

Emerald Ash Borer Preparedness Plan

Town of Rib Mountain Marathon County



Emerald Ash Borer adult (Photo: WDNR)

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Golden Sands
Resource Conservation
& Development Council, Inc.

Stevens Point, WI
755-343-6215
www.goldensandsrccd.org

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Introduction

The emerald ash borer (EAB) (*Agrilus planipennis*) is a beetle originally from China that was discovered in Detroit, Michigan in 2002. It is believed that it was hidden in wooden packing materials aboard a cargo ship. Once here, EAB has been incidentally transported to new locations in ash wood products, which has allowed the pest to rapidly spread to 29 states across the United States, and Ontario and Quebec in Canada. EAB was first detected in Southeast Wisconsin in 2008, and has moved steadily north since then (Figure 1).

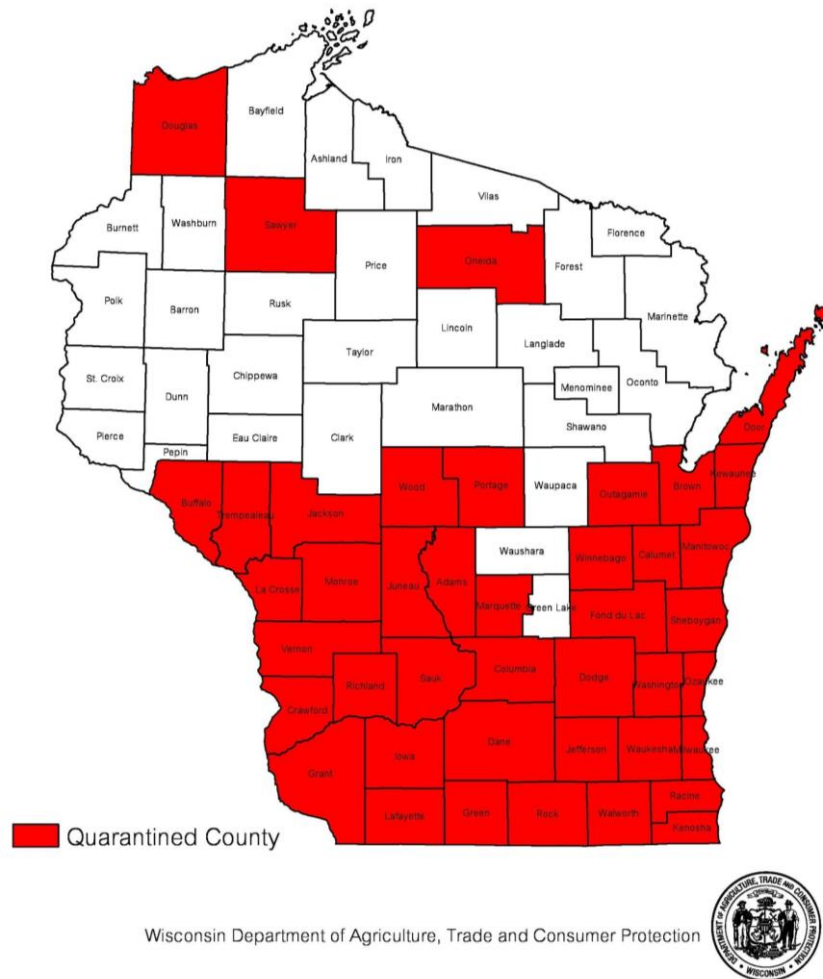


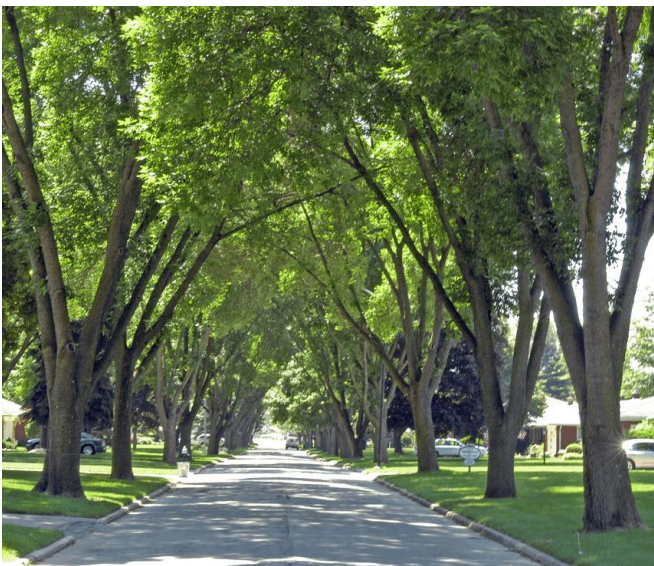
Figure 1. Quarantined counties in Wisconsin have EAB present or in neighboring counties, as of 8/31/16. (http://datcpservices.wisconsin.gov/eab/articleassets/WI_EAB_Quarantine.pdf)

The EAB beetle is a genus-specific feeder, meaning it only feeds on trees in the Fraxinus genus (green ash, white ash, black ash). EAB larvae tunnel under ash tree bark, leaving s-shaped trails called “galleries”. These trails are what sever the vascular tissue of the tree, cutting off the flow of water from the roots up to the leaves. Most ash trees die after 3 years of infestation. Some take longer to die. No resistant strain of ash tree has been found yet.

U.S. Forest Service research estimates that there are 38 million landscape trees in the 25-state area surrounding Detroit. They estimate it will cost \$10.7 billion to deal with the infestation as ash trees die, due to costs of treatment, removal, or replacement of important and beneficial landscape trees. Ash have been heavily planted in the urban forest, usually making up 20% of the public trees on streets and parks.

It is important for municipalities to know how to manage for EAB because it can spread quickly through urban ash tree populations making it challenging to allocate money for treatment and/or removal of so many dead or dying ash trees all at once. Symptoms of EAB go unnoticed for the first 2-3 years of infestation. Within another year or so, that tree and nearby ash trees are dead. By year 7 or 8, most of the ash trees in the community are already dead. EAB infested ash trees become a hazard in towns due to the unpredictability of falling branches and collapsing trees. With preparedness planning, a municipality’s liabilities can be reduced and costs can be spread out over a more manageable timeframe.

BEFORE EAB



AFTER EAB

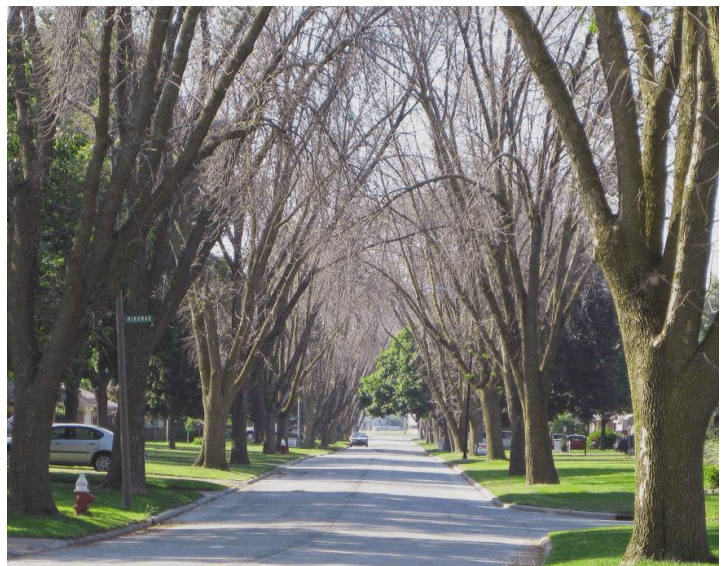


Figure 2. Toledo, OH - just one example of a community taken surprise by Emerald Ash Borer. After Dutch elm disease swept through, communities replaced their dead elms with ash trees, known for their

hardiness and resistance to most pests. Now, we have streets lined with ash trees, which are fatally affected by this new pest, emerald ash borer.

Purpose

Why should municipalities be planning now for EAB?

- Reduce risk of hazard trees.
- Maintain benefits trees provide such as shade and storm-water retention.
- To spread out the annual costs for training and labor requirements of tree removals.

Preparedness planning includes:

- Educating the community about the EAB threat to ash trees.
- Identifying and prioritizing the removal of hazardous trees.
- Budgeting to treat priority trees.
- Budgeting for tree removal and replanting.
- Planning for disposal of removed trees.
- Replanting with a diverse mix of tree species.

Methods

Before the ash tree inventory, we reviewed maps of each municipality and documented priority public properties and their boundaries. All trees on municipality-owned properties were included in the survey. We drove through every city street, and walked through parks and other municipality properties to record the location and condition of ash trees within municipality ownership. For this inventory we documented all ash tree species (genus: *Fraxinus*). (Mountain ash, genus: *Sorbus*, was not recorded, because it is not a true ash tree and not vulnerable to EAB.) The Rib Mountain ash inventory was conducted in July 2017.

The following data was recorded for each ash tree found:

Tree Number - Each inventoried tree is assigned a number. The tree number is used to find the tree location on the GIS maps

Location – Tree locations are divided into three categories for the inventory 1-street
2- municipal parks and buildings 3- municipal right of ways (strips of municipal owned land throughout the town, see figure 8). For street trees, the address was recorded. The name of the

park or building was recorded. The address or location of the municipal right of way was recorded.

Locations with multiple trees are always recorded North to South or East to West; if trees 23, 24, and 25 are at 1233 Main St, which runs north/south, tree 23 will be the north most tree and 25 will be the furthest south.

Common Name - What kind of ash tree is it? Green, White, Blue, or Black.

Diameter Class - The diameter was measured in inches using a Diameter Breast Height (DBH) Tape. Measurements are taken at the trees "breast height" which is 4' 5". If ground was not level the measurements were taken on the side with a hill. Trees with multiple stems at 4' 5" had their diameter measured lower on the trunk to get one single measurement. DBH results are rounded to the nearest inch.

Condition Class - Condition class rates the overall vitality of the tree with respect to a dead (0%) to a perfect specimen (100%) of the same species. Condition Classes are broken into 5 categories: dead/dying 0-19, poor 20-39, fair 40-59, good, 60-79, and excellent 80-100. Below are the tree stress indicators considered during the inventory to determine the condition of the trees:

- Chlorosis: yellowing of leaf tissue can be a sign of nutrient deficiencies.
- Dieback: dying branches may be an indicator of an unhealthy and/or declining tree, potential indication of EAB.
- Gnarly-ness: unsightly, twisted, and gnarled branches and tree trunks can indicate disease and reduce aesthetic value of the tree.
- Root issues: stem girdling roots (i.e. growing out of the soil and wrapping around the tree) or damaged roots may indicate, or lead to, future health issues.
- Wounds: poorly-callused wounds, or wounds misguidedly treated with sealant, may indicate reduced structural integrity of the tree.

Recommended Actions - Should the tree be treated, removed, or do nothing.

Comments- Any additional comments relevant to the tree inventory or future management and maintenance.

Results & Recommendations

1. Survey results & recommended management actions

At the time of this publication, EAB has not yet been reported in the Town of Rib Mountain (Marathon County), but is confirmed in the adjacent counties of Portage and Wood. It should be assumed that EAB will be detected soon in Marathon County, and take preparations accordingly.

The inventory found 85 ash trees in the Town of Rib Mountain the street right of ways, parks, and municipal land. Ash trees ranged in size from 0.25 - 23.7 inch DBH, with an average DBH of 8.7 inches (Figure 3).

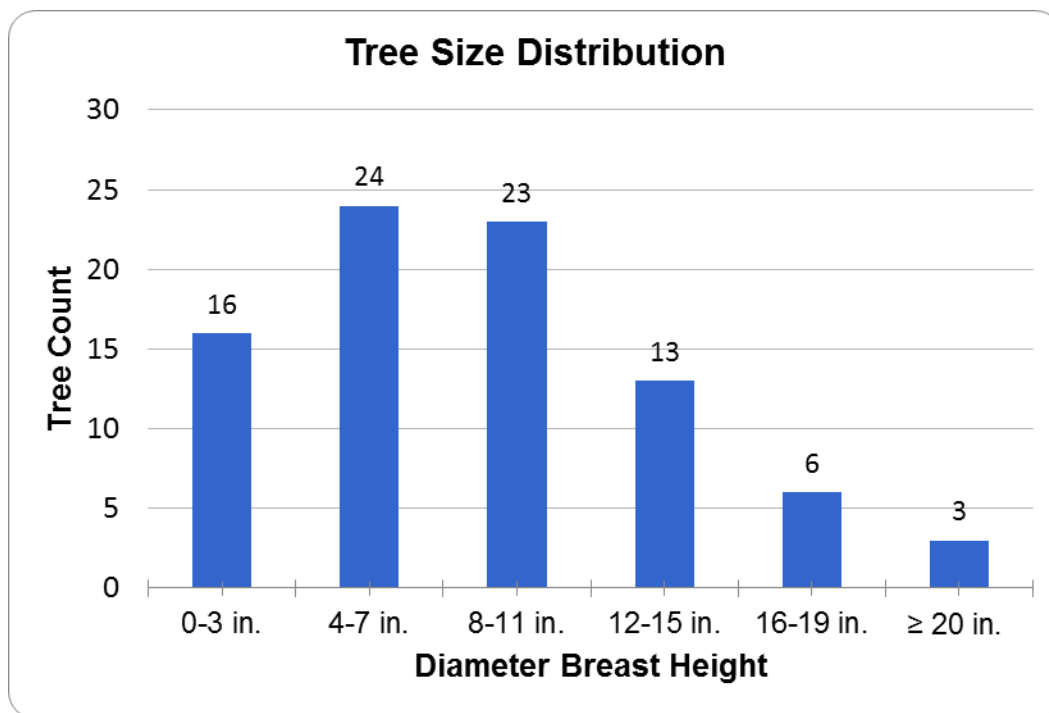


Figure 3. Ash tree trunk size distribution

Rib Mountains ash population is healthy with majority of the trees scored as good or excellent (Figure 4). The overall condition of the urban ash tree population is an average of about 70.3%. The tree with the lowest conditions score is tree 001, located at the Public works building. Tree

001 is showing symptoms of EAB: crown dieback and epicormic sprouts, and should be

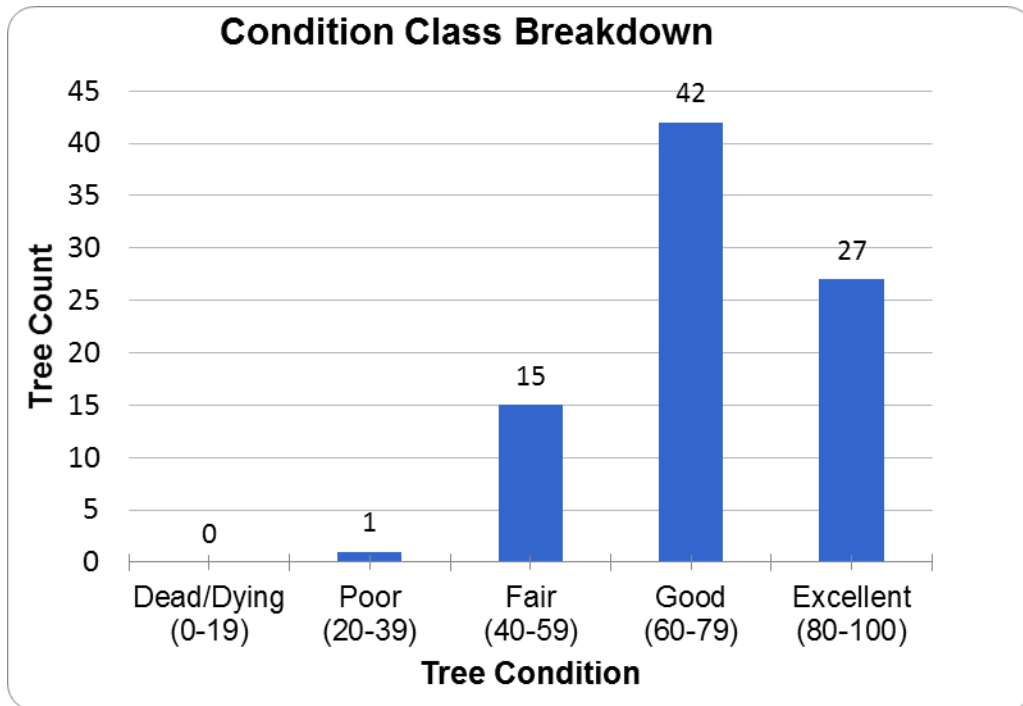


Figure 4. Condition class distribution of ash checked to see if the tree is declining from an EAB infestation or other causes.

All of the tree data collected during the inventory process can be seen in Tables 1, 2, and 3 on the following pages. GPS files of tree locations are being provided. Please note that the **GPS points should be used for guidance to the general location only**. Use species identification characteristics, DBH, and condition class data to confirm it is the target tree *before* taking management action.

Table 1. Municipal Parks and Buildings

Tree Number	Location	Common Name	DBH (inch)	Condition %	Recommended Actions	Comments
001	Public Works Building	Green Ash	6.6	20	remove	showing signs of stress, evaluate for EAB
002	Public Works Building	Green Ash	7.5	75	treat	no signs of stress
003	Public Works Building	White Ash	6.5	80	treat	good looking tree
004	Public Works Building	White Ash	5.2	70	treat	root/trunk issues
005	Public Works Building	White Ash	4.5	70	treat	root/trunk issues
006	Liberty Park	Green Ash	14.1	85	treat	great looking tree
007	Liberty Park	Green Ash	5.3	40	remove	tree looks stressed, in decline
008	Liberty Park	Green Ash	7.9	75	treat	good looking tree
009	Municipal Center	Black Ash	8.7	70	treat/remove	deadwood and trunk issues
010	Municipal Center	Black Ash	9	75	treat/remove	good looking tree
011	Municipal Center	Black Ash	7.2	75	treat/remove	good looking tree
012	Municipal Center	Black Ash	6.5	55	remove/nothing	canopy looks thin
013	Municipal Center	Black Ash	6.5	55	remove/nothing	canopy looks thin

Table 2. Ash Street Trees

Tree Number	Location	Common Name	DBH (inch)	Condition %	Recommended Actions	Comments
1	6709 NorthMountain Rd	Green Ash	16.6	85	treat	back yard by farm field
2	2005 Redwing Rd	Green Ash	16.1	80	remove	corner of yard
3	6005 Whippoorwill Rd	White Ash	1.3	75	remove/nothing	wild area
4	6005 Whippoorwill Rd	White Ash	2.2	75	remove/nothing	wild area
5	6304 Whippoorwill Rd	White Ash	0.25	55	remove/nothing	mowed area
6	6304 Whippoorwill Rd	White Ash	0.25	55	remove/nothing	mowed area
7	6304 Whippoorwill Rd	White Ash	1.3	55	remove/nothing	mowed area
8	6304 Whippoorwill Rd	White Ash	1.1	55	remove/nothing	mowed area
9	6304 Whippoorwill Rd	White Ash	0.5	55	remove/nothing	mowed area
10	6304 Whippoorwill Rd	White Ash	0.5	55	remove/nothing	mowed area
11	6304 Whippoorwill Rd	White Ash	0.6	55	remove/nothing	mowed area
12	6304 Whippoorwill Rd	White Ash	1	55	remove/nothing	mowed area
13	3501 North Mountain Rd	White Ash	2.9	75	treat	front yard
14	3501 North Mountain Rd	White Ash	3.3	75	treat	front yard
15	3001 Rib Mountain Way	Green Ash	15.3	75	treat	by mailbox
16	3001 Rib Mountain Way	Green Ash	14.8	75	treat	corner of yard
17	3000 Mountain Ct	Green Ash	11.4	80	treat	
18	3006 Mountain Ct	Green Ash	9.5	70	treat	culdesac circle
19	3006 Mountain Ct	Green Ash	10.4	70	treat	culdesac circle
20	2905 Mountain Ln	White Ash	4.3	50	remove	edge of yard, outgrown
21	2905 Mountain Ln	White Ash	3.8	50	remove	edge of yard, outgrown
22	2607 Nightengale Ln	White Ash	6.8	65	remove	edge of yard, outgrown
23	3101 Hummingbird Rd	White Ash	10.5	80	remove	by highway off hummingbird
24	4359 Hummingbird Rd	White Ash	11.3	75	remove	by highway off hummingbird
25	4459 Hummingbird Rd	White Ash	8.8	75	remove	by highway off hummingbird
26	1602 Daffodil Ln	White Ash	4.2	65	remove	leans over road
27	1802 Daffodil Ln	White Ash	7.2	75	remove	
28	1804 Daffodil Ln	White Ash	11.7	70	remove	leans over road
29	5153 Hummingbird Ln	Green Ash	23.7	85	treat	freeway off-ramp
30	1606 Park Rd	Green Ash	17.4	80	treat	large tree, action required
31	2305 Lilly Ln	Green Ash	18.9	80	remove	
32	2503 Lilly Ln	White Ash	11.8	80	treat	front yard
33	2503 Lilly Ln	Green Ash	12.4	75	treat	front yard
34	2503 Lilly Ln	White Ash	10.2	75	remove	wild area
35	2503 Lilly Ln	White Ash	11.8	75	remove	wild area
36	1606 Fern Ln	Green Ash	16.4	80	remove	
37	7301 Mosinee Tower Rd	White Ash	3.9	70	remove/nothing	Wooded area with lots of ash
38	7301 Mosinee Tower Rd	White Ash	15.8	70	remove	Wooded area with lots of ash
39	7301 Mosinee Tower Rd	White Ash	14.2	70	remove	Wooded area with lots of ash
40	5905 Bittersweet Rd	Green Ash	21.1	85	treat	Nice, big tree
41	8304 Wintergreen Rd	White Ash	7.5	70	remove	in wooded area
42	8304 Wintergreen Rd	White Ash	5.8	70	remove	in wooded area
43	8104 Buttercup Rd	Green Ash	11.1	80	remove	in wooded area
44	4505 Thornapple Rd	White Ash	5.5	80	remove	edge of farm field
45	4505 Thornapple Rd	Green Ash	12.2	80	remove	edge of farm field
46	5607 Blackberry Dr	White Ash	1.2	70	nothing	in wooded area
47	7004 Goldenrod Ct	White Ash	10.3	70	nothing	in wooded area
48	7004 Goldenrod Ct	White Ash	4.2	80	nothing	in wooded area

Table 2. Street trees continued

Tree Number	Location	Common Name	DBH (inch)	Condition %	Recommended Actions	Comments
49	Rib Mountain Rd and HWY 29	Green Ash	12.8	75	treat	
50	Rib Mountain Rd and HWY 29	Green Ash	10.6	55	remove	
51	Rib Mountain Rd and HWY 29	Green Ash	14.2	65	remove	
52	Rib Mountain Rd and HWY 29	Green Ash	18.5	80	treat	
53	4602 Swan Ave	Green Ash	3.2	80	treat	small tree, easy to remove
54	4602 Swan Ave	Green Ash	6	80	treat	
55	4602 Swan Ave	Green Ash	6.3	80	treat	
56	4502 Swan Ave	Green Ash	9.8	80	treat	pruning needed
57	4502 Swan Ave	Green Ash	9.6	70	treat	trunk wound
58	4502 Swan Ave	Green Ash	12.1	80	treat	pruning needed
59	4502 Swan Ave	Green Ash	9.6	80	treat	pruning needed
60	4502 Swan Ave	Green Ash	12.2	80	treat	pruning needed
61	4502 Swan Ave	Green Ash	12.4	70	treat	large wound of trunk

Table 3. Municipal right of ways

Tree Number	Location	Common Name	DBH (inch)	Condition %	Recommended Actions	Comments
A	Thornapple ROW	White Ash	9.1	75	nothing	West of ROW - wild area
B	Thornapple ROW	White Ash	9.3	75	nothing	West of ROW - wild area
C	Thornapple ROW	White Ash	5.7	75	nothing	West of ROW - wild area
D	Thornapple ROW	Green Ash	21.1	85	nothing	West of ROW - wild area
E	Thornapple ROW	Green Ash	7.2	80	treat	end of driveway
F	Thornapple ROW	Green Ash	14.9	80	treat	end of driveway
G	Thornapple ROW	White Ash	11.4	75	nothing	West of ROW - wild area
H	Thornapple ROW	White Ash	8	75	nothing	West of ROW - wild area
I	Thornapple ROW	White Ash	4.4	75	nothing	West of ROW - wild area
J	Tulip ROW	White Ash	11	55	nothing	wooded area
K	Tulip ROW	White Ash	6.2	70	nothing	wooded area

A total of 85 ash trees were found throughout Rib Mountain’s streets, parks, municipal buildings, and municipal right of ways. White, Green, and Black ash were all found in the inventory.

Figures 5-10 on the following pages show detailed images of the ash inventory tree locations.

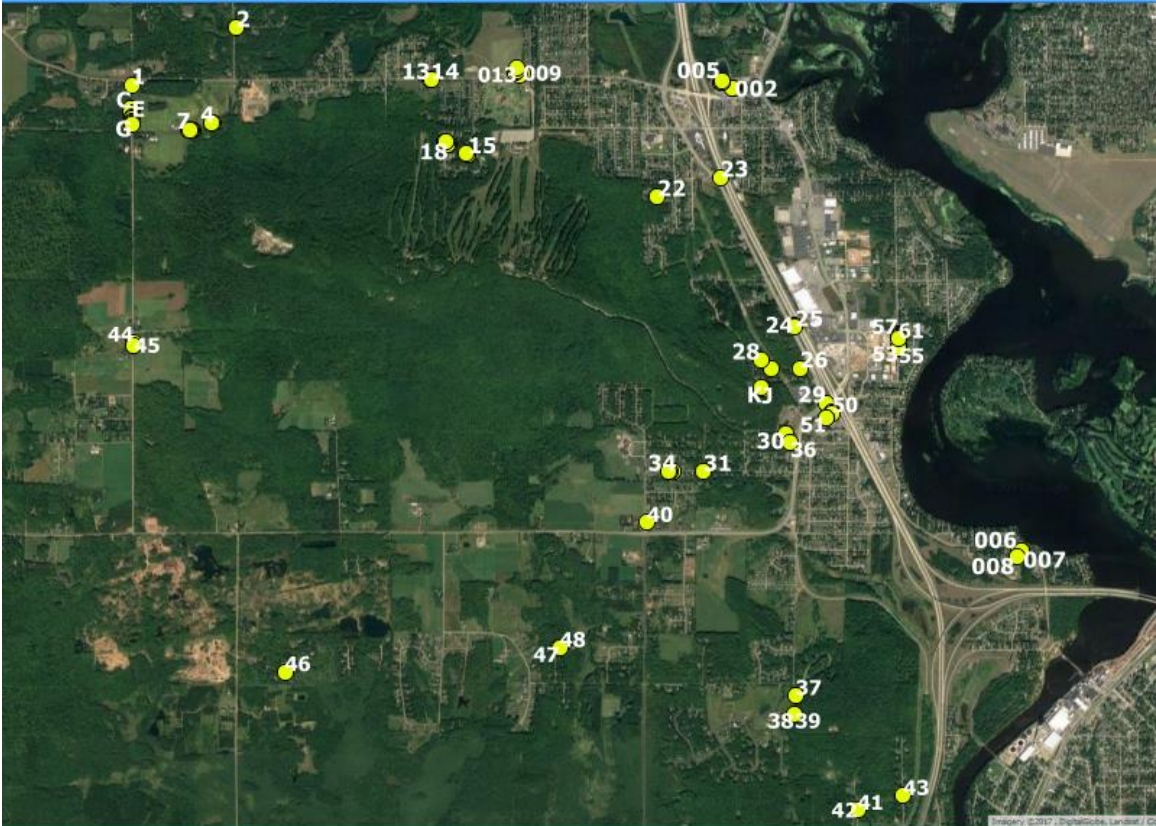


Figure 5. Rib Mountain overview map of all ash inventory tree locations.



Figure 6. Rib Mountain Public Works Building



Figure 7. Ash tree locations at Liberty Park



Figure 8. Thornapple St. right of way



Figure 9. Black ash locations at the Municipal Center



Figure 10. Ash street trees on Swan Ave.

In the recommendation sections following, we discuss the pro's and con's of various management options (removal, treatment, replanting). It is important to keep in mind both the costs of the management action AND the cost of lost benefits from removing a large, mature tree. To illustrate this, we input the Town of Rib Mountain ash inventory data into a 20-year simulation program (UWSP's EAB-PLANS©), which takes both costs and benefits into account (Table 4).

Table 4. Benefits/Costs analysis of management options. A benefits/cost ratio of 1.0 or more would provide more benefits than costs. Values closer to zero indicate more benefits lost.

Scenarios	Benefit Cost Ration
No Control	0.81
Preemptive Removal	0.51
Removal and Replant	0.53
Treatment	1.75
No EAB	3.37

'No Control' = a wait and see approach
 'Treatment' = treat and preserve all ash trees
 'Preemptive Removal' = remove all right away, no replanting
 'Preemptive Removal & Replacement' = remove all right away, replant
 'No EAB' = EAB does not arrive in the Town of Rib Mountain (unlikely).

The results of the analysis show that although there is a cost to treating all the trees, treating provides the most retained benefits, whereas preemptive removal & replanting provides more benefits than not replanting at all, but it takes 20 years to start recapturing the lost benefits (Figure 11). Benefits provided by trees include storm water retention, wildlife habitat, increased property value, shade and lower energy costs, and aesthetic value.

For most communities, the most beneficial course of action is a strategically integrated approach that includes some treatment, some preemptive removal, and replanting where it makes sense. Additional pro's and con's of various management options are discussed in following sections.

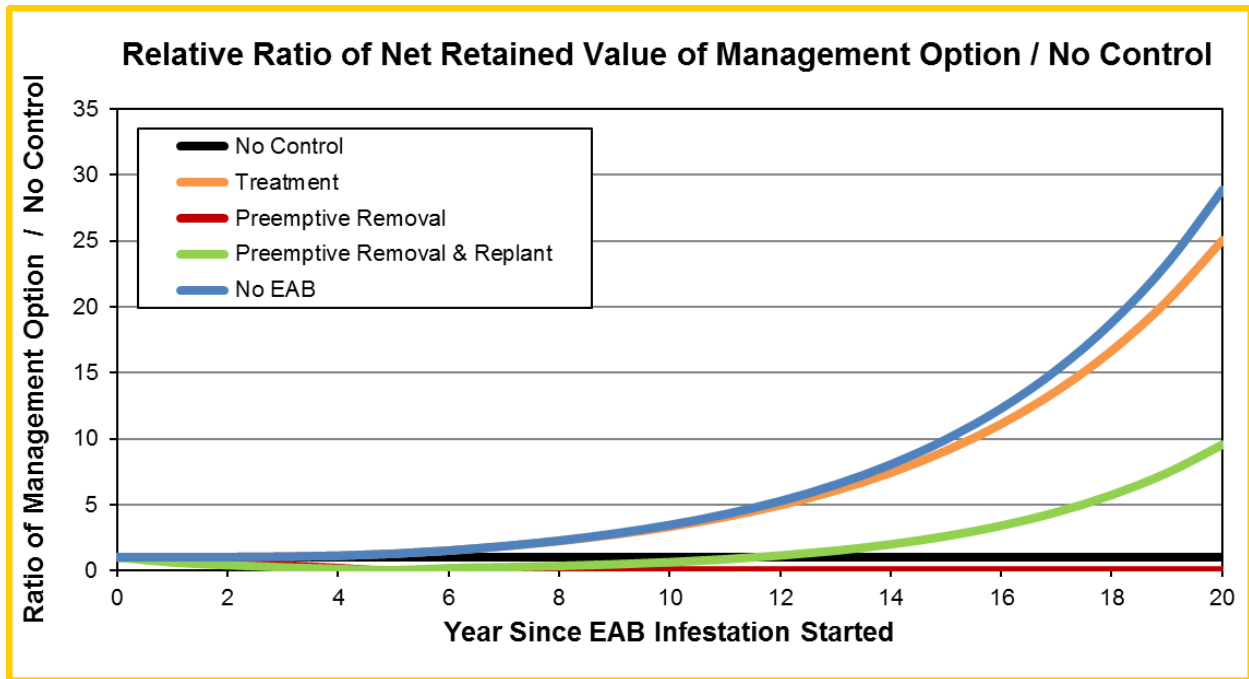


Figure 11. Relative Ratio of Retained Value, as provided by the EAB-PLANS 20-year timeframe analysis.

2. Recommended management & budgeting

Municipality capacity - Rib Mountain has a forestry department that has the equipment to handle non-hazardous tree work in-house. Hazardous tree work would include removals near utility lines or removals that involve technical rigging. Removals with such obstructions would need to be contracted. In-house capacity for insecticide treatments would be limited to soil drench treatments, applicable to trees <15" DBH. Trunk injection treatments for trees >15" DBH would be contracted out. The 2018 city budget will include costs associated with EAB

Table 6 shows estimated costs for treatment over five years. Costs NOT calculated include the lost benefits of trees removed. Management recommendations and scheduling take into consideration the location of the ash tree, current condition class, size, and vacancy. Since EAB is nearby, we are assuming EAB-affected trees will become evident in 2017 or soon thereafter. EAB management should be implemented as soon as possible. Additionally, because there are street trees and public parks that have numerous ash, we have taken into

consideration that messy removal activities will be visible to the public. Therefore, we have spaced out removals over multiple years. It is recommended that some of the more visible trees be preserved with treatment for now, to delay further management actions (and costs) until removal activities are out of the way. This will help to both reduce public outcry and spread out labor and costs over multiple years. Estimated cost of in-house soil drench - \$15 per tree 5 inch

Table 6. Estimated costs of treatment

Tree Number	Location	Common Name	DBH (inch)	Condition %	Recommended Actions	2018 Cost	2019 Cost	2020 Cost	2021 Cost	2022 Cost
1	6709 NorthMountain Rd	Green Ash	16.6	85	treat - trunk injection	\$166			\$168	
13	3501 North Mountain Rd	White Ash	2.9	75	treat - soil drench	\$15	\$15	\$15	\$15	\$15
14	3501 North Mountain Rd	White Ash	3.3	75	treat - soil drench	\$15	\$15	\$15	\$15	\$15
15	3001 Rib Mountain Way	Green Ash	15.3	75	treat - trunk injection	\$153			\$155	
16	3001 Rib Mountain Way	Green Ash	14.8	75	treat - trunk injection	\$158			\$150	
17	3000 Mountain Ct	Green Ash	11.4	80	treat - soil drench	\$30	\$30	\$30	\$30	\$30
18	3006 Mountain Ct	Green Ash	9.5	70	treat - soil drench	\$30	\$30	\$30	\$30	\$30
19	3006 Mountain Ct	Green Ash	10.4	70	treat - soil drench	\$30	\$30	\$30	\$30	\$30
29	5153 Hummingbird Ln	Green Ash	23.7	85	treat - trunk injection	\$237			\$239	
30	1606 Park Rd	Green Ash	17.4	80	treat - trunk injection	\$174			\$176	
32	2503 Lilly Ln	White Ash	11.8	80	treat - soil drench	\$30	\$30	\$30	\$30	\$30
33	2503 Lilly Ln	Green Ash	12.4	75	treat - soil drench	\$30	\$30	\$30	\$30	\$30
40	5905 Bittersweet Rd	Green Ash	21.1	85	treat - trunk injection	\$211			\$213	
54	4602 Swan Ave	Green Ash	6	80	treat - soil drench	\$30	\$30	\$30	\$30	\$30
55	4602 Swan Ave	Green Ash	6.3	80	treat - soil drench	\$30	\$30	\$30	\$30	\$30
56	4502 Swan Ave	Green Ash	9.8	80	treat - soil drench	\$30	\$30	\$30	\$30	\$30
57	4502 Swan Ave	Green Ash	9.6	70	treat - soil drench	\$30	\$30	\$30	\$30	\$30
58	4502 Swan Ave	Green Ash	12.1	80	treat - soil drench	\$30	\$30	\$30	\$30	\$30
59	4502 Swan Ave	Green Ash	9.6	80	treat - soil drench	\$30	\$30	\$30	\$30	\$30
60	4502 Swan Ave	Green Ash	12.2	80	treat - soil drench	\$30	\$30	\$30	\$30	\$30
61	4502 Swan Ave	Green Ash	12.4	70	treat - soil drench	\$30	\$30	\$30	\$30	\$30
002	Public Works Building	Green Ash	7.5	75	treat - soil drench	\$30	\$30	\$30	\$30	\$30
004	Public Works Building	White Ash	5.2	70	treat - soil drench	\$30	\$30	\$30	\$30	\$30
53	4602 Swan Ave	Green Ash	3.2	80	treat - soil drench	\$15	\$15	\$15	\$15	\$15
003	Public Works Building	White Ash	6.5	80	treat - soil drench	\$30	\$30	\$30	\$30	\$30
005	Public Works Building	White Ash	4.5	70	treat - soil drench	\$15	\$15	\$15	\$15	\$15
006	Liberty Park	Green Ash	14.1	85	treat - soil drench	\$30	\$30	\$30	\$30	\$30
008	Liberty Park	Green Ash	7.9	75	treat - soil drench	\$30	\$30	\$30	\$30	\$30
49	Rib Mountain Rd and HWY 29	Green Ash	12.8	75	treat - soil drench	\$30	\$30	\$30	\$30	\$30
52	Rib Mountain Rd and HWY 29	Green Ash	18.5	80	treat - trunk injection	\$185			\$187	
009	Municipal Center	Black Ash	8.7	70	treat - soil drench	\$30	\$30	\$30	\$30	\$30
010	Municipal Center	Black Ash	9	75	treat - soil drench	\$30	\$30	\$30	\$30	\$30
011	Municipal Center	Black Ash	7.2	75	treat - soil drench	\$30	\$30	\$30	\$30	\$30
E	Thornapple ROW	Green Ash	7.2	80	treat - soil drench	\$30	\$30	\$30	\$30	\$30
F	Thornapple ROW	Green Ash	14.9	80	treat - trunk injection	\$149			\$151	
					Annual Cost	\$2,183	\$750	\$750	\$2,189	\$750
					Total Cost	\$6,622				

DBH or less, \$30 per tree 6 inch DBH or greater. Estimated cost for professional trunk injection - \$10 per in. DBH.

It is recommended that Rib Mountain implement this plan as scheduled, in order to help spread out costs to work within their limited budget capacity. For the 5-year plan laid out above, the estimated costs total to \$6,662, with 35 ash trees surviving. Treating trees comes with a cost, unfortunately not treating them will as well.

Many of the trees not being treated are recommended for removal, there are 41 trees recommended for removal throughout Rib Mountain (Table 7). Tree removal costs can range from 15 to 25 dollars per diameter inch, lets call its \$20 per diameter inch to simplify the cost estimates. Removing all 41 trees will cost roughly \$6,032 over the 5 years. A set amount of trees should be removed each year based on budgeting, 2018 and 2021 have the lowest removal costs due to the high costs of trunk injections those years. Trees that are under 6 in DBH have the option to do nothing rather than remove, trees that small will not pose a safety

Table 7. Estimated cost for ash removals

Tree Number	Location	Common Name	DBH (inch)	Condition %	Recommended Actions	2018 cost	2019 cost	2020 cost	2021 cost	2022 cost
2	2005 Redwing Rd	Green Ash	16.1	80	remove	\$ 322				
20	2905 Mountain Ln	White Ash	4.3	50	remove	\$ 86				
21	2905 Mountain Ln	White Ash	3.8	50	remove	\$ 76				
22	2607 Nightengale Ln	White Ash	6.8	65	remove	\$ 136				
26	1602 Daffodil Ln	White Ash	4.2	65	remove	\$ 84				
50	Rib Mountain Rd and HWY 29	Green Ash	10.6	55	remove		\$ 212			
51	Rib Mountain Rd and HWY 29	Green Ash	14.2	65	remove		\$ 284			
27	1802 Daffodil Ln	White Ash	7.2	75	remove		\$ 144			
28	1804 Daffodil Ln	White Ash	11.7	70	remove		\$ 234			
31	2305 Lilly Ln	Green Ash	18.9	80	remove		\$ 378			
34	2503 Lilly Ln	White Ash	10.2	75	remove		\$ 204			
35	2503 Lilly Ln	White Ash	11.8	75	remove			\$ 236		
36	1606 Fern Ln	Green Ash	16.4	80	remove			\$ 328		
3	6005 Whippoorwill Rd	White Ash	1.3	75	remove/nothing			\$ 26		
4	6005 Whippoorwill Rd	White Ash	2.2	75	remove/nothing			\$ 44		
5	6304 Whippoorwill Rd	White Ash	0.25	55	remove/nothing			\$ 5		
6	6304 Whippoorwill Rd	White Ash	0.25	55	remove/nothing			\$ 5		
7	6304 Whippoorwill Rd	White Ash	1.3	55	remove/nothing			\$ 26		
8	6304 Whippoorwill Rd	White Ash	1.1	55	remove/nothing			\$ 22		
9	6304 Whippoorwill Rd	White Ash	0.5	55	remove/nothing			\$ 10		
10	6304 Whippoorwill Rd	White Ash	0.5	55	remove/nothing			\$ 10		
11	6304 Whippoorwill Rd	White Ash	0.6	55	remove/nothing			\$ 12		
12	6304 Whippoorwill Rd	White Ash	1	55	remove/nothing			\$ 20		
23	3101 Hummingbird Rd	White Ash	10.5	80	remove			\$ 210		
24	4359 Hummingbird Rd	White Ash	11.3	75	remove			\$ 226		
25	4459 Hummingbird Rd	White Ash	8.8	75	remove			\$ 176		
37	7301 Mosinee Tower Rd	White Ash	3.9	70	remove/nothing			\$ 78		
38	7301 Mosinee Tower Rd	White Ash	15.8	70	remove				\$ 316	
39	7301 Mosinee Tower Rd	White Ash	14.2	70	remove				\$ 284	
41	8304 Wintergreen Rd	White Ash	7.5	70	remove				\$ 150	
42	8304 Wintergreen Rd	White Ash	5.8	70	remove				\$ 116	
43	8104 Buttercup Rd	Green Ash	11.1	80	remove					\$ 222
44	4505 Thornapple Rd	White Ash	5.5	80	remove					\$ 110
45	4505 Thornapple Rd	Green Ash	12.2	80	remove					\$ 244
007	Liberty Park	Green Ash	5.3	40	remove					\$ 106
001	Public Works Building	Green Ash	6.6	20	remove					\$ 132
012	Municipal Center	Black Ash	6.5	55	remove/nothing					\$ 130
013	Municipal Center	Black Ash	6.5	55	remove/nothing					\$ 130
009	Municipal Center	Black Ash	8.7	70	treat/remove					\$ 174
010	Municipal Center	Black Ash	9	75	treat/remove					\$ 180
011	Municipal Center	Black Ash	7.2	75	treat/remove					\$ 144
Annual Costs						\$ 704	\$ 1,456	\$ 1,434	\$ 866	\$ 1,572
Total Cost						\$ 6,032				

risk when they eventually die.

The final management action and budgeting item is replanting. Ash trees that are removed should be replanted with a new species whenever there is an appropriate situation. Trees removed in heavily wooded areas don't need replacement. There are 9 trees marked for

Table 8. Ash removals that should be replanted

Tree Number	Location	Common Name	DBH (inch)	Condition %	Recommended Actions	2018 cost	2019 cost	2020 cost	2021 cost	2022 cost
23	3101 Hummingbird Rd	White Ash	10.5	80	remove/nothing	\$350				
24	4359 Hummingbird Rd	White Ash	11.3	75	remove/nothing		\$350			
25	4459 Hummingbird Rd	White Ash	8.8	75	remove/nothing		\$350			
50	Rib Mountain Rd and HWY 29	Green Ash	10.6	55	remove		\$350			
51	Rib Mountain Rd and HWY 29	Green Ash	14.2	65	remove			\$350		
007	Liberty Park	Green Ash	5.3	40	remove			\$350		
001	Public Works Building	Green Ash	6.6	20	remove				\$350	
012	Municipal Center	Black Ash	6.5	55	remove/nothing					\$350
013	Municipal Center	Black Ash	6.5	55	remove/nothing					\$350
Annual Cost						\$350	\$1,050	\$700	\$350	\$700
Total Cost						\$3,150				

removal that are in appropriate sites for replanting (Table 8). Trees can be planted throughout the 5 years based on budget space. Professional replacement (tree stock plus planting labor) can run \$315 - \$432, depending on the size and species planted.

Table 9 shows the yearly estimated costs for the Village of Rib Mountain associated with the Emerald Ash borer. Treatment and removal costs vary year to year, the total cost for treatment and removal for the 5 year plan is \$15,804.

Table 9. Cost estimate summary

	2018 Cost	2019 Cost	2020 Cost	2021 Cost	2022 Cost
Treatment	\$ 2,183	\$ 750	\$ 750	\$ 2,189	\$ 750
Removal	\$ 704	\$ 1,456	\$ 1,434	\$ 866	\$ 1,572
Replanting	\$ 350	\$ 1,050	\$ 700	\$ 350	\$ 700
Annual Cost	\$ 3,237	\$ 3,256	\$ 2,884	\$ 3,405	\$ 3,022
Total Cost	\$ 15,804				

3. Removal, Replanting, and Treatment - weighing the pro's and con's

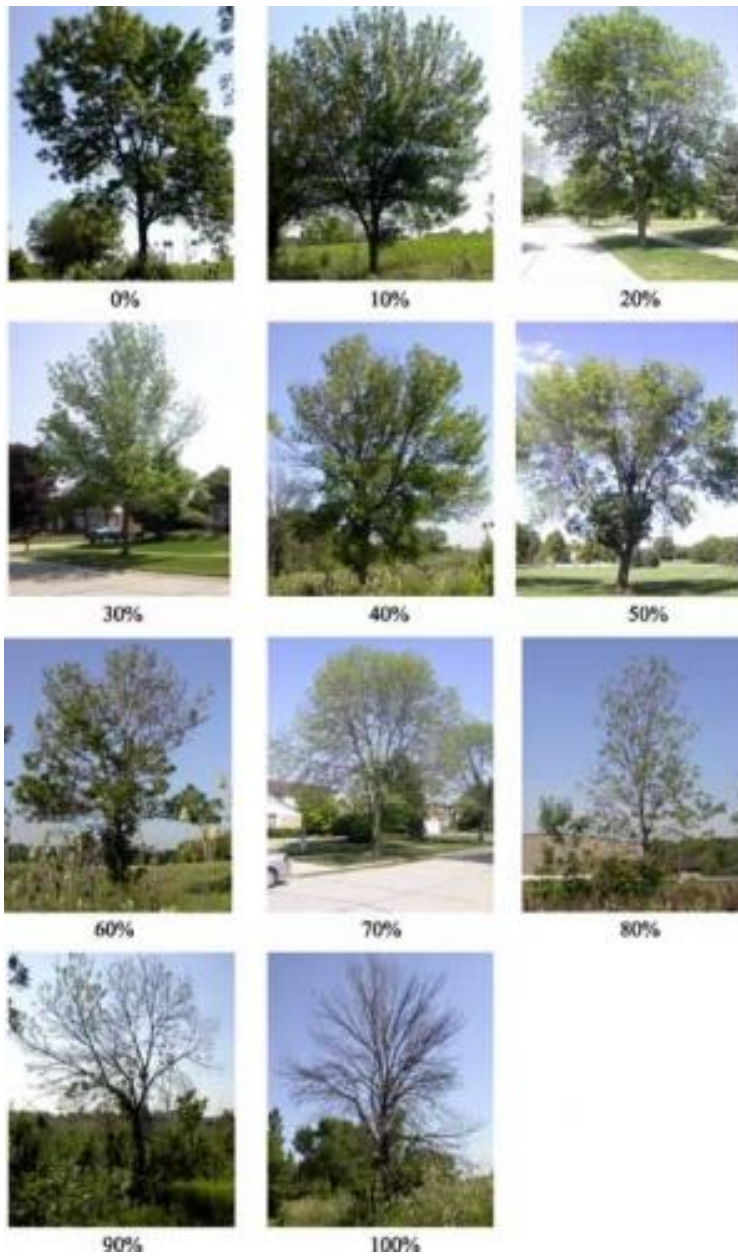
The decision to remove or preserve a mature tree may be more complicated than it seems. While considering various options, keep in mind that tree canopy can benefit the community because the trees provide aesthetics, increase property values, mitigate air pollution, hold stormwater, provide shade, and reduce energy costs. Strategically-placed shade trees can cut cooling costs by 30%. Communities already hit by EAB have seen water usage increase significantly due to increased watering of hot, sun-baked lawns. When you remove a tree, you lose *all* of the benefits it was providing.

When a new tree is planted, it can take about 30 to 40 years to recover the benefits of a mature tree with a full canopy. When planting saplings, an urban setting is often a difficult site to have a successful new planting, due to poor soil, road salt, vandalism, snow plow damage, and root restrictions. Saplings may need to be replanted several times before one is successful. It may be less costly overall for a municipality to preserve the existing mature tree through chemical treatment.

When deciding on protecting ash trees with insecticide treatments, remember that it is a long-term commitment. With EAB here to stay, it is likened to keeping a tree “on life support”, but insecticide treatment can be a cost-effective way to delay more costly removal activities; professional trunk injected treatments only need to be done every 2 or 3 years and several inexpensive insecticide products are available to homeowners.

However, not all ash trees are worth treating with insecticides. Based on current research, treatments are suggested only for ash trees located within 15 miles of a confirmed EAB site, or for trees located within a quarantined area. Insecticide treatments may not be necessary for ash trees located outside of these areas.

Even within the 15-mile radius, not all trees should be treated. Tree location, size, condition, and value, as well as the cost of treatment are all factors to consider. Trees located in a heavily wooded natural area may not be as valuable as a highly visible street tree or a valuable shade tree next to a building. In addition, consider the health of each tree before treating. It is recommended that only trees with 30% canopy dieback or less be treated and saved. Trees with greater than 30% canopy dieback should be removed and disposed of in accordance with established guidelines. All trees recommended for treatment, as presented in table 6, have less than 30% canopy dieback. See comparison photos below for helpful examples



Photos: www.msue.anr.msu.edu

4. Insecticide Treatment Options

Information from this section was collected from the UW-Extension webpage on EAB treatment. For more information visit: www.goldensandsrccd.org for links to this and other helpful resources.

a) Homeowner (non-professional) EAB treatment options

Insecticide products available for use by homeowners (no licensed required) are summarized in Table 6. These homeowner insecticides are for trees < 15 in DBH.

Table 6. Source: UW-Extension.

<i>Emerald ash borer insecticide treatments available to homeowners</i>			
<i>Product</i>	<i>Active Ingredient</i>	<i>Timing</i>	<i>Type of application</i>
<i>Bayer Advanced Tree & Shrub Insect Control (D) Bayer Advanced Tree & Shrub Protect & Feed (D or G) Bonide Annual Tree & Shrub Insect Control (D) Ferti-lome Tree & Shrub Systemic Drench (D) Optrol (D)</i>	<i>Imidacloprid</i>	<i>Mid-April to mid-May and/or early-Sept. to mid-Oct.</i>	<i>Soil Drench (D) or Granular (G)</i>
<i>Bayer Advanced Garden Tree & Shrub Protect & Feed II (D or G)</i>	<i>Imidacloprid + Clothianidin</i>	<i>Mid-April to mid-May and/or early-Sept. to mid-Oct</i>	<i>Soil Drench (D) or Granular (G)</i>
<i>Ortho Tree & Shrub Insect Control (G)</i>	<i>Dinotefuran</i>	<i>Mid-May to mid-June</i>	<i>Granular (G)</i>
<i>ACECAP 97 Systemic Insecticide Tree Implants</i>	<i>Acephate</i>	<i>Mid-May to mid-June</i>	<i>Trunk Implant</i>

(D) = Soil Drench Application Type

(G) = Granular Application Type

Trees < 15 inches DBH (diameter at breast height) can be well protected with soil drenches and granular products. Trees > 15 inches DBH can be treated with trunk implants, however, best results for large trees is available through professional help.

The Bayer Advanced Products, Bonide Annual Tree and Shrub Insect Control, Ferti-lome Tree and Shrub Systemic Drench, and Optrol are systemic insecticides applied as soil drenches around the base of an ash tree in mid-April to late-May and/or early-September to mid-October.

Two of the Bayer Advanced Products (Tree and Shrub Protect and Feed, Tree and Shrub Protect and Feed II) and Ortho Tree and Shrub Insect Control are available in granular formulations. Be aware that many insecticide products available at hardware stores and garden centers look similar. Carefully check all product labels before purchase to make sure to select the correct product/active ingredient. Consult a professional with questions and **ALWAYS** read and follow the label directions.

University research indicates that soil applications of imidacloprid provide excellent EAB protection for small ash trees less than about 6 inches DBH in the first year *following* treatment. Thus, treatment should begin **before** the tree becomes infested.

Trunk implants are effective almost immediately, but a tree that is 50% declined or more cannot be saved, and it is recommended that only trees at 30% or less decline are worth treating. Spring treatments (April 1st - May 15th) are most effective. Although ACECAP 97 Systemic Insecticide Tree Implants are available to homeowners, they are **not suggested** for use by non-professionals because they require physically drilling into a tree during their application. Regardless of homeowner having a drill, if you do not have professional training in EAB treatment and application then you could injure or kill the tree.

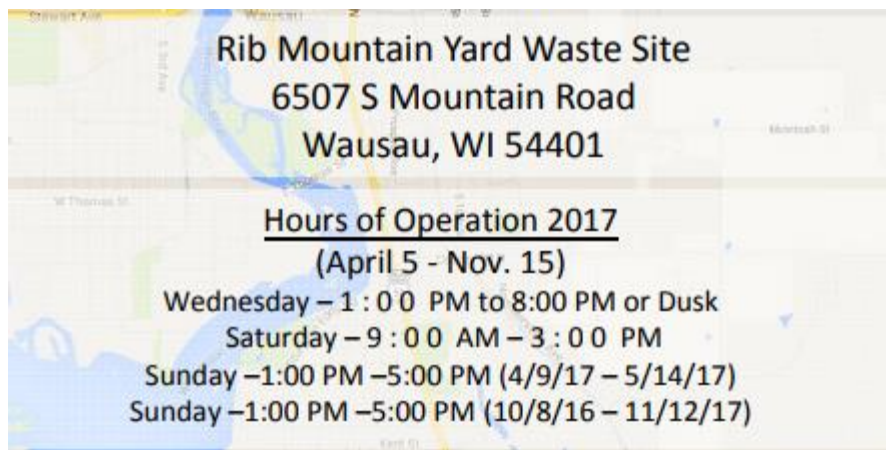
b) Professional EAB Treatment Options

Homeowners and municipalities may also contact a certified arborist or certified pesticide applicator to treat their trees. See <http://www.waa-isa.org> for a list of certified arborists in Wisconsin. Professionals have access to some products that are not

available to homeowners. Professionally applied trunk injections are effective almost immediately, but trees with 50% dieback or more cannot be saved, and it is recommended that only trees at 30% or less dieback be treated. Professional injections must be reapplied every 3 years.

The University of Wisconsin does not endorse commercially available insecticide products over those available directly to homeowners. Products discussed have been evaluated in a variety of Michigan State University research tests on EAB.

5. Disposal



The Town of Rib Mountain Yard Waste Site can be used ash wood disposal for the municipality and community members. Disposal of ash trees infested by EAB should be handled with care. Materials may not be moved to a non-quarantined county, and should not be mixed with other wood waste at the time of removal. Planning for disposal includes the following steps:

- a. Designate a staging area: Select a disposal site where EAB infested materials can be stored until disposal. The site should be supervised or have restricted access, so the public may bring EAB infested materials, but **NOT** remove them (i.e. taking “free wood” from the site). It may be a restricted waste site where only municipal employees have access, or may be a public waste site open during designated hours when a municipal worker is on-site.

- b. Sort materials: Designate areas for materials of certain sizes, as needed for removal and disposal. For example, size categories required by Zblewski Brothers, LLC are: brush, wood, stumps.
- c. Disposal and utilization:
 - i. The Wisconsin DNR has a urban wood users directory where you can search for wood utilization and wood users by county.
<http://dnr.wi.gov/topic/forestbusinesses/utilization.html>
 - ii. Wood chips for landscaping - It is allowable under quarantine regulations to use ash wood chips for landscaping purposes within the municipality. [To be compliant with quarantine regulations, a review and compliance agreement is needed for the machinery (chipper/tub grinder). See section 8. Quarantine for DATCP contact.] The municipality may chip materials and use them in municipal plantings. The general public should not be allowed to take wood chips, as it cannot be controlled where they end up using them.
 - iii. Saw logs - Ash is a valued wood for making furniture and other wood crafts. Sorting the logs from larger diameter trees for this purpose may be an alternative to chipping them. Wood workers with portable sawmills may be able to come on site, mill the wood, and haul it away. Some may do it simply as a service, some may be willing to pay for the wood. Contacts for portable saw mill operators:
 - i. Sabina Dhungana, DNR, (608) 261-0754, email:
sabina.dhungana@wisconsin.gov
 - ii. Urban Wood Users Directory
<http://dnr.wi.gov/topic/forestbusinesses/utilization.html>

6. Replanting

Urban tree planting should be done with a diverse mix of tree species. A common tree diversity rule of thumb is the 5-10-20 rule: no *species* can be more than 5% total population, no *genus* can be more than 10% total population, no *family* can be more than 20% total tree population. Ash were heavily replanted after dutch elm disease wiped out the elm population in the 70's. Maples are also currently overplanted in many communities throughout the state, and the Asian longhorn beetle is a new insect affecting maples trees that is spreading towards Wisconsin.

Having a diverse urban forest will help reduce costs and problems associated with tree insect and disease issues.

Knowing what to plant is dependent on knowing your current urban forests composition. Trees should be selected to meet the 5-10-20 rule. If you don't have a tree inventory or know your urban forests composition, here are some trees to consider for replanting: hackberry, ginkgos, tamaracks, oaks, Kentucky coffee tree, catalpa, ironwood, disease-tolerant elm varieties, and others. Many new varieties of these species have been developed to improve their suitability for urban sites, such as drought resistance, compact shape, salt-resistance, or less-messy fruits and seeds. A good resource to help choose tree species can be found online at:

<http://learningstore.uwex.edu/assets/pdfs/a2865.pdf>

7. Community Awareness

If community members are aware of EAB, there is a better chance of identifying an infestation early and saving some of the ash trees in the community. Additionally, the public will be more accepting of seeing trees that look healthy being cut down, if they understand EAB and the municipality's plan for handling it.

Tree walks (workshops) are an excellent way to both inform and interact with the community to teach them how to identify ash trees from other tree species. Additionally, tree walks can provide information on EAB symptoms and resources, as well as replanting options. Golden Sands RC&D and the Wisconsin Department of Natural Resources are organizations that could help communities get in contact with professionals to do tree walks and may also have brochures and other materials for distribution.

Other avenues for outreach may include:

- Articles in municipality newsletter
- Press release in local newspaper
- Municipal website
- Utility bill stuffers
- Door hangers
- Signage

8. Monitoring

It is recommended that the ash tree population be actively monitored on an annual basis, to detect EAB quickly when the pest arrives, as it will likely mean adjustments to your management timelines.

Monitoring is simply and affordably done by branch sampling of urban ash trees between September and May. This may be your best method for early detection. An actual branch of an ash tree is cut from the tree and the bark is peeled back to see if infested with EAB larva. (See Appendix 3 – EAB Monitoring Tools). Methods can be found at website: <http://cfs.nrcan.gc.ca/pubwarehouse/pdfs/32127.pdf>. For help with identifying ash tree species, see Appendix 1 – Ash Tree Identification.

Sometimes monitoring for EAB activity is conducted with traps and lures that the beetle is attracted to (i.e. EAB purple prism traps). (See Appendix 3 – EAB Monitoring Tools.) The trap has three sticky sides and the EAB eyes are sensitive to the purple color, which lures it in. Traps can be obtained from: <http://dnr.wi.gov/topic/urbanforests/documents/eabtoolbox/eab-synergytrapsandlures.pdf>. While, these traps are being used by state and federal agencies, EAB infestation is most often detected through branch sampling or the observation of heavy woodpecker activity.

Monitoring for symptoms and signs can also be done by visual observation:

(See Appendix 4 – EAB Symptoms and signs for photos of these symptoms and signs.)

- Chlorosis:** The first sign to indicate an EAB infestation is chlorosis. However, this symptom may be misleading, because it can be caused by a variety of tree infestations or diseases. Look for additional symptoms.
- Bark splits:** Vertical splits (2-5 inches long) in bark may indicate a patch of larval tunneling beneath the bark. However, this may be a symptom of other conditions, also, so look for additional symptoms.
- Woodpecker damage:** Heavy damage from woodpeckers on a tree that recently appeared healthy, is often the first visible symptom. This sign is highly visible in the winter, when bark chips littering the snow are easily seen.
- Bark “blonding”:** The appearance of “blonde” patches on the tree trunk is an indicator of woodpecker activity; woodpeckers flake off outer layers of bark, leaving behind the paler inner layer.

- ❑ **Larval tunneling:** Woodpecker damage indicates larval activity under the bark. To look for larvae, peel back the bark and look for S-shaped tunnels, called “galleries”.
- ❑ **D-shaped exiting holes:** Characteristic exiting features created by adult EAB beetles. This is not usually observable at eye-level until the infestation is very advanced and the tree is no longer savable.

If any three EAB indicators are found, whether the bug itself or symptoms on the tree, contact Wisconsin Department of Ag, Trade, and Consumer Protection (DATCP) at:

www.DATCPEmeraldAshBorer@wi.gov

1-800-462-2803

9. Quarantine

Marathon County is **NOT** currently under quarantine, but be aware that Portage and Wood counties have confirmed infestations and are under quarantine. The Department of Agriculture, Trade, and Consumer Protection (DATCP) and the USDA Animal and Plant Health Inspection Service (APHIS) administer the quarantines to a county. When EAB is detected in one municipality, the entire county is quarantined. Quarantines are set to restrict the movement of firewood and other regulated ash products OUT of quarantined areas, thereby reducing the spread of EAB.

Regulated items include ash nursery stock, cut hardwood (non-coniferous) firewood, ash logs, ash mulch or bark fragments larger than one inch in diameter (administrative rule ATCP 21). This would include logs, brush, and wood chips from affected ash trees the municipality removes. When reviewing your disposal options, quarantines must be observed and may affect your options.

If you have quarantine or compliance agreement questions, contact Tim Allen, DATCP, at (608) 516-7196 or timothy.allen@wisconsin.gov

Summary

Management recommendations made here were according to tree location, size, and condition class. For example, trees highly visible to the public that are structurally sound and not conflicting with utilities or site lines should be treated and preserved, whereas trees in less-important areas or lower condition class can be scheduled for removal and replanting. EAB is going to cost Rib Mountain money no matter what and treatment is the most economical option. Any changes to the given recommendations should consider the pro's and con's of each management option, including the lost benefits of a tree when it's removed. Monitoring is strongly recommended, so that if EAB arrives sooner than expected, the municipality can accelerate planned management activities.

Plan checklist:

- Management plan implementation:** Oversee implementation of this plan.
 - Responsible department/position: Public Works Director
- Management activities:** Identify who will do the treatment/removal work. If outside contractors are needed, make arrangements with those entities **well in advance** of needed work.
 - Removals (w/o utilities or structure):** Forestry Department
 - Training needs: none
 - Equipment needs: have chipper, loaders, chainsaws, dump trucks
 - Removals (w/ utilities or structure):** Contracted labor
 - Insecticide treatments (<15" DBH):** Forestry Department
 - Training needs: Read UW-Extension materials, read all label instructions
 - Equipment needs: Soil drench product (available in home improvement stores)
 - Insecticide treatments (>15" DBH):** Contracted labor - see International Society of Arborists website to locate a qualified professional
 - Training needs: In-house if training is available
 - Replanting:** Forestry Department

- Training needs: See www.arboday.org for planting tips
 - Equipment needs: purchase tree stock
 - Replanting smarter: Where trees are removed, consider planting a diversity of species to reduce the risk of losing the majority of the urban tree population to some unforeseen insect or disease situation. (The Wisconsin DNR recommends no more than 20% of any one tree genus e.g. hackberry, oaks, lindens etc. in any municipal forest population.)
- Stump grinding:** included with contracted removals, in-house = use a backhoe
- Budgeting:** Review final list of management actions and identify what costs are expected, where funding will come from in the budget. Solicit cost-sharing/grants to cover shortfalls.
- Responsible department/position: Public Works Director
- Monitoring:** Annually monitor for EAB through branch sampling between Sept - May. First branch sampling will be conducted by 06/01/2018. The responsible party will also continually observe the condition of the ash trees looking for visual symptoms of EAB, such as chlorosis, woodpecker activity, and D-shaped exit holes.
- Responsible department/position: Public Works Department
- Quarantine:** Review quarantine rules. Identify or locate a proper staging/disposal site and wood utilization options.
- Responsible department/position: Public Works Department
- Public outreach:** Create and execute a public outreach plan. Communicate with the public what pro-active steps are being taken to be ready for EAB, and where residents can go for help with managing their own ash trees.
- Responsible department/position: Public Works Department

Resources

1. General questions about EAB or project collaboration
Who: Golden Sands Resource Conservation and Development Council, Inc.
Website: <http://www.goldensandsrcd.org/our-work/land/eab-outreach>
2. Cost Sharing for Planning and Creating an Urban Forestry Program
Who: Wisconsin Department of Natural Resources (WDNR)
*See also: Local Regional Planning Commission, & Local Community Foundations
Website: <http://dnr.wi.gov/topic/UrbanForests/grants/index.html>
3. Toolkit for EAB planning step by step
Who: Wisconsin Department of Natural Resources (WDNR)
Website: <http://dnr.wi.gov/topic/urbanforests/documents/EABPlanGuidelines.pdf>
4. EAB Guide for Homeowners
Who: Wisconsin Department of Ag, Trade and Consumer Protection (DATCP)
Website: www.EmeraldAshBorer.wi.gov
5. History and information on EAB
Who: Wisconsin Department of Natural Resources (WDNR)
Website: <http://dnr.wi.gov/org/caer/ce/ee/critter/insect/emeraldashborer.htm>
6. Homeowner Guide to Emerald Ash Borer Insecticide Treatments
Who: UW-Extension
Website: Link to this resource at <http://www.goldensandsrcd.org/our-work/land/eab-outreach>
7. EAB University webinars
Who: Emerald Ash Borer Information Network
Website: <http://www.emeraldashborer.info/eabu.php>
8. International Society of Arborists
Who: Find a professional arborist

Website: <http://www.isa-arbor.com/>



Two urban ash trees stand outside of the Central Wisconsin



Children's Museum in Stevens Point, WI (left). The ash tree has opposite branching (red stars in right

photo) and compound leaves with somewhat of a gnarly figure.

Right Photo: http://treedoctor.anr.msu.edu/ash/ashtree_id.html



Ash trees have compound leaves (a leaf made up of several leaflets on the same stem), however, while comparing the different species of ash trees, there are slight contrasting characteristics and number of leaflets (5-11). Nonetheless, the emerald ash borer will attack all true ash tree species (green, white, or black).



Ash trees have a rather striped pattern to their bark, often with diamond shaped patterns appearing.

Appendix 2 - EAB Identification & Life Cycle



EAB adults hatch underneath the bark and create a D-shaped hole to emerge from in May, and then are capable of flying $\frac{1}{4}$ to $\frac{1}{2}$ mile to find more ash trees. Females will begin laying eggs within 2 weeks. Eggs take about 1-2 weeks to hatch and become larvae.

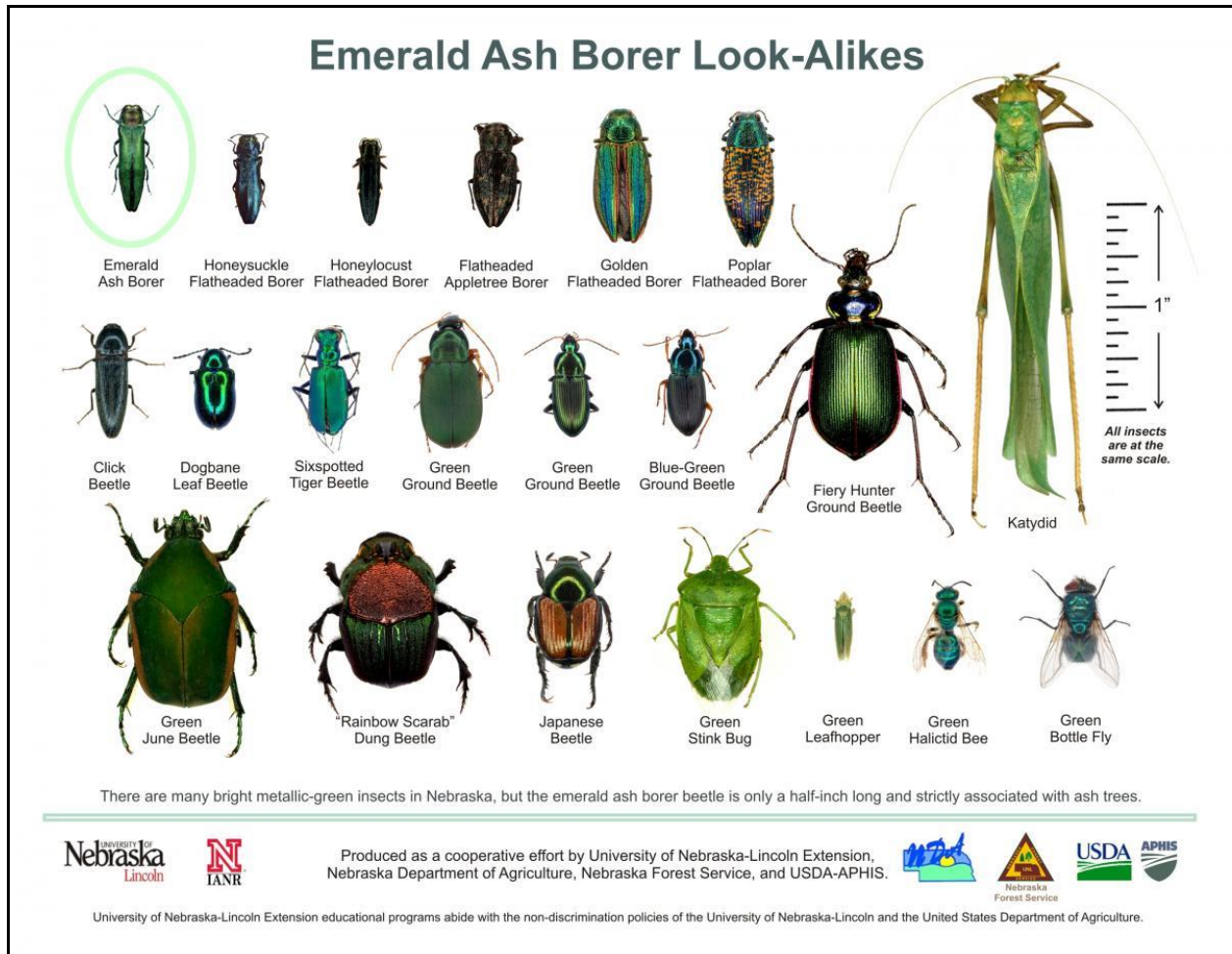


Photos:(top) www.forestryimages.org; (lower left) WDNR; (lower right) Krista Hamilton

EAB larvae and pupae live under the bark. Larvae spend the summer tunnelling under ash tree bark, leaving s-shaped trails called “galleries” under the bark before they pupate and emerge as

adults. These tunnels are what sever the vascular tissue of the tree, cutting off the flow of water up to the leaves above. Most trees die after 3 years of infestation.

Photos: WDNR



Many native beetles are green and can be mistaken for the emerald ash borer. EAB can be distinguished from other bugs by its bullet-shaped body and short antennae that wrap closely to its head. These arrow-dynamic features help the EAB adult tunnel out of the ash tree bark after it hatches from its pupal case.

Photos: Nebraska Forest Service.

Appendix 3 - EAB Monitoring Tools



A purple prism trap hanging from an ash tree is used for emerald ash borer monitoring. The trap has three sticky sides and the EAB eyes are sensitive to the purple color, which lures it in. Traps can be obtained from: <http://dnr.wi.gov/topic/urbanforests/documents/eabtoolbox/eab-synergytrapsandlures.pdf>.

Photo: www.maine.gov

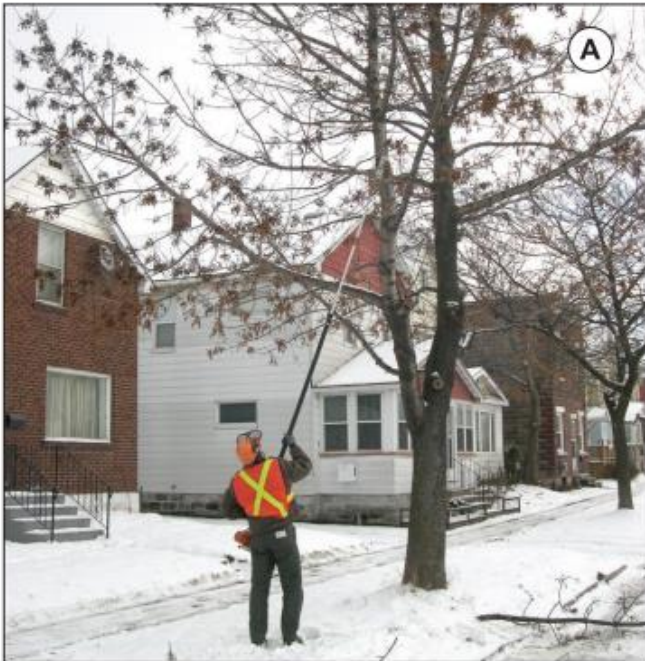


Fig. 3. Cutting (a), measuring and trimming (b) ash branches. Branches, cut to a length of 75 cm, are placed in a vise and bark is whittled off the basal 50 cm (c) (1.5 m piece shown here). Whittling removes bark in thin 1-2 mm strips (d).

Branch sampling can be performed at any time between September and May; however, because larvae continue to feed and grow in size in early fall, their galleries are easiest to see if branches are sampled after October. Cut a branch from mid-canopy, removing a 2-3" diameter limb section that is as close to the trunk as possible, for your best chance at catching EAB early.

Complete methods can be found on this website:
<http://cfs.nrcan.gc.ca/pubwarehouse/pdfs/32127.pdf>

Photo: <http://cfs.nrcan.gc.ca/pubwarehouse/pdfs/32127.pdf>

Appendix 4 - EAB Symptoms



One of the first symptoms of EAB infestations is called chlorosis, where there is yellowing of the leaves while the veins in the leaves stay green. However, chlorosis may be caused by a number of infestations and diseases, so looking for other symptoms will help determine if the chlorosis is related to EAB.

Photo: <http://utahpests.usu.edu>



EAB infested ash trees are commonly targeted by woodpeckers, leaving tell-tale signs of an infestation. In winter, the bark chips left behind may be readily apparent littering the snow. This photo shows the heavily-pecked ash tree, which is commonly called “blonding”.

Photo: WDNR



As emerald ash borers exit ash trees they leave an infamous D-shaped hole. By the time D-shaped holes are found at eye level, the tree has already been infested for awhile and the tree is likely dead.

Photo: WDNR



Once you have documented the symptoms listed on the previous pages, peel back some bark to see if there are S-shaped tunnels (“galleries”) and EAB larvae or pupae.

Photo: WDNR



Vertical splits in the bark (2-5 inches long) may be an indicator of EAB larval tunnelling “galleries” below the bark, as seen in the above photo. Splits may have other causes, so look for additional symptoms, such as larval tunnelling “galleries” below the bark.

Photo: <http://www.nyis.info/images/5016053.jpg>

If you have identified 3 signs or symptoms of EAB, whether the bug itself or symptoms on an ash tree, contact Wisconsin Department of Ag, Trade, and Consumer Protection (DATCP):

www.DATCPEmeraldAshBorer@wi.gov

1-800-462-2803