It is also difficult to detect because the decline of infected ash trees is usually gradual. Looking for visible signs and symptoms is one method for detecting EAB. Symptoms of an infestation might include dead branches near the top of a tree or wild, leafy shoots growing out from its lower trunk. However, D-shaped exit holes and bark splits exposing S-shaped tunnels are significant signs of EAB.

Woodpecker damage to EAB infested trees.
Source: WDNR EAB Field Guide

One sign that a tree has become infested by EAB is bark with a mottled appearance and/or jagged holes, both caused by woodpeckers looking for pre-pupal larvae. Another sign are the D-shaped exit holes present on the branches and the trunk left by emerging adults. For D-shaped holes to be present a tree has to be infested for at least one year. Since EAB prefers warm sunny areas of the tree the infestation usually begins in the tops of ash trees making if difficult to find D-shaped holes in the early stages of infestation. In

EAB adult emerging through D-shaped exit hole.
Source: USDA-Forest Service

addition, if a tree has EAB the bark may split vertically above larval feeding galleries. When the bark is removed from infested trees, the distinct, frass-filled larval tunnels that etch the outer sapwood and phloem are readily visible on the trunk and branches. An elliptical area of discolored sapwood, usually a result of secondary infection by fungal pathogens, sometimes surrounds larval feeding galleries.

The S-shaped tunnels excavated by feeding larvae interrupt the transport of nutrients and water within the tree during the summer, causing foliage to wilt and the tree's canopy becomes increasingly thin and sparse as branches die. Many trees appear to lose about 30% to 50% of the canopy after 2 years of infestation and trees often die after 3-4 years of infestation. Often at the margin of live and dead tissue, epicormic shoots may arise on the trunk of the tree. Dense root sprouting sometimes occurs after trees die.

Epicormic branching and dying branches possibly associated with infested ash tree.
Source: WDNR, EAB Field Guide

III. Tree Inventory

The first and most important step in managing a community's urban forest resource and preparing for EAB is to conduct a tree inventory. A tree inventory is the process of counting, characterizing, and recording information about the public and sometimes private trees that make up the urban forest or the stand of trees in woodlots. It is a useful tool that documents important information related to the total number of trees. The most common type of data collected in tree inventories are: location, land use, species, size, condition, site information, and maintenance needs. The goal of any community tree inventory is to provide information essential for management in a timely fashion, at a reasonable cost.

Street tree inventories document and help with management of trees along roads and within the public right-of–ways. Park inventories document the publicly owned trees away from streets and right-of-ways. These trees comprise a smaller part of the entire community tree population, but may be the most important part of the urban forest to many residents. They make up the more natural areas of communities and are usually a place of refuge or recreation for residents.

Documentation of street and park trees is useful for identifying trees a City is responsible for maintaining. This information can then be used to identify areas of susceptibility (i.e. high ash component), low species diversity (species and/or age), and future planting opportunities. The information can also be used to document a risk assessment program where trees prone to failure are identified and can be preemptively dealt with. Additionally, in the case of an accident, being able to produce a risk assessment and work history log indicates the community's active role in maintaining safe trees. Finally, all these items from an inventory can be used to develop a community forest management plan that provides direction for urban forestry initiatives.

The City of Menasha completed a tree inventory of its street, park, and other publically owned trees during the summer of 2010. The inventory did not include the City's Conservancy Area or the Heckrodt Wetland Reserve located within the City. In addition, the inventory did not include any trees on private property. The tree inventory will help assist in giving solid numbers to calculate the hours, manpower, and cost estimates needed to address the management of EAB. The inventory will also help to make decisions regarding a community forest management plan and promote the community's overall forest health.

The tree inventory was conducted by a combination of walking and driving to look at every tree. Data was recorded using an electronic hand held device loaded with ArcPad. The data was then downloaded to ArcGIS where it is permanently stored and the TDC (Tree Data Center) AddOn is used to manipulate and manage the data.

For each tree, several data variables were collected: address, aldermanic district, location type (i.e. ROW, park, cemetery, median, etc.), terrace width (if applicable), presence of underground or overhead utility lines, tree type, DBH (diameter at breast height), and general condition. Other data that was noted on each tree included if the tree was staked and the planting date if known. In addition, conditions concerning canopy, trunk, and root health; structure; and disease and insects were noted if applicable. For a listing of possible conditions recorded see Table 1.

Table 1: Tree condition variables recorded in 2010 tree inventory

Canopy Health	Trunk/Limb Health	Root Health	Structure	Other
Excellent, 90 – 100%	Canker/galls	Construction damage	Crossing/rubbing branches	Disease
Good, 71 – 90%	Crack, horizontal	Girdling	Leaning	Insects
Fair, 50 – 75%	Crack, vertical	Heaving	Topped	Unsuitable location
Poor, 30 – 50%	Decayed wood, cavity	Pavement restrictions	Weak branch unions	Vandalism
Critical, less than 30%	Decayed wood, fungus	Rot	Codominant stems	Suckers
Dead	Decayed wood, punky		Poor pruning practices	
Tip Dieback	Weedeater damage		Deadwood, 2" or larger	
	Bulging		Deadwood, lodged	
	Wounds			

Inventory Results

Location

The majority of public trees are located along street trees (62%) and in parks (31%). Table 2 describes the location of public trees.

Table 2: Location of public trees by number and percentage.

Location	Total	%
Right of Way (Terrace)	2658	60.4
Median Strip	92	2.1
Public Parking Lot	27	0.6
Public Buildings/Land	110	2.5
Jefferson Park	317	7.2
Smith Park	568	12.9
All Other Parks	479	10.9
Oak Hill Cemetery	30	0.7
Resthaven Cemetery	120	2.7
Grand Total	**4401**	**100.0**

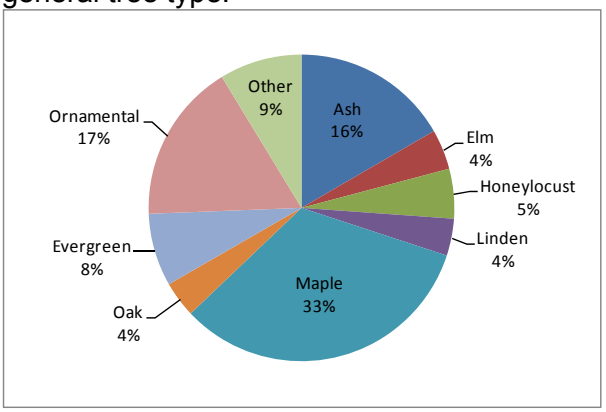
Species Distribution

The City of Menasha has over 65 different species of trees in over 35 different genus along its streets and in its parks. However, the top 10 occurring species comprise 66% of the total population. When considering the make-up of the urban forest, the widely accepted rule is that there should not be more than 5% of any one species, 10% of any one genus, and 20% of any one family. The percentages of Norway maple (12.7%), Green ash (11.1%), Crabapple spp. (8.2%), Freeman maple (7.4%), Silver maple (7.1%), White ash (5.2%), and Honeylocust (5.2%) exceed the species rule. And the genus *Acer* (Maple, 33%) and *Fraxinus* (Ash, 17%) exceed the genus rule. The distribution of trees by major tree types is shown in Table 3 and Figure 1. Maps showing the location of all trees by district can be found in Appendix A.

Table 3: Total number and percentage of public trees by general tree type.

Tree Type	Total	%
Ash	733	16.7
Elm	186	4.2
Honeylocust	231	5.2
Linden	172	3.9
Maple	1446	32.9
Oak	168	3.8
Evergreen	338	7.7
Ornamental	743	16.9
Other	384	8.7
Grand Total	**4401**	**100.0**

Figure 1: Percentage of public trees by general tree type.



Size Class

To optimize the value and benefit of the urban forest, an uneven-aged population is desired to allow allocation of annual maintenance costs uniformly over many years and to assure continuity in the overall tree canopy. A desirable distribution in a community's forest is to have a high proportion of young trees to offset establishment and age related mortality, while the percentage of older trees declines with age. This "ideal", uneven distribution suggests the largest fraction of trees (40% of the total) should be young, with diameters less than 8" in DBH, while only 10% should be in the large diameter classes (>24" DBH).[3]

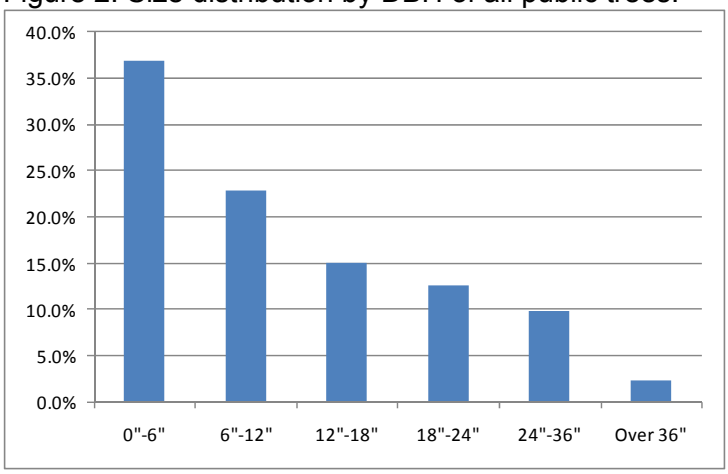
Most of Menasha's trees are between 0-6" DBH (Diameter at Breast Height) at 37%. While trees that are 24" DBH or greater make up approximately 12% of the tree population. Table 4 and Figure 2 shows the size distribution of public trees by percentage and DBH. The figure shows that the City has a sufficient number of smaller trees, but there is a need to make sure that there is an adequate amount of species being planted that will grow to be larger diameter trees to ensure an uneven-aged population.

Table 4: Total number and percentage of public trees by DBH class and general tree type.

	0"-3"		3"-6"		6"-12"		12"-18"		18"-24"		24"-36"		Over 36"		Grand Total	
Tree Type	#	%	#	%	#	%	#	%	#	%	#	%	#	%	Number	%
Ash	44	6.0	134	18.3	183	25.0	144	19.6	166	22.6	60	8.2	2	0.3	733	16.7
Elm	46	24.7	13	7.0	90	48.4	20	10.8	5	2.7	11	5.9	1	0.5	186	4.2
Honeylocust	31	13.4	29	12.6	73	31.6	58	25.1	32	13.9	6	2.6	2	0.9	231	5.2
Linden	34	19.8	15	8.7	31	18.0	44	25.6	30	17.4	16	9.3	2	1.2	172	3.9
Maple	212	14.7	193	13.3	204	14.1	255	17.6	260	18.0	271	18.7	51	3.5	1446	32.9
Oak	30	17.9	40	23.8	26	15.5	9	5.4	9	5.4	34	20.2	20	11.9	168	3.8
Evergreen	42	12.4	82	24.3	156	46.2	39	11.5	16	4.7	3	0.9	0	0.0	338	7.7
Ornamental	251	33.8	300	40.4	169	22.7	18	2.4	1	0.1	4	0.5	0	0.0	743	16.9
Other	81	21.1	50	13.0	77	20.1	76	19.8	39	10.2	35	9.1	26	6.8	384	8.7
Total	**771**	**17.5**	**856**	**19.5**	**1009**	**22.9**	**663**	**15.1**	**558**	**12.7**	**440**	**10.0**	**104**	**2.4**	**4401**	**100.0**

[3] City of Pittsburgh, Pennsylvania Municipal Forest Resource Analysis, Davey Resource Group, April, 2008.

Figure 2: Size distribution by DBH of all public trees.



Condition Ratings

Condition classes are an overall rating of factors covering tree health and structure including branches, condition of trunk and roots, decay, vigor, diseases problems, growth rate, crown development, life expectancy, etc. Five condition classes were used to rate trees in the City: good, fair, poor, critical, and dead (Table 5).

Table 5: Condition classes and definitions.

Condition Class	Definition
Good	Trees in good form and health. Trees may have some minor problems but would be easily corrected with proper maintenance.
Fair	Trees with minor structural defects and little signs of poor health. Trees would benefit from proper care and maintenance.
Poor	Trees with major structural problems and/or poor health. Trees are likely to decline further and be damaged in storms.
Critical	Trees in poor condition. Trees usually have some major defect(s) or are at the end of their life cycle.
Dead	Dead tree

The tree inventory results show that the majority of public trees (66%) are in good condition and 24% are in fair condition. Dead trees only make up 0.5%, with the majority of those trees being between 0-6" DBH, indicating that most dead trees are newly planted trees that did not survive establishment. Critical and poor trees make up 2.2% and 6.4% of the trees respectively. Although this may not seem like a high percentage, the majority of those trees are larger diameter trees. At the time of removal this will not only affect budgets, by costing more, but will impact the overall urban tree canopy of the City. The goal for critical and dead trees in the City should be zero.

Table 6: Total number and percentage of public trees by condition and DBH class.

Condition	Good		Fair		Poor		Critical		Dead		Total
0"-3"	572		143		30		13		13		771
3"-6"	678		151		22		0		5		856
6"-12"	789		171		36		9		4		1009
12"-18"	417		180		48		16		2		663
18"-24"	286		197		60		15		0		558
24"-36"	151		190		66		32		1		440
Over 36"	31		39		21		13		0		104
Grant Total	**2924**	**66.4%**	**1071**	**24.3%**	**283**	**6.4%**	**98**	**2.2%**	**24**	**0.5%**	**4401**

Ash Tree Summary

Ash trees account for nearly 17% of all public trees. There are a total of 733 ash trees, 68% are green ash and 32% are white ash. Both white and green ash are in the list of top 10 occurring species in the City, indicating the loss of these trees will be substantial. Approximately 440 are street trees, 240 are park trees, 37 are in the cemetery, and the remaining trees are found on other public land. The number of ash trees in natural areas is unknown at this time. The majority (62%) of the ash trees are in good condition. However, there are 57 ash trees in poor condition and 26 in critical or dead condition. Out of those slightly less than half of them are between 18” and 36” in size. Overall, the majority of the ash trees are fairly equally distributed between 3” and 24” in size. Maps showing the location of ash trees by district can be found in Appendix A.

Table 7: Total number of ash trees by DBH and condition class

DBH	Good		Fair		Poor		Critical		Dead		Total	%
0"-3"	32		7		2		3		0		44	6.0
3"-6"	90		34		7		0		3		134	18.3
6"-12"	136		33		10		2		2		183	25.0
12"-18"	85		46		7		5		1		144	19.6
18"-24"	93		50		19		4		0		166	22.6
24"-36"	18		24		12		6		0		60	8.2
Over 36"	1		1		0		0		0		2	0.3
Grand Total	**455**	**62.07%**	**195**	**26.60%**	**57**	**7.78%**	**20**	**2.73%**	**6**	**0.82%**	**733**	**100**

Associated Costs and Benefits

Trees are important to the City of Menasha. They help conserve and reduce energy use, reduce local carbon dioxide levels, improve air quality, and mitigate stormwater runoff. Additionally, trees provide a wealth of psychological, social, and economic benefits related primarily to their beauty and calming effect. Environmentally, trees make good sense, working ceaselessly to provide benefits back to the community. To help quantify these environmental benefits, and to place an annual dollar value on them, the i-Tree software can be used. i-Tree provides urban forestry analysis and benefit assessment tools. It was developed by the USDA Forest Service and numerous cooperators, i-Tree is in the public domain and freely accessible. The Forest Service, Davey Tree Expert Company, National Arbor Day Foundation, Society of Municipal Arborists, International Society of Arboriculture, and Casey Trees have entered into a cooperative partnership to further develop, disseminate and provide technical support for the suite. For the City of Menasha, an analysis was conducted using i-Tree and the 2010 tree inventory data. The estimates from i-Tree provide first-order approximations of tree value. i-Tree only generally accounts for the benefits produced by the trees, an accounting that is based on the best available science, with an accepted degree of uncertainty that can nonetheless provide a platform from which real management decisions can be made.

Annual Energy Benefits

Trees modify climate and conserve building energy use in three principal ways:[4]

- The shade they produce reduces the amount of heat absorbed and stored by built surfaces.
- Through the process of evapotranspiration (ET) they convert liquid water to water vapor which cools the air by using solar energy that would otherwise result in heating of the air.
- They decrease windspeed which reduces the infiltration of outside air into interior spaces and reduces conductive heat loss, especially where conductivity is relatively high (e.g., windows).

- *Trees save the City of Menasha $114,748 each year in energy costs with an average annual savings of $26 per tree.*
- *Ash trees alone save the City of Menasha $22,930 each year in energy costs with an average annual savings of $32 per tree.*

Annual Stormwater Benefits

Trees can reduce runoff in several ways:[5]

- Their leaves and branch surfaces intercept and store rainfall, thereby reducing runoff volumes and delaying the onset of peak flows.
- Their roots increase the rate at which rainfall infiltrates soil and the capacity of soil to store water, thereby reducing overland flow.
- Tree canopies reduce soil erosion by diminishing the impact of raindrops on barren surfaces.
- Transpiration through their leaves reduces soil moisture, increasing the soil's capacity to store rainfall.

- *Trees intercept 5,979,522 gallons of rainfall in the City of Menasha for an annual savings of $162,056 ($37 per tree).*
- *Ash trees alone intercept 1,141,651 gallons of rainfall in the City of Menasha for an annual savings of $30,940 ($44 per tree).*

Annual Air Quality Benefits

Urban forests provide four main air quality benefits:[6]

- They absorb gaseous pollutants (e.g., ozone, nitrogen oxides, and sulfur dioxide) through leaf surfaces.
- They intercept particulate matter (e.g., dust, ash, pollen, smoke).
- They release oxygen through photosynthesis.
- They transpire water and shade surfaces, which lowers air temperatures, thereby reducing ozone levels.

[4, 5, 6] Midwest Community Tree Guide: Benefits, Costs and Strategic Planting, E. Gregory McPherson et. Al., United States Department of Agriculture, forest Service, Pacific Southwest Research Station, General Technical Report PSW-GTR-199

- *Trees provide the City of Menasha $21,689 annually or $5 per tree in air quality benefits.*
- *Ash trees alone provide the City of Menasha $4,422 annually or $6 per tree in air quality benefits.*

Annual Carbon Benefits

Urban forests can reduce atmospheric CO2 in two ways:[7]

- They directly sequester CO2 in their stems and leaves while they grow.
- Trees near buildings can reduce the demand for heating and air conditioning, thereby reducing emissions associated with power production.

- *Trees sequester a net total of 1,241 tons of CO2 each year in the City of Menasha for an annual value of $18,618 or $4 per tree. In addition, the trees store 9,398 tons of carbon for an annual value of $140,974 or $32 per tree.*
- *Ash trees alone sequester a net total of 247 tons of CO2 each year in the City of Menasha for an annual value of $3,701 or $5 per tree. In addition, the trees store 1,722 tons of carbon for an annual value of $25,827 or $35 per tree.*

Annual Aesthetics Benefits

It is difficult to place a dollar value on the benefit trees provide to the overall well-being of City residents. Trees provide beauty in the urban landscape, privacy to homeowners, improved human health, a sense of comfort and place, and refuge for urban wildlife. Trees promote better business by stimulating frequent shopping, longer shopping trips, and a willingness to pay more for goods and parking by the residents in the urban environment. The value of some of these benefits may be captured in the property values of the land on which trees stand.[8]

- *The total annual aesthetic value of trees in the City of Menasha is $157,033 or $36 per tree.*
- *The total annual aesthetic value of ash trees alone in the City of Menasha is $32,046 or $47 per tree.*

Summary of all Benefits

- *The City of Menasha's trees have an annual total benefit of $474,143 and average $108 per tree.*
- *The City of Menasha's ash trees alone have an annual total benefit of $94,040 and average $134 per tree.*

[7, 8] Midwest Community Tree Guide: Benefits, Costs and Strategic Planting, E. Gregory McPherson et. Al., United States Department of Agriculture, forest Service, Pacific Southwest Research Station, General Technical Report PSW-GTR-199

IV. Confirmation, Authority, and Contacts

Confirmation

An outbreak of EAB has impact at the local, state, national, and international level. Currently, the closest discoveries of EAB are approximately 40 miles to the north in the City of Green Bay in Brown County, WI and approximately 70 miles to the southeast in West Bend and Newburg (Ozaukee and Washington Counties). A discovery of EAB in the City of Menasha or adjacent municipalities will require a cooperative management effort between local, state, and federal departments and agencies.

When EAB is confirmed in the area, the Wisconsin EAB Response Plan's modified Incident Command System (ICS) structure will be employed to meet response needs for approximately one year. This entails forming locally based EAB Response Units that will plan and implement survey, regulation, outreach, and management activities following a positive detection of EAB. In addition, the statewide EAB Operations Group will provide coordination, support, and resources to these units. The advantage of using the ICS structure is that it establishes a common set of objectives and strategies, allowing for a team effort between all agencies and organizations.

When EAB is confirmed in the area, EAB program staff will notify any affected individuals, such as local officials and key stakeholders, prior to the public release of information. Shortly after, they will place the local county and possibly surrounding counties under quarantine. A quarantine is a system of rules administered by the USDA-APHIS and DATCP. The rules are intended to help prevent the spread of EAB by slowing its movement, tracking ash trees from their origin to their final destination, and by using compliance agreements.

The Superintendent of the Department of Parks, Recreation, Forestry and Cemeteries will be responsible for coordinating communication and efforts between partnering agencies and City departments. He will also be responsible for implementing all aspects of this plan.

EAB Regulations for Quarantined Areas

In order to prevent further spread of EAB through artificial (human assisted) means, the following materials are regulated in quarantined areas:

- Ash trees, limbs, branches, and roots
- Ash logs, slabs, or untreated ash lumber with bark attached
- Cut firewood of all non-coniferous species
- Ash chips and ash bark fragments larger than one inch in two dimensions
- Mixed wood residue that may contain ash
- Any wood items which could harbor living EAB eggs, larvae, or adults and thus transmit an infestation.

For practical purposes, the minimum level of a quarantine will be at the county level. However, additional surrounding counties may be quarantined because of the possibility of natural EAB spread, and in order to allow for the processing of regulated articles. USDA-APHIS will primarily regulate interstate movement of regulated materials. DATCP will regulate intrastate movement of regulated materials. In addition, DNR Conservation

Wardens have the authority to issue citations for quarantine violations through NR40 (Wisconsin's Invasive Species Identification, Classification and Control Rule). While movement of regulated material anywhere within a quarantine area is legal, caution should be placed on the movement of material across large expanses of the quarantine to limit any further spread of EAB.

Quarantines will primarily affect nurseries, firewood dealers and users, and mills. DATCP will work with affected industries and communities to minimize the impacts. Compliance agreements are the most common tool used to allow industries to conduct business and move affected material while protecting areas of the state not yet affected by EAB. Compliance agreements allow for the movement of regulated material from quarantined areas to non-quarantined areas from October 1 to March 31 and require all material to be processed according to legal specifications by April 30. Under this treatment schedule, all life stages would be destroyed prior to adult emergence. The dates are determined based on the life cycle of EAB. EAB is in its larval stage under the bark of the trees from approximately October 1 to May 1, thus when transporting material during this time spread is minimized. However, due to EAB typically emerging from the trees in its adult "flight" stage between May 1 and September 30, no untreated material can be moved outside quarantine areas during this summer period. Listed below is a summary of EAB regulations by industry[9]. For a more extensive look at both federal and state summaries please refer to Appendix B. Contact DATCP officials for further information.

Nurseries

Ash nursery stock is prohibited from being distributed outside of the EAB quarantine area.

Mills & Loggers

Ash logs cannot be moved out of the quarantine area during the adult flight period (roughly April 1 through September 30) unless fumigated or debarked. From October 1 through March 31, untreated ash logs may be allowed to be moved to an approved mill outside of the quarantine area for processing by April 30. Bark and wood waste must be processed by April 30. These processes must be approved by state or federal agriculture agencies.

Firewood Producers & Users

All hardwood firewood is prohibited from distribution outside the EAB quarantine area unless it has been heat treated, fumigated or debarked (plus removal of ½ inch of wood). These processes must be approved by state or federal agriculture agencies. Firewood certified by DATCP may be moved within Wisconsin. Certification is available for businesses only. Firewood not for commercial sale (homeowner use) may be moved within the quarantine area but users should avoid moving firewood any distance from the area the wood originated from to reduce further spread of EAB.

Green Lumber Manufacturers

Ash lumber will need to be processed in an approved manner, such as complete removal of bark (plus ½ inch of wood), kiln drying by approved standards, or fumigation prior to distribution out of the quarantine area. All processes will need approval by state or federal agencies. Contact officials for further information.

[9] Easy Guide for Emerald Ash Borer Regulations, DATCP and USDA-APHIS

Pallet Producers

Ash lumber (generated from ash from the quarantine area) used to make pallets will need to be processed in a manner approved by state or federal agencies. Contact officials for further information.

Wood Waste

Wood waste from pruning, storm damage, or removals should not be moved from the point of action in order to reduce the spread of EAB. Locations for wood waste drop-off may be established in the near future. Contact officials for more information.

V. Tree Management Considerations

Monitoring and Detection

One of the first line of defenses against EAB is to monitor for the pest. It has been estimated in many instances where EAB was found, that EAB was usually present in the community for a number of years before it was detected. If a new EAB infestation can be detected while it is still limited in scale, it may be more controllable. In addition, identifying infestations early will give Cities more time to implement management strategies before ash trees in the community are in a late stage of decline and become hazardous, ultimately saving them money.

Purple Trap
Source: Wisconsin EAB Information Source Website

To date, the State of Wisconsin is and has been conducting survey and detection efforts across the state in hopes to detect EAB early. Probably the most well know effort is the use of the purple traps, which was used for the first time in 2007. The traps are made of a purple corrugated plastic board, that is coated with a non-toxic glue. Research shows that EAB is visually attracted to purple and to increase the attractiveness of the trap to the beetles, it is baited with a lure (Manuka oil). The traps are 24" in length, triangular in shape, and open in the center. Traps are placed in the tree canopy prior to the start of adult EAB emergence and are left hanging through the end of seasonal beetle flight. In 2010, DATCP placed nearly 9,000 traps across the state, with traps being place locally every 1.5 square miles.

Residents are encouraged to report any tree suspected of having EAB. Cases can be reported by notifying DATCP through their toll-free hotline, 1-800-462-2803 or by notifying the City of Menasha Parks, Recreation, Forestry, and Cemeteries Department at 967-3642. The Park Superintendent will make every effort to investigate all reports of suspected ash trees in the community and make a determination as to whether the incident warrants further investigation by state officials. However, residents are encouraged to refer to *Section II* of this document, the additional resources listed in Appendix C, or the City's website for signs and symptoms of EAB. Any suspected infestation will have to be confirmed by the USDA-APHIS laboratory or by a specialist at DATCP.

Although the state's efforts are substantial, the City will conduct its own surveying efforts.

Recommendations:

- To monitor for EAB simultaneously with daily tree and park maintenance activities.
- Upon removal or pruning of an ash tree, visual surveys will be done to the removed material looking for signs of EAB, such as "D" shaped holes, vertical splits in the bark, and S-shaped tunnels under the bark.
- Using information from the tree inventory, ash trees will be placed on an annual, rotating basis to periodically check for visual signs of EAB. i.e. ¼ of ash trees could be inspected each year.

Control, Treatment, and Removals

To date, communities in North America have not successfully eradicated EAB once detected. Symptoms of EAB are slow to appear, making initial infestations hard to detect. Once EAB is found it is usually estimated that it has been present for 3-5 years. As the population builds, EAB eventually infests and kills all varieties of ash trees in the area.

Once ash trees are infested with EAB, they typically decline and die over a period of 2-3 years. The burden of dealing with hundreds to thousands of dead and dying trees in a short period of time can place an enormous strain on a City's budget, personnel, and resources.

Management options vary and there is no one all-inclusive method. Some of the factors that can influence management decisions are:[10]

- Environmental impact – What are the environmental impacts of the control method considered? And how would those impacts be different if no action or a different method was considered?
- Land Ownership – Who owns the affected land and how does that influence access to the site?
- Land use and classification – What is the predominant land use in the affected and surrounding area? Natural area? Residential neighborhood? Downtown district? And is the method being considered consistent with the land use goals for the affected area?
- Cost of implementation – How much does the selected control method cost?
- Availability of resources to carry out control method – Is there sufficient financial and human resources to carry out the control method selected? Is the necessary equipment available? Does additional funding need to be obtained or allocated?
- Sociological impact – What are the potential social, cultural, and/or psychological impacts of the control method?
- Size of infestation – How large is the infestation and how long has it been there?
- Traditional ecological knowledge – Do indigenous people live in the area and will their resources or traditions be affected?

In addition, management options are typically divided into two categories: preventative (preemptive) or reactive management efforts. Preventative efforts entail education, preemptive removals, and insecticide controls. By preemptively treating or removing ash trees before the arrival of EAB in the community, the strains placed on a community can be minimized and provide flexibility in tree budgets. In addition, it can potentially diminish the movement of EAB across the landscape by making it difficult for dispersing beetles to find host trees.

Where reactive management, delays actions taken until EAB has arrived. It usually entails removing a tree once it is dead or infested with EAB and could possibly mean treating a tree with insecticides before it declines in health. With both management options, removals usually make up a significant portion. The advantages and disadvantages of conducting preemptive vs. reactive tree removals include the following:

[10] Wisconsin Emerald Ash Borer Response Plan, Updated: July, 2008 and Dane County Emerald Ash Borer and Wood Utilization Strategic Management Plan, May 15, 2009.

Table 8: Preemptive vs. Reactive Removals

Preemptive Removals: Removing ash trees not infested with EAB[11]	
Pros: • Opportunity to spread removal costs over longer time frame. • Reduces problem of dealing with many dead and/or hazardous ash trees at one time. • Opportunity to start the replanting/recovery process right away. • Greater flexibility in organizing removal and routine work schedules. • Ability to utilize ash wood for products or use it as a local source of firewood.	Cons: • Immediate impacts to tree canopy and aesthetics. • Removing healthy ash may create negative feeling in the community. • Does not take into account that research may find an effective control of EAB.
Reactive Removals: Removing ash trees which are either infested with EAB or dead [12]	
Pros: • Delayed impacts to tree canopy and aesthetics. • No negative public perception or removing healthy trees. • Delayed budgetary impacts until EAB hits. • Further EAB research may offer effective control, minimizing need for removals.	Cons: • If no action is taken to control EAB infestations, studies have shown that the rate of spread will be much faster. • Budget impacts can be severe once EAB is in community. • Replanting funds may not be available due to extreme removal costs.

In addition to removals, another management treatment option is insecticide control. Research has shown that insecticides can effectively treat trees for EAB. However, it should be noted that controlling insects that feed under the bark with insecticides has always been difficult and success is not guaranteed. When considering insecticide control as a management option, some of the highlights are:

- Insecticides are not effective in eradicating EAB infestations, but can effectively protect ash trees from EAB. They are best used as a preventative.
- The best control can be achieved when insecticide treatments are started before the tree is infested or in the earliest stages of infestation before visible symptoms are present.
- Rule of thumb for starting treatment is if EAB is found within your county or within 10-15 miles.
- Some chemical formulations can be purchased and applied by homeowners, others must only be applied by professional applicators.
- Emamectin benzoate is the only product tested to date that controls EAB for more than one year with a single application. It also provided a higher level of control than

[11],[12] Emerald Ash Borer Community Preparedness Plan, Michigan Department of Natural Resources and Michigan Department of Agriculture.

other products in side-by-side studies. In the State of Wisconsin this chemical is now a restricted use pesticide product. Pesticide certification and licensing is required to use it.

- Since insecticide treatments must be repeated each year, it may be more cost-effective to remove and replace the ash tree with an alternative tree to increase species diversity.
- Research and experience suggest that effectiveness of insecticides has been less consistent on larger trees. Research has not been conducted on trees larger than 25-inch DBH. When treating very large trees under high pest pressure, it may be necessary to consider combining two treatment strategies.
- Homeowners wishing to protect trees larger than 15-inch DBH should consider having their trees professionally treated.
- Treatment programs must comply with any label restrictions on the amount of insecticide that can be applied per acre in a given year.

It is important to note that research on insecticide management of EAB remains a work in progress. Scientists from universities, government agencies and companies continue to conduct intensive studies to understand how and when insecticide treatments will be most effective.

The following elements of the City's EAB Readiness Plan are suggested and are subject to periodic revision as new information about EAB is available and as EAB moves across the state. The plan is also subject to change should state and federal policies dictate or as budgets are altered.

In order to prevent or slow the spread of EAB, the City of Menasha will prioritize the treatment and removal of public ash trees by using data from the tree inventory. In addition, an estimated budget and timeframe will be generated for the recommendations and is presented in the *Section VI - Costs/Budget* of this plan.

<u>Public trees – Removals</u>

A preemptive management strategy is recommended for the City of Menasha that will not only manage for EAB but will help improve the overall well being of the City's urban forest. The recommended management strategy for removals will follow a two phase outline, removing one-third of the ash trees in each phase.

Phase I – Due to the number of hazardous trees in the city, the strategy recommends first removing and replacing all trees rated as dead or critical, this includes 26 ash trees, and all ash trees (57) rated as poor. Priority will be place on the dead and critical trees. If the current budget remains unchanged, the recommended removals will take approximately 7 years to complete. All remaining trees in poor condition will be monitored yearly for deteriorating conditions and moved into Phase I as deemed necessary.

In addition, happening concurrently to the other removals all ash trees regardless of condition, between 0-6" DBH, will be removed and replaced using in-house crews. This will be approximately 25 trees a year, with priority being placed on trees in dead, critical, or poor condition or under powerlines.

This phase would reduce the City's ash trees to only those with a DBH greater than 6" and in good and fair condition

Phase II – All remaining trees in poor condition will be monitored yearly for deteriorating conditions and will be progressively removed and replaced. If the current budget remains unchanged, the recommended removals will take approximately 10 years to complete.

In addition, happening concurrently to the other removals all remaining ash trees between 6 to 18" in DBH, and not under powerlines, will be removed in-house. If it is deemed necessary due to EAB's proximity to the city, these removals will be moved up into Phase I.

This phase will further reduce the City's ash tree population by one-third.

Table 9: Summary of public tree removal recommendations.

Phase	Recommendation	# of total trees removed	# of ash trees removed
I	Remove and replace all dead and critical trees	122	26
	Remove and replace all poor ash trees regardless of size	57	57
	Remove and replace all fair and good ash trees between 0-6" DBH*	163	163
II	Remove and replace all remaining trees in poor condition	226	0
	Remove and replace all fair and good ash trees, not underpowerlines, between 6-18" DBH*	258	258

*Assumes all dead, critical and poor ash trees have already been removed.

Other recommendations:

- To encourage Menasha utilities to remove any ash trees under powerlines as part of their regular line maintenance program.
- Re-evaluate the recommendations every 3-5 years to see if the timeline needs to be adjusted. The timeline could change over time due to EAB's proximity to the City, as costs fluctuate, and budgets change.
- Once EAB is found locally:
    - Removals should continue to take place during the winter months in order to minimize the spread of EAB.
    - Any ash tree removals conducted from April to August should be chipped on site. This includes both city crews and private contractors.

Public trees – Treatment

The City does not consider chemical treatment of its ash trees to be a long-term solution to managing EAB. However, the City does acknowledge that chemical treatments offer some benefits such as: they are a way to defer and spread removal costs over a longer length of time, they help to minimize to possible effects of an EAB infestation on the city's resources, they preserve the economic, ecological, and environmental benefits of the trees until replacement trees fill in the urban canopy, and they help to protect trees designated as specimen or heritage trees.

At this time, due to EAB not being found in close proximity, the City will not conduct any chemical treatments. When EAB is found in closer proximity and chemical treatments would be more advantageous, the Park Superintendent will have the main authority to determine if a tree will be selected for chemical treatment, what treatment will be used, and when the treatment will start. Currently, chemical treatments will not be recommended for street trees

in the City. However, chemical treatments will be considered as an option in some of the parks, such as Jefferson Park, due to higher densities of ash trees. This will not only help spread removal costs over time, it will also reduce the visual, aesthetic, and ecological impacts to the parks by maintaining the tree canopy while replacement trees fill in. Selection of park trees to be treated will be based on condition, location, structure, and utility conflicts.

Based on the inventory results, if only ash trees in good condition, having a DBH greater than 6", and are not located under powerlines are treated, there are approximately 110 park trees that would make good candidates for treatment.

Other recommendations:

- The city will allow residents to chemically treat a public ash tree adjacent to their property by permit only. It should be noted that currently chemical treatments are not a cure and have to be conducted indefinitely in order for the tree to withstand EAB. In addition, the chemical treatment of a tree will not preclude the future removal of an ash tree if deemed necessary by the Park Superintendent.

<u>Private trees – Removals</u>

Trees on private property will be the responsibility of the property owner. Trees will not be removed by City crews. If a tree on private property is deemed a nuisance or a hazardous tree, the City will enforce the relevant sections of the City Ordinance regarding the abatement of such trees. For more information regarding trees on private property refer to *Section VIII – Trees on Private Property.* For more information on the City Ordinance refer to the City website and/or *Section IX – Ordinance and Policy Review* of this document.

Replacements

The impacts of EAB on a community are directly dependent on the number, size and location of ash. The more ash a community has, the higher the infestation and the faster the insect will spread. In addition, the larger the trees are, the greater the cost for removal and the greater the loss of environmental services.

Providing for species and age diversity in your urban forest are two significant ways to reduce the impact of a destructive pest such as EAB. Recent pilot studies show that ash trees comprise around 12% of the all tree species within the boundaries of Wisconsin's communities. Ash is also the second most common street tree in Wisconsin communities (behind Norway maple), making up to as much as 30% of the street trees in a community.

When considering the diversity in your community an old rule of thumb is no more than 5% of one species, 10 % of one genus and 20% of one family. If you were to adhere to this, in the case of EAB, the loss of trees would still be pretty drastic at 10% of your entire forest. Optimally, you'd like to have the greatest diversity of species you can manage.

In addition to species composition, the size of trees in your community needs to be considered. EAB has been shown to attack all ash trees regardless of size. However, size will play a part in the sustainability of the whole forest and the cost of management. If all your trees are large, removal costs will be more. In the same instance if all the trees in community are the same size/age, they could potentially start to decline at the same time and eventually you will be faced with the same catastrophic tree loss even without EAB.

When establishing a replacement plan the following items should be considered.

- *Diversity of the tree species.* When planting new trees, the type(s) selected should adhere to the 5% species, 10% genus, and 20% family rule.
- *Cost of replacements and size of planting stock*. The size of planting stock needs to be considered because it will affect costs and the labor needed to plant it, i.e. a 5" caliper tree will cost more than a 2" caliper. It will also require machinery to move it.
- *Planting the right tree in the right place*. Trees species should be selected according to the location. Factors that should be considered include soil and light conditions, the mature size of the tree selected, size of planting location and space, and the location of overhead and underground utilities. Tree species selected need to be appropriately sized so that they do not interfere with power lines when they reach mature size.
- *Proper planting and mulching*. Many trees do not survive due to improper planting techniques, such as planting too shallow or too deep, digging hole too small, not backfilling correctly, and improper mulching.
- *Maintenance*. An equally important component as proper planting is to ensure the long-term survival of the tree. The first three years trees will require maintenance such as watering, pruning, and mulching.
- *Volunteers*. Utilizing volunteers is a good way to make sure community resources go farther while providing residents with an opportunity to make a positive difference in their community. In addition, a volunteer tree planting campaign can provide your community with the opportunity to educate residents on proper tree planting and maintenance techniques that they can apply to the project and at home.

The City of Menasha currently has a tree planting program in place. The program provides for trees to be planted on street terraces and on private property within the front yard setback. The city is comprised of eight districts, where two districts are targeted each year for planting. Targeted districts 1) allow for trees to be planted in the street terrace at no charge to the adjacent property owner and 2) Property owners receive a 50% deduction on the cost of a tree purchased by the City to be planted in their front yard setback. In the second situation, the property owner is responsible for pickup and planting. In non-targeted districts, trees may be planted on street terraces by the abutting property owner at their expense following certain guidelines and approval by the City Forester.

Currently the City plants approximately 100-150 new trees a year. The majority of the trees are 1.5" bare root. These are primarily trees in new planting spots; however some are replacements for trees that had to be removed. Currently the City has 733 ash trees. Ideally, all trees removed should be replaced. If the City started losing more trees annually due to EAB, then the number of plantings should go up accordingly. Depending on the number of increased removals per year, the budget may have to be altered or the tree planting program temporarily suspended for new trees to accommodate replacement of those trees removed. If all ash trees have to be removed due to EAB, it will cost approximately $42,000 for replacement trees plus staff time for planting.

In all cases the City has a list of recommended tree species for planting. Currently the list has trees from 9 families, 14 genera, and 33 species. With this list, it is possible to meet the 5/10/20 tree diversity rule.

Recommendations:

- As budget permits, all removed ash trees will be replaced with non-host species that will enhance the planting site, are appropriate for the planting site and add diversity. No plantings will be made that cannot be adequately maintained. All new plantings will conform to the “5-10-20” tree species diversity rule.
- Replanting will be managed through the regular spring and fall planting plans unless a special program is approved by the city council.
- In wooded areas, such as the Conservancy Area, natural regeneration will play a significant role in reforesting.
- The City will actively promote (solicit) donations for replacement trees and seek other funding opportunities whenever possible.
- The City will issue permits and work with residents willing to purchase and plant trees on the boulevard near their residence.

Staffing, Training, and Equipment

The Parks, Recreation, Forestry, and Cemeteries Department is staffed by one superintendent, and 7.5 permanent park worker positions. In addition, 2 to 4 seasonal employees are employed during the summer months. Parks workers are responsible for all park and terrace tree maintenance, including tree planting, pruning and removal, and maintenance of recreation facilities. Currently, large tree removals and stump grinding are contracted out.

In addition, monthly curb side brush pickup, emergency storm removals, and chipping of wood waste brought to the Public Works Facility are conducted by the Public Works Department. Two employees are used for the monthly curb side brush pickup and in case of an emergency, thirteen staff could be available.

Although none of the staff are certified arborists, all are trained in chain saw safety, felling techniques, and the operation of aerial bucket trucks and chippers. In addition, they all hold their CDL’s.

There is one 35’ aerial bucket truck and one chipper, that can accommodate logs up to 22 inches in diameter, shared between the two departments. A tub grinder is contracted twice a year to chip wood waste brought to the Public Works Facility.

There are currently enough chainsaws and hand tools to meet the needs of the City crews however, backup chainsaws should be purchased to prevent unscheduled down time due to wear and tear. If wood waste increases due to EAB, monthly curb side brush pickup work schedules may need to be altered. In addition, contracting the use of a tub grinder may need to be alter and/or alternative uses of the wood waste found.

The staff training and equipment capability is not adequate to handle all City tree related work even if distributed over a multi-year plan. Contracting the removal of trees that are too large, too tall, around powerlines, and outside of the range of the city owned equipment will be necessary.

Recommendations:

- Encourage staff to pursue ISA arborist certification.
- Additional training in climbing and rigging techniques is needed to advance the safety and removal qualifications of the staff.
- All staff should stay current on EAB information and training.
- Encourage employees to attend, host, and participate in all aspects of EAB management training.
- Conduct a “hands-on” workshop with the City Parks and Recreation and Public Works Department crews to educate them on the history, signs, symptoms, and treatments of EAB.
- Continue to advance crews in removal and safety training.

VI. Costs/Budget

With the arrival of EAB, the City will see an impact to their tree removal and disposal costs. In order to minimize the effect to the City's budget, cost-effective options will need to evaluated and implemented. This includes not only looking at removal and treatment costs but also finding cost-effective and creative ways to utilize products from tree removals. By doing this the City can lessen the economic impact of the pest's damage.

Estimated costs for the recommendations in Section IV were compiled and are shown below. It is important to keep in mind that they may change over time and if ash trees are left to die, costs for removal usually go up. The removal cost is based on contractor labor and is on a per inch basis. Therefore, as the trees get larger the costs of removal goes up. In addition, there are two separate costs estimates in the tables. One column is the contactor costs if staff was able to conduct some of the work. The second column assumes the contractor costs if they were to remove all the trees. City staff has the capability to remove all trees that are 0-6" DBH and 6-18" trees that are not located under or near powerlines. The costs of replacements is based on the purchase of a 1.5" caliper bare root tree and the cost of staking material. There is no associated cost for mulch since wood chips are available from the City's Public Works Facility. The replacement costs do not include staff time to plant the trees.

Currently, the Department of Parks, Recreation, Forestry, and Cemeteries has an estimated budget of $10,500 per year for removals and trimming, and $5,500 per year for the planting of new trees. These amounts were used to help determine the recommended management strategies in Section IV. It is important to keep in mind that if EAB arrives sooner than later, and removals and replacement have to be conducted in an abbreviated timeframe, that this will place a strain on the City budget including staff resources.

Phase I estimated costs

- Remove and replace all trees rated as dead or critical, this includes 26 ash trees.
- Remove and replace all ash trees rated as poor.
- Remove and replace all ash between 0-6" DBH. (Assumes all dead, critical and poor ash trees have already been removed in previous steps. This includes 15 trees.)

Table 10: Estimated contractor costs for phase I recommendations.

		Removals		Replacements
	# of trees	Costs 1*	Costs 2**	Costs
All Dead Trees	24	$1,200	$4,104	$1,374
All Critical Trees	98	$51,420	$60,252	$5,611
All Poor Ash Trees	57	$22,968	$28,548	$3,263
All 0-3" DBH Ash Trees***	39	$0	$2,340	$2,233
All 3-6" DBH Ash Trees***	124	$0	$14,880	$7,099
Grand Total	**405**	**$75,588**	**$110,124**	**$19,580**

*Contractor costs, assuming staff can conduct removals on all 0-6" trees and all 6-18" trees not under powerlines.
**Contractor cost to remove all trees.
***Assumes all dead, critical and poor ash trees have already been removed.

Using current budget projections and "Costs 1" it will take the City approximately 7 years to remove all the trees in Phase I. In addition, approximately $2,800 of the planting budget will be used each year just to replace trees that have had to be removed, dropping the number of new plantings in half.

Phase II estimated costs

- Remove and replace all remaining trees in poor condition.
- Remove and replace all ash trees between 6 to 18” in DBH, and not under powerlines. (Assumes all dead, critical and poor ash trees have already been removed in previous steps. This includes 27 trees.)

Table 11: Estimated contractor costs for phase II recommendations.

		Removals		Replacements
	# of trees	Costs 1*	Costs 2**	Costs
All Remaining Poor Trees	226	$97,512	$120,396	$12,939
All 6-12" DBH Ash Trees***	155	$0	$40,920	$8,874
All 12-18" DBH Ash Trees***	103	$0	$40,788	$5,897
Grand Total	**405**	**$97,512**	**$202,104**	**$27,709**

*Contractor costs, assuming staff can conduct removals on all 0-6" trees and all 6-18" trees not under powerlines.
**Contractor cost to remove all trees.
***Assumes all dead, critical and poor ash trees have already been removed.

Using current budget projections and “Costs 1” it will take the City approximately 9-10 years to remove all the trees in Phase II. In addition, approximately $3,000 of the planting budget will be used each year just to replace trees that have had to be removed, dropping the number of new plantings in half.

To remove all ash trees

To remove all ash trees in the City, contractor cost are estimated to be anywhere from approximately $170,000 to $278,000 depending on if some of the work is conducted by City staff. Replacement cost will be approximately $42,000.

Treatments

At this time chemical treatments will not be conducted. However, when the time presents itself there are several chemical treatments on the market for treating EAB. An estimated average of applying any one of them is approximately $1.50 per inch of DBH per year. Cost is based on 2010 product prices and does not include labor for application.

VII. Wood Utilization

EAB has the potential to generate a significant amount of wood debris in any one community. Most likely this will be a gradual increase initially, but later increasing rapidly as EAB populations increase. It will also depend on the number of ash trees in the community, how many were treated before hand with insecticides, and the management approach taken for tree removals (i.e. preemptive vs. reactive removals).

The big question every community will face is: What will be done with the wood debris? When facing this question items that will need to be considered are: How can the wood debris be utilized and/or disposed of? Are there local businesses that can use the wood debris? Where will the wood debris be stored (marshalling yards)?

Currently, when any street tree is removed by the City the wood is offered to the adjacent property owner. Any wood the adjacent property owner does not want, along with any other wood debris generated from public areas is brought back to the Public Works Facility. For private wood waste, brush collection is offered to residents once a month by the Public Works Department. The brush chipper can accommodate material up to 22" in diameter. Chips from brush collections are brought back to the Public Works Facility and made available to residents. In addition, residents and those conducting commercial tree services within the city can bring wood and lawn debris to the Public Works Facility. A private company is contracted to chip the wood debris twice a year. The wood chips along with lawn clippings and other organic debris is used to make compost that is then made available to residents.

Recommendations:

- Until a quarantine is in place for the local area, wood debris will continue to be handled in the same manner.
- The City's wood and yard waste recycling site will be posted with information on recognizing and reporting possible EAB infestations and regulations regarding EAB.
- If a quarantine is instated for the local area:
    - Wood debris will continue to be hauled to the Public Works Facility unless federal or state officials dictate otherwise.
    - Firewood will no longer be made available to residents. All wood debris will be chipped and/or composted.
    - Chipping of wood debris will need to be timed with the lifecycle of EAB to minimize the spread of the insect.
    - All wood utilization sites will be fenced and gated as necessary and have restricted hours of operation.
- If future wood waste volumes increase above current levels, additional utilization and storage yards will need to be explored. A possible site is the Badger Highway Quarry.
- The City will work with local lumber mills to utilize trees removed with high quality wood.
- The City will explore partners and additional strategies for wood utilization options.

VIII. Trees on Private Property

The majority of a community's trees are typically located on private property. Therefore, the City has an incomplete picture as to the number of trees located in citizen's yards. In the case of ash trees a general rule of thumb is 10 private ash trees for every 1 ash street tree. In most situations, the responsibility of tree removal on private property will belong to the property owner. Using that estimate, the City of Menasha has approximately 7,000 ash trees located on private property.

Recommendations:

- Property owners are urged to monitor the movement of EAB across the state. Any resident who suspects to have a tree infested with EAB is encouraged to report it. Cases can be reported by notifying DATCP through their toll-free hotline, 1-800-462-2803 or by notifying the City of Menasha Parks, Recreation, Forestry, and Cemeteries Department at 967-3642. The Park Superintendent will make every effort to investigate all reports of suspected ash trees in the community and make a determination as to whether the incident warrants further investigation by state officials. However, residents are encouraged to refer to *Section II* of this document, the additional resources listed in Appendix C, or the City's website for signs and symptoms of EAB.
- The decisions to treat, remove, or preserve private trees rests with the property owner. Residents should consider many variables when evaluating options, including tree size, location, and condition; access to the tree; potential targets should the tree fail; property value; shade, heating, and cooling values; treatment techniques, efficacy, and costs; proximity of EAB infestation; and intangible values. For information that could be helpful in understanding and controlling EAB refer to http://www.emeraldashborer.wi.gov/articleassets/EAB-HomeownersGuide.pdf
- Protective pesticide treatments may be effective, and may be applied at the residents discretion and expense. Treated trees should be removed if treatments fail and are infested with EAB. More information for insecticide products available to homeowners go to http://www.emeraldashborer.info/files/multistate_EAB_insecticide_Fact_Sheet.pdf
- The City will enforce the relevant sections of City Ordinance Chapter 4, Section 6 should it receive complaints about hazardous trees on private property or observe hazardous trees on private property affecting public property.
- Residents who loss an ash tree shading their house are encouraged to take advantage of Menasha Utilities Tree Power Program to help with the cost of a replacement tree. Please refer to Menasha Utilities website for additional information on the program and to see if you would qualify.

IX. Ordinance and Policy Review

In addition to a comprehensive community forestry program, local ordinances and policies can help prevent or control damage from emerald ash borer. Ordinances and policies should be based on local circumstances, management needs, goals and capacity. Properly applied, tree ordinances can facilitate good management of community tree resources.

The typical tree ordinance outlines the authorities and persons responsible for tree planting, care, and removal of trees on public property and in some cases on private property. Some basic components of a tree ordinance include:

- Goals
- Tree Board Establishment
- Authorities/Responsibilities
- Basic Performance Standards
- Enforcement/Penalties

Although ordinances should be flexible and broad enough to cover local circumstances, management needs, and goals; there are some specifics that should be considered specifically for EAB. They are:

- Establishment of authority for the municipality and forester (or other assigned person) for EAB control and management.
- Adopt ordinance language allowing EAB to be declared a public nuisance and authorizing control on both public and private property
- Adopt ordinance provisions or establish formal policies about firewood movement or storage.

The City of Menasha's has an ordinance and several policies in place to regulate and establish policy for:

- Controlling the planting, removal, maintenance, and protection of trees and shrubs in public areas.
- Eliminating and guarding against dangerous conditions which may result in injury to persons using public areas.
- Promoting and enhancing the beauty and general welfare of the City.
- Prohibiting the undesirable and unsafe planting, removal, treatment and maintenance of trees and shrubs in public areas.
- Guarding all trees and shrubs, both public and private, within the City against the spread of disease, insects, or pests.

The Trees and Shrubs ordinance can be found within the City of Menasha's Code of Ordinances, Title 6, Chapter 4. The Code of Ordinances can be found on the City's website or by contacting the City Forester. Policies for planting on street terraces and private property, along with tree maintenance standards can be found under the Parks, Recreation, Forestry, and Cemeteries Department link of the City's website. In addition, a detailed supplement of the City's Tree Care Policy is available from the Park, Recreation, Forestry, and Cemeteries Department.

The ordinance and policies were reviewed for specifics that should be considered for the control and management of EAB.

- *Establishment of authority for the municipality and forester (or other assigned person) for EAB control and management.*

The ordinance establishes City authority control and management of trees and shrubs and authority for the Superintendent of Parks, Forestry, and Cemeteries to serve as City Forester or other designated municipal employee to carry out the provisions in the ordinance.

- *Adopt ordinance language allowing EAB to be declared a public nuisance and authorizing control on both public and private property*

The ordinance defines public nuisance to allow for the control of EAB. However, continuity and consistency of the definition should be established throughout the ordinance.

- *Adopt ordinance provisions or establish formal policies about firewood movement or storage.*

The City has no ordinance or policy about the movement or storage of firewood. It is recommended that the definition of public nuisance be changed to also guard against the spread of disease, insects, and pests in firewood. In addition, it is recommended that the City pass a resolution encouraging residents to not transport firewood into City from outside the area.

There are several other items within the City ordinances and/or policies that are worth noting. They are not specifically related to the three bulleted items above but will be beneficial in EAB management efforts. One, the City has a tree planting program that provides for planting on street terraces and offers trees at a discounted price to residents who wish to plant a tree in their front yard setback. Two, the City has established standards for the trimming and removal of public trees along with the disposal of wood.

X. Community Outreach and Education

Public awareness is vital to slowing the spread of EAB, therefore it is never too early to begin the education and outreach process. Education and outreach plays a key role in communicating the effects of EAB on the City's urban forest and increasing public awareness, understanding, and support for the City's EAB Management Plan and program. Increasing public awareness of the City's EAB plan will also enhance the effectiveness of detection survey efforts, help to prevent adverse public reaction to control efforts, and promote compliance with regulations.

Ongoing communication, education, and outreach with employees, public officials, and citizenry will be the key components of the initial public awareness response. The efforts will continue and be expanded upon as more information becomes available. In addition, coordinated public information dissemination to residents and the media from both the state and local levels will ensure that information reaches the public as quickly as possible.

Recommendations:

- Educate employees, public officials, and citizens about EAB, the tree management guidelines presented in this plan, and proper wood utilization methods.
- Educate and inform all municipal leaders and officials through presentations and written reports to the Common Council, Park and Recreation Board, and other committees as needed.
- Develop an EAB page on the City website with updates on City activities and links to major EAB informational sites.
- Inform the community on EAB through local media outlets, direct or indirect mailing (tax and utility bills), newsletters, fliers, public meetings, neighborhood associations, and local garden clubs.
- Informational sessions will be coordinated with events such as Arbor Day, EAB Awareness Week, or any other appropriate event.
- Public service announcements will be encouraged through local media to educate the public about EAB.
- When EAB is found within the City of Menasha, information will be provided to City personnel, and citizens on the exact location of the infestation and plans on how it will be addressed.

Appendix A - Tree Inventory Maps

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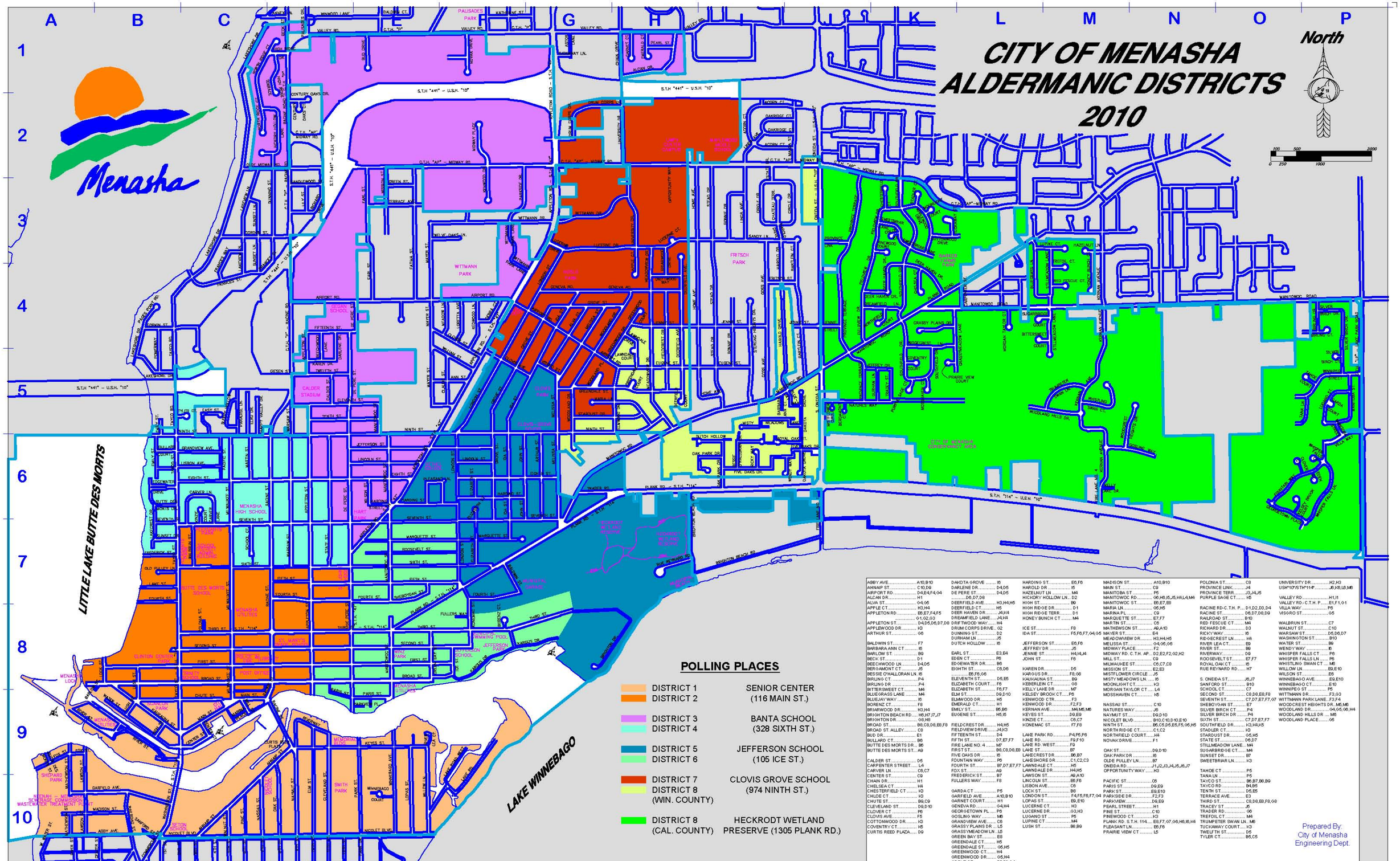
CITY OF MENASHA ALDERMANIC DISTRICTS 2010



2010 Tree Inventory

District 1

August 2010

- Ash
- Elm
- Evergreen
- Honeylocust
- Linden
- Maple
- Oak
- Ornamental
- Other
- District Boundary

N
W E
S

390 195 0 390
Feet

Menasha

Map 2

2010 Tree Inventory

District 2

August 2010

- Ash
- Elm
- Evergreen
- Honeylocust
- Linden
- Maple
- Oak
- Ornamental
- Other
- District Boundary

N
W E
S

220 110 0 220
Feet

Menasha

Map 3

2010 Tree Inventory - District 3

August 2010

Ash
Elm
Evergreen
Honeylocust
Linden
Maple
Oak
Ornamental
Other
District Boundary

1,600 800 0 1,600
Feet

Map 4

2010 Tree Inventory - District 4

August 2010

Ash
Elm
Evergreen
Honeylocust
Linden
Maple
Oak
Ornamental
Other
District Boundary

620 310 0 620
Feet

Map 5

2010 Tree Inventory

District 5

August 2010

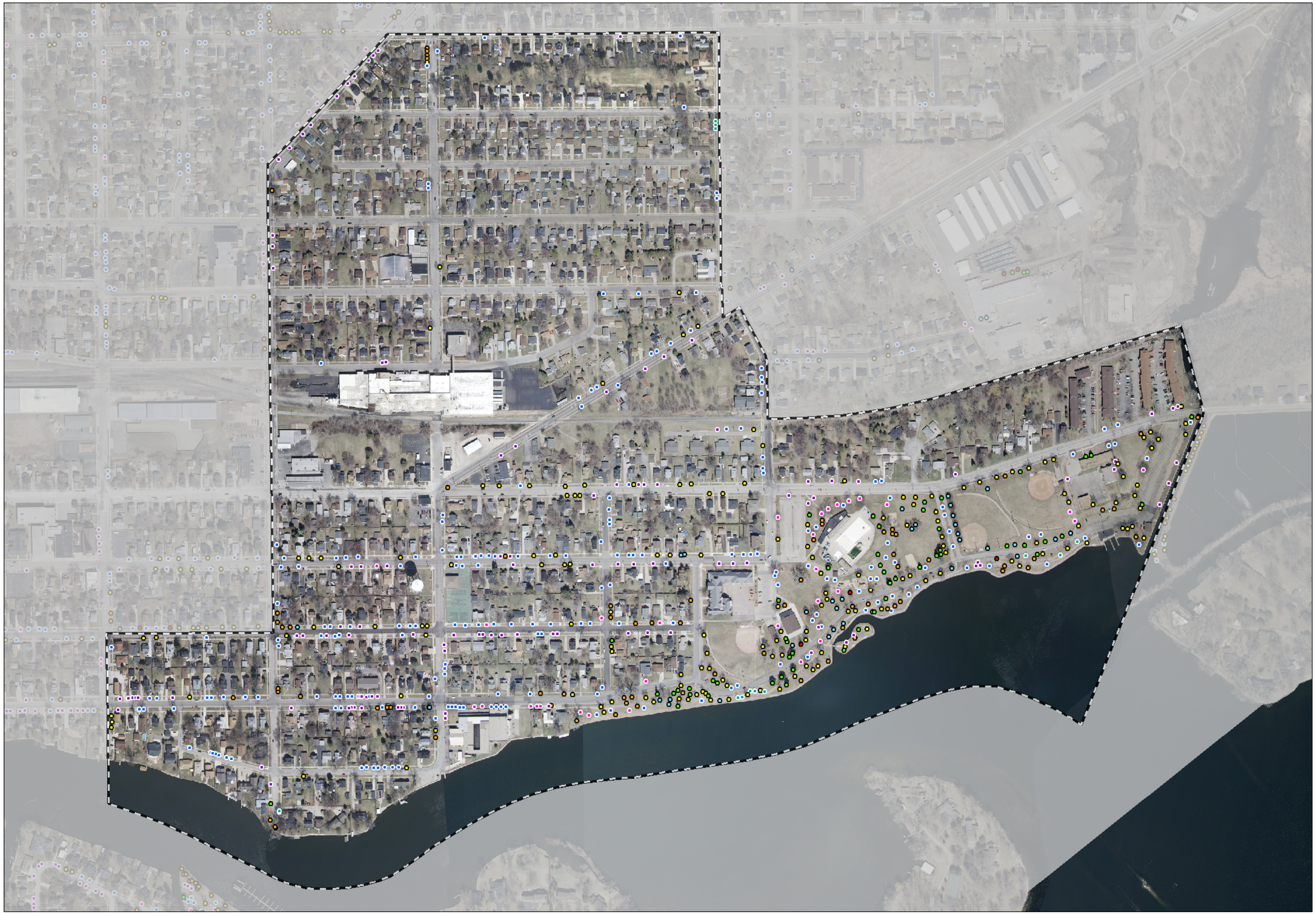
- Ash
- Elm
- Evergreen
- Honeylocust
- Linden
- Maple
- Oak
- Ornamental
- Other
- District Boundary

N
W E
S

380 190 0 380
Feet

Menasha

Map 6



2010 Tree Inventory

District 6

August 2010

- Ash
- Elm
- Evergreen
- Honeylocust
- Linden
- Maple
- Oak
- Ornamental
- Other
- District Boundary

N
W E
S

240 120 0 240
Feet

Menasha

Map 7

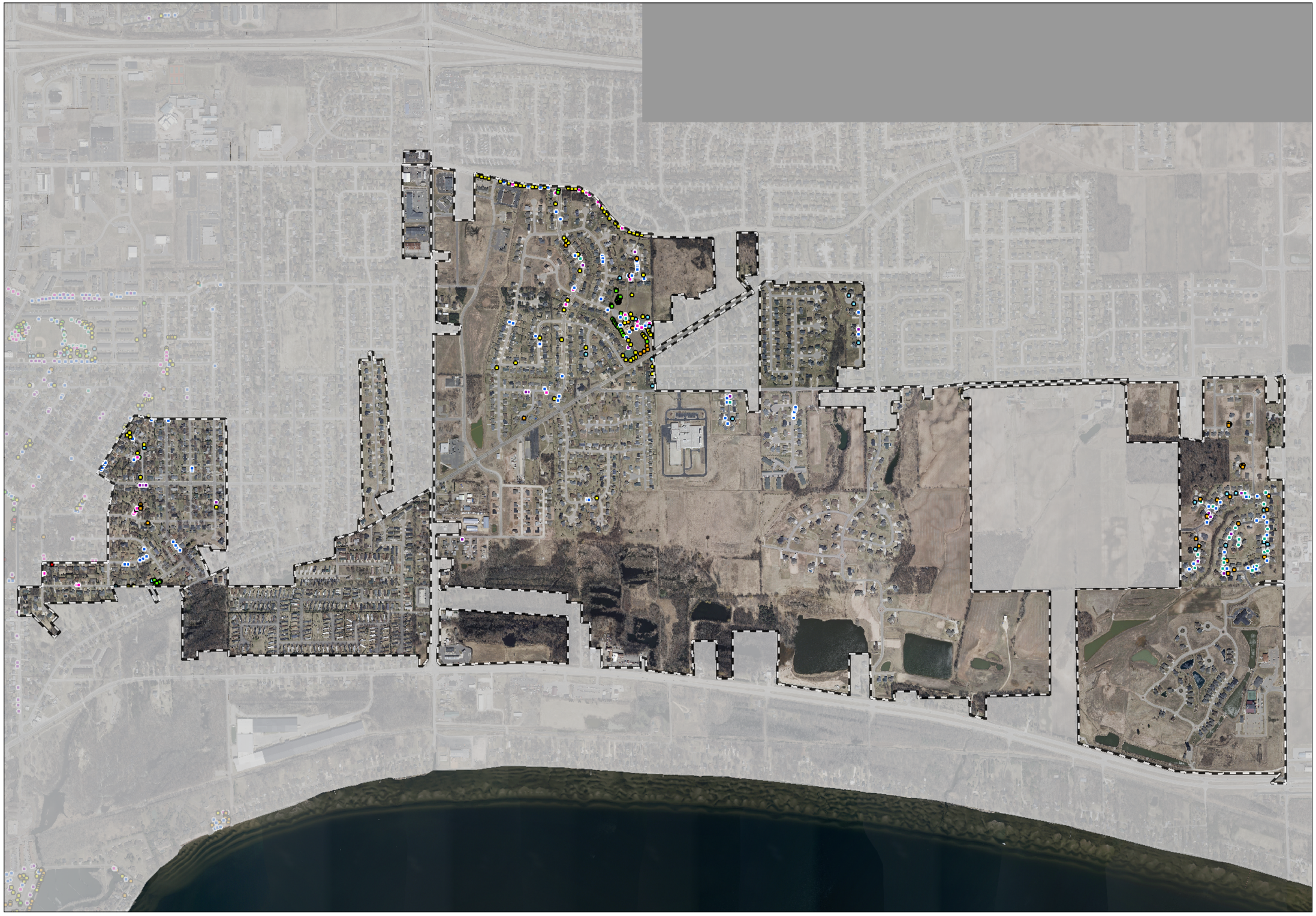
2010 Tree Inventory - District 7

August 2010

Ash
Elm
Evergreen
Honeylocust
Linden
Maple
Oak
Ornamental
Other
District Boundary

500 250 0 500
Feet

Map 8



2010 Tree Inventory

District 8

August 2010

- Ash
- Elm
- Evergreen
- Honeylocust
- Linden
- Maple
- Oak
- Ornamental
- Other
- District Boundary

N
W E
S

640 320 0 640
Feet

Menasha

Map 9

2010 Tree Inventory - Resthaven & Oak Hill Cemeteries

August 2010

100 50 0 100 Feet

- Ash
- Elm
- Evergreen
- Honeylocust
- Linden
- Maple
- Oak
- Ornamental
- Other
- Boundary

Map 10

2010 Tree Inventory

Jefferson Park

August 2010

- Ash
- Elm
- Evergreen
- Honeylocust
- Linden
- Maple
- Oak
- Ornamental
- Other
- Boundary

N
W E
S

110 55 0 110
Feet

Menasha

Map 11

2010 Tree Inventory - Smith Park

August 2010

- Ash
- Elm
- Evergreen
- Honeylocust
- Linden
- Maple
- Oak
- Ornamental
- Other
- Boundary

330 165 0 330 Feet

Map 12

Ash Trees in District 1

August 2010

1,600 800 0 1,600 Feet

Ash Trees (96)

District Boundary

Map 13

Ash Trees in District 2

August 2010

1,000 500 0 1,000 Feet

Ash Trees (116)

District Boundary

Map 14

Ash Trees
in District 3
August 2010
Ash Trees (74)
District Boundary
440
0
880
Feet
Menasha
Map 15

Ash Trees in District 4
August 2010
Ash Trees (65)
District Boundary
220 0 440
Feet
Menasha
Map 16

Ash Trees in District 5

August 2010

1,500 750 0 1,500 Feet

Ash Trees (42)

District Boundary

Map 17

Ash Trees in District 6

August 2010

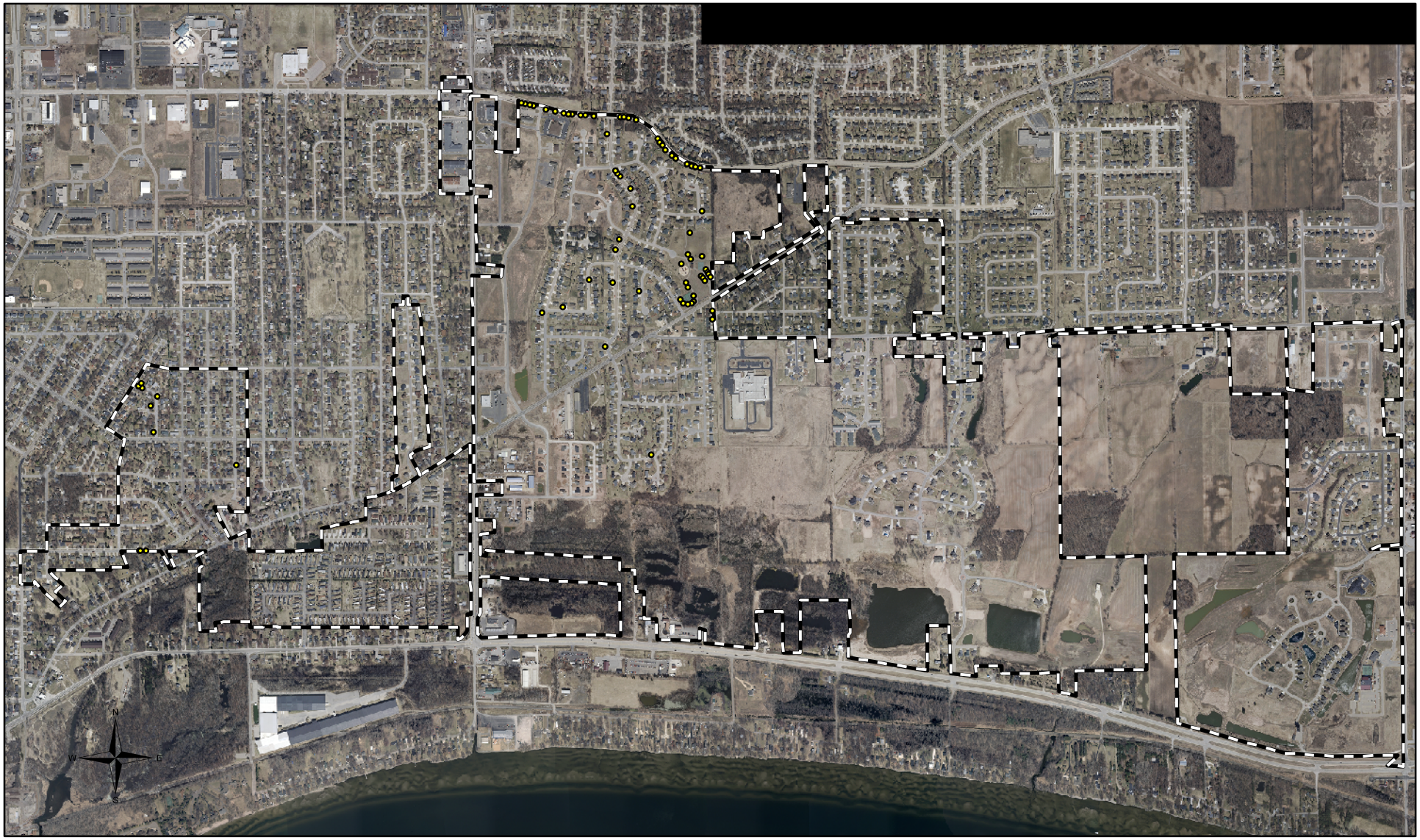
1,000 500 0 1,000 Feet

Ash Trees (160)

District Boundary

Map 18

Ash Trees
in District 7
August 2010
Ash Trees (69)
District Boundary
240 0 480
Feet
Menasha
Map 19



Ash Trees in District 8

August 2010

2,000 1,000 0 2,000 Feet

Ash Trees (74)

District Boundary

Map 20

Ash Trees in Resthaven & Oak Hill Cemeteries
August 2010
Ash Trees (37)
District Boundary
50
0
100
Feet
N
W
E
S
Menasha
Map 21

Appendix B – Federal and State EAB Regulations[13]

Federal Laws and Regulations:

- **Plant Pest Act 2000 – Prevent spread of plant pests**
  http://www.aphis.usda.gov/plant_health/plant_pest_info/weeds/downloads/PPAText.pdf
- **7CFR 301.53 – 301.53-9 – EAB regulations**
  http://www.access.gpo.gov/nara/cfr/waisidx_05/7cfr301_05.html
- **7CFR 319.40 – Solid wood packing material**
  http://www.access.gpo.gov/nara/cfr/waisidx_01/7cfr319_01.html

Wisconsin Statutes Providing State Authority:

- **26.30 – Forest insects and diseases, department jurisdiction and procedure**
  http://www.legis.state.wi.us/statutes/Stat0026.pdf

  (1) PURPOSE. It is the public policy of the state to control forest pests on or threatening forests of the state in order to protect the forest resources, promote good forest management, enhance the growth and maintenance of forests, promote stability of forest-using industries, aid in fire control by reducing the menace created by dying and dead trees, conserve forest cover on watersheds and protect wildlife, recreational values and other values of the forest.

  (2) POWERS. The department [Natural Resources] is vested with authority and jurisdiction in all matters relating to the prevention, detection and control of forest pests on the forest lands of the state, and to do all things necessary in the exercise of such authority and jurisdiction, except that this shall not be construed to grant any powers or authority to the department for the silvicultural control of forest pests on any land. This section shall apply only to the detection and control of forest pests on forest lands and does not affect the authority of the department of agriculture, trade and consumer protection under chs. 93 and 94. The action of the department under sub. (4) shall be coordinated with the department of agriculture, trade and consumer protection in accordance with s. 20.901.The secretaries of natural resources and agriculture, trade and consumer protection shall execute annually a memorandum of agreement to enable the coordination of pest control work of their departments.

- **94.01 – Plant inspection and pest control authority**
  http://www.legis.state.wi.us/statutes/Stat0094.pdf

  (1) In the conduct of survey and inspectional programs for the detection, prevention and control of pests, the department [Agriculture, Trade and Consumer Protection] may impose quarantines or such other restrictions on the importation into or movement of plants or other material within this state as necessary to prevent or control the dissemination or spread of injurious pests.

  (2) In accordance with sub. (1), the department, by summary order, may prohibit the removal of any plant, host plant, or other pest-harboring material from any private or public property, or any area of the state which in its judgment contains or is exposed

[13] Wisconsin Department of Natural Resources EAB Toolkit, last revised 1/26/2007, accessed 12/2010.

to injurious pests, except under such conditions as in its judgment are necessary to prevent the dissemination or spread of pests, giving written notice thereof to the owner or person in charge of the property. While such order is in effect no person with knowledge thereof shall cause or permit the removal of any such plant, host plant or other pest-harboring material from such property or area, unless it is in compliance with the conditions of such order. Orders issued under this subsection shall be in writing, have the force and effect of an order issued under s. 93.18, and are subject to right of hearing before the department, if requested within 10 days after date of service. Any party affected by the order may request a preliminary or informal hearing pending the scheduling and conduct of a full hearing.

(3) No person may obstruct or interfere with the examination or testing, by authorized inspectors and agents of the department, of any plants or other material suspected of being infested or infected with any injurious pests; nor may any person move any plants, plant parts, pests or pest-harboring materials contrary to the terms of any quarantine, rule, notice or order under this section.

(4) The department, through its authorized agents or inspectors, may enter at all reasonable times any property for purposes of inspection, investigation and control of suspected pest infestations or infections and may intercept, stop and detain for official inspection any person, truck, vessel, aircraft or other conveyance believed to be carrying plants or other materials infested or infected with pests, and may seize and destroy any such plants or other materials moved, shipped or transported in violation of any law, rule, quarantine notice or order.

- **94.02 – Abatement of pests**
  (1) If the department finds any premises, or any plants, plant parts, or pest-harboring materials located thereon are so infested or infected with injurious pests as to constitute a hazard to plant or animal life in the state, or any area thereof, it may notify the owner or person having charge of such premises to that effect, and the owner or person in charge shall, within 10 days after such notice, cause the treatment of the premises or the treatment or removal and destruction of infested or infected plants, host plants or other pest-harboring material as directed in the notice. No person may violate the terms of any notice received under this subsection, nor may any damages be awarded to the owner for such treatment, removal or destruction. Any person affected by a notice or order may appeal to the department and request a hearing under s. 94.01 (2).

  (2) If the owner or person in charge fails to comply with the terms of the notice, within 10 days after receiving it, the department or any cooperating local unit of government may proceed to treat the premises or to treat or destroy the infested or infected plants or other material. The expense of such abatement shall be certified to the town, city or village clerk and assessed, collected and enforced against the premises upon which such expense was incurred as taxes are assessed, collected, and enforced, and shall be paid to the cooperating unit of government incurring the expense, or into the general fund if the control work was conducted by the department.

  (3) If a serious pest outbreak constituting a significant threat to agricultural production or plant life occurs, and cannot be adequately controlled by individual property owners or local units of government in any area of this state, the department may petition the joint committee on finance for emergency funds with which to

conduct needed control work independently or on a cooperative basis with the federal or local units of government.

(4) This section pertains to the abatement of pests on agricultural lands and on agricultural business premises. This section does not affect the authority of the department of natural resources under ch. 26.

- **94.03 – Shipment of pests and biological control agents permits**
  1) No person may sell or offer for sale, or move, transport, deliver, ship or offer for shipment, any pest, as defined in s. 93.01 (10) or any biological control agent as defined in sub. (2), without a permit as prescribed by rules of the department. Such rules may provide for reasonable exemptions from permit requirements. Permits may be issued only after the department determines that the proposed shipment or use will not create sufficient hazard to warrant refusal of a permit. Permits shall be affixed to the outside of every shipping container or accompany the shipment as the department directs.

  (2) The department may by rule regulate and control the sale and use of biological control agents to assure their safety and effectiveness in the control of injurious pests and to prevent the introduction or use of biological control agents which may be injurious to persons or property or useful plant or animal life. The term "biological control agent" as used in this section means any living organism which because of its parasitic, predatory or other biological characteristics may be effective for use in the suppression or control of pests by biological rather than chemical means.

- **94.10 – Nursery stock, inspection and licensing** *(relevant sections only)*
  (2) Nursery dealer; annual license.

  (a) *License required.* Except as provided in par. (f), no person may operate as a nursery dealer without an annual license from the department. A nursery dealer license expires on February 20. A nursery dealer license may not be transferred to another person.

  (3) Nursery grower; annual license.

  (a) *License required.* Except as provided in par. (f), no person may operate as a nursery grower without an annual license from the department. A nursery grower license expires on February 20. A nursery grower license may not be transferred to another person.

  (3g) Christmas tree grower; annual license.

  (a) *License required.* Except as provided in par. (e), no person may operate as a Christmas tree grower without an annual license from the department. A Christmas tree grower license expires on February 20. A Christmas tree grower license may not be transferred to another person.

  (4) Nursery growers and dealers; records.

  (a) *Nursery dealers; records of nursery stock received.* A nursery dealer shall keep a record of every shipment of nursery stock received by the nursery dealer. The nursery dealer shall include all of the following in the record:

    1. A description of the types of nursery stock, and the quantity of nursery stock of each type, included in the shipment.

2. The name and address of the source from which the nursery dealer received the shipment.

(b) *Nursery growers and dealers; records of shipments to other nursery growers and dealers.* Each nursery grower and nursery dealer shall record every shipment of nursery stock that the nursery grower or nursery dealer sells or distributes to another nursery grower or nursery dealer. The nursery grower or nursery dealer shall include all of the following in the record:

1. A description of the types of nursery stock, and the quantity of nursery stock of each type, included in the shipment.

2. The name and address of the nursery grower or nursery dealer receiving the shipment.

(c) *Records retained and made available.* A nursery grower or nursery dealer who is required to keep records under par. (a) or (b) shall retain those records for at least 3 years and shall make those records available to the department for inspection and copying upon request.

(5) Labeling nursery stock.

(a) *Nursery stock shipped to grower or dealer.* No person may sell or distribute any shipment of nursery stock to a nursery grower or nursery dealer, and no nursery grower or nursery dealer may accept a shipment of nursery stock, unless that shipment is labeled with all of the following:

1. The name and address of the person selling or distributing the shipment to the nursery grower or nursery dealer.

2. A certification, by the person under subd. 1., that all of the nursery stock included in the shipment is from officially inspected sources.

(b) *Growers and dealers to report unlabeled shipments.* Whenever any person tenders to a nursery grower or nursery dealer any shipment of nursery stock that is not fully labeled according to par. (a), the nursery grower or nursery dealer shall promptly report that unlabeled shipment to the department.

(c) *Nursery stock sold at retail.* A person selling nursery stock at retail shall ensure that the nursery stock is labeled with the common or botanical name of the nursery stock.

(6) Care of nursery stock.

(a) *Adequate facilities.* A nursery grower or nursery dealer shall maintain facilities that are reasonably adequate for the care and keeping of nursery stock held for sale, so that the nursery grower or nursery dealer can keep the nursery stock in healthy condition pending sale.

(b) *Reasonable examinations.* Nursery growers and nursery dealers shall make reasonable examinations of nursery stock held for sale to determine whether that nursery stock is capable of reasonable growth, is infested with injurious pests or is infected with disease.

(7) Prohibitions.

(a) *Nursery dealers.* No nursery dealer may do any of the following:

1. Obtain, hold, sell, offer to sell or distribute nursery stock from any source other than an officially inspected source.

2. Misrepresent that the nursery dealer is a nursery grower.

(b) *Nursery growers and dealers.* No nursery grower or nursery dealer may do any of the following:

1. Sell, offer to sell or distribute any nursery stock that the nursery grower or nursery dealer knows, or has reason to know, is infested with plant pests or infected with plant diseases that may be spread by the sale or distribution of that nursery stock.

2. Sell, offer to sell or distribute any nursery stock that the nursery grower or nursery dealer knows, or has reason to know, will not survive or grow.

3. Misrepresent the name, origin, grade, variety, quality or hardiness of any nursery stock offered for sale or make any other false or misleading representation in the advertising or sale of nursery stock.

4. Conceal nursery stock to avoid inspection by the department, falsify any record required under this section or make any false or misleading statement to the department.

(8) Department inspection. The department may inspect nurseries and premises at which nursery stock is held for sale or distribution. The department may inspect premises at which evergreen trees are grown for eventual sale as Christmas trees and premises at which Christmas trees are held for sale or distribution.

(9) Department orders.

(a) *Holding orders and remedial orders.* An authorized employee or agent of the department may, by written notice, order a nursery grower or nursery dealer to do any of the following:

1. Temporarily hold nursery stock pending inspection by the department.

2. Remedy violations of this section.

3. Refrain from importing weeds or pests that threaten agricultural production or the environment in this state.

4. Permanently withhold nursery stock from sale or distribution, if the sale or distribution would violate this section or an order issued under this section and the violation cannot be adequately remedied in another manner.

5. Destroy or return, without compensation from the department, nursery stock that is sold or distributed in violation of this section, or an order issued under this section, if the violation cannot be adequately remedied in another manner.

(10) Reciprocal agreements with other states.

(a) *General.* The department may enter into reciprocal agreements with other states to facilitate interstate shipments of nursery stock.

(b) *Officially inspected sources.* As part of an agreement under par. (a), the department may recognize sources of nursery stock in another state as officially inspected sources.

(c) *Inspection and certification standards.* An agreement under par. (a) may specify standards and procedures for all of the following:

1. Inspecting officially inspected sources of nursery stock.
2. Inspecting and certifying interstate shipments of nursery stock.

- **94.46 – Stop sale, penalties, enforcement**
  (1) The department may issue a written or printed "stop sale" order to the owner or custodian of any lot of agricultural or vegetable seed not conforming with ss. 94.38 to 94.46, or rules thereunder. The order shall specify the sections of the law or rules violated and shall prohibit the sale or other disposition of the seed except as the department authorizes or directs. Unless the seed is brought into compliance with the law or rules and is released from the "stop sale" order, or other disposition is agreed upon in writing within 30 days after service of the order, the seed shall be disposed of as the department by notice in writing may direct. This shall not preclude the voluntary signing of a disposal agreement without the issuance of a "stop sale" order. Any notice or order hereunder may be served personally or by mail and shall have the effect of a special order under s. 93.18 subject to review under ch. 227 if within 10 days after service of any notice or order, the owner or custodian files with the department a written request for a hearing. Final disposition of the seed shall be stayed during pendency of the hearing but the "stop sale" order shall remain in effect.

  (2) Any lot of agricultural or vegetable seed not in compliance with ss. 94.38 to 94.46, or rules thereunder, or not disposed of in accordance with any disposal agreement or order under sub. (1), shall be subject to seizure on complaint of the department to a court of competent jurisdiction. If the court finds the seed to be in violation of law and orders the condemnation of said seed, it shall be denatured, processed, destroyed, relabeled or otherwise disposed of as the court directs.

  (3) In addition to or in lieu of other remedies provided for enforcement of ss. 94.38 to 94.46, the department may apply to the circuit court for a temporary or permanent injunction to prevent, restrain, or enjoin any person from violating ss. 94.38 to 94.46 or any rules or orders issued thereunder.

  (4) (a) Any person violating ss. 94.38 to 94.46 or rules promulgated thereunder shall forfeit not less than $100 nor more than $500 for the first offense. For any subsequent offense occurring within 5 years of a previous offense, the person shall forfeit, for each offense, not less than $200 nor more than $1,000. The 5-year period shall be measured from the dates of the violations which resulted in convictions.
  (b) Any person who knowingly violates ss. 94.38 to 94.46 or rules promulgated thereunder may be fined not more than $500 or imprisoned not more than 6 months or both.

<u>Wisconsin Administrative Rules:</u>

- **ATCP 21.17 – Emerald ash borer; import controls and quarantine**
  (1) Importing or Moving Regulated Items From Infested Areas; Prohibition. Except as provided in sub. (3), no person may do any of the following:

  (a) Import a regulated item under sub. (2) into this state if that item originates from an emerald ash borer regulated area identified in 7 CFR 301.53−3.

(b) Move any regulated item under sub. (2) out of an emerald ash borer regulated area that is identified in 7 CFR 301.53−3 and located in this state.

Note: The United States department of agriculture, animal and plant health inspection service (USDA−APHIS) periodically updates the list of regulated areas in 7 CFR 301.53−3. Subsection (1) applies to new regulated areas as those areas are identified in the CFR.

Each year, as a service, the Wisconsin department of agriculture, trade and consumer protection distributes an updated federal CFR listing to nursery license holders and other affected persons in this state. More frequent updates, if any, are available on the department's website at www.datcp.state.wi.us. Subsection (1) applies to new regulated areas as those areas are identified in the CFR, regardless of whether affected persons receive update notices from the department. Persons may request update notices by calling (608) 224−4573, by visiting the department's website, or by writing to the following address:

Wisconsin Department of Agriculture, Trade and Consumer Protection

Division of Agricultural Resource Management

PO Box 8911

Madison, WI 53708−8911

(2) Regulated Items. The following are regulated items for purposes of sub. (1):

(a) The emerald ash borer, *Agrilus planipennis* Fairmaire, in any living stage.

(b) Ash trees.

(c) Ash limbs, branches and roots.

(d) Ash logs, slabs or untreated lumber with bark attached.

(e) Cut firewood of all non−coniferous species.

(f) Ash chips and ash bark fragments (both composted and uncomposted) larger than one inch in diameter.

(g) Any other item or substance not listed in sub. (2) that may be designated as a regulated item if a pest control official determines that it presents a risk of spreading emerald ash borer and notifies the person in possession of the item or substance that it is subject to the restrictions of the regulations.

(3) Inspected and Certified Items; Exemption. Subsection (1) does not prohibit the shipment of a regulated item if a pest control official in the state or province of origin does all of the following:

(a) Inspects the regulated item.

(b) Certifies any of the following in a certificate that accompanies the shipment:

1. The regulated item originates from non−infested premises and has not been exposed to emerald ash borer.

2. The regulated item was found, at the time of inspection, to be free of emerald ash borer.

3. The regulated item has been effectively treated to destroy emerald ash borer. The certificate shall specify the date and method of treatment.

4. The regulated item is produced, processed, stored, handled or used under conditions, described in the certificate, that effectively preclude the transmission of emerald ash borer.

History: CR 06−008: cr. Register October 2006 No. 610, eff. 11−1−06.

- **NR 45.04(1)(g) – Firewood restrictions on state property**
  No person may possess firewood that originates from greater than 50 miles from the campground on that property where the wood will be used, or the property itself if there is no campground, or from outside the borders of the state. Firewood from sources approved by the department of agriculture, trade and consumer protection is allowable. Firewood includes all wood, processed or unprocessed, intended for use in a campfire. The department may seize and dispose of firewood possessed in violation of this paragraph.

  Note: A list of firewood sources approved by the department of agriculture, trade and consumer protection can be obtained by contacting Robert Dahl, WI DATCP, PO Box 8911, Madison, WI 53708, 608−224−4573, Robert.Dahl@datcp.state.wi.us.

Wisconsin Statutes Providing Local Government Authority:

- **27.09 – City forester, duties; tree planting**
  http://www.legis.state.wi.us/statutes/Stat0027.pdf

  (1) The board of park commissioners of every city may employ a city forester to take charge of and direct, subject to its supervision and control, all of the work authorized to be done under this section. It may also designate a municipal employee to perform the duties of city forester .

  (2) The common council shall include in its annual budget such sum as it deems necessary, if any, to meet all expenses of doing said work during the following fiscal year, including the salary of the city forester and the compensation of employees assisting the city forester, but not including amounts assessable to abutting property; and the taxes levied to provide for such expense shall be in addition to all other taxes for park and boulevard purposes.

  (3) The board may plant, transplant, remove, trim, spray and otherwise care for and protect all trees and shrubs on or in that part of every street, the grade of which has been established, lying between the lot line and the curb, or in the center or side plots in all boulevards and parkways, and in all public parks or grounds belonging to the city and control all such planting and transplanting by others. The board may guard all trees within the city so as to prevent the spread of disease or pests and to eliminate dangerous conditions, and may proceed pursuant to subs. (4) to (7).

  (4) Whenever the board proposes the setting out, planting or removing of any such living shade tree, it shall give 2 weeks' written notice to the owner of the lot or parcel of land on which such tree stands or will stand, or the owner's agent, or, if neither is known and there be a tenant occupying said property, then to such tenant, of a time and place at which said contemplated work will be considered by the city forester , specifying in detail the street, avenue or boulevard and portion thereof, upon or from which trees are proposed to be planted or removed, and the general nature and character of the changes and improvements contemplated. After such hearing, the city forester, subject to the direction of the board shall abandon said work or proceed with it as the city forester believes the best interest of the public requires.

  (5) The entire or any part of the cost of protecting, trimming, spraying, planting, renewing and removal of trees and shrubs between the lot line and the curb in front of any lot or parcel of land abutting on a street, avenue or boulevard may be chargeable to and assessed upon such lot or parcels of land. The governing body

shall hold a public hearing on the proposed assessment, and shall give notice thereof in such city or village, by publishing a class 2 notice, under ch. 985.

(6) The board shall keep a strict account of the cost of planting, protecting, renewing, removing, trimming, spraying and caring for trees and shrubs in front of each lot or parcel of land abutting on any street, avenue, or boulevard, and prior to November 10 in each year, shall make a report to the comptroller in cities having such an officer, and in other cities to the common council, of all work done for which assessments have been made as hereinbefore provided stating and certifying the description of land, lots, parts of lots or parcels of land abutting on a street, avenue or boulevard in which any such work shall have been done, and the amount chargeable to each such piece of property; and the comptroller at the time of making the comptroller's annual report to the common council of the lots or parcels of land subject to special assessments shall include therein the lots or parcels of land so reported to the comptroller by the board of park commissioners with the amount chargeable thereto for work done during the preceding year.

(7) The amounts so reported directly or through a comptroller to the council shall be levied on said lots or parcels of land, respectively, to which they are chargeable and shall constitute a lien thereon and shall be collected as other special taxes are levied and collected in the city. The board shall advance out of the park or other proper fund sufficient money for doing said work and said special assessments shall be credited to said fund of said city and shall not be diverted or used for any other purpose.

- **27.13 – Town and village parks**
  Every town and village may provide and maintain parks, parkways, boulevards or pleasure drives pursuant to the provisions of this chapter which are applicable to cities.

- **823.01 – Jurisdiction over nuisances**
  http://www.legis.state.wi.us/statutes/Stat0823.pdf

  Any person, county, city, village or town may maintain an action to recover damages or to abate a public nuisance from which injuries peculiar to the complainant are suffered, so far as necessary to protect the complainant’s rights and to obtain an injunction to prevent the same.

Appendix C – EAB Resources

Wisconsin's Emerald Ash Borer Information source

- http://www.emeraldashborer.wi.gov/
- EAB internet portal for Wisconsin sponsored by DATCP, WDNR, and the University of Wisconsin-Madison.
- Contains detailed information on EAB biology and host preference, firewood and quarantine regulations, management options, information on what Wisconsin is doing about emerald ash borer, and related links.

Emerald Ash Borer Information Network

- http://www.emeraldashborer.info/
- EAB webpage that is a collaborative effort of the USDA Forest Service, Michigan State University, Purdue University and Ohio State University
- Contains information of EAB biology, distribution, control measures, current research and links to various EAB infested states' websites.

WDNR Emerald Ash Borer

- http://dnr.wi.gov/forestry/fh/ash/
- Contains information on EAB biology, signs, symptoms, risk maps, survey plans, how to report EAB and the community toolkit for EAB planning.

DATCP Emerald Ash Borer

- http://datcp.state.wi.us/arm/environment/insects/emerald-ash-borer/index.jsp
- Contains information on Wisconsin's response plan, rules and regulations, how to report EAB, and related links.

University of Madison Emerald Ash Borer

- http://www.entomology.wisc.edu/emeraldashborer/
- Contains information regarding EAB biology, signs, symptoms, and EAB look-alikes.

US Forest Service Emerald Ash Borer

- *Northeastern Area site*, http://www.na.fs.fed.us/fhp/eab/
- Contains information on EAB, identifying and reporting, surveys, infestations, quarantines, related links, and picture gallery.
- *Northern Research Area site*, http://nrs.fs.fed.us/disturbance/invasive_species/eab/
- Contains information on all aspects of EAB research.

USDA National Invasive Species Information Center

- http://www.invasivespeciesinfo.gov/animals/eab.shtml
- Contains information on the USDA-APHIS EAB New Pest Response Guidelines, and links to other federal and state EAB websites.

USDA-APHIS Emerald Ash Borer

- http://www.aphis.usda.gov/plant_health/plant_pest_info/emerald_ash_b/index.shtml
- Contains information on EAB, quarantine maps, surveys and trapping, and regulations.

Ash Utilization Options Project of Southeastern Michigan

- http://www.semircd.org/ash/
- Contains information on positive uses of EAB infested wood, demonstration projects, and research on ash utilization.

Emerald Ash Borer Cost Calculator

- http://extension.entm.purdue.edu/treecomputer/index.php
- Site sponsored by Purdue University Extension. Provides a way to compare different EAB management strategies.